

AMENDMENT TO THE

**REGIONAL WATER QUALITY
MANAGEMENT PLAN**

TOWN OF SALEM

AS ADOPTED BY THE

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

MARCH 2001

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SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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SUBJECT: Certification of Amendment to the Adopted Regional Water Quality Management Plan (Town of Salem Sanitary Sewer Service Area)

TO: The Legislative Bodies of Concerned Local Units of Government within the Southeastern Wisconsin Region, namely: the County of Kenosha, the Villages of Paddock Lake and Silver Lake, and the Towns of Bristol, Randall, and Salem.

This is to certify that at the meeting of the Southeastern Wisconsin Regional Planning Commission, held at the Waukesha County Courthouse, Waukesha, Wisconsin, on the 7th day of March 2001, the Commission did by unanimous vote of all Commissioners present, being 17 ayes and 0 nays, and by appropriate Resolution, a copy of which is made a part hereof and incorporated by reference to the same force and effect as if it had been specifically set forth herein in detail, adopt an amendment to the regional water quality management plan, which plan was originally adopted by the Commission on the 12th day of July 1979, as part of the master plan for the physical development of the Region. Said amendment to the regional water quality management plan pertains to the revised Town of Salem sanitary sewer service area and consists of the documents attached hereto and made a part hereof. Such action taken by the Commission is recorded on, and is a part of, said plan, and the plan as amended is hereby transmitted to the constituent local units of government for consideration, adoption, and implementation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal and cause the Seal of the Southeastern Wisconsin Regional Planning Commission to be hereto affixed. Dated at the City of Waukesha, Wisconsin, this 8th day of March 2001.

Thomas H. Buestrin, Chairman
Southeastern Wisconsin
Regional Planning Commission

ATTEST:

Philip C. Evenson, Deputy Secretary

RESOLUTION NO. 2001-05

**RESOLUTION OF THE SOUTHEASTERN WISCONSIN REGIONAL PLANNING
COMMISSION AMENDING THE ADOPTED REGIONAL WATER QUALITY
MANAGEMENT PLAN, THAT PLAN BEING A PART OF THE MASTER PLAN
FOR THE PHYSICAL DEVELOPMENT OF THE REGION CONSISTING OF THE
COUNTIES OF KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WALWORTH,
WASHINGTON, AND WAUKESHA IN THE STATE OF WISCONSIN
(SALEM SANITARY SEWER SERVICE AREA)**

WHEREAS, pursuant to Section 66.0309(10) of the *Wisconsin Statutes*, the Southeastern Wisconsin Regional Planning Commission, at a meeting held on the 12th day of July 1979, duly adopted a regional water quality management plan as documented in the three-volume SEWRPC Planning Report No. 30, *A Regional Water Quality Management Plan for Southeastern Wisconsin: 2000*; and

WHEREAS, the Commission duly adopted amendments to the regional water quality management plan refining and detailing the Salem sanitary sewer service area in 1986, as originally documented in SEWRPC Community Assistance Planning Report No. 143, *Sanitary Sewer Service Area for the Town of Salem Utility District No. 2*, and in SEWRPC Community Assistance Planning Report No. 145, *Sanitary Sewer Service Area for the Town of Salem Utility District No. 1, Village of Paddock Lake, and Town of Bristol Utility District Nos. 1 and 1B*, and most recently amended in *Amendment to the Regional Water Quality Management Plan, Town of Salem*, dated June 1997; and

WHEREAS, by letter dated December 29, 2000, the Town of Salem requested that the Commission amend the Salem sanitary sewer service area to remove certain lands from the currently adopted sewer service area, and to add certain lands located outside of the currently adopted sewer service area; and

WHEREAS, the proposed amendment to the regional water quality management plan is documented in a Commission staff memorandum entitled, "Response to Request by the Town of Salem to Amend the Salem Sanitary Sewer Service Area," attached hereto and made a part hereof; and

WHEREAS, the requested change to the regional water quality management plan, as documented in the aforereferenced staff memorandum, was the subject of a public hearing held by the Regional Planning Commission on February 27, 2001; and

WHEREAS, Section 66.0309(9) of the *Wisconsin Statutes* authorizes and empowers the Regional Planning Commission, as the work of making the whole master plan progresses, to amend, extend, or add to the master plan or carry any part or subject thereof into greater detail;

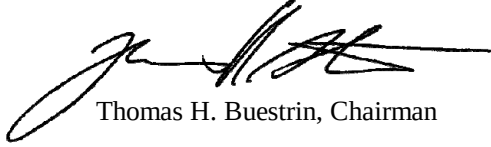
NOW, THEREFORE, BE IT HEREBY RESOLVED:

FIRST: That the regional water quality management plan for the Southeastern Wisconsin Region, being a part of the master plan for the physical development of the Region and comprised of SEWRPC Planning Report No. 30, Volumes One, Two, and Three, which was adopted by the Commission as a part of the master plan on the 12th day of July 1979, and which was amended on the 18th day of June 1997 to include the refined Salem sewer service area, as set forth in *Amendment to the Regional Water Quality Management Plan, Town of Salem*, be and the same hereby is amended in the manner identified on Map 2 of the aforereferenced SEWRPC staff memorandum.

SECOND: That the Executive Director is authorized to submit findings to the Wisconsin Department of Natural Resources and the Wisconsin Department of Commerce that public and private sanitary sewer extensions necessary to serve the anticipated development on the lands concerned are in conformance with, and would serve to implement, the adopted regional water quality management plan as herein amended.

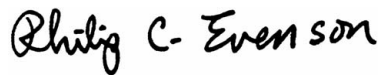
THIRD: That a true, correct, and exact copy of this resolution, together with the aforereferenced SEWRPC staff memorandum, shall be forthwith distributed to each of the local legislative bodies of the local governmental units within the Region entitled thereto and to such other bodies, agencies, or individuals as the law may require or as the Commission, its Executive Committee, or its Executive Director, at their discretion, shall determine and direct.

The foregoing resolution, upon motion duly made and seconded, was regularly adopted at the meeting of the Southeastern Wisconsin Regional Planning Commission held on the 7th day of March 2001, the vote being: Ayes 17; Nays 0.



Thomas H. Buestrin, Chairman

ATTEST:



Philip C. Evenson, Deputy Secretary

SEWRPC STAFF MEMORANDUM

RESPONSE TO REQUEST BY THE TOWN OF SALEM TO AMEND THE SALEM SANITARY SEWER SERVICE AREA

INTRODUCTION AND BACKGROUND

This memorandum was prepared in response to a long-standing request by the Town of Salem to the Southeastern Wisconsin Regional Planning Commission to amend the Salem sanitary sewer service area as that area is currently documented in *Amendment to the Regional Water Quality Management Plan, Town of Salem*, dated June 1997.¹ The basic purpose of this amendment would be to include within the planned Salem sewer service area certain lands located adjacent to, but outside, the currently adopted sewer service area and to remove certain lands from the existing sewer service area.

The proposed changes to the Salem sewer service area involve lands located in the vicinity of the Village of Paddock Lake and lands in other areas of the Town. The proposed changes involving lands in the vicinity of Paddock Lake are consistent with the recommended common boundary between the ultimate Paddock Lake and Salem sewer service areas, identified in a SEWRPC Staff Memorandum entitled “Documentation of Analyses Associated with Providing Sanitary Sewer Service to Certain Lands Lying in the STH 50 Corridor in the Paddock Lake-Salem Area.” That boundary is shown on Map 1. The boundary was delineated based upon consideration of the following factors: conveyance system cost effectiveness, pumping requirements, sewage treatment plant impacts, environmental impacts, and timing considerations. A copy of the above-referenced memorandum is included in Appendix A.

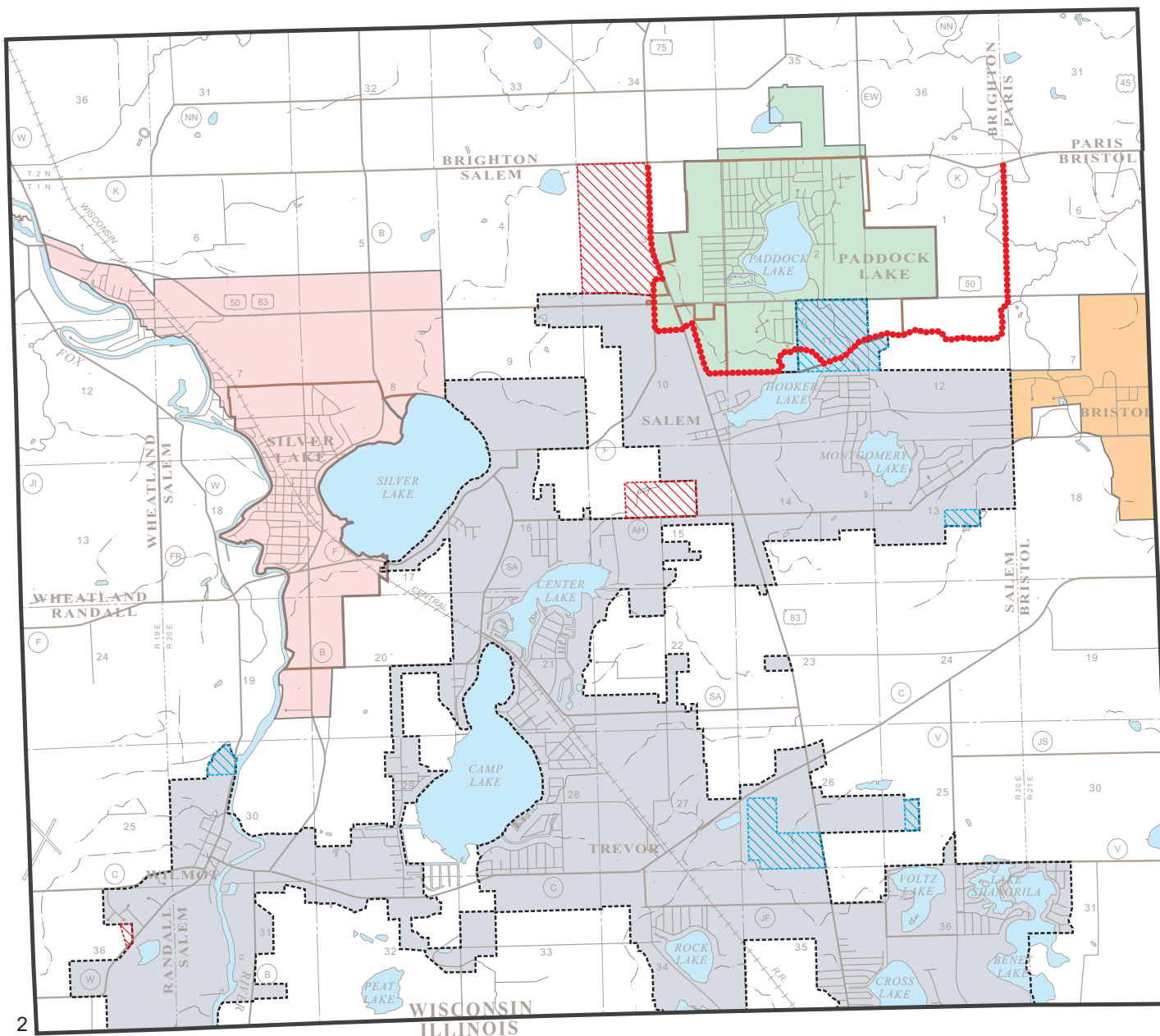
PROPOSED CHANGES

Three areas are proposed to be added to the existing sewer service area, as indicated by the red hatch pattern on Map 1. In combination these areas encompass a total of 386 acres. Of this total, 12 acres were in urban use in 1995, while 79 acres were comprised of environmentally significant lands—areas identified as environmental corridors, isolated natural resource areas, or wetlands and surface water areas less than five acres in size. The remainder of 295 acres consists of developable land located outside environmentally significant areas. Within the proposed addition located south of CTH K and west of STH 75, future urban development outside environmentally significant areas would likely consist of medium-density residential along with limited commercial, recreational, and institutional uses. Within the proposed addition located north of CTH AH and west of STH 83, future urban development outside environmentally significant areas would likely consist of low-density residential or institutional uses. The proposed addition located west of CTH W and south of CTH C consists of a parcel which has been developed as a single-family homesite.

Five areas are proposed to be deleted from the existing sewer service area, as indicated by the blue hatch pattern on Map 1. In combination, these areas encompass a total of 340 acres. Of this total, 28 acres were in urban use in 1995; 125 acres were comprised of environmentally significant lands, having been identified as environmental corridors, isolated natural resource areas, or wetlands and surface water areas less than five acres in size; and 187 acres were comprised of agricultural and other open lands.

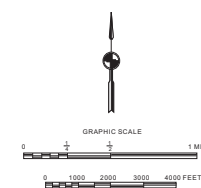
The net effect of the proposed changes described above would be to increase the overall size of the Salem sewer service area by 46 acres, or 0.5 percent. The developable area, excluding environmentally significant lands, would increase by 108 acres.

¹The refined Salem sewer service area was initially presented in SEWRPC Community Assistance Planning Report No. 145, Sanitary Sewer Service Area for the Town of Salem Utility District No. 1, Village of Paddock Lake, and Town of Bristol Utility District Nos. 1 and 1B, Kenosha County, Wisconsin, dated October 1986; and SEWRPC Community Assistance Planning Report No. 143, Sanitary Sewer Service Area for the Town of Salem Utility District No. 2, Kenosha County, Wisconsin, dated February 1986. The Salem sewer service area was subsequently amended in June 1991, December 1991, and June 1997.



Map 1
PROPOSED CHANGES TO THE TOWN OF SALEM SANITARY SEWER SERVICE AREA

- CURRENTLY APPROVED TOWN OF SALEM SANITARY SEWER SERVICE AREA
- AREAS TO BE ADDED TO THE TOWN OF SALEM SANITARY SEWER SERVICE AREA
- AREAS TO BE REMOVED FROM THE TOWN OF SALEM SANITARY SEWER SERVICE AREA
- PADDOCK LAKE SANITARY SEWER SERVICE AREA
- BRISTOL SANITARY SEWER SERVICE AREA
- SILVER LAKE SANITARY SEWER SERVICE AREA
- RECOMMENDED COMMON BOUNDARY BETWEEN THE ULTIMATE TOWN OF SALEM AND VILLAGE OF PADDOCK LAKE SANITARY SEWER SERVICE AREAS
- VILLAGE BOUNDARIES



Source: SEWRPC.

In addition to the revisions described above, certain other relatively minor adjustments have been made to the sewer service area plan map. These include the adjustment of the sewer service area boundary to better match real property lines and the adjustment of the boundaries of environmentally significant lands to better reflect environmental resources as shown on the most recent available aerial photography.

REVISED SEWER SERVICE AREA

The revised Salem sanitary sewer service area is shown on Map 2. With the proposed additions and deletions, the revised sewer service area would encompass about 13.8 square miles. The revised sewer service area would accommodate an estimated resident population of about 13,400 persons. This assumes that residential development in the proposed addition located south of CTH K and west of STH 75 would occur at a density of four dwelling units per net residential acre and further assumes that new residential development in the balance of the sewer service area would occur at densities envisioned in the Town of Salem land use plan.² In comparison, year 2020 regional land use plan resident population levels envisioned for the Salem sewer service area range from about 10,000 under an intermediate-growth centralized scenario to about 13,000 under a high-growth decentralized scenario. The estimated “buildout” resident population for the revised sewer service area of 13,400 persons roughly approximates the regional land use plan high-growth population level for the year 2020. In addition to the year-round resident population, it may be expected that the Salem sewer service area will continue to accommodate a seasonal population estimated at about 1,450 persons.

As shown on Map 2, the revised sewer service area encompasses a total of 4.3 square miles of environmentally significant lands—including about 3.8 square miles of primary environmental corridors, 0.2 square mile of secondary environmental corridors, 0.2 square mile of isolated natural resource areas, and 0.1 square mile of wetlands and surface water areas less than five acres in size. Thus, about 31 percent of the revised sewer service area would be comprised of environmentally significant areas.

Within the proposed sewer service area, the green shading on Map 2 identifies environmentally significant lands which are ineligible for sewer service. These areas include all primary environmental corridors, as well as wetlands, floodplains, shorelands, and steeply sloped areas within secondary environmental corridors and isolated natural resource areas. In general, the extension of sanitary sewers to serve new intensive urban development in these areas is not permitted; new sewer development is generally confined to limited recreational and institutional uses and rural-density residential development in upland areas. It should be recognized that the precise delineation of environmentally significant lands on specific parcels of land can only be determined through field investigation.

WATER QUALITY IMPACTS

Under the adopted regional water quality plan and the revised sanitary sewer service area plan, it is envisioned that all urban lands within the planned urban service area would ultimately receive sanitary sewer service. Assuming that all applicable Federal, State, and local permits are obtained and that proper site development and construction practices are employed, there should be no significant adverse water quality impacts attributable to the development of the planned sanitary sewer service area. In addition, the provision of public sanitary sewer service to those lands within the planned sanitary sewer service area which are currently developed and served by onsite sewage disposal systems may be expected to reduce the pollutant loadings from the existing onsite sewage disposal systems to both surface and ground waters.

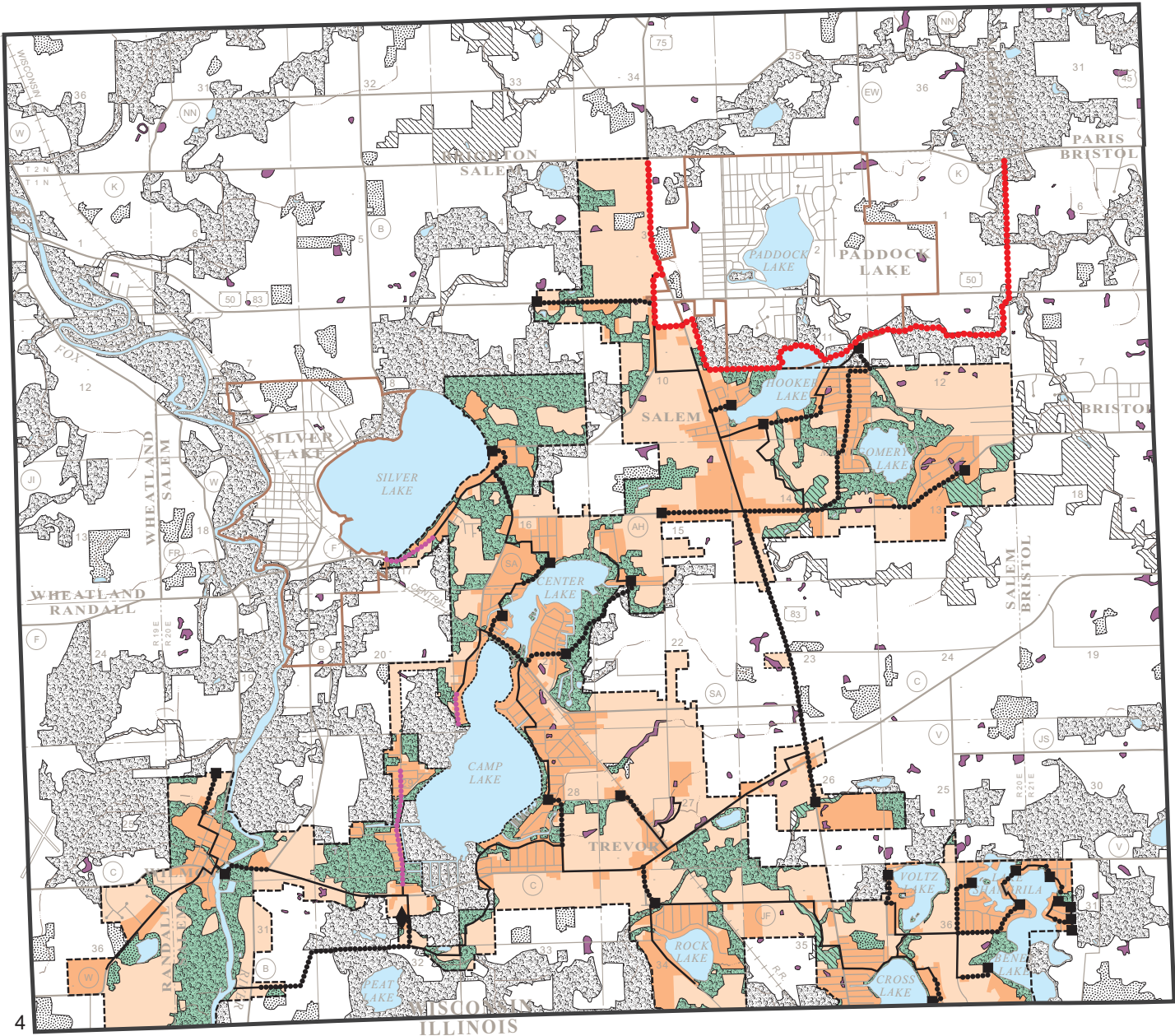
COST-EFFECTIVENESS ANALYSIS

Serving the area located south of CTH K and west of STH 75 via the Salem sewerage system has been found to be a cost-effective approach to the provision of sanitary sewer service to that area (see SEWRPC Staff Memorandum entitled

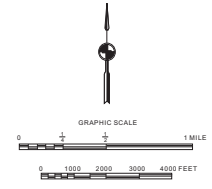
²The estimated “buildout” population does not include the following lands which, according to Town of Salem officials, are likely to remain in open space uses for the foreseeable future: the Salvation Army camp located along CTH SA and the property owned by the Benedictine Fathers located along 224th Avenue.

Map 2

**TOWN OF SALEM PLANNED
SANITARY SEWER SERVICE AREA: 2020**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  ENVIRONMENTALLY SIGNIFICANT LANDS WITHIN THE PLANNED SANITARY SEWER SERVICE AREA WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE
-  EXISTING AREA SERVED BY TOWN OF SALEM SANITARY SEWER SYSTEM: 2000
-  PLANNED SANITARY SEWER SERVICE AREA: 2020
-  PLANNED SANITARY SEWER SERVICE AREA BOUNDARY
-  RECOMMENDED COMMON BOUNDARY BETWEEN THE ULTIMATE TOWN OF SALEM AND VILLAGE OF PADDOCK LAKE SANITARY SEWER SERVICE AREAS
-  EXISTING PUBLIC SEWAGE TREATMENT FACILITY
-  EXISTING TRUNK SEWER
-  EXISTING FORCE MAIN
-  EXISTING PRESSURE SEWER
-  EXISTING PUMPING STATION
-  VILLAGE BOUNDARIES



Source: SEWRPC.

“Documentation of Analyses Associated with Providing Sanitary Sewer Service to Certain Lands Lying in the STH 50 Corridor in the Paddock Lake-Salem Area,” included in Appendix A). Based upon their locations, the proposed addition to the Salem sewer service area located along CTH AH and west of STH 83 and the proposed addition located west of CTH W and south of CTH C are able to be cost-effectively served by connection to the Salem sewerage system.

SEWAGE TREATMENT PLANT CAPACITY IMPACT ANALYSIS

Sewage from the Salem sewer service area is treated at the Town of Salem Utility District No. 2 sewage treatment plant. That sewage treatment plant has a design capacity of 1.57 million gallons per day (mgd) on an average annual basis. The average annual flow rate in 2000 was about 0.95 mgd on an average annual basis. The increase in sewer population to about 14,850 persons, including about 1,450 seasonal residents, assuming development of the sewer service area in accordance with the Town of Salem land use plan, is estimated to result in a flow rate of about 1.8 mgd, with total flows being somewhat dependent upon the sewage flows generated by new commercial and industrial uses. Thus, depending upon the level and density of growth that will actually occur under full buildout of the revised sewer service area, it may be necessary to increase the treatment plant capacity near the end of the 20-year planning period. No treatment plant expansion is expected to be necessary for at least ten years.

PUBLIC REACTION TO THE PLAN AMENDMENT

A public hearing was held on February 27, 2001, at the Kenosha County Center to receive public comment on, and reaction to, the proposed plan amendment. The hearing was sponsored by the Regional Planning Commission. A summary of the plan amendment was presented prior to receiving public comment, including a description of the lands proposed to be added to the sewer service area and any environmentally significant lands located within, lands proposed to be removed from the sewer service area, and potential impacts for the Town’s sewerage system.

The Town chairperson of the Town of Salem indicated Town support for the plan amendment.

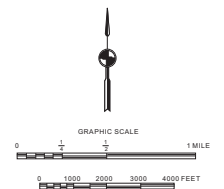
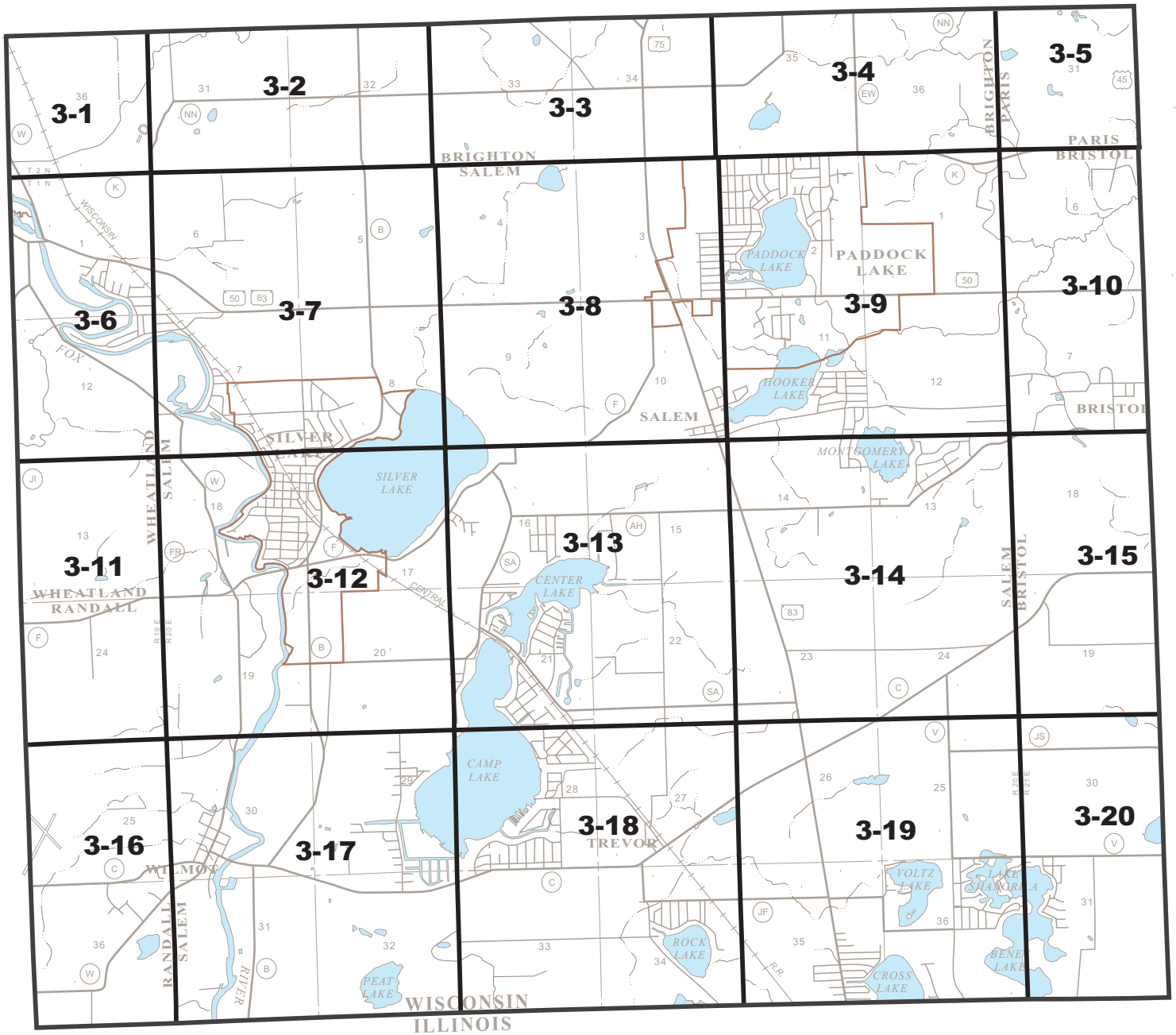
A review of the hearing record indicates that no substantive concerns were raised at the hearing. Accordingly, no changes were made to the proposed plan amendment as presented at the public hearing.

CONCLUDING RECOMMENDATION

Based upon the foregoing, it is recommended that the Southeastern Wisconsin Regional Planning Commission formally amend the sanitary sewer service area for the Town of Salem area in the manner identified on Maps 1 and 2. A more detailed delineation of the revised sewer service area and of the environmentally significant lands within is shown on a series of aerial photographs reproduced as Map 3 on pages 6 through 26 of this report.

Map 3

INDEX OF MAPS SHOWING ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED
SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS



Source: SEWRPC.

Map 3-1

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

U. S. Public Land Survey Section 36
Township 2 North, Range 19 East



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

Source: SEWRPC.
Photography Date: 1995

Map 3-2

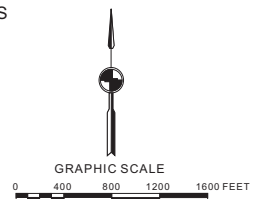
ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

U. S. Public Land Survey Sections 31 and 32
Township 2 North, Range 20 East



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

 SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS



Source: SEWRPC.
Photography Date: 1995

Map 3-3

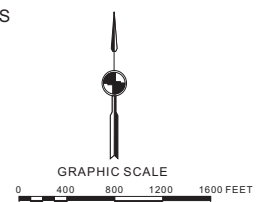
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 33 and 34
Township 2 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY



Source: SEWRPC.
Photography Date: 1995

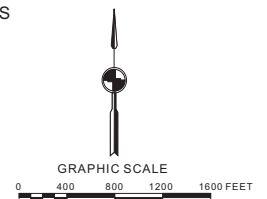
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 35 and 36
Township 2 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER
AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS
AND ISOLATED NATURAL RESOURCE AREAS
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY



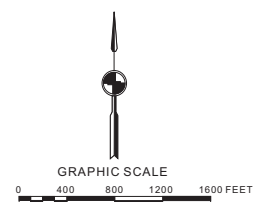
Source: SEWRPC.
Photography Date: 1995

**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Section 31
Township 2 North, Range 21 East**



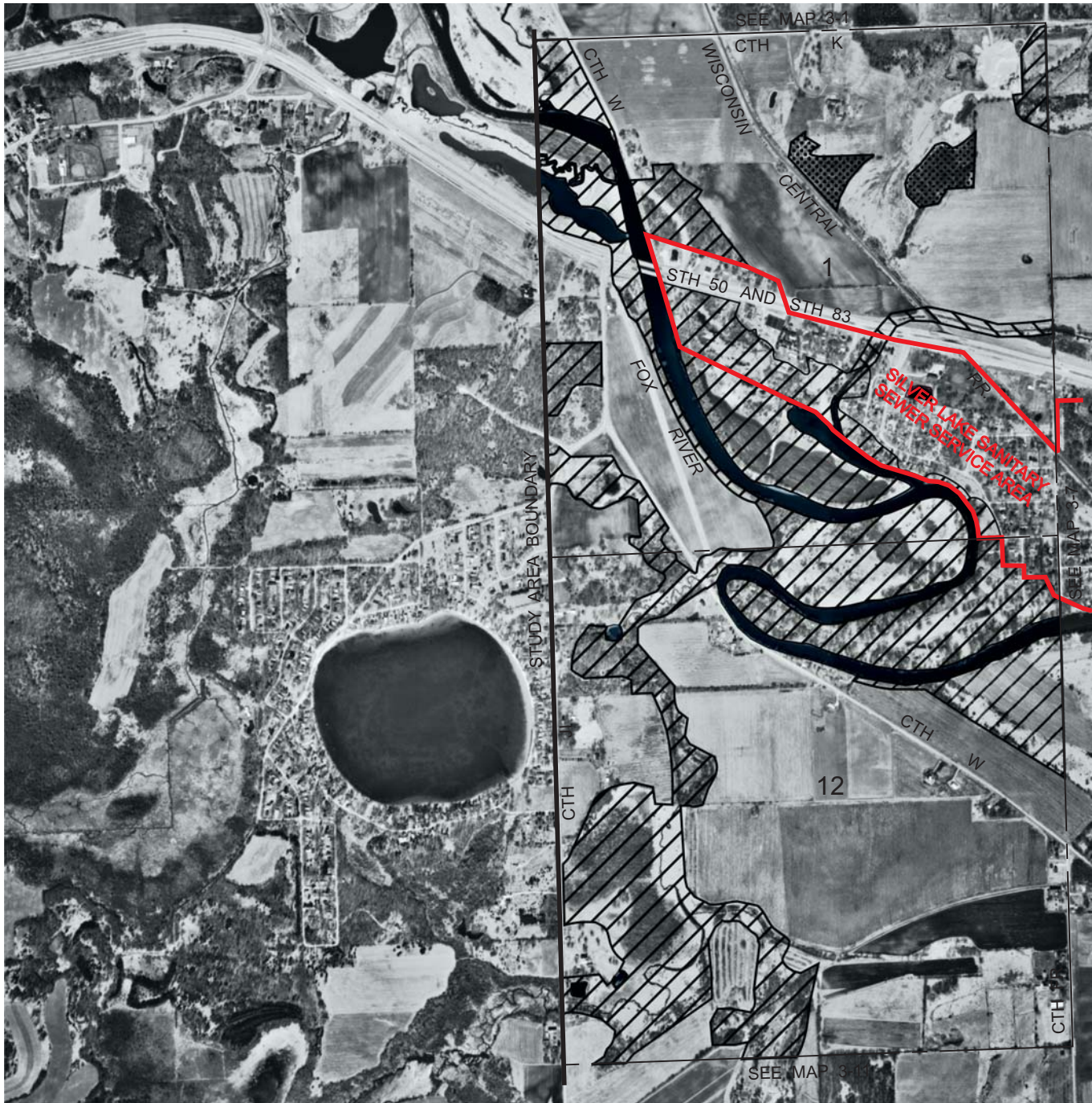
-  PRIMARY ENVIRONMENTAL CORRIDOR
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE
-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS



Source: SEWRPC.
Photography Date: 1995

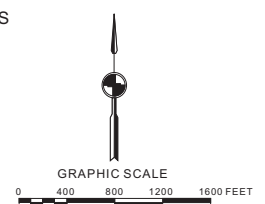
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 1 and 12
Township 1 North, Range 19 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER
AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS
AND ISOLATED NATURAL RESOURCE AREAS
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY



Source: SEWRPC.
Photography Date: 1995

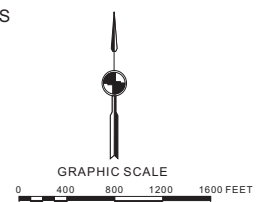
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 5, 6, 7, and 8
Township 1 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY

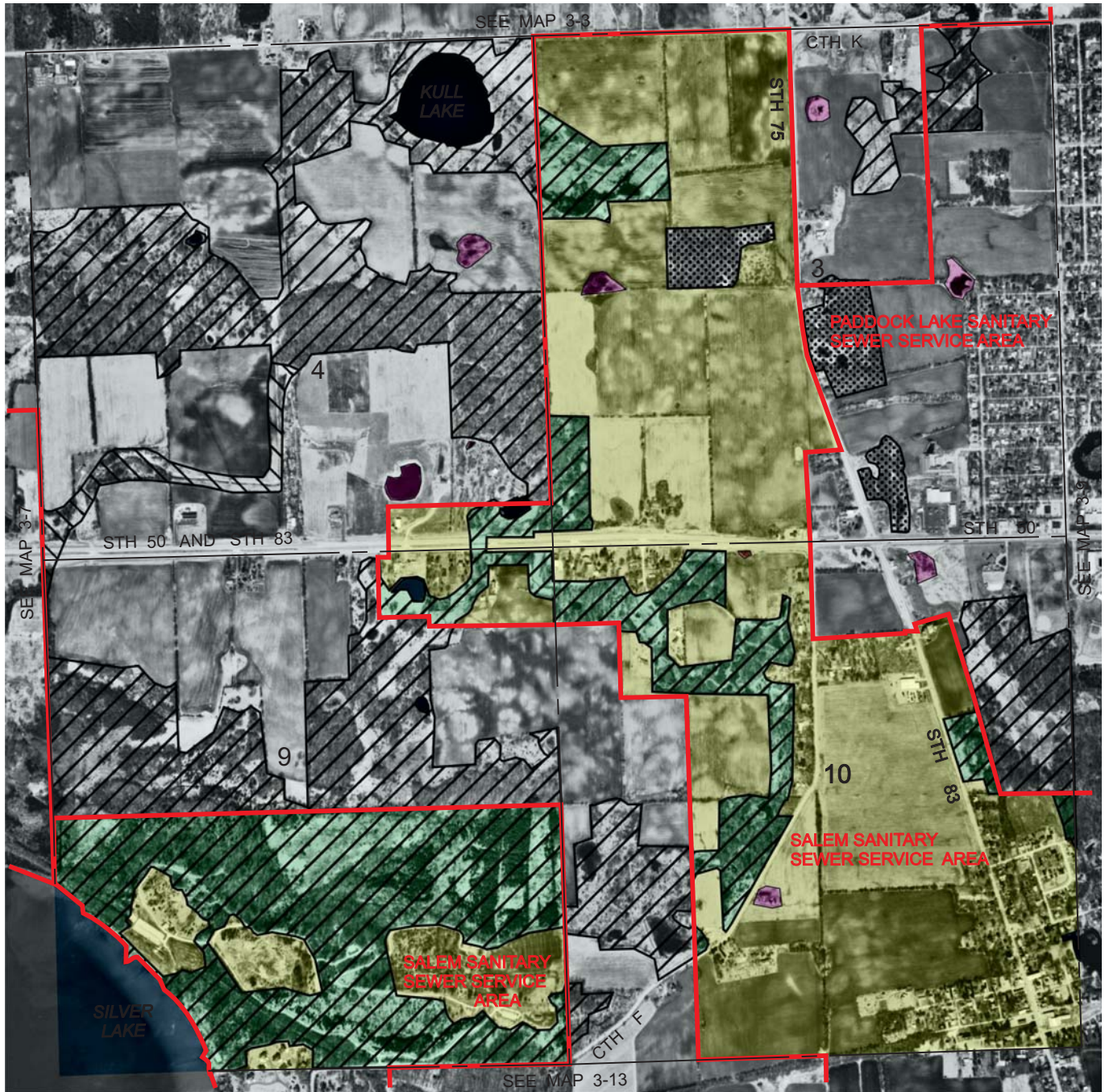


Source: SEWRPC.
Photography Date: 1995

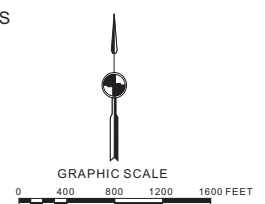
Map 3-8

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

U. S. Public Land Survey Sections 3, 4, 9, and 10
Township 1 North, Range 20 East



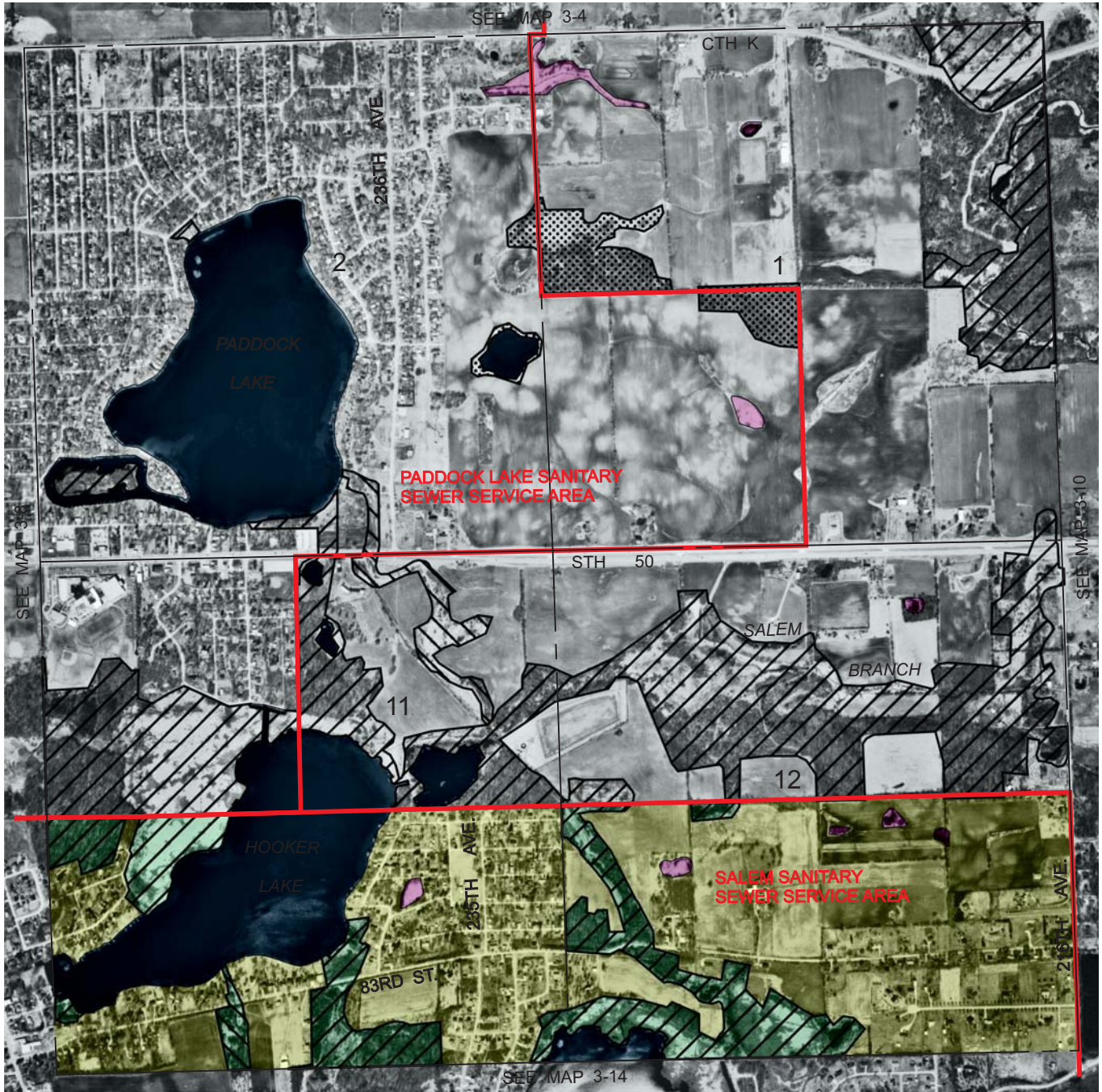
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|---|---|---|--|
|  | PRIMARY ENVIRONMENTAL CORRIDOR |  | SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS |
|  | SECONDARY ENVIRONMENTAL CORRIDOR |  | PLANNED SANITARY SEWER SERVICE AREA |
|  | ISOLATED NATURAL RESOURCE AREA |  | GROSS SANITARY SEWER SERVICE AREA BOUNDARY |
|  | WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE |  | LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS. |



Source: SEWRPC.
Photography Date: 1995

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

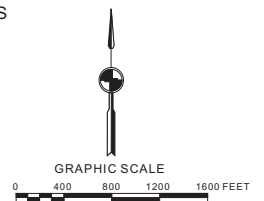
**U. S. Public Land Survey Sections 1, 2, 11, and 12
Township 1 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY

 LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



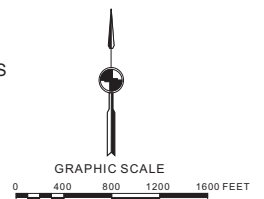
Source: SEWRPC.
Photography Date: 1995

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

**U. S. Public Land Survey Sections 6 and 7
Township 1 North, Range 21 East**



- | | | | |
|---|----------------------------------|---|--|
|  | PRIMARY ENVIRONMENTAL CORRIDOR |  | WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE |
|  | SECONDARY ENVIRONMENTAL CORRIDOR |  | SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS |
|  | ISOLATED NATURAL RESOURCE AREA |  | GROSS SANITARY SEWER SERVICE AREA BOUNDARY |



Source: SEWRPC.
Photography Date: 1995

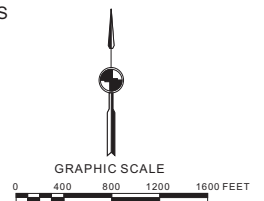
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 13 and 24
Township 1 North, Range 19 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA

 SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS
AND ISOLATED NATURAL RESOURCE AREAS



Source: SEWRPC.
Photography Date: 1995

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

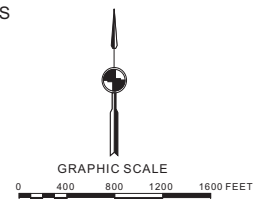
**U. S. Public Land Survey Sections 17, 18, 19, and 20
Township 1 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY

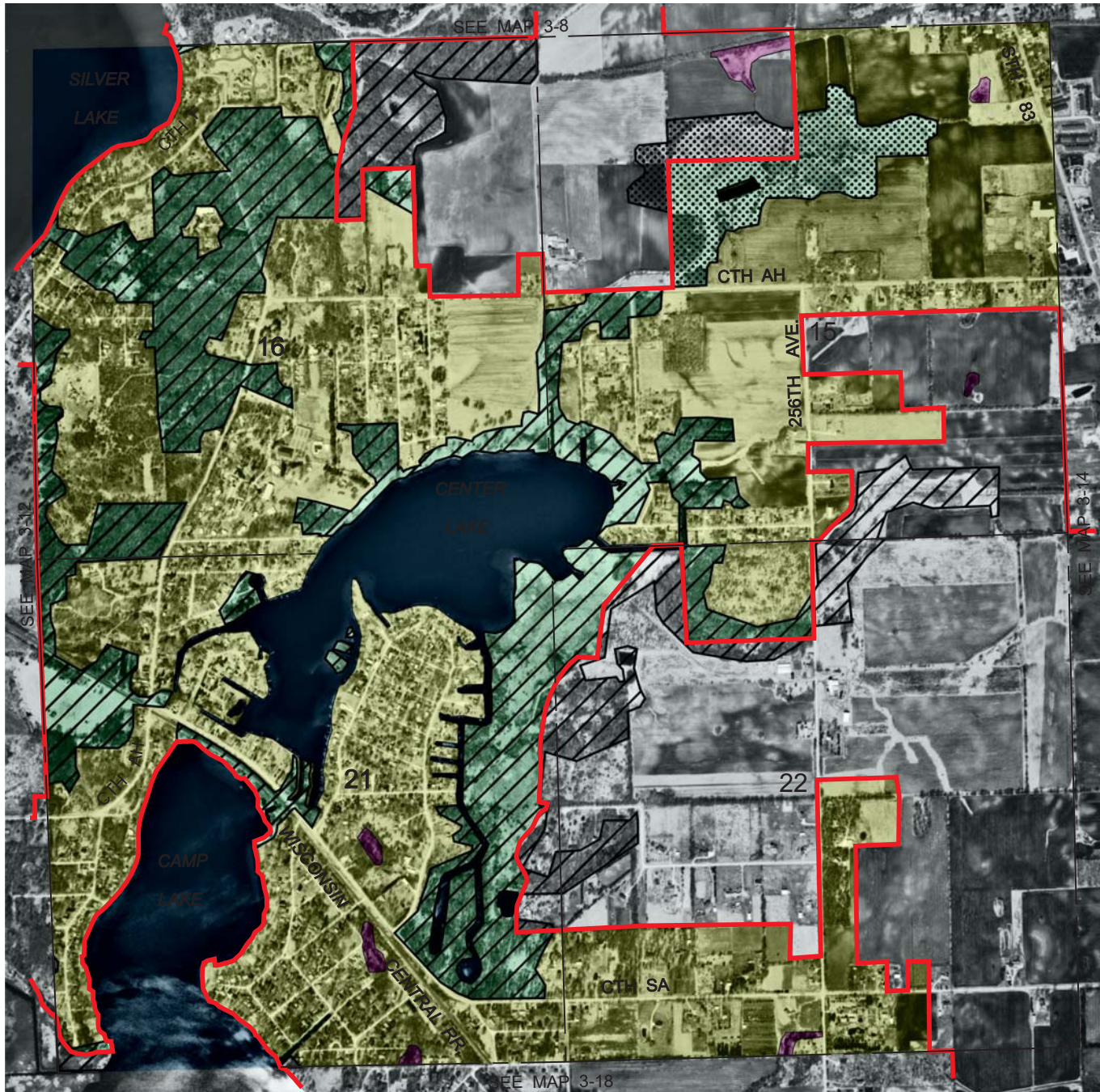
 LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

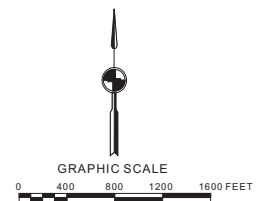
ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

**U. S. Public Land Survey Sections 15, 16, 17, and 18
Township 1 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE
-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS

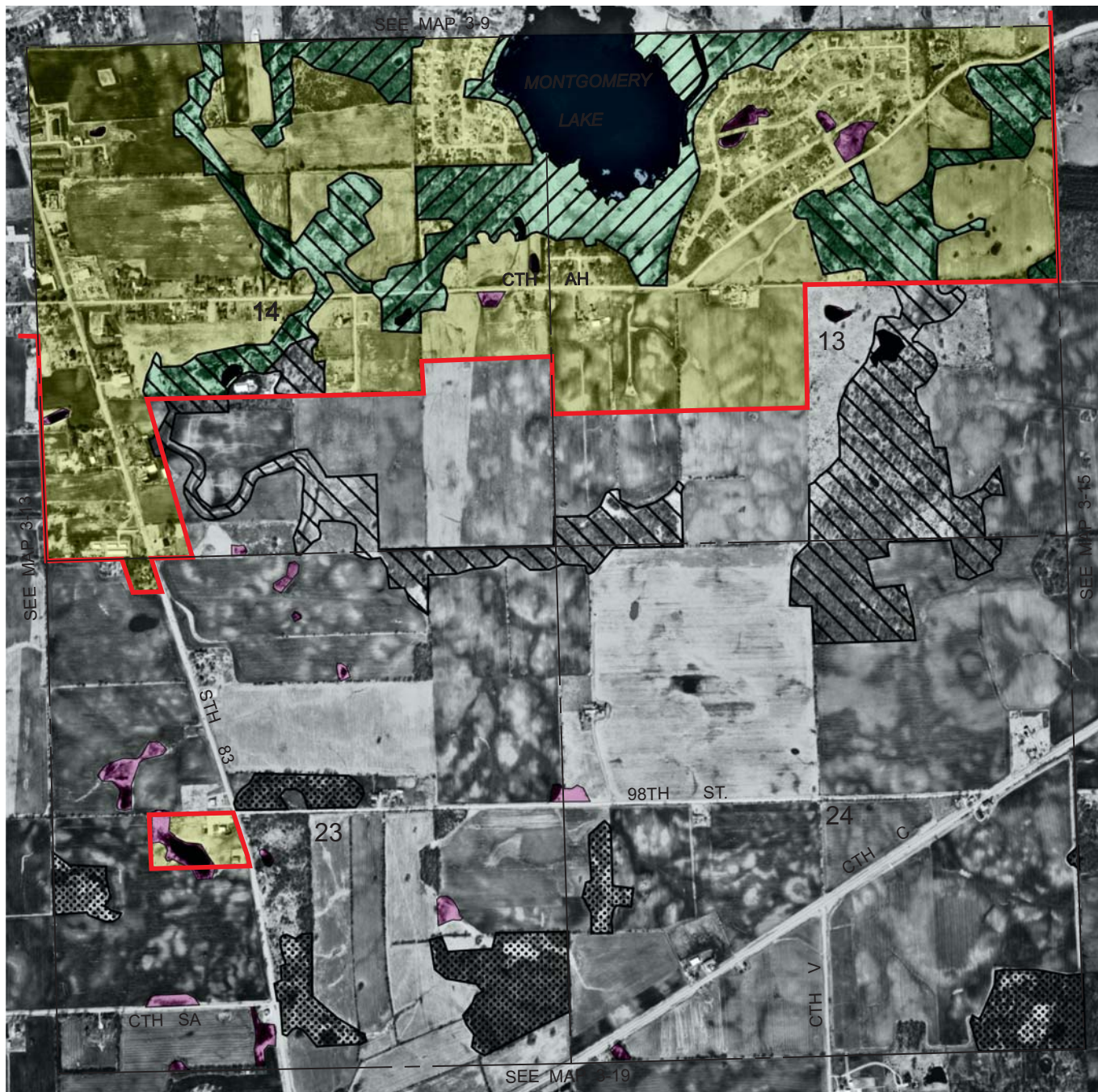
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY
-  LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

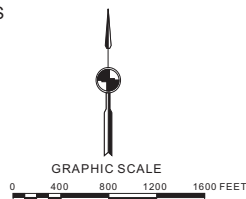
U. S. Public Land Survey Sections 13, 14, 23, and 24
Township 1 North, Range 20 East



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY

 LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

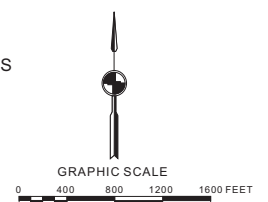
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 18 and 19
Township 1 North, Range 21 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA

-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE
-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY



Source: SEWRPC.
Photography Date: 1995

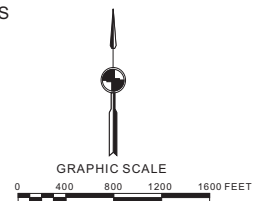
**ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY
SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS**

**U. S. Public Land Survey Sections 25 and 36
Township 1 North, Range 19 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

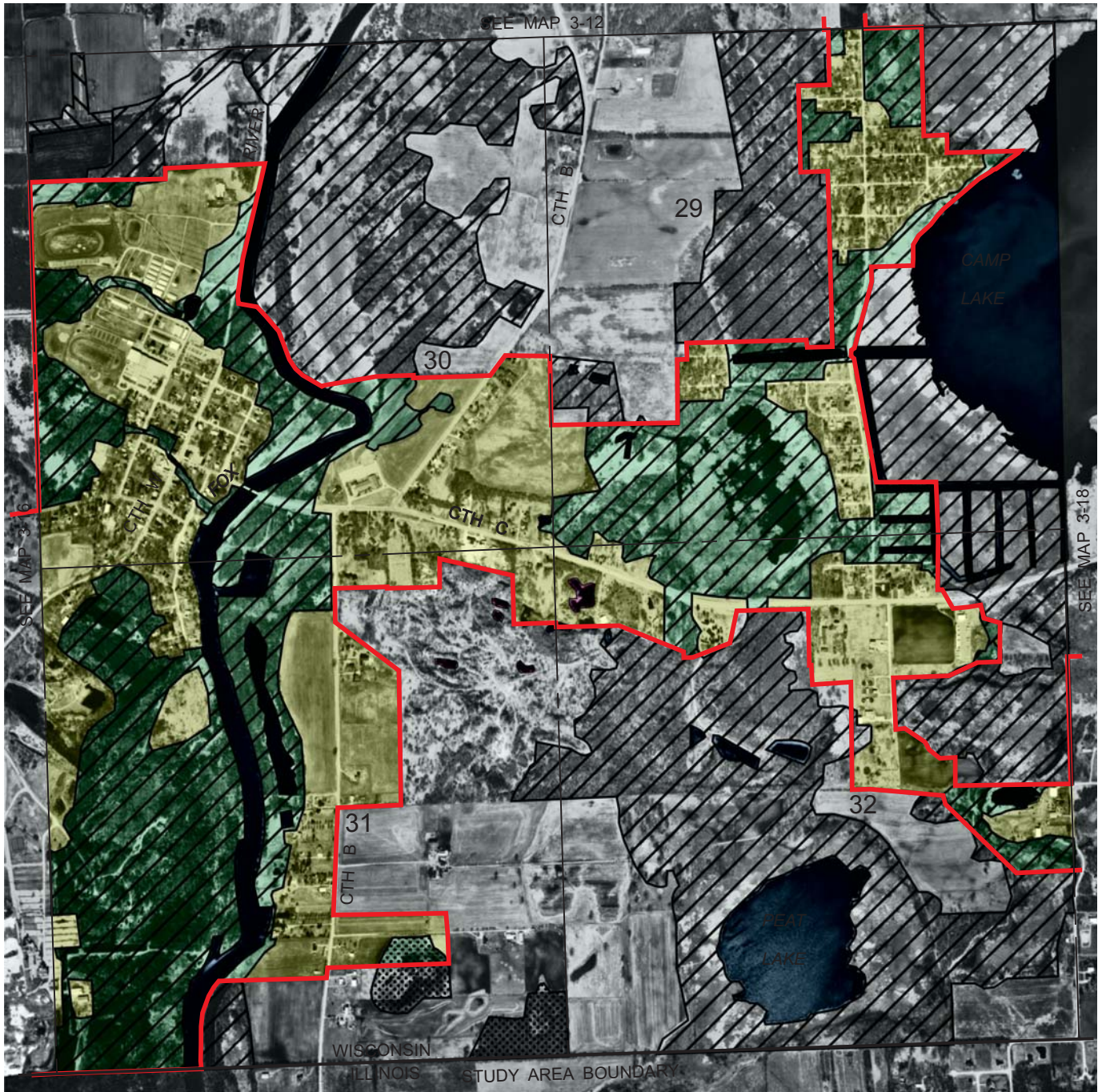
-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY
-  LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

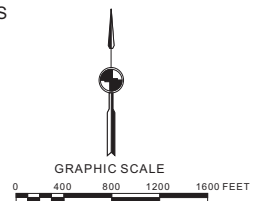
**U. S. Public Land Survey Sections 29, 30, 31, and 32
Township 1 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY

LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

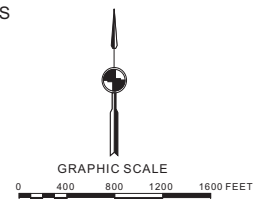
**U. S. Public Land Survey Sections 27, 28, 33, and 34
Township 1 North, Range 20 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  SECONDARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE

-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS
-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY

 LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

SEE MAP 3-14

CTH C

CTH JS

CTH V

26

25

CTH JF

STH 83

VOLTZ LAKE

SHANGRILA LAKE

35

36

CROSS LAKE

BENET LAKE

WISCONSIN

ILLINOIS

STUDY AREA BOUNDARY

CHICAGO AND NORTHERN PACIFIC RR

-
- 0 400 800 1200 1600 FEET

LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.

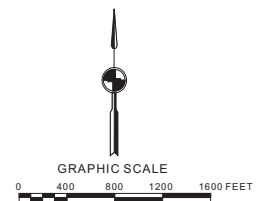
ENVIRONMENTALLY SIGNIFICANT LANDS AND PLANNED SANITARY SEWER SERVICE AREA FOR THE TOWN OF SALEM AND ENVIRONS

**U. S. Public Land Survey Sections 30 and 31
Township 1 North, Range 21 East**



-  PRIMARY ENVIRONMENTAL CORRIDOR
-  ISOLATED NATURAL RESOURCE AREA
-  WETLANDS AND SURFACE WATER AREAS LESS THAN FIVE ACRES IN SIZE
-  SURFACE WATER WITHIN ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS

-  PLANNED SANITARY SEWER SERVICE AREA
-  GROSS SANITARY SEWER SERVICE AREA BOUNDARY
-  LANDS WITHIN THE PLANNED SALEM SANITARY SEWER SERVICE AREA THAT ARE INELIGIBLE FOR SEWER SERVICE: ENVIRONMENTALLY SIGNIFICANT LANDS WHERE THE EXTENSION OF SEWERS TO SERVE NEW INTENSIVE URBAN DEVELOPMENT IS NOT PERMITTED. NEW SEWERED DEVELOPMENT IS CONFINED TO LIMITED RECREATIONAL AND INSTITUTIONAL USES AND RURAL-DENSITY RESIDENTIAL DEVELOPMENT IN UPLAND AREAS.



Source: SEWRPC.
Photography Date: 1995

APPENDICES

Appendix A

DOCUMENTATION OF ANALYSES ASSOCIATED WITH PROVIDING SANITARY SEWER SERVICE TO CERTAIN LANDS LYING IN THE STH 50 CORRIDOR IN THE PADDOCK LAKE-SALEM AREA (revised November 21, 2000)

-2-

INTRODUCTION

During the process of responding to requests by the Village of Paddock Lake and the Town of Salem to refine the sanitary sewer service areas attendant to the Paddock Lake and Salem sewage treatment plants, it was found that there were three areas which have been requested to be served by sewer extensions to both of the sewerage systems involved. In the absence of local agreement to eliminate this service area overlap, the procedures set forth in the regional water quality management plan and Chapter NR 121 of the *Wisconsin Administrative Code* require that the Commission base the apportionment of land upon the findings broadly related to cost-effectiveness in extending local sewer systems. Following a number of meetings, discussions, and exchanges of correspondence on this matter, it was concluded that the issue involving the overlap in sewer service area would not be solved based upon multi-purpose considerations and mutual agreement. Accordingly a cost-effectiveness analysis was undertaken to evaluate this matter. The results of that analysis are documented in the memorandum.

The analyses set forth in this memorandum were prepared in an effort to help the Village of Paddock Lake and the Town of Salem reach agreement as to the appropriate location for a division line between the sewer services areas of those communities. Alternatively, the Regional Planning Commission, as the designated areawide water quality planning agency, would use the information contained herein to recommend to the Wisconsin Department of Natural Resources such a division line. The Commission would do so only reluctantly, preferring that the Village and Town reach agreement on the sewer service areas in a cooperative manner.

In preparing the memorandum, the Commission staff independently evaluated the merits of the alternative courses of action considered, drawing upon, as appropriate, the following materials:

1. A report entitled, *Wastewater Collection System Plan*, dated November 1999, and prepared by Kaempfer & Associates, Inc., for the Town of Salem Utility District No. 1.
2. A letter report dated May 12, 2000, from Davison, Mulligan & Schiltz, Ltd., transmitting cost analysis data prepared by M.V. Engineering, LCC, and related to providing sewer service to the areas in question by connection to the Village of Paddock Lake sewerage system.
3. A letter report dated June 16, 2000, prepared by M.V. Engineering, LCC, for the Village of Paddock Lake setting forth further information on the means to serve the areas in question.

The geographic areas for which the cost effectiveness analyses were conducted are identified on Map 1. The cost analyses for each are provided in this memorandum following a discussion of the basic assumptions and procedures underlying the analyses.

BASIC ASSUMPTIONS AND PROCEDURES

In conducting its analyses in this matter, the Commission made certain assumptions and selected certain procedures to be followed. These basic assumptions and procedures are summarized in the following paragraphs.

Study Area

The primary study area consists of the three analysis areas being considered for connection to both of the sewerage systems involved as identified on Map 1. However, because of the interrelationship of the sanitary sewer system needed to serve these areas to other adjacent areas and sewer systems, consideration has also been given to the other related areas, as appropriate.

Design Year, Land Use, and Population of Service Areas

For purposes of this analysis, full buildout or ultimate development conditions were assumed for the three sewer service areas conditions. Land use and population data for the planned sanitary sewer service areas were derived from information developed by the Regional Planning Commission and considering local land use plans prepared by each community. In this regard, reference was made to the following two reports:

1. A report entitled, *Development Plan Update*, dated December 17, 1997, and prepared by Vandwalle & Associates for the Village of Paddock Lake.
2. A report entitled, *Town of Salem Land Use Plan: 2020*, dated March 1999 and prepared by Meehan & Company, Inc., for the Town of Salem.

Specific information on the land use assumptions is provided in Table 1. Because the buildout or ultimate development conditions exceed the 2020 planned urban land use conditions, the analyses are intended to develop a longer-term service area boundary. The limits of the 2020 service area will have to be defined within that boundary to reflect planned 2020 land use conditions.

Sewage Flows and Designations

The design sewage flow rates expressed in terms of average annual and peak hourly hydraulic loading for the three contested sewer service areas are set forth in Table 2. The design sewage flow rates are based upon the land use and population for each of the three analysis areas as set forth in Table 1. The methodology used to develop the planned flows considered the current flows generated by the Village of Paddock Lake and the Town of Salem Utility District Nos. 1 and 2, plus allowances for future development in the sewer service areas based upon per capita unit loading and peaking factors. The unit loadings and peaking factors used were based upon a refinement of the values developed for use in the regional water quality management plan and upon review of the current sewerage system loadings and data developed in the local sewer system analyses provided. A detailed description of the methodology used is set forth in Appendix A.

Gravity sewers have been designed to carry peak flows without surcharge. The capacity of the proposed gravity sewers was developed by means of the Manning's formula utilizing a roughness coefficient "n" of 0.13.

In evaluating the capacity and expansion needs of the existing pumping stations, it was assumed, for system planning purposes, that pumping stations could be upgraded if the ratio of design flow to current

station capacity is less than 2.0. In other cases, where the ratio is greater than 2.0, the station was assumed to be replaced. During the detailed design of any future improvements, this assumption would be expected to be reevaluated through a station-specific analysis.

Method of Economic Analysis and Cost Data

In the preparation of the adopted regional water quality management plan, the Commission used—and the Wisconsin Department of Natural Resources and the U.S. Environmental Protection Agency approved—a method of economic analysis that involved a determination of the present worth and equivalent annual costs for each alternative considered using a 50-year economic analysis period and an interest rate of 6 percent. Since the work being done in this memorandum is intended to provide the basis for refining the regional water quality management plan, the economic analysis method used should be the same as that used in preparing the original plan. For comparison purposes, the cost analysis was also done using a 20-year economic analysis period and an interest rate of 6 percent, in a manner similar to that used to meet current facility planning requirements. The 20-year, 6 percent cost-effectiveness analyses data are presented in Appendix B.

Cost estimates were based upon a set of common unit prices as reflected in the construction cost data set forth in Appendix C. For unique sewage system components, such as pumping station expansion and upgrading, cost estimates were based upon information set forth in local facility plans refined to be consistent between alternatives and with the unit price data set forth in Appendix C. The estimated construction costs developed using the unit costs in Appendix C and other analyses were increased by 35 percent to cover the cost of engineering services, legal and administrative costs, and contingencies.

Sewage Treatment Plant Considerations

For purposes of this analysis, no detailed quantitative evaluations were made of the specific costs for treatment plant capacity associated with each of the analysis areas being considered. However, a range of costs for future plant expansions is discussed based upon development of the entire service area potentially tributary to each plant, including the analysis areas being considered. It was assumed that treatment plant capacity could be provided in the case of either of the two sewerage systems involved. However, this will require a sewage treatment plant capacity increase in the case of the Village of Paddock Lake, and may require a capacity increase in the Town of Salem Utility District No. 2 plant at a future date. The treatment plant impacts and attendant issues are specifically considered qualitatively in the evaluation of the alternative plans as one of the factors taken into account in addition to the economic cost-effectiveness of the conveyance system. That information is included in a section of the memorandum which discusses evaluation factors.

AREA 1: STH 75-60TH STREET SOUTH

Area 1 consists of just over 400 acres located south of 60th Street (CTH K) both east and west of STH 75. The area extends south of 60th Street to 68th Street extended east of STH 75 and south of 60th Street to within about 300 feet north of 75th Street (STH 50) to the west of STH 75. The area includes about 27 acres of environmental corridor, wetland, and other isolated natural resource areas and nine acres of scattered existing residential land. The remainder of the site is open land. Under planned development conditions, the area is expected to include about 330 acres of residential land and 40 acres of commercial land.

Three alternative means of providing sanitary sewer service to Area 1 were investigated. Under the first alternative, as shown on Map 2, sewage from the area would be conveyed south and collected in an

existing Town of Salem Utility District No. 1 gravity sewer located along 75th Street. The collection system would include a new pumping station located in the northeastern portion of the area to collect most of the sewage from east of STH 75 which would be pumped by force main to a gravity sewer extending under STH 75. The main gravity sewer located along 75th Street would convey the sewage westerly along 75th Street to a replacement pumping station located at the site of the existing Salem pumping station No. 1-6. From that replacement pumping station, sewage would be conveyed by force main easterly in 75th Street to 256th Street and then by gravity southerly and easterly to STH 83 and then southerly to 84th Street. A portion of the gravity sewer in 256th Street would be replaced with a larger sewer. The existing sewerage system then flows easterly to the main Salem Utility District No. 1 pumping station located to the east of Hooker Lake outlet north of 80th Street. A portion of the gravity sewer in 84th Street would be supplemented with a relief sewer and the existing pumping station No. 1-2 would be upgraded. That main pumping station, which would be upgraded, then conveys sewage southwest to STH 83 and then southerly to the Town of Salem Utility District No. 2 sewerage system. As shown in Table 3, the total capital cost of providing this sewer connection to Area 1 is \$3,300,000. Operation and maintenance costs would approximate \$39,000 annually. The equivalent annual cost of this alternative would be \$254,000.

Under the second alternative, as shown on Map 3, sewage from Area 1 would be collected in the west-central portion of the area and conveyed by force main to an existing 15-inch gravity sewer in 66th Street, which flows northeasterly to the Village of Paddock Lake sewage treatment plant in the manner identified on Map 3. A portion of that 15-inch sewer would be supplemented with a relief sewer. A pumping station would also be included to collect and pump the sewage from the area east of STH 75, as was the case under Alternative 1. As shown in Table 3, the total capital cost of this alternative is estimated at \$3,100,000. Operation and maintenance costs would approximate \$40,000 annually. The equivalent annual cost of this alternative would be \$240,000.

Under the third alternative, as shown on Map 4, sewage from the portion of Area 1 located east of STH 75 would be collected at a pumping station located in the northeastern portion of the study area. That pumping station could collect sewage from the land uses located east of Area 1 within the currently approved Village of Paddock Lake sewer service area. The costs for the pumping station reflect the incremental cost to serve the eastern portion of Area 1. The pumping station would pump the wastewater southerly and then easterly to an existing 15-inch gravity sewer in 66th Street, which flows northeasterly to the Village of Paddock Lake sewage treatment plant in the manner identified on Map 4. Sewage from the remainder of the area would be collected and conveyed through the Town of Salem in a manner similar to Alternative 1. As shown in Table 3, the total capital cost of this alternative is estimated at \$3,100,000. Operation and maintenance costs would approximate \$32,000 annually. The equivalent annual cost of this alternative would be \$235,000.

AREA 2: CTH EW EXTENDED-60TH STREET SOUTH

Area 2 consists of 380 acres located south of 60th Street (CTH K) and east of CTH EW extended. The area extends south from 60th Street about 0.5 mile on the westerly portion of the area and extends to 75th Street (STH 50) in the eastern portion of the area. The area includes about 75 acres of environmental corridor and wetland and other isolated natural resource areas and 45 acres of scattered existing residential land. Most of the environmental corridor and the existing development is located in the eastern portion of the area in the vicinity of Brighton Creek. The remainder of the site is open land. Under planned development conditions, the area is expected to include about 260 acres of residential land.

Three alternative means of providing sanitary sewer service to Area 2 were investigated. Under the first alternative, as shown on Map 5, sewage from the area would be conveyed south to a proposed pumping station located north of 75th Street in the southeastern portion of Area 2. This pumping station would pump the sewage south and westerly to the main Salem Utility District No. 1 pumping station located to the east of Hooker Lake outlet north of 80th Street. That main pumping station, which would be upgraded, then conveys sewage southwest to STH 83 and then southerly to the Town of Salem Utility District No. 2 sewerage system. As shown in Table 4, the total capital cost of providing this sewer connection to Area 2 is \$1,967,000. Operation and maintenance costs would approximate \$30,000 annually. The equivalent annual cost of this alternative would be \$174,000.

Under the second alternative, as shown on Map 6, sewage from Area 2 would be collected at a pumping station located north of 75th Street east of the current Village limits and conveyed by force main south, west, and then north to the Village of Paddock Lake sewage treatment plant in the manner identified on Map 6. The proposed pumping station and force main serving Area 2 would also serve lands within the currently approved Village of Paddock Lake sewer service area and the costs reflect the incremental cost associated with serving Area 2. As shown in Table 4, the total capital cost of this alternative is estimated at \$1,583,000. Operation and maintenance costs would approximate \$11,000 annually. The equivalent annual cost of this alternative would be \$113,000.

Under the third alternative, as shown on Map 7, sewage from Area 2 would be conveyed south to a proposed pumping station located south of 75th Street in the vicinity of the Salem Branch of Brighton Creek near the eastern limits of Area 3. For cost analysis purposes, it was assumed that Area 3 would be served to the Town of Salem Utility District No. 1 sewerage system. Thus, the pumping station and force main involved would be used to provide service to both Areas 2 and 3. Accordingly, only the incremental cost of these facilities was allocated to providing service to Area 2. As shown in Table 4, the total capital cost of this alternative is estimated at \$1,872,000. Operation and maintenance costs would approximate \$24,000 annually. The equivalent annual cost of this alternative would be \$141,000.

AREA 3: SALEM BRANCH-75TH STREET SOUTH

Area 3 consists of 124 acres located south of 75th Street (STH 50), north of the Salem Branch of Brighton Creek, and west of the Salem-Bristol town line. The area includes about 37 acres of environmental corridor and wetland areas and 10 acres of scattered existing residential land. The environmental corridor is located along the Salem Branch and the existing development is located along 75th Street. The remainder of the site is open land. Under planned development conditions, the area is expected to include about 77 acres of residential land.

Two alternative means of providing sanitary sewer service to Area 3 were investigated. Under the first alternative, as shown on Map 8, sewage from the area would be conveyed to a proposed pumping station located south of 75th Street and near the eastern limits of the area. That pumping station would convey sewage south to the proposed new gravity sewer which would flow westerly to the main Salem Utility District No. 1 pumping station located to the east of Hooker Lake outlet north of 80th Street. That main pumping station, which would be upgraded, then conveys sewage southwest to STH 83 and then southerly to the Town of Salem Utility District No. 2 sewerage system. As shown in Table 5, the total capital cost of providing this sewer connection to Area 3 is \$835,000. Operation and maintenance costs would approximate \$17,000 annually. The equivalent annual cost of this alternative would be \$72,000.

Under the second alternative, as shown on Map 9, sewage from Area 3 would be collected at a pumping station located north of 75th Street in the southeastern portion of the Village and conveyed by force main westerly and then north to the Village of Paddock Lake sewage treatment plant in the manner identified on Map 9. The proposed pumping station and force main would also serve lands within the currently approved Village of Paddock Lake sewer service area and the cost reflect the incremental costs associated with serving Area 3. As shown in Table 5, the total capital cost of this alternative is estimated at \$800,000. Operation and maintenance costs would approximate \$5,000 annually. The equivalent annual cost of this alternative would be \$56,000.

AREAS 2 AND 3 COMBINED

Because of the potential to use common facilities to serve both Areas 2 and 3, a separate analysis was prepared considering these areas together.

Three alternative means of providing sanitary sewer service to Areas 2 and 3 were investigated. Under the first alternative, as shown on Map 10, sewage from the areas would be conveyed to a proposed pumping station located in the south of 75th Street in the vicinity of the eastern limits of Area 3. This pumping station would pump the sewage south to a new trunk sewer which would flow westerly to the main Salem Utility District No. 1 pumping station located to the east of Hooker Lake outlet north of 80th Street. That main pumping station, which would be upgraded, then conveys sewage southwest to STH 83 and then southerly to the Town of Salem Utility District No. 2 sewerage system. As shown in Table 6, the total capital cost of providing this sewer connection to Areas 2 and 3 is \$2,600,000. Operation and maintenance costs would approximate \$33,000 annually. The equivalent annual cost of this alternative would be \$201,000.

Under the second alternative, as shown on Map 11, sewage from Area 3 would be collected at a pumping station located in the vicinity of 75th Street in the southeastern portion of the Village and conveyed by force main westerly and then north to the Village of Paddock Lake sewage treatment plant in the manner identified on Map 11. The proposed pumping station and force main would also serve lands within the currently approved Village of Paddock Lake sewer service area and the costs reflect the incremental cost associated with serving Areas 1 and 2. As shown in Table 6, the total capital cost of this alternative is estimated at \$2,300,000. Operation and maintenance costs would approximate \$17,000 annually. The equivalent annual cost of this alternative would be \$163,000.

Under the third alternative, Area 2 would be connected to the Paddock Lake system in the same manner as noted under Alternative 2 for Area 2 under the section on Area 2 alone. Area 3 would be conveyed to the Salem system as described under Alternative 1 for Area 3 alone. As shown in Table 6, the total capital cost of providing this sewer connection to Areas 2 and 3 is \$2,400,000. Operation and maintenance costs would approximate \$29,000 annually. The equivalent annual cost of this alternative would be \$184,500.

EVALUATION FACTORS

Cost Summary

A summary of the economic analyses is included in Table 7. These costs were calculated using a 6 percent interest rate and a 50-year analysis period. Analyses using a 6 percent interest rate and a 20-year analysis period are included in Appendix C. The results of the latter cost-effective analysis are similar to the results of the former, as presented herein. In comparing the cost of the alternatives, the guidelines used indicate that, if two compared alternatives are found to be within 10 percent of one another in equivalent

annual costs, then those alternatives were considered to be equally cost-effective.¹ If two alternatives are found to be equally cost-effective, and assuming that there are no significant differences in environmental impact, then other factors, e.g. fiscal impact analyses and implementation considerations, may be taken into account in the selection of a final plan. Given the potential differences in the costs of the unquantified sewage treatment plant element of the alternatives, the 10 percent guideline is considered to be only an indication of cost-effectiveness and not an absolute determination in this particular analysis. As described below, the cost of treatment will be more for the Village of Paddock Lake sewage treatment plant. Thus, conveyance alternatives which are up to 20 percent less costly for connection to the Paddock Lake sewerage system should also be examined for other considerations.

Review of the costs set forth in Table 7 indicates that the costs of the three alternative plans to serve Area 1 are not significantly different and can be considered equal. The analyses also indicate that it is more cost-effective (28 percent) to serve Area 2 to the Paddock Lake system if considering Area 2 alone. The analysis also indicates that it would be 13 percent less costly to serve Areas 2 and 3 to the Paddock Lake system when considering both Areas 2 and 3 together. While this difference of 13 percent would typically be considered as a significant difference and a basis for decision, in this case it is recommended that the other considerations also be evaluated in developing a recommendation for Area 3.

Sewage Treatment Plant Impacts

The sewage flows expected to be generated from the three analysis areas would have a significant impact on both of the sewage treatment plants involved. As previously noted, it is estimated that the average annual sewage flows of 0.23, 0.12, and 0.05 million gallons per day (mgd) are expected to be generated from Areas 1, 2, and 3, respectively, under buildout conditions. Under buildout conditions, peak flows are estimated to be 0.91, 0.47, and 0.12 mgd for the three areas, respectively.

The Village of Paddock Lake sewage treatment plant currently has a design capacity of about 0.487 mgd on an average daily flow basis and about 2.50 mgd on a peak flow basis. The current average annual flow is about 0.45 mgd. During 1999, the monthly average flows during five of the first six months exceeded the design capacity. The Village has been in discussion with the Wisconsin Department of Natural Resources regarding the rerating of its sewage treatment plant capacity, which could result in an increase in the rated capacity of the plant. The maximum daily flows are about 2.0 mgd, with the peak flows exceeding that value, but not specifically known. In addition to the three sewer service areas being evaluated, there are other unsewered areas within the currently adopted planned sewer service area tributary to the Paddock Lake sewage treatment plant. The sewage flows from these areas are estimated to be about 0.2 mgd and 0.8 mgd on an average annual and peak flow rate basis, respectively. Accordingly, should all of the areas in question be added to the sewer service, the hydraulic loading to the Village of Paddock Lake would increase from about 0.45 to over 1.0 mgd on an average annual basis. The peak flows would be expected to increase from over 2.0 mgd to over 4.5 mgd upon buildout of the sewer service area.

¹The 10 percent guideline is founded in good engineering practice and is generally accepted as the degree of precision with which the costs entailed can be estimated. The use of this 10 percent guideline has been endorsed by the technical advisory committees that have assisted the Commission over the years in the economic evaluation of alternative public works projects.

A major plant capacity increase for the Village of Paddock Lake sewerage system from 0.40 to over 1.0 mgd on an average annual basis may also require an increased level of treatment. The plant currently discharges effluent to Brighton Creek below the Harris Tract Marsh at CTH K. That stream has a relatively low flow and, accordingly, the plant effluent limits may be made more stringent with the higher plant hydraulic loading. This may require the addition of tertiary treatment units. The cost of the plant expansion and upgrading to increase the plant capacity to 1.0 mgd may be expected to range from \$2.0 million to \$4.0 million. Furthermore, an expansion of the plant would be needed before any major new development occurs within the service area.

The Town of Salem Utility District No. 2 sewage treatment plant currently has a capacity of about 1.57 mgd on an average daily flow basis and about 6.0 mgd on a peak flow basis. The current average annual flow is about 0.95 mgd. The maximum daily flows are about 3.4 mgd with the peak flows exceeding that value, but not specifically known. In addition to the three sewer service areas being evaluated, there are other unsewered areas within the currently adopted and planned sewer service area tributary to the Town of Salem Utility District No. 2 sewage treatment plant. The sewage flows from these unsewered areas within the planned served area are estimated to be about 0.5 mgd and 2.0 mgd on an average annual and peak flow rate basis, respectively. Accordingly, should all of the areas in question be added to the Salem sewer service area, the hydraulic loading to the Town of Salem Utility District No. 1 would increase from about 0.95 to about 1.8 mgd on an average annual basis, assuming buildout of the entire sewer service area. The peak flows would be expected to increase from over 3.5 mgd to over 7.0 mgd upon buildout of the sewer service area. The cost of the plant upgrade to increase the plant capacity would be expected to range from \$1.0 million to \$2.0 million. The timing of such a plant expansion and upgrading, if needed, will be dependent upon the development trends and type of development. No expansion would be expected to be needed for five to 10 years.

With regard to cost-effectiveness considerations, the costs for sewage treatment can be expected to be higher at the Village of Paddock Lake system because of three factors. The first factor is effluent limits. Such limits are more stringent for discharge to Brighton Creek from the Village of Paddock Lake plant than the discharge by the Town of Salem Utility District No. 2 plant to the Fox River. With a significant increase in treatment plant design capacity, the effluent limits may become more stringent for Paddock Lake. The limits for the Salem plant discharge are not likely to change because the design capacity is not envisioned to change significantly. The second factor is the available capacity in the Town of Salem Utility District No. 2 facility. This available capacity would allow for treatment a large portion of the Salem sewer service area without expansion. The third factor is timing and the time value of money. The need to construct treatment facilities at the Village of Paddock Lake in the near term is more costly on a present worth or equivalent annual cost basis.

Environmental Impacts

The environmental impacts of the alternatives being considered are generally considered to be similar. In all cases, the urban development patterns considered are the same between alternatives and do not envision encroachment into the environmentally sensitive areas. One distinction can be made with regard to alternatives which would provide for connection of those areas, individually or in combination, to the Town of Salem Utility District No. 2 sewerage system. Those alternatives would require a sewer crossing of lands lying along the Salem Branch of Brighton Creek designated as primary environmental corridor and a stream crossing. Thus, there would be some short-term construction impacts of the corridor lands and the stream system. It is assumed that with proper construction techniques, that these impacts could be minimized and would be short-term in nature. Such impacts would affect Alternatives 1 and 3 for Area 2, Alternative 1 for Area 3, and Alternative 1 for Areas 2 and 3 together.

Timing of Development

The timing of development would generally be more flexible with the alternatives providing for sewer service to the Town of Salem Utility District No. 1 sewerage system. Treatment plant capacity currently exists in the Town of Salem Utility District No. 2 sewerage treatment plant. Such capacity does not exist at the Village of Paddock Lake system. A major sewage treatment plant expansion for the Village would likely take four or more years to accomplish. Accordingly, only limited development could be added to the service area tributary to the Village's sewerage system for at least a four- to five-year period

Sewage Pumping Considerations

Sewage being conveyed to the Town of Salem Utility District No. 1 system from the areas involved is pumped from two to four times, depending upon the area involved and the alternative selected. For the alternatives considering connection to the Paddock Lake sewerage system, sewerage is generally pumped one time. In general, gravity flow is preferred to the pumping of sewage, due to energy consumption and maintenance. Should fuel prices and labor costs escalate in the future, the cost of the alternatives requiring the most pumping would be affected negatively.

Summary and Conclusions of the Evaluation of Factors

Based upon review of cost-effectiveness analyses of the conveyance system alternatives, it is concluded that the alternatives for serving Area 1 and the alternatives for serving Areas 2 and 3 together, are similar. Accordingly, other factors should be considered in the evaluation. A summary of the factors considered in evaluating the alternatives for Area 1 and for Areas 2 and 3 together is included in Table 8.

Area 1 Evaluation

As previously noted, the cost of the conveyance alternatives to serve Area 1 are not considered to be significantly different. There is a general drainage divide which splits Area 1 at STH 75. Sewage generated east of that point generally flows easterly and sewage generated west of STH 75 generally flows west and south. Under Alternative 3, the wastewater from east of STH 75 could be conveyed to a pumping station location within the currently adopted Village sewer service area at a location where pumping is needed in any case. This will avoid duplication of pumping station construction and operating and maintenance. This option also has the lowest operation and maintenance cost and is, thus, less susceptible to cost increases due to energy and labor cost increases.

Alternative 3 would allow for the development of areas west of STH 75 without the need to wait for a major treatment plant expansion at the Village of Paddock Lake.

Based upon all of the factors involved, it is recommended that Alternative 3 be implemented for Area 1. That alternative provides for conveyance of sewage generated west of STH 75 to the Town of Salem Utility District No. 1 sewerage system and for the conveyance of sewage generated east of STH 75 to the Village of Paddock Lake sewerage system.

Areas 2 and 3 Evaluation

The only two conveyance options which are considered similar in costs for Areas 2 and 3 are Alternatives 2 and 3. Under Alternative 2, sewage from both areas would be conveyed to the Village of Paddock Lake sewerage system. Under Alternative 3, sewage from Area 2 would be conveyed to the Village of Paddock Lake sewerage system and sewage from Area 3 would be conveyed to the Town of Salem Utility District No. 1 sewerage system.

Alternative 3 has the advantage of being more flexible in timing for serving Area 3, in that treatment plant capacity is available. This alternative also eliminates a sewer crossing under 75th Avenue (STH 50). Both alternatives involve pumping of sewage. However, the sewage from Area 3 would be pumped once under Alternative 2, with connection to the Village system, and twice under Alternative 3, with connection to the Town of Salem Utility District No. 1 system. Alternative 3 also requires a sewer crossing of the environmental corridor along the Salem Branch of Brighton Creek which could have some short-term negative impacts. The cost impacts for sewage treatment and the uncertainty of level of treatment tend to favor Alternative 3, providing for connection of Area 3 to the Town of Salem Utility District No. 1 sewerage system.

Based upon all factors involved, it is recommended that Alternative 3 be initially selected for further consideration at an intergovernmental meeting with the communities involved and Kenosha County which would provide for Area 2 to be connected to the Village of Paddock Lake sewerage system and Area 3 to be connected to the Town of Salem Utility District No. 3 sewerage system.

CONCLUSION

Based upon the foregoing, the initially recommended common boundary between the Village of Paddock Lake and the Town of Salem sanitary sewer service areas is summarized on Map 12.

An intergovernmental meeting was held on November 8, 2000, at 3:00 p.m. at the Kenosha County Center to review the draft of this memorandum and to determine a course of action regarding subsequent steps in the sewer service area refinement process for the Village and Town. The meeting was attended by representatives of Kenosha County, the Village of Paddock Lake, the Town of Salem, and SEWRPC. At the meeting, it was agreed that consideration should be given to revising the boundary between the two sewer service areas tentatively so as to include Area 3 in the Village of Paddock Lake area. It was agreed that this memorandum would be revised to indicate the revised boundary. That change was considered to be allowable, since the alternatives for serving Area 3 were not considered significantly different. It was also agreed that a memorandum of understanding would be prepared which would provide the communities with assurances that there would not be challenges or land use control powers exercised which would interfere with land use developments within the other community's ultimate sewer service area. A copy of a draft memorandum of understanding providing for the assurances that were discussed at the November 8th meeting is attached as Exhibit A. It was agreed that the two communities would consider the revised boundary now documented herein and then respond to SEWRPC on its acceptability. If agreed to, SEWRPC would then proceed to work with the communities to develop sewer service area amendment documents, as appropriate, and work with the Wisconsin Department of Natural Resources to achieve adoption of any amendments.

The revised recommended common boundary between the Village of Paddock Lake and Town of Salem sewer service areas is shown on Map 13. This delineation reflects the tentative agreement reached at the November 8, 2000, intergovernmental meeting.

* * *

Table 1

**SUMMARY OF LAND COVER DATA FOR PADDOCK LAKE-SALEM
SEWER SYSTEM ANALYSIS AREAS: ULTIMATE BUILDOUT CONDITIONS**

Land Cover Category	Area (acres)
Area 1 – STH 75 60th Street South	
• Environmental Corridor	11
• Wetland Outside Environmental Corridor	4
• Isolated Natural Resource Areas	12
• Existing Urban Land	9
• Planned Recreation	7
• Planned Residential	330
• Planned Commercial	41
Total Area	414
Area 2 – CTH EW Extended-60th Street South	
• Environmental Corridor	52
• Wetland Outside Environmental Corridor	2
• Isolated Natural Resource Areas	21
• Existing Urban Land	47
• Planned Residential	258
Total Area	380
Area 3 – Salem Branch-75th Street South	
• Environmental Corridor	36
• Wetland Outside Environmental Corridor	1
• Existing Urban Land	10
• Planned Residential	77
Total Area	124

Source: SEWRPC.

Table 2

**POPULATION AND DESIGN FLOW DATA FOR PADDOCK LAKE-SALEM
SEWER SERVICE ANALYSIS AREAS: ULTIMATE BUILDOUT CONDITIONS**

Area	Design Population	Design Sewage Hydraulic Loading (mgd)	
		Average Annual	Peak
Area 1 – STH 75 60th Street South	2,060	0.23 ^a	0.91 ^a
Area 2 – CTH EW Extended-60th Street South	1,300	0.12	0.47
Area 3 – Salem Branch-75th Street South	500	0.05	0.18

^aIncludes contribution from 41 acres of commercial land.

Source: SEWRPC.

Table 3

ECONOMIC ANALYSIS COST ESTIMATES OF ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREA 1

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$1,520,000	\$ 9,600	\$106,000
• New and Replacement Pumping Stations (2)	315,000	18,600 ^b	42,700
• Upgraded Pumping Stations (2).....	170,000	8,000 ^b	21,000
• Force Mains	150,000	2,000	11,500
• Relief and Replacement Sewers	290,000	400 ^c	18,800
• Engineering Contingencies, Legal, and Miscellaneous (35 percent)	855,000	- -	54,200
Total	\$3,300,000	\$38,600	\$254,200
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$1,710,000	\$10,000	\$118,400
• New Pumping Stations (2).....	305,000	27,600	50,900
• Force Mains	280,000	3,000	20,700
• Engineering Contingencies, Legal, and Miscellaneous (35 percent)	805,000	- -	51,000
Total	\$3,100,000	\$40,600	\$241,000
Alternative 3—Service of Portions of Area 1 to the Village of Paddock Lake System and Portions through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$1,455,000	\$ 9,600	\$101,800
• New and Replacement Pumping Stations (2)	275,000	11,700 ^b	32,700
• Upgraded Pumping Stations (2).....	140,000	7,000 ^b	17,700
• Force Mains	140,000	3,800	12,700
• Relief and Replacement Sewers	290,000	400	18,800
• Engineering Contingencies, Legal, and Miscellaneous (35 percent)	805,000	- -	51,000
Total	\$3,105,000	\$32,500	\$234,700

^aEconomic analysis was conducted assuming a 50-year analysis period and a 6 percent interest rate.^bOperation and maintenance costs for replacement and upgraded pumping stations are based upon incremental cost over and above existing station costs.

Source: SEWRPC.

Table 4

ECONOMIC ANALYSIS COST ESTIMATES OF ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREA 2

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$ 911,000	\$ 6,500	\$ 64,300
• New Pumping Station (1).....	210,000	16,000	32,000
• Upgraded Pumping Station (1).....	60,000	4,000 ^b	8,600
• Force Main	276,000	3,000	20,500
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	510,000	- -	32,300
Total	\$1,967,000	\$29,500	\$157,200
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$1,014,000 ^c	\$ 7,000 ^c	\$ 71,300
• New Pumping Station (1).....	75,000 ^c	4,000 ^c	9,700
• Force Main	75,000 ^c	- _c	4,800
• Relief Sewer	9,000 ^c	400 ^c	1,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	410,000	- -	26,000
Total	\$1,583,000	\$11,400	\$112,800
Alternative 3—Service through the Town of Salem Utility District No. 1 System Assuming Service to Area 3 through the Same System			
• Gravity Sewers.....	\$1,178,000 ^d	\$ 7,500 ^d	\$ 82,200
• New Pumping Station (1).....	135,000	8,000	18,300
• Upgraded Pumping Station (1).....	60,000 ^d	4,000 ^d	8,600
• Force Main	14,000 ^d	- _d	900
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	485,000	- -	30,700
Total	\$1,872,000	\$23,500	\$140,700

^aEconomic analysis was conducted assuming a 50-year analysis period and a 6 percent interest rate.

^bOperation and maintenance costs for upgrading pumping stations are based upon incremental cost over and above existing station costs.

^cCost for facilities serving Area 2 and other Village of Paddock Lake sewer service areas are based upon incremental cost for increased sizing to serve Area 2.

^dCosts for serving Area 2 are based upon incremental cost for increasing sizes to serve Area 2.

Source: SEWRPC.

Table 5

ECONOMIC ANALYSIS COST ESTIMATES OF ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREA 3

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$440,000	\$ 3,000	\$30,900
• New Pumping Station (1).....	85,000	11,500	18,000
• Pumping Station Upgrade (1).....	30,000	1,800	4,100
• Force Main	65,000	1,000	5,100
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	215,000	- -	13,600
Total	\$835,000	\$17,300	\$71,700
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$537,000	\$ 3,500	\$37,500
• New Pumping Station (1).....	20,000 ^b	1,300 ^b	2,800
• Force Main	31,000 ^b	- _b	2,000
• Relief Sewer	5,000 ^b	- _b	300
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	210,000	- -	13,300
Total	\$803,000	\$ 4,800	\$55,900

^aEconomic analysis was conducted assuming a 50-year analysis period and a 6 percent interest rate.

^bCosts for serving Area 3 are based upon incremental cost for increasing sizes to serve Area 3.

Source: SEWRPC.

Table 6

**ECONOMIC ANALYSIS COST ESTIMATES OF
ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREAS 2 AND 3**

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$1,552,000	\$10,300	\$108,700
• New Pumping Station (1).....	215,000	17,000	33,400
• Upgraded Pumping Station (1).....	76,000	4,900 ^b	10,700
• Force Main	78,000	1,000	5,900
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	670,000	--	42,500
Total	\$2,591,000	\$33,200	\$201,200
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$1,530,000	\$10,700	\$107,700
• Pumping Station (1)	85,000 ^c	6,300 ^c	12,800
• Force Main	73,000 ^c	-- ^c	4,600
• Relief Sewer	9,000 ^c	-- ^c	600
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	595,000	--	37,700
Total	\$2,292,000	\$17,000	\$163,400
Alternative 3—Service of Area 2 through the Village of Paddock Lake System and Area 3 through the Town of Salem System			
• Gravity Sewers.....	\$1,454,000 ^d	\$10,000 ^d	\$102,200
• New Pumping Stations (2).....	160,000 ^d	15,500 ^d	27,700
• Pumping Station Upgrade.....	30,000	1,800	4,100
• Force Main	140,000 ^d	1,000 ^d	9,900
• Relief Sewer	9,000 ^d	400 ^d	1,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	625,000	--	39,600
Total	\$2,418,000	\$28,700	\$184,500

^aEconomic analysis was conducted assuming a 50-year analysis period and a 6 percent interest rate.

^bOperation and maintenance costs for upgrading pumping station are based upon incremental cost over and above existing station costs.

^cCosts for serving Areas 2 and 3 are based upon incremental cost for increasing sizes to serve Areas 2 and 3.

^dCosts for serving Area 2 are based upon incremental cost for increasing sizes to serve Area 2.

Source: SEWRPC.

Table 7

**SUMMARY OF ECONOMIC ANALYSIS OF ALTERNATIVE SEWERAGE
SYSTEM PLANS FOR ANALYSIS AREAS IN THE PADDOCK LAKE-SALEM AREA**

Area	Equivalent Annual Cost ^{a,b}	Index Using Least Cost Alternative As a Basis for Comparison
Area 1 – STH 75 60th Street South		
Alternative 1 – To Salem System	\$254,200	1.08
Alternative 2 – To Paddock Lake System.....	241,000	1.03
Alternative 3 – To Salem and Paddock Lake System	234,700	1.00
Area 2 – CTH EW Extended-60th Street South		
Alternative 1 – To Salem System: Option 1	\$157,200	1.40
Alternative 2 – To Paddock Lake System.....	112,800	1.00
Alternative 3 – To Salem System: Option 2	140,700	1.25
Area 3 – Salem Branch-75th Street South		
Alternative 1 – To Salem System	\$ 71,700	1.28
Alternative 2 – To Paddock Lake System.....	55,900	1.00
Areas 2 and 3 Combined		
Alternative 1 – To Salem System	\$201,200	1.23
Alternative 2 – To Paddock Lake System.....	163,400	1.00
Alternative 3 – Area 2 to Paddock Lake System and Area 3 to Salem System.....	184,500	1.13

^aEconomic analysis was conducted assuming a 50-year analysis period and a 6 percent interest rate.

^bCosts do not include consideration of sewage treatment plant impacts.

Source: SEWRPC.

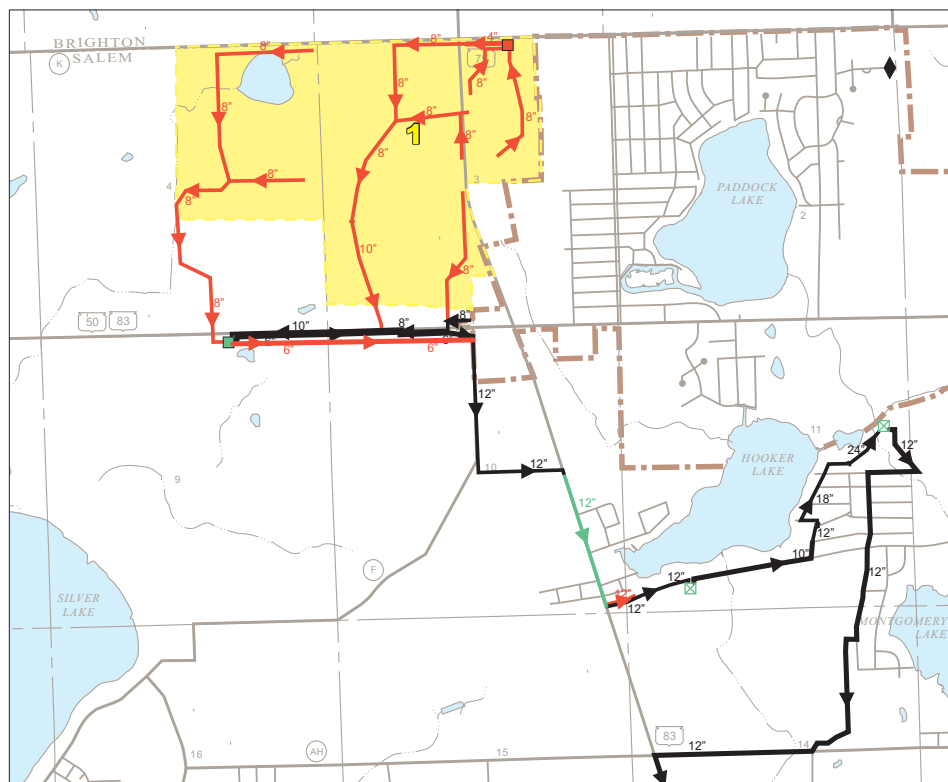
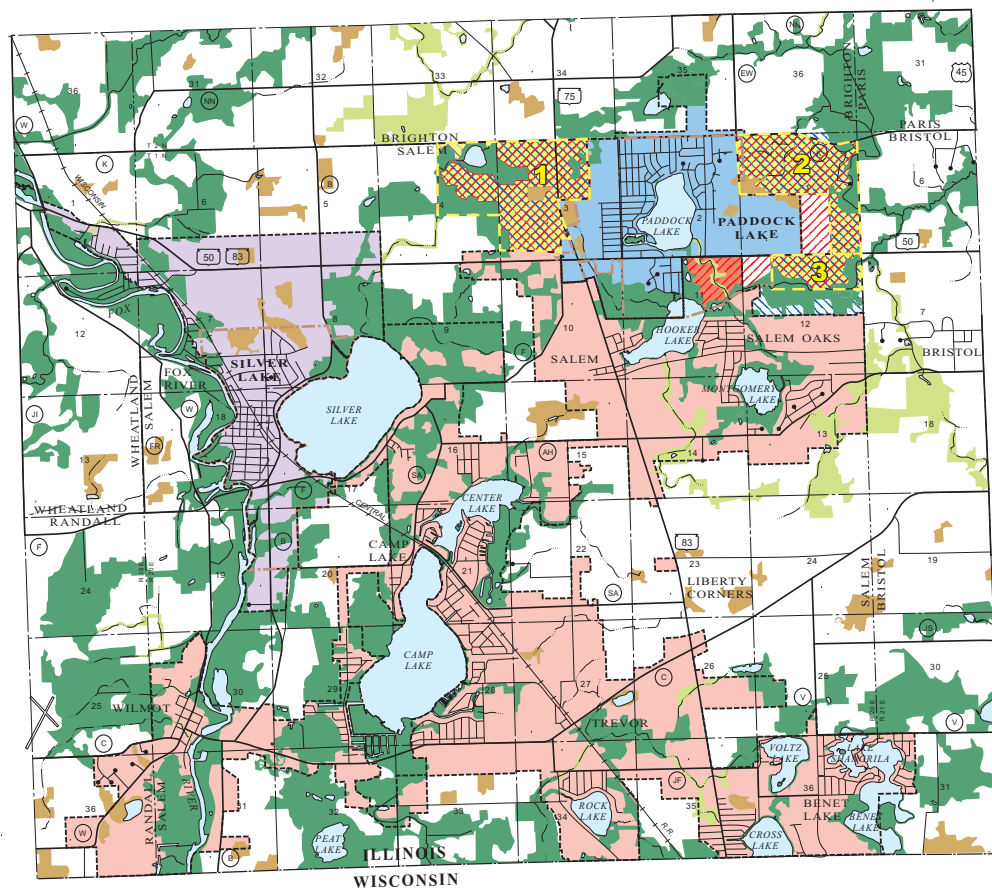
Table 8

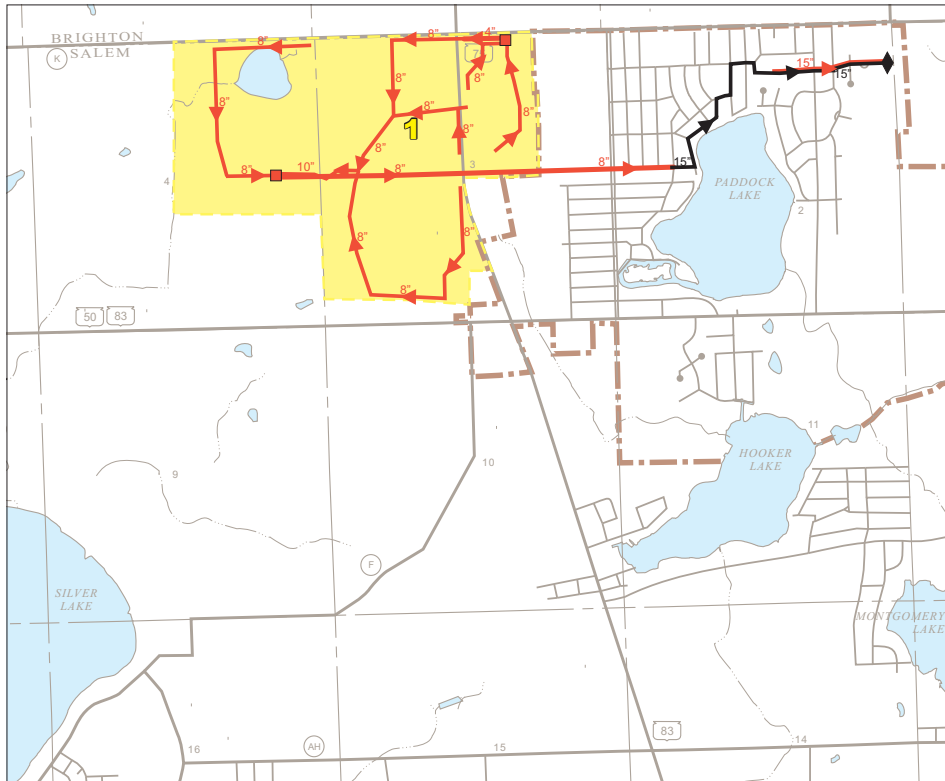
**NUMERIC SUMMARY OF EVALUATION FACTORS FOR SEWER
SERVICE ANALYSIS AREAS IN THE PADDOCK LAKE-SALEM AREA**

Area and Evaluation Factor	Alternative 1 Connection to Town of Salem System	Alternative 2 Connection to Village of Paddock Lake System	Alternative 3 Divide Area with Connection of a Portion to the Town of Salem System and a Portion to the Village of Paddock Lake System
Area 1			
Conveyance System			
Cost-Effectiveness	1	2	3
Pumping Station Energy, Operations, and Duplication	1	2	3
Sewage Treatment Plant Impacts.....	3	1	2
Environmental Impacts.....	2	2	2
Timing Flexibility	3	1	2
Total	10	7	12
Areas 2 and 3 Together			
Conveyance System			
Cost-Effectiveness	1	3	2
Pumping Station Energy, Operations, and Duplication	1	3	2
Sewage Treatment Plant Impacts.....	3	1	2
Environmental Impacts.....	2	3	2
Timing Flexibility	3	1	2
Total	10	10	10

NOTE: Each category is ranked from 1 through 3, with 3 being the most favorable and 1 the least. The highest total is an indication of the most favorable option.

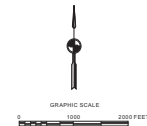
Source: SEWRPC.



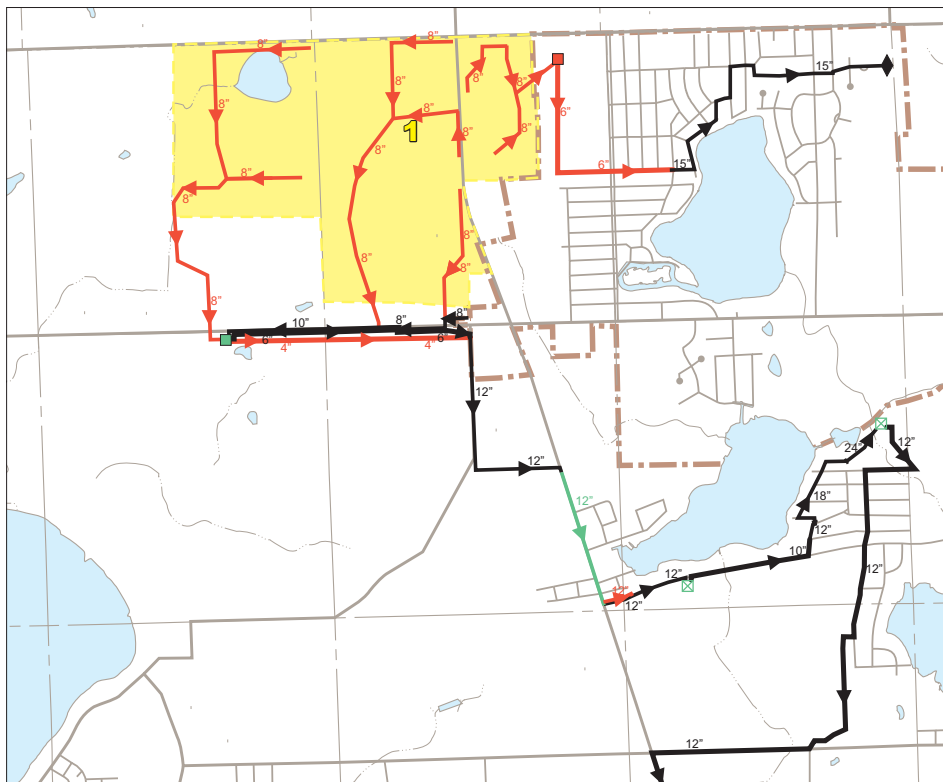


Map 3
ALTERNATIVE 2- SUBAREA 1 SERVICE TO THE
PADDOCK LAKE SEWERAGE SYSTEM

- 1 SEWER SERVICE ANALYSIS AREA
- EXISTING SEWAGE TREATMENT PLANT
- EXISTING GRAVITY SEWER (SIZE IN INCHES)
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)

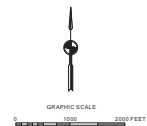


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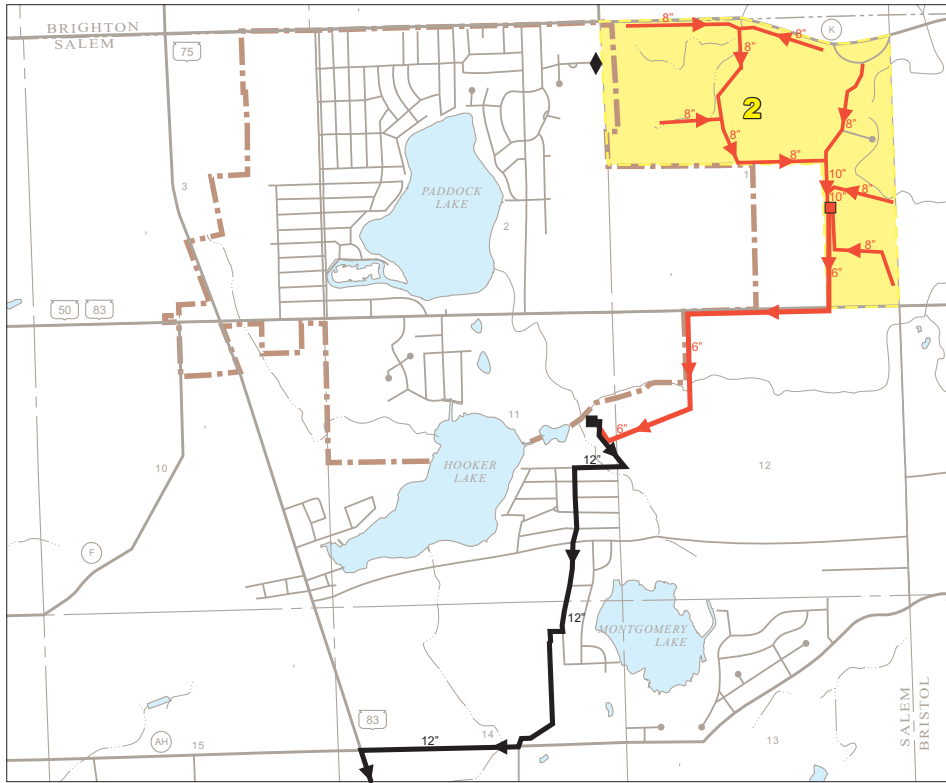


Map 4
ALTERNATIVE 3- SUBAREA 1 DIVIDED WITH SERVICE
TO PADDOCK LAKE SEWERAGE SYSTEM AND TO
THE TOWN OF SALEM UTILITY DISTRICT
NO. 1 SEWERAGE SYSTEM

- 1 SEWER SERVICE ANALYSIS AREA
- EXISTING SEWAGE TREATMENT PLANT
- EXISTING FORCE MAIN (SIZE IN INCHES)
- EXISTING GRAVITY SEWER (SIZE IN INCHES)
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)
- REPLACEMENT PUMPING STATION
- UPGRADED PUMPING STATION
- REPLACEMENT GRAVITY SEWER (SIZE IN INCHES)

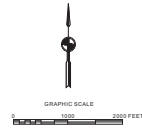


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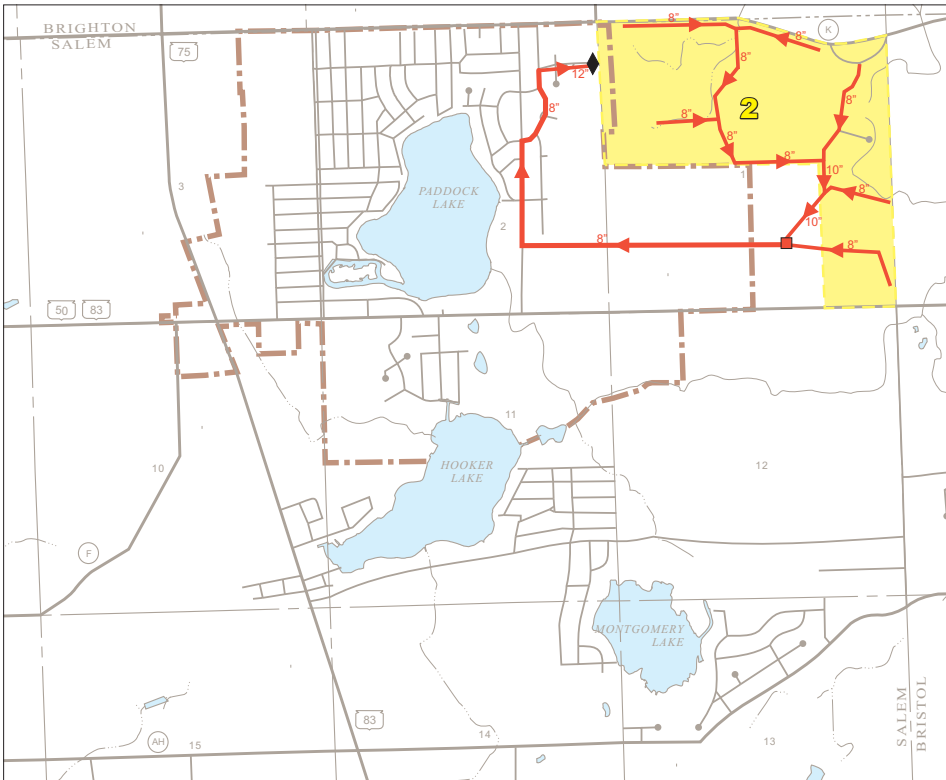


Map 5
ALTERNATIVE 1- SUBAREA 2 SERVICE TO THE SALEM SEWERAGE SYSTEM

- 2 SEWER SERVICE ANALYSIS AREA
- ◆ EXISTING SEWAGE TREATMENT PLANT
- EXISTING PUMPING STATION
- EXISTING FORCE MAIN (SIZE IN INCHES)
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)

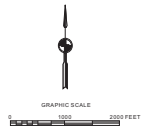


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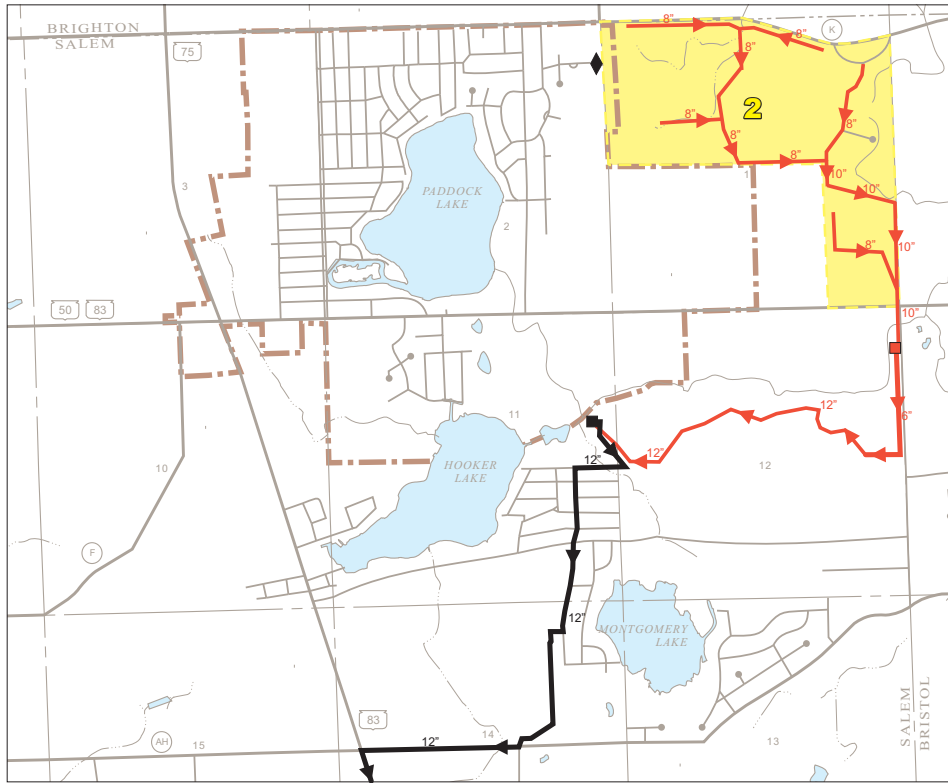


Map 6
ALTERNATIVE 2- SUBAREA 2 SERVICE TO THE PADDOCK LAKE SEWERAGE SYSTEM

- 2 SEWER SERVICE ANALYSIS AREA
- ◆ EXISTING SEWAGE TREATMENT PLANT
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)

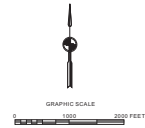


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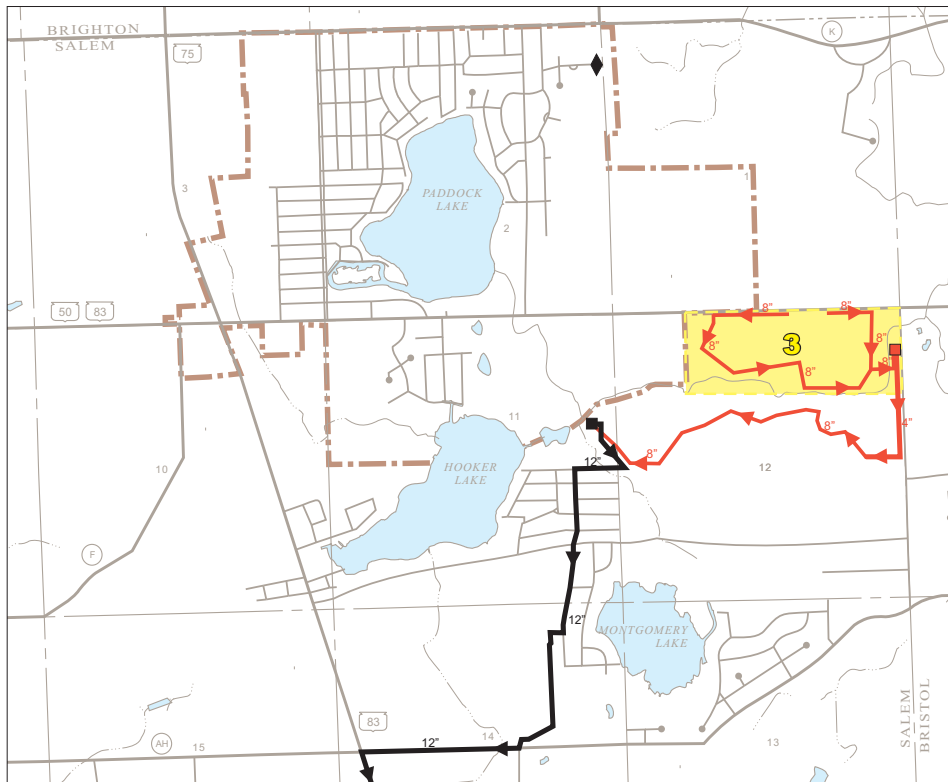


Map 7
**ALTERNATIVE 3- SUBAREA 2 SERVICE TO THE
 SALEM SEWERAGE SYSTEM
 ASSUMING SERVICE OF SUBAREA 3
 TO THE SALEM SYSTEM**

- 2 SEWER SERVICE ANALYSIS AREA
- ◆ EXISTING SEWAGE TREATMENT PLANT
- EXISTING PUMPING STATION
- EXISTING FORCE MAIN (SIZE IN INCHES)
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)

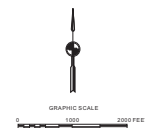


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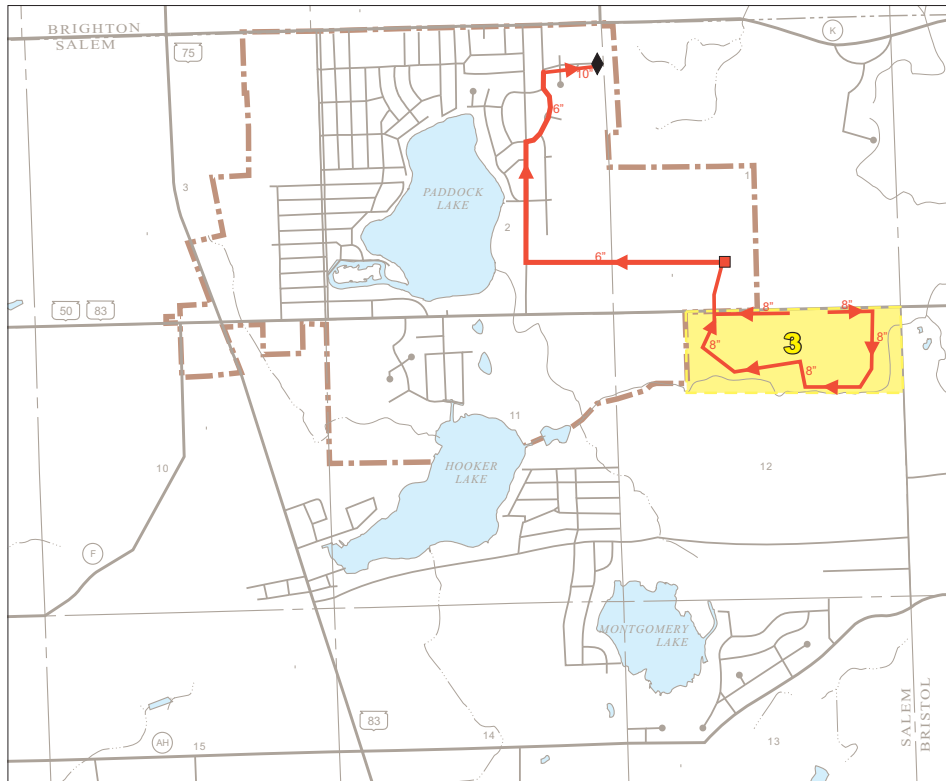


Map 8
**ALTERNATIVE 1- SUBAREA 3 SERVICE TO THE
 SALEM SEWERAGE SYSTEM**

- 3 SEWER SERVICE ANALYSIS AREA
- ◆ EXISTING SEWAGE TREATMENT PLANT
- EXISTING PUMPING STATION
- EXISTING FORCE MAIN (SIZE IN INCHES)
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)

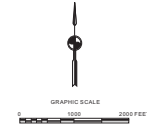


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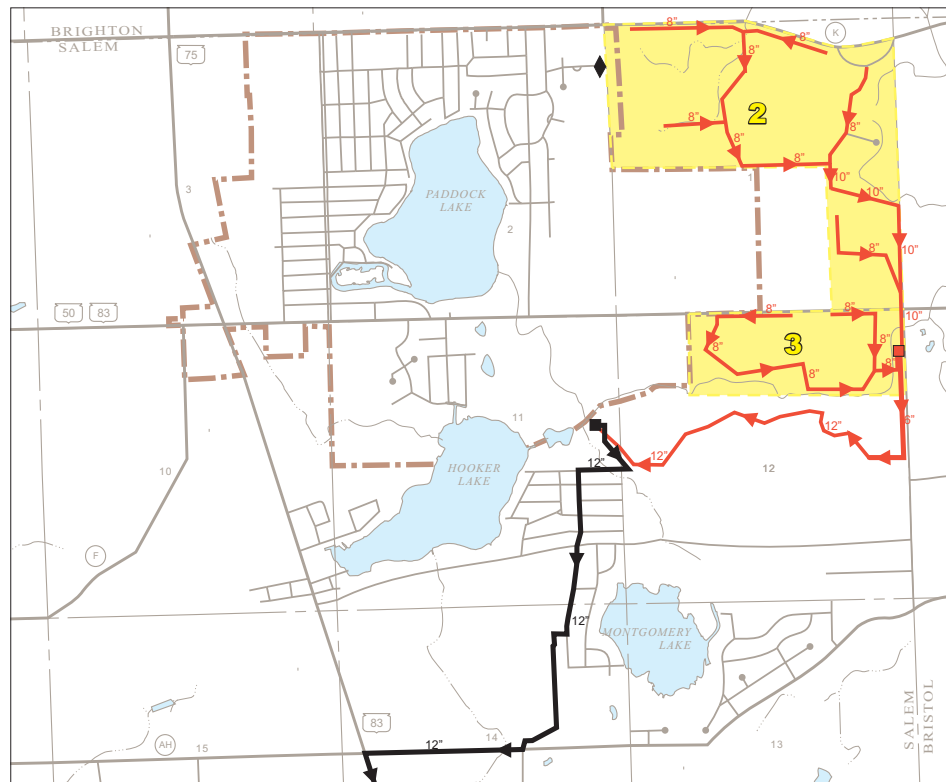


Map 9
ALTERNATIVE 2- SUBAREA 3 SERVICE TO THE
PADDOCK LAKE SEWERAGE SYSTEM

- 3 SEWER SERVICE ANALYSIS AREA
- ◆ EXISTING SEWAGE TREATMENT PLANT
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)

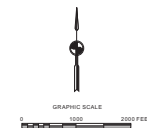


Source: SEWRPC.



Map 10
ALTERNATIVE 1- SUBAREA 2 AND 3 SERVICE TO THE
SALEM SEWERAGE SYSTEM

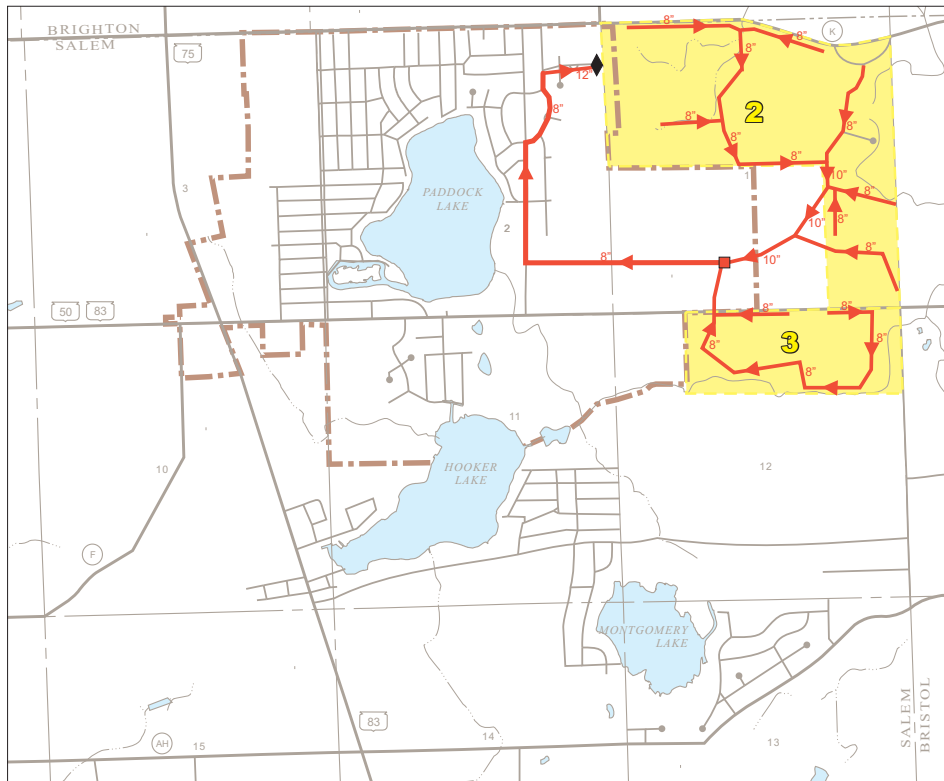
- 2 SEWER SERVICE ANALYSIS AREA
- ◆ EXISTING SEWAGE TREATMENT PLANT
- EXISTING PUMPING STATION
- EXISTING FORCE MAIN (SIZE IN INCHES)
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)



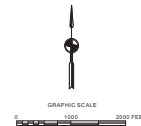
Source: SEWRPC.

Map 11

ALTERNATIVE 2- SUBAREA 2 AND 3 SERVICE TO THE
PADDOCK LAKE SEWERAGE SYSTEM



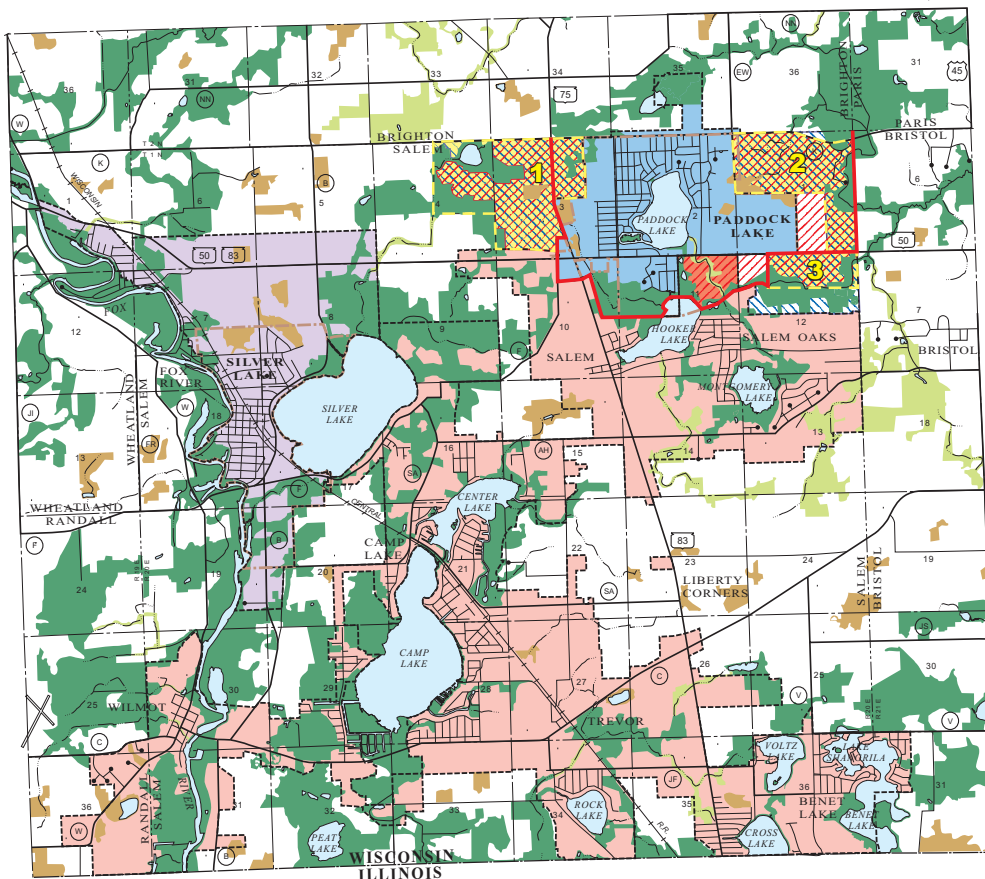
- 2 SEWER SERVICE ANALYSIS AREA
- EXISTING SEWAGE TREATMENT PLANT
- PROPOSED PUMPING STATION
- PROPOSED FORCE MAIN (SIZE IN INCHES)
- PROPOSED GRAVITY SEWER (SIZE IN INCHES)



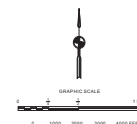
Source: SEWRPC.

Map 12

INITIAL RECOMMENDED COMMON BOUNDARY
BETWEEN THE ULTIMATE PADDOCK LAKE AND
SALEM SEWER SERVICE AREAS



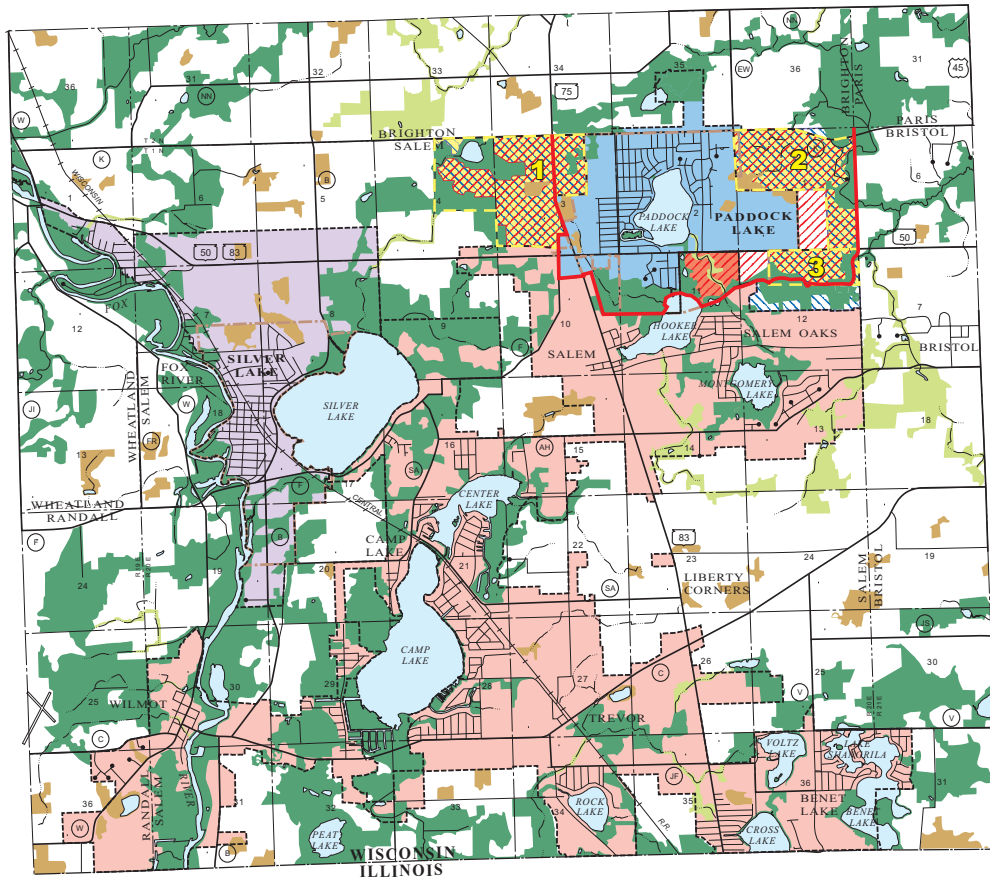
- CURRENTLY APPROVED PADDOCK LAKE SANITARY SEWER SERVICE AREA
- CURRENTLY APPROVED SALEM SANITARY SEWER SERVICE AREA
- AREA TO BE REMOVED FROM THE CURRENTLY APPROVED SALEM SEWER SERVICE AREA - ACCORDING TO TOWN LAND USE PLAN
- CURRENTLY APPROVED SILVER LAKE SANITARY SEWER SERVICE AREA
- ULTIMATE PROPOSED ADDITIONS TO THE PADDOCK LAKE SANITARY SEWER SERVICE AREA
- ULTIMATE PROPOSED ADDITIONS TO THE SALEM SANITARY SEWER SERVICE AREA
- PRIMARY ENVIRONMENTAL CORRIDOR
- SECONDARY ENVIRONMENTAL CORRIDOR
- ISOLATED NATURAL RESOURCE AREA
- 2 SEWER SERVICE ANALYSIS AREA
- VILLAGE BOUNDARIES
- RECOMMENDED COMMON BOUNDARY BETWEEN ULTIMATE PADDOCK LAKE AND SALEM SEWER SERVICE AREAS



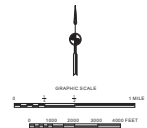
Source: SEWRPC.

Map 13

**FINAL RECOMMENDED COMMON BOUNDARY
BETWEEN THE ULTIMATE PADDOCK LAKE AND
SALEM SEWER SERVICE AREAS AS REVISED TO
REFLECT AGREEMENT REACHED IN A
NOVEMBER 8, 2000 INTERGOVERNMENTAL MEETING**



- CURRENTLY APPROVED PADDOCK LAKE SANITARY SEWER SERVICE AREA
- CURRENTLY APPROVED SALEM SANITARY SEWER SERVICE AREA
- AREA TO BE REMOVED FROM THE CURRENTLY APPROVED SALEM SEWER SERVICE AREA - ACCORDING TO TOWN LAND USE PLAN
- CURRENTLY APPROVED SILVER LAKE SANITARY SEWER SERVICE AREA
- ULTIMATE PROPOSED ADDITIONS TO THE PADDOCK LAKE SANITARY SEWER SERVICE AREA
- ULTIMATE PROPOSED ADDITIONS TO THE SALEM SANITARY SEWER SERVICE AREA
- PRIMARY ENVIRONMENTAL CORRIDOR
- SECONDARY ENVIRONMENTAL CORRIDOR
- ISOLATED NATURAL RESOURCE AREA
- SEWER SERVICE ANALYSIS AREA
- VILLAGE BOUNDARIES
- RECOMMENDED COMMON BOUNDARY BETWEEN ULTIMATE PADDOCK LAKE AND SALEM SEWER SERVICE AREAS



Source: SEWRPC.

Appendix A

SUMMARY OF SEWAGE FLOW RATES AND HYDRAULIC CAPACITY DESIGN DATA

GENERAL PROCEDURES

The planned year 2020 hydraulic loadings were based upon the current loadings, where applicable, plus an increment calculated using the planned population growth and unit loadings and peaking factors based upon the generalized rates and factors described below.

A unit loading rate was developed based upon consideration and review of loading rates used in the regional water quality management plan, the local plans for the two areas in question, loading rates experienced in similar communities, design factors used in other facility plans, and Chapter NR 110 of the *Wisconsin Administrative Code*.

GENERAL HYDRAULIC UNIT LOADING RATES AND FACTORS

A dry weather unit flow of 60 and 62 gallons per person per day was used in the locally developed sewer service cost analyses prepared by the Village of Paddock Lake and Town of Salem Utility District No. 1, respectively. Review of the sewage flow rates for both of the communities involved indicates that these dry weather flow rates are significantly lower than the current average annual per capita loading. The current average annual loadings being about 150 gpcd for both systems. However, it is recognized that the areas being analyzed will be new development served by new sewer systems. The use of plastic sewer pipe and water-saving plumbing fixtures should result in a lower flow rate than existing.

Information set forth in the regional water quality management plan documents that the average dry weather flow in Southeastern Wisconsin was about 121 gallons per capita per day, of which about 32 gallons per capita per day (gpcd) was attributable to commercial and industrial flows. In addition, an average annual flow rate of 210 gallons per capita per day, including an infiltration component, was used in the regional plan. The areas considered will not have significant commercial and industrial contributions, excepting where such land uses are specifically planned and separately accounted for. Average dry weather flow for the areas where commercial development is specifically planned for is estimated using 1,500 per acre per day.

Chapter NR 110 of the *Wisconsin Administrative Code* allows for use of up to 70 gpcd for base flows. An infiltration component is also allowed for annual average flow estimates. Thus, the total dry weather flow rate of up to 90 gpcd may be considered to be consistent with the *Wisconsin Administrative Code*.

Based upon consideration of the above, an annual average flow rate of 90 gallons per capita per day is used in the development of this analysis.

Based upon review of the current loading to the Village of Paddock Lake and Town of Salem sewage systems, the typical maximum monthly sewage flow rate may range from 1.4 to 1.5 times the average annual flow rate, while the maximum daily flow rate may range from 3.5 to 3.6 times the average annual flow rate. The regional plan recommended use of a ratio of 1.4. Because of new construction methods, and the current extensive use of plastic pipe, the ratio of 1.4 is considered reasonable for the areas being considered, even though this is lower than the current ratio. Likewise, a ratio of 4.0 was selected as the ratio of peak hourly flow to average dry weather flow. This factor in the range of 4.0 to 5.0 range used in the regional water quality management plan and is similar to the peaking factor used in the November 1999 Town of Salem local plan. No peaking factors were specifically documented in the Village of Paddock Lake analysis information.

Appendix B

20-YEAR COST-EFFECTIVENESS ANALYSES

Table B-1

ECONOMIC ANALYSIS COST ESTIMATES OF ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREA 1

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$1,520,000	\$ 9,600	\$117,500
• New and Replacement Pumping Stations (2)	315,000	18,600 ^b	43,500
• Upgraded Pumping Stations (2).....	170,000	8,000 ^b	21,400
• Force Mains	150,000	2,000	12,600
• Relief and Replacement Sewers	290,000	400 ^c	21,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent)	855,000	- -	74,500
Total	\$3,300,000	\$38,600	\$290,500
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$1,710,000	\$10,000	\$131,400
• New Pumping Stations (2).....	305,000	27,600	51,700
• Force Mains	280,000	3,000	22,900
• Engineering Contingencies, Legal, and Miscellaneous (35 percent)	805,000	- -	70,200
Total	\$3,100,000	\$40,600	\$276,200
Alternative 3—Service of Portions of Area 1 to the Village of Paddock Lake System and Portions through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$1,455,000	\$ 9,600	\$112,900
• New and Replacement Pumping Stations (2)	275,000	11,700 ^b	33,400
• Upgraded Pumping Stations (2).....	140,000	7,000 ^b	18,100
• Force Mains	140,000	3,800	13,700
• Relief and Replacement Sewers	290,000	400	21,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent)	805,000	- -	70,200
Total	\$3,105,000	\$32,500	\$269,300

^aEconomic analysis was conducted assuming a 20-year analysis period and a 6 percent interest rate.

^bOperation and maintenance costs for replacement and upgraded pumping stations are based upon incremental cost over and above existing station costs.

Source: SEWRPC.

Table B-2

ECONOMIC ANALYSIS COST ESTIMATES OF ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREA 2

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$ 911,000	\$ 6,500	\$ 71,200
• New Pumping Station (1).....	210,000	16,000	32,600
• Upgraded Pumping Station (1).....	60,000	4,000 ^b	8,700
• Force Main	276,000	3,000	22,600
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	510,000	- -	44,400
Total	\$1,967,000	\$29,500	\$179,500
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$1,014,000 ^c	\$ 7,000 ^c	\$ 79,000
• New Pumping Station (1).....	75,000 ^c	4,000 ^c	9,900
• Force Main	75,000 ^c	- ^c	5,300
• Relief Sewer	9,000 ^c	400 ^c	1,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	410,000	- -	35,700
Total	\$1,583,000	\$11,400	\$130,900
Alternative 3—Service through the Town of Salem Utility District No. 1 System Assuming Service to Area 3 through the Same System			
• Gravity Sewers.....	\$1,178,000 ^d	\$ 7,500 ^d	\$ 83,600
• New Pumping Station (1).....	135,000	8,000	18,700
• Upgraded Pumping Station (1).....	60,000 ^d	4,000 ^d	8,700
• Force Main	14,000 ^d	- ^d	1,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	485,000	- -	42,000
Total	\$1,872,000	\$23,500	\$154,000

^aEconomic analysis was conducted assuming a 20-year analysis period and a 6 percent interest rate.

^bOperation and maintenance costs for upgrading pumping stations are based upon incremental cost over and above existing station costs.

^cCost for facilities serving Area 2 and other Village of Paddock Lake sewer service areas are based upon incremental cost for increased sizing to serve Area 2.

^dCosts for serving Area 2 are based upon incremental cost for increasing sizes to serve Area 2.

Source: SEWRPC.

Table B-3

ECONOMIC ANALYSIS COST ESTIMATES OF ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREA 3

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$440,000	\$ 3,000	\$34,200
• New Pumping Station (1).....	85,000	11,500	18,200
• Pumping Station Upgrade (1).....	30,000	1,800	4,200
• Force Main	65,000	1,000	5,600
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	215,000	- -	18,700
Total	\$835,000	\$17,300	\$80,900
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$537,000	\$ 3,500	\$41,600
• New Pumping Station (1).....	20,000 ^b	1,300 ^b	2,900
• Force Main	31,000 ^b	- ^b	2,200
• Relief Sewer	5,000 ^b	- ^b	400
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	210,000	- -	18,300
Total	\$803,000	\$ 4,800	\$65,400

^aEconomic analysis was conducted assuming a 20-year analysis period and a 6 percent interest rate.

^bCosts for serving Area 3 are based upon incremental cost for increasing sizes to serve Area 3.

Source: SEWRPC.

Table B-4

**ECONOMIC ANALYSIS COST ESTIMATES OF
ALTERNATIVE SEWER SYSTEM PLANS TO SERVE AREAS 2 AND 3**

Alternative Plan Components	Initial Capital Cost	20-Year Average Annual Operation and Maintenance Cost	Equivalent Average Annual Cost ^a
Alternative 1—Service through the Town of Salem Utility District No. 1 System			
• Gravity Sewers.....	\$1,552,000	\$10,300	\$120,500
• New Pumping Station (1).....	215,000	17,000	34,000
• Upgraded Pumping Station (1).....	76,000	4,900 ^b	10,900
• Force Main	78,000	1,000	6,500
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	670,000	- -	58,400
Total	\$2,591,000	\$33,200	\$230,300
Alternative 2—Service through the Village of Paddock Lake System			
• Gravity Sewers.....	\$1,530,000	\$10,700	\$119,300
• Pumping Station (1)	85,000 ^c	6,300 ^c	13,000
• Force Main	73,000 ^c	- . ^c	5,200
• Relief Sewer	9,000 ^c	- . ^c	600
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	595,000	- -	51,900
Total	\$2,292,000	\$17,000	\$190,000
Alternative 3—Service of Area 2 through the Village of Paddock Lake System and Area 3 through the Town of Salem System			
• Gravity Sewers.....	\$1,454,000 ^d	\$10,000 ^d	\$113,200
• New Pumping Stations (2).....	160,000 ^d	15,500 ^d	28,100
• Pumping Station Upgrade.....	30,000	1,800	4,200
• Force Main	140,000 ^d	1,000 ^d	10,900
• Relief Sewer	9,000 ^d	400 ^d	1,000
• Engineering Contingencies, Legal, and Miscellaneous (35 percent).....	625,000	- -	54,400
Total	\$2,418,000	\$28,700	\$211,800

^aEconomic analysis was conducted assuming a 20-year analysis period and a 6 percent interest rate.

^bOperation and maintenance costs for upgrading pumping station are based upon incremental cost over and above existing station costs.

^cCosts for serving Areas 2 and 3 are based upon incremental cost for increasing sizes to serve Areas 2 and 3.

^dCosts for serving Area 2 are based upon incremental cost for increasing sizes to serve Area 2.

Source: SEWRPC.

Table B-5

**SUMMARY OF ECONOMIC ANALYSIS OF ALTERNATIVE SEWERAGE
SYSTEM PLANS FOR ANALYSIS AREAS IN THE PADDOCK LAKE-SALEM AREA**

Area	Equivalent Annual Cost ^{a, b}	Index Using Least Cost Alternative As a Basis for Comparison
Area 1 – STH 75 60th Street South		
Alternative 1 – To Salem System	\$290,500	1.08
Alternative 2 – To Paddock Lake System.....	276,200	1.03
Alternative 3 – To Salem and Paddock Lake System	269,300	1.00
Area 2 – CTH EW Extended-60th Street South		
Alternative 1 – To Salem System: Option 1	\$179,500	1.37
Alternative 2 – To Paddock Lake System.....	130,900	1.00
Alternative 3 – To Salem System: Option 2	154,000	1.18
Area 3 – Salem Branch-75th Street South		
Alternative 1 – To Salem System	\$ 80,900	1.24
Alternative 2 – To Paddock Lake System.....	65,400	1.00
Areas 2 and 3 Combined		
Alternative 1 – To Salem System	\$230,200	1.21
Alternative 2 – To Paddock Lake System.....	190,000	1.00
Alternative 3 – Area 2 to Paddock Lake System and Area 3 to Salem System.....	211,800	1.11

^aEconomic analysis was conducted assuming a 20-year analysis period and a 6 percent interest rate.

^bCosts do not include consideration of sewage treatment plant impacts.

Source: SEWRPC.

Appendix C

Table C-1

SEWERAGE SYSTEM COMPONENT UNIT COST DATA

SEWER CONSTRUCTION COSTS NEW CONSTRUCTION WITH GRANULAR BACKFILL (COST PER LINEAL FOOT OF SEWER)

Pipe Diameter	Depth of Sewer (feet)			
	8-15	16-20	21-25	26-30
8 Inches	\$55	\$100	\$125	\$155
12 Inches	65	120	145	170
15 Inches	75	140	165	185
18 Inches	80	150	170	195
21 Inches	85	165	180	210
24 Inches	95	180	200	225

SEWER CONSTRUCTION COSTS NEW CONSTRUCTION WITH SPOIL BACKFILL (COST PER LINEAL FOOT OF SEWER)

Pipe Diameter	Depth of Sewer (feet)			
	8-15	16-20	21-25	26-30
8 Inches	\$50	\$ 90	\$110	\$135
12 Inches	55	100	130	145
15 Inches	60	120	150	160
18 Inches	65	130	160	170
21 Inches	70	145	170	185
24 Inches	80	165	185	200

NOTE: Costs are for mid-1999 and include:

- Labor and equipment
- Pipe
- Bedding
- Shoring
- Backfill
- Contractor's overhead and profit
- Manholes
- Site restoration
- Dewatering operations

Costs do not include:

- Pavement—Add \$20 per lineal foot to include pavement
- Engineering
- Legal and administration
- Rock excavation
- Contingencies

Source: SEWRPC.

Table C-2

SEWERAGE SYSTEM COMPONENT UNIT COST DATA

OPEN-CUT FORCE MAIN CONSTRUCTION COSTS (COST PER LINEAL FOOT OF FORCE MAIN)

Item	Granular Backfill	Spoil Backfill
4 Inches	\$25	\$20
6 Inches	30	25
8 Inches	35	30
10 Inches	40	35
12 Inches	45	40

NOTE: Costs are for mid-1999 and include:

- Labor and equipment
- Pipe
- Bedding
- Shoring
- Backfill
- Contractor's overhead and profit
- Site restoration
- Miscellaneous appurtenances

Costs do not include:

- Pavement—Add \$10 per lineal foot for pavement
- Engineering
- Legal and administration
- Rock excavation
- Contingencies

Source: SEWRPC.

Exhibit A

**MEMORANDUM OF UNDERSTANDING BETWEEN
THE VILLAGE OF PADDOCK LAKE AND THE TOWN OF SALEM**

PREAMBLE

This is a memorandum of understanding between the Village of Paddock Lake (Village) and the Town of Salem (Town) to establish agreement on municipal actions related to the lands within the ultimate sewer service areas associated with the sewage treatment plants operated by the Village and the Town of Salem Utility District No. 2. The ultimate sewer service area boundary (USSAB) between the Village and the Town is shown on Map 13 of the November 21, 2000, memorandum prepared by the Southeastern Wisconsin Regional Planning Commission entitled, "Documentation of Analyses Associated with Providing Sanitary Sewer Service to Certain Lands Lying in the STH 50 Corridor in the Paddock Lake-Salem Area." A copy of said Map 13 is attached hereto as Exhibit A.

PURPOSE

The general purpose of this memorandum of understanding is to guide a coordinated and harmonious development and provision of sewer service to lands within both the Village and Town sewer service areas. Specifically, the memorandum of understanding sets forth the agreements of the Village and Town related to municipal actions impacting the future development and provision of sewer service on either side of the USSAB.

TERM OF MEMORANDUM OF UNDERSTANDING

The identified USSAB is intended to be perpetual, unless changed by mutual agreement as provided for under Section III.

AMENDMENT

The provision and agreements of this memorandum may be changed, or formally amended, by mutual consent of both parties.

AGREEMENTS OF THE VILLAGE AND TOWN

The Village and Town at any time may jointly or separately petition the Southeastern Wisconsin Regional Planning Commission and the Wisconsin Department of Natural Resources to reconfigure planned sanitary sewer service areas in a manner consistent with the USSAB. The Village and Town agree not to obstruct each other in efforts to obtain approvals of any such petitions.

The Village agrees not to exercise any extraterritorial zoning, land division, or official mapping powers in that portion of the Town lying south and west of the USSAB.

The Town agrees not to oppose annexations of lands in the Town to the Village provided that such lands lie north and east of the USSAB.

EFFECTIVE DATE

This memorandum of understanding shall become effective upon execution by both the Village and the Town.

The Village and the Town have executed this memorandum of understanding and certify that the memorandum of understanding has been approved by their respective governing bodies.

Date _____

By _____
Joseph Riesselmann, President
Village of Paddock Lake

Date _____

By _____
Shirley Boening, Chairperson
Town of Salem

Table C-3**SEWERAGE SYSTEM COMPONENT UNIT COST DATA**

**PUMP STATION CONSTRUCTION COSTS
(COST PER STATION)**

Peak Pumping Capacity Q (mgd)	Type	Construction Cost ^a
0.2	Submersible pump	\$ 75,000 ^b
0.5	Buried steel	180,000
1.0	Buried steel	220,000
2.5	Buried steel	350,000
5.0	Cast in place concrete	1,200,000

^aCosts are for mid-1999 and include:

- Normal dewatering systems
- Earth support systems
- Emergency power generator with the exception of the 0.2 mgd station
- Depth for 0.15-1.0 mgd station = 20 feet
- Depth for 2.5-7.5 mgd station = 25 feet

Costs do not include:

- Engineering
- Legal and administration
- Rock excavation

^bAdd \$20,000 for portable emergency generator, if desired.

Source: SEWRPC.

Appendix B

MINUTES OF THE PUBLIC HEARING

A public hearing was conducted by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff at the Kenosha County Center, 19600-75th Street, Bristol, Wisconsin, on February 27, 2001, to receive public comment on matters related to the Paddock Lake and Salem sanitary sewer service areas.

Philip C. Evenson, SEWRPC Executive Director, called the hearing to order at 7:00 p.m. He explained that the hearing would be concerned with two related matters: delineation of a common boundary between the ultimate Town of Salem and Village of Paddock Lake sanitary sewer service areas; and proposed amendments to the Salem sewer service area.

Mr. Evenson indicated that there was overlap between the areas which the Town of Salem and the Village of Paddock Lake desired to include in their respective sewer service areas. He indicated that the Commission had attempted to bring the Town and Village together to reach an agreement on a dividing line. After it became clear that this approach would not succeed, he noted, the Commission staff undertook a quantitative analysis as a basis for determining a dividing line, focusing on system cost-effectiveness. He then asked Robert P. Biebel, SEWRPC Chief Environmental Planner, to describe the methodology and findings of that analysis.

Mr. Biebel distributed copies of excerpts from a SEWRPC Staff Memorandum entitled “Documentation of Analysis Associated with Providing Sanitary Sewer Service to Certain Lands Lying in the STH 50 Corridor in the Paddock Lake-Salem Area”—specifically, Tables 7 and 8 and Maps 4, 11, and 13 from that memorandum (copy included in Appendix A). He described the overlapping areas—that is, the areas which the Town and Village had both expressed an interest in including in their sewer service areas. He described the methodology used to estimate the costs of serving the overlapping areas, assuming, alternatively, connection to the Salem system and connection to the Paddock Lake system. The recommended common boundary between the ultimate Salem and Paddock Lake sewer service areas, he said, was based upon a consideration of conveyance system cost effectiveness, pumping requirements, sewage treatment plant impacts, and timing considerations.

William J. Stauber, SEWRPC Chief Land Use Planner, then described the proposed changes to the Salem sewer service area, as documented in the preliminary draft of “Amendment to the Regional Water Quality Management Plan—Town of Salem.” He described the areas proposed to be added to and removed from the Salem sewer service area; he explained the rationale for the changes; and he noted that the changes are consistent with the recommended ultimate boundary between Salem and Paddock Lake sewer service area. He explained the significance of the delineation of the outer boundaries of the sewer service area and significance of the delineation of environmentally significant lands insofar as the future extension of sewer service is concerned. He also described the impact of planned development within the revised sewer service area on the capacity of the Salem sewage treatment plant.

Mr. Evenson then invited comments from the audience.

Shirley Boening, Chairperson of the Town of Salem, stated that the Town of Salem fully supports the proposed amendment to the Salem sewer service area. Others in the audience asked questions about the amendment, but no other substantive comments were made.

Mr. Evenson explained that the Regional Planning Commission would consider the proposed amendment to the Salem sewer service area at its quarterly meeting on March 7th and, upon adoption and subsequent publication of the final report, forward the amendment to the Wisconsin Department of Natural Resources.

The hearing was adjourned at 7:50 p.m.