FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary, Conclusions and Recommendations for Bridgewater Township Municipal Authority

1. Subsequent to completion of the Facility Plan, the U.S. Environmental Protection Agency (EPA) issued Program Requirements Memorandum (PRM) 78-9, Funding of Sewage Collection System Projects. This PRM required a more detailed analysis of those areas proposed for sewers. The analysis included a determination of substantial human habitation; a review of pollution problems; a review of existing soils and flood hazard conditions; sampling of South Branch of East Branch of Wyalusing Creek; and a determination of population density. The results of this analysis are as follows:

   a. The Lake Montrose area does not meet the substantial human habitation requirement and there is no specific evidence of a need for new or additional facilities in the remaining areas. Therefore, no sewers are recommended for this area. Any future repairs or replacements to existing on-lot systems should be administered by the Sewage Enforcement Officer. Also, since the land that could be developed is generally not suitable for subsurface disposal, the Bridgewater Township Supervisors and Authority should adopt rules, regulations and ordinances to define developer responsibilities with regard to sewage collection and disposal, particularly sewers, to ensure the safety of the lake's water quality.

   b. The Meshoppen Creek Road area does not meet the substantial human habitation requirement and there is no evidence of a need for new or additional facilties. Therefore, no sewers are recommended for this area. Any future repairs or replacements to existing on-lot systems or requests for new systems should be administered by the Sewage Enforcement Officer.

   c. The South Montrose area should be further considered for sewerage facilities assistance under the EPA Construction Grants program. The area meets the substantial human habitation requirement and has a demonstrated problem with malfunctioning subsurface disposal systems, contaminated wells and stream contamination. Due to poor soils, steep slopes, and flood hazards, much of the existing area to be served is unsuitable for individual subsurface disposal systems, including alternate systems. Also, many of the homes in the areas where alternate systems may be acceptable are on rather small lots and it may be difficult to install alternate systems should these be required. As the population density of the area exceeds 10 people per acre, a comparison between a conventional sewer system and possible alternate systems is not required. A sewer system as

conceptually developed in the Facility Plan should be the means of providing sewerage service in South Montrose. Sewage treatment alternatives were re-evaluated and are discussed in the following paragraph.

2. Two sewage treatment alternatives were re-evaluated for the proposed South Montrose sewage treatment plant. These were the package plant for two stage nitrification recommended in the Facility Plan and an aerated lagoon. An economic analysis based on present worth showed that these are essentially equal from an economic standpoint. The possibility exists that the lagoon system could be constructed without a liner in the lagoon and without an emergency generator; in this case the lagoon system would be less costly. However, this is a design function and depends on a substantial amount of field data and regulatory coordination to determine if these two items can be deleted. The major disadvantage to the lagoon system is its ability to meet the Pennsylvania Department of Environmental Resources (DER) effluent ammonia requirement. To do this will require superchlorination to reduce the ammonia followed by dechlorination to reduce the chlorine in the effluent. This can become a complex operation for a small plant. For these reasons, the package two stage nitrification plant is recommended at this time.

3. A breakdown of estimated costs to construct and operate the South Montrose sewerage system is as follows:

   a. Estimated Total Capital Costs

      Estimated total capital costs include construction, engineering, legal, financial and administrative costs of the project. The total, Federal and local shares, based on eligibility under the EPA Construction Grants Program are estimated as follows (a detailed breakdown is shown in Tables A-4, A-7, A-8 and A-9 of the Amendment):

	EPA Eligible Costs	Ineligible Costs	Total
Federal Share	$637,725	-	$637,725
Local Share	$212,575	$144,550	$357,125
Totals	$850,300	$144,550	$994,850

   b. It is anticipated that the local share of capital costs will be financed by means of revenue bonds or a loan from the U.S. Farmers Home Administration (FmHA). Other sources of Federal and State funds are also available, but for this Amendment only revenue bonds and an FmHA loan have been considered.

      It is anticipated that a one-time connection fee of approximately $500 will be charged. Front foot assessments may also be charged, but no consideration has been given to this at this time. If there

is FmHA assistance there will probably be no front foot assessments as this method of financing is usually not associated with FmHA projects.

The estimated annual debt service charge for the local share of capital cost of the proposed facilities is $29,500 with revenue bonds and $23,500 with an FmHA loan.

(Revenue bonds at 7% for 40 years with 10% coverage. FmHA loan at 5% for 40 years with 10% coverage for the first ten years.)

c. The estimated annual operation and maintenance cost of the proposed facilities is $22,000. It is anticipated that an annual subsidy of $2,000 would be received under Pennsylvania Act 339 which provides subsidies to municipal wastewater treatment facilities. (Note: Act 339 subsidies are currently funded from Federal Revenue Sharing Funds.)

d. The following table shows a breakdown of the estimated total monthly costs for a typcial residential customer served by the proposed South Montrose system. This breakdown assumes a revenue bond issue to finance the system.

Estimated monthly operation and maintenance charge (includes Act 339 subsidy)	$14.10
Estimated monthly debt service charge	$ 9.60
Total estimated monthly charge	$23.70

Should an FmHA loan be secured, this total estimated monthly charge would decrease to approximately $20.85. If other financial aid is successfully obtained this monthly charge would decrease still further.

4. It is recommended that the Bridgewater Township Municipal Authority proceed with the proposed facilities in accordance with the Schedule established in Chapter 5.0 of the Amendment.

Summary, Conclusions and Recommendations for Montrose Municipal Authority

1. Since the completion of the Montrose-Bridgewater Facility Plan the Pennsylvania Department of Environmental Resources (DER) has decided to consider the Montrose sewage collection system as a combined system. As a result the storm water handling facilities proposed in the Facility Plan were deleted and the revised plant capacity was estimated to be 450,000 gallons per day (gpd).

2. Because of these revisions, an economic analysis of all of the original alternatives, with the addition of land application, was carried out to verify the original selection of rotating biological contactors (RBC) to

meet the effluent standards established by DER. The economic analysis verified the RBC's as the most cost-effective process for the Montrose sewage treatment plant.

3. In addition to the plant improvements recommended in the Facility Plan, it is recommended that the manual grit removal system be replaced with an automatic aerated grit removal system; the aeration-settling tanks be refurbished and the sludge drying bed media be replaced. Also, considering current sludge disposal regulations and technology improvements, it is recommended that the sludge applicator truck be replaced with a belt filter press. Only one aerobic digester will be required instead of two as originally proposed.

4. A breakdown of costs to improve and upgrade the Montrose sewage treatment plant is as follows. (This includes costs to rehabilitate portions of the sewer system as reported in the Sewer System Evaluation Survey.)

   a. Estimated Total Capital Costs

      Estimated total capital costs include construction, engineering, legal, financial and administrative costs of the project. The total Federal and local shares; based on eligibility under the U.S. Environmental Protection Agency (EPA) Construction Grants Program are estimated as follows (a detailed breakdown is shown in Table A-15 through A-18 of the Amendment):

	EPA Eligible Costs	Ineligible Costs	Total
Federal Share	$1,222,100	-	$1,222,100
Local Share	$ 407,400	$110,000	$ 517,400
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      (Revenue bonds at 7% for 40 years with 10% coverage. FmHA loan at 5% for 40 years with 10% coverage for first ten years.)

   c. The estimated annual operation and maintenance costs of the proposed facilities is $34,000. The 1980 budget for operation and maintnenace for the present plant is $61,300. The Montrose

Municipal Authority currently receives an annual subsidy of $3,900 under Pennsylvania Act 339 which provides subsidies to municipal wastewater treatment facilities. It is anticipated an additional $8,200 in Act 339 subsidies would be provided for the new facilities. (Note: Act 339 subsidies are currently funded from Federal Revenue Sharing Funds.)

d. The following table shows a breakdown of the estimated total monthly costs for a typical residential customer served by the Montrose Plant. This breakdown assumes a revenue bond issue to finance the project.

Estimated monthly operation and maintenance charge for existing facilities based on 1980 budget*	$ 2.40	
Present monthly debt service	$ 6.00	
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Subtotal, proposed facilities		$ 7.10
Total estimated monthly charge		$15.50

*Includes Act 339 subsidy

Should an FmHA loan be secured, this total estimated monthly charge would decrease to approximately $14.60. If other financial aid is successfully obtained, the monthly charge would decrease still further.

5. It is recommended that the Montrose Municipal Authority proceed with the proposed facilities in accordance with the schedule established in Chapter 5.0 of the Amendment.

DRAFT
FACILITY PLAN AMENDMENT

MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY
SUSQUEHANNA COUNTY, PENNSYLVANIA

JULY 1980
GAI REPORT NO. 2193

FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

Table of Contents

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*Includes Act 339 subsidy

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FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

1.0 INTRODUCTION

The Facility Plan for the Borough of Montrose and the area of Bridgewater Township in the vicinity of Montrose Borough was completed in 1977. Since the completion of the Facility Plan and its acceptance by the Montrose Municipal Authority and the Bridgewater Township Municipal Authority two events have occurred which resulted in this Amendment to the Facility Plan. The first event was the issuance of Program Requirements Memorandum (PRM) 78-9, Funding of Sewage Collection System Projects, by the U.S. Environmental Protection Agency (EPA) on March 3, 1978. This PRM required a more detailed analysis of those areas proposed for sewers by the Facility Plan. Since Montrose was already sewered, these areas were limited to the village of South Montrose (in Bridgewater Township) and certain areas of Bridgewater Township contiguous to Montrose.

The second factor was a decision by the Pennsylvania Department of Environmental Resources (DER) to consider the Montrose collection system as a combined system (i.e., combined in that both stormwater and sanitary sewage flow in the same pipe system). This decision has a significant impact upon the quantity of wastewater to be treated at the Montrose sewage treatment plant, resulting in changes to the proposed facilities and the capacity of the plant.

These are primarily the two items evaluated in this Amendment. However, also included is an Addendum to the original Facility Plan which basically addresses questions that DER and EPA raised concerning the original Facility Plan. Those questions directly related to the two events mentioned above are addressed in the Amendment.

Among the first activities in preparing the Amendment were requests for letters of intent from possible residental and commercial developers and interviews with local officials involved with planning and public health in the area. Letters were mailed to various persons or organizations who were reported to be considering different types of development in the area, but no responses were received. The 100 unit elderly housing complex identified in the Facility Plan has been built as an 80 unit facility in Montrose. A public housing development has been proposed, but this is currently in litigation. The commercial expansion identified in the Facility Plan does not appear to be active at this time.

Interviews were held with the Regional Sanitarian for DER, Bridgewater Township officials and Sewage Enforcement Officer, and representatives of the Susquehanna County Planning Commission, the Farmers Home Administration, and the U.S. Soil Conservation Service to obtain data for this Amendment.

The results of the PRM 78-9 analysis and classification of the Montrose collection system as "combined", along with the information obtained from the various sources mentioned above, are detailed in the following report.

2.0 PRM 78-9 ANALYSIS (FUNDING OF SEWAGE COLLECTION SYSTEM PROJECTS)

Although EPA's Program Guidance Memorandum (PRM) 78-9, Funding of Sewage Collection System Projects, was issued on March 3, 1978, approximately one year after the original Facility Plan was completed, it was necessary to incorporate the actions required by this PRM into an Amendment to the Facility Plan for the Bridgewater Township areas as these are currently not sewered, while Montrose is sewered and therefore not subject to these provisions.

PRM 78-9 sets forth a rather rigorous evaluation procedure to determine if there is a need for wastewater management in an area, to determine if there is a cost-effective alternative to sewers for areas proposed for potential sewers and to determine if either the alternative or the sewers are eligible for EPA funding.

The evaluation required by PRM 78-9 included the following activities:

a. A determination of substantial human habitation.

b. A review of malfunctions of existing on-lot (subsurface disposal) systems and incidents of contaminated wells predicated on existing records.

c. A review of existing soils and flood hazard conditions within the areas proposed for sewers.

d. A visual stream survey of South Branch of East Branch Wyalusing Creek with water quality analyses for fecal coliform.

e. Population density.

Each activity is discussed in the following sections.

Substantial Human Population

New collector sewer projects are eligible for EPA funding only in a community substantially in existence on October 18, 1972. To implement this, EPA policy is such that areas to be served by new collector sewer projects must meet the requirement for "substantial human habitation." This has been defined such that the bulk (generally two-thirds) of the flow design capacity through a sewer system is to be for wastewaters originating from habitation existing on or before October 18, 1972.

Collector pipes designed primarily to serve the equivalent of a city block or five acre areas without substantial human habitation as of October 18, 1972, would not be eligible for grant assistance.

On this basis the following areas would probably qualify for additional consideration for grant assistance.

1. Unsewered areas north and west of Lake Montrose.

2. All of South Montrose except the Mountain View Estates development in the southeast corner of the village. All but four homes in the rest of the village were built prior to October 18, 1972 and no future development of any significant size is expected in this area.

The following areas would probably not qualify for grant assistance on this basis.

1. Area just east of Lake Montrose. Potential for future development along any sewer lines in this area is significant.

2. Meshoppen Creek Road. Only 13 homes existed at the time of the study and, although almost all these homes were built before October 18, 1972 many more could be added if a sewer were built such that less than two thirds of any flow would come from the existing homes.

3. Mountain View Estates in South Montrose. Most of the homes here were built after October 18, 1972 and there is potential for more development.

Review of Existing Conditions

The review of existing sewage disposal conditions has involved interviews with personnel of DER's Bureau of Community Environmental Control and review of their files; interviews with the Bridgewater Township Sewage Enforcement Officer (SEO); meetings with the Bridgewater Township Municipal Authority members and Bridgewater Township Supervisors; field visits for this purpose and a limited bacteriological sampling program. The results of the review of existing conditions are as follows:

a. Lake Montrose Area

There appears to be no record of problems in the areas along Lake Drive and Pa. Route 29 north of Lake Montrose. There have been references to numerous past complaints about the area east of Lake Montrose (see Facility Plan, p. 10-2; DER letter 7/16/79 and GAI letter 7/2/79) and documented complaints reportedly had been received by DER concerning this area prior to 1975. However, there are no recent (since 1976) complaints on file with DER or Bridgewater Township concerning malfunctioning on-lot systems in this area. The Bridgewater Township SEO reported that in recent years there have been two on-lot repairs in this area as well as four failed percolation tests on properties within or near this area.

b. Meshoppen Creek Road

DER has no known complaints of malfunctioning on-lot systems in this area nor have there been any general comments about problems here. The SEO reported one failed percolation test on a preperty along this road.

c. South Montrose

South Montrose has a history of malfunctioning on-lot systems and complaints about problems associated with malfunctioning on-lot systems such as pollution of wells and surface water contamination.

The July 16, 1979 letter from DER described malfunctioning on-lot systems and contaminated wells reported to their Regional Sanitarian. The SEO reported that there have been five repairs and five failed percolation tests in the South Montrose area. In addition, a surface water sampling program was conducted within South Montrose to determine the extent of contamination in the area.

Table A-1 presents a tabulation of the malfunctioning on lot systems and contaminated well locations documented by DER; and, the results of a sampling survey by Bridgewater Township. (The results of the stream survey, discussed later, are presented here also).

As can be seen from the Table, contamination from failing systems or poor soil/geologic conditions is prevalent.

Soil and Flood Hazards Conditions

As part of the PRM 78-9 evaluation, soil conditions and flood hazards were investigated for their possible impact on subsurface sewage disposal systems. Portions of U.S. Soil Conservation Service (SCS) soil maps are reproduced as Figures A-4, A-5, and A-6 for the Lake Montrose, Meshoppen Creek Road and South Montrose areas. With each of these figures is a tabulation of the soil types encountered and their relative suitability for subsurface disposal as defined by both SCS and DER. A description of the DER classification is found in Table A-2. This information was utilized in preparing composite overlays for Figures A-1, A-2 and A-3 for the three areas to show the general type of subsurface systems that might be acceptable in an area or whether subsurface systems are even acceptable. The three general categories are:

a. Conventional subsurface systems may be acceptable

b. Alternate subsurface systems permissible

c. Alternate subsurface systems not acceptable

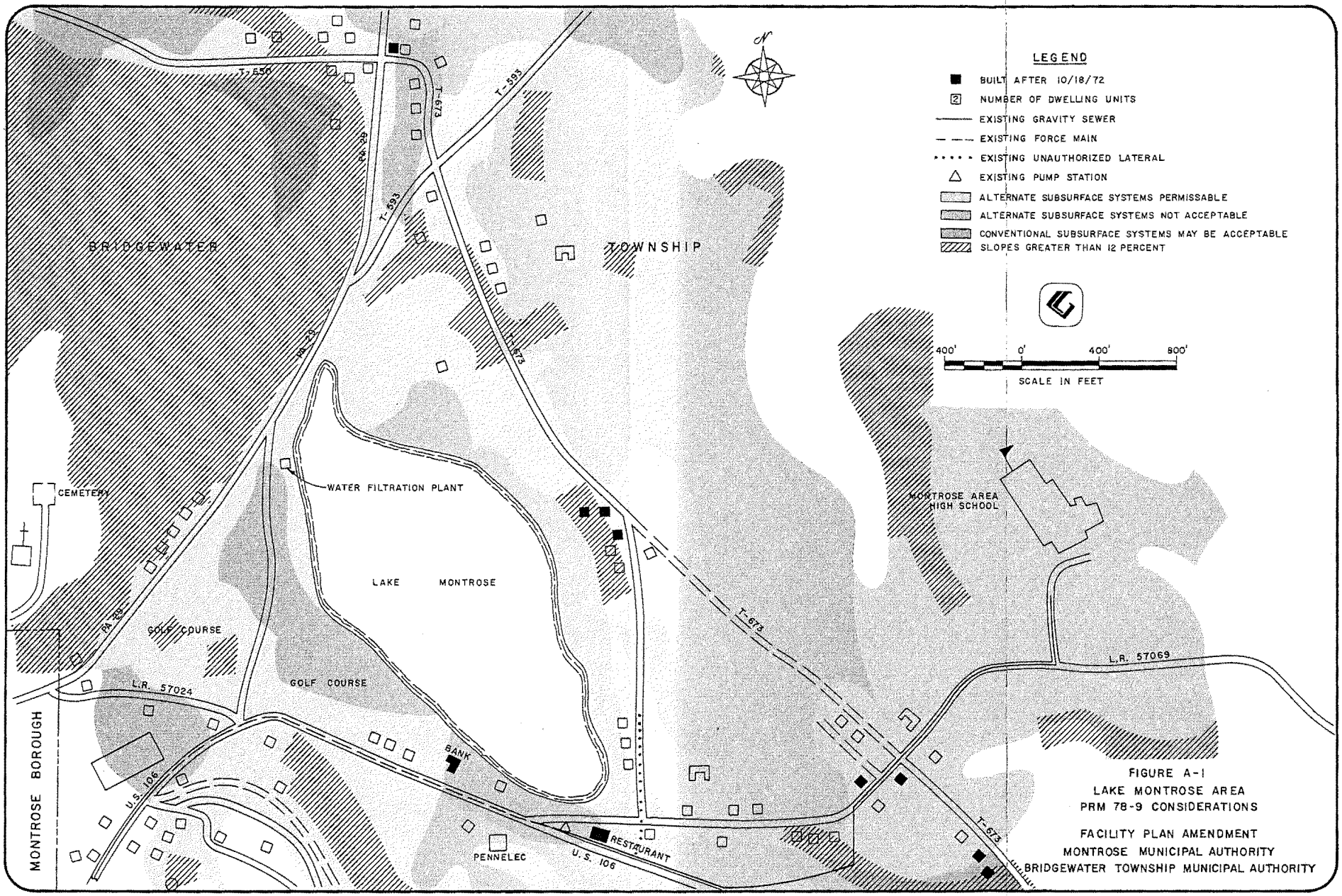
TABLE A-1

LOCATION OF MAL-FUNCTIONING ON-LOT SYSTEMS,
CONTAMINATED WELLS, AND SAMPLING POINTS
IN SOUTH MONTROSE

LOCATION NO. (See Figure A-3)		COMMENT
1.	Near Feed Mill	Field Sample, contaminated; not fecal coliform
2.	Drainage ditch near Warner home	Field Sample; highly contaminated with fecal coliform; odor; drainage also coming from east side of Pa. 29.
3.	Near R. Tanner Sr. home	Field Sample; highly contaminated with fecal coliform.
4.	Creek sample near Montdale Feed Mill	Field Sample; highly contaminated with fecal coliform.
5.	Near Apartment House	Field Sample; highly contaminated with fecal coliform.
6.	Creek below Janner, Inc.	Field Sample; highly contaminated with fecal coliform.
7.	Creek above Janner, Inc.	Field Sample; highly contaminated with fecal coliform.
8.	Near Fair House	Field Sample; highly contaminated with fecal coliform.
9.	Brown's Mobile Home Park	Contaminated water sample(1) Malfunctioning sewage system
10.	Brown's Mobile Home Park	Malfunctioning sewage system.
11.	Bowie's Restaurant	Contaminated water samples(1)

Note: Five repairs and five failed percolation tests reported by SEO not included in Table.

(1) Subsequently corrected


LEGEND
BUILT AFTER 10/18/72
NUMBER OF DWELLING UNITS
EXISTING GRAVITY SEWER
EXISTING FORCE MAIN
EXISTING UNAUTHORIZED LATERAL
EXISTING PUMP STATION
ALTERNATE SUBSURFACE SYSTEMS PERMISSABLE
ALTERNATE SUBSURFACE SYSTEMS NOT ACCEPTABLE
CONVENTIONAL SUBSURFACE SYSTEMS MAY BE ACCEPTABLE
SLOPES GREATER THAN 12 PERCENT
400' 0' 400' 800'
SCALE IN FEET
BRIDGEWATER TOWNSHIP
MONTROSE BOROUGH
T-650
T-673
T-593
PA 29
WATER FILTRATION PLANT
CEMETERY
LAKE MONTROSE
GOLF COURSE
GOLF COURSE
MONTROSE AREA HIGH SCHOOL
L.R. 57024
L.R. 57069
U.S. 106
BANK
RESTAURANT
PENNELEC
FIGURE A-1
LAKE MONTROSE AREA
PRM 78-9 CONSIDERATIONS
FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

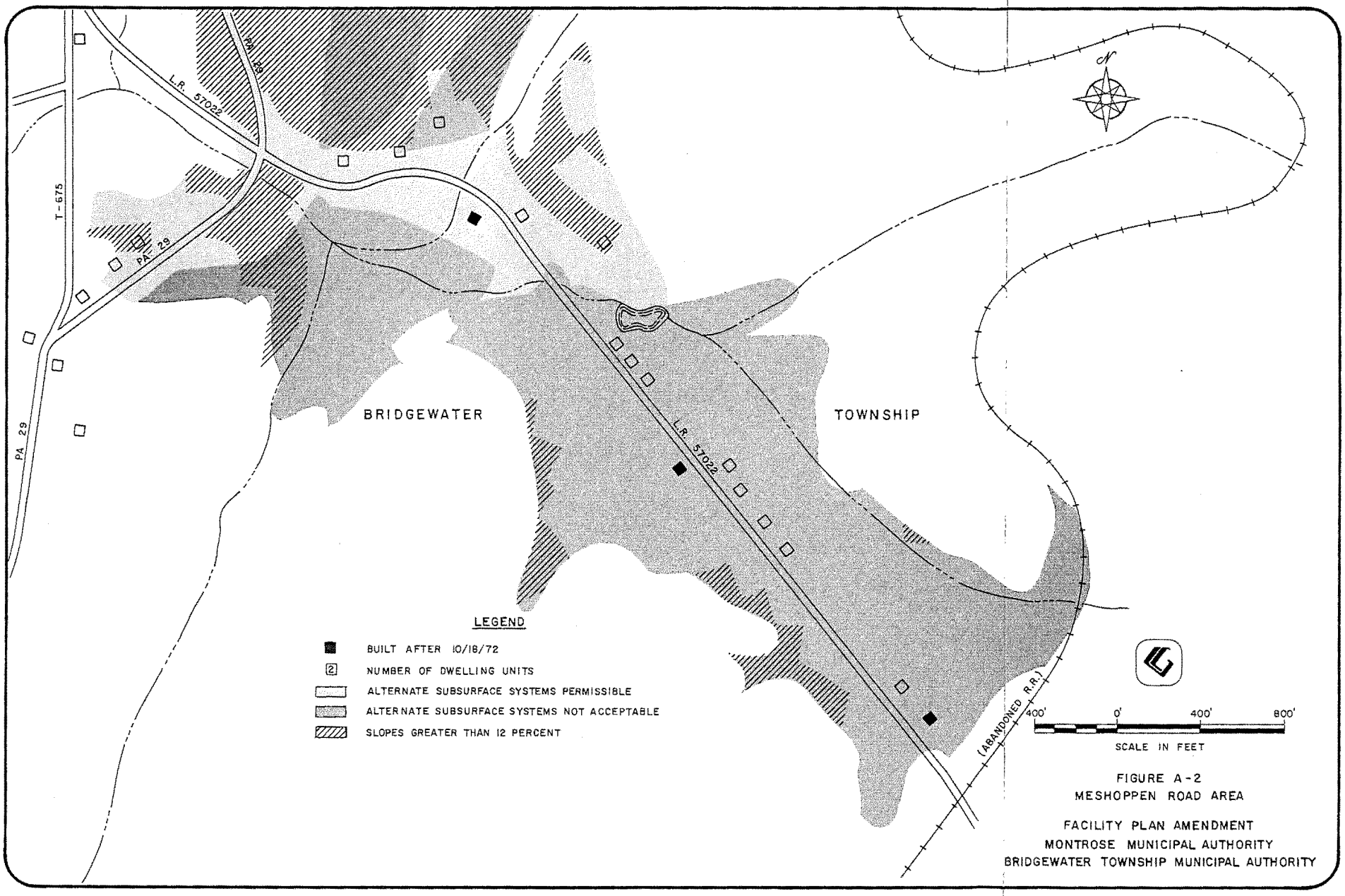


FIGURE A-2
MESHOPPEN ROAD AREA

FACILITY PLAN AMENDMENT
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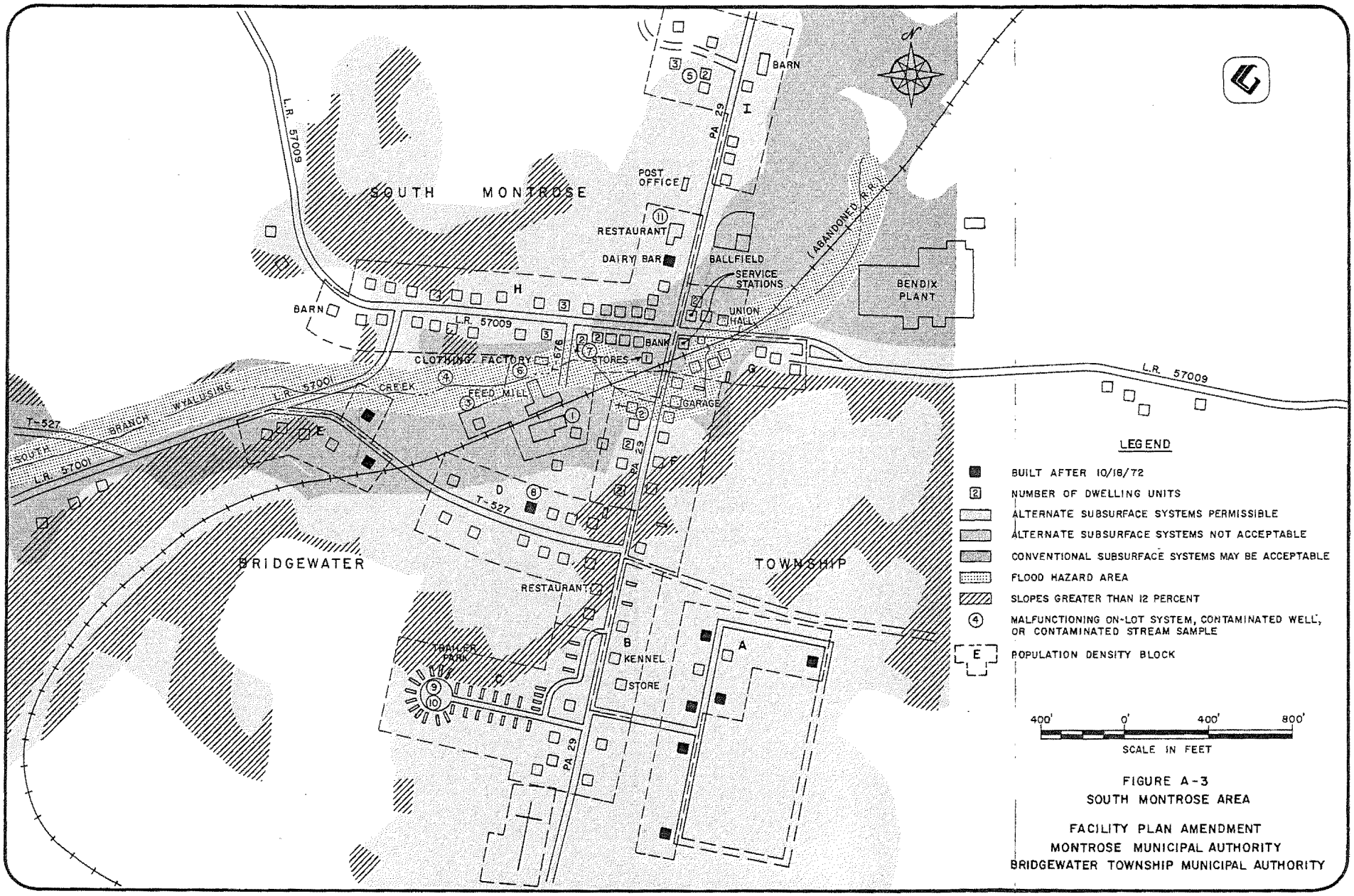


FIGURE A-3
SOUTH MONTROSE AREA

FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

SOIL CLASSIFICATIONS
LAKE MONTROSE AREA

SCS Classification	Limitations for Subsurface Disposal	DER Classification
Cut and Fill Cu	On site investigation	8
Chenango CnB2	slight (rapid permeability)	1
Lackawanna LaB2	severe (low permeability)	8
Lackawanna LaC2	severe (low permeability)	8
Lordstown LkC2	severe (shallow bedrock)	5
Lordstown LkD2	severe (shallow bedrock)	5
Lackawanna L_gD	severe (slop; low permeability)	8
Lordstorm LsD	severe (shallow bedrock; slope)	5
Morris MoB2	severe (HWT; low permeability)	15
Morris MoC2	severe (HWT; low permeability)	15
Mardin McB2	severe (low permeability)	14
Mardin M_gB	severe (low permeability)	14
Norwich NcB	severe (HWT; low permeability)	15
Wellsboro WeB2	severe (low permeability)	14
Wellsboro WeC2	severe (low permeability)	14
Volusia VcB2	severe (HWT; low permeability)	15
Volusia VsD	severe (slope; HWT; low permeability)	15
Wellsboro WiD2	severe (slope; low permeability)	14
Lordstown LoC2	severe (shallow rock)	5
Lordstown LsF	severe (shallow rock; slope)	5

HWT = high water table

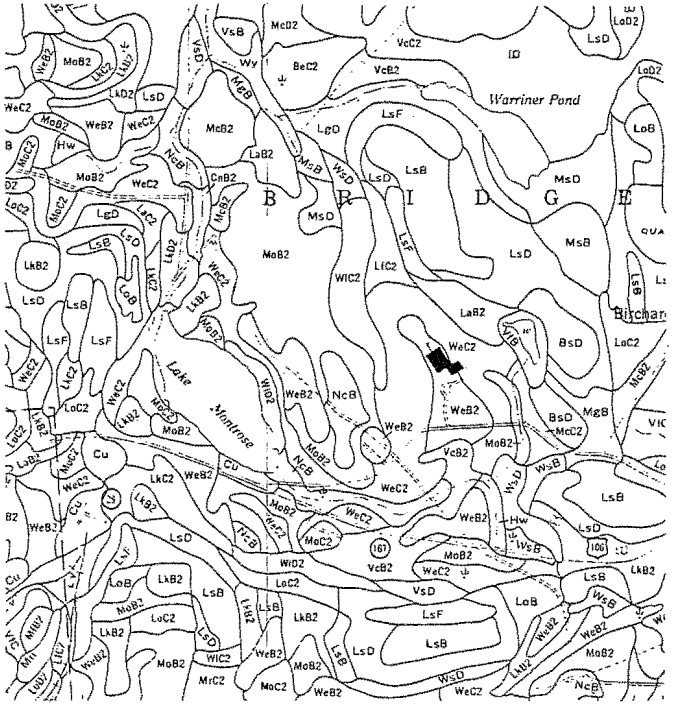


FIGURE A-4
LAKE MONTROSE AREA
U.S.S.C.S. SOIL MAP

FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

SOIL CLASSIFICATIONS
MESHOPPEN ROAD AREA

SCS Classification	Limitations for Subsurface Dispoasl	DER Classification*
Vousia VcB2	severe (HWT; low permeability)	15
Volusia VcC2	severe (HWT; low permeability)	15
Morris MsB	severe (HWT; low permeability)	15
Morris MoB2	severe (HWT; low permeability)	15
Mixed Alliwium Mn	severe (Flooding)	13
Wellsboro WlC2	severe (low permeability)	14
Wellsboro WeC2	severe (low permeability)	14
Morris MoC2	severe (HWT, low permeability)	15
Chenango CnB2	slight	1
Holly Hw	severe (Flooding)	13
Wellsboro WsD	severe (slope; low permeability)	14

*See Table S-2 for definition of these classification

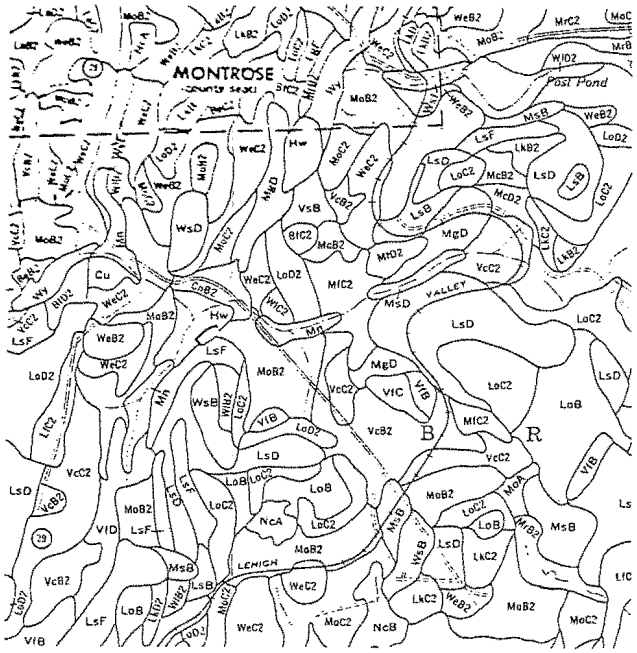


FIGURE A-5
MESHOPPEN ROAD AREA
U.S.S.C.S. SOIL MAP

FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

SOIL CLASSIFICATIONS
SOUTH MONTROSE AREA

SCS Classification	Limitations for Subsurface Disposal	DER Classification*
Cut and Fill Cu	On site investigation	8
Bath BeB2	Severe (low permeability)	10
Bath BfB2	Severe (low permeability)	10
Bath BfC2	Severe (low permeability)	10
Lordstown LkB2	Severe (shallow bedrock)	5
Lordstown LkC2	Severe (shallow bedrock)	5
Lordstown LaC2	Severe (low permeability)	8
Lordstown LsD	Severe (shallow bedrock; slope)	5
Mardin McB2	Severe (low permeability)	14
Mardin McC2	Severe (low permeability)	14
Mardin M_gD	Severe (slop; low permeability)	14
Mixed alluvial	Severe (flooding)	13
Morris MoB2	Severe (HWT; low permeability)	15
Morris MoA	Severe (HWT; low permeability)	15
Norwich NsB	Severe (HWT; low permeability)	15
Volusia VcB2	Severe (HWT; low permeability)	15
Volusia VsB	Severe (HWT; low permeability)	15
Wellsboro WeB2	Severe (low permeability)	14

*See Table S-2 for definition of these classifications

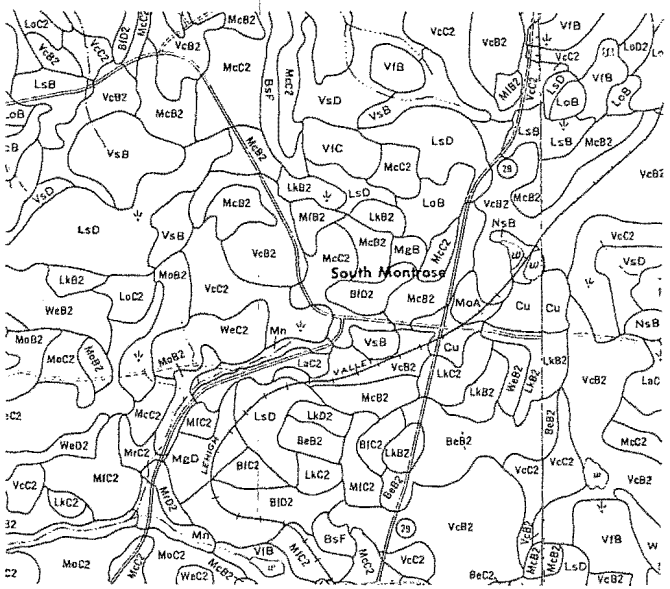


FIGURE A-6
SOUTH MONTROSE AREA
U.S.S.C.S. SOIL MAP

FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE A-2
DESCRIPTION OF DER CLASSIFICATIONS

1= Soils with very rapid percolation with hazard from insufficient filtration and renovation of effluent.

5= Moderately deep, well drained soils with probable percolation rates of one inch of water in 15-30 minutes.

8= Deep, well drained soils with probable percolation rates of one inch of water in 45-60 minutes.

10= Well drained soils with probable percolation rates slower than one inch of water in 60 minutes.

13= Soil series that occur in flood plains and have a high flooding hazard. Not suitable for subsurface disposal systems.

14= Moderately well drained soils on upland sites. These soils have seasonal high water tables which are the major limitation on use for subsurface disposal systems.

15= Somewhat poorly, poorly, and very poorly drained soils on upland sites. These soils have high water tables and are unsuitable for subsurface disposal systems.

The soil suitability in the three areas is discussed in the following sections. Flood hazard is a consideration in the South Montrose area and is discussed in that section.

a. Lake Montrose

As can be seen in Figure A-1, there is very little soil suitable for subsurface systems and much of this either is already developed or is unsuitable because of slope restrictions. There is some soil suitable for alternate subsurface systems, but this is generally scattered. Much of this soil also is on slopes too steep for the applicable systems or comprises land already developed. The most available land for construction, to the east of Lake Montrose, is in an area of soils characterized as being unsuitable for subsurface systems. This is the same land area previously identified as not being able to meet the substantial human habitation requirement for grant eligibility.

b. Meshoppen Creek Road

Approximately two-thirds of this area is characterized by soils unsuitable for subsurface systems. Much of the remaining area is characterized by soils in which alternate subsurface systems are possible, but in which the slopes may be too steep to permit construction of the alternate systems applicable to these types of soils.

c. South Montrose

There are locations in South Montrose, particularly in the center of South Montrose and to the east and west where the soil may be suitable for conventional subsurface systems. However, the land to the east is occupied by the Bendix facility. Much of the area in the center and to the west lies within the flood hazard boundary area, as identified by the U.S. Department of Housing and Urban Development, and, as a result, is unsuitable for conventional subsurface systems.

Much of the remainder of South Montrose lies in areas where either the soil is unsuitable for any type of subsurface system, or where the slopes are too steep for the alternative systems that could be used with the soil types present. The remaining areas of South Montrose are in soils which may permit alternate subsurface systems. These soils are generally characterized by SCS as having low permeability and severe conditions for subsurface disposal and by DER as being moderately well drained but with a seasonal high water table which is the major limitation on the use of a subsurface disposal system. Also, many of the existing homes in this remaining area are on rather small lots and it could be difficult to install an alternate system if this should be required.

Stream Survey

Concurrent with the sampling program of suspected on-lot system failures mentioned under Review of Existing Conditions, some water analyses of the small creek flowing through the Village (a tributary of the East Branch of Wyalusing Creek) were made. As shown on Table A-1, both samples showed a high degree of fecal coliform contamination. Frequently, local citizens complain that the odor of sewage emanating from the creek is very apparent.

Population Density

In accordance with PRM 78-9, population densities were calculated for the three areas of Bridgewater Township on a block by block basis with no block exceeding 15 acres. As a result of these calculations it was found that none of the blocks for the Lake Montrose area exceeded approximately six persons per acre, and for the Meshoppen Creek Road area, none exceeded approximately three persons per acre. No further work was done with these two areas for the reasons described in the following section. In the South Montrose area population densities ranged from 5 persons per acre to 19.7 persons per acre. Table A-3 shows the breakdown of population densities for South Montrose; refer to Figure A-3 for the location of the population tracts.

TABLE A-3
POPULATION DENSITY
SOUTH MONTROSE AREA

POPULATION TRACT	ACRES	POPULATION	DENSITY (persons/acre)
A	4.65	23	5
B	1.38	17	12.3
C	6.55	129	19.7
D	4.13	41	10
E	1.15	14	12.2
F	2.75	41	14.9
G	2.06	38	18.4
H	9.41	116	12.3
I	2.52	28	11.1

Conclusions Regarding PRM 78-9

1. The Lake Montrose area, except for the area already served by the High School interceptor, is excluded from further consideration in the Facility Plan on the basis that either a large portion of the area does not meet the substantial human habitation requirement or that there is no specific evidence of

a need for new or additional facilities in the remaining areas. Any future repairs or replacements to existing on-lot systems should be administered by the SEO. Also, since the land that could be developed is generally not suitable for subsurface disposal, the Bridgewater Township Supervisors and Authority should adopt rules, regulations and ordinances to define developer responsibilities with regard to sewage collection and disposal, particularly sewers, to ensure the safety of the lake's water quality.

2. The Meshoppen Creek Road area is excluded from further consideration on the basis that it does not meet the substantial human habitation requirement and there is no evidence of a need for new or additional facilities. Any future repairs or replacements to existing on-lot systems or requests for new systems should be administered by the SEO.

3. The South Montrose area should be further considered for sewerage facilities assistance under the EPA Construction Grants program. The area meets the substantial human habitation requirement and has a demonstrated problem with malfunctioning subsurface disposal systems, contaminated wells and stream contamination. Due to poor soils, steep slopes, and flood hazards, much of the existing area to be served is unsuitable for individual subsurface disposal systems, including alternate systems. Also, many of the homes in the areas where alternate systems may be acceptable are on rather small lots and it may be difficult to install alternate systems should these be required. As the population density of the area exceeds 10 people per acre, a comparison between a conventional sewer system and possible alternate systems is not required. A sewer system as conceptually developed in the Facility Plan should be the means of providing sewerage service in South Montrose. An update of sewerage facilities in South Montrose is provided in the following chapter.

3.0 SOUTH MONTROSE SEWERAGE SYSTEM

Based on the results of the PRM 78-9 work, discussed in Chapter 2.0, a conventional sewage collection system and sewage treatment plant remain the recommended alternative for the South Montrose area. The sewage collection system would remain as proposed in the Facility Plan, see Figure 8.3. The sewers in the Mountain View Estates area would not be eligible for Federal assistance, but they should be included in the sewer system as this area is an integral component of South Montrose.

The rationale for sizing the South Montrose sewage treatment plant is based on population and the DER Sewerage Manual, which states that for new sewer systems the design average daily per capita flow of sewage shall be not less than 100 gallons per day, including infiltration. For the Facility Plan it was estimated that there were 500 persons in South Montrose. Based on more recent data, there are approximately 174 equivalent dwelling units (EDU's) and an average density of 3.39 persons per household in Bridgewater Township, and it is estimated that the population of South Montrose is 590 people. At the time the Facility Plan was prepared there appeared to be a trend of significant growth in the Township and an estimate of 888 people was arrived at for the South Montrose area for the year 2002. Since that time DER, through the Comprehensive Water Quality Management Plans, has determined that the Bridgewater Township population will remain stable from 1980 through 2002. Even with a stable population, it is assumed that South Montrose will realize some development; however, it will probably not be as great as was anticipated based on the earlier trends. Therefore, for planning purposes, it is assumed that 700 people may be served by the proposed sewage treatment plant at South Montrose. This assumption is tempered by the rate of development in South Montrose for the past several years and the overall stable population forecast for the Township. With this revised population estimate, the plant capacity would be 70,000 gallons per day.

Sewage Treatment

During the course of preparing the Facility Plan Amendment, it was requested that the aerated lagoon alternative, without spray irrigation, for a treatment plant at South Montrose be re-assessed.

This re-assessment is made in conjunction with an update of the package two-stage activated sludge plant proposed in the Facility Plan. The aerated lagoon system was evaluated with input from both Bridgewater Township's engineer concerning the nearby Quaker Lake system and Gilbert's design for another lagoon using the same aeration system as Quaker Lake.

A present worth analysis to determine the most cost-effective of these two systems was made on the basis of the capital and annual operating costs shown in the two following tables. (Note: All

costs are 1980 dollars as compared to 1976 in the Facility Plan. An approximate total compounded escalation of 33 percent in sewerage construction costs has occurred since late 1976. However, escalation was not necessarily applied equally to each item and in some cases was not applied at all).

The present worth analysis for these two systems is shown in Table A-6. A present worth calculation was also made for the aerated lagoon system without a liner and emergency generator. As can be seen the package plant and lagoon system (with liner & generator) are almost equal in terms of total present worth and average annual equivalent cost. A lagoon system without a liner and generator is less costly than either of the other two alternatives.

Included with the lagoon system costs are facilities to superchlorinate the effluent to reduce ammonia to the concentration required by DER and facilities to dechlorinate the effluent so it will not be toxic to aquatic life. These systems will require close supervision.

Based on the present worth analysis and the fact that a lagoon liner may be required, the package treatment plant is recommended at this time.

If it is desired to pursue the lagoon system further, this could be done in Step 2 during preliminary design since, for planning purposes the present worths of either system, as presented in this Amendment, are essentially equal. Also, if a liner and generator are not required for a lagoon system, this would be the most cost-effective of the alternatives. However, determination of need for a liner and generator is a design function and can be done at that time.

For the purposes of this Amendment, all further financial calculations will be based on the package plant. Table 10 from the Facility Plan is updated as Table A-7 so that a current financial analysis can be performed. Table A-8 has also been prepared to show the associated project costs. (Note: If a lagoon system should be implemented during design, the costs to users would be equal to or less than the package plant depending on liner or generator needs.)

Certain items are not eligible for funding under the EPA construction grants program and these are specifically shown in the various tables.

Table A-9 shows the estimated annual cost per EDU with two types of financing discussed in the Facility Plan. In each case an allowance is first made for the basic EPA construction grant of 75 percent of eligible costs. In the first analysis of annual cost, a conventional revenue bond issue was considered. For the purposes of the financial aspects of this Amendment, it was determined that a 7 percent interest rate is still a reasonable figure to use for

municipal revenue bonds. The maturity period for the bonds was also assumed to be 40 years as in the Facility Plan, although it is possible that this could be 30 years or less depending on investors altitudes at the time bonds are actually issued. A decrease in the maturity period to 30 years would increase the annual cost by about $12.00 per equivalent dwelling unit (EDU). The coverage has been reduced from 20 percent to 10 percent on the assumption that the Township would "guarantee" the bonds, thereby reducing the "risks" to potential bond holders. With only EPA participation, the annual cost is estimated at $284 per EDU.

The second financing method assumes a Farmers Home Administration (FmHA) loan on the local share. With FmHA, the interest rate would be 5 percent over a 40 year period with 10 percent coverage required only during the first ten years. With an FMHA loan the annual cost is estimated at $250 per EDU. While an FmHA loan, in addition to the EPA grant, is a realistic probability for a community such as South Montrose, there are also the other possibilities for financial assistance as discussed in the Facility Plan. These include an FMHA grant, a supplemental grant from the Appalachian Regional Commission, and a grant from the Pennsylvania Community Facilities Act program. Any of these would further reduce costs.

As discussed in the Facility Plan, on a local basis, front foot assessments could also be levied to reduce the initial capital expenditures and connection fees could be used to reduce initial costs or provide initial operating funds. Neither of these have been included in the financial calculations in the Amendment. Front foot assessments may or may not be levied (and if FmHA financing is involved, it tends to discourage such assessments). Connection fees will most likely be assessed and it is estimated this fee would be about $500 per connection.

Individual homeowners will also have to pay to have the sewer street lateral (to curb line) connected to their household plumbing. It is estimated these one-time individual costs may generally range from $500 to $1500 depending on distances from building to curb line and revisions to the building plumbing to connect to the sewer system. (Note: See the Facility Plan for a detailed discussion of front foot assessments, connection fees and other financial considerations.)

Sewage Plant Site

Several potential plant sites exist west of South Montrose along the South Branch of the East Branch of Wyalusing Creek. The "site" indicated in the Facility Plan is only schematic in nature to show a general site area. Selection of a specific site in this area should wait for Step 2 when field survey data should be available. Actual plant location, however, also may depend somewhat on the ease of acquisition. Also should a lagoon be the finally chosen alternative for sewage treatment, the site for the lagoon will depend on soils analyses at specific sites to determine whether a man-made liner is required.

TABLE A-4

CONSTRUCTION AND OPERATING COSTS
PACKAGE TREATMENT PLANT AT SOUTH MONTROSE

Construction Costs

	ITEM	COST
1.	Package treatment plant, installed	
a.	Two-stage activated sludge process with comminutor, bar screen, splitter box, blowers, aerobic digester, and chlorine chamber.	$115,000
b.	Flow equalization tank with blowers, pumps and controls.	20,000
c.	Tertiary filter - rapid sand filtration	33,250
d.	Site work, excavation, concrete work, mechanical and electrical connections	73,150
2.	Control Building including small laboratory.	45,000
3.	Emergency generator	15,000
4.	Fencing	10,000
5.	Land	5,000
Total Construction Cost		$316,400

Annual Operating Cost

	ITEM	COST (70,000 gpd)
1.	Electrical	$ 6,000
2.	Manpower	8,000
3.	Maintenance, Materials, Chemicals	4,000
4.	Administrative	4,000
Total Annual Cost		$ 22,000

Notes to Package Treatment Plant: The cost of a share in sludge applicator truck (shared with Montrose) has been deleted as a belt filter is being recommended for Montrose instead of a sludge applicator truck. Stabilized sludge would instead be hauled to Montrose for processing on the belt filter there. An alternative would be to provide sludge drying beds at South Montrose.

TABLE A-5
CONSTRUCTION AND OPERATING COSTS
AERATED LAGOON AT SOUTH MONTROSE

Construction Costs

	ITEM	COST
1.	Aerated Facultative Lagoon System	
	a. Excavation, backfill, compaction	$ 70,000
	b. Liner	60,000
	c. Blowers and aeration piping	30,000
	d. Miscellaneous materials, baffles, etc	30,000
2.	Lift pumps, chemical feed systems	20,000
3.	Tertiary sand filter	33,250
4.	Mechanical & Yard Piping	15,000
5.	Control building	45,000
6.	Site work, including fencing .	30,000
7.	Electrical	22,000
8.	Emergency generator	15,000
9.	Land	10,000
Total Construction Costs		$ 380,250

Annual Operating Cost

	ITEM	COST
1.	Electrical	$ 4,800
2.	Manpower	6,000
3.	Maintenance, Materials, Chemicals	3,000
4.	Administrative	4,000
Total Annual Cost		$ 17,800

Note: Sludge accumulation in an aerated lagoon system is very minimal and the need to clean sludge out is estimated to occur only once every 15 to 20 years. Also, depending on the site, a liner for the lagoon may not be required if the in situ soils are adequate for groundwater protection. This is a design consideration which would be determined during preliminary design. Also a emergency generator may not be required, but this too would be determined during preliminary design as it is site dependent (if flow can enter & leave the lagoons without pumps, this would not be needed). The capital savings for these two items would be about $75,000.

TABLE A-6
PRESENT WORTH ANALYSIS
SOUTH MONTROSE SEWAGE TREATMENT PLANT

Alternative	Construction Cost (1)	Annual Operation & Maintenance (2)	Salvage Value, Year 2002 (3)	Present Worth				
				Project Cost (4)	Operation & Maintenance (5)	Salvage Value (6)	Total Present Worth (7)	Average Annual Equivalent Cost (8)
1. Package Treatment Plant	$316,400	$22,000	$ 38,000	$411,320	$231,000	$ 9,600	$632,720	$60,300
2. Aerated Lagoon	380,250	17,800	156,000	494,325	186,900	39,400	641,825	61,170
3. Aerated Lagoon without Liner or Generator	305,250	17,800	115,000	396,825	186,900	29,000	554,725	52,870

Notes:
Col. 4 = Col. 1 x 1.3
Col. 5 = Col. 2 x 10.5
Col. 6 = Col. 3 x 0.25245
Col. 7 = Col. 4 + Col. 5 - Col. 6
Col. 8 = Col. 9 x 0.09531

Financial factors are for 7-1/8% interest for 20 years.

TABLE A-7
SEWAGE COLLECTION SYSTEM
SOUTH MONTROSE

Item	Quantity	EPA Eligible Costs	Ineligible Costs
1. 8-inch diameter sewer	9000 ft	$234,000	
2. 6-inch house connections (sewer to curb line)	103 ea		$34,250
3. Manholes	40 ea	39,000	
4. Grinder pumps	46 ea	52,900	12,900
5. 1¼-inch diameter pressure sewer house connections	46 ea	7,200	1,800
6. 2-inch diameter PVC pressure sewer main	1500 ft	9,600	4,100
7. Surface restoration	3000 yd^2	38,600	13,000
Subtotal Construction Costs		$381,300	$66,050
Total Construction Cost			$447,350

TABLE A-8
ENGINEERING, LEGAL, FINANCIAL AND ADMINISTRATIVE COSTS
SOUTH MONTROSE

	EPA Eligible Costs	Ineligible Costs
1. Engineering:		
Surveys (Design)	$ 5,500	-
Surveys (Right-of-way)	-	$ 3,000
Design	43,800	4,000
General Supervision of Construction	13,800	1,500
Resident Inspection and Quality Control	60,000	-
Operation and Maintenance Manual	7,000	-
Grant Applications	-	2,000
Grant Administration	8,000	-
Sewer Use Ordinance, User Charges, Industrial Cost Recovery	2,000	-
Start Up	5,000	-
Soil Borings	2,000	-
Engineering Report	2,500	-
	$149,600	$10,500
2. Legal:		
Counsel during Financing	-	$ 8,000
General Counsel	$ 5,000	3,000
	$ 5,000	$11,000
3. Financial:		
Bond Discount	-	$ 9,000
Capitalized Debt and Reserve Funds	-	30,000
Printing of Bonds, Trust Indenture, etc.	-	5,000
		$44,000
4. Administrative		
Inter-municipal Agreements		$ 8,000
Clerical Costs	3,000	
	$ 3,000	$ 8,000
Subtotals	$157,600	$73,500
Total Costs	$231,100	

TABLE A-9
PROJECT FINANCING AND ANNUAL COSTS
SOUTH MONTROSE

	EPA Eligible Costs	Ineligible Costs	
Treatment Plant	$311,400	$ 5,000	
Sewage Collection System	381,300	66,050	
Subtotal Construction Cost	692,700	$ 71,050	
Total Construction Cost			$763,750
Engineering, Legal, Financial Administrative Costs	157,600	73,500	231,100
Total Project Costs	$850,300	$144,550	$994,850
75% Federal (EPA) Grant (of Eligible Costs)			$637,725
Local Share (25% x $850,300 + $144,550)			$357,125

Annual Costs with:	Bond Issue	FMHA Loan
Amortization of Principal plus Interest (with 10% coverage)	$29,500	$23,500
Operation and Maintenance	22,000	22,000
Allowance for PA Act 339 subsidy(1)	- 2,000	- 2,000
Total Average Annual Cost of Proposed Facilities	$49,500	$43,500
Annual Cost of Proposed Facilities per EDU	$ 284	$ 250

(1) This subsidy is currently based on the Commonwealth receiving Federal Revenue Sharing Funds.

4.0 MONTROSE SEWAGE TREATMENT PLANT

As was noted earlier, DER has determined that the Montrose sewer system can be considered to be a combined system; refer to DER letter of July 10, 1979 in the Appendix. Under this condition, by-passing of the plant will be permitted as stated in DER's letter and the sewage treatment plant can be reduced in size and the stormwater process facilities can be eliminated. The total plant capacity in this situation is estimated to be 450,000 gpd. This flow consists of two components: the infiltraton/inflow which can be cost effectively treated (in this revised situation, this flow is an integral component of the base flow due to the combined nature of the system) and residential flows. The estimated population served in 2002 is:

Montrose Borough:	2200[1] people
Montrose Area Junior-Senior High School	578 population equivalents (2312 students)
Bridgewater Township connected to Montrose	400[2] people
	3178

(1) Comprehensive Water Quality Management Plan (COWAMP) Year 2000 projection is 2156.

(2) Approximately 300 already connected.

It is assumed the present daily per capita contribution of sewage will remain at 60 gallons per day (gpd) as this is not a high contribution to begin with and as people will be more aware of water conservation in the future. This then results in a sanitary sewage flow of about 191,000 gpd plus an infiltration/inflow flow of 250,000 gpd (see original Facility Plan) for a total of 441,000 gpd. For design purposes it is recommended that 450,000 gpd be used.

Since by-pass of flow in excess of 450,000 gpd is now permissable, the equalization tanks, hydrosieves and most of the proposed additional chlorination system can be eliminated from the present project and some of the remaining proposed facilities can be scaled down in size, although not necessarily proportionately in cost.

Since the plant was scaled down in size, it was decided to review the present worth analysis of the Facility Plan alternatives to verify the selection of the rotating biological contactors (RBC) in the Facility Plan. DER had also requested that land application be given more consideration rather than dismiss it on the basis that soils in the area are not suitable for this purpose. A brief discussion of land application and the present worth analysis of the four alternatives for a 450,000 gpd plant follow.

Land Application

A general description of land application is discussed in the Facility Plan. For specific consideration at Montrose, soil type and topography are among the first items to be considered.

The soil types in the vicinity of the Montrose sewage treatment plant are:

Mardin channery silt loam,
Morris channery silt loam,
Volusia channery silt loam,

All of these soils are described generally as sloping, somewhat poorly to moderately well drained, perhaps suitable to land application uses. Generally slopes should be less than 15 percent for land application. However, in the area of the plant slopes appear to exceed this and suitable sites may be some distance from the plant and not necessarily contiguous.

At the Penn State Water Renovation and Conservation Research Project, it was found that an application rate of two inches per week, over a single twelve hour period per week, provided acceptable results[1]. Also at Penn State, the land-discharge effluent was a chlorinated secondary effluent. For purposes of this Amendment, it is assumed that similar conditions could exist at Montrose. (The referenced literature indicated a 2 inch per week application to be acceptable for a silt-loam soil type. This land application technique is described in the literature as the "irrigation" method.) Also DER limits applications to 2 inches per week or less and requires secondary treatment and disinfection prior to land application.

At a two inches per week application rate, 58 acres will be required for the system (7,758 gal per day per acre). For this evaluation, a fixed sprinkler method was assumed with flow to laterals controled by automatic valves, laterals and main lines buried, the land being too rolling and steep for traveling sprinklers.

Land application of sewage effluent rests its premise in absorption of water into the soil and use of nutrients in the wastewater by plant life grown on the irrigated area. These things must be considered impractical in Montrose from the period November through April, because of frozen ground, which is also likely to be snow-covered. To account for this situation and to maintain a water balance for proper use of the land application technique, at least three months storage in a reservoir should be provided for plant effluent. This is equivalent to about 90 acre-feet of storage or 9 acres with a 10-foot depth of water. Although a lined lagoon was mentioned for South Montrose, this analysis has assumed an unlined lagoon because the cost to line a lagoon would be extremely high.

Present Worth Analysis

An economic analysis based on present worth was made of the three original alternatives plus land application. This analysis does not include those items common to all four alternatives, it evaluates only those components which vary from alternative to alternative. The construction and operating costs of these four alternatives are shown in Tables A-10 to A-13; the present worth analysis is then shown in Table A-14. As a result of this present worth analysis, the rotating biological contactors (RBC) are still the most cost-effective alternative for the Montrose sewage plant. Even allowing for the 15 percent differential preference allowed by EPA for land application, the RBC's are much more cost effective than land application. Also, as discussed in the addendum, the RBC's are probably the most likely treatment process (except for land application) to meet the stringent ammonia requirements established by DER.

Cost Estimate of Upgraded Montrose Sewage System Improvements

Cost estimates have been prepared for this new concept for the Montrose plant. These are shown in Tables A-15 and A-16. All facilities related to the equalization tank, including the hydrosieve and most of the proposed additional chlorination facilities have been deleted. Also the proposed second aerobic digester can be deleted. The existing anaerobic digester has the capacity to serve the anticipated loads as an aerobic digester and it is still recommended to convert this to an aerobic system. Certain items are not eligible for funding under the EPA Construction grants program and these are specifically shown in the various tables. In addition to the facilities originally proposed for the Montrose plant, it is recommended that certain additional improvements be made to the plant. These would be common to any of the alternatives and include:

a. Replacement of sludge drying bed media.

b. Refurbishing of the existing Haljmur process aeration-settling tanks.

c. Replacement of the existing manually cleaned grit chamber with an aerated, automatically cleaned grit chamber (especially considering the anticipated continued use of the combined system and deletion of the equalization tank).

Also, since the Facility Plan was prepared, sludge disposal regulations have become increasing more stringent and some new technologies in sludge management have proven to be quite effective. For these reasons it is recommended that the sludge applicator truck originally proposed be replaced with a belt filter to dewater sludge. This dewatered sludge can then be rather easily disposed of in a sanitary landfill or on agricultural land, if approved by DER.

It is anticipated that Montrose would process the sludge from the South Montrose plant as no dewatering facilities are proposed for this plant because it is so small and is relatively close to the Montrose plant. Liquid sludge would be hauled to Montrose by tank truck for processing on a periodic basis.

Estimates for annual operation and maintenance have also been prepared. These are shown in Table A-17.

Financial Analysis

The financial parameters for the Montrose plant upgrading have been assumed to be the same as for the South Montrose project. Table A-18 shows the estimated annual cost per EDU with two types of financing discussed in the Facility Plan. In each case an allowance is first made for the basic EPA construction grant of 75 percent of eligible costs. In the first analysis of annual cost, a conventional revenue bond issue was considered. For the purposes of the financial aspects of this amendment, it was determined that a 7 percent interest rate is still a reasonable figure to use for municipal revenue bonds. The maturity period for the bonds was also assumed to be 40 years as in the Facility Plan, although it is possible that this could be 30 years or less depending on investors attitudes at the time bonds are actually issued. A decrease in the maturity period to 30 years would increase the annual cost by about $4.00 per equivalent dwelling unit (EDU). The coverage has been reduced from 20 percent to 10 percent on the assumption that the Borough would "guarantee" the bonds, thereby reducing the "risk" to potential bond holders. With only EPA participation, the increase in annual cost because of the sewerage system improvements is estimated at $85 per EDU. The second financing method assumes a Farmers Home Administration (FmHA) loan for the local share. With FmHA the interest rate would be 5 percent over a 40 year period with 10 percent coverage required only during the first ten years. With an FmHA loan the increase in annual cost for the improvements is estimated at $75 per EDU. While an FmHA loan in addition to the EPA grant, is realistic probability for a community such as South Montrose, there are also the other possibilities for additional assistance discussed in the Facility Plan. These include an FmHA grant, a supplemental grant from the Appalachian Regional Commission, and a grant from the Pennsylvania Community Facilities Act program. Any of these would further reduce costs.

To determine the total annual costs, the estimated increase in annual costs for the proposed improvements were added to the present debt service and the 1980 Budget for operation and maintenance (O and M).

This is summarized as follows:

Present Debt Service	$ 23,200
Additional Debt Service (Bond Issue)	42,700
1980 Budget For O and M	61,300
Additional O and M	34,000
Present Act 339 Subsidy	- 3,900
Additional Act 339 Subsidy	- 8,200
Total Average Annual Cost for Existing and Proposed Facilities	$149,100
Average annual cost per EDU	$ 185

These calculations are based on 804 EDU's being served by the Montrose Plant. The Facility Plan originally identified 690 EDU's in Montrose and 85 in Bridgewater Township (775 EDU's total). Since that time 10 additional connections have been made at the Hart trailer development in Bridgewater and the 80 unit elderly housing complex has replaced 6 EDU's in Montrose. For the elderly housing we have assumed a conservative estimate of 25 EDU's, which after accounting for the 6 EDU's lost, gives a net gain of 19 EDU's.

The Facility Plan discussed the possibility of separate bond issues, in proportionate shares, by the Montrose and Bridgewater Authorities to finance the Montrose plant upgrading. This can become a rather complicated procedure and in this Amendment it has been assumed that the Montrose Municipal Authority will finance the entire upgrading costs. However, Montrose would recover the initial investment attributable to Bridgewater Township through an annual payment from Bridgewater Township. This annual payment would consist of a proportionate fixed cost for annual debt service payment and a variable cost for operation and maintenance which would probably be based on the actual flow from Bridgewater Township.

The net effect of either method of financing, i.e., one bond issue or two, will be essentially the same to the users, especially as EPA does require equitable sharing of costs and since the improvements will benefit all users. (Note: There are two minor differences in this point. First, the benefits from sewer rehabilitation are not necessarily equal between Bridgewater and Montrose and this could make a difference of one to two dollars per year per EDU between the two municipalities. Second, Bridgewater Township users may not be subject to the same sewer collection costs as the Montrose users, although they would probably have to pay a transportation charge for use of the Montrose system and this could result in a few dollars difference in rates.)

The actual method of financing the project will depend on the results of the negotiations of any inter-municipal agreement, but as stated earlier the net effect on the users, whether in Bridgewater or Montrose, will be essentially the same regardless of how the project is initially financed.

TABLE A-10
CONSTRUCTION AND OPERATING COSTS
ROTATING BIOLOGICAL CONTACTORS

Construction Costs

Item	Cost
1. Rotating Biological Contactors	$390,000
2. Sewage Pumps (total of three)	7,500
Total Construction Costs	$397,500

Annual Operating Costs (Differences)

Item	Cost
1. Electrical	$ 9,000
2. Manpower	1,500
3. Maintenance and Materials	2,000
	$ 12,500

TABLE A-11
CONSTRUCTION AND OPERATING COSTS
PACKED TOWERS

Construction Costs

	Item	Cost
1.	Packed Towers (2)	$260,000
2.	Primary clarifiers	134,000
3.	Additional aeration capacity including tanks, blowers and piping	145,000
4.	Sewage Pumps (total of 6)	15,000
Total Construction Costs		$554,000

Annual Operating Costs (Differences)

1.	Electrical	$ 11,000
2.	Manpower	3,200
3.	Maintenance and Materials	2,500
		16,700

TABLE A-12
CONSTRUCTION AND OPERATING COSTS
SINGLE STAGE NITRIFICATION

Construction Costs

	Item	Cost
1.	Primary clarifiers	$134,000
2.	Additional aeration capacity including tanks, blowers and piping	256,000
3.	Sewage pumps (total of 3)	7,500
Total Construction Costs		$397,500

Annual Operating Costs (Differences)

1.	Electrical	$ 13,000
2.	Manpower	2,400
3.	Maintenance and Materials	2,000
		$ 17,400

TABLE A-13
CONSTRUCTION AND OPERATING COSTS
LAND APPLICATION

Construction Costs

	Item	Cost
1.	Irrigation equipment including pipe, pumps, sprinklers, valves, etc.	$400,000
2.	Land Cost, Irrigation area, 58 acres	58,000
3.	Storage Lagoon, 90 acre-ft (no liner)	300,000
4.	Land Cost, Storage area, 9 acres	9,000
Total Construction Cost		$767,000

Annual Operating Costs (Differences)

1.	Electrical	$ 4,000
2.	Manpower	3,000
3.	MAintenance and materials	3,000
		$ 10,000

TABLE A-14
PRESENT WORTH ANALYSIS
MONTROSE SEWAGE TREATMENT PLANT

Alternative	Construction Cost (1)	Annual Operation and Maintenance (2)	Salvage Value, Year 2002 (3)	Present Worth				
				Project Cost (4)	Operation and Maintenance (5)	Salvage Value(6)	Total Present Worth (7)	Average Annual Equivalent Cost(8)
1. Rotating Biological Contactors	$397,500	$12,500	$ 54,000	$516,750	$131,250	$13,600	$ 634,400	$60,500
2. Packed Towers	554,000	16,700	107,700	720,200	175,350	27,200	868,350	82,800
3. Single Stage Nitrification	397,500	17,400	111,000	516,750	182,700	28,000	671,450	64,000
4. Land Application	767,000	10,000	307,000	997,100	105,000	77,500	1,024,600	97,600

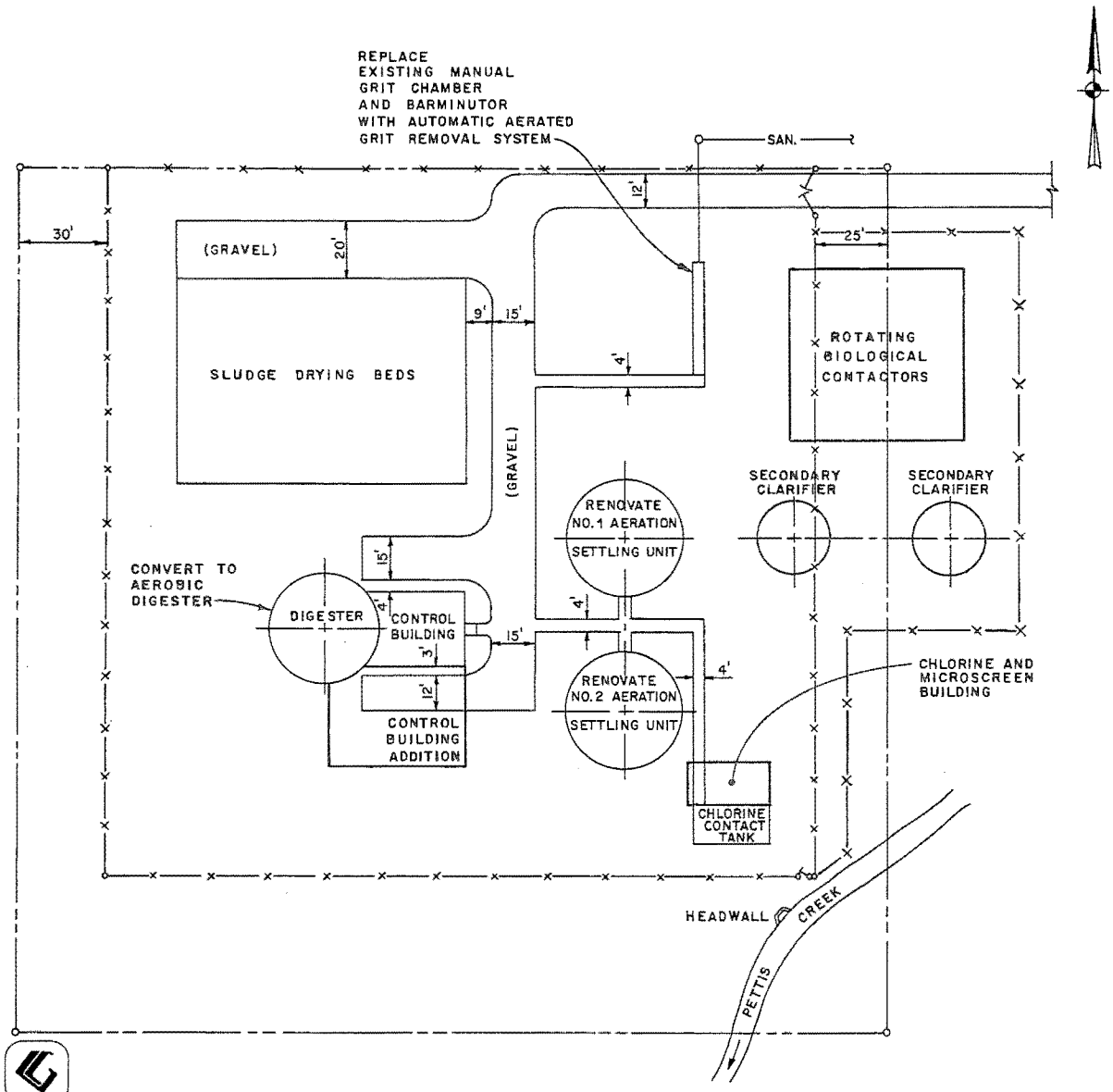
Notes: Col. 5 = Col. 2 x 10.5
Col. 6 = Col. 3 x 0.25245
Col. 7 = Col. 4 + Col. 5 - Col. 6
Col. 8 = Col. 7 x 0.09531

Financial factors are for 7 1/8% interest for 20 years.

TABLE A-15
MONTROSE SEWERAGE SYSTEM UPGRADING
ESTIMATED CONSTRUCTION COSTS

Sewage Treatment Plant Item	EPA Eligible Costs	Ineligible Costs
1. Rotating biological contactors	$ 390,000	
2. Secondary clarifiers	134,000	
3. Microscreen, including building	90,000	
4. Belt filter	75,000	
5. Aerated grit chamber	73,000	
6. Digester conversion	50,000	
7. Renovate existing aeration - settling tanks	80,000	
8. New sludge bed media	10,000	
9. Sewage pumps	7,500	
10. Control building addition	50,000	
11. Site work	50,000	
12. Piping	100,000	
13. Electrical and instrumentation	110,000	
14. New by-pass	20,000	
Subtotal Sewage Treatment Plant	$1,239,500	
Sewer System Rehabilitation	$ 58,000(1)	
Total Construction Costs	$1,297,500	NONE

(1) Updated cost from Sewer System Evaluation Survey Report.



EXISTING FACILITIES
PROPOSED FACILITIES

FIGURE A-7
PLOT PLAN OF EXISTING SYSTEM
AND PROPOSED EXPANSION
MONTROSE SEWAGE TREATMENT PLANT

FACILITY PLAN AMENDMENT
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE A-16
ENGINEERING, LEGAL, FINANCIAL AND
ADMINISTRATIVE COST
MONTROSE MUNICIPAL AUTHORITY

		EPA Eligible Costs	Ineligible Costs
1.	Engineering:		
	Surveys (Design)	$ 11,000	
	Design	100,000	
	General Supervision of Construction	45,000	
	Resident Inspection & Quality Control	100,000	
	Soil Borings	4,000	
	Operation and Maintenance Manual	12,000	
	Grant Applications		$ 2,000
	Grant Administration	8,000	
	Sewer Use Ordinance, User Chargers Industrial Cost Recovery	2,000	
	Engineering for Sewer Rehabilitation work	26,000	
	Start-up	10,000	
	Engineering Report	3,000	
		$321,000	$ 2,000
2.	Legal:		
	Counsel during Financing		$12,000
	General Counsel	$ 6,000	6,000
		$ 6,000	$18,000
3.	Financial:		
	Bond Discount	-	$15,000
	Capitalized Debt and Reserve Funds	-	50,000
	Printing of Bonds, etc.	-	10,000
			$75,000
4.	Administrative:		
	Intermunicipal Agreements		15,000
	Clerical Expenses	5,000	
		$ 5,000	$ 15,000
	Totals	$332,000	$110,000

TABLE A-17
ADDITIONAL ANNUAL OPERATION AND MAINTENANCE COSTS
MONTROSE SEWAGE TREATMENT PLANT

	Item	Cost
1.	Power	$23,000
2.	Manpower*	-
3.	Maintenance and materials	3,000
4.	Administrative (FICA, Insurance, etc.)	8,000
		$34,000

*The Montrose operating staff has recently been increased and would be sufficient for the upgraded plant. The manpower costs associated with the alternatives considered in the present worth analysis represented the relative amount of available manpower that would have to be spent on that process.

TABLE A-18
PROJECT FINANCING AND ANNUAL COSTS
MONTROSE SEWAGE TREATMENT PLANT UPGRADING

	EPA Eligible Costs	Ineligible Costs	
Treatment Plant Upgrading	$1,239,500	-	
Sewer Rehabilitiation	58,000	-	
Total Construction Cost	$1,297,500		$1,297,500
Engineering, Legal, Financial & Administrative	$ 332,000	$110,000	442,000
Total Project Costs		$110,000	$1,739,500
75% Federal (EPA) Grant (of Eligible Costs)			$1,222,100
Local Share (25% x $1,629,500 + $110,000)	$1,629,500		$ 517,400

INCREASE in Annual Costs with:	Bond Issue	FMHA Loan
Amortization of Principal plus Interest (with 10% coverage)	$ 42,700	$ 34,000
Operation and Maintenance	34,000	34,000
Allowance for PA Act 339 Subsidy(1)	- 8,200	- 8,200
Total Average INCREASE in Annual Cost for Proposed Facilities	$ 68,500	$59,800
INCREASE in Annual Cost due to Proposed Facilities per EDU (804 EDU's)	$ 85	$ 75

(1) This subsidy is currently based on the Commonwealth receiving Federal Revenue Sharing Funds.

5.0 SCHEDULE

1. Montrose Municipal Authority and Bridgewater Township Municipal Authority review and approve the Facility Plan and Amendment, hold a public hearing and make application for a Step 2 Design grant by November 1, 1980.

2. After receipt of Pennsylvania Department of Environmental Sources and Environmental Protection Agency approvals of the Step 1 Facility Plan and Amendment, authorize engineering design and specifications of recommended improvements by February 28, 1981.

3. Complete design, construction drawings and specifications by November 30, 1981.

4. Submit plans and specifications for required reviews by A-95 Clearinghouse (Pennsylvania State Clearinghouse and Northern Tier Regional Planning Commission), and to Pennsylvania Department of Environmental Resources, by January 15, 1982.

5. Make application to Environmental Protection Agency, through the Pennsylvania Department of Environmental Resources, for a Step 3, Construction, grant, after receipt of all required regional and State agency approvals, by March 15, 1983.

7. Receive Environmental Protection Agency obligation of funds (Grant Awards) after certification of Step 3 application by the Pennsylvania Department of Environmental Resources, by July 31, 1983.

8. Advertise for, receive and evaluate construction bids, and, after approval by Environmental Protection Agency for revision of grant amounts, sell bonds for local share of financing. After bond settlements, commence constructon, by January 31, 1984.

9. Complete construction of proposed Bridgewater facilities by January 31, 1984 and Montrose facilities by April 30, 1984.

6.0 ENVIRONMENTAL COMMENTS

The environmental considerations and effects of the proposed projects are generally as discussed in the Facility Plan. However, there are two modifications from the Facility Plan in the Amendment that result from the PRM 78-9 analysis and the decision by DER to allow by-passing at the Montrose sewage treatment plant.

The PRM 78-9 analysis has shown that there appear to be no current subsurface disposal problems in the Lake Montrose and Meshoppen Creek Road areas of Bridgewater Township. For primarily this reason sewers are not now recommended for these areas. As was noted in Section 2 Chapter 2.0 of the Amendment, even if sewers were necessary, they would not be eligible for EPA funding. As recommended earlier, subsurface disposal for individual homes or small businesses in these areas should be administered by the SEO. If any subdivisions are proposed, in the Lake Montrose area, Bridgewater Township and the Bridgewater Township Municipal Authority should have the necessary regulations and ordinances to require the developer to install sewers and to connect to the existing system provided capacity is available. If development is properly controlled with respect to subsurface disposal in these areas, there should be no environmental deterioration because of sewage disposal.

As for the by-passing of high flows at the Montrose plant, it has been determined by DER that there will be essentially no negative impact on Pettis Creek from the by-pass. See DER memo dated August 8, 1979 in the Appendix.

ADDENDUM TO
FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

This addendum is prepared as an annex to the Facility Plan and essentially discusses questions or comments posed by the Pennsylvania Department of Environmental Resources (DER) and the U.S. Environmental Protection Agency (EPA) in letters of February 27, 1978 and November 28, 1978. A meeting was held on December 14, 1978 at EPA's Philadelphia office to discuss these and to determine a course of action. Those comments, and the responses, which are not included in the foregoing Amendment, are presented in this Addendum.

COMMENTS AND RESPONSES TO DER LETTER OF NOVEMBER 14, 1980

The numbering system followed below corresponds to that of the letter.

Current Situation

1) Comment

Page 4-2. Soils Map required for Study Area (should be included as part of PRM 78-9). Land Use Map should be included for Bridgewater Township.

Response

Soils Maps for the Study Area are included in the Facility Plan Amendment as part of the PRM 78-9 work.

A land use map, dated June 1978, has been prepared for Bridgewater Township by the Northern Tier Regional Planning Commission. This is included in the Appendix to this Addendum.

Alternatives

1) Comment

Flow and waste reduction measure and water reuse (metering, etc.) should be addressed.

Response

The EPA regulations (40 CFR Part 35, Appendix A, Item 8 c) state that flow reduction requirements per se do not apply to Applicants with populations less than 10,000 persons. Nonetheless, the Montrose and Bridgewater Township Municipal Authorities intend to encourage the use of water-saving devices, including the following low-flow plumbing hardware and appliances:

a) Inserts in toilet tanks, or adjustable floats, to reduce flow by 30 percent.

b) Shallow-trap toilets to use approximately one-third less water.

c) Low-flow showerheads, which utilize about three gallons per minute flow.

d) Low-water use clothes washers.

With regard to water metering, the customers of the private water company serving the Montrose area already have meters.

The Facility Plan shows conclusively that infiltration-inflow corrections are drastically needed, but that water reduction and water re-use measures, while important, would not have a significant impact on this particular project. Water consumption in the Montrose area is already a rather low 60 gpcd and no increase is expected in this rate. Combined with a small population, the total quantity of water involved is rather minimal and any change in sewage flows would have a negligible impact in overall plant costs.

2) Comment

Page 6-13 and Figure 8.3. PRM 78-9 requirements must be addressed for entire study area.

Response

This is discussed in the Facility Plan Amendment.

3) Comment

Page 6-9. Land application should be included in the cost-effective analysis and not screened out initially due to soil limitation only.

Response

Land application for effluent from a South Montrose sewage treatment plant was addressed in the Facility Plan. Land application for the effluent from the existing Montrose plant was further considered in the Amendment in conjunction with the re-assessment of the reduced capacity plant since DER has decided to consider the Montrose sewer system as a combined system.

4) Comment

Page 6-5 - rationale used concerning on-lot systems should be extended to all unsewered areas.

Response

All unsewered areas, i.e., Lake Montrose area, Meshoppen Creek Road area, and South Montrose were considered in light of PRM 78-9 requirements, which address on-lot alternatives.

5) Comment

Rationale for sizing of South Montrose Treatment Plant should be addressed (pending results of PRM 78-9 work). Also, site alternatives were not addressed.

Response

These are addressed in the Facility Plan Amendment.

6) Comment

Utilization of existing facilities for extended aeration process was not considered.

Response

Utilization of the existing facilities for the extended aeration process was not considered for two reasons. First, extended aeration is very similar to the single stage nitrification process, which was one of the alternatives considered in the Facility Plan. The most visible difference between these two processes is that extended aeration would require additional aeration capacity beyond that required for single stage nitrification process. The extended aeration process would require approximately 25 percent more aeration tank capacity and associated aeration equipment. This would add about $50,000 in capital costs and $2,000 in operation costs (electricity) to the estimates for Alternative IC, Single Stage Nitrification. The other major differences between these two processes pertain to operation. The sludge residence time and mixed liquor suspended solids (MLSS) concentrations vary between these two operations and while both accommodate carbon oxidation and nitrification within a single tank, it is our opinion that single stage nitrification could better achieve nitrification than extended aeration, in this particular situation.

Public Hearing

1) Comment

No discussion of environmental impacts, primary or secondary, beneficial or adverse, addressed at public hearing.

Response

This was discussed at the public hearing on the Facility Plan Amendment. Comments are included in the Appendix.

Comment

Cost estimates and alternatives were not sufficiently developed to let public make decision about plan.

As a result of the PRM 78-9 work for South Montrose and the reduced size of the Montrose plant, new economic analyses of alternatives were made along with conceptual estimates of the recommended plan. The project estimates and other financing information are presented in the Amendment in accordance with PRM 76-3.

Appendix

1) Comment

A-95 review comments should be included.

Response

Northern Tier Regional Planning and Development Commission comments are included with this report in the Appendix.

The following are responses to their three comments.

1. The Montrose Terrace Park mobile home development has been accounted for in the Amendment. Also Mr. Neil Conboy and K&P Management Co. were contracted concerning their proposed developments around Lake Montrose, but no response was received from either of these.

2. An estimated connection fee of $500 is anticipated for the proposed South Montrose project. This is discussed in the Amendment. At this time it is not known if front foot assessments will be charged. This would probably be a decision made closer to the time of actually financing the project. Front foot assessments will probably not be charged if FmHA assistance is provided.

3. There are no specific grant or loan possibilities for fixed income persons. However, depending on the situation, the sanitary sewer connection fee may be an eligible item for persons eligible for low income housing rehabilitation programs of the various community development agencies. There are also additional overall project grant sources that may be pursued, such as from the Appalachian Regional Commission and FmHA. These have not been included in the estimated project financing since there is a greater uncertainty about their availability than about EPA grants and a conventional bond issue.

Cost Estimates

1) Comment

Unallowable costs shown as grant eligible

a) Table 7 - R/W Survey
Grant Application
Legal Agreements
Financial Reports
Bond Preparation

b) Table 8 - Item 2, House Connections

c) Table 9 and 10 - Item 2

Response

The cost tables in the Amendment show eligible and ineligible costs for the proposed facilities. The above items have been included as ineligible.

Implementation

1) Comment

Page 9-3 and 9-5. Revise schedule.

Response

A revised schedule is included in the Facility Plan Amendment, see Section 5.0.

Facilities Comments

1) Comment

Page 4-1, as precipitation falls as snow from November to April, and the mean temp = 50°F (Jan & Feb 24°F; July 69°F), the RBD process may not provide sufficient NH_3-N removal during the winter months.

Response

As was discussed in the Facility Plan and in subsequent letters, the reduction of ammonia-nitrogen (NH_3-N) in the effluent to the levels specified by DER will be difficult to achieve with any process. However, the ability to meet these requirements is greater with the rotating biological contactors (RBC) than with any of the other processes for such a small system. First, operational control will be much simpler than with any of the other processes. Sludge retention time, mixed liquor suspended solids, pH and power costs are all factors which are less critical or less expensive than with the other alternatives. As to temperature, the figures cited are air temperature and not that of wastewater, which will be warmer.

Any effects due to temperature (air or wastewater) are likely to be greater on processes other than the RBC's, as the RBC's will be inside a protective covering while the other processes would not be so protected. As to ability to meet the NH_3-N standard, a review of current literature indicates that many processes would be unable to consistently meet this standard set by DER. (Possibly they could, if additional facilities and/or more rigorous operational control was exercised). Operating data from the Waymart (Wayne County) wastewater treatment plant, situated in a

very similar climatological setting, indicates that this RBC plant (RBC's located in a building) has consistently produced an effluent well within the NH_3-N limits established for Montrose.

2) Comment

The "Montrose Municipal Authority SSES Engineering Report, March 1977" indicates a possible peak inflow of 10.0 MGD in the existing system. Also, Table V indicates 12 possible sanitary/storm sewer cross-connections. This same table is reproduced in the SSES Final Report, August, 1978. One of the recommendations of this report indicates that a total of 138, 240 gpd of I/I would be cost-effective to eliminate. However, no further discussion of the 10 MGD of inflow was included in this report. If the Facilities Plan is to consider the existing system as a separate sanitary sewer, then elimination of this inflow must be addressed. Otherwise, the system must be considered combined and the design flow derived as follows: average daily dry weather flow and non-excessive infiltration and maximum industrial flow. Also, any flow in excess of the design flow in a combined system would be by-passed without treatment if there is no significant effect on the identified existing beneficial uses of the receiving waters. The treatment plant would still have to attain DER effluent limitations for the design flow to protect the receiving stream during critical low-flows (10 year - 7 consecutive day low flow, Q_{7-10}).

Also, see DER letter of July 10, 1979 concerning by-pass of the Montrose Sewage Treatment Plant (Copy in Appendix).

Response

Concerning the cross-connections, refer to the Appendix for the Gilbert letter of March 13, 1979 for a response.

Since DER has determined that the existing Montrose sewer system can be considered to be a combined system and since by-passing of the plant will be permitted at this time, as stated in DER's letter of July 10, 1979, the Montrose sewage treatment plant can be reduced in size and certain of the unit processes can be eliminated. The design flow was based on the estimated average daily dry weather flow, non-excessive infiltration and an allowance for some growth based on COWAMP projections. This is discussed in detail in the Facility Plan Amendment.

3) Comment

Page 6-10. Primary clarifiers may not be required for the packed towers and single stage nitrification alternatives.

Response

Primary clarifiers are required for these alternatives.

The existing aeration-settling tanks would be converted to provide strictly aeration tankage, along with new aeration tanks to provide the necessary capacity, for these processes (this applies to the reduced size plant discussed in the Amendment as well as the larger plant in the Facility Plan). Primary tanks are then needed to reduce the biochemical oxygen demand (BOD) and suspended solids (SS) loads on the following processes so that these facilities can more reliably provide carbon oxidation and nitrification. Without the contribution of primary clarifiers, the subsequent units would have to be sized to handle these BOD and SS loads with increased costs and probable decrease in effectiveness.

The existing aeration-settling tanks would be refurbished as part of the rotating biological contactor system and would provide the primary clarification function ahead of the rotating biological contactors.

To not provide primary clarifiers places an undue burden on the rest of a plant and on the operators. Also, a primary clarifier sludge contributes greatly to the success of an overall sludge process. While secondary sludges are often difficult to thicken and dewater, a primary sludge usually thickens and dewaters well. Therefore, when the two sludges are combined prior to introduction to a digester, the primary sludge generally mitigates the negative aspects of the secondary sludge. First, since this combined sludge thickens well, a minimum amount of water is introduced into the digesters (thereby increasing the effective volume of the digesters), and since the stabilized sludge dewaters well, operational problems, chemicals and time are reduced as compared to strictly secondary sludge.

FACILITY PLAN AMENDMENT

MONTROSE MUNICIPAL AUTHORITY

BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

APPENDIX

A - Correspondence

B - Bridgewater Township Land Use Map

C - Public Hearing Comments

D - A-95 Review Comments

APPENDIX A

CORRESPONDENCE

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES
Bureau of Community Environmental Control
401 Scranton State Office Building
100 Lackawanna Avenue
Scranton, Pennsylvania 18503
Telephone: (717) 961-4521

July 16, 1979

Mr. Edward J. Hollos, P.E.
Gilbert Associates
P.O. Box 1498
Reading, Pennsylvania 19603

Dear Mr. Hollos:

In response to your letter of May 2, 1979 requesting additional information on problems experienced with Brown's Trailer Court and Red's Diner in the Montrose/ South Montrose area, I am submitting the following information.

The attached bacteriological analysis report on Brown's Mobile Home Park indicates a high concentration of fecal coliforms as a result of a water sample test taken by Sanitarian Gramacke on July 19, 1976. Also, Sanitarian Gramacke dye-tested the sewage system at this mobile home park on the same day and observed positive dye results. The problem was subsequently corrected. A complaint was additionally investigated in June 1978 regarding another sewage malfunction problem, which was again corrected by the owner of the park.

Bowie's Restaurant (formerly Red's Diner) had highly polluted water samples taken on February 20, 1979 and March 7, 1979 by Sanitarian Kevin Augustine. He was instructed to discontinue use until after corrections were made. Test results were then negative on April 3, 1979.

Additionally, our Department has been involved in the protestations concerning the proposed development of a shopping center above Lake Montrose. Numerous meetings have been held with officials, residents, planning commision, etc. regarding their strong objections to this development. The residents maintain the existing homes surrounding Lake Montrose have already numerous sewage malfunctions which further pollute the Lake. Our office has not been formally notified ofthese existing malfunctions, however, evidence of their existence is manifest. Another housing development is further being proposed above the lake area which, I am sure, will also result in further protestations by area residents concerned about the quality of their water supply. The lake seemingly is continuing to exhibit increased indication of deterioration and pollution. If you wish further information on Lake Montrose problems, I would recommend that you contact Montrose Borough Council.

Very truly yours,

Robert W. Riester
Sanitarian Supervisor

RWR:cl
cc: File
Attachment

Ref: 06 7122057

COMMONWEALTH OF PENNSYLVANIA

DEPARTMENT OF ENVIRONMENTAL RESOURCES

Bureau of Water Quality Management
Wilkes Barre Regional Office
90 East Union Street
Wilkes Barre, Pennsylvania 18701
July 10, 1979

Sewerage: 201 Facility Plan
Montrose Borough/Bridgewater Township
Susquehanna County

Mr. Edward J. Hollos
Gilbert Associates, Incorporated
P.O. Box 1498
Reading, Pennsylvania 19603

Dear Mr. Hollos:

Regarding your June 29, 1979 letter, you will find in Chapter 75, Section 75.25 of the Department's Rules and Regulations, criteria for using manmade liners for a lagoon system. Enclosed is a module which should be submitted prior to initiation of any field tests. If you have any questions please contact either Barrett E. Borry of the Bureau of Water Quality Management or Fred Karl of the Bureau of Solid Waste Management.

Regarding the effluent limitations, the NH_3-N requirements are actually as lenien as they could be. The 0.5 mg/l average for summer would probably be used as a maximum value if reevaluated today. These limitations were established by Harrisburg as part of an implementation plan for Northeastern Pennsylvania which was adopted in 1973.

Regarding the by-pass for Montrose Sewage Treatment Plant, based on surveys conducted by our Aquatic Biologist, it was felt that no treatment should be required for the by-pass at this time. However, the by-pass discharge should be separated from the sewage treatment plant discharge and moved approximately 50' upstream from the existing outfall. The preceding is based upon the premise that large quantities of inflow and infiltration attributed to the "old" system will still be part of the treatment system and will not be cost-effective to remove. Therefore, we must conside the existing system, for all practical purposes, to be combined.

If you have any questions concerning this matter, please feel free to tontact me at (717) 826-2553.

Very truly yours,

Richard J. Stepanski
Sanitary Engineer
Planning Section

RJS:ga
Enclosure - Module
cc: Paul Dietz, EPA
Carlton Ferris, Montrose Municipal Authority
Audley Lott, Bridgewater Township Sewer Authority
Paul Swerdon, Chief, Facilities Section BWQM, Wilkes Barre
File

COMMONWEALTH OF PENNSYLVANIA
Bureau of Water Quality Manageme
Wilkes Barre Regional Office
90 E. Union Street - 2nd Floor
Wilkes Barre, Pa, 18701
August 8, 1979

SUBJECT: Aquatic Biological and Chemical Investigation
Pettis Creek
Susquehanna County

TO: Richard J. Stepanski RJS 8/10/79
Sanitary Engineer
Planning Section

FROM: Edward P. Kupsky 8-9-79
Water Pollution Biologist

The Montrose STP and Pettis Creek were sampled on 4/19/79, 5/24/79, and 6/7/79 in an attempt to determine the effect of the STP's by-pass on the stream. Since the by-pass and the plant effluent are combined within the plant, it was impossible to separate stream degradation caused by the STP effluent from that caused by the by-pass. Sampling was conducted during storm loading and normal loading to measure relavant parameters under each condition. Chemical data are based on a 0.5 gal. noncomposite grab sample. Fecal coliform data are based on a 450 ml composite grab sample. Benthic macroinvertebrates were collected using a hand held screen. The following is an analysis and interpretation of the data by station.

Station 1: Pettis Creek - approximately 30 yd upstream of the effluent from the Montrose STP.

On 4/19/79 and 6/7/79 all of the measured chemical parameters were within the limits established as safe for aquatic life. This conclusion is substantiated by the collection of 12 taxa of macrobenthos including many pollution sensitive species with long life cycles.

On 5/24/79 immediately after a heavy rain, the BOD_5 was 8.0 ppm, which is slightly above the recommended concentration. The presence of the pollution sensitive taxa with long (1 year or more) life cycles indicates that this concentration was not degrading the stream. Except for a high fecal coliform concentration all of the other measured parameters were within recommended limits.

Influent and effluent at Montrose STP.

Influent samples were collected in an attempt to determine the composition of water which could be by-passed if the effluents were not combined. The 5/24/79 sample is probably representative of initial storm run-off and was being by-passed. It had a BOD_5 concentration of 80.0 ppm which could be potentially degrading.

The effluent had potentially degrading concentrations of BOD_5 and NH_3-N on all three sampling dates. These concentrations were extremely high on 5/24/79 when the plant was being upset by storm overloading. The MBA concentration was also high on this date.

Aquatic Biological and Chemical Investigation
Pettis Creek
Susquehanna County
August 8, 1979

These effluent concentrations, well above the influent concentrations, indicate the loss of sludge by the plant, and creates a far greater degrading potential thar if the entire influent were by-passed.

Station 2: approximately 50 yd downstream of the Montrose STP effluent.

Only 5 taxa of pollution tolerant macrobenthos were collected on 4/19/79. Of the measured chemical parameters, the BOD_5 (5.5 ppm) and the NH_3-N (0.98 ppm) were marginal and if reflective of continous conditions, could account for the observed degradation. The BOD_5 in the 5/24/79 sample (53.00 ppm) would definitely account for the degradation. It is impossible to determine, without flow data, what proportion of the downstream concentration was being contributed by the effluent or the by-pass. It can be assumed that the concentration would have been lower, probably much lower, had not the effluent concentration of BOD_5 been 460 ppm. Thus it is possible that a by-pass of 80 ppm influent might be allowable if the STP effluent is at or near its normal operating discharge concentration of approximately 7.00 ppm BOD_5.

Conclusions: Pettis Creek, upstream of the Montrose STP discharge, contained a diverse, pollution sensitive macrobenthic community and appeared free of pollutional stress. Downstream of the STP discharge, the stream contained only a few taxa of pollution facultative and tolerant organisms. This degradation is reflective of, and can be attributed to, high NH_3-N and BOD_5 concentrations from the STP under normal, and especially under periods of heavy runoff. It is probable that the degradation would be of a lesser degree and distance if the STP were not heavily overloaded under heavy runoff conditions and instead was maintained at an operating flow with the excess by-passed.

Recommendations: Under the current treatment process, at no time should the plant be hydralically overloaded. By-passing should be employed as needed.

While it can not be stated with certainty, it is probable that by-passing could be continued in the future if the STP is meeting their effluent criteria.

EPK:kab

cc: Regional File
Central File

Gilbert/Commonwealth engineers and consultants

GILBERT ASSOCIATES, INC., P. O. Box 1498, Reading, PA 19603/Tel. 215 775-2600/Cable Gilasoc/Telex 836-431

July 2, 1979

Pennsylvania Department of
Environmental Resources
Bureau of Community and
Environmental Control
Room 401
Scranton State Office Building
100 Lackawanna Avenue
Scranton, PA 18503

Attn: Mr. Robert Reister

RE: Montrose Municipal Authority
Amendment to 201 Facility Plan
W. O. 06-7122-054

Gentlemen:

On December 7, 1978, I visited your office for an interview with the Regional Sanitarian responsible for Bridgewater Township in Susquehanna County. During this visit I spent about one hour talking to Mr. Gramecke, Mr. Augustine, and Mr. Reister about past and present on-lot sewage disposal problems for those portions of Bridgewater Township proposed to be sewered in the 201 Facility Plan prepared for the Montrose/South Montrose area.

Mr. Gramecke indicated that there were no recent complaints (recent being defined as within the past three years) of malfunctioning systems along Meshoppen Creek Road (the attached map of the area defines the relationship of Meshoppen Creek Road as well as the other areas in question to the study area) and the Lake Montrose Area. However, he indicated that there were complaints of malfunctioning systems in the Lake Montrose Area prior to 1975, but these are no longer retained on file per DER policy. In the South Montrose Area, on the other hand, there were recent complaints concerning Brown's Trailer Court and Red's Diner.

For my work involving amendment of the 201 Facility Plan to Incorporate EPA's PRM 78-9 requirements, I need, from your office, written substantiation of the failures mentioned above for the trailer court and the diner and for any other failures which may have been reported in the six months since my visit. Also, please indicate the approximate location of each failure on the enclosed map and return to me for my files.

Gilbert/Commonwealth engineers and consultants
GILBERT ASSOCIATES, INC., P.O. Box 1498, Reading, PA 19603/Tel. 215 775-2600/Cable Gilesoc/Telex 836-431

Although I am not exactly sure how effectively I can use it, I would appreciate any comments your office might have concerning the past problems in the Lake Montrose Area.

For your convenience, I have enclosed a stamped, self-addressed envelope for your response. If you have any questions, please call me at (215) 775-2600, extension 4826.

Very truly yours,

Edward J. Hollos

EDWARD J. HOLLOS, P.E.
Project Manager
Environmental Division

EJH:kab
Enclosures

cc: Montrose Municipal Authority
Bridgewater Township Municipal Authority
D. R. Kratzer

This copy to: E. Hollos

Gilbert/Commonwealth engineers and consultants

March 13, 1979

COPY

Mr. Paul Dietz
U. S. Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, PA 19106

Re: Montrose Municipal Authority
Sewer System Evaluation Survey
W.O. 06-7122-053

Dear Paul:

This letter is prepared in response to a question you had regarding the referenced project.

You will recall that our report for this project was presented in two volumes, Volume 1 was dated March, 1977 and presented the results of the Physical Survey and Rainfall Simulation stages. Volume 1 also presented a proposed Preparatory Cleaning and Internal Inspection Program which was approved by DER/EPA.

Volume 2, dated August 1978, reported the results of the Internal Inspection Program and outlined a proposed Sewer Rehabilitation Program.

Based upon our recent telephone conversation, it is my understanding that your only question regarding the SSES is that there are 12 possible cross-connections listed in Table V of Volume 1. Most of these cross-connections were not televised. The following is an explanation of why they were not.

The 12 possible cross-connections listed in Table V were located approximately through smoke-testing. The only way to determine whether or not these cross-connections actually exist would be to televise sanitary sewer lines in the vicinity of each. As discussed in Volume 1, television inspection on many parts of the Montrose System would, in effect, require rebuilding the system just to televise it.

Of the 12 possible sources listed in Table V, only 3 should be televised (results for these are in Volume 2), and these proved to be negative. The other 9 could not practically be televised. It was our opinion that

This copy to:

Gilbert/Commonwealth engineers and consultants
GILBERT ASSOCIATES INC. P.O. Box 1498 Reading PA 19603

it would be more cost-effective to allow these cross-connections (if they in fact exist) to discharge into the proposed retention basin rather than to eliminate them. This opinion is stated in our Volume I report which was approved by EPA/DER.

I trust that this letter has answered your question. Should you have any further questions regarding this matter please do not hesitate to contact me.

Very truly yours,

Phillip Podolick

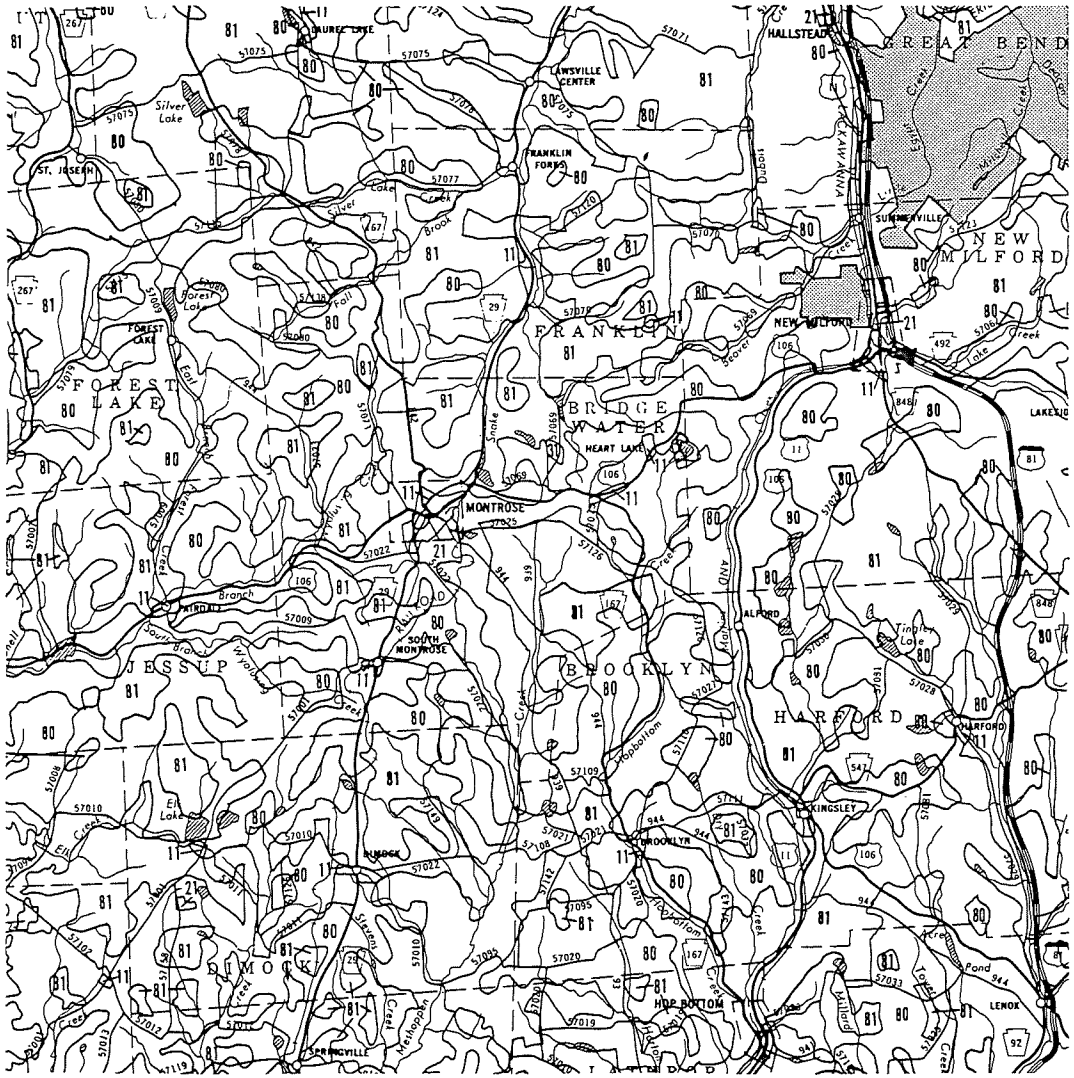
PHILLIP A. PODOLICK
Project Manager
Environmental Division

PAP:ss

cc: D. Kratzer
E. Hollos

APPENDIX B

BRIDGEWATER TOWNSHIP LAND USE MAP



SUSQUEHANNA COUNTY

PENNSYLVANIA

EXISTING LAND USE

LEGEND

11	RESIDENTIAL
21	COMMERCIAL & SERVICES
31	INDUSTRIAL
80	AGRICULTURAL
81	FOREST
33	MINING
	PUBLIC/QUASI-PUBLIC

SOURCE

USGS–ERTS

NORTHERN TIER REGIONAL PLANNING AND DEVELOPMENT COMMISSION

JUNE 1978

N

NTR PDC

2 1 0 2 4 6 8 10

SCALE IN MILES

The preparation of this map was financed in part through a comprehensive planning grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1954, as amended and as administered by the Bureau of Planning, Pennsylvania Department of Community Affairs.

APPENDIX C

PUBLIC HEARING COMMENTS

TO BE INSERTED AFTER PUBLIC HEARING

APPENDIX D

A-95 REVIEW COMMENTS

susquehanna county
planning commission

Courthouse Annex
Montrose, Pennsylvania 18801
(717) 278-3718

February 3, 1978

Mr. Thomas R. Smith, P.E.
Gilbert/Commonwealth
P. O. Box 1498
Reading, PA 19603

Dear Mr. Smith:

The Susquehanna County Planning Commission has completed review of the "Step 1 Facilities Plan - Montrose Municipal Authority, Bridgewater Township Municipal Authority." The following comments were endorsed by the Planning Commission on January 31, 1978.

1. Some impending developments do not seem to be considered as potential EDU's. For example:
   a. The Montrose Terrace Park (mobile home) was not included in the list of large users in Bridgewater Township. This mobile home park, when fully developed could provide up to 25 additional users.
   b. A thirty-lot subdivision is proposed by Mr. Neil Conboy near Lake Montrose. Mr. Conboy's intention is to utilize the Montrose Sewer System.
   c. A new commercial use of fifteen-twenty stores is now being proposed for a parcel next to Andre & Sons on State Highway 706 near Lake Montrose.

2. The average yearly payment per EDU is well described. Additional cost such as front-foot assessments and hook-up fees are mentioned but not discussed specifically regarding the project.

3. What grant or loan possibilities are there for fixed income persons, such as the elderly for payment of hook-up fees?

Thank you for allowing the Susquehanna County Planning Commission to comment on this Step 1 Plan, which basically is of excellent quality. We hope that the County Planning Commission may be of assistance to you in the future.

Sincerely yours,

Jeffery K. Stover/cmc

Jeffery K. Stover
County Planning Director

JKS/cmc
05.2, 29-3061

NORTHERN TIER REGIONAL PLANNING AND DEVELOPMENT COMMISSION

507 MAIN STREET
TOWANDA, PA.
18848
(717) 265-9103

WITH COUNTY PLANNERS IN

BRADFORD
COURT HOUSE
TOWANDA, PA. 18848
(717) 265-6107

SULLIVAN
COURT HOUSE
LAPORTE, PA. 18626
(717) 946-5061

SUSQUEHANNA
COURT HOUSE
MONTROSE PA. 18801
(717) 278-3718

TIOGA
120 MAIN STREET
WELLSBORO, PA. 16901
(717) 724-4136

WYOMING
COURT HOUSE
TUNKHANNOCK, PA. 18657
(717) 836-5145

February 6, 1978

Thomas R. Smith, PE.
Project Manager
Environmental Division
Gilbert Associates, Inc.
P.O. Box 1498
Reading, PA 196

Re: Montrose Municipal Authority
W.O. 06-7122-050

Dear Mr. Smith:

I recently received the Step 1 Facility Plan for the Montrose Municipal Authority-Bridgewater Township Municipal Authority (received by our office September 23, 1977).

You requested that we review and comment on the plan. The NTRPDC has taken the position that the comments of the County Planning Director are to represent the formal viewpoint of the regional agency (we take this position since the County Planning Directors are employees of the NTRPDC).

I have discussed this plan with Jeff Stover, the Susquehanna County Planning Director. He assures me that by date of February 2, 1978, he forwarded his comments to you.

Should you have any further questions or if you require additional information from this office, please contact me.

Our apologies for the delay in response to your request.

Sincerely,

John M. Eberhard

John M. Eberhard
Administrative Assistant

JME/cms
05.2

STEP 1
FACILITY PLAN

MUNCIPAL WASTEWATER TREATMENT WORKS

MONTROSE MUNICIPAL AUTHORITY -
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

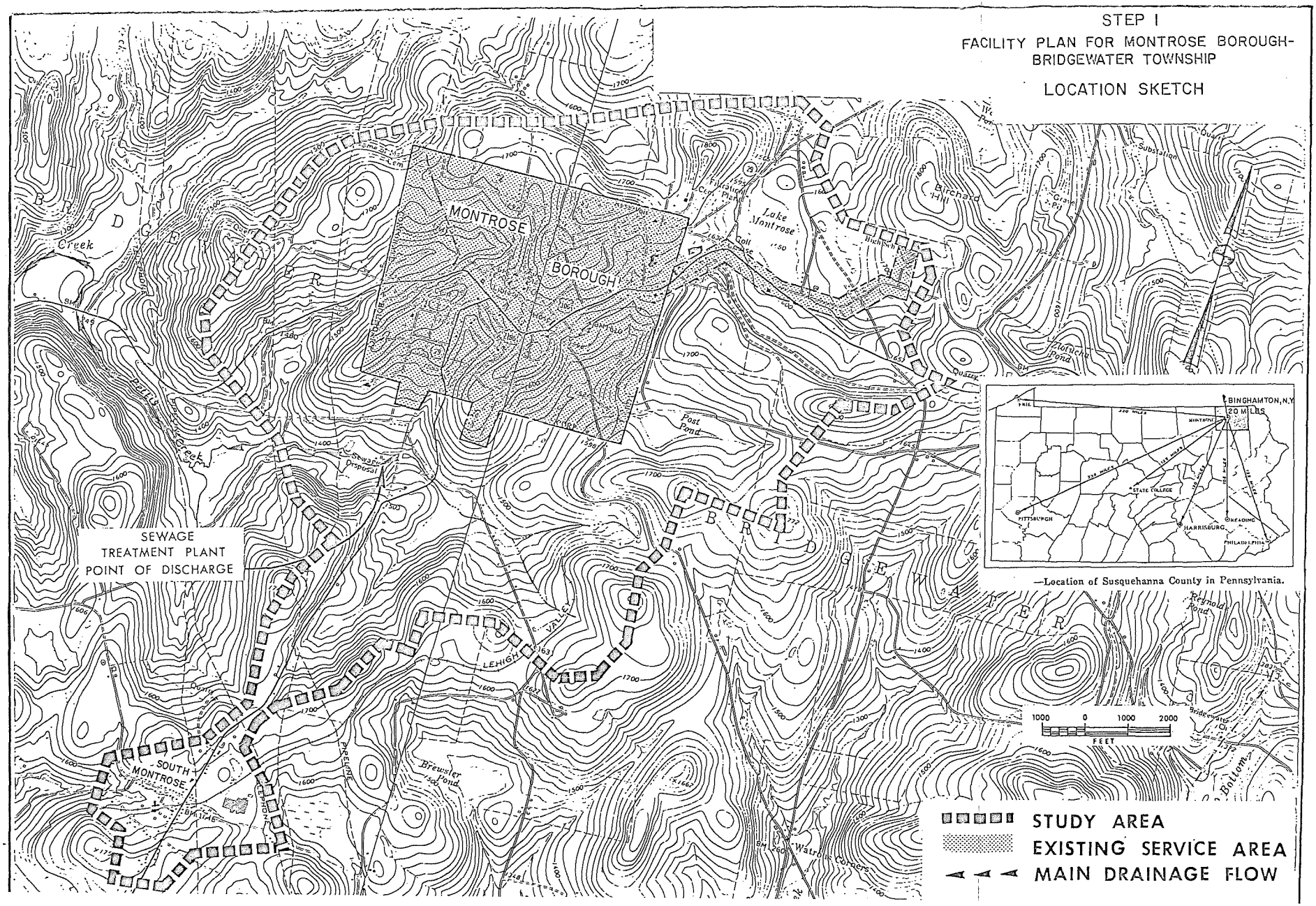
SUSQUEHANNA COUNTY
PENNSYLVANIA

MARCH, 1977

STEP I

FACILITY PLAN FOR MONTROSE BOROUGH-
BRIDGEWATER TOWNSHIP

LOCATION SKETCH



—Location of Susquehanna County in Pennsylvania.

STEP 1

FACILITY PLAN

MONTROSE MUNICIPAL AUTHORITY - BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

SUSQUEHANNA COUNTY, PENNSYLVANIA

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

APPENDIX (Continued)

1.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

1.1 The Montrose Municipal Authority is authorized by Montrose Borough to engage in public sewerage operations. The Authority, together with the Bridgewater Township Authority, authorized Gilbert Associates, Inc. to undertake this "Step 1 Facilities Plan" for possible additional or improved sewage collection and treatment facilities for Montrose Borough and portions of the surrounding Bridgewater Township. The planning area is located centrally in scenic Susquehanna County, near the northern border of Pennsylvania and 20 miles from the manufacturing city of Binghamton, New York.

1.2 This Step 1 Facilities Plan is being financed with 75 percent grant support from the Environmental Protection Agency (EPA), under Federal Law P.L. 92-500, the Federal Water Pollution Control Act of 1972, plus a grant from the Commonwealth of Pennsylvania covering one-half of the remaining 25 percent. Continuance of the sewerage planning and design ("Step 2") within the body of EPA regulations and guidelines should ensure eligibility for a Federal "Step 3" construction grant, presently amounting to 75 percent of most project costs.

1.3 All possible alternatives for sewage collection and treatment were investigated, and are described and financially analyzed in this study. Certain Federal and State regulations, however, will influence which alternates are acceptable. For example, under the Federal Water Pollution Control Act of 1972, no Federal grant award may be made for a new sewer system in a community in existence on October 18, 1972 unless it is further determined by the EPA Regional Administrator that the bulk (generally two-thirds) of the flow design capacity through the sewer system will be for wastewaters originating from the community in existence on October 18, 1972.

1.4 It was found that the cost-effective sewerage alternative will be to treat the sewage generated within South Montrose at a package plant located near South Montrose; and that the areas of Bridgewater Township surrounding Montrose Lake have their sewage treated at the upgraded and expanded Montrose sewage treatment plant.

1.5 The Montrose sewage plant will require upgrading to tertiary treatment. This will be accomplished by the addition of rotary biological contactors, additional settling tanks, and a microscreen. Sludge will be digested in aerobic units. An equalization tank will be provided to contain polluted inflow.

1.6 As a supplement to this report, the Consultants are preparing an Infiltration/Inflow Evaluation Survey, wherein the existing Montrose Municipal Authority sewer system is being evaluated. Preliminary results show that approximately 50 percent of the infiltration and inflow can be cost-effectively eliminated by selected improvements to the sewer system.

1.7 Estimated costs of the proposed system, including the additions to the treatment plant, infiltration and inflow elimination, the South Montrose and Bridgewater Township collection systems, the South Montrose Package Treatment Plant, and related engineering and administrative work, will amount to about $3,350,000.

1.8 Gilbert Associates, Inc. has recommended as follows:

a. This Step 1 Facilities Plan for the Montrose-Bridgewater Township area, after review and acceptance by the Montrose Municipal Authority and the Bridgewater Township Authority, and the further review and approval of governing agencies, including the State Clearinghouse, the County Planning Commission and Regional Clearinghouse, the Pennsylvania Department of Environmental Resources, and the Federal Environmental Protection Agency, should be used as the basis for application to the EPA for a "Step 2" Engineering Design grant.

b. Following completion of Step 2 Design, application should be made for a Step 3 Construction grant of 75 percent of eligible project costs.

c. Before final approval is given for the sewage collection system shown on the plans accompanying this Facilities Plan, a comprehensive planning review of the general area should be performed, in order to insure the optimum placement of sewers and desired public services, considering commercial, industrial, and recreational needs.

Form Approved
OMB No. 158-R0134

SUMMARY OF COSTS OF PLANNED TREATMENT WORKS SCHEDULED BY PROJECT AND CATEGORY *(Read instructions on reverse before completing form)*			MUNICIPALITY *(Applicant)*: "Montrose-Bridgewater Township Joint Authority"			APPLICANT'S APPLICATION NO. C- _____ -0__
1.		*a. PROJECT SEQUENCE	b. PROJECT SEQUENCE	c. PROJECT SEQUENCE	d. PROJECT SEQUENCE	e. TOTAL ALL PROJECTS
2.	PROJECT STEP	STEP 2	STEP 3	STEP	STEP	
3.	ESTIMATED CALENDAR QUARTER/ YEAR APPLICATION WILL BE SUBMITTED TO EPA FOR FUNDING	2/77	1/79			
		$	$	$	$	$
4.	a. CATEGORY I Secondary Treatment and BPWTT					
	b. CATEGORY II More Stringent Treatment	141,000	1,000,000			
	c. CATEGORY IIIA Infiltration/Inflow Correction	143,000	1,100,000			
	d. CATEGORY IIIB Major Sewer System Rehabilitation					
	e. CATEGORY IVA New Collectors, etc.	62,000	900,000			
	f. CATEGORY IVB New Interceptors, etc.					
	g. CATEGORY V Correction of Combined Sewer Overflows					
	h. CATEGORY VI Treatment and/or Control of Stormwaters					
5.	TOTAL COST OF STEP 2 AND STEP 3 PROJECTS — a. PREVIOUSLY FUNDED	$	$	$	$	$
	b. PLANNED	$ 346,000[1]	$ 3,000,000[1]	$	$	
6.	TOTAL ESTIMATED COST OF ALL PLANNED BUT UNFUNDED PROJECTS TO BE INCLUDED IN THE ENTIRE GRANT					$ 3,346,000[2]
7.	STEP 1 PROJECT COST PROJECT NO. C _____ -0 ____					** $ 70,700
8.	COST ESTIMATES OF PLANNED PROJECTS WERE COMPUTED AS OF _____ (MONTH AND YEAR) AND REFLECT THE LATEST CONSTRUCTION COST INDEX OF _____ AS REPORTED BY THE ENGINEERING NEWS RECORD.					

9a. ESTIMATES PREPARED/VERIFIED BY			9b. REVIEW AND APPROVAL BY STATE AGENCY	
NAME *(Please print)*		DATE	NAME *(Please print)*	DATE
ORGANIZATION			ORGANIZATION	
TELEPHONE NUMBER	AREA CODE	NUMBER	SIGNATURE	
SIGNATURE			9c. REVIEW AND APPROVAL BY EPA REGIONAL OFFICE	
			NAME *(Please print)*	DATE
			SIGNATURE	

* The Step 1 project, if any, will be reported on line 7.

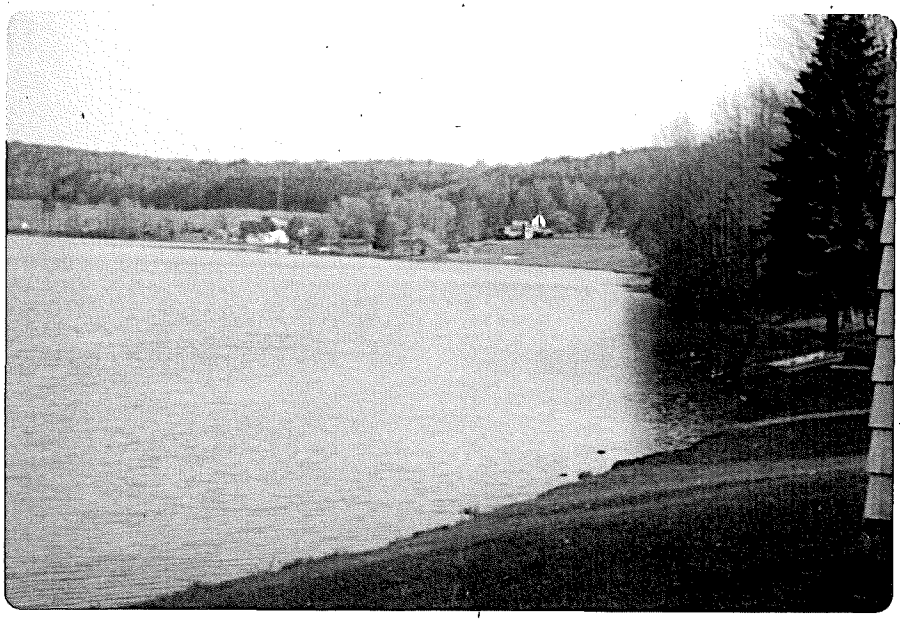
** If no Step 1 project was funded by EPA, insert N/A.

[1] Includes Engineering and prorated share of legal, fiscal, and administrative costs.

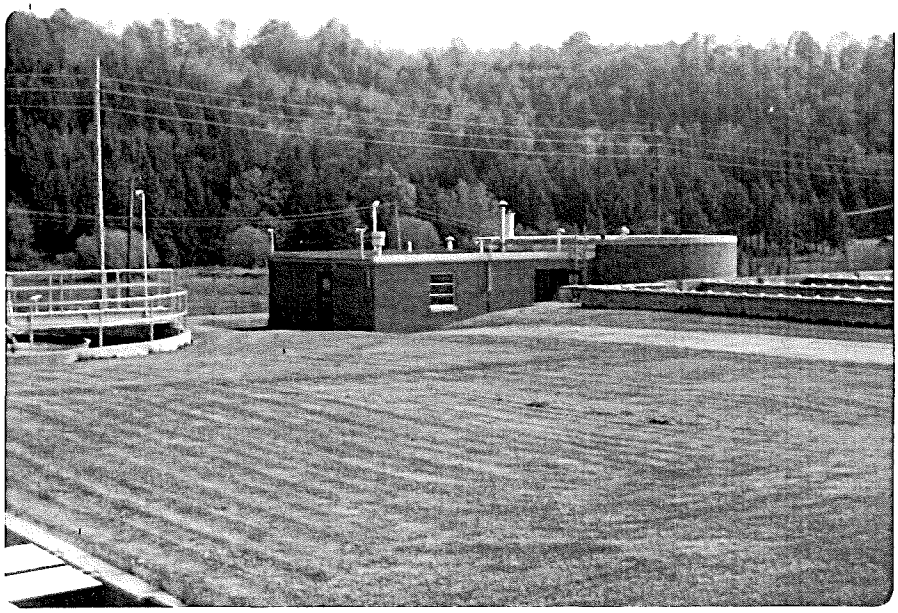
[2] See Table 13.

DOWNTOWN MONTROSE

PANORAMIC VIEW OF MONTROSE, PENNSYLVANIA



MONTROSE LAKE



MONTROSE SEWAGE TREATMENT PLANT

2.0 INTRODUCTION

2.1 Authorization of Study

The Montrose Municipal Authority was incorporated by a Montrose Borough Council Ordinance dated April 6, 1959, under provisions of the Pennsylvania Municipalities Authorities Act of 1945. Its first project was the construction of a new sewage treatment plant and appurtenances, completed in 1963. Up until that time the Borough had been served by a primary (Imhoff-tank) sewage treatment plant contructed in 1914. This plant, which had deteriorated by 1963, was abandoned when the new plant commenced operation. The 1963 project was aided by a Federal Grant in the amount of $64,581 under the provisions of P.L. 84-660, the Federal Water Pollution Act of 1956. This Act was superseded on October 17, 1972 by P.L. 92-500, the Federal Water Pollution Control Act of 1972. The new Act requires that the public sewerage planning process be divided into three phases:

Step 1 Plan of Study followed by a Facility Plan;

Step 2 Engineering Design;

Step 3 Construction.

Each of the three steps, if performed according to Federal and State Regulations and Guidelines and approved, is eligible to apply for 75 percent Federal Grant support. It is therefore the purpose of this Step 1 Facility Plan to qualify the Montrose Municipal Authority, as the appointed "lead agency" for such Federal Grant aid.

Under Environmental Protection Agency (EPA) regulations first promulgated on February 11, 1974, as 40 CFR 35, the Step 1 Facility Planning phase must be preceded by a "Plan of Study." The "Plan of Study" is designed primarily to delineate an officially-approved regional or multi-municipal sewerage service area in those cases where this appears feasible or desirable. The Montrose Municipal Authority, on February 10, 1975, authorized Gilbert Associates, Inc. to review the existing sewerage situation and prepare the required Plan of Study. The Plan of Study was completed in May, 1975, and was reviewed and approved by the Pennsylvania Department of Environmental Resources.

The Plan of Study as approved included Montrose Borough plus certain developing areas on the periphery of the Borough and a corridor extending south to and including South Montrose in Bridgewater Township--see the Location Sketch, preceding, and the copy of the Plan of Study in the Appendix. After State approval, an application was made to EPA for a Step 1 Facility Planning grant. Upon EPA approval of the application, preparation of this Step 1 Facility Plan for Montrose and portions of Bridgewater Township was authorized by the Montrose Municipal Authority on March 8, 1976. This Facility Plan will provide, after review and concurrence by the County and Regional Clearinghouse Planning Commissions, the required Step 1 Facility Plan, conforming in scope to the complete requirements of regulation 40 CFR 35.

2.2 Study Purpose and Scope

The purpose of this Facility Plan is to investigate the need for additional or improved sewage collection and treatment facilities and, by a systematic evaulation of feasible alternatives, demonstrate that the proposed measures represent the most cost-effective means of meeting established effluent and water quality goals, recognizing environmental and social considerations.

The planning area, as illustrated on the Location Sketch, is largely defined by the limits of the natural watershed which includes most of Montrose Borough. In addition to the Borough and its immediate environs within the watershed, the planning area includes an area northeast of the Borough encompassing Lake Montrose and Montrose Area High School, the settled area immediately north of Lake Montrose adjacent to Route 29, the land along Route 706 to high ground 1-1/2 miles east of the Borough, Meshoppen Creek Road, and a strip extending southwest along Route 29, to and including the unincorporated Village of South Montrose, all in Susquehanna County, Pennsylvania. The area is drained by the North Branch of the Susquehanna River and its tributaries. The effluent from the existing Montrose Sewage Treatment Plant is discharged into Pettis Creek, which flows westward into the East Branch of Wyalusing Creek. This creek joins the Susquehanna River at the Borough of Wyalusing in Bradford County.

This study is being performed as a joint effort on the part of both the Montrose Municipal Authority and the Bridgewater Township Municipal Authority. The Environmental Protection Agency has awarded a Step 1 Federal Grant of 75 percent of the estimated costs of preparation of this Facilities Planning Study. In addition, the Commonwealth of Pennsylvania is funding one-half of the remaining 25 percent of the study costs. The work to be performed is outlined in the Plan of Study dated May 1975, a copy of which is in the Appendix.

This Facility Plan follows the format outlined in the revised Environmental Protection Agency (EPA) guidance manual titled "Preparing a Facility Plan," issued May 1975. Effective July 1975, this guidance superseded the EPA "Guidance for Facilities Planning" issued in January 1974, and presents a simpler and more up-to-date description of the basic requirements for a Step 1 Facility Plan. The Plan of Study submitted in May 1975 followed the 1974 guidance; thus the format of this Facility Plan will differ slightly from the scope of work outlined in the Plan of Study.

The existing sewerage system for the Borough of Montrose and environs consists of a sewage collection system and a treatment plant which employs the two-stage high-rate modification of the activated sludge process to provide complete treatment of the wastewater it receives.

Problems of plant overloading, primarily because of infiltration into the collection system, have occurred. On September 23, 1971, the Pennsylvania Department of Environmental Resources, noting that the average daily flow for 1970 exceeded the permitted maximum average

flow by over 50,000 gallons per day, prohibited any additional connections to the Montrose Municipal Authority's sewer system or treatment facilities. This prohibition was lifted by the State on October 16, 1975, based on a re-rating of the plant's hydraulic capacity upward from 334,000 to 410,000 gallons per day average sewage flow.

2.3 General Description of Planning Area

The Planning Area is located centrally in Susquehanna County, Pennsylvania. Susquehanna County is one of five counties constituting a Commonwealth of Pennsylvania planning region known as the Northern Tier Region. The Northern Tier Region is represented for comprehensive planning purposes by an A-95[1] Clearinghouse Planning Agency, the Northern Tier Regional Planning and Development Commission, located in Towanda, Bradford County. This regional commission will have primary review responsibility for this Step 1 Facility Plan. The Susquehanna County Planning Commission in Montrose will also have local review responsibility. The Borough of Montrose also is represented by its own Planning Commission, as is Bridgewater Township.

The Pennsylvania Department of Environmental Resources is presently preparing a Comprehensive Water Quality Management Plan (COWAMP) for the Commonwealth. Susquehanna County lies in Study Area 4 of the nine COWAMP Study Areas into which the Commonwealth has been divided. The engineering consultant working in Study Area 4 is carrying out the collection of data but is not yet (1977) in a position to make an evaluation of water quality management problems for the region.

Although the planning area lies within the purview of the Susquehanna River Basin Commission, review by this body will not be required[2]. Since the project does not lie on a state boundary, there is no transfer of surface water into or out of the basin, and the project has no interstate impact.

The Borough of Montrose, with a population of 2,058 in the year 1970, is the county seat of Susquehanna County, and was incorporated as a borough in 1824. It is completely surrounded by Bridgewater Township, which had a population of 1,876 in 1970.

It will be noted from the Location Sketch that Susquehanna County is bounded on the north by New York State; and consequently the economy of the County is linked more or less closely to nearby centers of population in New York. The general area of Northeastern Pennsylvania

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[1] Office of Management and Budget Circular A-95, Revised, "Federal and Federally Assisted Programs and Projects," Federal Register, Volume 38, No. 228, November 28, 1973.

[2] As stated by Mr. Peter Carlucci, Counsel to the Commission and Executive Assistant to the Director, in a telephone conversation on June 2, 1976.

was, prior to the American Revolution, a matter of contention between the colonies of Connecticut and Pennsylvania, and was hotly contested at times, in a now little-remembered era known as the "Pennamite Wars;" it was not until the early 1800's that the question was resolved in favor of Pennsylvania. The area was colonized very early by settlers from the colonies of Vermont, New York and Massachusetts; and from the colony of Connecticut whose indefinite and disputed western boundary was said to extend into this area. Older communities such as Montrose therefore still show the influence of a New England and upstate New York architectural heritage. Many fine homes and buildings in the Borough of Montrose, built in the late Victorian era, exhibit these influences.

Montrose Borough, in common with most rural communities in Northeastern Pennsylvania, reached an economic and population peak in the late 1800's, based on the timbering industry and upon dairying and general farming.

This economic era can be said to have subsided generally prior to the First World War, with population declines or bare equilibriums extending generally up to the present.

After World War II, in common with a general trend in the United States, increasing development occurred in suburban areas outside the core cities and boroughs, in this case in Bridgewater Township. Therefore, the Borough's population loss may in part be seen as Bridgewater Township's gain. A table of historical population comparisons between Borough and Township follows:

HISTORICAL POPULATION BY DECADES
PLANNING AREA

Year	Bridgewater Township	Montrose Borough
1890	-	-
1900	-	1,827
1910	-	1,914
1920	-	1,661
1930	-	1,909
1940	1,408	1,997
1950	1,355	2,075
1960	1,498	2,363
1970	1,876	2,058
1975(estimated)	2,250	2,060

3.0 EFFLUENT LIMITATIONS

On June 4, 1975, the Pennsylvania Department of Environmental Resources issued new effluent requirements which the Montrose Plant must satisfy. These are:

> Ammonia nitrogen must not exceed 1.0 mg/l (milligrams per liter) in summer (June 1st - October 31st) and not exceed 1.5 mg/l in winter (November 1st - May 31st). The 7-day summer average must not exceed 0.5 mg/l.
>
> Total suspended solids must not exceed 10 mg/l (7-day average).
>
> Dissolved oxygen (DO) must be 6 mg/l, or greater.
>
> Total Biochemical Oxygen Demand (BOD_T) must not exceed 55 mg/l.

These requirements are based on a sewage treatment plant flow of 410,400 gallons per day with an organic loading of 950 lbs/day of 5-day Biochemical Oxygen Demand.

The above requirements have been submitted to the U.S. Environmental Protection Agency (EPA) by the Pennsylvania Department of Environmental Resources (DER) in connection with DER's application PA 0038644 of April 1976 to EPA for a municipal permit for Montrose. This permit would be issued under the National Pollutant Discharge Elimination System (NPDES). The permit is still pending with EPA (January, 1977).

4.0 CURRENT SITUATION

4.1 Conditions in Planning Area

4.1.1 Planning Area Description

The Borough of Montrose and Bridgewater Township are located near the center of Susquehanna County, approximately 20 miles due south of Binghamton, New York, and approximately 30 miles north-northwest of Scranton, Pennsylvania. The county occupies an area of 836 square miles and had a population of 34,344 in 1970. Montrose, the county seat, was laid out in 1812 and incorporated as a borough in 1824. It had a population of 2,058 in 1970; the population of Bridgewater Township was 1,876 in 1970.

Geologically, Susquehanna County is part of the dissected Allegheny Plateau, with rolling hills and deeply-entrenched streams. Elevations within the county range from about 800 feet to about 2,700 feet; within the area under study, elevations range from 1,340 feet to 1,860 feet. Mean annual temperature is less than 50°F; monthly temperatures in Montrose average from 24°F in January and February to 69°F during July. Precipitation is normally well distributed throughout the year, averaging 3 to 4 inches per month. Short-period dry spells may develop at any time, but extended severe droughts are rare. From November into early April much of the precipitation falls as snow; the ground is usually snow-covered to varying depths about 80 days each winter.

The first European settlers arrived in the area beginning in 1787, from Vermont, New York, Connecticut, and Massachusetts. The Indians had used the area only as a hunting ground; and even the white settlers did little extensive farming until well into the 19th Century. The number of farms grew with the population, and both reached a peak in the late 19th Century. The area has always been important for farming; but there are fewer farmers and farms are becoming larger. Dairy farming predominates at present. The number of rural non-farm residences is increasing; most new homes are of this type.

4.1.2 Organizational Context

The Montrose Municipal Authority and the Bridgewater Township Municipal Authority are the joint entities involved with the preparation of this Facility Plan. The Montrose Municipal Authority has been designated as "lead agency" for the project.[1] Costs not reimbursable from Federal and State funds will be shared on an equitable basis by the two Authorities.

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[1] "Lead Agency" is defined to mean the person or organization that has accepted the financial, legal, and/or leadership responsibilities for a program or project.

The Susquehanna County Planning Commission and the Northern Tier Regional Planning and Development Commission are cognizant of the objectives of the Facility Plan and have provided valuable assistance in its preparation.

4.1.3 Demographic and Land Use Data

The principal community in the planning area is the town of Montrose, a small residential community with an active retail business which serves the surrounding farm trade, resort, and manufacturing area. As the county seat of Susquehanna County, it is a center of governmental, legal, and banking activity for the area.

The Montrose Area Junior-Senior High School, with 950 students in 1976, is located within the planning area, two miles east of Montrose. It serves the community, Bridgewater Township, and nine other townships and boroughs.[1] The modern 40-bed Montrose General Hospital is also located in Montrose Borough.

Some industry exists in the planning area. These industrial activities include an aircraft parts manufacturer, sawmills, manufacturers of finished wood products, print shops, dairies, and feed mills. A listing of these establishments is included in Table 2, Appendix.

Many residents of the planning area work in the vicinity of Binghamton, New York, especially at the IBM plant at Johnson City; and at Tunkhannock on the Susquehanna River in neighboring Wyoming County, Pennsylvania, primarily at the Charmin Paper Mill which employs 2,500 people.

The planning area had approximately 3,000 residents in 1976. The population of Montrose Borough declined from 2,363 in 1960 to 2,058 in 1970. This decline has been halted, however, and the Borough is slowly regaining population, according to the Susquehanna County Planning Commission. Susquehanna County, as a whole, has shown an 8 percent increase in population in the five-year period since 1970. Table 1, Appendix, shows that the number of land parcels and assessed value thereof remained almost constant for Montrose Borough in the years 1972-1976. However, in Bridgewater Township, the number of land parcels for this 1972-1976 period showed a 63 percent increase, accompanied by a 20 percent increase in assessed value.

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[1] Jessup Township, Franklin Township, Liberty Township, Apolacon Township, Choconut Township, Forest Lake Township, Friendsville Borough, Little Meadows Borough, Silver Lake Township.

A report issued by the U.S. Census Bureau covering the years 1970-1973 indicates an increase in the five-county Northern Tier Region's[1] population of 5.4 percent. During the same time period, the population of Pennsylvania increased by only 0.9 percent. Each county in the Region experienced an increase in population. Susquehanna County's percentage growth rate of 7.4 percent ranks sixth in the State. The Census Bureau report indicates that while cities are losing population, it is the rural counties which are growing the fastest. The small growth in Pennsylvania's population and the loss of city population indicates that the growth of rural counties is a result of out-migration from the cities and in-migration to rural counties. A projection[2] of the Susquehanna County growth level from 1970 to 1980 shows a rate of increase in population of 15 percent. Historically, the population of the Northern Tier Region reached its zenith in 1890. A decline set in until 1930, caused by migration to the cities. With a reversal of the trend, it is possible that the population of the Region may soon surpass that of 1890.

It is reasonable to assume that these population growth trends will continue in the future within the planning area, namely, a very slow, natural growth within the present borough limits of Montrose Borough, accompanied by a much more rapid increase outside the Borough in Bridgewater Township. Developers have indicated an interest in residential development of 40 to 50 acres north of Montrose Lake, together with establishment east of the lake of a "mini-mall" consisting of 12 stores. The soils of these planned development areas will not, however, support on-lot sewage systems.

4.1.4 Water Quality and Uses

The Montrose Borough area is supplied public water from a privately-owned water company. Other portions of Bridgewater Township within the planning area are supplied with water from deep wells. Numerous farm ponds supply water for livestock.

The Montrose water treatment plant, owned and operated by the Keystone Water Company Division of American Water Works Company, Inc., is situated on the west edge of the spring-fed Montrose Lake. The lake has approximately 44 acres surface area and an estimated 160 million gallon capacity.[3] Raw water is drawn from the lake and is treated with alum and lime in a settling basin. The treated water then flows by gravity through two rapid-sand

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[1] Bradford, Sullivan, Susquehanna, Tioga, and Wyoming Counties.

[2] Projection made by Northern Tier Regional Planning and Development Commission, in its "Comprehensive Water and Sewer Plan, Susquehanna County, Pennsylvania, published in November 1970, page I-6.

[3] Thomas R. Milnes, "Feasibility Report on Wastewater Collection and Disposal System for Bridgewater Township," submitted to Bridgewater Township Supervisors (Tunkhannock: Milnes Engineering, Inc., May 16, 1972), p. 3.

filters, is chlorinated and fluoridated, and is then pumped to an uncovered reservoir located on a hill above the town of Montrose. The treated water flows from the reservoir by gravity through the distribution system. Approximately 800 connections are served. The plant treats an average of 300,000 gallons per day.

4.1.5 Other Environmental Conditions

The planning area has a humid continental climate that provides long, cold winters, cool summers, and plentiful precipitation which is ordinarily well-distributed throughout the year. A sizable part of the annual precipitation falls as snow during the winter months. Prevailing westerly winds bring most of the weather systems affecting this area eastward from the inland continental regions. As a result, the area is subject to a wide variety of weather.

The planning area is characterized by moderately steep hills and narrow valleys. Outside the communities of Montrose and South Montrose, forests and dairy farms are much in evidence.

The planning area is in the Morris-Wellsboro-Volusia soil association, which is typically gently sloping to moderately steep, "somewhat poorly drained" to "moderately well drained" soil on a dissected plateau.[1] Farming is important in this soil association. A large part of this association has sites suitable for ponds. Nearly all of it is suited to silviculture or tree growing. Most of this association has "severe" limitations for many aspects of community development, particularly for on-site disposal of sewage. The major limitations are a seasonal high water table and slow permeability. There are many flagstone quarries.

The effluent of the present sewage treatment plant discharges to Pettis Creek. The State has recently prepared new, rigid effluent requirements which the Montrose sewage treatment plant must satisfy. These requirements, described previously in Section 3, Effluent Limitations, are not presently being met in their entirety. There are no known environmental factors such as wetlands, flood plains and waterways, unique plant or animal communities, or other important fish and wildlife habitats; historic, archeological and cultural features, air quality, or other factors that would be significantly affected by the waste treatment alternatives.

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[1] From General Soil Map, contained in "Soil Survey of Susquehanna County, Pennslylvania," published by United States Department of Agriculture, Soil Conservation Service (Washington, D.C.: U.S. Government Printing Office, August 1973).

A visit was made to the Planning Area on September 28, 1976 by two biologists. Biological and water quality sampling were not performed. All roads in the planning area were travelled, and with the aid of U.S.G.S. topographic maps, the area was examined for valuable or unusual habitats. Wetland, water bodies, flood plains, and plant communities were located and visually examined to the extent possible. The Pennsylvania Fish Commission Waterways Patrolman for the northeast section of the state was contacted for information on the fisheries.

Susquehanna County is located in the southern portion of the Allegheny Section of the Northern Appalachian Highland Division of the Hemlock-White Pine-Northern Hardwoods Forest Region.[1] The original vegetation can be described as hemlock-hardwoods forest, which lacks the more northern conifers and shows the influence of the more southern forest types such as the Oak-Chestnut Region. The composition of the forest today, however, differs markedly fron the original due to the influences of man. The woodlots of the area are composed primarily of red and sugar maples (Acer rubrum) and A. saccharum) and beech (Fagus grandifolia). Other species include oaks (Quercus spp.), hickories (Carya spp.), basswood (Tilia americana), birches (Betula spp.), and black locust (Robinia pseudoacacia).

Younger woodlots, such as those that have grown up from old fields, have aspen, (Populus tremuloides), ash (Faxinus sp.), and hawthorn (Crataegus sp.). The gently sloping to moderately steep topography of the region provides areas where many small ponds have formed. Wetland areas are common along the edges of these ponds. Characteristic trees of these wetlands include hemlock (Tsuga canadensis), sourgum (Nyssa sylvatica), and aspen (Populus tremuloides). Herbaceous species include bracken fern (Pteridium aquilinum), goldenrod (Solidago spp.)., and asters (Aster spp.). Such pond and wetland areas provide habitat for a variety of wildlife such as migrating ducks and geese and mammals such as muskrats.

Lake Montrose, which serves as Montrose's water supply, is located in the northeast portion of the planning area, northeast of Montrose. The eastern shoreline, which is partially wooded, has several newer homes. A large plot of farmland on the northeastern shore is for sale. A large portion of the western and southwestern shoreline is occupied by a golf course. Several new homes are located on the hillside overlooking the western shore, and few older homes are located near the southern shore. Some of these are inadequately served by malfunctioning on-lot sewage treatment systems. Several small boats were on the lake, indicating that it receives some recreational use. Lake Montrose is fed by a small stream that meanders into the southeastern end of the lake. The lake in turn feeds into Snake Creek, which flows northward through primarily agricultural area. Less than a half-mile stretch of Snake Creek is within the planning area.

[1] From "Deciduous Forests of Eastern North America", by E. L. Braun, 1950.

The lakeshore itself has little cover except for a plot of trees on the eastern shore and the northwestern portion near the headwaters of Snake Creek. Much of the gently-sloping shoreline is lawn to the edge of the lake. The lake bottom is most likely mud, and probably supports some aquatic macrophytes.

Few data are available on water quality of the lake. There have been reports of occasional water quality problems in the past, possibly due to drainage from septic tanks, and increasing development in the area. Algal blooms occasionally appear in the lake, but this is typical of lakes in this area of the state.[1]

The lake supports populations of bass (Micropterus sp.), pickerel (Esox sp.), muskellunge (Esox masquinongy), bullheads (Ictalurus sp.), and suckers (Catostomus sp.)[1]. Fishing pressure in the Montrose area is generally heavy, especially on Lake Montrose.

Snake Creek in the planning area is shallow and narrow with a rock, gravel and silt bottom. Its narrow flood plain is not obvious. Its water quality is probably influenced mainly by Lake Montrose, and by land use in its watershed.

The portion of Snake Creek that is within the study area flows through both woodland and farmland. Near the northern shore of Lake Montrose, Snake Creek passes through an oak-dominated woods consisting of oaks (Quercus spp.), hickories (Carya spp.), maples (Acer spp.), and a few hemlocks (Tsuga canadensis). Further north, the creek passes through cropland, some of which has apparently been recently abandoned. A few trees such as willows (Salix sp.), aspens, elms (Ulmus sp.), and maples grow along the stream.

The upper reaches of Snake Creek support populations of bait fishes, such as minnows[1]. Downstream, well north of the study area, it is stocked with trout. Fishing pressure is heavy. A branch of Pettis Creek begins in a small pond north of South Montrose and flows northward. The "main" branch begins in Post Pond, and several smaller ponds east of Montrose (within the planning area) and flows in a westerly direction past the sewage treatment plant south of Montrose. Pettis Creek joins Wyalusing Creek less than one mile west of the planning area.

At the sewage disposal plant Pettis Creek is about three meters wide, and shallow with a rubble and mud bottom. In this stretch, the stream is a closely-spaced succession of short riffles and pools. The stream and some of its tributaries appear to have steep gradients and poorly-defined flood plains. Downstream of the

[1] From a telephone conversation with Mr. R. R. Roberts, Waterways Patrolman, Northeast Region, Pennsylvania Fish Commission, on October 1, 1976.

sewage treatment plant, Pettis Creek flows through extensive meadows that appear to have been used at one time for grazing. A few new homes as well as older farm houses are located in the stream valley. Upstream of the plant the stream flows through farmland, wooded areas, and newly-developed areas.

The Wyalusing Creek near the Pettis Creek confluence is five to six meters wide, shallow and swift, with a rubble and rock bottom. West of Montrose it flows through farmed and wooded areas with spotty new development.

Pettis Creek, like Snake Creek, supports populations of bait fishes such as minnows. The Wyalusing Creek, however, is stocked with trout, and fishing pressure is periodically heavy.

No designated natural areas occur within the planning area. The nearest such area, the Woodbourne Forest and Wildlife Sanctuary, is located approximately 4.5 miles south of Montrose, well out of the area to be affected by the project.

The Sewage Enforcement Officer for Bridgewater Township has stated that soil conditions in the planning area are not, in general, satisfactory for on-lot disposal of sewage. He concludes, however, that if the South Montrose and the Lake Montrose areas, which now lack a sewage collection system, are tied into the Montrose sewage treatment plant, other sewage problems in the Township will be minimal.[1]

4.2 Existing Wastewater Flows and Treatment Systems

There is an existing sewage collection system and treatment plant serving Montrose Borough and its immediate environs. Other parts of the planning area are served by on-lot disposal systems or by holding tanks. The Bendix Navigational Aids plant in South Montrose, which employs 600 people, has its own oxidation-pond system to handle its industrial and domestic wastes.

The Montrose Borough sewage collection system is composed of approximately 55,000 feet of 4-, 6-, and 8-inch sewers, and approximately 19,000 feet of 8-, 10-, and 12-inch interceptor sewers with a single 14-inch line feeding into the sewage treatment plant located one-half mile south of the Borough line. Approximately 95 percent of the built-up portion of the Borough is served. The Montrose Area Junior- Senior High School, located 1-1/2 miles east of the Borough in adjacent Bridgewater Township, is connected to the Borough's sewer system. Certain residents outside the Borough, on the road leading to the high school, and along Route 706, are also connected to this 8-inch line, which is owned and maintained by the school, and which includes a pump station at the junction of Route 706 and the Township road leading to the high school. This line was constructed in 1959-60 at the same time as the school, and is presently in good condition.

[1] Interview with Brayton L. Hollenbeck, Sewage Enforcement Officer, Bridgewater Township, on June 1, 1976.

Much of the existing Montrose Borough sewage collection system was installed prior to 1910, with only minor extensions added over the years. Some cross-connections presently exist with the storm water system; these cross-connections will be eliminated. The present treatment plant was built in 1963, with financial aid under P.L. 84-600, the Federal Water Pollution Control Act of 1956.

The treatment plant employs a two-stage high-rate modification of the activated sludge process to provide a complete treatment of the wastewater it receives. The existing plant includes a grit chamber, comminuting chamber (Barminutor), Parshall flume, primary aeration settling unit, secondary aeration settling unit, chlorine contact tank, digestion tank, and sand drying beds. The plant's control building houses the following facilities: three sludge pumps, air blowers, heat exchanger, chlorination facilities, office space, washroom, and laboratory. The plant hydraulic capacity was re-rated in October 1975 to 410,000 gallons per day of sewage flow, with lifting of the 1971 State prohibition to new connections to the system. During the 12-month period October 1975-September 1976, inclusive, the plant received an average daily flow of 374,916 gallons. Whenever there are periods of heavy rainfall or melting of ice or snow, infiltration and inflow of groundwater and storm water into the sewer system cause flow to exceed plant capacity. The annual operating records shows that, during 1976, the treatment process removed an average 88.2 percent of the biochemical oxygen demand, and an average 72.85 percent of the suspended solids from the plant influent. The chlorinated plant effluent is discharged into Pettis Creek, approximately 60 feet from the chlorine contact tank. The tributary watershed of Pettis Creek at this point is 1800 acres or 2.8 square miles. Waste sludge is anaerobically digested to remove odor-causing organic matter and to reduce the content of pathogenic organisms. The sludge contains sufficient nitrogen, phosphorus, and potash to make it a desirable soil conditioner and fertilizer, and it is distributed over nearby farmland.

4.3 Infiltration and Inflow

4.3.1 Determination of Data

The rate of groundwater infiltration into the Montrose Sewerage system varies between 70,000 gallons per day in the driest period of the year to 360,000 gallons per day in the wettest, with an annual average of about 225,000 gallons per day. In addition, storm water inflow, often exceeding the 1.15 million-gallon-per-day measuring capacity of the Parshall flume at the sewage treatment plant, is received during and immediately after heavy rainfalls. The Regional Water Quality Manager of the Pennsylvania Department of Environmental Resources on October 23, 1975, certified that the Montrose sewerage system was subject to excessive or possibly excessive infiltration/ inflow. (See Certificate, in Appendix.)

Gilbert Associates, Inc. is conducting an infiltration/inflow study as one of the requirements of an overall engineering project involving improvements to the sewage treatment plant. The first objective of the infiltration/inflow study was to estimate the total quantities of infiltration and of inflow which are presently being received into the sanitary sewer system.

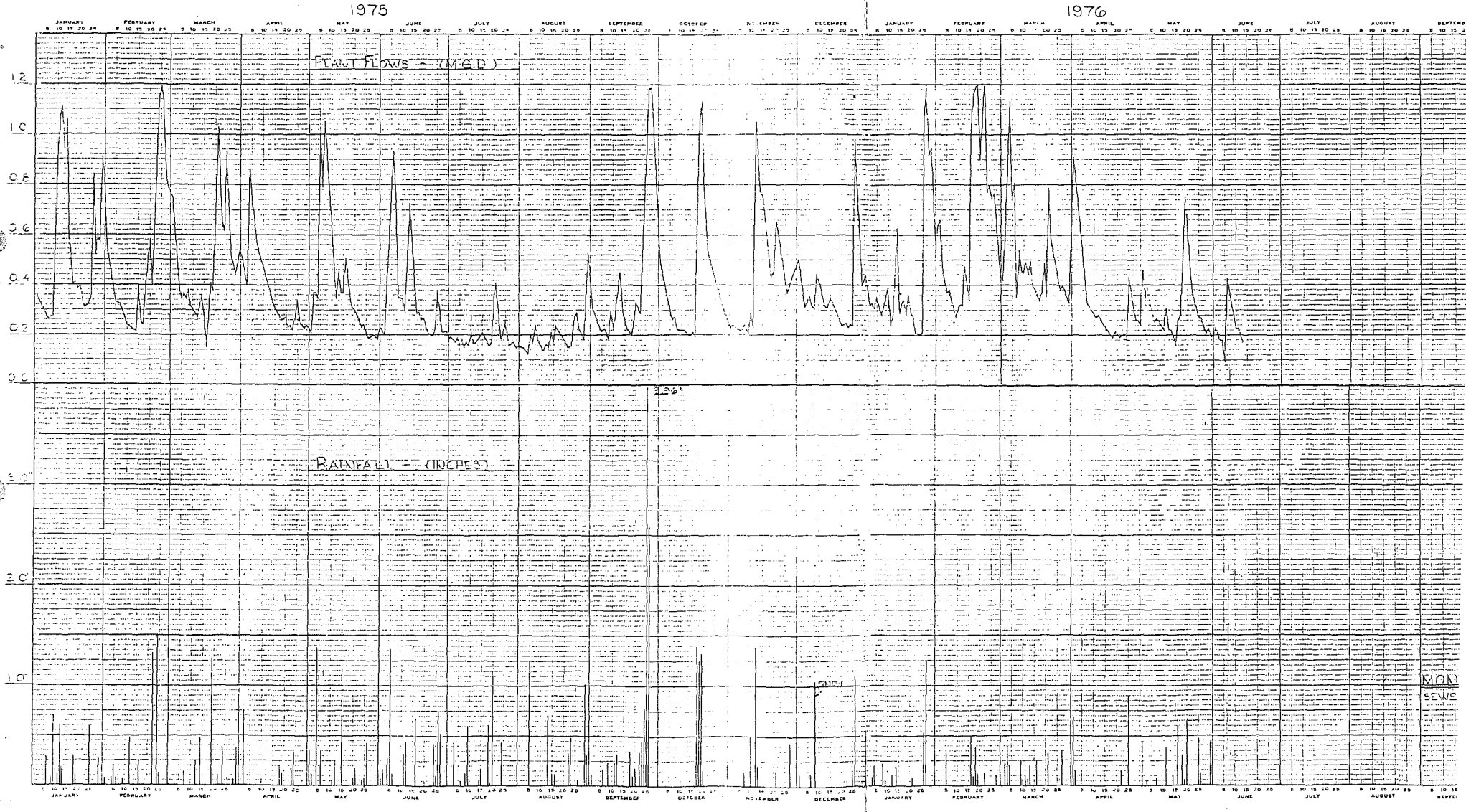
Graph I, which follows, is a hydrograph of the plant flow. The hydrograph is simply a comparison of daily flows received at the treatment plant to daily precipitation received in the area. The objective of the hydrograph is to demonstrate the existence of significant quantities of infiltration/ inflow through demonstrating a correlation between plant flow rate and daily precipitation.

Examining Graph I will show a very definite correlation. For example, on February 21 and 22, 1975, 1.3 and 1.5 inches of precipitation were received; plant flows increased from 400,000 gallons per day to over 1,000,000 gallons per day as a result. On January 26, 1976, a 1.5 inch rainfall increased plant flows from 200,000 to 1,200,000.

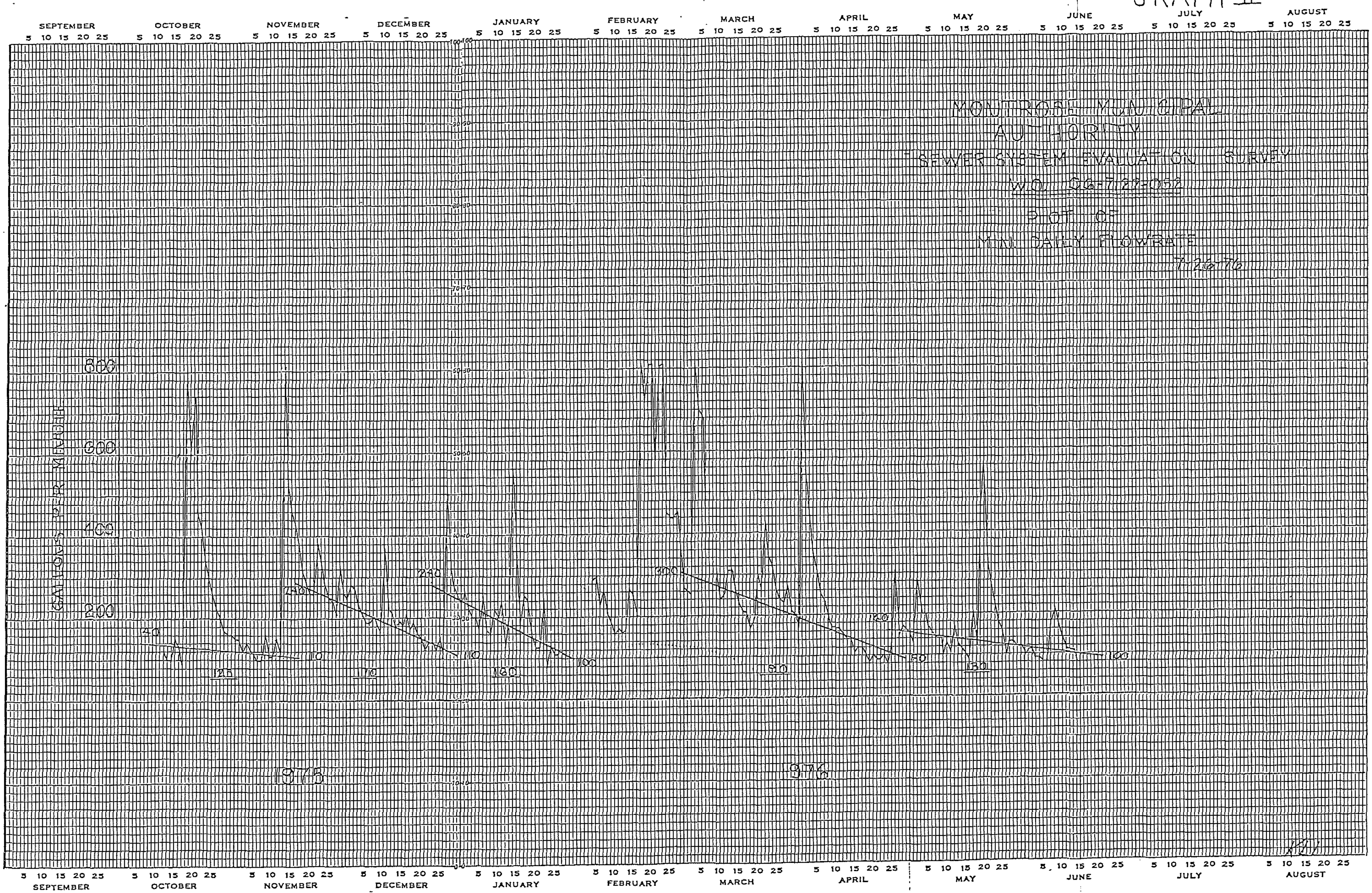
It is significant also to note that rainfall occurring during the "drier" months of the year such as July and August produces a smaller increase in plant flows than would the same amount of rainfall occurring in a "wetter" month. This is so because much of the rainfall during a "dry" month is absorbed by the dry ground and consequently, less of this rainfall enters the sewerage system as infiltration/inflow. This factor is further evidence of the correlation between rainfall and infiltration/ inflow.

Graph II, following, represents an analysis to determine rates of groundwater infiltration entering the sanitary sewer system. Graph II is a plot of daily minimum flow rates as received at the wastewater treatment plant. By minimum flow rate is meant the minimum instantaneous flow rate as received at the plant (usually at 3:00 a.m. or 4:00 a.m.) and expressed in gallons per minute.

The rate of infiltration is dependent upon groundwater table elevation and is largely unaffected by the fall of rain or by the time of day. The flow of wastewater naturally will vary with the time of day, reaching peaks in morning and evening hours when people are awakening or preparing dinner, etc. The flow of wastewater will fall off greatly after midnight when most people are in bed and the remaining flow entering the plant will be mostly from infiltration. Hence, there is a very close relationship between the minimum daily plant flow rate and the rate of infiltration. Therefore, except when it is raining, the minimum plant flow rate and the rate of infiltration will, for all practical purposes, be the same. This is especially true in a town like Montrose where there is no significant quantity of industrial wastewater entering the system. Admittedly this method of analysis ignores the occasional residence or commercial establishment


1975
1976
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
PLANT FLOWS = (M.G.D.)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
RAINFALL = (INCHES)
2.0"
1.0"
MON
SEWS

GRAPH II


SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
5 10 15 20 25
MONTROSE MUNICIPAL AUTHORITY
SEWER SYSTEM EVALUATION SURVEY
PLOT OF
MIN. DAILY FLOWRATE
7-26-76
GALLONS PER MINUTE
800
600
400
200
1975
1976

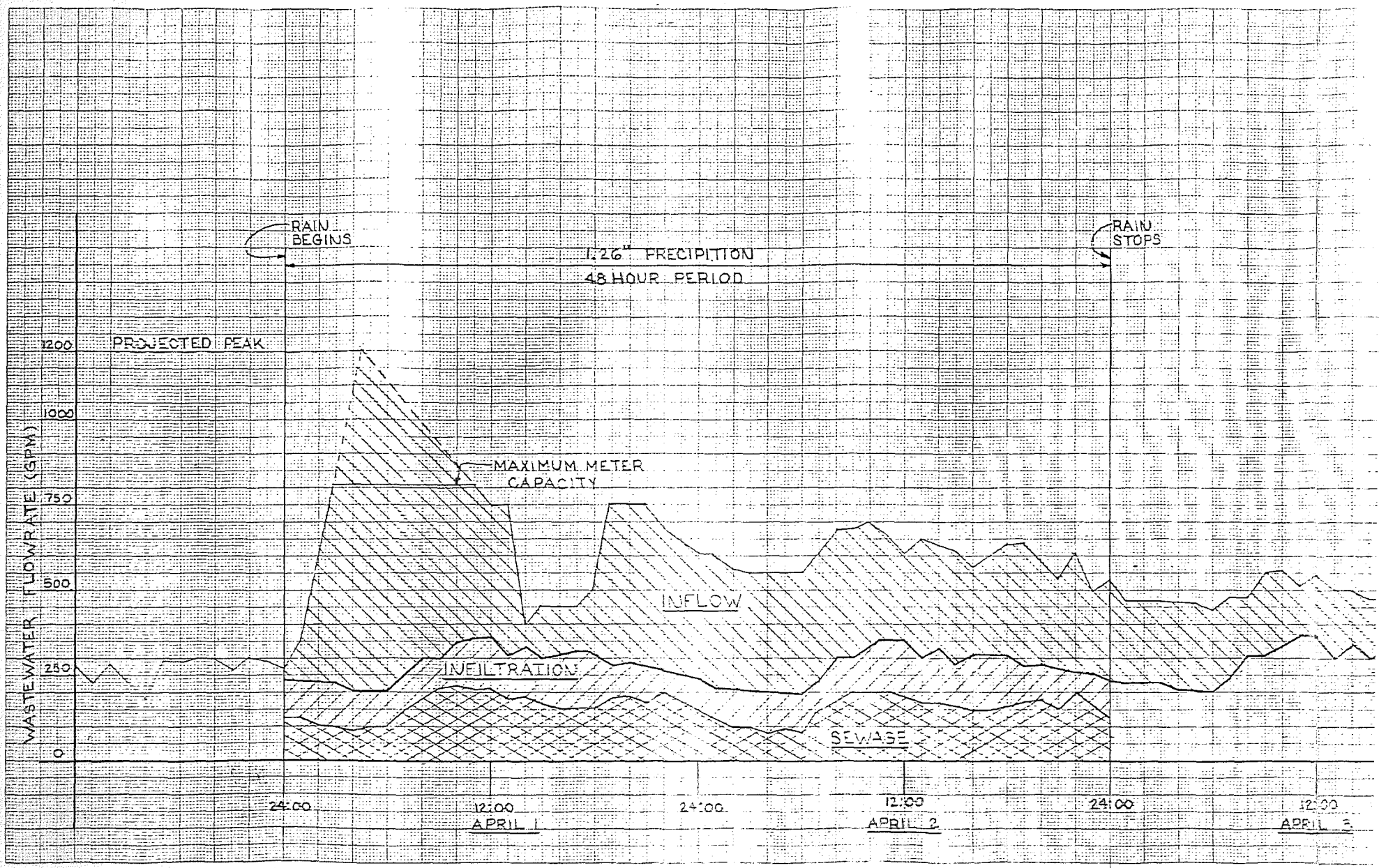
which may generate wastewater after midnight. The quantity of any wastewater generated in this manner will, however, be insignificant in terms of this analysis.

In Graph II, it can be seen that the curve has a pattern of cycles of groundwater infiltration. Each level is associated with a period of rainfall which raises the groundwater table elevation in a period of time. The groundwater table elevation as reflected in minimum flow rates then begins to drop until another rainfall occurs which raises it again and repeats the cycle. For example, in early November, 1975, minimum flow rates were consistently around 110 to 140 GPM. On November 12, rainfall caused the minimum to increase to over 800 GPM. Most of this drastic increase in flow was undoubtedly due to inflow. However, several days later the minimum flow rate was down to 240 GPM. From that point, the rate began a steady decrease until it was down to the previous level of about 110 GPM. The period of time of this decrease in the minimum flow rate from 240 GPM to 110 GPM, which extends from mid-November until late December, comprises one "cycle" or a period of time when maximum to average ground conditions existed. In late December, another cycle was started as heavy precipitation increased the minimum flow rates again to the maximum condition.

On Graph II, a straight line has been drawn to indicate the average minimum flow rate during each cycle, and the high and low limits of this line have been indicated. On the above example of mid November/late December, these limits would be 240 GPM upper and 110 GPM lower. The numerical value of the average minimum flow rate is listed under the curve representing the average minimum flow rate. For the above example, this would be 170 GPM.

For each of the "cycles", an average has been taken and the average of these averages would be the average minimum flow rate, or in other words, the average rate of groundwater infiltration for the period. This average would be 155 GPM or 223,000 gallons per day. Based on this analysis, it was concluded that the average rate of infiltration into the Montrose sanitary sewer system is approximately 225,000 gallons per day. The rate of infiltration into the system under maximum groundwater conditions went as high as 300 GPM or 432,000 gallons per day, but a more ordinary high groundwater rate of infiltration would be approximately 220 GPM or about 360,000 gallons per day.

Graph III is a continuous plot of plant flow rates from 12 noon on March 31, 1976 through midnight on April 24, 1976, a period of 132 hours or 5-1/2 days. Examination of the plot will show that from noon to midnight on March 31, plant flow was averaging about 250 GPM. At midnight, a rainfall began and by 1:00 a.m., plant flow was already increasing. By 3:00 a.m., plant flow rate had reached the maximum meter capacity of 800 GPM and between 5:00 a.m. and 6:00 a.m., it had reached the projected peak rate of 1,200 GPM.

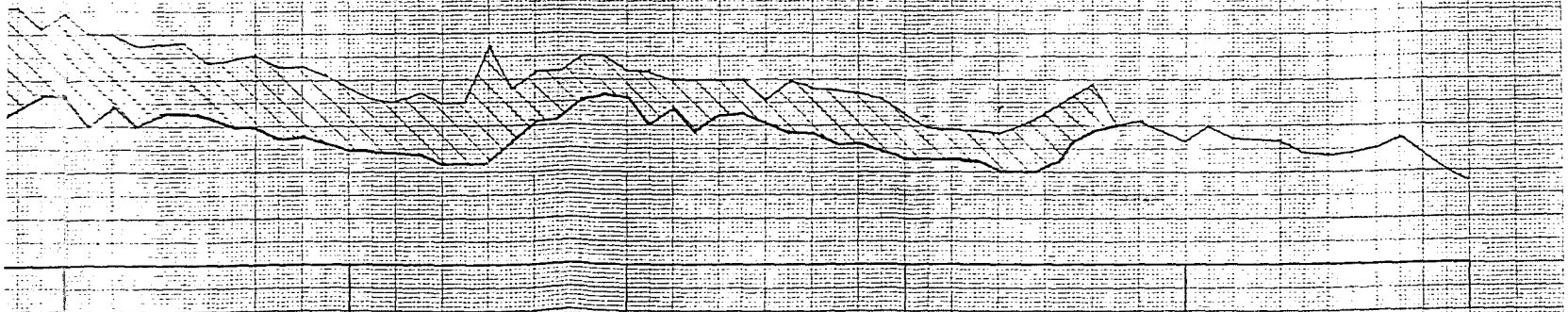

RAIN BEGINS
1.26" PRECIPITION
48 HOUR PERIOD
RAIN STOPS
PROJECTED PEAK
MAXIMUM METER CAPACITY
INFLOW
INFILTRATION
SEWAGE
WASTEWATER FLOWRATE (GPM)
1200
1000
750
500
250
0
24:00
12:00
APRIL 1
24:00
12:00
APRIL 2
24:00
12:00
APRIL 3

GRAPH III

MONTROSE MUNICIPAL AUTHORITY
SEWER SYSTEM EVALUATION SURVEY.
W.O. 06-7122-052

GRAPHICAL ANALYSIS FOR
INFILTRATION/INFLOW

7-23-76



KLL

By 11:00 a.m., plant flow rate dropped back down within the measuring range of the plant flow meter. Precipitation continued on for 38 hours more until midnight, April 2, but plant flow rate did not again exceed the meter measuring capacity.

During the 48 hour period of precipitation, two additional flow curves have been plotted. One curve represents the total flow of infiltration and sewage into the plant during the period, while the other curve represents the flow of sewage only into the plant during the period. The curve representing total flow of infiltration and sewage was obtained by plotting hourly plant flow for a day with similar groundwater conditions during which it did not rain. The difference in plant flow between a day when it does rain and a day when it does not rain, if all other factors are equal, will be inflow.

4.3.2 Summary of Findings

From the above described graphs, it was determined that the peak rate amount of storm water presently entering the sewer system amounts to 5 to 10 million gallons per day. This quantity of flow is 10 to 20 times the present capacity of the plant. A plant expansion program to accommodate this flow would be impractical. The capital investment for such a plant would be prohibitive. Also, the system would probably not operate properly because it would be grossly overdesigned. Flows of 5 to 10 million gallons per day might be expected one or two times a year.

The converse of this plan would be to recommend no plant expansion for inflow, but rather to entirely eliminate the inflow problem at the source. This would require an extensive[1] construction program. Almost the entire central collection system would have to be rebuilt. This would not be economically feasible. Also, the disturbance to normal public activities within the Borough of Montrose would be considerable.

A plan that combines advantages of both alternatives was the one selected for the storm water inflow reduction program. Infiltration and inflow would be reduced by an amount consistent with cost-effective analysis. The decision for making a correction to a leaking sewer would be based on the quantity of flow entering through the leak, the cost of making the repair and the cost of treating the flow associated with the leak. Because of the age of the sewer system and the lack of as-built plans showing its extent, any sewer rehabilitation program short of the complete reconstruction discussed above will still allow some inflow to reach the treatment plant.

[1] Cost would be approximately 2 million dollars.

The Federal Environmental Protection Agency Infiltration and Inflow Program comprises the following steps:

Phase I - Infiltration/Inflow Analysis; Preliminary Study

Phase II - Sewer System Evaluation Survey
- o Physical Survey
- o Rainfall Simulation
- o Preparatory Cleaning
- o Internal Inspection
- o Final Report

Phase III - Sewer Rehabilitation
- o Preparation of Specifications
- o EPA Approval
- o Construction

Since the Pennsylvania Department of Environmental Resources certified[1] on October 23, 1975 that this project is "subject to excessive or possible excessive infiltration/inflow as defined in 40 CFR 35.927", the Phase I Preliminary Study was not required.

Gilbert Associates personnel commenced a Phase II Sewer System Evaluation Survey in March 1976. This consisted of the following steps:

- o A preliminary field survey, to draft an up-to-date sewer system plot plan;
- o A flow analysis, involving detailed tabulation and evaluation of existing flow charts for the past two years, for purposes of a preliminary estimate of the total rate of infiltration/inflow;
- o A field survey, involving physical inspection of over 150 manholes; smoke testing to simulate the effect of rainfall on inflow of storm water into the sewer system and to check for sanitary/storm sewer cross-connecting; and flow monitoring at key points in the system to locate groundwater leaks.
- o Preparation of an infiltration/inflow report to be incorporated into this Facility Plan[2], to make a preliminary determination of the costs of eliminating, transporting and treating infiltration/inflow by the treatment plant, and to arrive at a cost-effective design capacity.

With the Physical Survey and Rainfall Simulation portions of Phase II now complete, Gilbert Associates personnel are now preparing an Interim Report, which must be approved by the Federal Environmental Protection Agency before the remaining steps listed above can be carried out.

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[1] See Certificate, in Appendix.

[2] See Section 6.4.1

4.4 Performance of Existing System

The effects of the following factors on performance of the Montrose Sewage Plant have been considered:

Adequacy of plant design;
Quality of operation and control;
Competence and number of operating personnel;
Adequacy of sampling and testing program;
Adequacy of laboratory facilities; and
Quality of maintenance program.

The hydraulic design of the wastewater treatment plant is adequate for the present and immediate future. If additional connections are made to serve the projected population expansion of Bridgewater Township, however, additional aeration facilities will have to be built, to serve the population projected for the year 2002. Also, additional equipment will have to be provided to enable the plant to meet the effluent quality requirements listed in Section 3.

The plant is well-maintained, and the equipment is kept in good working order. Good records are kept. Weekly and monthly plant operating reports are forwarded to the Pennsylvania Department of Environmental Resources. The plant is visited at least quarterly by representatives of the Consultant, Gilbert Associates, Inc.

There is one plant operator, licensed[1] by the State to operate a sewage treatment plant. An additional operator is being sought.

Weekly operation reports containing pertinent laboratory tests performed and other operating data are sent to Gilbert Associates, Inc., for review.

The plant itself has limited laboratory facilities. Laboratory tests for biochemical oxygen demand and suspended solids are performed under contract with a qualified private laboratory in Binghamton, N.Y.

The maintenance program is good. Mechanical equipment at the plant is inspected daily. Lubrication of equipment is carried out as recommended by the equipment manufacturer. Treatment facilities are cleaned regularly to prevent odor nuisances. The grounds are kept neat and well trimmed. Metallic surfaces are painted as needed. Repairs to pumps and other mechanical equipment are made by the plant operators.

[1] Class D, Type 1

5.0 FUTURE SITUATION

5.1 Land Use

The Act 537[1] Official Plan for Susquehanna County, prepared by the Northern Tier Regional Planning and Development Commission in 1970, stated that existing development in Bridgewater Township is concentrated in the following areas:

- adjacent to Lake Montrose;
- in the Village of South Montrose; and
- adjacent to Heart Lake in the eastern part of the Township.

The Plan further stated that future development may be expected to occur adjacent to Lake Montrose and east of Montrose Borough along State Route 706. In regard to Montrose Borough, it stated that the only 1970-1980 sewer improvements which will be needed will be extensions to serve the developing areas.

There has been no zoning for land use in Bridgewater Township to date. The Borough of Montrose, however, is zoned: see Montrose Zoning Map, Figure 1, Appendix.

In 1973 the Northern Tier Regional Planning and Development Commission prepared a Second Stage Overall Development Program, to identify, on a regional basis, problems and situations which hamper economic development. The Program sets goals and recommends possible strategies, including best use of available land, which when followed will improve the economy of the five-county[2] Northern Tier Region which encompasses the planning area.

5.2 Demographic and Economic Projections

It is reasonable to assume that population growth trends will continue in the future as they have tended in the past, namely, a slow, natural growth within the present borough limits of Montrose, accompanied by a much more rapid increase outside the borough in Bridgewater Township.

As shown in Table 2, Appendix, and as mentioned in the previous Section, the assessed value of land in Montrose Borough has increased less than three percent in the period 1972-1976, whereas that of Bridgewater Township has increased 20 percent. It is reasonable to assume that these trends will continue, and that they will be reflected in future planning-area land values.

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[1] Pennsylvania Sewage Facilities Act of January 24, 1966, which requires all municipalities in the Commonwealth of Pennsylvania to prepare, adopt, and submit to the Department of Health, official plans to provide for the adequate disposal of sewage.

[2] Bradford, Sullivan, Susquehanna, Tioga, and Wyoming Counties.

No new industrial development is contemplated within the planning area itself, which is essentially agricultural and residential in nature. The Second Stage Overall Economic Development Program prepared in 1973 for the Northern Tier District, however, has as a major goal the expansion of manufacturing industry to increase employment, with emphasis upon those industries which are based upon locally-available raw materials. When this program is implemented, it could furnish additional possibilities for employment, within easy commuting distance of the planning area, for residents of the area. For example, development of industrial parks is contemplated in the relatively-nearby communities of Forest City, Susquehanna, and Tunkhannock.

The Environmental Protection Agency Guidance indicates that the facility planning period should extend 20 years beyond the date when the planned facility is scheduled to begin operation. For the purpose of this study, the Consultant has assumed that any expansion or replacement of the existing sewage treatment plant, or construction of any new plant, would take place by 1982. Therefore, the planning period covers the years 1982 to the year 2002.

In order to establish population, and thus establish flows and waste loads for the year 2002, the Consultants have made certain assumptions based upon available data. To build up a total population figure for the year 2002, four distinct entities have been considered separately. These are Montrose Borough, South Montrose, Bridgewater Township other than South Montrose and Montrose Area Junior-Senior High School.

Montrose Borough's population decreased 13 percent in the decade of 1960-1970. The population appears to have stabilized in the 1970's, however, and may even be showing a slight increase, according to the Susquehanna County Planning Commission. This is confirmed by figures shown in Table 2, Appendix; total assessed land parcels in the borough increased slightly, from 773 to 779, in the period 1972-1976. The zoning of the borough, as shown in Figure 1, Appendix, implies that few new single-family residences will be constructed within the borough. According to the 1970 Census, as shown on Table 3, Appendix, the median age in the borough was 37.2 years, vs. 29.3 years for Susquehanna County; the percent of people under 18 years was 30 percent for the borough and 36 percent for the county; the percentage of people over 65 years was 16.6 for the borough and 11.3 for the county; persons per household numbered 2.86, vs. 3.26 persons per household for the county. All of these figures indicate an older-than-average population for the borough, and show a tendency toward a decreasing borough population.

Offsetting this downward population tendency in the borough are certain factors which will tend toward a population increase in the future. These are the proposed establishment within the borough limits of a 100-unit elderly-housing complex; a 100-unit apartment unit; a commercial expansion involving 15 new businesses; and the splitting up of big houses into two-and three-unit dwellings.[1]

[1] Information from Susquehanna County Planning Commission.

All of these factors tend to indicate that the population of Montrose Borough within its present boundaries will increase slightly in the future. Therefore the Consultants have made the assumption that the population of Montrose Borough will be 2,500 people in the year 2002, for design purposes.

In Bridgewater Township, however, the situation is different. The population has increased approximately 20 percent in the years 1970-1975.[1] In the period 1972-1976, the number of land parcels has increased 63 percent and the assessed value of all parcels has increased 20 percent.[2] There is no zoning in Bridgewater Township at present (1976). Figures for the 1970 Census, shown in Table 3, Appendix, indicate a younger-than-average population for the township, when compared with similar figures for Susquehanna County. The median age was 28.3 in the township, 29.3 in the county; 36.8 percent of the township's population were under 18, compared with 36.0 percent in the county; 9.0 percent of the people were over 65, compared with 11.3 percent in the county. Persons per household numbered 3.39 in the township, versus 3.26 persons per household in the county. These figures all show a tendency toward an increasing township population. The only factors militating against a future increase in township population would appear to be economic and environmental, namely, whether residents of the township can continue to find employment within easy driving distance of their homes; and whether their homes can be provided with water and sewage facilities. In regard to economics, the outlook appears bright for the immediate future, with nearby industrial parks proposed, and with industry in Susquehanna County and the surrounding Pennsylvania and New York counties in a period of expansion. Also, plentiful water is available, both from surface sources and from deep wells to the underlying aquifer. Sewerage facilities would be provided for many new homes under the alternatives proposed under this Facility Plan. Others, geographically inaccessible to public sewerage, could be served by conventional on-lot systems such as the standard trench (tile field), seepage beds, and serial distribution systems. Where conventional systems are impracticable, approved alternates such as the elevated-sand or "turkey" mound, the sand-lined system, the oversized system used with aerobic tanks, and the shallow placement system can be used. Where no gravity system is practical, low-pressure sewer systems incorporating grinder pumps can be installed on an individual-property basis, to pump sewage through small diameter pipes to the sewage treatment plant. Considering all of the above factors, and averaging the results of three different methods of population projection,[3] the Consultants have determined that a population of 4,000 people is a realistic figure for Bridgewater Township for the year 2002. Of these, the Consultants have determined that

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[1] Information from Susquehanna County Planning Commission.

[2] Information from Susquehanna County Tax Assessor's Office; see Table 2.

[3] Arithmetic, Geometric, and Apportionment (local populations to increase in the same ratios as county population) methods of projections.

1450 people will be living within the planning area,[1] exclusive of Montrose Borough and Montrose Area Junior-Senior High School.

The wastewater created by local industry has been largely disregarded when compared with the total wastewater handled. Discussions with officials of the Bendix Corporation have indicated that as long as the existing wastewater facility for the plant in South Montrose remains adequate, they have no desire to connect to a municipal sewerage system.[2] The Montrose Area Junior-Senior High School which presently has 950 students in attendance, is connected to the Montrose Sewage Treatment System by a sewer line and pump station owned and maintained at present by the School District. The school serves nine other boroughs and townships in the county beside Montrose Borough and Bridgewater Township. Based on population projections for the county, the Consultants have assumed that an average of 50 school children will be gained per year to the high school enrollment, which would indicate that the Montrose Area Junior-Senior High School would have a student population of 2,250 children in the year 2002. Since these children would not be in residence, except for those living within the planning area who have been enumerated earlier under borough and township calculations, a factor will be applied to this number for design purposes. Based on the 0.25 factor used in the EPA Model Facility Plan, the Consultants have considered that 25 percent of the assumed 2,250-student enrollment of Montrose Area Junior-Senior High School in the year 2002 shall be counted for design purposes, for an equivalent school population of 562 served by the public sewerage system.[3]

A summary of the projected populations for the design year are given below. A more detailed tabulation is given in Table 11, Appendix.

Estimated Total Study Area Population, 2002 A.D.

Montrose Borough, Resident Population	2,500
Bridgewater Township, Resident Population	662
South Montrose	888
Equivalent High School Population	562
Total Design Population, 2002 A.D.	4,612

[1] From projections based on a December 1976, house count; see Table 11.

[2] See letter in Appendix dated August 23, 1976, from Office of the General Counsel, Bendix Corporation.

[3] A figure of 20 gallons per capita per day average flow is given for high schools in Table 2-10, Average Sewage Flows from Institutional Facilities, in Wastewater Engineering: Collection, Treatment, Disposal, by Metcalf & Eddy, Inc., McGraw-Hill, New York, 1972.

5.3 Forecast of Flow and Waste Load

The Montrose Sewage Treatment Plant hydraulic capacity was re-rated to 410,000 gallons per day of sewage flow on October 16, 1975. During the year October 1975 - September 1976, the plant received an average daily flow of 374,916 gallons. During this 12-month period the treatment process removed an average of 88.2 percent of the biochemical oxygen demand (BOD), and 72.8 percent of the suspended solids, from the plant influent. Average effluent 5-day-BOD was 29 ppm, and average effluent suspended solids was 46 ppm, for the 12-month period.

Plant flows are presently on the order of 400,000 gallons per day (GPD) Based on a preliminary infiltration/inflow (I/I) study, infiltration rates were found to average 225,000 gallons per day. Inflow averaged 285,000 gallons per day. However, most of this inflow is presently bypassed and is, therefore, not metered at the plant, and is not part of flow rates as indicated on plant operating reports. Rates of inflow could range from almost zero to as much as 5 to 10 million gallons per day.

Industrial wastes do not appear to be a problem, now or in the future. No new industry is contemplated; and the largest industry in the planning area, the Bendix Corporation facility at South Montrose, has an adequate on-lot system, and, as previously stated, does not wish to be connected to the proposed South Montrose collection system. The American Waterworks Service Company's water treatment plant located at Lake Montrose has a new on-lot system and will not be required to connect to the proposed facilities in the vicinity of Lake Montrose.

The existing Montrose collection system would be extremely difficult to rehabilitate. Most of it was constructed prior to 1918; 4-inch and 6-inch pipe was used for many of the mains; and manholes were constructed at irregular intervals, in some sections over 1,000 feet apart. Thus infiltration will continue to be in evidence in spite of efforts to eliminate it. A program to locate sources of infiltration and inflow in critical areas was carried out during 1975 by the Montrose Municipal Authority. The program consisted of using 6- and 8-inch portable weirs to measure flow between known manhole sections. The data resulting from this study was recorded and transposed on the sewer map. In addition to the above work, 56 sump pumps and 48 roof drains were disconnected from the sanitary sewer system in 1975, thus reducing inflow.

Because of the continued existence of infiltration/inflow into the system, the sizing of the Montrose Sewage Treatment Plant expansion cannot be based strictly on population and per capita flow contributions. Instead, the plant must be sized for the sewage flow of the population plus the infiltration that is expected to remain following rehabilitative measures plus the peak rates of inflow that might be anticipated during a rainfall.

Flow projections are estimated as follows:

First, the average or steady flows are calculated, that is, normal sewage flow plus infiltration. In Table 5, Appendix, three different methods of estimating the design year flow were employed. The average of the three methods yields an average design flow of approximately 400,000 gpd. (The reason that the design year flow is about the same as the present flow is that the increase in flow due to new connections will be offset by a decrease due to infiltration/inflow elimination.)

Second, the peak flows to the plant caused by storm water inflow are considered as a factor in sizing the plant. It is estimated that the design year peak inflow, even after infiltration/inflow reduction measures, would still amount to approximately three million gallons per day. Of this three million gallons, a portion would be rather highly polluted with automotive oil and organic debris that would be washed into the sewer system at the beginning of the rainfall period. This portion of the storm water inflow must receive complete treatment. Following this "first flush" of polluted storm water, it is expected that a significantly cleaner stream of storm water would arrive at the plant, that could be treated sufficiently by screening and chlorination. As an alternative to building a sewage treatment plant of three million gallons per day capacity to treat the peak storm flow, the Consultants recommend construction of an equilization tank which will hold the "first flush" of polluted water for later treatment when capacity becomes available in the plant. The amount of water in the first flush is difficult to determine without conducting a field study of the situation. For the purpose of this report, however, it is assumed that the first flush would be contained in the first one and one-half million gallons of storm water. (As part of the design phase, a study should be carried out to determine more accurately the quantity of flow in the first flush and the consequent size of the equalization tank.) Any storm flow exceeding one and one-half million gallons would receive treatment of only solids removal and chlorination. The hydraulic capacity of the plant is summarized in the table below.

Normal Plant Hydraulic Capacity	Plant Capacity in Gallons Per Day
Dry weather flow (including infiltration)	400,000
Excess capacity (to treat contents of holding tank)	300,000
Plant capacity	700,000
Additional Hydraulic Capacity for Inflow	
Holding tank	1,500,000
Rough treatment	1,500,000
Total combined flow capacity, peak day	3,700,000

Because of the varying contributions of storm inflow expected during wet and dry periods, organic loadings have been determined from operating data on the existing plant rather than from standard per capita contributions of suspended solids and BOD. For the 12-month period ending in August 1976, the average suspended solids and BOD concentrations in the raw sewage influent were 120 mg/1 and 278 mg/1 respectively.

The strength of sewage that would be treated at South Montrose has been determined by using the recommended Department of Environmental Resources per capita contribution for organic loading. This standard is 0.17 lbs/capita/day of BOD.

5.4 Future Environment of the Planning Area Without the Project

Given the poor condition of the planning area soil, the area without additional public sewage collection and treatment facilities will continue to deteriorate with respect to water quality, since soil conditions will not support on-lot sewage treatment systems in most of the area.

This aspect is particularly important in the vicinity of Lake Montrose. Some pollution of the lake had already been noted at the time of this study (1976), from defective on-lot sewage disposal systems on lakeside properties. Since the lake is relatively small, a cumulative buildup of organic matter may occur. This situation could prove to be a serious health hazard, as well as an aesthetic problem, in the future. The lake is used for swimming and boating, as well as being the source of raw water for the water treatment plant which serves Montrose Borough and environs.

Some areas, on the other hand, would be more advantageously sewered by on-lot systems. For instance, to provide sewage disposal for some of the outlying areas of the planning area, it may be more economically feasible to develop sanitary on-lot sewage disposal systems if soil conditions permit. Also, it may be possible to utilize presently malfunctioning on-lot systems by rehabilitating the drain fields.

If additional collection system capacity is not provided at the desirable development areas such as Montrose Lake, an undesirable "patchwork" pattern of development may occur, in areas least able to handle wastewater effluent.

Environmental conditions without additional public sewerage facilities would also suffer in the vicinity of South Montrose, a growing community of over 500 people in 1976. South Montrose at present relies completely on on-lot systems; there is no local sewage collection system or treatment plant.

Finally, if additional equipment to reduce ammonia nitrogen and biochemical oxygen demand is not provided, the effluent from the existing Montrose Sewage Treatment Plant will contribute to the degradation of Pettis Creek, in violation of Department of Environmental Resources regulations.

6.0 ALTERNATIVES

6.1 Optimum Operation of Existing Facilities

The Montrose Sewage Treatment Plant was constructed in 1963 and is designed to provide secondary treatment of sanitary sewage by a modified activated-sludge process. The method of treatment is a two-stage, high-rate process which requires no primary sedimentation and has much shorter aeration periods than conventional activated sludge treatment. Raw sewage enters through a grit chamber and barminutor, thence to a Parshall flume for flow measurement. The Parshall flume has a capacity of 1,150,000 GPD. Sewage is discharged to the center of aeration-settling Unit No. 1 via a twelve-inch influent pipe. Air is added by diffusers. The activated sludge mixed liquor from the aeration chamber passes downward under a skirt into the quiescent zone of the settling chamber. Settled sludge is continuously raked to a hopper, and a sludge pump recirculates it back to the raw sewage line entering the unit. Settled sewage from the No. 1 unit overflows the settling chamber weir and is piped by gravity to the No. 2 aeration chambers. Here the process duplicates the flow of the No. 1 Unit.

Secondary effluent from the No. 2 settling chamber flows over the weir to a chlorine contact tank. The chlorinated effluent discharges through a sixteen-inch outfall line to the receiving stream, Pettis Creek.

Raw sludge is wasted intermittently from the No. 1 and No. 2 Units to the anaerobic digester. Digester supernatant is returned to the head of the plant to be mixed with the influent. Digested sludge is pumped to open beds for drying and eventual land application.

Hydraulically, the plant was designed for an average daily flow of 334,000 gallons per day. In 1975 the plant was re-rated at a capacity of 410,000 gallons per day. For the twelve month period ending September 1975, the average daily flow was 381,900 gallons per day. In that same period the design capacity was exceeded 112 times and the peak design capacity was exceeded 13 times. Most of these cases correspond to periods of significant precipitation.

Following are the basic data upon which design of the existing Montrose sewage treatment plant was predicated:

Year constructed	1963
Design year	1985
Design population	3,340 (equivalent)[1]

[1] The estimated 1985 Montrose population was 2,950; to this was added population equivalents for the "Montrose Consolidated Joint High School" (now known as Montrose Area Junior-Senior High School) and the residences along Route 106.

BOD contribution per capita	0.17 lb/capita/day
Sewage flow	100 gal/capita/day[1]
Avg. daily flow	0.334 MGD
Avg. daily flow (re-rated)	0.410 MGD
Maximum flow	0.963 MGD
Minimum flow	0.115 MGD

From the data, it is evident that the existing plant could hydraulically accommodate the design year sewage flow providing that about 90,000 gallons per day of infiltration is eliminated. However, as mentioned in the previous section, the sizing of the Montrose plant must also be able to treat the "first flush" of storm water inflow. This can be accomplished by adding an additional 300,000 gallons per day of capacity to the plant and a 1.5 million gallon flow equalization tank.

Prior to 1975, the treatment plant was required to meet the standard secondary treatment level of 85 percent reduction of BOD_5 and suspended solids, plus disinfection. In conjunction with the re-rating of the plant hydraulic capacity in October, 1975, more stringent discharge requirements were proposed by the Pennsylvania Department of Environmental Resources. Among these requirements are a total suspended solids standard of 10 mg/l or less and an ammonia nitrogen standard of 0.5 mg/l or less during the summer months. At present, the plant is not achieving these levels of treatment.

6.2 Regional Solutions

A regional solution to the sewerage problems of the Borough of Montrose and all of Bridgewater Township is presently not feasible. Relatively sparse population and geographical factors will prohibit an economic regional solution. At this point in time, "regionalization" should be limited to the Planning Area delineated by the Plan of Study.

6.3 Waste Treatment Systems

6.3.1 Basic Systems

Alternative treatment systems must be considered as part of a Facility Plan. The four basic plans are as follows:

a. "no-action" plan

b. treatment and discharge of effluent

c. treatment and reuse

d. land application

[1] Includes allowance for industrial wastewater and infiltration.

Existing undesirable conditions would continue to exist and would eventually become aggravated if no action were taken. The continuing deterioration of the collection system would interfere with efficient operation of the sewage treatment plant, especially during periods of heavy runoff. At present the effluent of the treatment plant is not meeting the rigorous EPA/DER standards for ammonia nitrogen and suspended solids, although effluent five-day Biochemical Oxygen Demand (BOD) concentrations are within the required limit. Improper operation of the sewage treatment plant due to infiltration could produce effluent with high bacterial and BOD concentrations. Water quality of Pettis Creek would worsen, with resulting unfavorable effects on the aquatic biota. If this condition should continue, the water quality of Wyalusing Creek, a trout stream, could be affected. The on-lot sewage systems in Bridgewater Township would continue to use soils with "severe" limitations for wastewater treatment. Continued use of unsuitable soils for on-lot disposal could be expected to increase bacterial and BOD concentrations in nearby water bodies, including Lake Montrose, where water pollution has been observed.

Also, the ban on connections would doubtless be re-imposed.

Treatment and discharge of effluent is the scheme currently being used for sewage disposal in the Study Area. Although operational problems do exist, the existing sewage treatment plant, which is a high-rate modification of the activated sludge process, has functioned adequately under the proper conditions. It is felt that with additional treatment units and renovation of existing facilities, the plant can be made to operate reliably under a variety of loading conditions. Therefore, activated sludge treatment and discharge will be considered as a viable treatment scheme for this Facility Plan. Activated sludge plants can be operated to establish and maintain bacteria to nitrify ammonia. This can be accomplished by supplying preliminary clarification and aeration followed by additional aeration to ensure that the nitrifying organisms will propagate at a faster rate then they are destroyed. Additional clarifier capacity is provided to handle the higher mass of microbial growth which results. Several other new techniques have been employed to increase the capabilities of activated sludge plants, such as rotating discs and packed towers to maintain extra biological solids; these techniques are described in Paragraph 6.4, which follows.

Among other forms of treatment and discharge of effluent to be considered are waste stabilization ponds. These ponds, familiar to and favorably received by local residents, could be an attractive alternative because of their low energy requirements and simplicity of operation. They "require little energy because they rely on natural forces such as aeration and produce minimum quantities of sludge. A multicelled pond with intermittent-discharge capabilities can achieve secondary treatment and best practicable treatment without additional aeration or filtration if average loading does not exceed 20 pounds of 5-day BOD per acre per day and if it has at least a 6-month storage capability. However, this is not true of ponds which discharge continuously. Normally, ammonia is readily converted; however, BOD_5 removal and ultimate

removal of nitrogen, both of which are dependent upon the effective capture of suspended solids, are more difficult. Ponds with lesser capabilities can employ mechanical aeration or rely on pretreatment (such as primary sedimentation) or postfiltration to achieve the required levels. High solids carry-over, seasonal changes, algae growth, hydraulic short-circuiting, and overload conditions are problems which arise in many ponds and make achieving the standards more difficult".[1]

Treatment and reuse is a concept applicable to areas where there is an economic base for water reuse. Less than two percent of the Nation's treated water is reused, mostly to irrigate land; some is used for industrial cooling water or groundwater recharge. Public health authorities and water experts are still unwilling to endorse reuse of water for drinking without further research into its health aspects.[2] Considering the sparsely populated nature of the planning area and the adequate supplies of water available, treatment and reuse does not appear to be an economically valid alternative at this time. The Bendix Corporation and the Montrose Golf Course might both have use for nonpotable water. However, their own supplies are adequate and the sewage treatment plant could probably not make water available on a competitive basis.

Land treatment is the application of wastewater, and the nutrients it contains, on the land by one of three basic approaches: irrigation, overland flow, and infiltration-percolation. In the irrigation mode, the wastewater is applied onto relatively flat land by spraying or by surface spreading. In an overland flow system, the wastewater is sprayed over the upper edges of sloping terraces and flows slowly down the hill and through the grass and vegetative litter. In infiltration-percolation systems, the primary goal is to recharge groundwater by percolating as much wastewater into the ground as possible via spreading basins.

The space requirements for land treatment are a function of the level of treatment required and the soil type. They range from 100 to 600 acres per million gallons per day of capacity.[3] Most of the soils in the Township and the Borough possess "severe" limitations for an on-site disposal of sewage. The impermeable nature of the soil would not permit the required natural filtration; and there is the possibility that the seasonally high groundwater table could become polluted. For the above reasons, the land treatment alternative will be considered only for the effluent of the proposed alternatives for South Montrose, namely, the package treatment plant effluent or the stabilization pond effluent.

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[1] Alternative Waste Management Techniques for Best Practicable Waste Treatment," U.S. Environmental Protection Agency, Washington, D.C., 1975.

[2] "Technology and $20 billion advance wastewater treatment effort", Engineering News-Record, October 2, 1975.

[3] "Environmental Pollution Control Alternatives: Municipal Wastewater" p. 51. U.S. EPA Technology Transfer, prepared by Gordon Culp, 1975.

The existing on-lot systems in Bridgewater Township would come under the general heading of land treatment. Many of these systems are malfunctioning, because of the "severe" soil conditions existing. These deficiencies are particularly noticable in the vicinity of Lake Montrose, where flow of insufficiently treated sewage to the lake has been observed. Rehabilitation of these malfunctioning on-lot systems should be investigated, to include the four new alternate systems permitted under the latest Department of Environmental Resources regulations. The alternates approved are the elevated sand mound; the sand-lined system; the oversized system (used only with aerobic tanks); and the shallow placement system. Philosophy of the Department of Environmental Resources is that wherever possible, any sewage disposal system that is malfunctioning should be repaired rather than replaced. Therefore, the first-priority step is to determine the cause of the malfunction, and to repair the existing system if possible. If the causes of the problem are soil or site limitations, the solution may be to install one of the alternate systems listed above. If all other possibilities for abating pollution or correcting environmental health hazards have been exhausted, the home-owner should consider the use of a holding tank. If installation of public sewers is foreseen, the use of a holding tank could be considered as an interim solution to the problem. In any event, rehabilitation is the responsibility of the home-owner; and a permit is required, from the local Sewage Enforcement Officer or from the Department of Environmental Resources.

6.4 Evaluation of Treatment Alternatives

In Section 6.3, basic treatment systems were screened for their applicability to the sewerage problems of the Borough of Montrose and Bridgewater Township. In this section, specific unit processes will be evaluated to select the optimum treatment process.

The alternatives considered are presented in the table below.

ALTERNATIVES

I. INFILTRATION/INFLOW

- A. Selection of Optimal Montrose Sewage Treatment Plant Design Flow
- B. Equalization Storage for Storm Water Inflow

II. TREATMENT SYSTEM

- A. Rotating Biological Discs
- B. Packed Towers
- C. Single Stage Nitrification

III. SLUDGE DIGESTION

A. Two Stage Anaerobic Digestion
B. Aerobic Digestion

IV. SLUDGE DEWATERING

A. Drying Beds
B. Vacuum Filtration

V. TERTIARY TREATMENT

A. Granular Dual-Media Filtration
B. Microscreening

VI. SOUTH MONTROSE SEWERAGE ALTERNATIVES

A. Package Treatment Plant
B. Waste Stabilization Pond and Spray Irrigation System
C. Pumping Station and Force Main to Montrose

6.4.1 Infiltration/Inflow

Selection of Optimal Montrose Sewage Treatment Plant Design Flow

The optimal design flow is that which allows for the most economical combination of costs for treating and transporting total wastewater with costs for rehabilitating the sanitary sewer system to eliminate infiltration/inflow. The selection of the optimal design flow was done graphically and in accordance with guidelines in "Handbook for Sewer System Evaluation and Rehabilitation," published by the U.S. Environmental Protection Agency in December, 1975. This method makes use of the engineering technique of cost-effectiveness analysis.

In order to perform the cost-effectiveness analysis, field work was conducted to assess the general physical condition of the sewer system. This information was generated through physical inspection of manholes, through flow monitoring, and through rainfall simulation tests. Detailed information regarding the physical condition of the sewer system will be presented in the report on the Sewer System Evaluation Survey which is in progress.

For the purpose of selecting the optimal design flow, two types of costs were developed and compared, these being;

- costs for rehabilitating the sewer system to eliminate infiltration/inflow,

- costs for transportation and treatment of total wastewater flow including infiltration/inflow. For convenience and validity of

cost comparison, all costs were converted to their present worth or average annual equivalent values. The facility planning period of twenty years and the most current interest rate of 6-3/8% (as published in the Federal Register by the Water Resources Council) were used for present worth determinations.

Graph IV, following, shows the variation of infiltration/inflow elimination costs and of wastewater transportation and treatment costs as functions of the percentage of total infiltration/inflow which would be eliminated. Both curves are appropriately labeled.

Graph IV shows that if 40 percent of the total infiltration/inflow were eliminated, rehabilitation costs would be about $180,000 and transportation and treatment costs would be about $1.92 million (present worth value of capital, operation and maintenance costs over the 20-year design life of the project) for a total cost of about $2.10 million. If 70 percent of the total infiltration/ inflow were eliminated, rehabilitation costs would rise greatly, to about $2.08 million, while transportation and treatment costs would drop slightly, to about $1.64 million for a total cost of about $3.72 million.

Also shown on Graph IV is a composite cost curve. This curve simply represents the graphical combination of the transportation and treatment cost curve and the infiltration/inflow elimination cost curve. The minimum point on the composite cost curve represents the most cost-effective combination of treating and eliminating infiltration/inflow. This minimum cost point occurs at 50 percent of infiltration/inflow elimination. This means that 50 percent of the total infiltration/inflow (about 250,000 gallons per day on an annual average basis) can be cost-effectively eliminated while the remaining 50 percent should not be eliminated but rather should be treated.

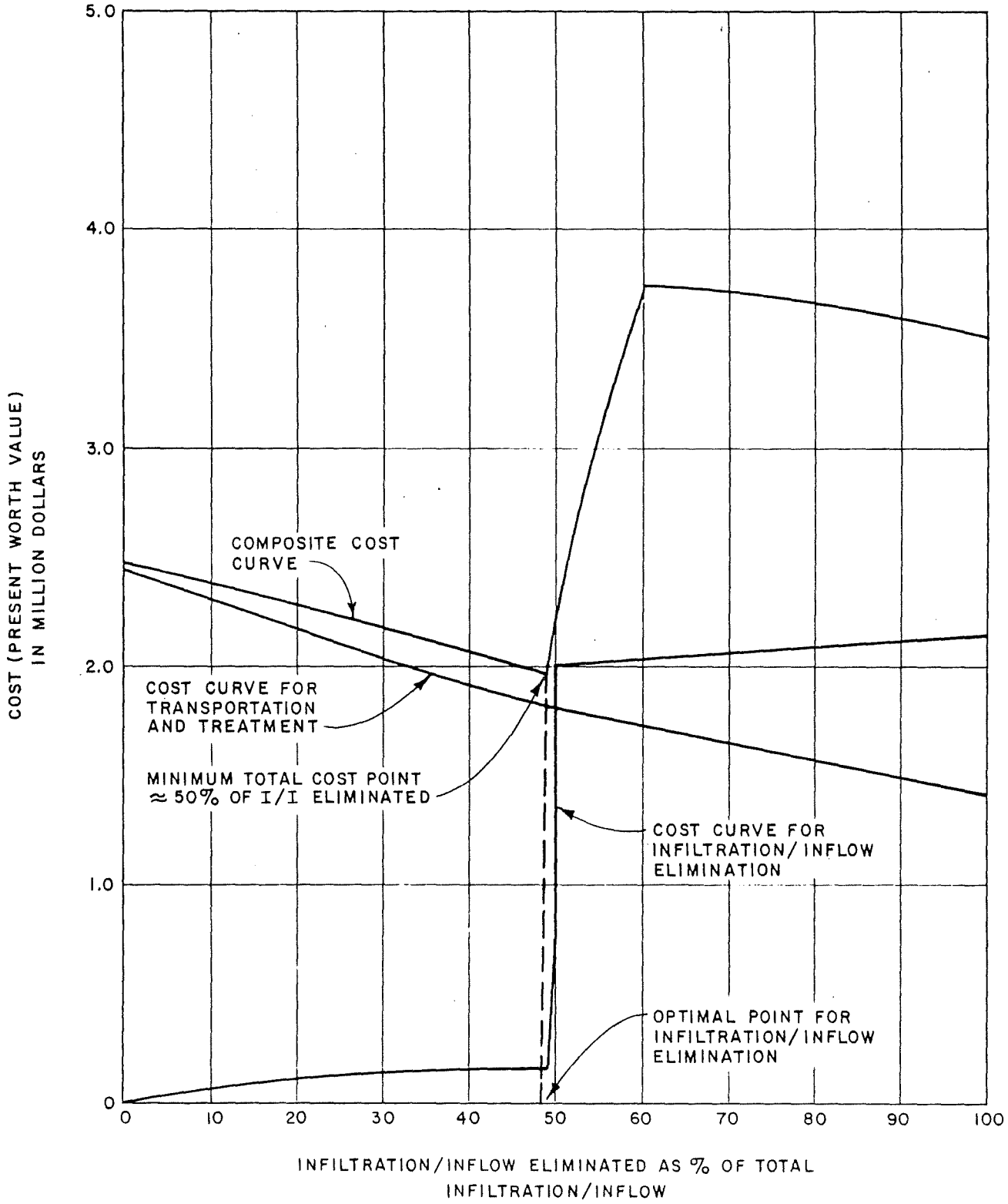
Note that there is a sudden increase in infiltration/inflow elimination costs which occurs at about 50 percent of infiltration/ inflow eliminated. The reason for this is directly related to the age and physical condition of the sanitary sewer system.

The system can be conveniently divided into four segments, these being, the east interceptor system, the west interceptor system, the school system, and the central system. Most of the east, west, and school systems have been designed and built in accordance with modern, acceptable standards. However, most of the central system was constructed prior to 1918, and modern construction and design techniques were not used. For example, manhole sections sometimes exceed 400 lineal feet; changes of direction and junctions of sewer lines are not made inside manholes, 4-inch and 6-inch pipe is used for sanitary sewer mains, and other violations of good design standards. Because of this, conventional sewer rehabilitation could not be used in these older parts of the system. Infiltration/Inflow elimination in these parts of the system would entail complete replacement of the sanitary sewers and laterals.

GRAPH IV

MONTROSE MUNICIPAL AUTHORITY

PRELIMINARY COST-EFFECTIVE ANALYSIS TO DETERMINE INFILTRATION / INFLOW TO BE ELIMINATED



The sudden increase of infiltration/inflow elimination costs in Graph IV reflects this factor. The Graph shows that up to about 50 percent of the total infiltration/inflow can be eliminated through conventional methods at a relatively low cost. To eliminate more than 50 percent, however, would involve replacing a large part of the sewer system and eliminating most of the remaining infiltration/inflow in the remainder of the system.

The information discussed at the beginning of this Section, as well as the information developed in Graph IV, was used to develop Graph V which follows. This Graph shows the variation of infiltration/inflow elimination costs, and of wastewater transportation and treatment costs, as functions of design flow. Both of these curves are appropriately labeled.

Graph V shows that if a 600,000 gallon per day treatment plant were built, wastewater transportation and treatment costs would be about $1.64 million and infiltration/inflow elimination costs would be about $2.10 million for a total cost of $3.74 million. If a 900,000 gallon per day treatment plant were built, wastewater transportation and treatment costs would be about $2.39 million and infiltration/inflow elimination costs would be about $60,000 for a total of about $2.45 million.

As was the case on Graph IV, a composite cost curve is also shown on Graph V. The minimum point on this composite cost curve represents the optimal design flow in terms of cost-effectiveness. As can be seen, the optimal design flow would be 700,000 gallons per day.

As a result of the graphical analysis shown on Graphs IV and V, it is concluded that 700,000 gallons per day should be the design flow, and that approximately 250,000 gallons per day of infiltration/ inflow should be eliminated from the system. This combination represents the most cost-effective manner of treating or eliminating the infiltration/inflow into the system.

The selection of the optimal design flow as being 700,000 gallons per day can be demonstrated by the following table.

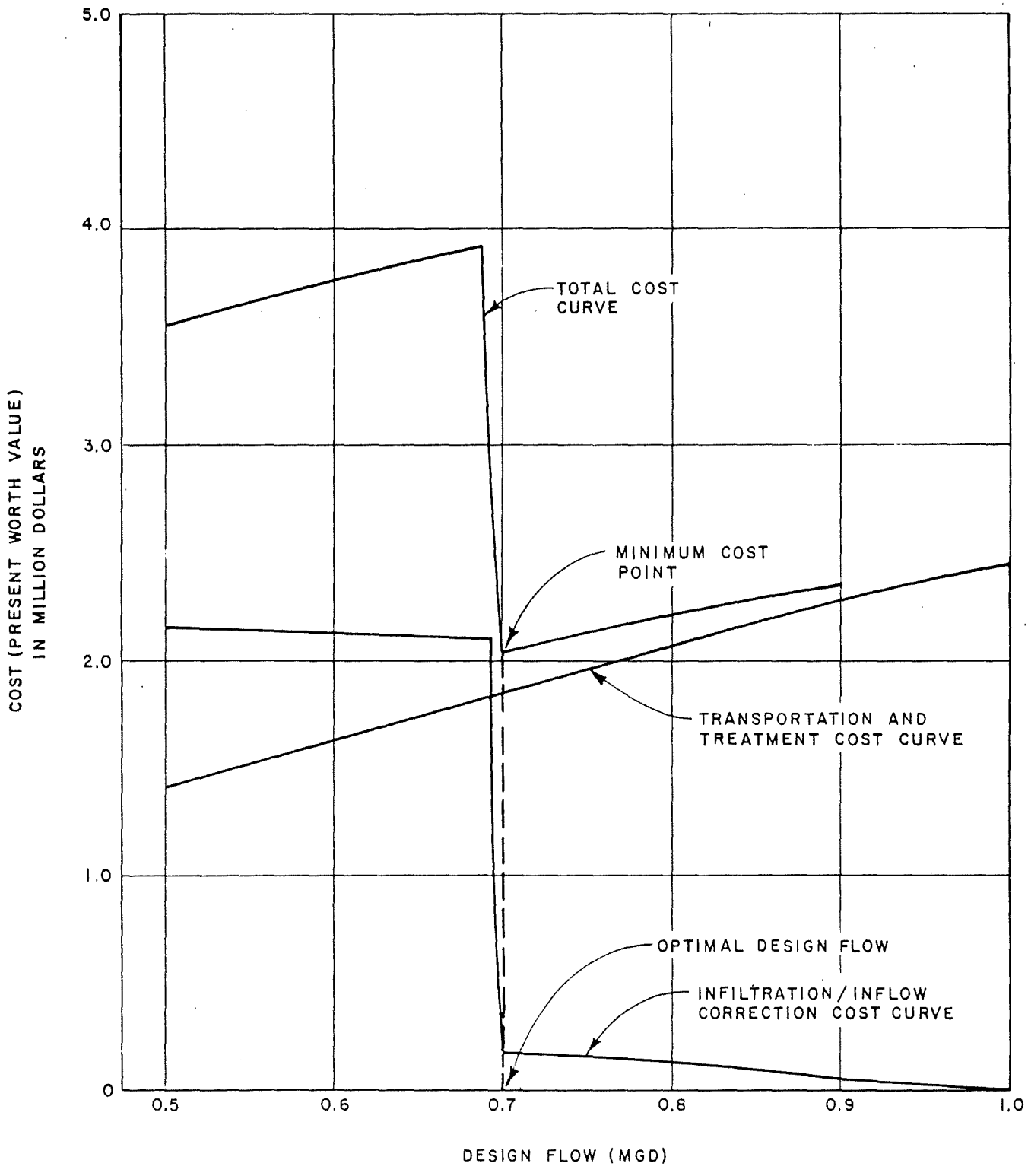
Design Flow (GPD)	Transportation and Treatment Costs (Million Dollars)	Infiltration/Inflow Elimination Costs (Million Dollars)	Total Costs (Million Dollars)
500,000	$1.40	$2.15	$3.55
600,000	1.64	2.10	3.74
700,000	1.86	0.18[1]	2.04
800,000	2.07	0.12	2.19
900,000	2.39	0.06	2.45

[1]Rounded to $200,000 in subsequent cost tables.

GRAPH V

MONTROSE MUNICIPAL AUTHORITY

DETERMINATION OF OPTIMAL DESIGN FLOW



In the above, the total costs which would be associated with the construction of various size plants of 500,000 GPD through 900,000 GPD capacity have been listed. As can readily be seen, total costs associated with the 700,000 GPD plant are the least.

It must be kept in mind that the graphical analyses discussed in this section are preliminary and are performed prior to the completion of the sewer system evaluation survey. Accordingly, the quantity of infiltration/inflow to be eliminated and the optimal design flow may change during the final design stage of the project.

Equalization Storage for Storm Water Inflow

To eliminate the possibility of a process upset caused by high storm flows, an equalization or holding tank should be built. This tank would be sized to hold half of the storm water inflow that will still enter the sewer system after infiltration/inflow corrections. In the event of a storm contributing significant quantities of inflow, a bypass valve would be opened which would direct flows in excess of 0.7 million gallons per day to the equalization tank. The tank would be sized to hold the "first flush" of storm water. This first flush is highly contaminated with automotive oils and organic debris. Subsequent storm flows, being less polluted, would bypass both the plant and the equalization tank and would receive treatment consisting of screening and chlorination only, before discharge to the receiving stream. Following the storm, as capacity becomes available in the plant, the stored storm water would be introduced into the treatment process for complete treatment. A low lift pumping station would be required to pump the sewage from the equalization tank to the treatment process.

6.4.2 Treatment System

The most difficult requirement to be met by any treatment system which discharges effluent to a planning-area stream is the ammonia nitrogen effluent requirement, namely, a maximum of 1 milligram per liter (mg/l) in summer and 1.5 mg/l in winter. The existing Montrose Sewage Treatment Plant cannot meet these requirements; samples taken on July 19th and 20th, 1976, for example, showed effluent ammonia nitrogen concentrations of 14 mg/l and 9.5 mg/l.

Treated wastewater effluent containing ammonia nitrogen consumes dissolved oxygen in the receiving water, and it can be toxic to fish life. Oxidation of ammonia nitrogen to nitrate nitrogen, a process known as "nitrification", will convert the nitrogen to a form which will not affect the receiving stream adversely. Three treatment systems which include nitrification as part of their processes are described below.

A. Rotating Biological Discs

From operating data on the two aeration/settling units, it is evident that a large percentage of BOD and suspended solids removal takes place in the primary unit with comparatively little taking place in the secondary unit (see Table 4, Appendix). This alternative involves operating the two units in parallel thereby doubling the hydraulic capacity and suffering only a small loss in treatment efficiency. The lost treatment efficiency will be recovered by a series of rotating biological discs. These units would provide the additional treatment necessary to attain the proposed effluent standards for ammonia nitrogen and BOD_5. The facility would consist of 12-foot-diameter plastic discs mounted upon eight 25-foot-long shafts rotating in a concrete tank and housed under fiberglass enclosures.

B. Packed Towers

This alternative utilizes packed towers to effect the bulk of secondary treatment. A packed tower very closely resembles a conventional trickling filter; however, there are two significant differences which make packed towers a more attractive alternative than trickling filters. In place of crushed rock, the towers employ manufactured media which have a much higher specific surface (square feet/cubic feet) and a corresponding higher percentage of void spaces. This permits greater biological slime growth without inhibiting the passage of oxygen. Secondly, as a result of using lightweight plastic media, towers can be built on a smaller area than trickling filters and still maintain long contact times.

This alternative consists of primary treatment, packed towers, and single stage nitrification. The primary treatment would consist of two twenty-five-foot-diameter primary clarifiers followed by two pumps to lift the sewage into the towers. The packed towers would be twenty feet tall and each would have a surface area of 20 x 30 feet. Nitrification would take place in the two existing aeration units supplemented by two plug flow aeration facilities with 15,600 cubic feet of capacity each. Secondary clarification following the nitrification stage would require the installation of two 25-foot diameter units.

C. Single Stage Nitrification

This alternative consists of primary treatment followed by single stage nitrification using expanded aeration facilities. Secondary treatment is achieved by providing additional aeration facilities and therefore, longer detention times.

This alternative would require two new 25-foot-diameter primary clarifiers. The longer detention time would require two plug flow aeration tanks with 25,300 cubic feet of volume each. Finally, two secondary clarifiers of 25-foot diameter each will be required.

6.4.3 Sludge Digestion

Consideration was given to a no-action plan for sludge digestion. With the increased sludge production anticipated for the design year, there would be inadequate detention time for proper stabilization.

A. Two-Stage Anaerobic Digestion

In this process, two digesters operating in series would separate the function of biological stabilization from gravity thickening and storage. The sewage in the first-stage high-rate unit is completely mixed and heated for optimum digestion. Mixing is accomplished by one or more of a variety of mixing devices. The discharged sludge would have a lower solids concentration than the raw feed because of the conversion of volatile solids to gaseous end products.

The second-stage digester would be a floating-cover type with provisions for withdrawing supernatant. By minimizing hydraulic disturbances within the tank, density of digested sludge and clarity of the supernatant are both increased.

B. Aerobic Digestion

This alternative would require the conversion of the anaerobic digester to an aerobic facility. Gas piping and mechanical equipment would be removed and a mechanical aerator would be installed. After the conversion, the tank would have a capacity of 16,000 cubic feet. An additional tank of 16,000 cubic feet would be required to attain sufficient detention times of about 20 days.

6.4.4 Sludge Dewatering

A. Drying Beds and Sludge Applicator Truck

There is adequate sludge drying bed surface area for present-day needs. However, the beds are often near capacity because of adverse weather conditions. This alternative would utilize the drying beds in their present condition. They would be backed up by a sludge applicator truck which would carry digested sludge to farmland and either spray it on the surface or inject it into the topsoil.

B. Vacuum Filtration

This alternative would require a vacuum filter to produce a dewatered sludge. The filter would be housed in the control building. Using the vacuum filter for dewatering would free the 7,000 square feet of sludge drying bed area for future plant improvements.

6.4.5 Tertiary Treatment

A. Granular Dual-media Filtration

In order to meet the proposed effluent requirements, it will be necessary to provide a unit process capable of producing an effluent low in suspended solids concentration. This can be accomplished by the use of a dual-media (anthracite and sand) filtration system. This alternative would require considerable expense for backwash pumps and storage and would have to be located in the control building. It would also require pilot studies to form a rational basis for design of the filter.

B. Microscreening

Microscreening is another method of obtaining a high-quality effluent. In this process, wastewater enters the opened end of a partially submerged, rotating drum. The wastewater passes through a screening cloth on the drum and the collected solids are washed off by high pressure jets. The facility proposed in this alternative would have a ten-foot-diameter by ten-foot-long drum and would also have to be located in a building.

6.4.6 South Montrose Sewerage Alternatives

A. Package Plant

A possible treatment alternative for South Montrose would be a factory-built sewage treatment plant. There is a wide variety of models available from various manufacturers. The one selected for this application is a two-stage activated sludge plant consisting of a primary and final aeration tank, final settling tank, comminutor, bar screen, splitter box, blowers, aerated sludge holding tank, and chlorine chamber. An aerated flow equalization tank would precede the plant for the purpose of smoothing out peak flows. A tertiary rapid sand filter is also included in the plant to insure that the suspended solids discharge requirements are met.

In the two-stage activated sludge process, flow is through a pair of aeration tanks in series. The detention time in each tank is about 12 hours. With this arrangement, carbonaceous BOD is

mostly removed in the first tank and nitrification takes place in the second tank. Excess sludge would be stored in the sludge tank until it could be removed by truck and distributed on farm land.

The plant would be located about 2,500 feet southwest of the center of South Montrose. Discharge would be to an unnamed tributary of the Wyalusing Creek. Discharge requirements, according to the Department of Environmental Resources, would be identical to those for Montrose treatment plant discharge to Pettis Creek.

B. Waste Stabilization Pond and Spray Irrigation System

Waste stabilization ponds are large shallow ponds designed to treat wastewater through the interaction of sunlight, wind, algae, and oxygen. Typically, raw wastewater enters the pond at a single point in the middle of the pond or at the edge. Ponds are usually two or four feet deep; at least deep enough to prevent weed growths, but not deep enough to prevent mixing by wind currents. Shallow ponds usually contain algae-released oxygen through nearly all of their depth; the only portion devoid of oxygen is the sludge layer at the bottom. The sludge deposits must eventually be removed by dredging. To eliminate the dependence of the sewage-consuming aerobic bacteria on algal-produced oxygen and to reduce the area required by the pond, aeration equipment is sometimes installed in the pond to supply oxygen. Aerated ponds are typically about one-fifth the size of a conventional oxydation pond. They are usually followed by a quiescent, second-stage pond to remove most of the suspended solids from the effluent. Pond construction entails the building of a gently sloping embankment, together with some sort of impervious liner material for the bottom to prevent seepage to the groundwater table. Soil borings must be carried out at the pond site to determine surface and subsurface characteristics, and their effect on the construction and operation of the pond.

Some of the benefits of stabilization ponds are:

- Low energy requirements
- Successful operation does not require highly skilled operating personnel
- Ponds are less subject to breakdown or malfunction than are mechanical plants
- Many ponds achieve low fecal coliform bacteria concentrations without a separate disinfection process

Despite these advantages, there has been considerable controversy in recent years over whether ponds can achieve the required limitations for secondary treatment. In addition, the ammonia nitrogen standard will be difficult or impossible to attain with

treatment by a stabilization pond only. For these reasons, discharge of the pond effluent to the receiving stream is not recommended. An acceptable alternative is to discharge the pond effluent on the land by spray irrigation.

The pond proposed for South Montrose would be located approximately 6,000 feet southwest of the center of South Montrose. It would be an eight foot deep pond with a normal operating depth of two to five feet. The pond would be operated in three cells with a total liquid surface area of seven acres. Aeration of the pond would be enhanced by a diffused air piping network on the bottom of the pond. The spray irrigation system for pond effluent would be located adjacent to the pond. It would consist of about 7,000 feet of 1-1/4 inch PVC piping buried underground with nozzles projecting above ground every 75 feet. Approximately 10 acres of land would be required to handle the effluent from the ponds. The Department of Environmental Resources requires the spray irrigation system to be shut down during the winter months because of insufficient infiltration percolation into frozen ground. For approximately four months, from mid-December to mid-April, there would have to be complete retention of the sewage in the ponds. This can be accomplished with the seven acres of pond area only, providing that they are completely emptied at the beginning of the winter season.

C. Pumping Stations and Force Main to Montrose

As an alternative to treatment and discharge of South Montrose's sewage, transmission to the Montrose Sewage Treatment Plant via a pumping station, force main, and interceptor was also considered. This alternative would utilize a factory-built pumping station located about 2,500 feet southwest of the center of South Montrose. Sewage would be pumped from this location through a four-inch force main north along Rt. 29 to the high point between Montrose and South Montrose. From there, sewage would flow by gravity to the Montrose Plant.

The pumping station is a wet-well mounted station with two vacuum-primed vertical, non-clog sewage pumps each rated at 75 gpm at a total dynamic head of 150 feet. The station will require an emergency generator to provide standby power in case of a power outage. The pumps will discharge to a four-inch ductile iron force main, 3,500 feet long. At the end of the force main, sewage will flow by gravity through a 7,500-foot, 8-inch interceptor.

6.4.7 Bridgewater Township Sewage Collection Systems

Sewage collection systems were evaluated in areas where it was felt there was a sufficient population base to bear the cost of such systems and also in areas that local residents felt there was a need for public sewerage facilities. The areas in which sewage collection systems were evaluated were South Montrose, Lake Montrose, Meshoppen Creek Road and along Rt. 706 from the Montrose High School pumping station to the cement plant. All of the systems will utilize 8-inch diameter sewers and will operate without the use of major pumping stations. However, grinder pumps and small diameter (2-inch) pressure sewers will be required to serve some of the residents in South Montrose and around Lake Montrose. There is concern that installing sewers in the vicinity of Lake Montrose, a public water supply, could cause further pollution of the lake. The pressure sewer line on Lake Avenue would pass within 50 to 75 feet of the lake while the gravity line proposed for Lakeview Drive would be over 100 feet away. This is a sufficient distance to preclude the possibility of sewage entering the lake. As a safety factor, construction techniques such as concrete encasement, when required, would be utilized to insure that there is no exfiltration into the lake.

7.0 PLAN SELECTION

7.1 Views of Public and Concerned Interests on Alternatives

A public hearing was held in the Court House at Montrose, Pennsylvania at 7:30 P.M. on August 5, 1976. The purpose of this meeting was to discuss the Sewage Facility Plan and alternatives and to offer concerned interests adequate opportunity to express their views, in accordance with the requirements of PL 92-500 regarding public participation.

The meeting was conducted by Mr. Alan Reimel, Chairman of the Montrose Municipal Authority, and by Messrs. Alex M. Brand, Phillip A. Podolick, and Richard S. Valentine of Gilbert Associates, Inc. Also in attendance were Mr. Robert Wallace, representing the Wilkes-Barre regional office of the Pennsylvania Department of Environmental Resources; members of the Montrose and Bridgewater Township Authorities; and approximately 30 other interested citizens.

Mr. Reimel of the Montrose Authority made the introductory statements. He then turned the meeting over to Mr. Valentine of Gilbert Associates for the main public participation portion of the meeting.

Mr. Valentine gave a brief history of how Gilbert Associates was authorized to prepare the plan. He then asked Mr. Brand to describe the Federal Water Pollution Control Act of 1972 under which the plan is being prepared. Mr. Brand described the Plan of Study which outlines what will be covered by the Facility Plan. He then described the ten major parts of a Facility Plan, as outlined by the Federal Environmental Protection Agency's Guidance Manual, and the steps required to qualify for the 75 percent Federal grant assistance for sewerage design and construction.

Mr. Valentine distributed maps of the project area, and described with the aid of the map and charts, what work Gilbert Associates proposes for area sewerage in the design year 2000, namely, doubling the capacity of the treatment plant, sewering South Montrose and the areas around Montrose Lake, and correcting infiltration and inflow. He outlined the proposed treatment process, including a holding pond to handle inflow during heavy rainfall, and showed how Gilbert Associates had estimated the study area population for the year 2000 and thus arrived at a design hydraulic capacity.

At this time, various citizens questioned the Consultants' population figures for Bridgewater Township, the lack of sewers on Lakeview Avenue, the routing of the interceptor from South Montrose to the Montrose Sewerage Treatment Plant, and their rejection of a treatment plant to serve South Montrose alone. The Consultant promised to look into these matters.

Mr. Podolick described the inflow and infiltration studies performed by his group, and the difference between inflow and infiltration. He discussed the cost effectiveness of treating the wastewater produced by infiltration/inflow versus correcting infiltration/inflow at the source by sewer rehabilitation. He described the procedure whereby the State certifies that possible infiltration/inflow exists and the Consultant proceeds directly to a detailed sewer survey, as did occur in Montrose. Mr. Podolick described investigations performed on the Montrose sewer system.

Using charts, Mr. Valentine outlined the cost estimates for the design and construction phases of the project, stating that estimated total costs would be $3,300,000, and explained that of this amount, $824,000 would be local costs. In reply to a question, Mr. Valentine stated that the cost figures did not include the purchase from the School Board of the sewer line from the High School to Montrose.

Mr. Brand described how annual costs were arrived at, and the debt service requirements for the project.

Concluding the presentation, Mr. Valentine went through a description of the proposed sequence of project events, stating that construction was scheduled for completion in 1980.

In the question period following the completed presentation, many citizens expressed concern over how sewer rates would be determined, and over what share of the proposed work the Borough and the Township would bear. A member of Borough Council asked whether the cost per household would be roughly one hundred dollars, as it appeared from the figures given. Mr. Brand explained how total annual costs were divided among connections to the sewer system. In reply to a question concerning sewer rates, Mr. Brand said that meters should be installed. A citizen of Montrose wondered why it was necessary to expand the Montrose Sewage Treatment Plant for Montrose Borough only. Mr. Brand and Mr. Reimel explained that Federal grant policy encourages communities to work together; and that an equitable division of costs between Montrose and Bridgewater Township would be arranged. A resident suggested that every property owner should be notified of what increase in rates he will incur, before the Authority makes any final determination. Questions concerning the method of determining the boundaries of the study area, and concerning population projections for Bridgewater Township, were raised and discussed.

Mr. Reimel, after ascertaining that there were no further questions or statements, closed the meeting at approximately 9:45 P.M.

A complete transcript of the Public Meeting may be found in the Appendix.

7.2 Evaluation and Ranking of Alternatives

The relative advantages and disadvantages of each alternative are discussed in this section. The alternatives will be evaluated on the basis of environmental effects, monetary costs, implementation capability, contribution to water quality management objectives, energy and resource use, reliability, and system compatibility. Based on the arguments presented in this section, a single plan will be chosen.

7.2.1 Preliminary Screening of Alternatives

Before undertaking an analysis of major system components, it was possible to make a preliminary screening of those alternatives that were obviously infeasible. After the preliminary screening, the evaluation of the remaining alternatives was conducted on a more detailed basis.

Infiltration/Inflow

The first set of alternatives for screening are the infiltration/inflow reduction measures. According to the regulations, infiltration and inflow correction must be considered in order to become eligible to receive a Federal construction grant. If it can be shown that excessive infiltration and inflow exists, a sewer rehabilitation program must be undertaken to receive the 75 percent Federal construction grant. An evaluation of the plant hydrograph (see Section 4) indicates that infiltration/inflow is a predominant feature of the Montrose sewer system. Infiltration/inflow aspects have been evaluated in this report and are described in detail in Section 6, along with optimal design and rehabilitation curves.

To summarize, the plan for storm water reduction would involve a combination of sewer rehabilitation work and the construction of an equalization tank at the treatment plant. This could be accomplished with a minimum of disruption to public activities, while the equalization tank would be built at the plant to handle the inflow that could not be eliminated by the sewer line rehabilitation measures. A screening device and chlorination facilities would be provided for treatment of storm flows that exceed the capacity of the equalization tank.

The most cost-effective method of treating infiltration/inflow is to:

- Carry out corrective repair measures on the sewer lines themselves, such as fixing leaks;
- Provide an equalization tank to hold the initial highly polluted runoff from storms (inflow);
- Provide extra treatment plant capacity to treat the equalization tank effluent over a period of time.

Sludge Digestion

Other items subject to preliminary screening are the sludge digestion alternatives proposed for the Montrose plant which include (a) two stage anaerobic digestion and a (b) two-tank aerobic digestion system. An anaerobic system requiring sealed tanks, heat exchangers, boilers, a sludge mixing system, and gas piping, is estimated to be about 1.6 times more expensive to construct and install than the simpler aerobic system consisting of open tanks, blowers, and air piping. Power requirements, however, would be slightly higher for the aerobic system because of the cost of operating the blowers.

Problems of operational control would be fewer, although operating costs would be higher, for the aerobic system. Aerobic digestion is less sensitive to fluctuations in influent characteristics than is anaerobic digestion. The key consideration is that the supernatant from the aerobic digesters would be rather low in ammonia nitrogen concentration. Since this is not true with anaerobic digestion, operating an anaerobic digester would make the problem of meeting the strict ammonia nitrogen effluent requirement even worse. Construction, aesthetic, and environmental effects would not be significantly different for the two alternatives.

On the basis of the above discussion and especially with regard to the high ammonia nitrogen concentration in the anaerobic supernatant, it was determined that aerobic digestion should be employed at the plant.

Sludge Dewatering

Sludge dewatering alternatives involve (1) improving the operation of the drying beds by providing them with a fiber glass cover, (2) continuing with the existing system of drying beds supplemented by a sludge applicator truck, and (3) vacuum filtration. Upon an investigation of the drying bed capacity and the expected improved performance of the digesters it was determined that the beds would be adequate for future use if they were protected from adverse weather conditions. Enclosing the beds with a fiber glass cover to keep out moisture and increase solar heating was examined. It would cost approximately $140,000 to purchase and install such a cover.[1] A significantly cheaper alternative would be to buy a sludge applicator truck which could spray sludge on the land or inject it into the topsoil. The truck could be bought for about $36,000 and both Montrose and South Montrose could share in its cost and its use.[2] The drying beds would remain in use as a back-up for the truck. Vacuum filtration, normally a costly process, would be prohibitively expensive for a treatment plant the size of Montrose's.

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[1] From Structures Unlimited, Inc., Manchester, New Hampshire.

[2] From Big Wheels, Inc., Paxton, Illinois.

Tertiary Treatment

The tertiary treatment alternatives are granular media filtration and microscreening. Microscreening is the more feasible of the alternatives, especially on the basis of costs and operating problem. Granular media filtration has a capital cost approximately twice that of microscreening and operating costs that are four to five times as much. The operating problems associated with backwashing of the granular media filter present an additional impetus for the selection of microscreening as the tertiary treatment alternative.

Collection System Along Route 706

The Consultants examined the cost-effectiveness of the sewering of the existing properties along Route 706. This sewering would be accomplished by running a gravity sewer from the eastern boundary of the study area, i.e., from the high ground immediately west of the quarry, westward to the sewage pumping station south of Lake Montrose. This would entail the installation of 5,000 feet of 8-inch gravity sewer main, to serve nine Equivalent Dwelling Units (EDU's), determined as follows:

Property	EDU's
Loomis Properties	3
Claverack Electric Company	3
Andre & Son Fertilizers	1
Jim's Sonoco Station	1
VFW	1
	9 EDU's

Estimated costs per EDU would be $11,111, determined as follows:

> 5,000 feet of 8-inch gravity sewer main @ $20 per linear foot installed ÷ 9 EDU's = $11,111.

This cost appears excessive to the Consultants, and costs for serving these properties have not been included in this report. It is believed that these properties would be better served by on-lot systems, or, if required, by grinder pumps and pressure sewers connecting to the force main south of Lake Montrose. The latter pressurized system would cost approximately $3,000 per EDU.

7.2.2 Evaluation of Major System Components

A summary of the selected facilities and the alternatives remaining to be evaluated are listed in the following table.

I. SEWAGE TREATMENT ALTERNATIVES

A. Rotating Biological Contactors
B. Packed Towers
C. Single Stage Nitrification

II. SOUTH MONTROSE TREATMENT ALTERNATIVES

A. Package Treatment Plant
B. Pumping Station and Force Main
C. Waste Stabilization Pond and Spray Irrigation System

III. AUXILIARY FACILITIES

A. Infiltration/Inflow Reduction and Equalization Tank

1. Coarse Screening
2. Chlorination

B. Sludge Applicator Truck
C. Aerobic Digestion
D. Microscreening
E. Control Building and Laboratory
F. Chlorine and Microscreen Building
G. South Montrose/Bridgewater Township Sewage Collection System

Sewage Treatment Alternatives

It should be mentioned at the outset that consistently meeting the ammonia nitrogen requirements of 0.5 mg/l in the summer and 1.5 mg/l in the winter is not guaranteed with any of the processes described hereafter. It has been continually expressed to the Consultant by manufacturers' representatives and other knowledgeable people in the field that meeting the DER-required ammonia nitrogen requirements day after day will be extremely difficult due to shock loadings, temperature changes, and other unknown occurrences. Detailed design may indicate that it is necessary to provide an additional tertiary treatment step such as break-point chlorination to insure that the ammonia nitrogen requirement is consistently met.

Alternative IA - The significant feature of this alternative is the use of rotating biological filters for a large percentage of the BOD removal and essentially all of the ammonia nitrogen removal. Cost estimates are given in Table 7.1.

Alternative IA has the least power requirements of the three alternatives because the only significant cost would be to run a number of low-horsepower motors to rotate the discs. Land requirements are also the least for this alternative.

Operating reliability with the bio-discs is very good. The units require only a nominal amount of process control. They are efficient at accepting toxic or shock loadings and have very good predicted BOD and ammonia nitrogen removal.

Construction activities would probably be slightly less extensive with this alternative because there are fewer additional clarifiers required than with the other alternatives. There would be no unusual environmental aesthetic effects with this alternative. By having the units covered, there would be no odors or nuisances such as filter flies.

Alternative IB - This is the packed tower alternative. Cost estimates are given in Table 7.2.

Alternative IB has average power requirements because of the pumping facilities needed to get the sewage up to the towers. The land requirements are average.

Operational problems associated with packed towers include odors due to anaerobic conditions and filter flies. These nuisances could probably be eliminated by covering the towers; however, there would have to be some means of forcing air into the towers. Towers will not operate well in extremely cold weather. Operational problems associated with the aeration tanks (maintaining the correct air-to-sewage ratio) would exist with this alternative. The performance of the towers is also subject to the strength of the incoming waste. To operate properly, the influent must be primarily domestic sewage with little industrial waste contributions.

Construction problems would be of average complexity for this alternative. No unusual environmental effects would be expected. The aesthetic effect of this alternative would be about average. As discussed above, odors could be a problem. This alternative would be the most visible due to the height of the towers but this is not of great concern.

Alternative IC - This is the single stage nitrification alternative. Cost estimates are given in Table 7.3.

Single stage nitrification has the greatest land requirement of the three alternatives. The facilities could be situated on the property of the existing plant; however, complete gravity flow through the system would not be possible. This alternative has the greatest power requirements.

Operation of this facility would probably be the most difficult of the three alternatives. Tight process control of operating parameters would be necessary. Changes in pH, detention time, and other variables will cause the process to operate at less than peak efficiency. The large number and frequency of tests to be performed would also increase

the operating costs. The process is greatly influenced by shock loads, so that introduction of an unusual waste could result in a process upset. Single stage nitrification is affected by low temperatures as are the other alternatives. However, maintaining a sufficiently high temperature by covering the units would be most difficult for this alternative.

Construction, aesthetic considerations, and environmental effects would all be of insignificant consequence for this alternative.

South Montrose Treatment Alternatives

Alternative IIA - This alternative would involve a tertiary package treatment plant installed southwest of South Montrose at the location shown on Figure 8.3. Capital and operating costs are listed in Table 7.5. The facility would require a construction cost of $257,000 and an initial annual operating cost of $24,500 per year. This alternative has the lowest capital cost and the highest operating cost. Land requirements would be the least of any of the alternatives.

Operation of the package plant would be relatively trouble-free. Most of the effort would involve backwashing the tertiary filters. Since the facility is designed as a complete unit, all of the processes are compatible. Maintenance of the plant would consist of occasional cleaning of the tanks and diffusers, lubrication, and a repainting every several years.

Although filtration was not selected as the tertiary treatment step for the Montrose plant because of high capital and operating costs, the filtration process was selected for South Montrose. The reason for this is that the package plant is designed to accommodate the filter, and is recommended as the tertiary step by the package plant manufacturer.

Construction of the package plant would be significantly easier and less extensive than any of the other alternatives. All internal piping and wiring would be performed by the manufacturer and the only field construction would involve excavation, concrete pads, and interconnection of the major components. Since the scale of this alternative is much smaller than either of the other two alternatives, aesthetic and environmental effects would be minimal.

Alternative IIB - This alternative consists of a pumping station, force main, and gravity interceptor. The pumping station would be situated at the same location as the package treatment plant (see Figure 8.3) and the force main would run from the pumping station into the center of South Montrose and then north on Rt. 29. At the highest elevation, on Rt. 29, the force main would discharge into a gravity interceptor which would flow to the Montrose treatment plant. The capital and operating costs for this alternative are shown on Table 7.6.

The construction cost of $399,000 is about medium for the three alternatives and the annual operating cost of $13,000 is the lowest. The construction cost includes $136,000 which represents the additional capital expenditure that would be required at the Montrose treatment plant to treat the sewage coming from South Montrose. Included in the operating cost is an annual fee of $10,000 which would have to be paid to Montrose for the cost of treating South Montrose's sewage at Montrose.

Operation of the pumping station would only require periodic checking to see that the pumps are running properly and occasional cleaning of the sewer. It is anticipated that the pipeline would be constructed in street rights-of-way. If this could not be done, a large quantity of private right-of-way would have to be bought.

This alternative would cause extensive environmental and aesthetic effects during construction because of the large areal extent of the facility. However, the long-term effects would be minimal. Following construction, adverse environmental effects would not exist.

Alternative IIC - This alternative would require the construction of a 7 acre three-cell waste stabilization pond and a 10 acre spray irrigation system. The total land area required for this alternative would be about 25 acres. A summary of the construction cost estimates, given in Table 7.7, shows that this alternative would have the largest construction cost, mainly because of the large amount of excavation and the cost of a impermeable liner for the pond. Total construction costs are estimated to be $615,000. Operating costs are about equivalent to Alternative IIA. Initial operation and maintenance would amount to about $23,500 per year.

Operating the system is fairly simple. During summer months, stabilization within the ponds and application of the effluent to the land should proceed with little difficulty. During the winter, the effluent from the ponds will not permeate the soil as it is distributed by the spray irrigation system. Therefore, the sewage will simply be retained in the ponds until the spring thaw. Construction of the pond would require a large amount of earthmoving. Strict erosion control measures would have to be practiced to prevent the loss of large quantities of soil.

With proper operation and maintenance of the pond, there should be no negative environmental or aesthetic effects. If the pond is not operated properly, the presence of odors and nuisance organisms may be expected.

7.3 Selected Plan

The selected plan, based on discussions presented in the previous section, includes infiltration/inflow corrections, an equalization tank with screening and chlorination facilities, rotating biological

contactors, two aerobic digestion tanks, microscreening, additional chlorination facilities, a control building addition, a chlorine and microscreen building, a tertiary package treatment plant for South Montrose and sewage collection facilities for South Montrose, the Lake Montrose area, and Meshoppen Creek Road.

The bases for selection of the rotating biological contactors and the package treatment plant are described in Table 7.4 and Table 7.8 respectively. Table 7.4 shows that the rotating biological contactor alternative would have an average annual cost, based on present worth calculations, of $77,500. Single stage nitrification would cost $79,100 per year and packed towers, $92,200 per year. Table 7.8 shows that the package treatment plant would have an average annual cost of $54,500, the pumping station, force main, and interceptor would have a cost of $59,400 per year, and the stabilization pond and spray irrigation system would have a cost of $87,200 per year. All of the costs were developed using an interest rate of 6-3/8% and a period of 20 years.

Table 7.9 lists the alternatives and their rank in meeting various economic, social, environmental and technical criteria.

It has been ascertained that there is sufficient land immediately east of the existing sewage treatment plant site for the proposed upgrading. This plot, owned by the Montrose Municipal Authority, lies between Pettis Creek and the sewage plant access road. Land for the proposed treatment facilities for South Montrose would have to be purchased; approximately 25 acres would be required, in the low-lying area southwest of the village.

7.4 Environmental Impacts of Selected Plan

The environmental impacts of the selected facilities for the Montrose Sewage Treatment Plant will be minimal. Construction activities will be limited to a confined, low-visibility area. All of the facilities will be located on the property of the existing plant or immediately adjacent thereto. No relocation of people or structures will be required.

The construction of the South Montrose sewage collection system and the package treatment plant will result in temporarily adverse environmental conditions. Dust will be a problem but will be minimized by control measures. The construction will be highly visible since most of it will occur on public roads. The construction of the sewers will increase the value of the properties located adjacent to the sewer line.

Restoration of streets and rights-of-way will be undertaken as soon as possible following completion of construction.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.1
CONSTRUCTION AND OPERATION COSTS
ALTERNATIVE IA
ROTATING BIOLOGICAL CONTACTORS

ITEM	COST
1. Rotating Biological Discs	
a. Plastic discs, shafts, motors and fiberglass covers, baffles and handrails	$342,000
b. Concrete tank, 60 feet x 60 feet x 7 feet deep	41,000
2. Secondary clarifiers; two at 25 feet diameter each	48,000
3. Sewage pumps; three at 280 gpm each	3,000
Total Construction Cost	$434,000
Annual Operating Costs	
1. Electrical[1]	$ 18,700
2. Manpower[2]	7,400
3. Maintenance and Materials[2]	1,900
	$ 28,000

Table does not include treatment works and operating costs common to all alternatives, i.e., control building addition, chlorination and screening facilities, digester equipment, sludge handling equipment, site work, instrumentation, and administrative costs.

[1] See Table 14, Appendix.

[2] "Estimating Costs and Manpower Requirements for Conventional Wastewater Treatment Facilities," Black & Veatch Consulting Engineers. U.S. Government Printing Office, Washington, D.C., October, 1971.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.2
CONSTRUCTION AND OPERATION COSTS
ALTERNATIVE IB
PACKED TOWERS

ITEM	COST
1. Packed Towers (2)	
a. Media, 24,000 cubic feet	$ 81,000
b. Concrete structures	32,000
c. Fiberglass covers	24,000
d. Nozzles and aluminum grating	36,000
2. Primary clarifiers; two at 25 feet diameter each	40,000
3. Secondary clarifiers; two at 25 feet diameter each	48,000
4. Aeration equipment; diffusers, piping, etc.	219,000
a. Concrete tanks; two at 65 feet x 20 feet x 12 feet deep, with handrails	65,000
5. Blowers (3)	12,000
6. Sewage pumps; three at 280 gpm each	3,000
7. Recirculation pumps; three at 500 gpm each	6,000
Total Construction Costs	$ 566,000
Annual Operating Costs	
1. Electrical[1]	$ 16,700
2. Manpower[2]	9,500
3. Maintenance and Materials[2]	3,100
	$ 29,300

Table does not include treatment works and operating costs common to all alternatives, i.e., control building addition, chlorination and screening facilities, digester equipment, sludge handling equipment, site work, instrumentation, and administrative costs.

[1] See Table 14, Appendix.

[2] "Estimating Costs and Manpower Requirements for Conventional Wastewater Treatment Facilities," Black & Veatch Consulting Engineers, U.S. Government Printing Office, Washington, D.C., October, 1971.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.3
CONSTRUCTION AND OPERATION COSTS
ALTERNATIVE IC
SINGLE STAGE NITRIFICATION

	ITEM	COST
1.	Aeration Equipment; diffusers, piping, etc.	$ 239,000
	a. Concrete tanks; two at 105 feet x 20 feet x 12 feet deep, with handrails	80,000
2.	Primary clarifiers; two at 25 feet diameter each	40,000
3.	Secondary clarifiers; two at 25 feet diameter each	48,000
4.	Sewage pumps; three at 280 gpm each	3,000
5.	Blowers (3)	21,000
Total Construction Costs		$ 431,000

Annual Operating Costs

1.	Electrical[1]	$ 19,600
2.	Manpower[2]	8,800
3.	Maintenance and Materials[2]	2,400
		$ 30,800

Table does not include treatment works and operating costs common to all alternatives, i.e., control building addition, chlorination and screening facilities, digester equipment, sludge handling equipment, site work, instrumentation, and administrative costs.

[1] See Table 14, Appendix.

[2] "Estimating Costs and Manpower Requirements for Conventional Wastewater Treatment Facilities," Black & Veatch Consulting Engineers, U.S. Government Printing Office, Washington, D.C., October, 1971.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.4

PRESENT WORTH ANALYSIS
SEWAGE TREATMENT PROCESSES

	Construction Cost (1)	O&M (0.7 MGD) (2)	Salvage Value Year 2002[1] (3)	Present Worth				Average Annual Equivalent Cost (8)
				Project Cost (4)	O&M (5)	Salvage Value (6)	Total Present Worth (7)	
Alternative IA Bio-Discs	$434,000	$28,000	$ 49,000	$564,000	$312,000	$14,000	$ 862,000	$77,500
Alternative IB Packed Towers	566,000	29,300	123,000	736,000	326,000	36,000	1,026,000	92,200
Alternative IC Single Stage Nitrification	431,000	30,800	78,000	560,000	343,000	23,000	880,000	79,100

Col. 4 = Col. 1 x 1.3

Col. 5 = Col. 2 (11.13)

Col. 6 = Col. 3 x 0.2906

Col. 7 = Col. 4 + Col. 5 - Col. 6

Col. 8 = Col. 7 x 0.08986

Project Costs include the following: Construction Costs, Engineering Design and Surveys, Legal Costs, Administrative Costs, and Financial Costs. A typical example is shown in Table 7, Appendix.

Financial factors are for 6-3/8% @ 20 years.

[1] See Table 15, Appendix.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.5
CONSTRUCTION AND OPERATING COSTS
ALTERNATIVE IIA
PACKAGE TREATMENT PLANT AT SOUTH MONTROSE

	ITEM	COST
1.	Package treatment plant, installed	
	a. Two-stage activated sludge process with comminutor, bar screen, splitter box, blowers, aerated sludge holding tank and chlorine chamber.	$ 90,000
	b. Flow equalization tank w/blowers, pumps, and controls.	12,000
	c. Tertiary filter - rapid sand filtration	25,000
	d. Site work, excavation, concrete work, mechanical and electrical connections.	55,000
2.	Control building	45,000
3.	Emergency generator	15,000
4.	Sludge applicator truck (South Montrose share of cost)	5,000
5.	Fencing	10,000
Total Construction Cost		$257,000

Annual Operating Costs	50,000 gpd	88,800 gpd
1. Electrical	$ 3,500	$ 4,900[1]
2. Manpower	12,500	12,500
3. Maintenance and Materials	1,500	2,000
4. Administrative	7,000	8,000
	$ 24,500	$27,400

[1] See Table 14, Appendix

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.6
CONSTRUCTION AND OPERATING COSTS
ALTERNATIVE IIB
PUMPING STATION, FORCE MAIN AND INTERCEPTOR FROM
SOUTH MONTROSE TO MONTROSE SEWAGE TREATMENT PLANT

	ITEM	QUANTITY	UNIT PRICE	EXTENDED PRICE
1.	8-in diameter interceptor sewer	7,500 ft	$ 20	$ 150,000
2.	4-in diameter ductile iron force main	3,500 ft	$ 10	35,000
3.	Manholes, all depths including cast iron covers	20 ea	$ 750	15,000
4.	Restoration (PennDOT Type II)	2,300 yd^2	$ 10	23,000
5.	Pumping Station	1	25,000	25,000
6.	Emergency generator	1	$15,000	15,000
	TOTAL CONSTRUCTION COST			$ 263,000
7.	Capital Costs-Montrose Sewage Treatment Plant Expansion, to handle South Montrose Sewage			$ 136,000
	TOTAL CAPITAL COST OF ALTERNATIVE IIB			$ 399,000

Annual Operating Costs	50,000 gpd	88,800 gpd
1. Electrical	$ 1,500	$ 2,000[1]
2. Manpower[2]	1,200	1,200
3. Maintenance and Materials[2]	300	300
4. Treatment Cost	10,000	17,700
	$13,000	$21,200

[1]See Table 14, Appendix.

[2]"Estimating Costs and Manpower Requirements for Conventional Wastewater Treatment Facilities," Black & Veatch Consulting Engineers, U.S. Government Printing Office, Washington, D.C., October, 1971.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.7
CONSTRUCTION AND OPERATION COSTS
ALTERNATIVE IIC
STABILIZATION POND AND SPRAY IRRIGATION SYSTEM
AT SOUTH MONTROSE

	ITEM		COST
1.	Three-cell stabilization pond system		$416,000
	a. Excavation	$117,000	
	b. PVC liner	$182,000	
	c. Backfill	$111,000	
	d. Mobilization	$ 6,000	
2.	1-1/4-inch spray irrigation piping including excavation, 7000 linear feet		28,000
3.	Irrigation pumps		3,000
4.	Aeration system		40,000
5.	Pump and blower building at pond site		10,000
6.	Emergency generator building		7,000
7.	Emergency generator and electrical wiring		22,000
8.	Fencing; pond and irrigation sites		54,000
9.	Land; 25 acres		35,000
Total Construction Costs			$615,000

Annual Operating Costs	50,000 gpd	88,800 gpd
1. Electrical	$ 2,500	$ 3,600[1]
2. Manpower	12,500	12,500
3. Maintenance and Materials[2]	1,500	1,900
4. Administrative	7,000	8,000
	$23,500	$26,000

[1] See Table 14, Appendix.

[2] "Estimating Costs and Manpower Requirements for Conventional Wastewater Treatment Facilities," Black & Veatch Consulting Engineers, U.S. Government Printing Office, Washington, D.C., October, 1971.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7.8

PRESENT WORTH ANALYSIS
SOUTH MONTROSE TREATMENT ALTERNATIVES

	Construction Cost (1)	O&M (.050 MGD) (2)	O&M (.088 MGD) (3)	O&M Gradient (4)	Salvage[3] Value, Year 2002 (5)	Present Worth: Project Cost (6)	Present Worth: O&M (7)	Present Worth: Salvage Value (8)	Present Worth: Total Present Worth (9)	Average Annual Equivalent Cost (10)
Alternative IIA Package Treatment Plant	$257,000	$24,500	$27,400	$145	$ 38,000	$334,000	$284,000	$ 11,000	$607,000	$54,500
Alternative IIB Pumping Station Force Main and Interceptor	399,000[1]	13,000[2]	21,200[2]	410	125,000	519,000	178,000	36,000	661,000	59,400
Alternative IIC Stabilization Ponds and Spray Irrigation	615,000	23,500	26,000	125	351,000	800,000	272,000	102,000	970,000	87,200

Col. 4 = (Col. 3 - Col. 2)/20

Col. 6 = Col. 1 x 1.3

Col. 7 = Col. 2 (11.13) + Col. 4 (81.15)

Col. 8 = Col. 5 x 0.2906

Col. 9 = Col. 6 + Col. 7 - Col. 8

Col. 10 = Col. 9 x 0.08986

Project Costs include the following: Construction Costs, Engineering Design and Surveys, Legal Costs, Administrative Costs, and Financial Costs. A typical example of these costs is shown in Table 7, Appendix.

Financial factors are for 6-3/8% interest @ 20 years.

[1]Construction cost includes portion of Montrose sewage treatment plant expansion costs required by inclusion of South Montrose system.

[2]Includes portion of Montrose treatment plant operating costs necessary for South Montrose.

[3]See Table 15.

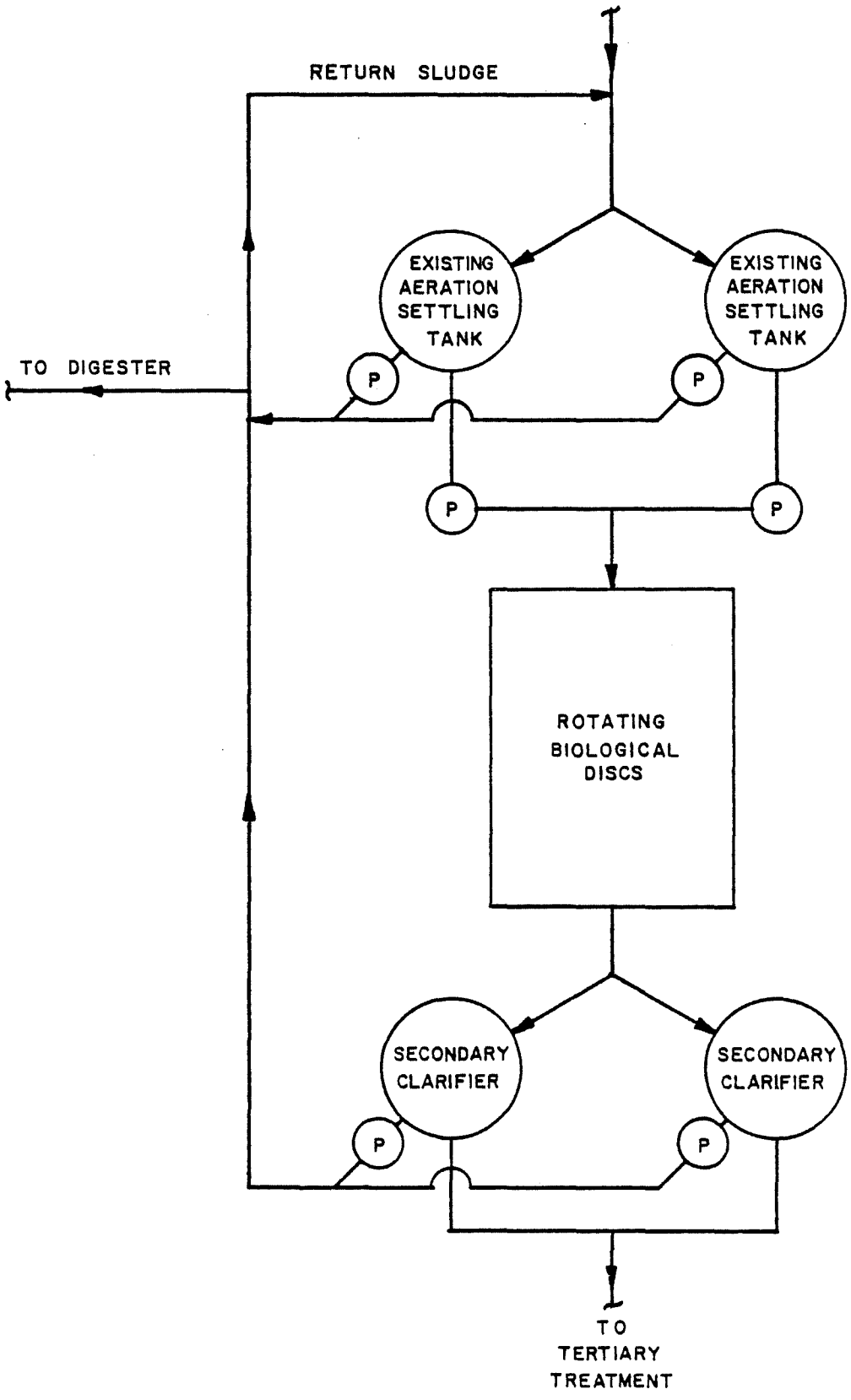
TABLE 7.9

RANKING OF ALTERNATIVES

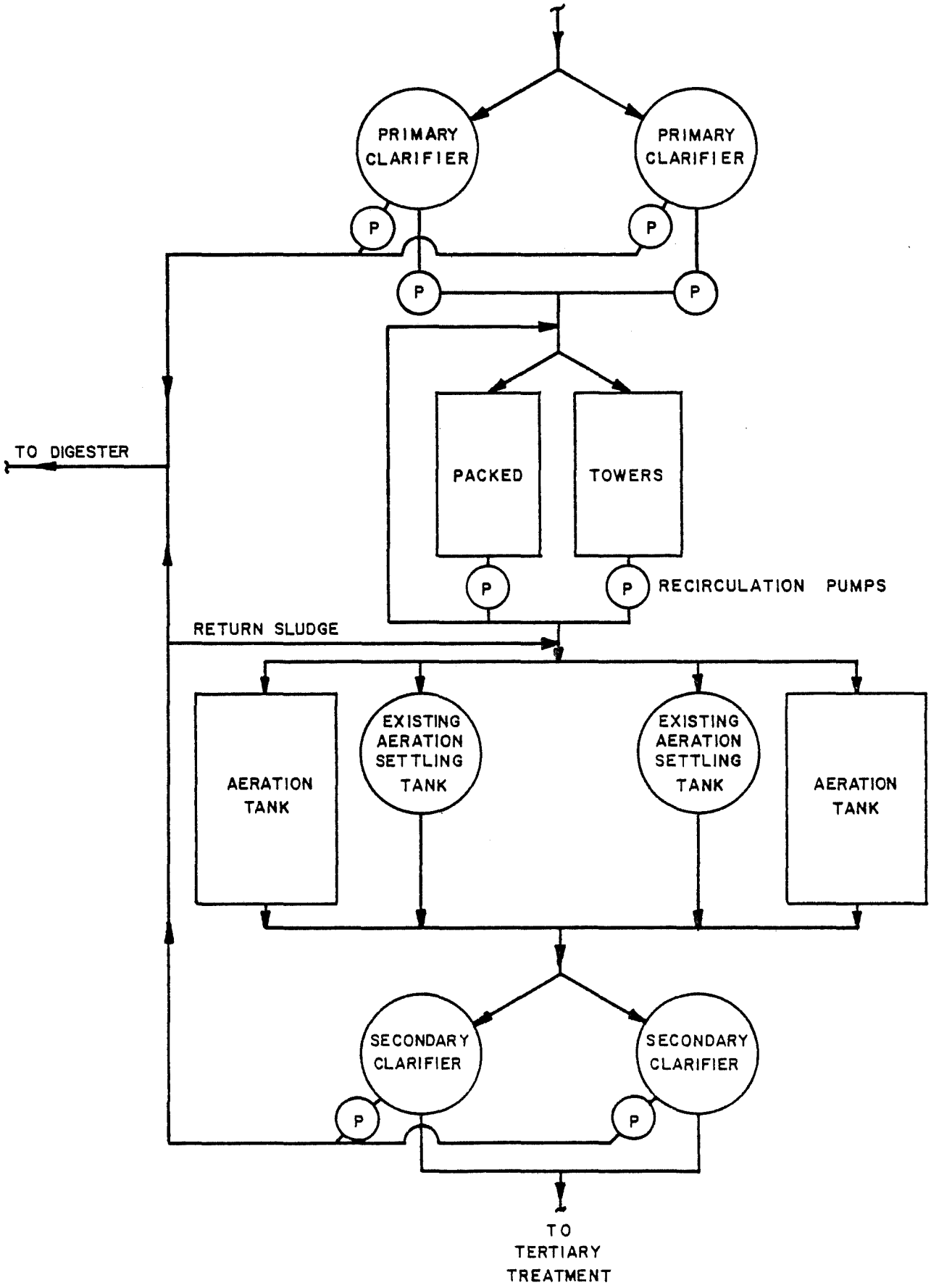
		IA	IB	IC	IIA	IIB	IIC
1.	Monetary						
	Capital Cost	2	3	1	1	2	3
2.	Energy and Resources						
	Power	1	2	3	3	1	2
	Land	1	2	3	1	2	3
3.	Operations						
	Reliability	1	2	2	2	1	3
	Performance	1	1	1	2	1	2
	Maintenance and Labor	1	2	3	2	1	2
4.	Construction	1	2	2	1	2	2
5.	Aesthetics	1	1	1	1	2	2
6.	Environmental	1	1	1	1	2	2
	COMPOSITE RANK	1	3	2	1	2	3

1. Most Desirable
2. Intermediate Desirability
3. Least Desirable

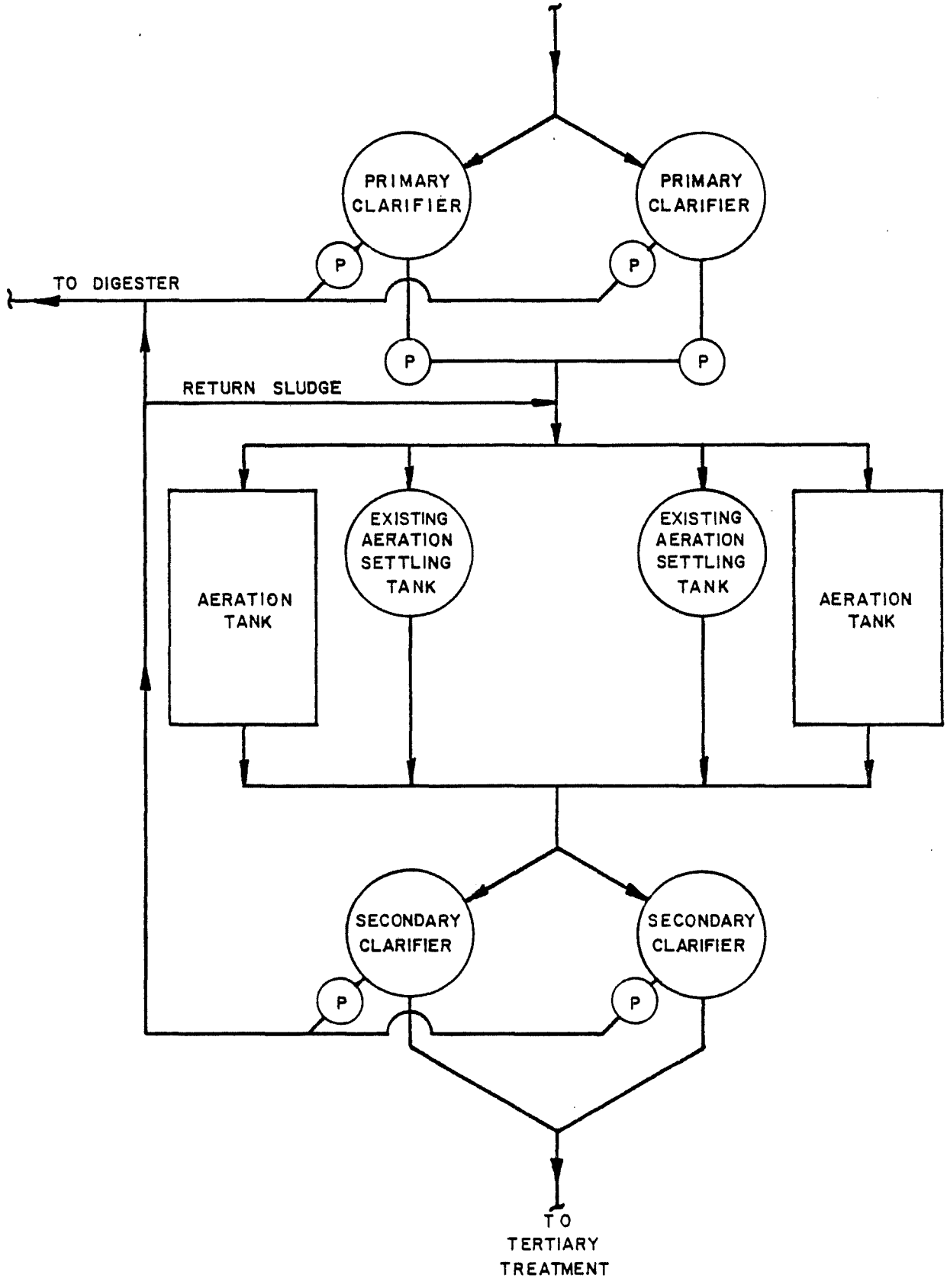
MONTROSE SEWAGE TREATMENT PLANT
FIGURE 7.1
ALTERNATIVE IA
ROTATING BIOLOGICAL DISCS
SCHEMATIC FLOW DIAGRAM



MONTROSE SEWAGE TREATMENT PLANT
FIGURE 7.2
ALTERNATIVE IB
PACKED TOWER
SCHEMATIC FLOW DIAGRAM



MONTROSE SEWAGE TREATMENT PLANT
FIGURE 7.3
ALTERNATIVE IC
SINGLE STAGE NITRIFICATION
SCHEMATIC FLOW DIAGRAM



8.0 PRELIMINARY DESIGN AND COST ESTIMATES

8.1 Description of Design

The proposed facilities for the Montrose Sewage Treatment Plant consist of a comminutor, rotating biological contactors, secondary clarifiers, aerobic digesters, microscreen, chlorination facilities, control building addition, sludge applicator truck, and equalization tank. A plot plan of the existing and proposed facilities is shown on Figure 8.1, and a schematic flow diagram of the selected plan is shown on Figure 8.2, following. The proposed facilities for South Montrose are a small control building and a package treatment plant consisting of a two-stage activated sludge process preceded by a flow equalization tank and followed by a tertiary rapid sand filter.

In addition to the treatment systems proposed for the two locations, sewage collection systems are proposed for the Lake Montrose area in the vicinity of Rt. 706 and the area north of the lake, along Meshoppen Creek Road, and in South Montrose. All of the sewers would flow by gravity except for about 33 grinder pump installations in the area north of the Lake and about 50 such installations in South Montrose. The sewage collection systems are shown on Figure 8.3, following.

The facilities proposed for the Montrose Sewage Treatment Plant have been predicated on plant operating data rather than standard design guidelines. The following data were taken from the operating reports of May 1975 through August 1976.

Suspended Solids	120 mg/l
B.O.D.	280 mg/l
Ammonia Nitrogen	25 mg/l
Minimum sewage temperature, winter	44°F
% Suspended solids removal from Aeration Unit #1	62%
% BOD removal from Aeration Unit #1	68%

For the South Montrose treatment plant, there was no existing operating data to draw on. Therefore, accepted guidelines were used to design the plant.[1] The design parameters are listed below:

Average flow	88,000 gpd
Suspended solids	240 mg/l
BOD	200 mg/l
Ammonia nitrogen (estimated)	25 mg/l

[1] "Sewerage Manual", Pa. Department of Environmental Resources, Bureau of Water Quality Management, 4th ed., Harrisburg 1976.

FACILITY PLAN

MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

FIGURE 8.3

PLOT PLAN OF PROPOSED
SEWAGE COLLECTION FACILITIES

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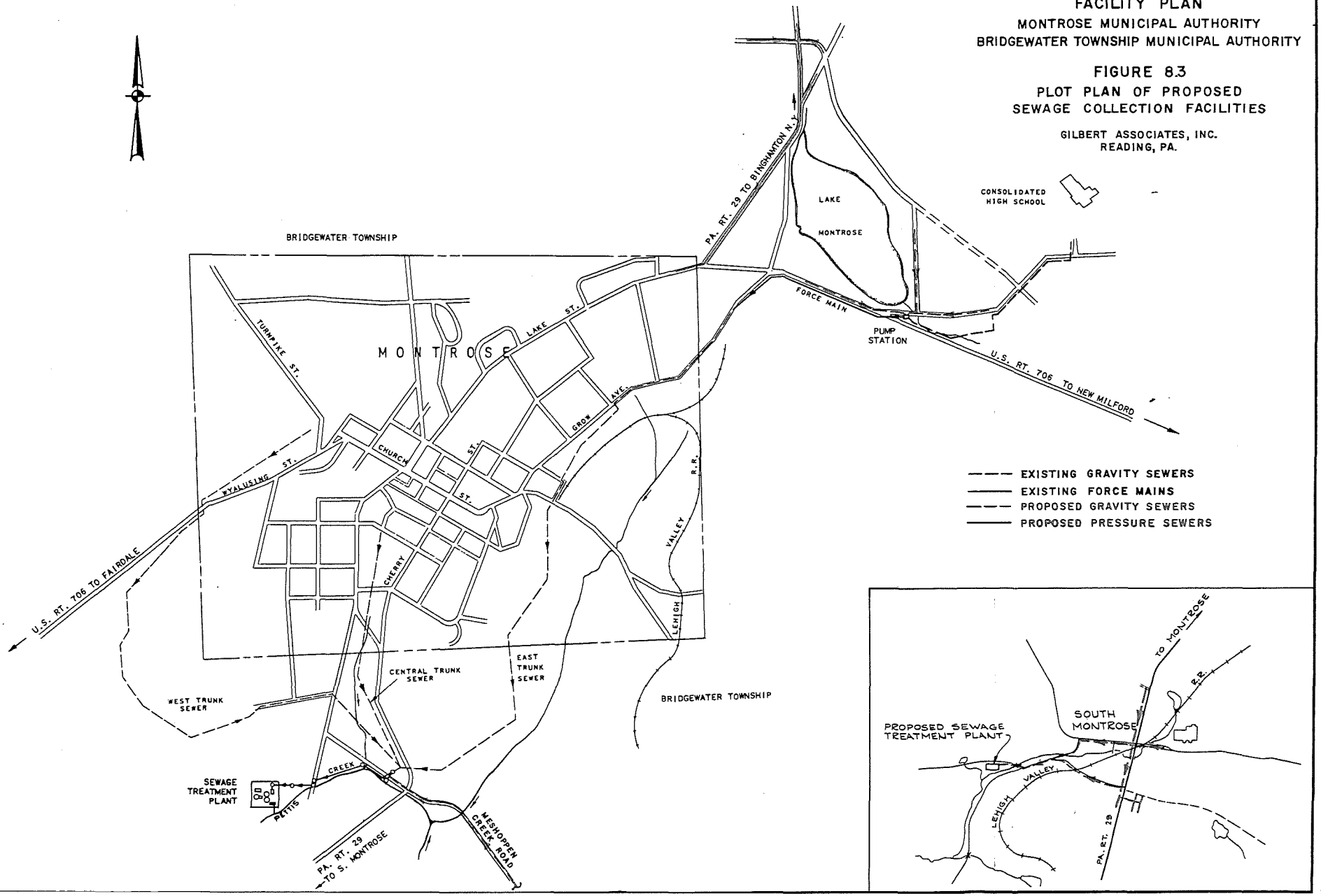
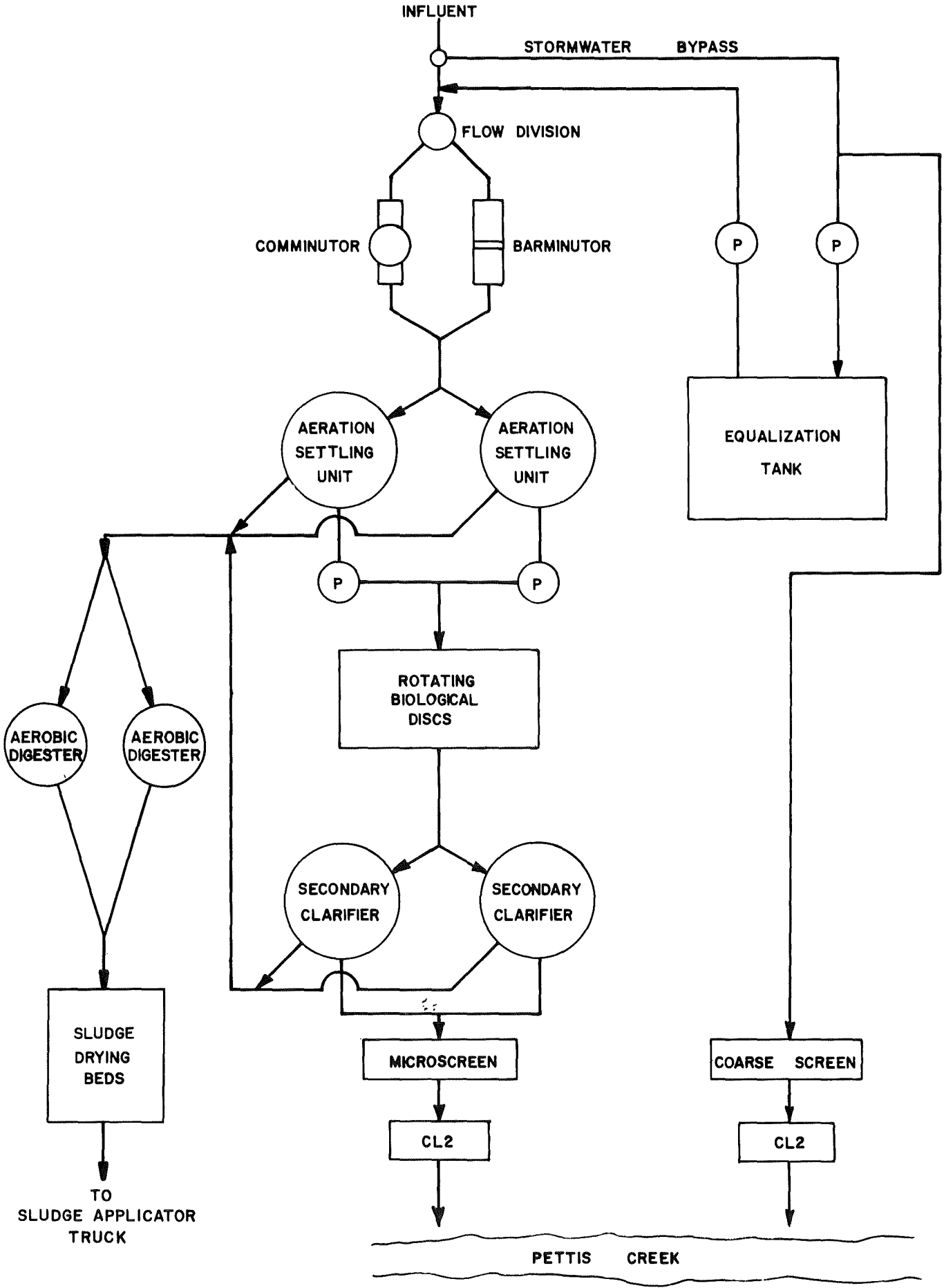
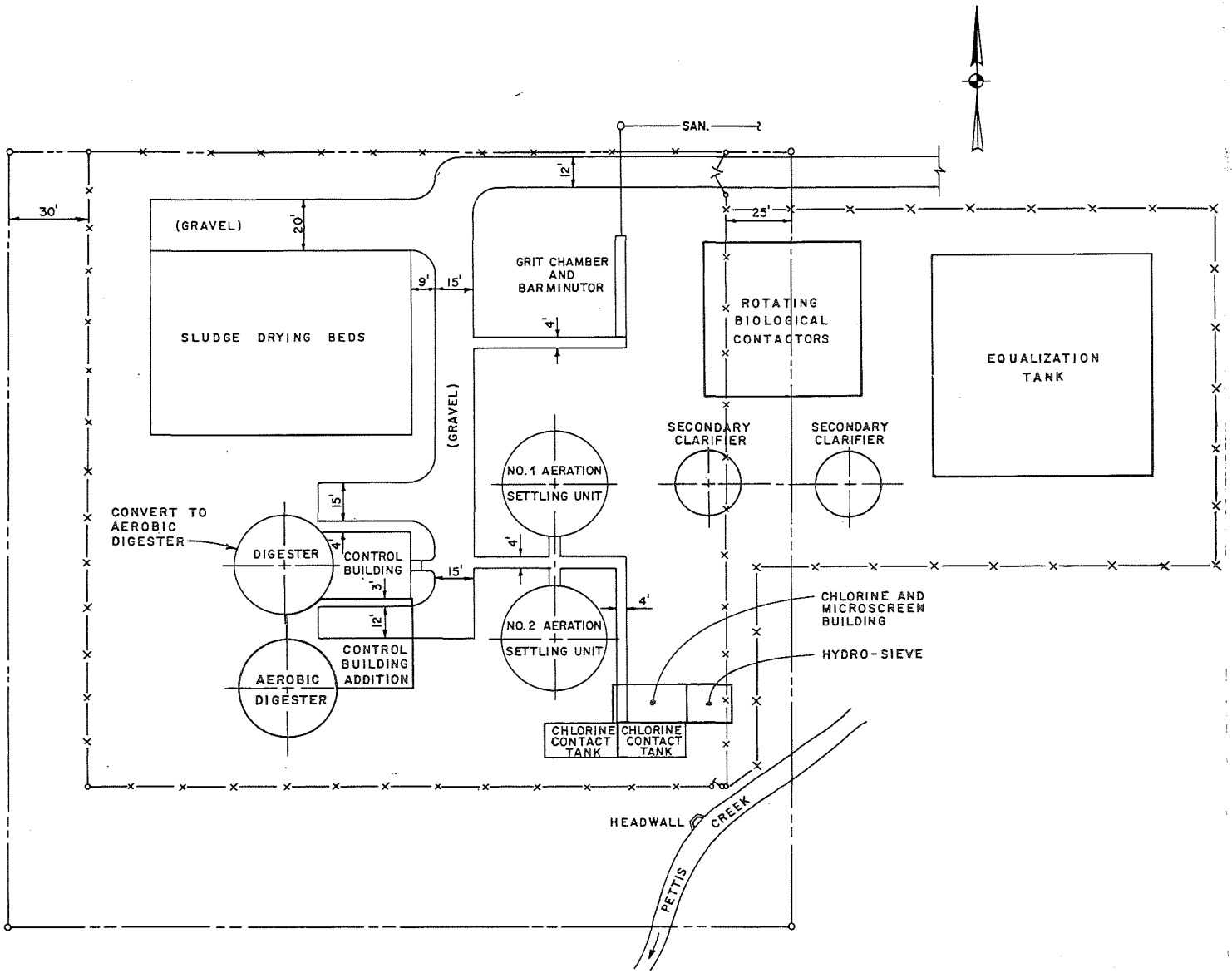


FIGURE 8.2
SELECTED PLAN
SCHEMATIC FLOW DIAGRAM
MONTROSE SEWAGE TREATMENT PLANT





EXISTING FACILITIES
PROPOSED FACILITIES

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

FIGURE 8.1
PLOT PLAN OF EXISTING SYSTEM
AND PROPOSED EXPANSION
MONTROSE SEWAGE TREATMENT PLANT

GILBERT ASSOCIATES, INC.
READING, PA.

The design of the sewage collection systems was based on a sewage flow per connection of 350 gallons per day and a minimum velocity of 2 feet per second in the gravity sewers. From these criteria, the gravity sewers would all be eight inches in diameter and the pressure sewers would be two inches in diameter.

An integral part of the Montrose treatment plant is the equalization tank which is provided to accomodate peak flows caused by storm water inflow. When flows exceed the full treatment capacity of the plant, the excess would be diverted by an overflow weir to the equalization tank. The tank would receive the excess flow until it fills up or until the storm subsides. In the event of a storm contributing more than the capacity of the tank (1.5 million gallons) the flow would bypass the tank and pass through a coarse screen and a chlorine contact tank. After the storm subsides, the contents of the tank would be introduced into the treatment stream at the rate of about 300,000 gallons per day. This would empty the tank in five days. The contents of the tank would be continually aerated to prevent it from becoming septic.

The design of the rotating biological contactor is such that high degrees of treatment, especially of ammonia nitrogen, can be achieved. By utilizing the existing aeration/settling units in parallel as pretreatment facilities for the contactors, a large amount of carbonaceous BOD can be removed before the waste stream reaches the contactors. With most of the organic matters removed, nitrifying bacteria will begin to appear at an earlier stage in the contactor tank, thereby increasing the nitrification detention time and reducing the ammonia nitrogen concentration in the effluent.

With rotating biological contactors, unlike trickling filters and packed towers, the bio-mass is passed through the wastewater, rather than the wastewater over the bio-mass. Because of this arrangement, operation of the process is on a once-through basis with no need for recycle of effluent. The absence of recycle makes operation very simple and eliminates a substantial source of operating expense in terms of pumping horsepower.

Sludge digestion would take place in the dual aerobic digesters. Ultimate disposal would be by application to farmland by a sludge applicator truck. During periods of cold weather or other climatic conditions that would prevent disposal to the land, the existing sludge drying beds could be used for storage.

The package treatment plant proposed for South Montrose will receive sewage from the South Montrose collection system by gravity. The plant will be located about 2500 feet southwest of the center of the community. The plant will utilize the two-stage activated sludge process to attain the required levels of treatment. The

two-stage process is well suited to this application because the long detention times (approximately 12 hours in each stage) are necessary to reach a high level of ammonia nitrogen removal.

The plant is equipped with a rapid sand filter for tertiary treatment. This step is necessary to consistently achieve the suspended solids discharge requirement of 10 mg/l. Sludge handling facilities would consist of an aerated sludge holding tank. Ultimate disposal would be by land application using the sludge applicator truck maintained by Montrose. South Montrose would pay a share of the capital and operating costs of the truck.

8.2 Summary of Cost Estimates

The construction costs for the proposed facilities are as follows:

Montrose Sewage Treatment Plant Expansion	$1,377,000[1]
South Montrose Sewage Treatment Plant	257,000[2]
Montrose Borough Infiltration/Inflow Corrections	200,000[3]
Lake Montrose Area Sewage Collection System	276,000[4]
Meshoppen Creek Road Sewage Collection System	128,000[5]
South Montrose Sewage Collection System	336,000[6]
TOTAL CONSTRUCTION COSTS	$2,574,000

For the purpose of preliminary determination of rates the costs have been distributed among three entities; Montrose Borough, Bridgewater Township (excluding South Montrose) and South Montrose. The breakdown of the construction costs is described in Table 13 of the Appendix. The cost of the equalization tank, the cost of the extra plant capacity required for treating the contents of the equalization tank, and the cost of the infiltration/inflow corrections would be borne completely by the residents of Montrose Borough. In addition, Montrose Borough residents would be responsible for 77.5 percent of the cost of the plant expansion with the storm water handling facilities deducted[7].

Bridgewater Township residents would be responsible for 22.5 percent of the plant expansion without the storm water handling facilities plus the Lake Montrose and Meshoppen Creek Road sewage collection systems and a small amount of infiltration/inflow work to be done in Bridgewater Township (the school line).

South Montrose would pay for its own sewage treatment plant and collection system.

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[1] See Table 6.

[2] See Table 7.5.

[3] See Graph V, Section 6.

[4] See Table 9.

[5] See Table 8.

[6] See Table 10.

[7] For derivation of percentage, see Table 11, Appendix.

Annual operation and maintenance costs are summarized below:

	Existing (1976)	New Facilities	Total
Montrose Sewage Treatment Plant			
Power	$ 7,106	$ 23,200	$ 30,306
Labor	12,560	12,500	25,060
Maintenance & Materials	10,895	8,000	18,895
Administrative	10,294	15,000	25,294
Subtotal	$ 40,855	$ 58,700	$ 99,555
South Montrose Treatment Plant			
Power	-	$ 3,500	$ 3,500
Labor	-	12,500	12,500
Maintenance & Materials	-	1,500	1,500
Administrative	-	7,000	7,000
Subtotal	-	$ 24,500	$ 24,500

The operation and maintenance costs of the Montrose Sewage Treatment Plant would be distributed between Montrose Borough and Bridgewater Township on a 77.5 - 22.5 percentage basis as were the construction costs.

Tables 9.1, 9.2, and 9.3 summarize the project financing of the three areas, Montrose Borough, Bridgewater Township and South Montrose. The total project costs for each area include the various construction items listed in Table 13 of the Appendix plus engineering, legal, financial, and administrative costs. It is expected that the project will be eligible for a 75% Federal grant leaving a local bond issue of 25% of the project costs. The debt service on the bond issue is assumed to be paid back over 40 years at 7% interest. The bottom line of the three tables would be the new sewer rentals for residents in each of the areas. For Montrose Borough and Bridgewater Township, the rentals include that amount already being paid for sewerage service. The new rentals for the three areas are listed below:

	Annual Rental
Montrose Borough	$171
Bridgewater Township	$275 (no front foot assessments)
South Montrose	$251 (no front foot assessments)

Unless the 75% Federal grant is obtained, the financing of the project would have to be borne by local residents. It is evident that the local costs would then become prohibitively high. This judgment would not depend solely upon local attitudes or reactions; the Consultant feels that such very high sewer rates, even if proposed, will not attract the interest of bond underwriters or lending banks.

9.0 ARRANGEMENTS FOR IMPLEMENTATION

9.1 Institutional Responsibilities

It is evident from the requirements of sewerage planning described in this report that Montrose Borough and Bridgewater Township may have to enter a legal agreement for sharing capacity in the treatment plant and for sharing transportation of sewage through certain trunk sewers. In such cases public officials need to be informed on the essentials underlying such intermunicipal service agreements.

The typical legal agreement for sewage treatment will make a distinction between how the parties are to share:

1. the capital costs of building a new plant, or sharing, expanding or upgrading an old one; and

2. annual operation, maintenance, administrative, and repair costs (O&M Costs).

The capital costs of a new treatment plant, or of a treatment plant expansion or upgrading, are shared by the parties according to the capacity reserved for each. The prorated portions are based on reserve capacity; that is, each party pays the full cost of its allocated share even though it may actually be using only a fraction of the capacity reserved for it.

Each party will also agree to pay its share of the operating and maintenance costs, according to the estimated or measured volume of sewage it contributes. During the first year of operation this amount may be estimated, or stated in the agreement as an empiric formula.

After the first year of operation the owner or operator of the intermunicipal plant must issue an annual report, whose content and accessibility to all parties will be specified in the agreement. This annual report will give, among other items, the metered volume of sewage treated at the plant for the past year. The contribution of the other party or parties will also have been determined, at points where "outside" sewers join the "parent" system. From these records of measured or estimated annual flows, a prorating formula is computed, under which the parties share all of the common operation, maintenance, administration and other costs according to the amount of sewage contributed by each in the past year.

Summarizing, capital costs are shared according to reserved capacities, usually projected by expected population about twenty years into the future. Operating costs are shared according to the volume of sewage contributed by each party.

The Pennsylvania Municipality Authorities Act requires that an Authority's rates be "reasonable and uniform." This does not imply that all the properties connected to one sewerage system must pay identical charges, either for collection or treatment. Obviously average rates will be higher in the Township, which needs collection sewers as well as treatment capacity. Courts have ruled that an Authority's rates should be uniform within a given classification. Further, rates are not established upon a basis of geographic or political subdivisions, but upon volume and type of sewage discharge, and the cost, capital as well as operating, of supplying the service.

In addition to formulae allocating capital and operating costs, an intermunicipal legal agreement should contain provisions for sharing sewage transportation costs for use of trunk sewers on the way to the treatment plant. When a new trunk sewer or interceptor sewer is built to serve two or more municipalities, they will each pay a share of the capital costs according to reserved flow capacity as previously explained. Often it is to the advantage of a rapidly-developing municipality to "buy into" such a trunk sewer in advance of actual need, by legal agreement with the constructing municipality.

Finally, a equitable intermunicipal legal agreement must specify that all Federal and State grants and subsidies received for a commonly-shared project will be deducted from the project costs, before the remaining capital and operating costs are prorated among the participants as previously described. In connection with this, the grant application forms, and the later Federal-Local Government contracts for grants, require the submission of the ratified intermunicipal legal agreement as part of the documentation supporting the intermunicipal grant application or applications.

The foregoing comments assume intermunicipal cooperation or legal agreement between legally-constituted public bodies or public non-profit agencies.

It is generally recognized that cooperative efforts in regard to additional sewage facilities would be the least expensive and most easily administered course. Certain problems exist, however, based upon the already-existing Montrose Borough and Bridgewater Township Authorities. Two possible solutions suggest themselves:

1. The creation of a new Joint Authority, having membership from both the Borough and Township, which would purchase the assets of the incumbent Authorities and undertake to construct the needed improvements; or

2. The Montrose Municipal Authority by contract with the Bridgewater Township Authority would undertake to improve the treatment plant with the cost thereof to be shared, and the Montrose Municipal Authority and Bridgewater Township Authority would independently construct their own needed systems.

Whichever method is chosen, protections thought necessary will be incorporated in a Borough-Township and Inter-Authority legal agreement.

One procedure if the Joint Authority device were to be used for the first solution might be as follows:

1. The Borough and Township would create such a Joint Authority;

2. The Joint Authority would enter into a Service Agreement with the Borough and the Township Authorities providing for the construction of the plant improvements and the sharing of costs;

3. The Joint Authority would issue bonds in an amount sufficient to retire the outstanding debt of the plant and to construct and finance the improvements;

4. The existing treatment facilities would be conveyed to the Joint Authority; and

5. The improvements would be constructed by the Joint Authority which would either operate the system or lease it back to the Borough for operation.

6. The Bridgewater Authority would build its own collection systems.

If the Montrose Municipal Authority were to undertake the improvements to the plant, as introduced in the second solution, preceding, the procedure might be as follows:

1. An agreement would be entered into between the Montrose Municipal Authority and the Bridgewater Township Authority providing for the improvement only of the plant and the division of costs;

2. The Montrose Municipal Authority would issue bonds in an amount sufficient to cover the financing of its portion of the treatment plant improvement cost.

3. The Bridgewater Township Authority would issue its bonds in an amount sufficient to cover the financing of its portion of the treatment plant improvements, plus a factor for value of the existing plant useful to the improved process and plant, plus the cost of sewage facilities for South Montrose, the Lake Montrose area, Meshoppen Creek Road, and the outlying areas to be served by pressure sewer connections;

4. The treatment plant itself would be operated by the Montrose Municipal Authority as heretofore; the collection systems would be operated by the Montrose Municipal Authority and the Bridgewater Township Authority, within their respective jurisdictions.

A disadvantage of the latter method (although it is frequent enough in current municipal practice) is that it requires two bond issues with the attendant increase in costs. In either case the most important factor would be the negotiation of an agreement satisfactory to all providing for the construction and operation of the facilities and the equitable sharing of costs.

9.2 Implementation Steps

9.2.1 General

The recommended implementation and construction schedule follows, for the treatment plant expansion and improvement only, by the Montrose Municipal Authority.

(The same schedule must independently but concurrently apply also to the Bridgewater Township Authority's sewerage projects, since that Authority will have to supply evidence, in applying for its construction permits and planning approvals, and also for its Federal grant, that a treatment facility will exist capable of providing the proper degree of treatment for the township's sewage. Generally, the completion dates for a new or improved sewage treatment facility and a sewage collection system to be connected to it must be coordinated. This is not only a consideration of water quality management, but it has important fiscal aspects as well--the trust indentures governing the local-share borrowings, i.e, Borough and Township bond issues, will mandate that the flow of project revenues, in pre-scheduled amounts, begin as of a stipulated date. Otherwise a new project can be declared in default on its bonded debt.)

The required coordinated and simultaneous scheduling of two such mutually-dependent projects is regulated both by specific clauses of the intermunicipal legal agreement, and also through the grant approval and award processes. In such cases, one of the "Special Conditions" of both grant awards will stipulate that the two projects begin on or about the same date, and that the Borough treatment facility will be ready to accept sewage when the Township begins making connections.

9.2.2 Proposed Schedule

1. Montrose Municipal Authority and Bridgewater Township Authority review the Facility Plan and take formal action toward its approval by June 9, 1977.

2. After receipt of Pennsylvania Department of Environmental Resources and Environmental Protection Agency approvals of the Step 1 Facility Plan, make application for a Step 2, Design, grant, by July 1, 1977.

3. Authorize engineering design and specifications of proposed alternatives by October 31, 1977.

4. Complete design, construction drawings and specifications by November 30, 1978.

5. Submit plans and specifications, and Final Engineering Report, for required reviews by A-95 Clearinghouse (Pennsylvania State Clearinghouse and Northern Tier Planning Commission), and to Pennsylvania Department of Environmental Resources, by January 15, 1979.

6. Make application to Federal Environmental Protection Agency, through the Pennsylvania Department of Environmental Resources, for a Step 3, Construction, grant, after receipt of all required regional and State agency approvals, by February 28, 1979.

7. Receive Environmental Protection Agency obligation of funds (Grant Awards) after certification of Step 3 application by the Pennsylvania Department of Environmental Resources, by August 1, 1979.

8. Advertise for, receive and evaluate construction bids, and, after approval by Environmental Protection Agnecy for revision of grant amounts, sell bonds for local share of financing. After bond settlements, commence construction, by January 2, 1980.

9. Complete construction of proposed facilities by March 31, 1982.

9.3 Operation and Maintenance

A draft Operations and Maintenance Manual will be prepared, providing for staffing, management, training, sampling, and analysis for effective operation and maintenance of the enlarged and remodeled sewage treatment facility. This draft Manual will be prepared concurrently with the construction of the project. The completion of the Operations and Maintenance Manual, approved by the Environmental Protection Agency, is a mandatory requirement for receipt of the full amount of the Federal grant.

9.4 Financial Requirements

9.4.1 General

Throughout this Facility Plan, the perspective has been maintained that the Montrose and Bridgewater sewerage planning must be performed within a framework insuring eligibility for Federal grant under P.L.92-500, the Federal Water Pollution Control Act of 1972. If the projects receive high enough priorities, and are duly accredited for grant by

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 4
SUMMARY OF LABORATORY DATA
MONTROSE SEWAGE TREATMENT PLANT

	Raw Influent, ppm		Aeration Unit No. 1 Effluent, ppm		Plant Effluent, ppm		Mixed Liquor, ppm	
Date	S.S.	BOD	S.S.	BOD	S.S.	BOD	S.S.	BOD
12/22/76	90	460	25	36	19	5	4180	2880
11/23/76	166	420	42	22	24	7	3720	3360
10/15/76	105	300	57	30	43	9	2110	850
9/24/76	604	180	236	120	230	15	6300	2340
8/16/76	100	260	11	48	10	20	3050	2280
7/23/76	254	180	40	70	30	40	4500	2520
6/25/76	240	300	58	144	45	15	3130	1960
5/28/76	194	460	65	90	52	54	2740	2300
4/30/76	140	180	57	24	40	20	1350	2520
4/2/76	55	280	20	54	18	30	3000	2340
3/8/76	69	120	35	36	22	18	3800	1320
2/2/76	67	180	32	42	21	25	2640	2400
AVERAGE	174	277	56	60	46	22	3377	2256

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 5
MONTROSE SEWAGE TREATMENT PLANT UPGRADING
DETERMINATION OF DESIGN FLOW

To determine the design year flows three projection techniques were used. All flow calculations assume a present average daily flow to the treatment plant of 375,000 gallons per day, a present infiltration rate of 225,000 gallons per day, and a design year infiltration rate of 135,000 gallons per day. The calculations do not include storm water inflow. The present population is assumed to be 2,500 and the design year population is assumed to be 3,724. (Design year population does not include South Montrose.)

1. Present Average Flow to Treatment Plant 375,000 GPD
   Present Infiltration - 225,000 GPD

   Present Dry Weather Sewage Flow 150,000 GPD

   Project Present Dry Weather Flow to the Design Year

   $$\frac{3724}{2500} \times 150{,}000 = 223{,}000 \text{ GPD}$$

   Design Year Dry Weather Sewage Flow 223,000 GPD
   Design Year Infiltration 135,000 GPD

   Design Year Flow to Plant 358,000 GPD

2. 3724 Design Year Population
   - 2500 Present Population

   1224 Increase in population by design year using DER recommended per capita flow contribution

   1224 x 100 gpcd = 122,400 GPD

   Increase in Sewage Flow 122,400 GPD
   Present Dry Weather Sewage Flow 150,000 GPD
   Design Year Infiltration 135,000 GPD

   Design Year Flow to Plant 407,400 GPD

3. 3724 x 100 gpcd = 372,400 GPD; Design Year Population x 100 gallons per capita day

   Averaging the three methods yields 379,266 GPD

   USE 400,000 GPD

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 6
MONTROSE SEWAGE TREATMENT PLANT UPGRADING
TO 0.7 MILLION GALLONS PER DAY
CONSTRUCTION COST ESTIMATE

Site Work	$ 50,000
Buildings and Structures	
Control Building Addition	38,000
Microscreen and Chlorine Building	20,000
Concrete Tanks and Foundations	330,000
Process Equipment	
Rotating Biological Contactors	342,000
Secondary Clarifiers	48,000
Digester Equipment	141,000
Microscreen	64,000
Sludge Applicator Truck (Montrose share of cost)	31,000
Pumps	10,000
Other Equipment	28,000
Process Piping	175,000
Electrical and Instrumentation	100,000
TOTAL CONSTRUCTION COST	$1,377,000

Annual Operating Costs

		Existing Plant (1976)	Expansion (to 0.7 MGD)	Total
1.	Power	$ 7,106	$23,200[1]	$30,306
2.	Manpower	12,560	12,500	25,060
3.	Maintenance and Materials	10,895	8,000	18,895
4.	Administrative	10,294	15,000	25,294
		$40,855	$58,700	$99,555

[1]See Table 14, Appendix.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 7
ENGINEERING, ADMINISTRATIVE, FINANCIAL, AND LEGAL COSTS
TREATMENT PLANT EXPANSION (0.7 MGD)

1.	ENGINEERING	
	a. Surveys	$ 11,000
	b. Engineering Drafting	45,000
	c. Treatment Plant Design	125,000
	d. Grant Applications	10,000
	e. Operation and Maintenance Manual	9,000
	f. Engineering during Construction	32,000
	g. Resident Inspection of Construction	58,000
		$290,000
2.	ADMINISTRATIVE	
	a. Public Participation	$ 5,000
	b. Intermunicipal/Operating Agreements	18,000
	c. Financial Reports	10,000
	d. Clerical Expenses	10,000
		$ 43,000
3.	FINANCIAL	
	a. Bond Discount	$ 15,000
	b. Capitalized Debt and Reserve Funds	36,000
	c. Printing of Bonds, Trust Indentures, etc.	9,000
		$ 60,000
4.	LEGAL	
	a. Counsel during Financing	$ 10,000
	b. General Counsel	10,000
		$ 20,000
TOTAL ENGINEERING, ADMINISTRATIVE, FINANCIAL AND LEGAL COSTS		$413,000

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 8
CONSTRUCTION COSTS
SEWAGE COLLECTION SYSTEM
MESHOPPEN CREEK ROAD
BRIDGEWATER TOWNSHIP

	ITEM	QUANTITY	UNIT PRICE	EXTENDED PRICE
1.	8-in diameter gravity sewer pipe	5,000 ft	$ 20	$ 100,000
2.	6-in diameter house connections (sewer main to curb line)	16 ea	$ 250	4,000
3.	Manholes, all depths including cast iron covers	17 ea	$ 750	12,750
4.	Roadway Restoration (assuming sewer laid in shoulder of road)	2,200 yd^2	$ 5	11,000
	TOTAL CONSTRUCTION COST			$ 127,750
			USE	$ 128,000

Above estimates include earth excavation, rock excavation, installation of pipe, backfill, shoring, and all work necessary for a complete job.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 9
CONSTRUCTION COSTS
SEWERAGE FACILITIES
LAKE MONTROSE AREA, BRIDGEWATER TOWNSHIP

	ITEM	QUANTITY	UNIT PRICE	EXTENDED PRICE
1.	8-in diameter gravity sewer pipe	7,000 ft	$ 20	$ 140,000
2.	6-in diameter house connections (sewer main to curb line)	29 ea	$ 250	7,250
3.	Manholes, all depths including cast iron covers	25 ea	$ 750	18,750
4.	Grinder pump units	33 ea	$ 1,100	36,300
5.	1-1/4-in diameter pressure sewer house connections (pressure main to grinder pump)	33 ea	$ 150	4,950
6.	2-in diameter PVC pressure sewer mains	5,500 ft	$ 7	38,500
7.	Restoration (PennDOT Type II)	3,000 yd^2	$ 10	30,000
	TOTAL CONSTRUCTION COST			$ 275,750
			USE	$ 276,000

Above estimates include earth excavation, rock excavation, pipe installation, backfill, shoring, and all work necessary for a complete job.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 10
CONSTRUCTION COSTS
SEWAGE COLLECTION SYSTEM
SOUTH MONTROSE
BRIDGEWATER TOWNSHIP

	ITEM	QUANTITY	UNIT PRICE	EXTENDED PRICE
1.	8-in diameter collection sewer pipe	9,000 ft	$ 20	$ 180,000
2.	6-in diameter house connections (sewer main to curb line)	93 each	$ 250	23,250
3.	Manholes, all depths including cast iron covers	40 each	$ 750	30,000
4.	Grinder Pump units	50 each	$ 1,100	55,000
5.	1-1/4-in diameter pressure sewer house connections (pressure main to grinder pump)	50 each	$ 150	7,500
6.	2-in diameter PVC pressure sewer main	1,500 ft	$ 7	10,500
7.	Restoration (PennDOT Type II)	3,000 yd^2	$ 10	30,000
	TOTAL CONSTRUCTION COST			$336,250
			USE	$336,000

Above estimates include earth excavation, rock excavation, installation of pipe, backfill, shoring, and all work necessary for a complete job.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 11
POPULATION DISTRIBUTION
MONTROSE BOROUGH - BRIDGEWATER TOWNSHIP

	1982	2002
Montrose Borough	2,100	2,500
Bridgewater Township		
Lake Montrose[1] (equivalent population)	218	387
Montrose Jr., Sr., High School[2] (equivalent population)	312	562
Meshoppen Creek Road	55	100
Outlying areas (served by pressure sewer connections)	25	175
	610	1,224
Sub-total	2,710	3,724
South Montrose	600	888
TOTAL	3,310	4,612
PERCENT OF TOTAL POPULATION (South Montrose excluded)		
Montrose Borough	77.5%	67.1%
Bridgewater Township	22.5%	32.9%

[1]Includes proposed mall; does not include Keystone Water Company

[2]Population shown is 25% of school enrollment

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 11 (CONTINUED)
HOUSE COUNT
CONDUCTED DECEMBER 9 and 10, 1976
BY GILBERT ASSOCIATES, INC.

		EDU's (Equivalent Dwelling Units)
Area North of Lake Montrose		23
Meshoppen Creek Road		16
Lake Montrose Area (Lakeview Drive, Rt. 706, etc.)		
Claverack Electric Co.	3	
Andre & Son Fertilizer	1	
Jim's Sunoco	1	
Sayre Savings and Loan	1	
Humane Society	2	
Houses	16	
Lake Montrose Plaza	2	
		26
Lake Avenue		
Houses	8	
Montrose Country Club	2	
		10[1]
South Montrose		
Brown's Circle Mobile Home Court	34	
Mountain View Estates	8	
Garage	1	
Exxon Station	2	
BP Station	2	
Baseball Field	1	
Bank	1	
Post Office	1	
Grocery Store	1	
Church	1	
Lott's Feed Mill	2	
Jenner Clothing Factory	10	
Bowies Bar & Restaurant	5	
Houses	91	
		160

[1] Four houses are in Montrose Borough.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 11 (CONTINUED)
HOUSE COUNT
CONDUCTED DECEMBER 9 AND 10, 1976

	EDU's (Equivalent Dwelling Units)
Summary of EDU's in Planning Area	
Borough of Montrose	
Montrose Sewage Collection System (1975)	775
Customers in Bridgewater Township (estimated)	-85
Montrose Borough connections	690
Bridgewater Township	
Customers already connected (estimated)	85
Area north of Lake Montrose	23
Lake Montrose Area	26
Lake Avenue	6
Meshoppen Creek Road	16
	156
South Montrose	160

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 12
TREATMENT PLANT EXPANSION COST BREAKDOWN

Treatment Plant Expansion Construction Costs without South Montrose	$1,377,000[1]
Deduct Equalization Tank and Appurtenances	- 290,000[2]
	1,087,000
Deduct cost of plant expansion required to treat storm water inflow (300,000 gpd) 300,000/700,000 x $1,087,000	- 466,000
Treatment Plant Upgrading Construction Costs without equalization tank, storm water capacity, and South Montrose capacity. 0.4 MGD plant	$ 621,000

[1] See Table 6

[2] Cost of Equalization Tank and Appurtenances

Tank Structure	$ 165,000
Pumps	6,000
Hydrasieve	15,000
Concrete Pad, Sump	3,000
Chlorine Contact Tank	52,000
Flow Division Box	2,000
Piping	33,000
Electrical Work	5,000
Site Work	9,000
Construction Costs	$ 290,000

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 13
CONSTRUCTION COST DISTRIBUTION

Montrose Borough

1.	Infiltration/Inflow Correction	$ 190,000
2.	Equalization tank and appurtenances	290,000
3.	Plant Expansion required to treat Equalization tank contents (300,000 gpd)	466,000
4.	Plant Upgrading-Montrose share (77.5% x 621,000)	481,000
	TOTAL CONSTRUCTION COST-MONTROSE BOROUGH	$1,427,000
	PROJECT COST	$1,855,000

Bridgewater Township

1.	Lake Montrose Sewage Collection System	$ 276,000
2.	Meshoppen Creek Road Sewage Collection System	128,000
3.	Plant Upgrading-Bridgewater share (22.5% x 621,000)	140,000
4.	Infiltration/Inflow Correction (School Line)	10,000
	TOTAL CONSTRUCTION COST-BRIDGEWATER TWP.	$ 554,000
	PROJECT COST	$ 720,000

South Montrose

1.	South Montrose Sewage Collection System	$ 336,000
2.	Package Treatment Plant	257,000
	TOTAL CONSTRUCTION COST-SOUTH MONTROSE	$ 593,000
	PROJECT COST	$ 771,000
	TOTAL PROJECT COST	$3,346,000

Note: Project Cost is calculated as 1.30 x Construction Cost

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 14
ANNUAL ELECTRICAL COSTS

1. South Montrose Pumping Station

Pumps - 30 hp motors
Electricity - $0.03 per kilowatt-hour
Factor - 0.746 kw/hp
Running time - 8 hrs/day

$$HP \times 0.746 \frac{kw}{hp} \times hr \times days \times \$/kw\text{-}hr = \text{Annual Electrical Cost}$$

30 x 0.746 x 8 x 365 x $0.03 = $1,960/year

2. Stabilization pond and spray irrigation system

Irrigation pumps - 15 hp
Running time - 8 hr/day 8 months/year

15 x 0.746 x 8 x 243 days x $0.03 = $650/year

Stabilization pond blowers - 15 hp

15 x 0.746 x 24 x 365 x $0.03 = $2,940/year

3. Package Treatment Plant

Aeration tank blowers - 15 hp,
Flow equalization pump - 3 hp,
Tertiary filter - blower - 3 hp,
backwash surge pump 1/2 hp,
clear well pump 3 hp,
clear well feed pump 1/2 hp; Total 25 hp

25 hp x 0.746 x 24 x 365 x $0.03 = $4,900/year

4. Rotating Biological Contactors

Rotating contactor motors - 8 @ 5 hp ea

8 x 5 x 0.746 x 24 x 365 x $0.03 = $7,840/year

Aeration power costs - 40 hp blowers

40 x 0.746 x 24 x 365 x $0.03 = $7,840/year

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 14 (CONTINUED)
ANNUAL ELECTRICAL COSTS

5. Packed towers

Recirculation pumps (2)

$$0.175^{1} \times H_L \frac{\times \text{MG} \times \text{Cost/HP-Hr} \times 24 \times 365}{\text{Efficiency}} = \$/\text{year}$$

Efficiency - 70%
Cost/kw-hr = $0.03; cost/hp-hr = $0.022/hp-hr[2]
Head H_L = 30 feet

$$0.175 \times 30 \times \frac{1.4 \times 0.022}{0.70} \times 24 \times 365 = \$2,020/\text{year}$$

Aeration power costs - 50 hp blowers

$$50 \times 0.746 \times 24 \times 365 \times \$0.03 = \$9,800/\text{year}$$

6. Single stage nitrification

Aeration power costs - 75 hp blowers

$$75 \times 0.746 \times 24 \times 365 \times \$0.03 = \$14,700/\text{year}$$

7. Sewage pumps

0.7 MGD
30 feet TDH
70% Efficiency
0.022 factor for $/hp-hr

$$0.175 \times 30 \frac{\times 0.7 \times 0.022}{0.7} \times 24 \times 365 = \$1,010/\text{year}$$

8. Primary clarifier

2 motors at 5 hp each

$$2 \times 5 \times 0.746 \times 24 \times 365 \times 0.03 = \$1,960/\text{year}$$

---

[1] $0.175 = \frac{694 \text{ gpm}}{\text{MG}} \times \frac{8.33 \text{ lb/gal.}}{33,000 \text{ ft-lb/min.}}$

[2] $\$0.022 = \$0.03/\text{kw-hr} \times \frac{0.746 \text{ kw}}{\text{hp}}$

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 14 (CONTINUED)
ANNUAL ELECTRICAL COSTS

9. Secondary clarifiers

2 motors at 5 hp each

2 x 5 x 0.746 x 24 x 365 x $0.03 = $1,960/year

10. Aerobic digester

15 hp blowers
Running time 12 hrs/day

15 x 0.746 x 12 x 365 x $0.03 = $1,470/year

11. Microscreen

3 hp motor
Running time - 6 hr/day

3 x 0.746 x 6 x 365 x $0.03 = $150/year

12. Lights, heat, etc.

15 hp

15 x 0.746 x 24 x 365 x $0.03 = $2,940/year

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 14 (CONTINUED)
ANNUAL ELECTRICAL COSTS

Summary: Electrical Costs:

Alternative IA

1.	Contactor motors	$ 7,840
2.	Blowers	7,840
3.	Secondary clarifiers	1,960
4.	Sewage pumps	1,010
		$18,650

Alternative IB

1.	Recirculation pumps	$ 2,020
2.	Blowers	9,800
3.	Primary clarifiers	1,960
4.	Secondary clarifiers	1,960
5.	Sewage pumps	1,010
		$16,750

Alternative IC

1.	Blowers	$14,700
2.	Primary clarifiers	1,960
3.	Secondary clarifiers	1,960
4.	Sewage pumps	1,010
		$19,630

Plant Expansion using Alternative IA

1.	Contactor motors	$ 7,840
2.	Blowers	7,840
3.	Secondary clarifiers	1,960
4.	Sewage pumps	1,010
5.	Aerobic digester	1,470
6.	Microscreen	150
7.	Lights, heat, etc.	2,940
		$23,210

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 14 (CONTINUED)
ANNUAL ELECTRICAL COSTS

Summary: Electrical Costs

Alternative IIA

1.	Aeration tank blowers	$ 2,940
2.	Flow Equalization Pump	588
3.	Tertiary filter blower	588
4.	Tertiary filter backwash surge pump	98
5.	Tertiary clearwell pump	588
6.	Tertiary clearwell feed pump	98
		$ 4,900

Alternative IIB

Sewage Pumps	$ 1,960

Alternative IIC

1.	Irrigation pumps	$ 650
2.	Stabilization pond blowers	2,940
		$ 3,590

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 15
SALVAGE VALUE OF ALTERNATIVES

Alternative IA	
1. Concrete tank 30/50 x $41,000	$ 24,600
2. Baffles and handrails 10/30 x $25,000	8,300
3. Secondary clarifiers 10/30 x $48,000	16,000
	$ 48,900
Alternative IB	
1. Media 10/30 x $81,000	$ 27,000
2. Concrete tanks 30/50 x ($32,000 + 65,000)	58,200
3. Fiber glass 10/30 x $24,000	8,000
4. Clarifiers, primary and secondary 10/30 x $88,000	29,300
	$122,500
Alternative IC	
1. Concrete tank 30/50 x $80,000	$ 48,000
2. Clarifiers, primary and secondary 10/30 x $88,000	29,300
	$ 77,300
Alternative IIA	
1. Control building 30/50 x $45,000	$ 27,000
2. Emergency generator 10/30 x $15,000	5,000
3. Fencing 30/50 x $10,000	6,000
	$ 38,000
Alternative IIB	
1. Interceptor and Force main 30/50 x (150,000 + 35,000 + 15,000)	$120,000
2. Generator 10/30 x $15,000	5,000
	$125,000
Alternative IIC	
1. Stabilization pond 30/50 x $416,000	$249,600
2. Land 35,000	35,000
3. Piping 30/50 x $28,000	16,800
4. Buildings 30/50 x $17,000	10,200
5. Fencing 30/50 x $54,000	32,400
6. Generator 10/30 x $22,000	7,300
	$351,300

NOTE: In ratio 30/50,
Numerator = years of service life remaining for civil works at end of planning period (20 years)
Denominator = Total service life

In ratio 10/30,
Numerator = years of service life remaining for mechanical and electrical works at end of planning period (20 years)
Denominator = Total service life

MONTROSE MUNICIPAL AUTHORITY

PLAN OF STUDY

FOR FACILITIES PLAN

MAY 1975

Gilbert Associates, Inc. engineers and consultants

Gilbert Commonwealth Companies

P.O. Box 1498, Reading, Pennsylvania 19603/Telephone 215-775-2600/ Cable Gilasoc/Telex 836-431

May 16, 1975

Commonwealth of Pennsylvania
Department of Environmental Resources
383 Wyoming Avenue
Kingston, Pennsylvania 18704

Attention: Mr. Larry Pawlush
Regional Water Quality Manager

Re: Montrose Municipal Authority
W.O. 06-7122-000

Gentlemen:

This submission is the Plan of Study for a Facilities Plan for the Montrose Municipal Authority to upgrade and possibly expand the existing wastewater treatment plant. Enclosed are a narrative statement of the proposed tasks, a work and grant payment schedule and an itemized cost estimate.

The federal grant application and supporting documents have been submitted to the DER Program Services Section in Harrisburg.

Should you have any questions please contact us.

Very truly yours,

Dale R. Kratzer

DALE R. KRATZER, P.E.
Environmental Division

DRK:blm

Enclosures

CONTENTS

PLAN OF STUDY
FOR
MONTROSE MUNICIPAL AUTHORITY

CONTENTS (Continued)

PLAN OF STUDY
FOR
MONTROSE MUNICIPAL AUTHORITY

A. NATURE OF STUDY AREA

1. Description of Study Area

The proposed Study Area is located in Susquehanna County, Pennsylvania. It includes those areas so designated in Figure 1 and further described as follows. The major portion of the Study Area is defined by the limits of the natural watershed encompassing most of Montrose Borough extending down to a topographical low point of about 1,340 feet. The low point is further defined as being located immediately downstream from the confluence of the watershed's two major streams and about one-half mile downstream from the existing Montrose Municipal Authority's wastewater treatment facility outfall. The proposed Study Area also includes certain areas outside the natural watershed. They are (1) an area just north of the Borough, (2) an area extending northeast of the Borough encompassing Lake Montrose and Montrose Area High School, and (3) a strip extending down Route 29 southwest of the Borough encompassing the unincorporated area of South Montrose in Bridgewater Township.

There are two major water bodies within the proposed study area, Lake Montrose and Post Pond. Lake Montrose serves as the public water supply for Montrose. A small reservoir within the Borough boundary receives, stores and distributes water pumped from the filtration plant located lakeside. In addition, there are about a dozen small ponds within the proposed Study Area ranging in size from 1 acre to about 10 acres each.

2. The Basis for Delineating the Study Area

As shown in Figure 1, delineation of the proposed Study Area was primarily based upon natural watershed boundaries in order to be consistent with preferred water management planning. This concept was modified to include those areas presently within the service area of the Authority; that is, all areas within the Borough boundary and the Montrose Area High School. In addition, areas near Montrose which are expected to develop were also included for evaluation because of their potential growth problems such as those associated with increasing numbers of on-lot systems and the possibility of tying into the Montrose system. Two areas so identified for this study were (1) the Lake Montrose area including a strip along the existing sewer line leading to the Montrose Area High School, and (2) South Montrose including a strip along Route 29 where the potential sewer extension would go.

3. The Responsible Planning Entity and Nature of Any Agreement for Conducting the Planning

The Montrose Municipal Authority will be the responsible planning entity to oversee the preparation of the Facilities Plan. As a portion of Bridgewater Township is sewered and connects to the Montrose system, contact is being made with the Bridgewater Township Municipal Authority to determine if the study can be performed as a joint effort on the part of both Authorities. A copy of the letter sent to Bridgewater Authority is attached as Appendix 1.

Montrose Municipal Authority has retained Gilbert Associates, Inc. as its consultant for the Facilities Plan and the agreement for performing this work has been submitted with the application.

4. Latest Census Data for Planning Area Population; and Approximate Growth Rate

The following data have been obtained from the Susquehanna County Planning Commission.

Population

Year	Montrose Borough	Bridgewater Township (Total)	Bridgewater Township (Planning Area, Estimated)
1960	2363	1498	-
1970	2058	1876	400
*Growth Rate	-12.9%	+25.2%	-

* The trend in Montrose Borough has not continued and indications are that the Borough is regaining population. In addition, many of the people who have left Montrose, have moved into adjoining Bridgewater Township.

5. A Brief Description of Existing Waste Treatment Systems and Major Industries Served By Them

There are no major industries in the Montrose system. The existing collection system was installed in 1914 with minor extensions added over the years. It is a sanitary sewage system; it is not a combined system. The wastewater treatment plant, which was constructed in 1963, utilizes the two-stage high rate activated sludge process. The existing plant consists of a comminutor, grit chamber, primary aeration tank, primary settling unit, secondary aeration unit, secondary settling unit, chlorine contact tank, anaerobic digester and sludge drying beds. The average daily flow to the plant in 1974 was 377,000 gpd with a suspended solids removal efficiency of 86.0% and a BOD_5 reduction/removal efficiency of 87.1%.

6. Description of Pertinent Basin or Wastewater Management Plans and Portions Thereof To Be Used or Incorporated Into The Facility Plan

In Act 537, Official Plan for Susquehanna County, dated January 1971, it was recommended that a collection system and an interceptor sewer be constructed to serve the developed sections of Montrose Lake and the rapidly developing area east of Montrose Borough. The sewage would be collected and treated at the treatment plant in the Borough. Since development is scattered throughout the balance of the Township, on-lot disposal was recommended to continue to be the method of sewage treatment.

In accordance with the above recommendation, the present plan of study includes Lake Montrose area and area east of the Borough up to and including the Montrose Area High School.

7. A Statement Concerning Existing Water Quality Problems and Complexity of Planning Situation

a. This project should not require complex planning activities. The project basically meets the guidelines suggested in EPA's "Guidance for Facilities Planning" for a "simple" planning case. The project:

1) is not within a Standard Metropolitan Statistical Area

2) is estimated to have a new investment requirement of less than $5,000,000

3) is in an environmental setting that appears relatively non-sensitive.

As to area growth rate, Montrose Borough had been losing population through 1970, but it now appears that the Borough population is slowly increasing. The Bridgewater Township growth rate has been higher than the national average for urban areas, but much of this increase is accounted for by persons moving from the Borough. As this is a sparsely populated area, the total increase in population is not considered as having a major impact on the area.

b. There are three pieces of data concerning existing water quality problems.

1) The "Engineering and Financial Report" dated March 24, 1961, for the Montrose sewage treatment plant states: "Pettis Creek has been known to run practically dry during dry weather. Using a minimum runoff of 0.1 cfs per square mile, which is typical for this area of Pennsylvania, the dilution factor at minimum flow would be 1:2 based on the average daily flow rate."

2) A sewer connection ban has been imposed by DER on the Montrose system. This ban is due to the excessive hydraulic loads experienced at the plant as a result of excessive infiltration/inflow in the sewer system. The age of the sewer system and the materials used in its construction are the contributing factors to this excessive infiltration/inflow.

3) The DER has also prepared new effluent requirements which the Montrose plant must satisfy. These are:

$NH_3 - N \leq 0.5$ mg/l in summer, and

≤ 1.5 mg/l in winter

Total suspended solids ≤ 10 mg/l

Dissolved oxygen ≥ 6 mg/l

$BOD_T \leq 55$ mg/l

The status of water quality in the planning area will be investigated in more depth and more accurately detailed in the facilities plan.

B. SCOPE

1. Narrative Statement on Procedures for Facilities Plan Preparation

The format followed in developing the planning tasks is based on the outline suggested by EPA for contents of an application for a Facilities Plan and the outline for the facilities planning process in "Guidance for Facilities Planning" (Figure 2.1, page 12).

a. Establish Water Quality Objectives and Other Water Management Goals

We will contact DER and the COWAMP Study consultant to determine existing or potential water quality objectives or other water management goals which may affect this project. Contact will also be made with local and regional planning agencies to determine if other environmental or water management plans or goals exist which may affect the project.

b. Review Pollution Sources, Waste Loads and Water Quality Information

Any permits issued by DER or under the NPDES system will be reviewed and DER and EPA will be contacted to determine any additional requirements. The review of pollution sources and waste loads will include review of plant operating records; DER records on the existing plant; county sanitarians records for those areas of the planning area not currently sewered for complaints, malfunctioning on-lot systems, etc; and sewage enforcement officer's records of permits and denials of permits for on-lot systems. Where measurable data on pollution sources or waste loads are lacking, such as in unsewered areas, standard parameters will be considered and estimates will be made on this basis for waste loads and flows. A wastewater sampling program will be initiated at the tratement plant during this task to provide design data for parameters not presently measured at the plant.

c. Inventory Existing Waste Treatment Systems and Determine Existing Flows

1) This activity will incorporate much of the data from the proceeding task to determine existing flows. The inventory of existing waste treatment systems will include flow and waste reduction measures, sewers, the treatment plant, effluent disposal measures and sludge disposal measures. A performance evaluation of the existing wastewater treatment plant will be prepared and will include:

   a) plant performance

   b) operational problems

   c) operating personnel

   d) sampling and testing program

   e) laboratory facilities

   f) maintenance program

   The inventory will also include a discussion of on-lot disposal systems in the planning area based on data from Task b above. The sampling program begun in Task b will be continued here.

2) The infiltration/inflow analysis (Phase I) will identify the presence, quantity, and type of infiltration/inflow conditions which exist in the sewer system. Information to be obtained and evaluated in the analysis will include, but not necessarily be limited to, the following:

   a) basic flow data for the sewer system including overflows and bypassed flows;

   b) location, frequency, and cause of overflow conditions in the collection/treatment system caused by infiltration/inflow;

   c) relationships of existing population to flows in the sewer system;

   d) geographical and geological conditions which may affect the present and future quantities or connection costs of the infiltration/inflow;

   e) general analysis of age, length, type, materials of construction; and known physical conditions of the sewer system.

For determination of possible excessive infiltration/inflow in the analysis, preliminary cost estimates will be developed. These will include the relative costs (for the design life of the treatment works) both for connecting the infiltration/inflow conditions, and increasing the treatment work capacity to provide the required degree of wastewater treatment for the quantities of infiltration/inflow.

If the Infiltration/Inflow Analysis (Phase I) demonstrates that the sewer system may be subject to excessive infiltration/inflow, and if EPA concurs with the results of the analysis a Sewer System Evaluation Survey (Phase II) will be performed. The Evaluation Survey, if performed, will consist of the following specific items:

f) A proposed plan of study will be prepared and submitted to the EPA Regional Administrator for approval.

g) Upon approval of the plan of study, a systematic examination of the sewer system to determine the location, flow rate, and cost of connection of each definable element of the total infiltration/inflow problem will be performed. The Evaluation Survey will consist of five separate stages; these being: physical survey, rainfall simulation, preparatory cleaning, internal inspection, and analysis. This Survey will be conducted in accordance with such guidelines as the EPA Regional Administrator shall furnish from time to time.

h) A Sewer System Evaluation Survey report stating the specific location, condition, estimate of rate of flow and cost of rehabilitation of each defined element of infiltration/inflow will be prepared. This report will summarize the quantities of defined infiltration/inflow and propose a program of rehabilitation to connect the excessive infiltration/inflow.

d. Inventory Existing Environmental Conditions

The environmental inventory will provide baseline environmental data against which projected environmental changes attributable to the various management alternatives may be evaluated. It will encompass the delineated study area and may be subsequently modified to include other alternatives as they develop, such as sludge or effluent land disposal sites.

On an informal basis, the inventory began as a factor in preliminary environmental evaluation when maps were consulted for the purpose of delineating and describing the study area (see Section A.1 and Figure 1). It was during this preliminary

evaluation that the question of including or omitting various adjacent land areas and water bodies was considered pursuant to sound water management planning and existing environmental goals and planning policy. However, a formal environmental inventory will begin along with the development and evaluation of system and management alternatives, thereby providing environmental data for early feedback into the alternative evaluation process (see section B.1.f.).

The formal environmental inventory will include the following salient areas:

(1) topography, including topographic maps;

(2) climatology;

(3) geology;

(4) ground and surface water hydrology, quality; water uses;

(5) plant and animal communities, particularly:

- aquatic biota in receiving water
- general description of affected ecosystems
- endangered or locally threatened species
- other wildlife

(6) unique or vunerable environmental features;

(7) Unique archeological, historic, scientific or cultural areas;

(8) community growth patterns and land use trends;

(9) air quality; and

(10) aesthetics.

Historical base data (climatological, ecological, hydrological land-use, etc.) will also be reviewed and summarily presented. This will require interviews with appropriate agencies, clubs, and associations as well as a review of existing pertinent literature.

A short field study will be conducted to augment existing data, and to determine the presence of unique environmental and socio-cultural features.

In all cases, the inventory will include consideration of existing environmental goals and constraints including an evaluation as to the uniqueness of the area and to the possibly presence of rare or endangered species.

e. Population and Wastewater Flow Forecasts

The facilities planning period for population and wastewater flow forecasts will be 20 years beyond the estimated date of initial system operation.

This work will include review of existing population studies and the correlation of these projections with any land use and zoning plans. Economic projections including growth tends and constraints for the planning area will be considered for their impact on development.

Available flow records will be analyzed to determine present waste flows and loads. This information along with any potential flow and waste reductions and water use tends will then be used to develop the flow and waste forecast.

f. Develop and Evaluate Alternatives

The development and evaluation of alternatives will include alternative waste treatment systems, cost effectiveness evaluation and an environmental evaluation. As the existing plant is relatively new (1963) and generally performs well, there is no apparent advantage to considering a new plant site. The proposed Facilities Plan will consider:

1) Optimized operational efficiency of the existing plant.

2) Upgrading of the existing plant by either biological or physical-chemical treatment or combinations of these two.

3) Wastewater reuse for either groundwater recharge or surface water supply enhancement.

4) Land application.

The existing plant achieves sludge stabilization by anaerobic digestion which is working quite well. Therefore, alternatives to sludge disposal will consider the final disposal options of land application and landfill disposal. As incineration is quite expensive for small systems, this option will not be considered.

Flow and waste reduction measures for reducing any excessive sewer system infiltration/inflow will be compared with treatment at the wastewater plant on a cost effective basis as part of the infiltration/inflow work.

There will probably be no alternative interceptor or trunk line systems to be considered as any additional sewers will be only minor extensions, or possibly an interceptor to pick up South Montrose.

As mentioned in section B.1.d, the environmental evaluation began when the study area boundaries were being defined, and it will continue as an integral part of the alternative evaluation process as the facilities plan develops. The impact of an alternative will be evaluated with a view toward noting significant impacts and failures to meet environmental goals or constraints. Thus, adverse impacts may be a basis for rejecting an alternative.

Primary effects will include (1) temporary or long-term construction effects and (2) operational effects. Secondary effects such as those affecting land-use will also be addressed.

g. Develop and Evaluate Alternative Institutional, Legal and Financing Methods for Implementation

In conjunction with development and evaluation of alternative wastewater systems, alternative management systems will be considered. The institutional arrangements and authority of existing management agencies will be evaluated and compared to those required to implement the actual wastewater plan.

Various types of management situations such as operating, leaseback, joint or individual authorities will be considered. Financial obligations for capital and annual costs for existing and potential systems will be considered.

h. Refine, Review and Display Alternative Proposals

Each alternative will be examined, refined and modified as needed to define all elements sufficiently to assess realistically costs, reliability and environmental effects. The selected plan will represent the optimum combination of these items and will include a recommendation for implementation. Contribution towards meeting adopted environmental goals and features to offset or mutigate adverse environmental impacts will be reviewed in detail for each remaining alternative. Discharge site and potential land disposal sites will be reviewed and located more precisely with a view toward minimizing environmental effects as well as costs. All alternatives and the selected plan will be presented at a public hearing before the decision on the selected plan is finalized.

i. Public Participation

All meetings of the Montrose Municipal Authority are open to the public as required by Pennsylvania law. In development of the Facilities Plan, the Authority will solicit comments and

ideas from the public to be considered in the plan. Progress reports on the plan will be made available for each Authority meeting and for the public. Authority or consultant personnel will be available to address local environmental, civic, professional, etc. groups.

A public hearing will be held prior to adoption of the Facilities Plan by the Authority to present the alternatives considered, the method of evaluation, and the tenatively selected plan. The Authority will notify interested groups and persons of the hearing by posting general and detailed notices and sending written notices to local and regional agencies, clearinghouses, interested groups, officials and citizens.

The hearing record will include:

1) A statement that participants were informed of the purpose of the hearing.

2) Copies of notices, advertisements, etc.

3) List of those notified.

4) List of witnesses.

5) Text of each presentation.

6) Summary including issues raised, conflicts resolved and unresolved, and other significant portions of the record.

j. Facilities Plan

At the completion of the Public Hearing, the Facilities Plan will be finalized, printed and submitted to the Authority, DER and EPA.

ESTIMATED COSTS FOR FACILITIES PLAN
MONTROSE MUNICIPAL AUTHORITY
MONTROSE, PENNSYLVANIA

	Task	Man-Hours	Cost	Estimated Expenses	Total Cost Per Task
a.	Establish Water Quality Objectives and Other Water Management Goals	24	$ 600	$ 200	$ 800
b.	Review Pollution Sources, Waste Loads and Water Quality Information	40	800	450*	1,250
c.	Inventory Existing Waste Treatment Systems and Determine Existing Flows				
	Treatment Systems	40	1,000	250*	1,250
	Infiltration/Inflow Analysis	~~208~~	~~4,300~~	~~500~~	~~4,800~~
	Sewer System Evaluation Survey	1,582	41,050+	1,600	42,650
d.	Inventory Existing Environmental Conditions	152	3,800	500	4,300
e.	Population and Wastewater Flows Forecasts	80	2,000	100	2,100
f.	Develop and Evaluate Alternatives	520 464	11,480	1,200**	12,680
g.	Develop and Evaluate Alternate Institutional, Legal and Financing Methods for Implementation	80	2,000	200	2,200
h.	Refine, Review and Display Alternative Proposals	168 144	3,800	300	4,100
i.	Public Participation	84 72	2,360	600	2,960
j.	Facilities Plan	68	1,500	200	1,720
					~~$80,810~~ 76,010
				Contingencies at 10%	8,080 7,601
				TOTAL	~~$88,890~~ 83,610

* Includes $250 allowance for sampling program at wastewater treatment plant.

** Includes $500 allowance for soil borings if needed in analyses of land application of effluent.

\+ Includes $12,000 for outside services: Preparatory cleaning - $6,000
Internal Inspection - $6,000

Prepared: [signature] 5/12/78
Dale Kratzer

Approved: [signature]
Luke F. Chelius

[signature]
Raymond T. Kase

APPENDIX 1

LETTER TO BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

Montrose Municipal Authority
28 Public Avenue
Montrose, Pa.

Bridgewater Township Municipal Authority

Attention: Mr. Audley Lott
Chairman

Re: Plan of Study

Gentlemen:

The Montrose Municipal Authority met recently with representatives of the Kingston Regional Office of the Pennsylvania Department of Environmental Resources in connection with the Plan of Study that is being performed for us by our consulting engineer, Gilbert Associates.

We were advised by Penn DER that the 201 Study (Facilities Plan) must be performed for the entire area of study which includes the Montrose Lake Area of Bridgewater Township, possibly South Montrose in Bridgewater Township and the Borough of Montrose.

Since the study area may encompass both the developed portions of Bridgewater Township and Montrose, we suggest that the study be performed as a joint effort on the part of both authorities. The major advantage of this joint cooperation would be to possibly allow a higher priority rating to be attained for Federal funding.

We request that you give this matter your careful consideration and respond to us with your decision by May 12, 1975, so we can inform Penn DER of the progress which is being made toward completing the areawide sewerage plan.

Montrose Municipal Authority

28 Public Avenue

Montrose, Pa.

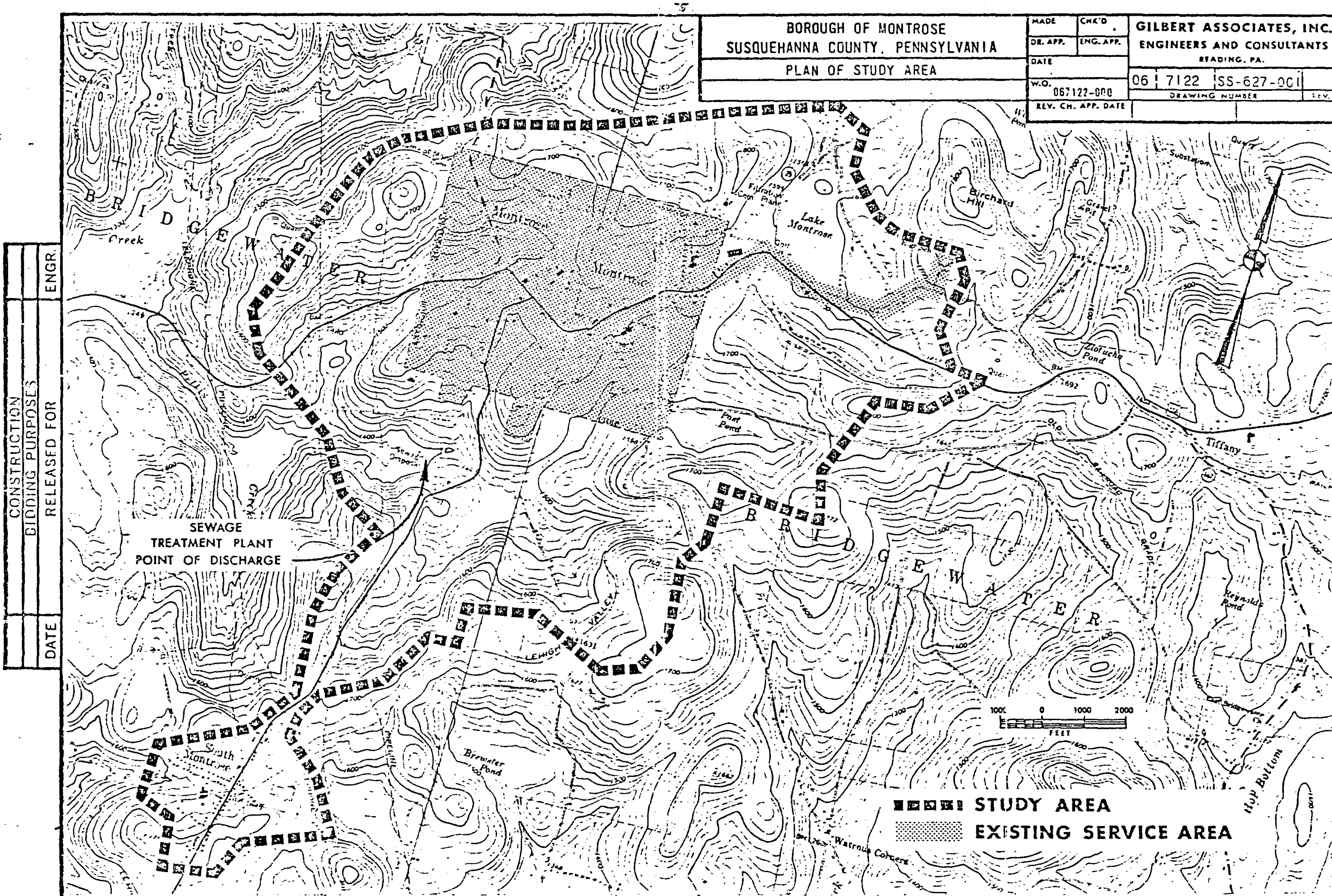
If you have any questions concerning our request, please contact us.

Very truly yours,

ROBERT BARTRON
Chairman
Montrose Municipal Authority

RB:dls

bcc: DER
GAI


BOROUGH OF MONTROSE
SUSQUEHANNA COUNTY, PENNSYLVANIA
PLAN OF STUDY AREA
MADE
CHK'D
DR. APP.
ENG. APP.
DATE
W.O. 067122-000
REV. CH. APP. DATE
GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.
06 7122 SS-627-001
DRAWING NUMBER
REV.
CONSTRUCTION
BIDDING PURPOSES
RELEASED FOR
ENGR
DATE
SEWAGE
TREATMENT PLANT
POINT OF DISCHARGE
BRIDGEWATER
Lake Montrose
Birchard Hill
Montrose
Zlofucha Pond
Tiffany
Reynolds Pond
LEHIGH VALLEY
South Montrose
Brewster Pond
Watrous Corners
Hop Bottom
1000 0 1000 2000
FEET
STUDY AREA
EXISTING SERVICE AREA

MONTROSE MUNICIPAL AUTHORITY SUSQUEHANNA COUNTY, PENNSYLVANIA	MADE JVS	CHK'D	GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.
	DR. APP.	ENG. APP.	
WORK & GRANT PAYMENT	DATE 5-9-75		06 7122 SS-627-002
SCHEDULES FOR	W.O. 067122-000		DRAWING NUMBER / REV.
FACILITIES PLAN	REV. CH. APP. DATE		

CONSTRUCTION BIDDING PURPOSES RELEASED FOR ENGR. DATE

TASKS

a. Establish Water Quality Objectives & Other Management Goals

b. Review Pollution Sources, Waste Loads and Water Quality Information

c. Inventory Existing Treatment Systems and Determine Existing Flows

Treatment Systems
Infiltration/Inflow Analysis
Sewer System Evaluation Survey (if required)

d. Environmental Inventory

e. Population and Wastewater Flow Forecasts

f. Develop and Evaluate Alternatives

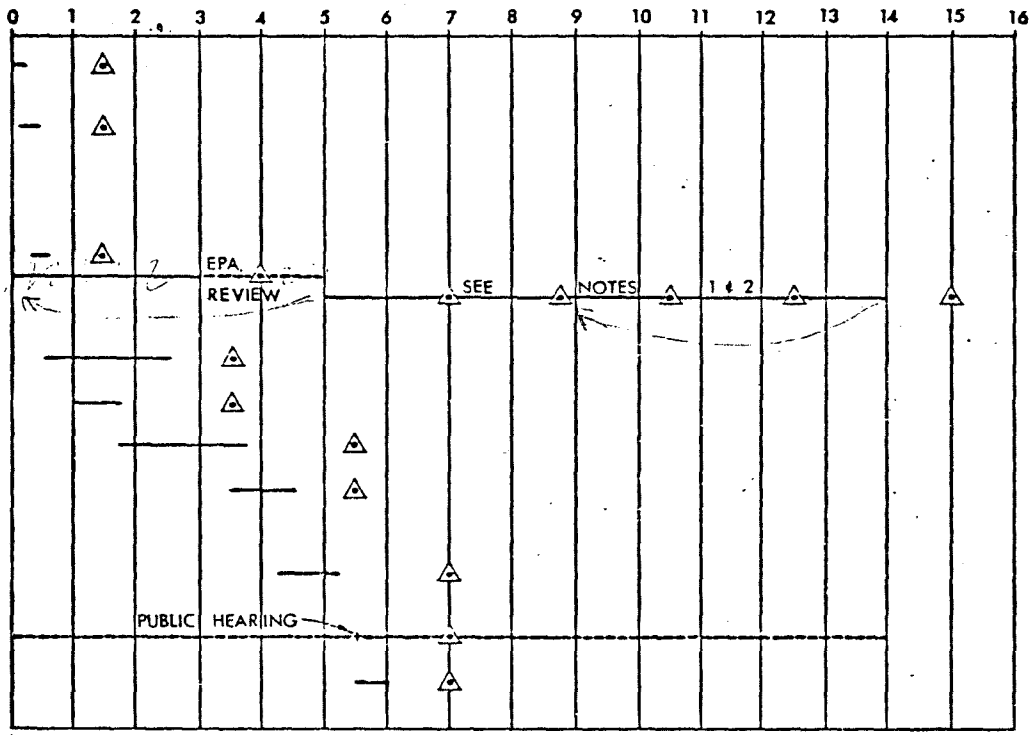
g. Develop and Evaluate Alternative Institutional, Legal and Financial Methods

h. Review, Refine & Display Alternative Proposals

i. Public Participation

j. Facilities Plan

MONTHS



EPA/DER/MMA Authorization to Start Facilities Plan

Legend:

——— Task Duration

- - - - Continuing Task

△ Grant Payment Schedule

NOTES:

1. Should the Sewer System Evaluation Survey (SSES) be necessary, portions of items f, g, h, i, and j would be completed after the completion of the SSES. This would require approximately 2 additional months for a total time of 16 months.

2. Payout for the SSES would be made as the various elements of the SSES are completed. The SSES elements include: 1) physical survey, 2) rainfall simulation, 3) preparatory cleaning, 4) internal inspection and 5) survey report.

Susquehanna County,
State of Pennsylvania, } ss:

Henry W. Felton, being duly sworn, says he is the editor of the Montrose Independent, a weekly newspaper of general circulation, published at Montrose, Pa., in said county, which was established in February, 1816, and that the affiant is not interested in the subject matter of the notice or advertising, and that all of the allegations of the statement as to time, place and character of publications are true, and that a notice, whereof the annexed is a copy, was published in said paper on

NOTICE
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DONALD DEAN, SECRETARY
26 & 29-1

.....23rd.....day of..June.....197.6.
and .....1st.....day of..July.....197.6
and .....8th.....day of..July.....197.6
and .....15th...day of..July.....197.6
and .....~~day~~ of.....197...

Henry W. Felton

Sworn and subscribed before me this ....5th.....
August...A.D. 19.76.

Bonnie D. Mead Notary Public

My Commission Expires .....NOTARY PUBLIC
BONNIE D. MEAD
MONTROSE BORO., SUSQ. CO. PENNA.
MY COMMISSION EXPIRES: 9-4-78

Susquehanna County,
State of Pennsylvania, } ss:

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31-1

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Transcript of Public Meeting held by the Montrose Municipal Authority in the Court Room of the Susquehanna County Court House, Thursday, August 5, 1976, commencing at 8:00 o'clock P.M.

MR. REIMEL: I'd like to welcome you on behalf of the Montrose Municipal Authority to this public participation meeting. I'm Allan Reimel of the Montrose Municipal Authorty. The purpose of this meeting is to inform area residents and groups of the progress made on the sewer facility plans for the Montrose Borough and Bridgewater Township areas. The second purpose of this meeting is also to get any comments or ideas or questions from the area residents or groups who are here tonight, so we encourage you to participate along with us. The agenda for tonight's meeting will be something like this. First we'll have the introduction of the Montrose Muncipal Authority and Bridgewater Authority, our consulting engineers and any other groups that are present here tonight. Then I'll turn the meeting over to a member of our consulting firm about the facilities plan, and then we'll have another consulting engineer who will talk abou the facilities plan - exactly what it is and what we have done to date. Fourthly will be the proposals as a result of this study, probably the future needs of this area. The last thing on the agenda will be any comments or statements that any of you out there would like to make. Now, I have received word from the Montrose Borough Council that they would like to make a statement. The only other request I've had has been from a Montrose resident, Fred DeFau; he would like to make a statement also. Now,is there any other group here represented by those who would like to make an official statement at the end of this meeting?

(No audible response)

O. K. During the meeting you will be free to ask questions at the

end of each section. Try to let the engineers get through with their section before we get too many questions so that we'll not be distracted from where we are. At the end of each section they will ask for questions, so please try to contain them until the end of each section.

Members of the Montrose Municipal Authority are Ralph Rosa, Donald Dean, Bob Bartron, Bob Chamberlin, and the member at large is Robert Lee. The members of the Bridgewater Municipal Authority are Mr. Audley Lott, Worden Allen, Jim Croup, Neil Conaboy and Doyle Thomas. Our conulting engineers are from the firm of Gilbert Associates of Reading,Pennsylvania. We have here tonight with us Mr. Richard Valentine, Joe Fiadli, Alex Brand, and Dave Lydon. They will be speaking throughout the course of the agenda.

Now, do we have any members from any government agency here tonight to be recognized - we'd like to recognize them?

(Reply) Bob Wallace, Department of Environmental Resources from Wilkes-Barre.

MR. REIMEL: Is there anybody else from any government agency who would like to be recognized?

(No audible response)

MR. REIMEL: O. K. At this time I would like to turn the meeting over to Dick Valentine, who will get into the second section of the agenda.

MR. VALENTINE: Good evening, Ladies and Gentlemen. I'd like to start off by giving a brief history of how this plant came about. The Montrose Municipal Authority authorized Gilbert Associates to prepare a plan of study in February of 1975, and we completed this plan of study in May of 1975, which describes just about what we're doing at this time. This plan of study was approved by the D.E.R., the Department of Environmental Resource. Then we were authorized, we at Gilberts'

to prepare a facility plan in March of this year, March of 1976, and the facility plan is the first step of a three-step plan under which grants are authorized under the Federal Water Control Act of 1972. Before we describe what we have done this far in our preominary design and our estimates, I'd like to have a member of our group, Mr. Alex Brand, describe the Federal Water Control Act and its various ramifications. We would be able to complete approximately fifty percent of ourddesilting plant at this time. Mr. Brand?

MR. BRAND: I'm also particularly glad to be here tonight because the last time was fifteen years ago when I used to come up once a month to supervise the financing of the Sewage Treatment Plant of the 1963 project. Now, at that time the Montrose Borough Municipal Authority had a thirty percent Federal grant. That was under an old law now no longer in force. It's beneficial, I think, to go over some of the aspects of the old law because it has changed so completely since 1972 when Congress enacted a new law. P. L. 660, the old law, provided a thirty percent grant to local governments or authorities who had designed sewage treatment works or interceptor sewers. There was no money for collection sewers at all, and there is, of course, today. So at that time Montrose has an (unintelligble) sewage treatment plant which is updated and upgraded from primary to secondary and they got a thirty percent grant, and it was my job to make sure that all of the books and accounting was done according to government methods; that payrolls were submitted every month; that contractors were paying their people the authorized wages, basically union wages, and so forth. In fact, I remember that I discussed this rather lengthily with Don Dean - I even remember the episode. There was a wage dispute back in 19 -- towards the end of the project, in which some of the laborers claimed that they had been laying pipe for the contractor all the while, and that they should be paid not the laborers' rate but the pipelayer's rate. So this was causing - I, being on the spot, should have caught it, but I didn't know that these people were laying

pipe actually, being laborers, and so, believe it or not, there was an arbitration meeting called at the Borough Hall up on the second floor, this was about June of 1963, I think, and with that the people came from Washington, New York and Philadelphia and Harrisburg - there were union leaders there - all over a matter which was ultimately settled for two hundred and four dollars. We must have spent a couple of thousand of State of Federal money and our own time to get this settled. We had a local policeman - I don't remember his name - and we had all parked on the square. The policeman sat in on the meeting, which started at about ten, and we had all parked in the slots at the parking meters on the square there. Well, when we got out at about half past twelve, we had all been ticketed. The policeman had left after about an hour, and it was obvious what he had done. I was rather hot about the whole thing, and I refused to pay - I think it was for a half dollar, but I refused to pay him. About a month later our firm got a letter from the State Police. They had tracked it down through the company car license number, and we were accused of being a scofflaw, and the boss called me in, and I explained that I had saved the Boro a couple of thousand bucks, and he said, "Look, Alec, pay the fifty cents and put it on your expense account." I wrote the check for fifty cents payable to the Commonwealth of Pennsylvania, and I never heard any more about it. Well, so much for reminiscing. That was thirteen years ago.

Now, P. L.84-660, the old Water Pollution Control Act, expired in early 1972, in October 1[illegible], 1972 - this is one of the dates I remember, October 18, 1972, Congress enacted the Federal Water Pollution Control Act of 1972, P. L. 92-500 over the then present law, and President Nixon vetoed it. I think most of you people will remember that. President Nixon claim-d that it would be (inaudible) to authorize seventeen billion dollars to be spent within three years at the rate of five, six or seven billion dollars a year to clean up the nation's waters. Now, this was, as I said, in October of 1972. Now, I think that all of you will remmmber that even though Congress enacted this law over

President Nixon's veto, he still had the Presidential O.M.B., the Office of Management and Budget, which had the power to control the rate of Federal spending, so he impounded all of these funds for a couple of years. Nothing went on at all in the United States. In fact, I can assure you that many of the engineering firms had to get out of the environmental business, or the sanitary engineering aspects of it, because nothing was moving. Now, that it's moving again because that the Federal Courts have ruled that the money be released, and that's why there is money again for sewer design, construction - sewer design and construction. Incidentally, in the 1963 project, the Borough of Montrose had to pay the engineers the whole cost of design. There was no Federal grant to do that. We did a feasability report, which I remember was done for about fifteen hundred dollars; the Borough paid for that. Then independently the Borough authorized us to do this design for the sewage treatment plan, and the Borough paid us for that. It's no longer that way. Under the new law, P. L. 92-500, 1972, they divided everything into three steps. Now, steps two and three are related to design, and they will always be that way. You obviously have to go into engineering design to design any public facility, whether it's a school or a sewer system, and of course construction is a very expensive thing. When you finally advertise for bids and get the lowest bidder you get into the construction. So steps two and three will always be together - design and construction. Step one, a facility plan, is something brand new. That's why we're here tonight.

Now, I'm going to start to use the word "statutory", and that means that it's written into law. Nothing that the Borough of Montrose of any of the other local governments can do about it. It's statutory - it's written into the law, under Section 201 of 1972 , and everybody, every local government if they wish to get this percent must do what the statute requires. There are a lot of loose ends in the whole law to

do with environmental assessment. What effect will this proposed sewer improvement have on the environment? Will it do it harm? Will it alleviate or mitigate the harm being caused right now. One of the requirements that you can't get away from is public participation. It's necessary that the public be invited to one or two meetings in the course of this planning to listen to what's being done, and that there must be a transcript - which is why there's a reporter here tonight - who I guess will give us a report verbatim of what's going on. Amoung other things the law requires is that you must have an elevation and inflow study. The reason for that the Federal Government does not wish to finance plans that are too big. This is in order to qualify for the seventy-five percent grant for this, and then if the whole plan is approved, the seventy-five percent grant for design, and the seventy-five percent for the actual construction costs.. This is statutory, and there is nothing that either you or I can do about it

The actual planning has about ten parts. The first of these will be available to any interested party in Montrose. Dick Valentine, the professional engineer - it's about fifty-ercent done now, is it Dick? Well, at any rate, the first part will be a short form of the plans, a summary of the recommendations. The second part will be a map of the plan area for study purposes only. Now, incidentally this step 1 plan - this step one facility plan process begins with something Dick mentioned earlier, the plan of study. Now, that's written in caps. It has a formal name for the beginning of the facility plan. Now, each local government or authority that felt it needed sewer improvements or planning, must submit, at its own cost, to the Federal Government, E.P.A. a plan of study, which tells generally what you propose to do, what the local problems are and what area you propose to study. Now, you are no longer allowed to state that you will plan only for a Borough, whether it be Montrose or Canton or any of the other muncipalities. You must try so far as is possible to study the entire drainage area, which is why Bridgewater Township is included here, as your development spills over

into the Township and as the population tables are updated. So it's up to the Borough and the Township to state whether they want to be studied together, but the fact is that the State, the Department of ENvironmental Resources in Harrisburg, tells you how large the area is to be and then tells you what you must study. So you can fight that if you wish. When the decision is made it will be published in the Pennsylvania Bulletin and the local papers, and I'm sure many of you read the Pennsylvania Bulletin and the local papers - about what the state was finding long before this.

Now, the plan of study must also contain a statement of cost to the agency, to the local government who do the step one facilities planning. This is also submitted and you can see why that is - because when the plan of study is done and approved, the cost estimate which is part of the plan of study is used as a basis for an application to E.P.A. for seventy-five percent of the cost. That's why the engineers have to work within a certain, very definite budget, so that the Federal Government will pick up seventy-five percent of the cost and the local share will be twenty-five percent. So all of this --

MR. McKENZIE: Excuse me, sir. You lost me there. Are you on the facility plan or the plan of study?

MR. BRAND: The plan of study was done already. I had outlined - what I'm talking about now is what its cost will be - you're going to be getting seventy-five percent back. The State tells you what exactly you plan should consist of, what your plan should be capable of. Dick can, perhaps, explain this in more detail later. I am not an engineer myself and I would prefer to stay away from technical things. The fourth part of your facility plan would be to describe the currency of the conditions in your area, what your population is for the whole area, the Township and the Borough, how the land is being used, how the water is being used, and generally what the conditions are. As I said, we have a lot of environmental communities here, such as campgrounds, which you must

be aware of. As part of Part Four you must describe your existing waste treatment plant, and you must submit the infiltration and inflow that's coming in, and you must appraise the performance of your existing system. The you must also describe what your land use plans are, population projections, and forecast your future waste load. The sixth part of the Step One Facility Plan is that you must develop alternatives. What is the best way to achieve what you're trying to do? Part Seven is that the engineer must have a consultation with his clients and the public, as we are doing tonight, to select a plan, work out its environmental effects, and you must work out the costs, broken down into pipe lines, pumping stations, expansion of lines, and so forth. Now, Nine is important because it covers the various - including institutional responsibilities of the project as well as the local government's, and how you're going to finance it. Remember that even though the Federal Government picks up seventy-five percent of the cost, twenty-five percent is still a lot. The twenty-five percent added on top of what you're paying now within the system. There is no free lunch anywehre, no matter. No matter how the Federal people talk about the seventy-five percent, remember that you still have to pay the twenty-five percent. To do that, you're going to have to borrow money, and in all probability each Authority will have to borrow money because that's why you have these authorities. However, this is not quite worked out yet. At the time, 'though it will be the responsibility of both Authorities, but there will be a lot of work done before that takes place.

The last thing, the final item in the plan is your environmental assessment. Now, why do we need that? This can be a pain. You ha-e to really look into every environmental impact that the sewage plan may have, such as will it encourage too much development in certain areas where you don't want it? Is it incompatible to land use plan and so forth? Now, the reason you've got to have environmental assessment is that there is another public law that Congress passed in 1969, which is known as NEPA,

the National Environmental Protection Act. This requires that any action taken by anybody in the United States that may have a signifigant impact on the environment, and the environmental effect assessment, or if necessary the one bigger one is the environmental effect statement, which must be submitted and evaluated, and this must be complied with because there are groups that would see to it that an invornmental impact statement would/be demanded immediately. At any rate, this statement should be submitted, which should satisfy your local groups who have environmental interests. It's submitted to your local groups in the district, such as Planning Authorities, School Board Authorities - it would have to be approved by the Board of your Planning Commission and by the State's - approved by everybody, then submitted to the Federal Environmental Protection A-ency in Philadelphia, and then the Authority would fill out an application for Step Two, the design plan. Now, that's pretty important. The study of your planning now calls for a seventy-five percent grant which you did not have under the old law. Back in 1962 on the plan for the present plant, the funding the Borough took on itself. They paid us out of Borough funds itself. There were no Federal funds for design plans. Again, I stress that this is all set out for you by law. There is no way of getting out of doing these things that the law requires you to do. There is one other act, the Federal - the Act of 1968 - the Federal Inter-Governmental Cooperation Act came out, again during the Nixon Administration. This requires municipalities to work together, the Intergovernmental Cooperation Act of 1968, and the way that they did this, they assigned the OMB, the Office of Management and Budget, which became an office directly under the President that now has the direct responsibility of supervising a series which they call A-95 clearing houses. They are super planning commissions. There are only about nine of these in Pennsylvania. They are going to examine every possible municipality cooperating. So there are three laws here, the Congressional Act Act, the Environmental one of 1972, and the

Intergovernmental Cooperative one of 1968. They all require you to work together. O. K. Thank you for listening. Dick?

MR. VALENTINE: O. K. Thank you, Mr. Brand. Are there any questions for Mr. Brand? Any questions at this time?

MR. BRAND: Incidentally, I'm not entirely all for these Federal grants, and their renewal. No matter how they talk about all their grants, the fact remains that your costs will go up. What I'd like to see the Federal Government come out with is a grant for operation because the more sophisticated they become, the more expensive it becomes to run them, so it's not only the twenty-five percent share, your local share, but your operating costs are going to go up. So if I sound enthusiastic, as I said before, I'm not really that way at all..

MR. VALENTINE: Mr. Brand has described the context of the facilities plan, which are the ten steps. At this time we'll get to the real heart of the facilities plan. We'd like to get input from you. We have completed about half and we have done enough preliminary design to get some preliminary costs. We'd like your opinions on these things. We'd be willing to modify our design in accordance with your wishes. The facility plan has been described by Mr. Brand. I have passed out maps of the project area. Is there anyone that is not close enough to see it?

(No audible reply)

This boundary of the project area, the facility plan study araa, was defined for the plan of study, and which was approved by the State Department of Environmental Resource, as you can see in the Lake Montrose area, the Montrose Borough, the Village of South Montrose with a (inaudible leading up to it, some parts of Bridgewater Township surrounding Montrose Borough. Now, our plan facilities essentially comprise expansion of the existing Borough of Montrose Sewage Treatment Plant, which you can see is located Southwest of Montrose Borough marked on your map. It now has a rated capacity, recently rated capacity of four hundred and ten thousand

gallons a day. What we propose is to design a plant which in the year 2000, twenty years from the completion of the revised facility which we have described - I'll go into the schedule later of how we're going to go through the design and construction phase, and we figure that construction will be complete by 1980. Therefore, twenty years from 1980, the year 2000, is our design year for the treatment plant, and we have chosen to apply eight hundred thousand gallons for the revised treatment plant. We'll go into that later. It will approximately double the size of the treatment plant. Also we propose certain collection systems in Bridgewater Township. We propose to sewer South Montrose, and we propose to run a line from the sewer area of South Montrose to the existing treatment plant, We also propose to sewer the areas around Lake Montrose, as shown in gree I believe.

A third thing we will stress tonight is correcting the infiltration and inflow, and later on I'll ask Mr. Podolick what his work has been in that area - to describe it, and after that I will come to our estimated costs to carry out this work.

Any questions?

MR. CHESTER ROSE: Later.

MR. VALENTINE: All right. Thank you. This shows the existing property line and the existing sewage treatment plant. You can't readily see the items on the sewage plant, but that isn't really what I want to show tonight. I want to show what we are proposing to add. In other words, we are going to utilize the existing system, as a primary system, after which we will go through a system and we will remove various impurities to satisfy the state standards in large measure, after which they will go through a secondary clarifier and then through a filter or microfilter and chlorinated and then pass out as before. We have also planned for inflow at a maximum rainfall by establishing a holding pond outside the equalization pond outside the present property line. Now,

that's something we'd like to have your ideas on. This holding pond will hold a million and a half gallons during heavy rainfall. Now, if this holding pond is filled and we continue to have rainfall, we will treat it and hold it and then when the heavy rainfall decreases we will feed this back through the plantand it will be treated in this manner.

Now, these are the criteria that we have used to design this plant for the year 2000. These are our best estimates. We are certain willing to listen to whaever you have to say about it. We have said the resident population in Montrose Borough in the year 2000 will be two thousand five hundred people. The 1970 census it was two thousand fifty-eight. We're saying that the resident population in a portion of Bridgewater Township involved in the study area will be one thousand seven hundred. We are saying that the portion of the high school population for sewage treatment purposes will be five hundred seventy students, for a total population, design population of the study area of the year 2000 of four thousand seven hundred and thirty-seven people, and given the rough rule of thumb of a hundred gallons per capita per day, that would come out to be four hundred seventy thousand gallons per day. We have drawn two other calculations, and they arrive at this figure - they come out just about the same. On top of that we have put in an excess capacity of three thousand gallons a day to take care of this treatment of holding pond, which I previously described, which can be done over a period of five days. Inother words, the holding pond holds one million - one and a half million gallons, keep three hundred thousand gallons every day for five days going through the pond, every day for five days during heavy rainfall, and that would make a total treatment plant design capable of eight hundred gallons per day. As I said before, the holding pond holds one million five hundred thousand gallons. The rough treatment of the flow coming into the plant, which the holding pond could not hold, in other words another five hundred million gallons a day, for a total of ten hundred million gallons. I think I'll stop now for questions.

MR. CHESTER ROSE: That population for Bridgewater Township, that's the whole Township, isn't it? That population would be the whole population of Bridgewater Township at present?

MR. VALENTINE: Well, sir, the present population is one thousand eight hundred and seventy-six in the 1970 census. The population is growing. The County Planning Commission says it has grown twenty precent in the last five years.

MR. ROSE: Well, I questioned them on that, and they said they had never put out such a figure.

MR. REIMEL: What would the figure be? Do you have any idea what the figure would be, that you would say, Mr. Rose?

MR. ROSE: Well, I question where they got those figures because the Susquehanna County Planning Commission said they never made a forecast.

MR. VALENTINE: Well, I'm sorry, I don't like to disagree with you, but that's the impression I got from them. I will check back with them on it, however.

MR. BRAND: Is that in the County Master Plan?

MR. VALENTINE: That I don't know.

MR. ROSE: Another question, you haven't included Lakeview Avenue in your plan according to the sketch here.

MR. VALENTINE: Where is that?

MR. ROSE: It's on the east side of Lake Montrose.

MR. VALENTINE: Well, it seems that all the maps aren't the same.

You have a question, sir?

REPLY: I'm Warren Williams, Montrose Borough Council. I wondered about the corridors that exist from South Montrose to Montrose - why the line would come down 29 as opposed to the valley which is slightly north of Route 29?

MR. VALENTINE: Well, it should come down along the route. It didn't show that way. You'll have to excuse our draftsmanship.

MR. WILLIAMS: No, I didn't mean that. The valley - it shows the valley slightly north --

MR. Outside the study area.

MR. WILLIAMS: Well, I wondered how th- study area was so designed as to widen uphill to the cup as opposed to facing the valley? Which is north?

MR. VALENTINE: That's a good question. We'll certainly make a note of that. In that section there is a quarry on the back, so that it would be the longer way around, wouldn't it?

MR.WILLIAMS: Well, I don't know that. It would seem that you would have less pumping.

MR. VALENTINE: We'll certainly look into it.

MR. BRAND: Dick,at what point on the map would be the elevation point where pumping would not be needed? Right outside of South Montrose? It would then slope down to the treatment plant? Can you point that out on the map?

MR. VALENTINE: That's correct. We would have gravity flow down from South Montrose to a pumping station outside the study area and pump up to a point near the high point here, which is the narrowest neck of the corridor and gravity flow down then to the treatment plant.

Another question?

REPLY: I'm Worden Allen from South Montrose, and I have a question. Did you make a study of the cost and the feasibility of a filtering system in South Montrose, as opposed to the pumping station in Montrose? I'm interested in what the study was on that, the costs and so forth?

MR. VALENTINE: We studied it. I'm not sure that the cost was in detail, but we do have the costs in the preliminary stages of investigation, so we are investigating it, but I believe it will not satisfy the standards set out by the State. I think the proposed Montrose Treatment Plant will satisfy these requirements.

Are there any further questions? Any questions at this time? You may ask questions at the end. We won't let you go without getting answers or getting your questions presented. We may not be able to answer them, but we'll certainly try. I wish I could satisfy this question on the population. As I said, my only authority is the Susquehanna County Planning Commission, and you s-y it does not agree with it.

MR. ROSE: Well, I checked with them after you talked with me, and they told me that they didn't know of any forecast. They said that they never made one.

MR. VALENTINE: Well, I regret that the gentleman is not here.

MR. ROSE: It's Don Hughes. What about Bridgewater?

MR_ VALENTINE: There is a planning Commission in Bridgewater Township, but they have never goine into it. The population as of 1970 was 2058. The Montrose Planning Commission says that the population here is remaining stable at this time. Would you concur with that?

MR. ROSE: That's what they say, yes.

MR. VALENTINE: Any other questions?

(No audible response)

MR. VALENTINE: At this time, I would like to have Mr. Podolick describe the infiltration, and then I will go into the costs after that.

MR. PODOLICK: I guess we have all gathered by this time, from what Mr. Brand and Mr. Valentine have said that there are a lot of requirements involved in getting this sewage treatment plant. One of the requirements, and often a signifigant one, is for the infiltration inflow to be studied. Before I talk about these studies, I'd like to define a couple of these terms as the definition of these terms has been developed in the rules and regulations associated in the new law. Now, there is a difference between infiltration/inflow. Infiltration is defined as a leakage of ground water in the sanitary sewer system through defective pipes, separated pipe joints, leaks in the base of angles, stuff like this. Infiltration will have a tendency to remain fairly stable for several weeks or several months during a season of the year when you have a lot of water, rain from high ground elevations. Inflow, on the other hand, is directly related to rainfall, inflow of the leakage from surface water into the sanitary sewer system, through such things as roof leaders, leaking through manhole covers that are ventilated, through direct cross connection at storm sewers.. As opposed to infiltration, inflow is very shortly reaching the treatment plant, an hour or two after a heavy rain starts, and after the rain stops in a matter of hours it will be zero. So inflow is very short-lived, and it is directly related to rainfall. Infiltration is a little longer in life, directly related to ground water from higher elevations. One of the other very important things, definitions, that we're involved with is the definition of excessive infiltration inflow. It is one thing to go out and measure infiltration inflow; it's another to know when it's excessive, when you should make an effort to eliminate it. So P. L. 29(inaudible) defines excessive infiltration inflow as being in existence, a situation

where it is cheaper to eliminate infiltration inflow rather than to treat it at the sewage treatment plant.. So what you've got to do for stoppage of excessive infiltration inflow is this: locate the sources, measure the quantity involved in these sources, estimate what it would cost to eliminate that source, and what it would cost to treat the excessive infiltration inflow associated with the source. If it's cheaper to treat it than to eliminate it that would obviate the necessity of allowing it to exist. If to eliminate it isn't as expensive, you eliminate it. Obviously an excessive infiltration problem represents an unecessary expenditure when you are planning the annual operational costs. The rules and regulations associated with P.L. 209500 require that all grant applicants demonstrate to the United States Environmental Agency that there is not excessive infiltration inflow, so that no excessive infiltration inflow exists in any of the sewage systems which would be tributary to the treatment plant for which you apply for a grant. The next step in this program is called infiltration inflow analysis. This is kind of a preliminary study where you select certain key manholes throughout the system, and inflow monitor, and then you make a preliminary judgment of whether or not excessive infiltration inflow is possible. If step one says that excessive infiltration inflow is possible, you then proceed to phase two, called a search evaluation survey. A search evaluation survey is a is a much more detailed analysis because you actually get into individual manholes inspection, and you get into sewer line televising and all types of detailed inspections. If Phase two, the evaluation survey, concludes that excessive infiltration inflow does exist, you are then required to get into Phase Three, the actual rehabilitation sewer program itself. You must rehabilitate all the sewer sources of infiltration located in the Phase Two survey. The Federal Government reimbursment of seventy-five percent is available for all three phases of the program. Shortly after this law was first initiated in '72, it was discovered that the Phase One process, the infiltration inflow analysis, introduced a lot of delays

in the whole design-construction procedure, so it was modified to include the procedure known as State Certification. State Certification can replace the infiltration inflow analysis. This means that the State, the Pennsylvania Department of Environmental Resources evaluates both ends of the plain. The State may certify a possible excessive infiltration inflow does exist and it then goes directly into the phase of detailed study. I bring this up because this is what did happen in Montrose. The State did certify that a possible infiltration inflow did exist, and we proceeded directly to a phase two detailed survey. Of course, in accordance with the Departments' evaluation, Montrose retained Gilbert Associates to perform the survey. This was back, I think, in January or February. Now, when you are informed of stuff like this, we depend upon ground water, high ground water in existence. What we're doing is we're drawing out, we're making manhole to manhole inspections to look for leakage of ground water in the system. If you don't have a high ground water table, you're going to get erroneous results. We're going to measure manholes that are going to be dry, and this is because the table is too low. Unfortunately, we didn't have a very dry spring, and it hasn't been a very good summer, so we still haven't completed this; we still don't have it. We anticipate (inaudible) the gounrd water level early in winter, so we hope the study will be complete by next spring. We did, however, estimate quantity of infiltration inflow through a practical analysis of past flows. We took a look at the past several years of flow data, and based on this analysis we thought that an equalization pond, and we estimate that it will cause an effective correction of seventy-five percent of inflow, and only thirty percent of inflow in the Borough. It would eliminate probably thirty percent of the inflow throughout the central part of town. So what we're preliminarily investigating if a seventy percent percent inflow thirty percent infiltration plant will be cited based on that kind of estimation.

That concluees my part. Are there any questions on it?

MR. VALENTINE: Are there any questions at this time?

(No audible response)

MR. VALENTINE: Well, the remainder of the meeting will be taken up with the costs and with the schedule of the Step Two and Step Three portions of the development in the design and construction data or phases. After that, we'll have any final questions you may have and any statements which you may wish to make.

Now, these are the costs so far. Can you see them in the back row? Yes? Thank you. These items emphasize, although still in the preliminary stages - they are based on our best estimates as of now, based on our preliminary design. The costs are all-inclusive. It includes the cost of design, construction, supervision, construction by the end of the year and legal costs.. For the South Montrose sewers we have a cost of nine hundred and forty-one thousand dollars. For the sewers at Lake Montrose and around there we've put in a cost of four hundred twenty-five thousand dollars. For the treatment plant expansion, which I described to you, one million six hundred sixty-one thousand. To correct the portions of infiltration inflow, which Mr. Podolick described, two hundred and seventy thousand dollars, for a total cost of three thousand - three million three hundred thousand.

MR. REIMEL: Did you give us a figure at that meeting we had as two million and a half?

MR. VALENTINE: I did, but we have since added additional work. We are all the time revising and refining our figures. At the meeting it came up that additional sewers would be required around Lake Montrose. Your Federal grant payments would be seventy-five percent of this, or two million one hundred seventy-three thousand dollars.

MR. ROSE: So we've got to come up with --

MR. VALENTINE: You've got to come up with eight hundred and twenty-four thousand dollars. At the meeting last Thursday I said that the State would take care of twenty-five percent of that. I'm sorry. They don't. The only part that they take care of is the half of the twenty-five percent of the facilities plan in step one. Perhaps Mr. Brand can explain this.

MR. BRAND: The State will give you two percent annually. The twenty-five percent sounds big, but it really isn't because an Authority usually sells its bond issue over a forty-year term, so your annual payment will, of course, be a very much smaller sum, and the State, under another law, which is a two percent subsidy, will give you two percent for the remaining twenty-five percent of your costs each year for forty years, so over the forty years you'll get about eighty percent of that back, but only two percent a year at a time. It's premature to consider all of this yet, however, I think this next chart will show you all there is now in an annual cost. It will convert it into an annual cost.

MR. ROSE: I have a question.

MR. VALENTINE: I don't know whether you explained it, but you said Lake Montrose will include the line from the High School? Does that take the line from the High School?

MR. VALENTINE: No, it doesn't.

MR. ROSE: That's an added figure then?

MR. VALENTINE: Yes, it would be. It would have to be purchased, yes.

MR. BRAND: Well, the High School will still use the line. If they have half of their capacity unused, you buy that half from them.

MR. VALENTINE: Again, we're only in the process, and we don't really know what the story is - whether we're going to have to buy it or they'll give it to us or what. We're in design at this stage, and I don't think that should be gone into tonight.

MR. BRAND: Well, it will be a matter for the Authority and legal counsel to discuss.

MR. VALENTINE: I wonder, Mr. Brand, if you would take us through the annual cost. You understand these matters much better than I do. Would you do that for us please?

MR. BRAND: Well, they are based on feasibility reports reports' estimates, which of course will be refined. They will be refined much more by the time we are through Step Two of final design when engineers get their plans to a state near completion. I'm talking about our own practice at Gilbert Associates. They will go into the estimating department, where skilled and experienced, trained estimators do take-offs, every foot of pipe, its diameter and epth is costed. So by the time Step Two is completed, you will have fairly accurate costs. Incidentally, when we opened bids for the Borough of Birdsboro in Berks County the day before yesterday, and our estimate was about one percent high, which was very, very good. They were very satisfied on that. We got a lot of compliments on it. Incidentally the Step One Facilities plan is laid out on a topographical map and the survey has not yet been completed. Before we begin Step Two design, the first thing we do is the surveyors in the field will accurately lay out all the data, and our own design department will figure up the exact location of the manholes, sewers and so forth, and from that our trained estimators will estimate the cost. So right now, we have just the order of costs.. Now, Dick pointed out just a total cost. Now, obviously it's not giong to be just one lump. It will involved the County, the Borough Authority, and the Township Authority will be aware

of their respective share of the costs. Right now, for the sake of simplicity, the very preliminary stage will roughly be eight hundred twenty-four thousand dollars. Now, if this has to be borrowed for forty years, which is the maximum a Borough or Authority is allowed under the law, and most authorities' bond issues are for forty years. It is borrowed at seven percent interest, which is usual and the rate you can expect right now. Your capital recovery factor, is .075. That means if you borrow a dollar and pay it back over forty years' interest paying period, you will be paying seven and a half cents each year back on that dollar. It's very simple. Similarly, if you borrow a thousand dollars, you move the decimal point over, and you will be paying seventy-five dollars back a period on it. If you borrow a million dollars, you will be paying seventy-five thousand dollars a year. It's a simple thing. Every office in government has a book on these capital recovery factors, and of course every real estate agent has them; that's how they work out your mortgage. So, if you borrow eight hundred twenty-four thousand dollars at seven percent, your true amortization rate, capital recovery factor is seven point five cents on the dollar, or point o seven five. So that means you would have to pay annually, for the Township and the Borough together, sixty-one thousand eight hundred dollars a year over and above what you are paying now only for debt surface, amortization on your own. Now, here is where we get into some entanglements. The Borough will probably not have to pay recovery in this amount. When you borrow money for long term from investment houses and so forth, they usually insist on what they call a coverage, particularly for new systems, which Township sewers would be, and that means that the coverage on a new system is about twenty-five percent extra You've got to check every year. Now, this money goes into your account, whether it's the Borough or the Townhsip, it's still your money and paying interest for you, but it creates a debt service reserve. In case you lose population or a big industry moves out of town, or hard times come bringing unemployment where you can't get your annual

debt service in,your bank, the bank will use the debt service reserves, so you've got to have this amount - twenty-five percent. The Borough of Montrose has an operating authority, and operation approved with a system of earning that says you are paying your way; your sewer rates are meeting your debt service, so it would probably be maybe only ten percent. The Township, if it tried to borrow, might have to pay twenty-five percent. These things cannot be stated accurately at this time.

Now, operating sots, am I right, Dick? You mean that operating costs will add to that figure, is that so? And you must add your present debt service from 1963, which is twenty-three thousand one hundred sixty-eight dollars a year. So this amounts to a total value of debt service and operation and maintenance together, of a hundred and thirty-five thousand eight hundred and eighty-eight dollars per year. Now, it will be up to the engineers and the legal counsels of both authorities, as we-l as Township supervisors, Borough Council members and Authority members, to decide, in a legal agreement at a later date, to decide how this is going to be pro-rated, how much is going to be the Borough's share, the treatment plant expansion, and on how much the Township is going to have to find for its own sewers.

I point out also that you can't use the year two thousand to project the population, because obviously if we say these sewers are built in 1982, only those houses that are there in 1982 are available to pay, so we'll have to get very involved with the Susquehanna County Planning Commission, actually walk the area, jump into the car and count the houses that are there now, consult with the local real estate agents and other Montrose people who will be there in 1982. Now, I have participated in thirty or forty of these operations in the last ten or fifteen years, and I do know that no bank or lending institution is willing to lend you any money at all unless they know that the revenues are going to come in. It's the same way if you buy a house or a car; they want to know if you are a good risk or a poor one, and they are going to find out. At any

rate, we'll have to know what's going to be there in 1982. Actually, you will borrow,for the time that you need the money, the investment people will insist that you fund with perhaps a two-year debt service for the Township. Let's say the Township debt service is twenty-five thousand a year, it will mean that they will insist on lending you fifty thousand dollars a year extra, and that, of course, goes into the debt service reserve fund at your trustee bank so it's there because once the system is there, is in, the people are going to take a long time to connect. It may be two years before everybody gets in and you have your full flow of revenue. Now, these are all considerations that we know about that will be figured in at a later date. We'll give you very precise figures and you should insist on them, however, we can't give them to you now.

Are there any questions?

(No audible response)

MR. VALENTINE: To conclude our program, I'll just list what we have scheduled for after the facilities plant is approved. We hope to finish this plan by the end of September, or early in October at any rate, and have it approved by the State and the Federal Government by January of next year. That's what we're planning on at this time, that the design will be complete on or about the third of January of 1977. It would take nine months, we figure, to prepare the design plans and specifications. After that it may take about six months to get State and Federal approval, and three more months for bids and local share planning, and in this phase that would be a total of eighteen months. After that we're all ready to begin construction, and we figure construction would take another eighteen months, so we're talking about three years from the third of January, 1977, or 1980 when everything will be constructed. Any questions? As I say, these plans are tentative, and are representative of the schedules at this time.

Any questions?

(No audible response)

Well, that concludes our presentation at this time. I think we are going to have comments from interested parties who wish to present or make statements. Mr. Reimel?

MR. REIMEL: The Montrose Borough Council might wish to present any comments they have at this time. Mr. Kelly or Mr. Williams?

MR. WILLIAMS: I guess the only one is really the cost per household. It would appear from the figures that you have given us that it would be roughly a hundred dollars per household or business or whatever the case may be.

MR. VALENTINE: Mr. Brand could perhaps answer that.

MR. BRAND: Well, I would like to answer that, but, as I said, you will have to have two rate districts, one is your extension of districts into the Township because there your connections are going to cost quite a bit, and the other will be for the sewage treatment plant expansion costs, and that will have to be pro-rated between the Borough and the part utilized by the Township, so this will have to be spelled out in a legal agreement, which will have to be undertaken and worked on, probably for months, by both authorities and their legal counsel. Now, I can give you a formula, and you can estimate the figures and come up with the cost. Within that chapter of the facilities plan, which says selection of a plan and then the development of costs, the engineers will develop the E.D.U. or equivalent domestic units. He will not only find out how much the household will cost, but also, for instance, the high school equivalents will be, how much in the way of revenues can be estimated, how much will you get from the Montrose Inn --(Inaudible portion) and then he will take your total annual costs for the combined system, which is a hundred thirty-five thousand eighteen dollars, and

divide that by the number of connections and you will find out approximately how much it is going to cost each family. If a filling station has a car wash which uses five EDU's, it will be five times as much as the average family would pay. So you do have that EDU figure now.

MR.McKENZIE: When you're speaking of costs, you're speaking of additional costs?

MR. BRAND: No, I'm talking about total costs. When you get a figure of the total annual costs, which is all your debt service combined, including your old debt service and the new , and your total operating and maintenance costs per year. That's what you have to raise in revenues. For instance, homes might be at a hundred dollars a year. I only project that figure because I heard it, but for instance, a large restaurant of - say - a hundred tables, it might come to fifteen times that, fifteen times what a family would use.

MR. McKENZIE: But in Montrose, we're now on sewers, paying certain amounts. Will these additional costs be on top of what we are now paying?

MR. BRAND: No, your present costs are figured in. That's why I said your present costs, and, of course, your present debt service is included in, so dividing this by that, that would be the new cost, not on top of the old cost, no, and here again, I know legal counsel is here, there are considerations of equity. You can't raise sewer costs within the Borough because you have to put sewers out in the Township. This must be put into a legal agreement.

MR. MC KENZIE: We must cover our costs, and we cannot cover Township costs?

MR. BRAND: Right.

UNIDENTIFIED QUESTIONER: One other question, with reference to rates, where we have meters in the Borough as opposed to wells and that type of thing in Bridgewater Township, how this might be resolved as far as establishing rates.

MR. BRAND: This is a common thing. It will be written into the legal agreement. There are references on the meter rates, that is it's equitable because it's charging heavy water users more, and the meters also are a check on how much might be coming into the system in infiltration. This will all be stated in the legal agreement. With the Township coming into the Borough, there should be meters along the main line because, one, that is the only equitable way to do it to avoid arguments, and second, it's a check on infiltration. We are working now on a project for the City of Easton in Northampton County, and they allowed two outlying townships to hook into their system, at first on meters, and these systems have developed a lot of infiltration, so it pays to put in meters. However, these meters are expensive, and they don't work too well on small systems. I don't want to give you a technical opinion, 'though.

MR. DE FAU: I have a question I'd like to ask. I'm Fred DeFau of the Montrose Municipal Authority. Why is it necessary for the present Montrose Treatment Plant to be expanded, provided it serves only Montrose Borough? As I understand it, this plant was finished in 1963, constructed and esigned for a capacity of three thousand five hundred and seventy-five residents; the present population is estimated at two thousand fifty-eight, and gives you about four hundred gallons per day. Now, I, as a citizen of the Borough of Montrose and a home owner, am not interested in providing service for the Township of Bridgewater if it's going to cost the residents of Montrose Borough one penny more than it is costing them today, unless it's absolutely necessary to rehabilitate the present facility only for the Borough of Montrose's use. I'd like to know why in the name of God

we ever got into this game, coming around telling people they'll have to spend possibly a hundred more dollars.

MR. REIMEL: Mr. DeFau, just to clarify that a little bit, you know when Mr. Williams made that statement on a hundred dollars a house, Mr. Brand was trying to explain, you know, the number of houses into the cost, divide the number of houses into the cost as an equitable way of doing it, and I think he explained that legally, when we come to work out the agreement, the Montrose Municipal Authority, as representative of the Montrose population, is not going to sit there and absorb unfair costs of taking in the Bridgewater sewage.

MR. DE FAU: Well, I cannot understand why our plant does not function properly now, when it was designed for a population of three thousand, which we're not going to have until 1980 or maybe the year 2000. It would seem we have sufficient capacity now, to go to the year 2000.

MR. BRAND: May I interrupt? Since 1972 both the Commonwealth of Pennsylvania, through its' sanitation laws, and the Federal Government through this new law, have very greatly raised their standards. They want the streams cleaner, not only around Montrose, although you are in a sensitive area, what with the vacation resorts in the area. Now, as I see it, the cost to the Borough of Montrose, to the people on the system now within the Borough boundaries, will be limited to those costs that are associated with upgrading the plant, that is to enable us to turn out a better effluence to meet the new laws, and that we cannot avoid. There is no question of increasing the capacity for you unless the area grows appreciably within the next twenty years.

MR. DE FAU: Well, have you estimated the cost of updating the present facility so it would have a much better discharge than it does now only for the Borough of Montrose? Now, I'm not particularly interested

in providing speculators with increases in land values; I'm interested in this area and its people.

MR. BRAND: I've been in this line of work since 1961 when I retired from the military, and I've associated with agencies in Washington and Philadelphia and elsewhere, and I've studied the development of our Federal system. Starting about 1966, when the Barker Housing-Urban Development was established and all this urban renewal began, in cities like New York, Philadelphia, and other big cities, the Federal agencies began making it their policy to make communities cooperate with each other. They weren't forcing you to, but they had one means of encouraging them to cooperate, and that was with the Federal grants, big grants, from the government, whereby they were provided with monies to restore or redevelop cities. The Urban Development Act of 1966, which encouraged regional planning, or metropolitan area planning, which was amended by the (inaudible) Cooperation Act of 1968, which made it a function of the President's Office of Management and Budget to say that no grants would go to anyone, anywhere, unless their plan were approved by what they call a Circular A-95 clearing house, and that regional clearing house planning commission must certify that your communities are working together. The will not consider Montrose working alone. They won't consider Northampton working alone; they don't consider even Wyalusing working alone. They don't have sewers or anything. So there is no way you can confine it even if you try to. Even your public safety or police systems, they don't want the Township to have its own, or their own.

MR. REIMEL: Mr. Brand, I'd like to back up Mr. DeFau. He may or may not be aware of the situation the Montrose Authority was in two or three years ago. We had a ban from the Department of Environmental Resources from hooking on additional customers, and the reason for that was that our plant capacity was rated at three hundred thirty-four

gallons, and our average daily flow was much higher than that, and the Department of Environmental Resources had seen that figure which legally we had to supply to them, and they said, "Hey, there's something wrong with your system." It was way over in capacity, and to fix that problem, you know, "We're putting a ban on your community not to take any additional customers." So as far back as two years ago we decided that we'd have to try to figure out a way to get this ban lifted. So we went out on our own and talked with our engineers and tried to figure out what we'd have to do to get this ban lifted, you know, if we had to upgrade or what the problem was. We had, as Mr. Podolick explained, a lot of infiltration inflow coming into our system. Every time it rained, we'd see the meters hop right up, and that was what was causing the increased average flow per day rate that we were providing to the State.. So along at the same time, we started to plan with our engineers and tried to get separate plans for the Borough of Montrose. In the meantime, the Bridgewater Municipal Authority was formed, and it was advised to us, and Mr. Brand has emxplained why, that in order to get any Federal funds individual Townships and Boroughs could not go this alone because you can't get the funds. So we're forced to look at the situation where ahl the costs of doing it alone are not available, whereas if we join in with Bridgewater Township in plans that would essentially solve both our problems. I think this is the factor of why we're involved with Bridgewater Township. Maybe we didn't necessarily want to be two years ago, but it was forced upon us, and that's why the Federal Government is looking toward our regional areas. I can assure you that the Montrose population is not going to incur costs of Bridgewater by putting their sewage into our system. There will be an equitable arrangement. We've yet to com up with the arrangement; that's part of the end of this plan.

MR. McKENZIE: Are you saying our problem is really infiltra-

tion in the Borough of Montrose? We had the capacity, but we used up --

MR. REIMEL: The design capacity - I don't think we ever used up the design capacity. I don't think we ever reached the design capacity as it was designed fifteen years ago.

MR. DE FAU: Do you know how many gallons per day?

MR. REIMEL: It was three hundred thirty-four thousand gallons per day. We did get that re-rated to four hundred and ten thousand gallons a day. It hasn't signifigantly decreased - the average flow per day. We have done about all we could do with the manpower we had to get this infiltration out of there. That's why we called upon these engineers to do these studies - to tell us what's the most cost effective way of eliminating this. You know, we could dig up all the sewers in Montrose and replace them all, and that might be part of the problem, but htat would cost about a half a million dollars, and the other proposal, which they say is more cost effective is to put this holding pond down there as far as Montrsoe is concerned, you know. Let all the infiltration and inflow come in because, you know, it would cost too much to eliminate that.

MR. CANTONE: The holding pond is just for the Borough of Montrose?

MR. REIMEL: Yes, that's part of the costs they've given us. I don't have that break-down.

MR. DE FAU: But that million gallon pond and the costs they've given you is to take care of any inflow that comes down from the Borough of Montrose? For the study area?

MR. REIMEL: I think that holding pond was designed for the infiltration-inflow from Montrose Borough, is that it?

MR. VALENTINE: Right.

MR. REIMEL: You didn't design it, anything there, thinking that new sewers from Bridgewater Township and outlying areas would have infiltration, right?

MR. PODOLICK: I think an important point here is to realize that in the central part of Montrose Borough the sewers there were constructed in the early 1900's, and they are just reaching the end of their useful life, and we could probably find leaks throughout the entire central part of town. It would just cost a fantastic amount of money to dig up the whole town. It's almost certainly cheaper to just put this pond in. Accept the infiltration and treat it

MR. REIMEL: I would say that the cost of doing that would be incurred by Montrose. You wouldn't expect Bridgewater to build a holding pond to take care of our infiltration, and in the same token, I can't see us paying for, you know, the Bridgewater Township part of this project.

MR. DE FAU: Before the Montrose Borough Authority makes a final determination, I would like to see every property owner, householder, businessman, or otherwise, see a detailed statement of costs, what additional sewer revenues they are going to have to come up with. I'd like to know whether it's going to be ten dollars every quarter, or fifteen dollars every quarter, or what that adjustment will be before they make any final determination.

MR. REIMEL: Well, I think this may be the subject of another public meeting. We have, you know, legal ramifications in this whole thing.

MR. BRAND: You do have some good points there. As I said, before we go into final design, there will be accurate figures, within on percent --

MR. DE FAU: What' I'm getting at, is you're talking about

a plant to take care of a population of thirty-five hundred, and we've got a population of two thousand fifty-eight. How are we in this kind of trouble?

MR. REIMEL: Well, I think that back in 1960 we were having kind of a dry spell, and the planning period that went through design - the designers of the plan, I'm sure that they didn't provide for any infiltration-inflow capacity. Over the last fifteen years, the water table has gone up.

MR. DE FAU: Last year it went down.

MR. REIMEL: That's true, but I'm sure that as long as we're at the stage of seeing what happens when the water table goes up, they will project it and design something with a capacity to take care of this infiltration.

MR. WILLIAMS: Question. The proposed study area, the area that was studied, I wonder how it was determined? How the boundary line was drawn?

MR. VALENTINE: I'm sorry I can't answer that. Perhaps Mr. Reimel can help me on this. It was proposed in our plan of study, I know, and approved by the State in May, 1975. Could you help us with that? Do you know the history of the boundary of the study area? It includes the drainage area for Montrose, plus the Village of South Montrose when the area was proposed to us.

(UNIDENTIFIED): When the area was proposed to us, it must be advertised in the Pennsylvania Bulletin, local newspapers or anyone's input, but the main agencies that will provide input are the Bureau of Environmental Control. Those people will take the initial sewage plants of Bridgewater, South Montrose and for Montrose. It will be correlated

so it's a logical viable study area. That does not mean necessarily that everything in that study area will be sewered. One of the things that we do look at, one of our main factors, is the drainage. Does that answer your question?

MR. WILLIAMS: Yes.

MR. ROSE: I wonder if you can tell me, asssuming your forecast of population is correct, how did you arrive at the 1700 connections from Bridgewater Township? That would mean seventy-five percent of the population would be tied into the sewer. I don't see how that would be possible from the two lines that you have proposed.

MR. VALENTINE: My projection for the population of the whole of Bridgewater Township was four thousand. That's the whole of Bridgewater Township, and I made the further assumption --

MR. ROSE: Well, the figure you had on your chart was two thousand.

MR. VALENTINE: That's for the year two thousand. I contemplated that half of the population in the Township of Bridgewater in the year two thousand would be within the study area. Of that two thousand I contemplated that eighty-five percent would be connected to the sewer system. That's how I arrived at it. I'm not saying it's correct, but that's my best estimate.

MR. REIMEL: Mr. Rose, I think if you look out in the Montrose area, you know, out toward New Milford, that area there. There is virtually no residential or business areas there at this time, and I think what is projected here is how many businesses could conceivably go in that area? Now, I'm sure if you looked at South Montrose, you could say how much area is there available to be developed? I think

it's a lot less in the Montrose and South Montrose areas than it is in the Bridgewater Township area out around Lake Montrose. So where you might say seventeen hundred out of two thousand or two thousand out of four thousand people will be in the study area. I don't think he means the Bridgewater Township population as it is today. I think he was looking at the growth potential of that area.

Are there any other questions to be answered here either by myself or any other member of the authority?

Would anybody else like to make a statement?

Mr. DeFau, have you anything else?

MR. DE FAU: I made my statement.

MR. REIMEL: O. K. Fine. We'll consider this public meeting closed at this time. Thank you for coming.

* * * * * * *

STENOGRAPHER'S CERTIFICATE

I HEREBY CERTIFY that the proceedings in the foregoing matter are contained fully and accurately, to the best of my ability, in the stenograph notes taken by me, and that this copy is a true and correct transcript of the same.

Jeanne R. Lambert

JEANNE R. LAMBERT,
OFFICIAL COURT REPORTER
45TH JUDICIAL DISTRICT,
COMMONWEALTH OF PENNSYLVANIA.

CERTIFICATION

EXCESSIVE OR POSSIBLE EXCESSIVE INFILTRATION/INFLOW

It is hereby certified that the following project is in my professional judgment, subject to excessive or possible excessive infiltration/inflow as defined in 40 CFR 35.927, and that I am authorized to make this certification on behalf of the Pennsylvania Department of Environmental Resources.

Signed

Regional Water Quality Manager
Title

October 23, 1975
Date

Sewerage
Borough of Montrose
Susquehanna County
Infiltration/Inflow

LAP:JPL:hp

Bendix

The Bendix Corporation
Office of the General Counsel
Eastern Region
Teterboro, NJ 07608

Tel (201) 288-2000

Gilbert Associates, Inc.
P. O. Box 1498
Reading, Pennsylvania 19603

August 23, 1976

Attention: Mr. D. A. Leidel

Re: Montrose Sewerage System

Dear Mr. Leidel:

Pursuant to your letter of August 9, 1976, we have been informed that our Montrose facility is presently uninterested in discharging waste products into a proposed public sewer system in South Montrose, Pennsylvania.

Should an interest in such a service develop, our facility will be certain to contact you.

Very truly yours,

John J. Scialo

JJS/mlf

BIBLIOGRAPHY

Commonwealth of Pennsylvania. The Pennsylvania Manual, 1970-71, Volume 100. Harrisburg: 1971.

_____. Pennsylvania Abstract, 1972.

_____, Department of Environmental Resources, Bureau of Water Quality Management. Sewerage Manual. 4th ed. Harrisburg: 1976.

Erdman, K.S., and Wiegman, P.G. Preliminary List of Natural Areas in Pennsylvania. Western Pennsylvania Conservancy, 1974.

Fair, G.M.; Guyer, J.C.; and Okun, D.A. Water and Wastewater Engineering. 2 vols. New York: John Wiley & Sons, Inc., 1966.

Gilbert Associates, Inc. Plan of Study for Facilities Plan for the Montrose Municipal Authority. Reading: Gilbert Associates, Inc., May, 1975.

_____. Annual Report of Consulting Engineers: Operation of the Wastewater Treatment System, the Fiscal Year of 1975, for the Montrose Municipal Authority. Reading: Gilbert Associates, Inc., January, 1976.

_____. Annual Report of Consulting Engineers: Operation of the Wastewater Treatment System, the Fiscal Year of 1976, for the Montrose Municipal Authority. Reading: Gilbert Associates, Inc., January, 1977.

Milnes Engineering, Inc. Feasibility Report on Wastewater Collection and Disposal System for Bridgewater Township. Tunkhannock: Milnes Engineering, Inc., May 1972.

Northern Tier Regional Planning and Development Commission. Act 537 Official Plan, Susquehanna County, Pennsylvania. Towanda: NTRPDC, December, 1970.

_____. Susquehanna County Manufacturing Industries and Number of Employees. Towanda: NTRPDC, March, 1974.

_____. Susquehanna County Publications Bibliography. Towanda: NTRPDC, July, 1974.

_____. Comprehensive Water and Sewer Plan, Susquehanna County, Pennsylvania. Towanda: NTRPDC, 1970.

_____. Second Stage Overall Economic Development Program, Northern Tier District. Towanda: NTRPDC, 1973.

_____. "Northern Tier Region Population Grows," from Northern Tier Reporter, November-December 1975. Towanda: NTRPDC, 1975.

U.S. Department of Agriculture, Soil Conservation Service. Soil Survey, Susquehanna County, Pennsylvania. Washington: USGPO, August, 1973.

U.S. Environmental Protection Agency. Guidance for Preparing a Facility Plan. Washington: EPA, Revised May, 1975.

_____. Model Facility Plan for a Small Community. Washington: EPA, September, 1975.

_____. Alternative Waste Management Techniques for Best Practicable Waste Treatment. Washington: EPA, October 1975.

_____. Environmental Pollution Control Alternatives: Municipal Wastewater. Prepared by Gordon Culp. El Dorado Hills, California: 1976.

the State to the Federal government, grants of 75 percent of almost all costs should be received. Certain costs will prove ineligible for grant, chiefly land and rights-of-way acquisition and financing charges. These, however, should in this case prove not significant, since Montrose already owns its plant site.

9.4.2 Project Costs

Total Project Costs for the selected alternatives are $3,346,000. These costs have been divided among Montrose Borough, Bridgewater Township excluding South Montrose, and South Montrose, which has been recommended to be a separate project. A breakdown of these costs is shown below:

	Total Project Costs	75% Federal Grant	Local Share
Montrose Borough	$1,855,000	1,391,000	464,000
Bridgewater Twp. (excluding So. Montrose)	720,000	540,000	180,000
South Montrose	771,000	578,000	193,000
	$3,346,000	2,509,000	837,000

A more complete breakdown of these costs is given on Tables 9.1, 9.2, and 9.3, which follow. The local costs are shown as being funded entirely by a Long-Term Bond Issue, since the amount of the front foot assessments revenue (applicable only to new sewers in the Township) is unknown at this time. As described in Paragraph 9.4.3, following, the amount to be funded by the Long-Term Bond Issue will probably be less than that shown on the Tables.

9.4.3 Funding of Local Share

Two different types of bond issue are used to finance the local share of sewer system design and construction. The first type, the Short-Term Bond Issue, is usually retired within five years by front foot assessment revenue. Under Pennsylvania law, municipalities are allowed to levy a front foot assessment upon each property holder whose property is improved, benefited or accommodated by a sewerage system. Where an Authority exists, the actual collection of these assessments is made by the Authority, assisted by the legal powers of the municipality when required. Legally, the front foot assessment may not exceed the actual value of the improvements. However, the maximum legal assessment often proves quite high due to the inclusion of treatment plant and interceptor sewer costs, among others; and inadvisable to impose. The actual amount charged each property by the front foot rule thus becomes a local compromise between what is legally permissible and what is realistic in terms of the properties served and the owners' ability and willingness to pay. The decision on the amount of the front foot assessment, if any, will become the responsibility of the township

officials and their investment advisors, just prior to the sale of the Long-Term Bond Issue. The greater the amount which can be realized from front foot assessments, the less the amount of the high-interest Long-Term Bond Issue. The Borough, being already sewered, will not impose any front foot assessment.

The Long-Term (usually 40-year) Sewer Revenue Bond Issue is placed on the market at the same time as the Short Term Bond Issue described above. Interest rates on the two Bond Issues are determined by the state of the financial market at the time of the Bond Settlement; but total interest costs on the five-year Assessment Revenue Bond Issue are much less than on the 40-year Sewer Revenue Bond Issue. The annual costs to the Authority then consist of: (1) Annual interest and principal repayment (amortization) of the Long-Term Bond Issue; and (2) Annual Operating Costs. It is the total of these two items, divided by the number of Equivalent Domestic Units (EDU) in the system, which gives the Average Annual Rental per EDU served. The Average Rental is important to the property owner as it tells him the appropriate amount of his annual or quarterly sewer billing. Theoretically, as more connections are made to the system, the Average Annual Rental per EDU will decrease, operating costs remaining the same. In fact, however, such costs do not remain constant indefinitely, and the increasing costs of operation may keep pace with or exceed the income from new connections.

While discussing costs and financing, it is advisable to detail the full costs of public sewerage to the sewered property holder. There are four basic categories of costs in cases, such as Bridgewater Township, where new collection systems are built:

1. Front Foot Assessment - The front foot assessment is billed when the sewer line passing the property is certified by the Engineer as completed and tested. It is payable in cash or in equal payments (at interest) over five years. It is not legally necessary to impose a front foot assessment. However, in its absence, the annual cost per EDU increases markedly, since the long-term bond issue will be for an appreciably greater amount, at much greater accumulated interest cost.

2. Annual Sewer Rental - Usually billed quarterly, this pays the debt service for building the system, plus its annual operating and maintenance costs. The debt service payment is made for the full term of the Sewer Revenue Bond Issue, usually forty years. The operating and maintenance costs are a recurring cost which may vary from year to year, usually increasing due to changes in costs such as for materials and salaries.

3. Tapping or Connection Fee - Since charges cannot be billed until a system is built and providing service, and since it may take several years to connect all properties included in the Financial

Plan, there is usually a shortage in annual revenues in the early years of operations. A tapping or connection fee on the order of several hundred dollars, sometimes more, is then charged at the time of connection of the property to the street lateral. This is deposited at the Trustee Bank to a Clearing Fund, with disbursements controlled by the Trust Indenture.

4. Property Sewer Costs - The property owner must pay all costs for connecting his house sewer to the system's sewer lateral. This lateral normally is installed from the street sewer to the curb line at the owner's property. For this the property owner hires his own community-licensed plumbing contractor. The work must be inspected before being covered. On-property sewage disposal systems, such as septic tanks with drainage fields, must be de-activated at the same time, as specified in the applicable Sewer Use and Connection Ordinance. This can be enacted only by the local government concerned, since an Authority does not have legislative powers.

9.4.4 Alternative Financial Plan (Supplementary Financing Assistance)

The basic financial plan considered thus far has contemplated a Federal Grant under P.L. 92-500 of 75 percent of most project costs, to both the Design (Step 2) and Construction (Step 3) costs. The remaining 25 percent (after-grant) amount was visualized to be financed by the negotiated sale of bonds, in the private sector, either by a new Joint Authority, or individually by the existing Borough and Township municipal authorities. As the bond issue was set up in each case, a conventional or "conservative" approach was used; that is, an interest rate of 7 percent was assumed (currently being experienced), and coverage of 20 percent (for Bridgewater Township bonds). In the 130-percent-of-Construction-Costs formula for estimating Total Project Costs, provision was made for the inclusion of the legal and financing costs, as well as engineering, surveying, sub-surface investigations and the like.

The Consultant, from recent experience on several completed or under-way EPA grant-assisted public sewerage projects in Northeastern Pennsylvania, has aided these municipalities in financing the after-grant costs through several other Federal aid programs. Since Montrose Borough and Bridgewater Township are authentically rural, they will qualify to apply to the FmHA (Farmers Home Administration of the Department of Agriculture), for low-interest (5 percent) loans, and possibly for grants also. Further, the debt service on these loans will not require coverage, nor will the loan amounts be discounted by 2-1/2 percent as is customary when financing in the private sector.

Further, Susquehanna County is classified as an ARC (Appalachian Regional Commission) depressed area. The Montrose-Bridgewater project or projects should therefore qualify for a supplementary grant or grants from ARC on the order of 5 percent of project costs. (The word supplementary is a key word here; to receive ARC aid, a public facilities

project must first have been awarded another "basic" Federal grant.) The regional A-95 Clearinghouse Commission will assist in applying for the ARC grants. It is repeated that several other municipalities having recently engaged in sewerage construction in Northeastern Pennsylvania have received financial aid not only from EPA, but from the FmHA and ARC as well.

Table 9.1, following, shows the project financial plan for Montrose Borough under "conventional" bond issue financing, culminating in an estimated Average Annual Sewer Rental for Montrose Borough alone of $171 a year, or about $43 a quarter. Table 9.1.1 shows how the same project would look, with the basic EPA grant, a supplementary grant from ARC, and a 5 percent FmHA loan. Under this plan, an annual "savings" on the order of $13,000 can be effected, resulting in an Average Annual Sewer Rental per Connection on the order of $152, or $38 a quarter. It should be understood that, when the Step 2 design is completed and application is made for the EPA grant, every effort should be made to obtain an FmHA grant as well as the low-interest loan. This would lower the Average Annual Sewer Rental even more. At today's high interest rates, every dollar of grant money (upon which interest does not have to be paid) will save three to four dollars in the amount ultimately paid back under a long-term borrowing.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 9.1
PROJECT FINANCING
MONTROSE BOROUGH

Montrose Sewage Treatment Plant Expansion	$1,237,000
Infiltration/Inflow Corrections	190,000
Total Construction Costs	1,427,000
Engineering, Legal, Financial, and Administrative Costs @ 30%	428,000
TOTAL PROJECT COSTS	1,855,000
75% Federal Grant	1,391,000
Local Share (Bond Issue) 25%	464,000
Annual Costs:	
Average Annual Payment (.075009 x $464,000) (40 years, 7%, No coverage)	34,800
Existing Debt Service, (77.5% x 23,200)	18,000
Operation and Maintenance (77.5% x 99,555)[1] of Existing Plant and Expansion	77,200
	$ 130,000
Deduct Act 339 Subsidy (2% of Local Costs of Plant) (0.02 x $1,237,000 x 1.3 x 0.25)	(-8,000)
Deduct Existing 2% Subsidy	(-3,900)
TOTAL AVERAGE ANNUAL COST	$ 118,100
Annual Cost of Proposed and Existing Facilities per EDU, 1982 (690 EDU's)	$ 171

[1] See Table 6, Appendix.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 9.1.1
PROJECT FINANCING WITH SUPPLEMENTARY GRANTS AND LOANS
MONTROSE BOROUGH

Total Project Costs	$1,855,000
Minus EPA 75% grant	- 1,391,000
Subtotal	464,000
Minus ARC grant (5% of Project Costs)	- 92,750
Total for Local Financing	$ 371,250
Annual Costs	
Average Annual Payment (.058278 x $371,250) (40-years, 5%, FmHA, No coverage)	$ 21,636
Existing Debt Service	18,000
Operation and Maintenance	77,200
	$ 116,836
Deduct Act 339 2% Subsidy for New Project	(-8,000)
Deduct Existing 2% Subsidy	(-3,900)
Total Annual Revenue Required	$ 104,936
Annual Cost per EDU (690 EDU's)	$ 152
Quarterly Cost per EDU	$ 38
Monthly Cost per EDU	$ 13

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 9.2
PROJECT FINANCING
BRIDGEWATER TOWNSHIP, EXCLUDING SOUTH MONTROSE

Montrose Sewage Treatment Plant Expansion	$140,000
Lake Montrose Area Sewage Collection System	276,000
Meshoppen Creek Road Sewage Collection System	128,000
Infiltration/Inflow Corrections (School Line)	10,000
Total Construction Costs	554,000
Engineering, Legal, Financial, and Administrative Costs @ 30%	166,000
TOTAL PROJECT COSTS	720,000
75% Federal Grant	540,000
Local Share (Bond Issue) 25%	180,000
Annual Costs:	
Average Annual Payment (.075009 x $180,000 x 1.20) (40 years, 7%, 20% coverage)	16,200
Existing Debt Service of Montrose Sewage Treatment Plant (22.5% x 23,200)	5,200
Operation and Maintenance of Existing Plant and Expansion (22.5% x 99,555)[1]	22,400
	$ 43,800
Deduct Act 339 Subsidy (2% of Local Costs of Plant) (.02 x $140,000 x 1.3 x 0.25)	- 900
TOTAL AVERAGE ANNUAL COSTS	$ 42,900
Annual Cost of Proposed and Existing Facilities per EDU, 1982 (156 EDU's[2])	$275

[1] See Table 6, Appendix.

[2] From house count, December, 1976.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 9.3
PROJECT FINANCING
SOUTH MONTROSE

South Montrose Package Sewage Treatment Plant	$257,000
South Montrose Sewage Collection System	336,000
Total Construction Costs	593,000
Engineering, Legal, Financial, and Administrative Costs @ 30%	178,000
TOTAL PROJECT COSTS	771,000
75% Federal Grant	578,000
Local Share (Bond Issue) 25%	193,000
Annual Costs:	
Average Annual Payment (.075009 x $193,000 x 1.20) (40 years, 7%, 20% coverage)	17,400
Operation and Maintenance	24,500
	$ 41,900
Deduct Act 339 Subsidy (2% of Local Costs) (0.02 x $257,000 x 1.3 x 0.25)	- 1,700
TOTAL AVERAGE ANNUAL COSTS	$ 40,200
Annual Cost of Proposed Facilities per EDU, 1982 (160 EDU's[1])	$251

[1] From house count, December, 1976.

10.0 SUMMARY OF ENVIRONMENTAL CONSIDERATIONS

10.1 Existing Environmental Considerations

These existing environmental conditions have been considered in some detail in Section 4.1, and are summarized here. The purposes of the environmental evaluation are twofold: first, to assist selection of the best alternative plan, and second, to assist the Environmental Protection Agency in its decision on whether or not an Environmental Impact Statement is required for the project.

The planning area is as shown on the Location Sketch. It includes the Borough of Montrose and four square miles of the surrounding 41-square-mile Bridgewater Township. The climate provides long, cold winters, cool summers, and bountiful precipitation normally well-distributed throughout the year. Soils are gently sloping to moderately steep, somewhat poorly drained to moderately well drained, and lie in the glaciated part of the dissected Allegheny Plateau. Two major water bodies, Montrose Lake and Post Pond, and a dozen small ponds lie within the planning area. There are no major rivers; a small stream, Pettis Creek, flows westward and receives Montrose sewage treatment plant effluent.

The Montrose Municipal Authority, constituted in 1959, has since 1963 owned and operated the only public sewage treatment plant in the planning area. The recently-formed Bridgewater Municipal Authority controls no sewerage facilities at present, but has joined with the Montrose Municipal Authority in carrying out the present Step 1 Facility Plan. Regional planning is carried out by the Northern Tier Regional Planning and Development Commission in Towanda, assisted locally by the Susquehanna County Planning Commission in Montrose. Also involved in the planning process are the recently-formed Bridgewater Township Planning Commission, and the active Montrose Planning Commission.

The 1970 census showed that 2,058 people resided in Montrose Borough, and that 1,876 people resided in the whole of surrounding Bridgewater Township. In the planning area outside the Borough, the Township consists largely of hilly, wooded areas and dairy farms, together with the small village of South Montrose, and the residential and recreation area around Lake Montrose to the east of the Borough. Although there is some local industry in addition to agriculture, many local residents work outside Susquehanna County.

The Borough of Montrose is served by a private water company which provides approximately 300,000 gallons per day of treated Montrose Lake water to over 700 customers. Other residents get water from deep wells. Water quality is generally satisfactory. Water for livestock is provided from small, man-made ponds on the farms.

Air quality is excellent in the planning area, and noise levels are low. Electric power is provided by the Pennsylvania Electric Company. There are no wetlands in the planning area, of the sort which would provide a shelter for wildlife; nor are there other environmentally sensitive areas such as flood plains and coastal zones. Although there are many examples of fine old homes of the Victorian era in Montrose, there are no historical sites per se; but the Susquehanna Historical Society and Free Library in Montrose houses fascinating memorabilia of the past. No archeological sites have been found; the Indian tribes of the Six Nations used the area primarily as a hunting ground. There are no Federal or State projects in the area, and none are planned. No plant and animal communities would be affected by any of the alternates considered.

10.2 Future Environment Without the Project

Section 6.3 of this report describes the future environment without the project or the "no action" plan. Briefly, the implications of the "no action" plan lie in four categories: surface water quality, groundwater quality, land use limitation, and socio-economic factors. These are summarized below.

The surface water quality which would probably be most affected by no action is that of Lake Montrose. The Bridgewater Township Supervisors had by 1972 already received "complaints on malfunctioning on-lot disposal systems on the lake watershed. Given the severe area soil conditions and the expected future housing development, one can predict more frequent complaints and more importantly an accelerated degradation of Lake Montrose water quality. The deteriorating water quality would be due to the organic, nitrogen, and phosphorous nutrients contained in sewage discharged to surface and groundwaters feeding the lake."[1] The effect on the effluent discharged to Pettis Creek by the existing sewage treatment plant would probably not be as great. But, with no modifications to the plant, the effluent quality would not meet the new State standards of quality described in Section 3 of this Facility Plan.

Although pollution of the groundwater table has not yet been defined as a problem, it could prove to be one in the future, with the expected rise of population in the Township. Since nearly all the soils in the planning area have moderate to severe soil limitations for on-lot sewage disposal, "groundwater contamination is a distinct possibility for clustering of 20 or more dwelling units at densities units/acre of less."[2]

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[1] Thomas R. Milnes, "Feasibility Report on Wastewater Collection and Disposal System for Bridgewater Township", submitted to Bridgewater Township Supervisors (Tunkhannock: Milnes Engineering, Inc., May 16, 1972), p. 3.

[2] "Comprehensive Water and Sewer Plan, Susquehanna County, Pennsylvania," (Towanda: Northern Tier Regional Planning and Development Commission, November, 1970) p. 5-3.

Other existing environmental conditions such as air quality, noise levels, and plant and animal communities would be unaffected by the no-project alternative. Development of residential and industrial areas would, however, be held back by the lack of public sewerage, particularly in the vicinity of Lake Montrose. A recent engineering study[1] covering sewerage for approximately 100 proposed dwelling units in the vicinity of the lake has not yet been implemented.

10.3 Evaluation of Alternatives

Alternatives considered included (1) enlarging and upgrading the existing treatment plant, including the construction of a holding tank to contain stormwater; (2) construction of a small wastewater treatment plant or a waste stabilization pond at South Montrose, to handle wastewater from that village for the year 2002; and (3) construction of a 11,000-foot-long sewer main leading from South Montrose to the Montrose Sewage Treatment plant. All alternatives assumed that lands adjacent to the present Montrose sewage treatment plant would be used for the holding tank, and for the upgrading and enlargement of the plant as required. In addition, for all of the above alternatives, the assumption was made that the areas in the vicinity of Lake Montrose and Meshoppen Creek Road would be sewered and connected to the Montrose Municipal Authority's treatment system. All alternatives assumed that South Montrose would be sewered, which it is not at present. Establishment of waste treatment facilities at South Montrose would make it unnecessary to construct the 11,000-foot sewer from South Montrose to the Montrose Sewage treatment plant.

Section 7.2 of this report describes in detail the evaluation of alternatives with respect to effluent requirements, environmental effects, operational considerations, and cost-effectiveness.

On the basis of environmental effects, monetary costs, effluent requirements, operational considerations, and the probable effects on the environment, the proposed method of remodeling and enlarging the existing treatment plant was selected, with South Montrose sewerage connected to a new package treatment plant to be constructed west of South Montrose.

10.4 Environmental Effects of Selected Plan

10.4.1 General

The various sewage treatment alternatives would be required to produce an effluent that meets the state's discharge requirements. Any impacts would occur at the existing treatment plant and at the proposed South Montrose package treatment plant, and would be primarily engineering and economic in nature.

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[1] Thomas R. Milnes, "Feasibility Report on Wastewater Collection and Disposal System for Bridgewater Township," (Tunkhannock: Milnes Engineering, Inc., May 16, 1972) p. 4 and Exhibit 1.

Land disposal of sludge would require land nearby. The major aquatic ecological impact would be potential contamination of surface and groundwater due to the nature of the soils in the area.

Alternatives to the proposed project would be to route a pipeline from South Montrose to the sewage treatment plant, and to use alternative methods of sewage treatment and disposal, such as waste stabilization ponds and spray irrigation. These alternatives have been eliminated primarily on the basis of cost-effectiveness, rather than upon any adverse effect they might have on the environment.

10.4.2 Primary Impacts

The greatest aquatic ecological impact due directly to construction and operation would be temporarily increased erosion, and siltation of Pettis Creek and Lake Montrose, and the creek west of South Montrose. This impact may be reduced with use of proper construction techniques. Operations will result in an effluent of higher quality than is presently being discharged into Pettis Creek.

The principal impact on terrestrial system will be due to construction of the interceptors and pipelines. Disruption of plant and animal communities will occur along the pipeline routes, but this is expected to be a temporary effect, as ecological succession will in time re-establish the lost vegetation and animal populations. No major ecological communities will be affected, as the planned pipeline routes either follow existing rights-of-way such as roads or cross fields primarily used for agriculture.

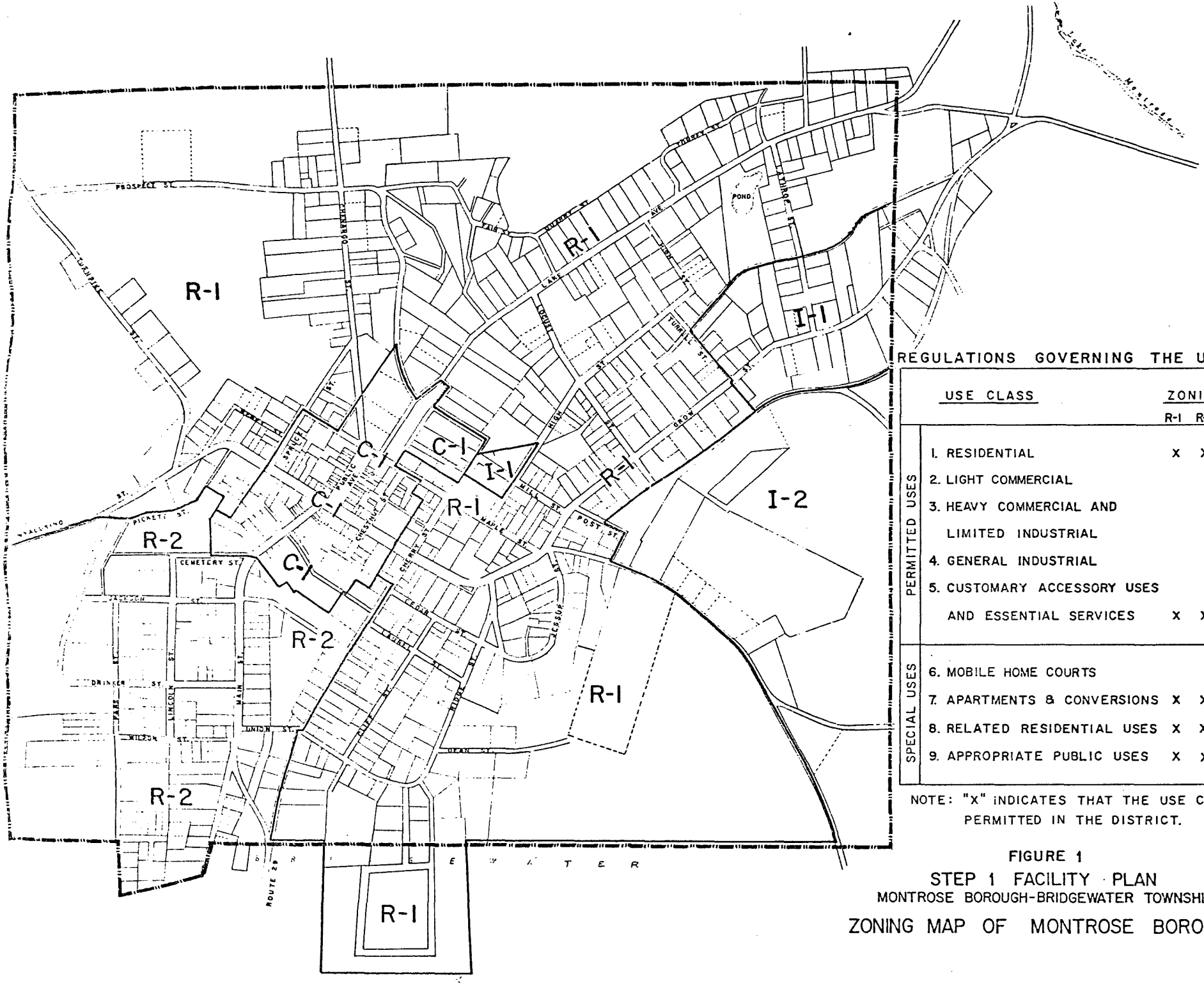
10.4.3 Secondary Impacts

The proposed project will make possible further development in the Montrose and Bridgewater Township area. Although the possibility of surface and groundwater contamination due to on-lot disposal facilities will be reduced or eliminated in the service area, erosion and siltation will increase as development continues. Depending on the extent and location of development, this could affect the capacity of Snake Creek and Wyalusing Creek to support trout.

Land developed as a result of the increased sewage treatment capacity will be eliminated as wildlife habitat. This development will not remove significant wildlife habitats, except possibly in the vicinity of Lake Montrose, where development seems most likely. The small wetland area to the east of Lake Montrose may be affected by development, but since it is not unique in the area - wetlands are common near the numerous small ponds in the area - the impact is not considered significant.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY - BRIDGEWATER TOWNSHIP AUTHORITY

APPENDIX



REGULATIONS GOVERNING THE USE OF LAND

	USE CLASS	ZONING DISTRICT				
		R-1	R-2	C-1	I-1	I-2
PERMITTED USES	1. RESIDENTIAL	X	X			
	2. LIGHT COMMERCIAL			X	X	X
	3. HEAVY COMMERCIAL AND LIMITED INDUSTRIAL			X	X	X
	4. GENERAL INDUSTRIAL					X
	5. CUSTOMARY ACCESSORY USES AND ESSENTIAL SERVICES	X	X	X	X	X
SPECIAL USES	6. MOBILE HOME COURTS					X
	7. APARTMENTS & CONVERSIONS	X	X			
	8. RELATED RESIDENTIAL USES	X	X	X		
	9. APPROPRIATE PUBLIC USES	X	X	X	X	X

NOTE: "X" INDICATES THAT THE USE CLASS IS PERMITTED IN THE DISTRICT.

FIGURE 1

STEP 1 FACILITY PLAN

MONTROSE BOROUGH-BRIDGEWATER TOWNSHIP

ZONING MAP OF MONTROSE BOROUGH

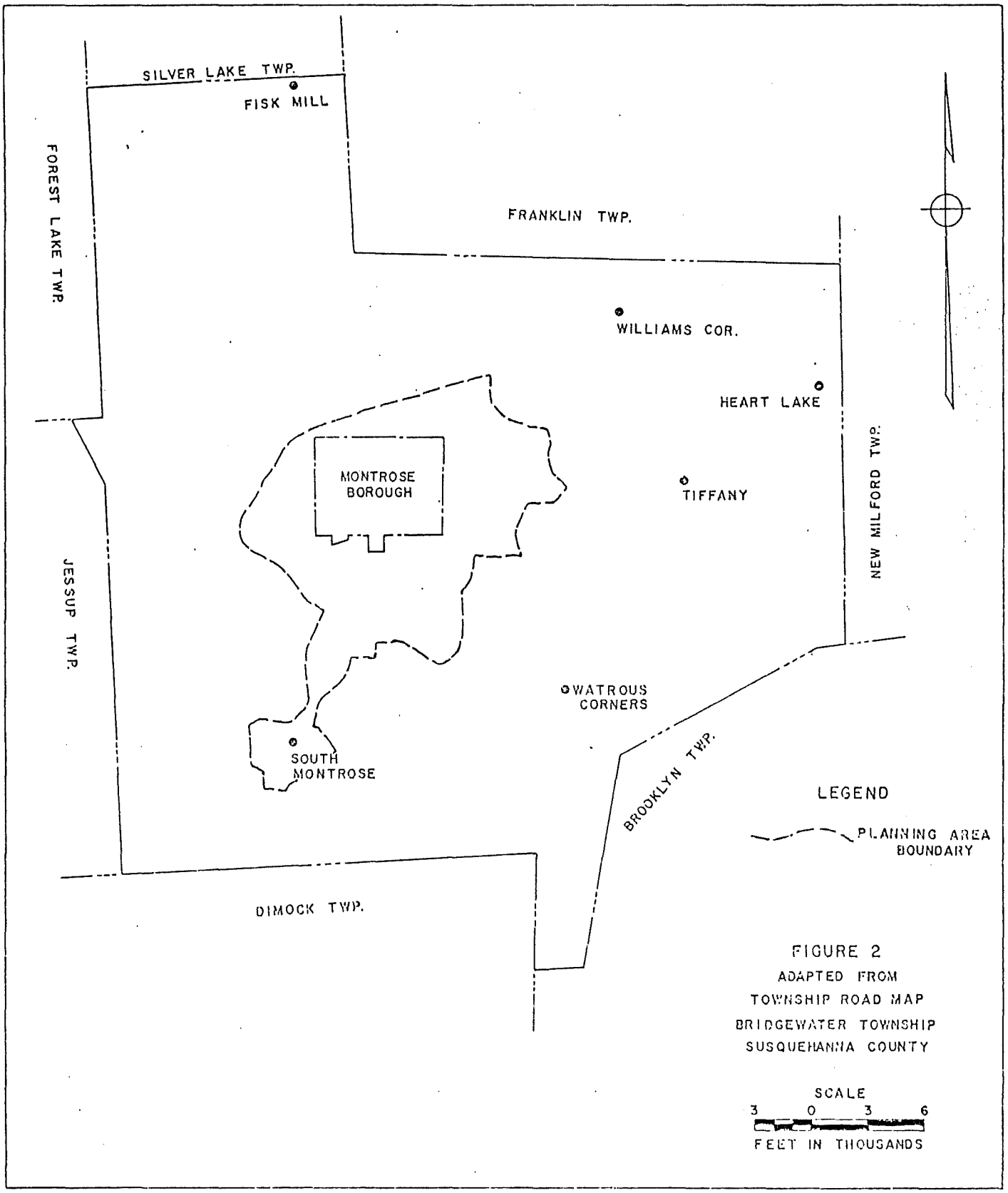


FIGURE 2

ADAPTED FROM

TOWNSHIP ROAD MAP

BRIDGEWATER TOWNSHIP

SUSQUEHANNA COUNTY

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 1

MANUFACTURING INDUSTRIES IN THE STUDY AREA
EMPLOYING 10 OR MORE PERSONS[1]

Name of Industry	Type of Industry	No. of Employees (in 1974)
Lott's Feed Mill	Animal Feed	10
Janner, Inc.	Clothing	69
Donald Dean and Sons, Inc.	Wood Products	70
Donald Dean and Sons, Inc.	Wood Products	30
John Dilesi Lumber Co.	Wood Products	16
Montrose Publishing Co., Inc.	Printing	49
Beach Manufacturing Co.	Woodworking Machinery	28
Bendix Corp.	Aircraft Parts	519

[1]Excerpted from Leonard Ginn, Susquehanna County Manufacturing Industries and Number of Employees, Northern Tier Regional Planning and Development Commission (Towanda: NTRPDC, 1974); and from information received from Mr. Donald Dean.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 2

ASSESSED VALUE OF LAND PARCELS, 1972-1976[1]

Montrose Borough

Year	Total Parcels	Assessed Value
1972	773	$ 4,504,550
1973	773	4,525,710
1974	776	4,557,650
1975	777	4,577,350
1976	779	4,621,000

Bridgewater Township

Year	Total Parcels	Assessed Value
1972	899	$ 4,952,550
1973	935	5,220,850
1974	984	5,468,000
1975	1,038	5,788,900
1976	1,465	5,937,400

[1] Figures supplied by the Tax Assessment Office, Court House, Montrose, Pa.

FACILITY PLAN
MONTROSE MUNICIPAL AUTHORITY
BRIDGEWATER TOWNSHIP MUNICIPAL AUTHORITY

TABLE 3

GENERAL CHARACTERISTICS OF MONTROSE BOROUGH,
BRIDGEWATER TOWNSHIP, AND SUSQUEHANNA COUNTY[1]

Municipality	No. Sq. Mi.	Median Age	Percent Under 18 Years	Percent 65 Years and Over	Number of Households	Total Population	Persons of Household
Bridgewater Twp.	40.8[2]	28.3	36.8	9.0	554	1,876	3.39
Montrose Borough	1.2	37.2	30.0	16.6	700	2,003[2]	2.86
Susquehanna County Average per 1970 Census	833[2]	29.3	36.0	11.3	10,457	34,344	3.26

[1]From a table entitled "General Characteristics of Each Municipality Within Susquehanna County" based on the 1970 Census; table supplied by Susquehanna County Planning Commission.

[2]Other reference works give 1970 Montrose population as 2,058, Bridgewater Township area as 41.5 sq.mi., and Susquehanna County area as 836 sq.mi.