ST. LOUIS, MISSOURI
WATER QUALITY MANAGEMENT PLAN
AREAWIDE WASTE TREATMENT MANAGEMENT STUDY (208)

MAY, 1978

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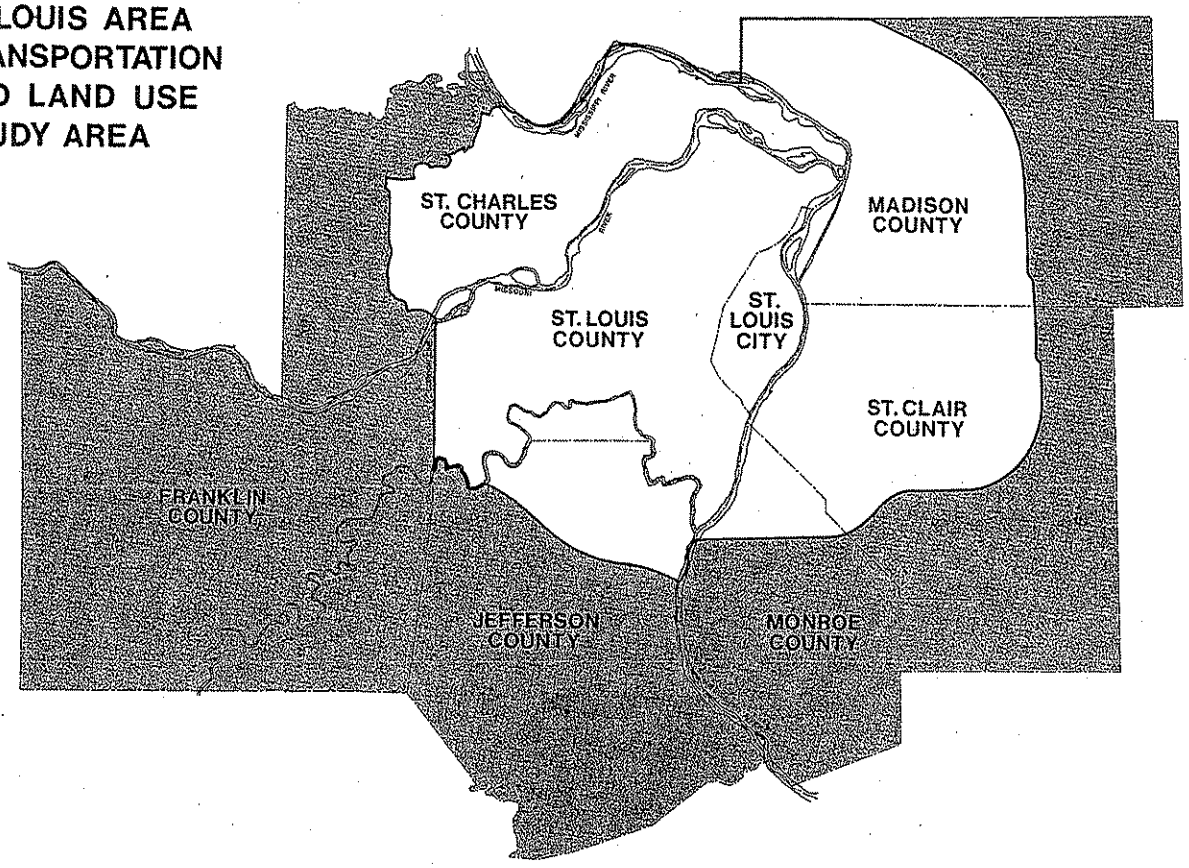
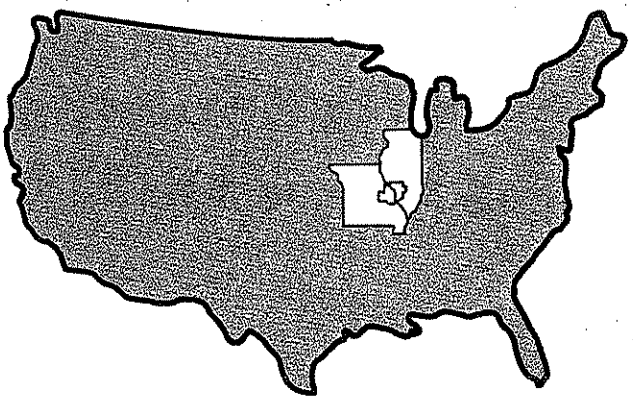


ST. LOUIS METROPOLITAN AREA

UNITED STATES



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1. INTRODUCTION

I. THE 208 PLAN--BACKGROUND, GOALS, PURPOSES

Clean water is essential to the health and vitality of our nation. Water pollution affects all living things and upsets nature's delicate balance.

In 1972, a commitment was made to protect the rivers and streams of our nation. P.L. 92-500, the Federal Water Pollution Control Act Amendments, was enacted; it established goals and objectives, and more importantly, the tools to insure that our nation's water quality will be protected. This report, and the planning effort which led up to it, is St. Louis' contribution to this national commitment.

Section 208 of the Clean Water Act makes grants available to designated metropolitan areas and planning agencies to solve water pollution problems and to plan for measures to minimize pollution in the future. In the spring of 1975, the Governor of Missouri designated the City of St. Louis, Franklin, Jefferson, St. Charles and St. Louis Counties as a 208 planning area (see Figure 1). In addition, the Governor designated the East-West Gateway Coordinating Council as the agency responsible for preparing the Water Quality Management Plan for this area.[1]

The objective of the Clean Water Act is to "restore and maintain the chemical, physical and biological integrity of the nation's waters." To accomplish this objective, two

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[1]Owing to the difference in the characteristics of streams and the governmental framework in the Illinois portion of the St. Louis Metropolitan Area, the Governor of Illinois designated the Southwestern Illinois Metropolitan and Regional Planning Commission to undertake 208 planning in Madison, St. Clair and Monroe Counties in Illinois. The two planning efforts have been coordinated through an agreement worked out by both planning agencies, both states and the U.S. Environmental Protection Agency.

AREA OF STUDY

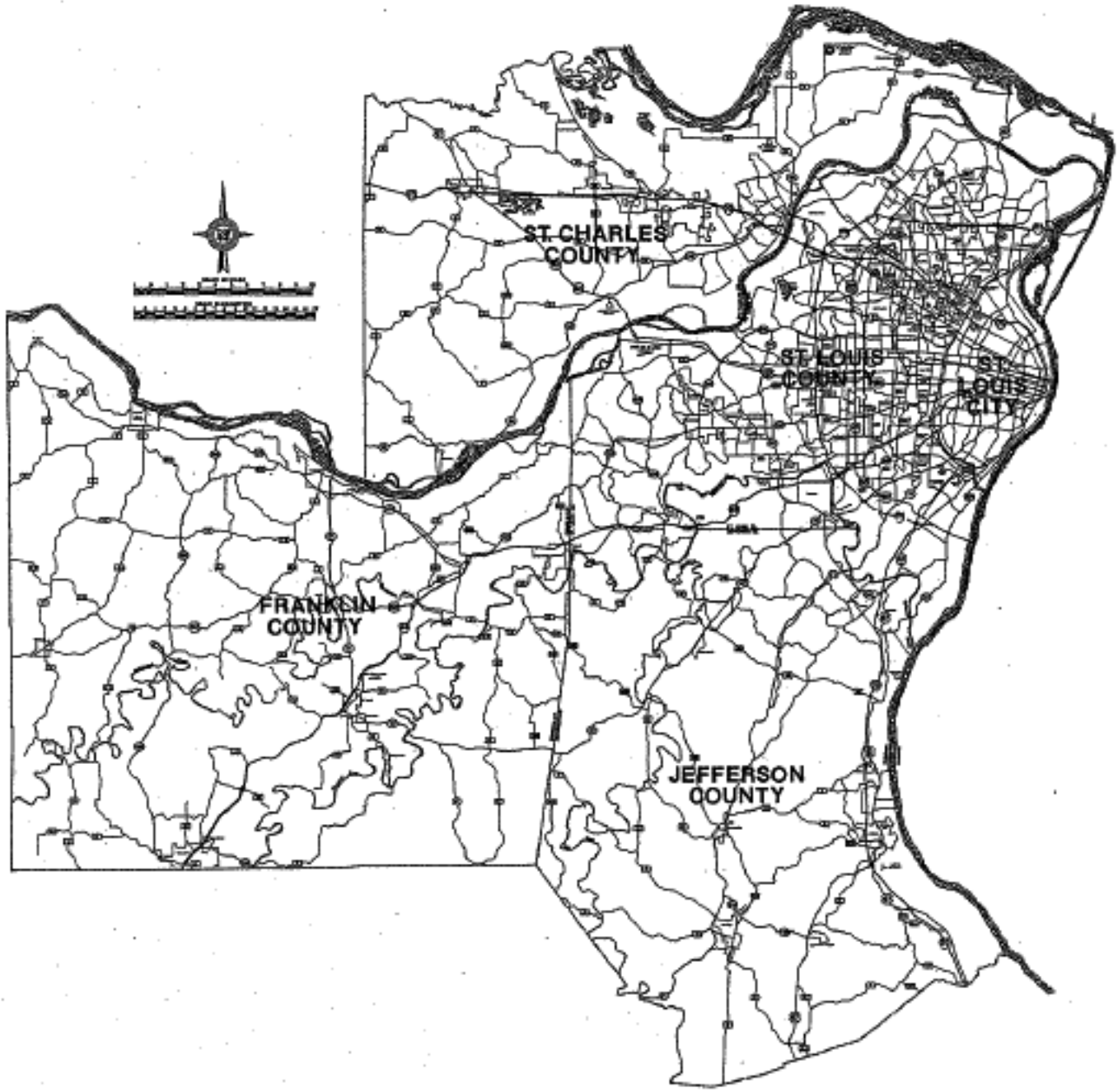

figure 1

primary goals have been established. The first goal, which summarizes the purpose of all aspects of the Clean Water Act, is to eliminate the discharge of pollutants into navigable waters by 1985. A second, interim goal is to attain "water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water." This "fishable and swimmable" goal is to be achieved by July, 1983.

A number of policy statements are included in the Act which sets forth the framework for achieving these goals and objectives. One of these policy statements makes it "the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollution in each state." This national policy is the basis for 208 planning.

Planning under Section 208 of the P.L. 92-500 represents a unique opportunity for local governments to assess water quality problems and devise their own strategies for solving them within the framework of national policy. The dominant role of local governments in devising 208 Plans has been stressed continuously by Federal and State agencies administering the program.

Local governments need to have a major role in devising the 208 Plan because local governments will have primary responsibility for enacting, enforcing and financing most aspects of the Plan. Control of nonpoint sources of pollution, for example, involves programs ranging from zoning and building regulations to streetsweeping and leaf collection. Responsibility for these programs is currently and is expected to remain, within the realm of local governments. Although federal and state aid is used for their construction, wastewater treatment plants are generally owned, operated and maintained by units of local government. (These existing "management agencies" in many instances will continue to serve as management agencies as part of the 208 Plan.) For these reasons and others, the 208 Plan must be devised by and, in its final form, be acceptable to the local governments responsible for its implementation.

The 208 Plan has come to mean many things to many people. To some in the St. Louis area, it has meant help in establishing a sewer district to deal with local sewage problems. To others, it has meant assistance in studying local 20-year sewage treatment needs. To still others, it has held the promise for a comprehensive approach to either solving local public health and development problems or providing clean water for the future recreational and commercial pursuits of

citizens in the St. Louis area. To all, most importantly, the 208 program has heightened awareness of the importance of clean water to the health and economic vitality of their community and the total St. Louis region.

Section 208 was intended to do these things and more. In fact, there are 16 major points set forth in the law which a 208 Plan must address (see Appendix C). These points include strategies for treatment plant construction, nonpoint source controls, and management agency designation among others. These 16 points represent the output required by Federal regulations. Federal regulations, however, were not the only factors affecting how the 208 Plan was to be written.

Early in the project, the East-West Gateway Coordinating Council and advisory committees determined that: 1) some of the federal requirements were more relevant to local problems than others; and that 2) given the limited time frame and funding available, 208 planning in the St. Louis area should focus on a manageable number of immediate water quality management problems.

A "regional profile" prepared early in the planning process summarized these immediate water quality management problems. In Jefferson County, for example, attention was drawn to the nearly 500 individual point sources of pollution in the northern part of the county discharging partially treated sewage into small streams. Other problems identified in Jefferson County included geological problems associated with septic tanks and the lack of overall management authority to coordinate sewer development and pollution clean-up efforts. In Franklin County, the organization of rural sewer districts and, again, geological problems associated with septic tanks were seen as critical. St. Charles County, with its high growth rate, active governmental units, and historical experience in water quality management, posed a unique set of issues. The main concerns were to achieve some kind of watershed approach to treatment to deal with the County's anticipated growth and to develop a management approach sensitive to watershed-wide as well as local concerns. In the City of St. Louis and St. Louis County, major concerns included the annexation of urbanized portions of the County into the Metropolitan St. Louis Sewer District, the upgrading of treatment facilities, control of combined sewer overflows and control of pollution from urban stormwater and construction site runoff.

This, then, is a generalized summary of issues and concerns for which the 208 Plan includes a blueprint for future action. As the study progressed, numerous additional issues

were identified and addressed. The Final Plan combines recommendations intended to fulfill federal planning and funding requirements with realistic, implementable approaches to solving the St. Louis area's most significant water quality management problems.

II. HOW THE PLAN WAS PREPARED

A. Study Team Organization

The study team for undertaking the St. Louis 208 Study consisted of the East-West Gateway Coordinating Council staff, a management planning consultant and a prime environmental engineering consultant. Under the prime engineering consultant were two subcontractors retained to perform specific engineering tasks. The overall organization of the study team is shown in Figure 2.

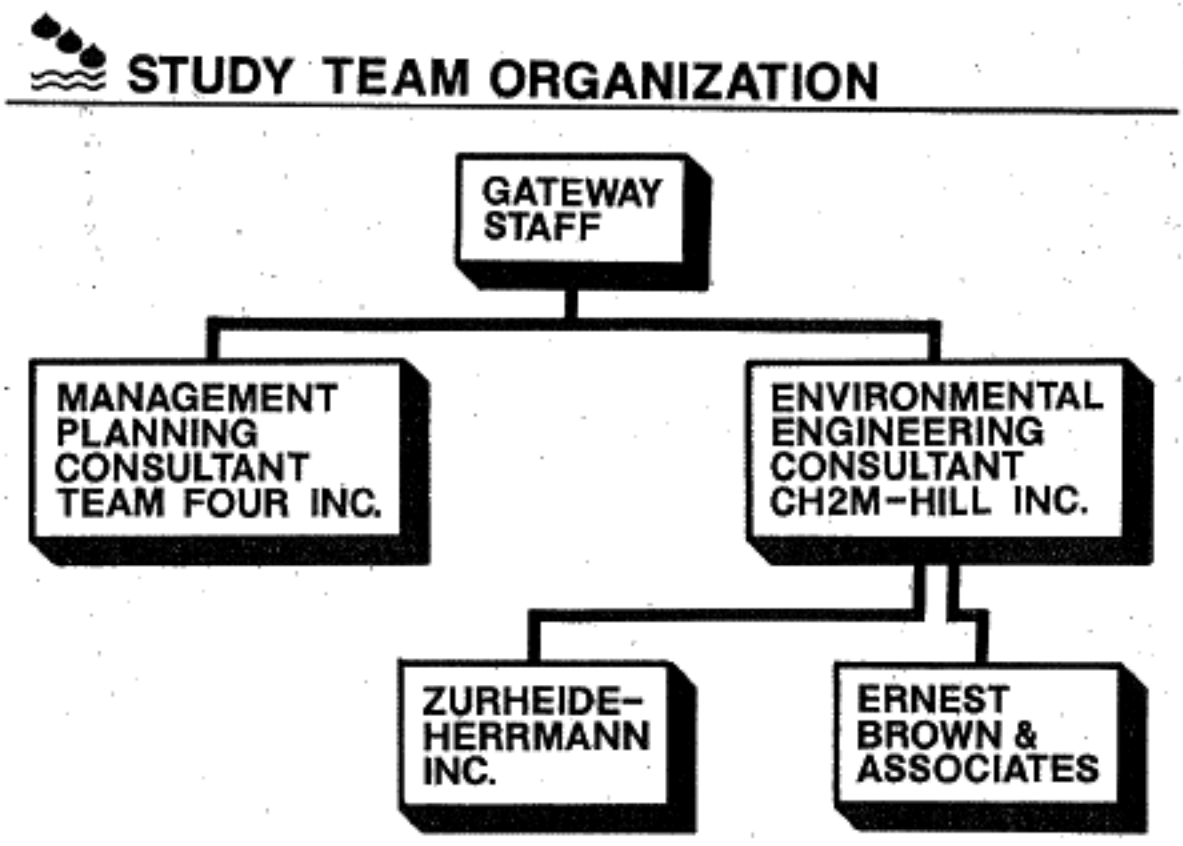

figure 2

The Gateway staff retained overall responsibility for organization and management of the study. In addition to reviewing and supervising the work of consultants, the staff was responsible for public information and public participation activities, liaison with local officials, collection and formating of many kinds of data, and completion of certain technical planning tasks, including the Draft and Final 208 Plan and the Environmental Assessment.

Consultants, selected by a special committee of the Gateway Board of Directors after an extensive screening program, were assigned specific, well defined technical planning tasks. In its capacity as management planning consultant, Team Four Inc. was responsible for the analysis of existing management agencies, their operating procedures and legal capabilities; the assessment of the capability of existing management agencies and laws to fulfill the requirements of 208 Plan implementation; and the identification of alternative approaches to developing effective, feasible and acceptable governmental frameworks for addressing present day water quality management needs.

The environmental engineering consultant and its subcontractors were given the responsibility of identifying existing and potential water quality problems using adopted criteria; determining the sources and relative importance of the sources of these problems; and designing alternative approaches to reducing the impact of these various pollution sources to acceptable levels. These tasks involved assembling and analyzing water quality data and projecting future water conditions based on anticipated growth through use of a computer model. The analysis of pollution sources then enabled the consultants to develop the most cost-effective approaches to water quality improvement.

B. The Study Process

The philosophy employed in producing the St. Louis 208 Plan was two-fold. First, an attempt was made to involve affected governmental officials and interested citizens in the major decision-making points in the project. As a result, three series of community workshops were held at the conclusion of major phases of the project. At these workshops, participants expressed their views on work that had been done

(see Element 16 and 25 Reports).[2] These views were used by the staff in redirecting the project in the succeeding phase.

The second part of the philosophy involved an attempt to analyze in detail only those problems which were most significant and proposed solutions which appeared most feasible. To accomplish this, the project was organized into four phases (see Figure 3). The first phase involved a superficial look at a wide range of pollution problems and potential solutions. This involved collecting all previous reports and existing data as well as listing all potential pollution sources suggested by citizens and officials. During the second phase, this list was reviewed and classified to eliminate problems from investigation that were not significant and proposals to solve problems that did not appear feasible. During Phase III, additional data was sought to provide a well-documented description of water qulaity problems and clearly defined recommendations for solving these problems. At the conclusion of Phase III, alternative pollution control strategies were presented for evaluation and selection of preferred water quality management techniques.

The selected control techniques were fine-tuned during Phase IV and were published in the Draft Plan. The Draft Plan was distributed for review to the U.S. Environmental Protection Agency (EPA); the Missouri Department of Natural Resources (DNR); counties and local communities; and the 208 advisory committees. A public hearing on the Draft Plan was held on March 9, 1978. Comments from these reviewers and the Public Hearing were then used to prepare the recommendations for final publication in this report.

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[2]Because of the thoroughness and complexity of this planning effort, including all data and methodologies in this Final Plan Report would yield an unwieldly document, unsuitable for distribution. Therefore, throughout this report, reference will be made to previous 208 reports where a more indepth discussion of an issue can be found or where detailed methodologies and data collection procedures are described. These interim outputs, called Element Reports, have been distributed to members of the 208 advisory committees and local public officials. Copies of these reports are available at East-West Gateway. See Appendix D for a listing of 208 report outputs. It should be noted that the Element Reports are not technically accurate in all cases. The thrust of the reports was to present methodologies and interim outputs which were later refined and corrected during the 208 planning process.

208 PLANNING PROCESS

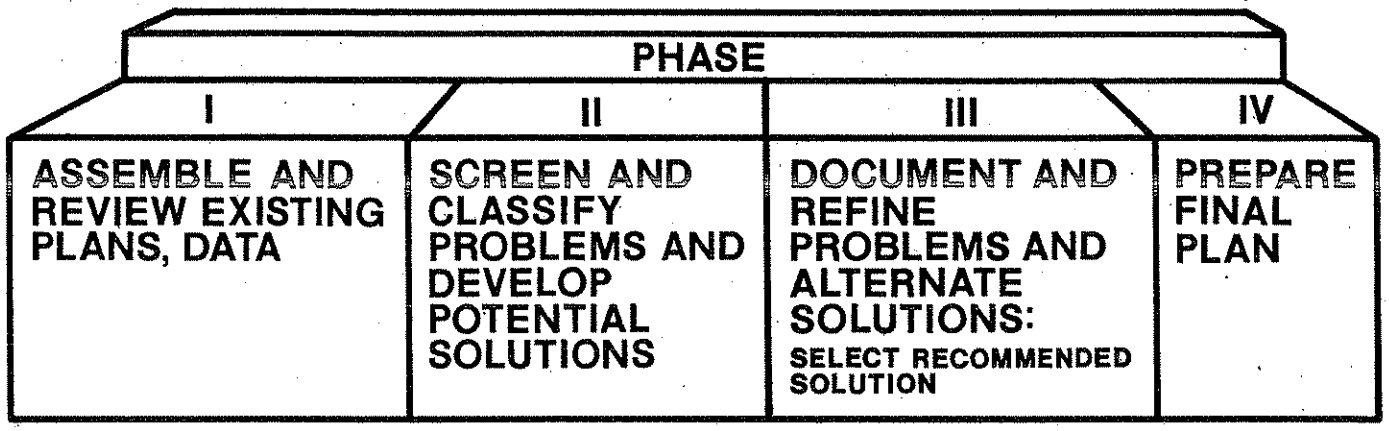

figure 3

This approach meant that detailed data was collected only for those issues which, through workshops, committee reviews and staff evaluation, were viewed as most important. This approach economized on time and money and allowed greater effort to go into developing an effective and acceptable plan of action.

The community workshops held with citizens and officials at the conclusion of the major study phases were only part of the community involvement process. Throughout the project, publications and articles were distributed to a wide range of people on Gateway's mailing list. Regular contacts were made with newspapers and media to publicize progress of the study. Special events, including field trips to study pollution sources, tours of treatment plants, and a barge trip on the Mississippi River to promote Clean Water Week were also part of the 208 community involvement program.

Two advisory committees participated in the development of the Plan (see Figure 4 and Appendix A). The Citizens Water Quality Task Force met monthly throughout the project to provide a sounding board for proposals and to assist the staff in obtaining input from a wider segment of the population. The Policy Advisory Committee, consisting of elected officials, industry leaders, and citizens and agency representatives met monthly to oversee progress of the project and provide policy direction in determining what tasks should be undertaken and how they should be done.

On April 28, 1978, the Policy Advisory Committee recommended to the Board of Directors of East-West Gateway that they approve the recommendations of the 208 Plan. The Board of Directors, on the same date, approved the recommendations with comments from Franklin and Jefferson Counties (see Appendix E).

GATEWAY 208 COMMITTEE ORGANIZATION

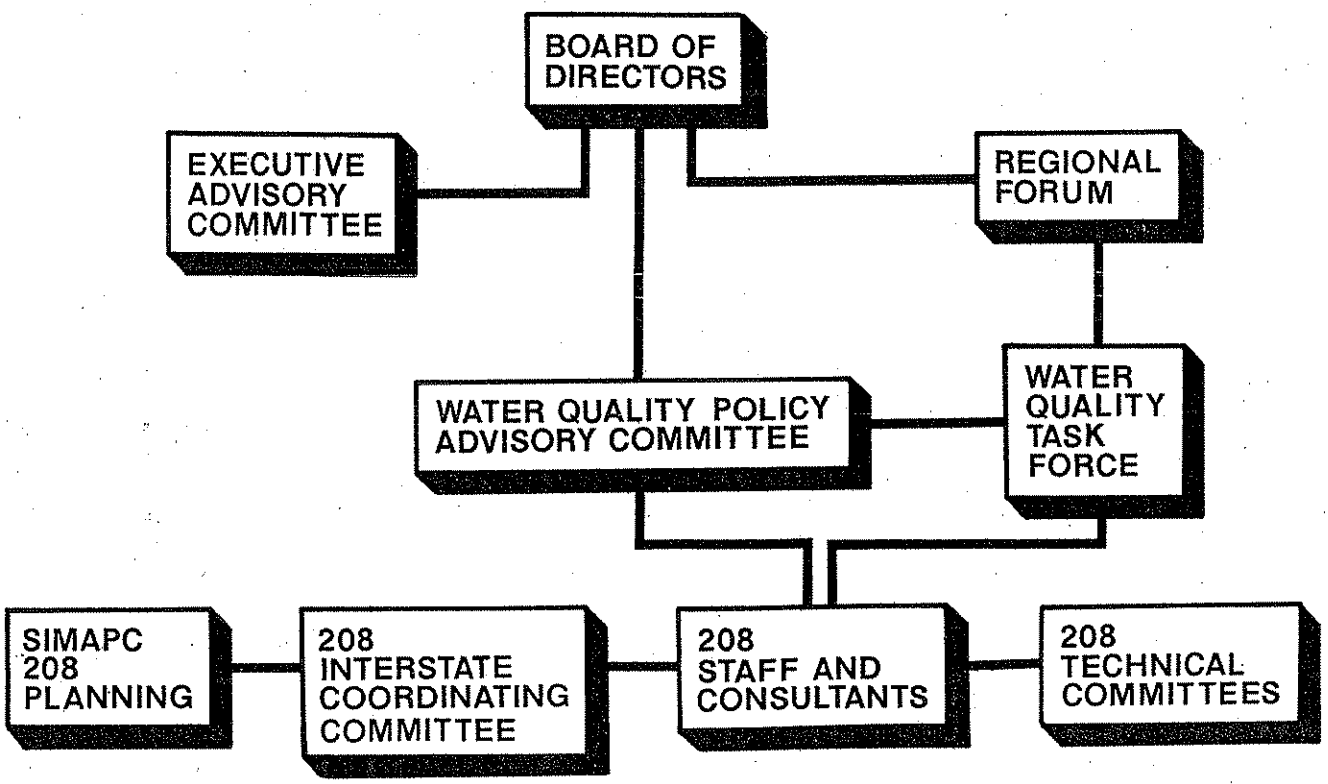

figure 4

III. THE PLAN AND ITS IMPACT ON THE ST. LOUIS AREA

The pollution control measures set forth in this Plan, when implemented, will insure that the level of quality of rivers and streams of the St. Louis area meet current State standards (see Figure 5). The Plan will insure that in areas that are growing and are projected to grow, the negative effects of this growth--inadequately sized treatment plants, malfunctioning septic tanks, and pollution in once clean streams--will be kept to a minimum.

The Plan will result in construction of new treatment facilities and sewer systems. Jobs and economic development will be a direct spinoff of these recommendations. Another result of the Plan will be new ordinances and regulations, new sewer districts, and more importantly, new Statewide legislation.

Essentially, the Plan is a mixture of two approaches to water quality management: brick and mortar (structural) and regulatory (non-structural). Before 208 planning, the approaches were seldom integrated. Structural control measures were generally favored because their results could be more easily quantified. Non-structural controls, however, are less expensive because their purpose is to prevent, rather than treat pollution. This 208 Plan integrates both approaches into a pollution control strategy. Building treatment plants alone will not result in adequate water quality; nor will the passing of ordinances and regulations do the job. The most cost-effective way of meeting water quality standards is to do both simultaneously. The Plan strives to meet that goal.

There are several essential ingredients that go into making a successful Water Quality Management Plan. All of these ingredients can be found in this document. They are: 1) relevant, accurate, and correctly selected data; 2) practical and desirable target objectives identified as a result of analyzing this area's water quality problems; 3) pollution control recommendations which were intelligently selected from among alternatives and which can be understood and accepted by those who must implement them; 4) an identification of the governments and agencies who will implement the recommendations; and 5) a built-in mechanism for updating and modifying the Plan.

Another important ingredient of this Plan, one which engineers and planners don't often brag about, is that the Plan is not perfect and does have shortcomings. It is not improper to say, however, that these shortcomings are actually

BASINS AND WATERSHEDS

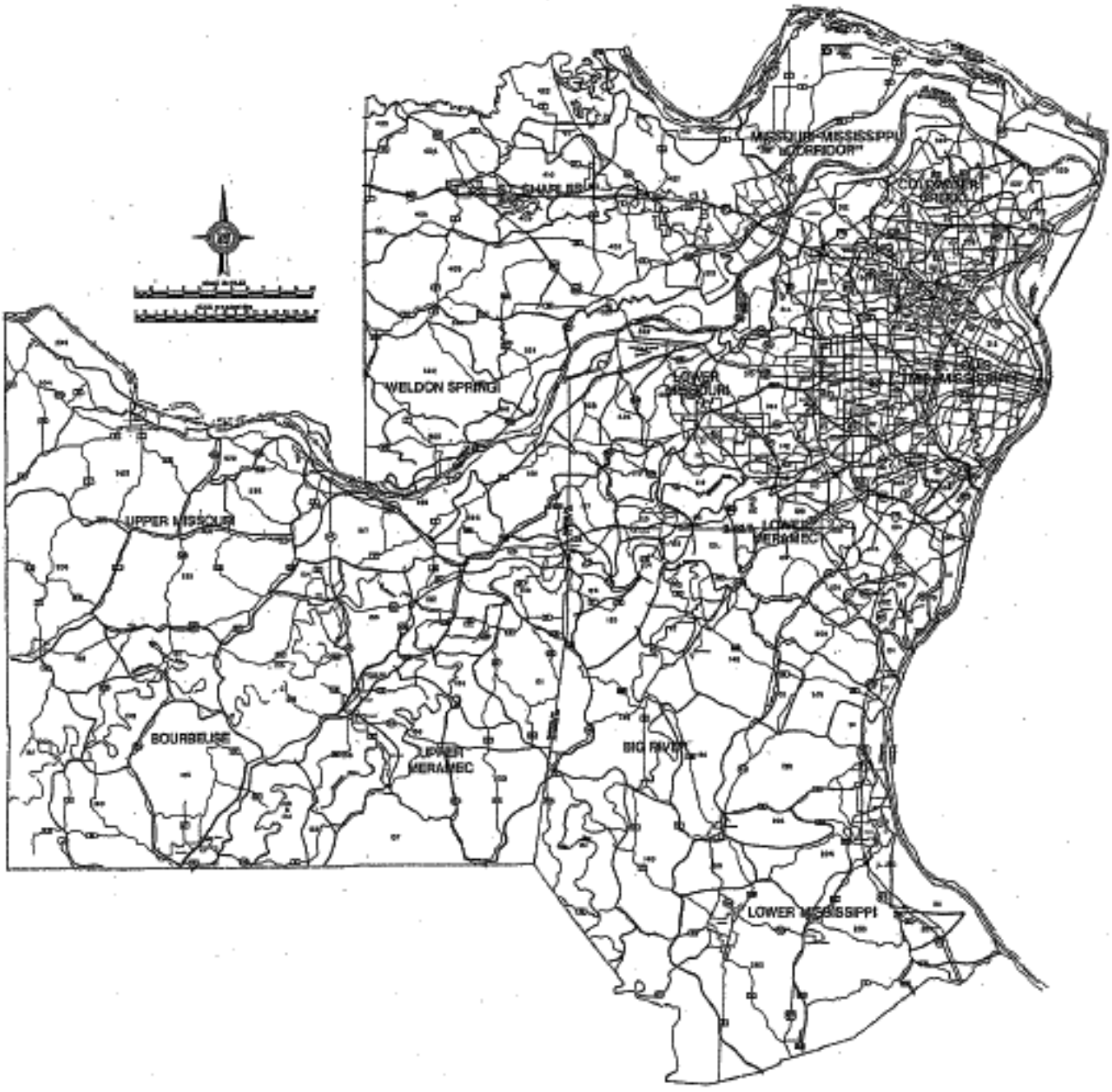

figure 5

one of the Plan's strengths. When a problem presented itself to which there was no current feasible solution, pie-in-the-sky solutions were not developed. Rather, the nature of the limitations were explored and recommendations made on closing the "feasibility gap."

The best example of a shortcoming of the Plan is in the area of nonpoint source controls. There is considerable doubt about whether the Plan's nonpoint source control recommendations can be implemented in Missouri second class counties (Franklin, Jefferson, and St. Charles). These controls are necessary to meet water quality objectives in certain watersheds within these counties; however, the State statutes governing the powers of a second class county do not present the counties with a clear indiciation of whether they can implement the recommendations. This limitation is specifically indicated in the Plan to serve notice to the State that changes in the State statutes may be necessary. Until this issue is resolved, the Plan recommends actions for second class counties to take which are clearly authorized under their governing statutes.

Finally, it is important to emphasize the dynamic nature of this Plan. Section 208 includes provisions for updating and revising the Plan. Funds for continued 208 planning have already been appropriated for fiscal year 1978 and there is strong indication that Congress will fund 208 planning for the next five fiscal years.

Continued 208 planning is one of the key aspects of a Water Quality Management Program. Besides updating the control recommendation, continued 208 planning will help implement some of the major management and regulatory recommendations of the Plan. The momentum to solve water quality problems in the St. Louis area which began over two years ago will be continued.

A major difference between the initial two-year planning period and continued planning is the level of federal funding: the federal government supplied 100 percent of the funds to produce this Plan; during continued planning, 25 percent of the funds must be supplied from local sources. It is, therefore, integral to the success of a continued 208 planning program in the St. Louis area that local matching funds be made available to attract federal 208 funds.

IV. A DESCRIPTION OF THE FINAL 208 PLAN REPORT

This Final 208 Plan Report is divided into two areas--the first, a description of the pollution control recommendations and their effectiveness; the second, how the controls are to be implemented and by whom. The first area contains four sections: Point Source Control Recommendations-Section 2; Nonpoint Source Control Recommendations--Section 3; Residual Waste Control Recommendations--Section 4; and Water Quality Effectiveness--Section 5. A brief description of each section of this report is presented below.

A. Section 2: Point Source Control Recommendations

Point sources of pollution are wastewater treatment facilities and industries--any activity which discharges wastewater at a point into a river or stream (see Figure 6).

There are three major aspects of point source control policy which are stated in this section:

1. The size of the treatment facility, the extent of the trunk sewer system, and the service area of the system based on projected year 2000 population (see Figure 7).

2. The required level of treatment of the facility based on the standards of the receiving stream.

3. The agency given the responsibility for constructing and operating the facility and trunk sewer system.

These three items, once the 208 Plan is approved, will be used as the policy of the federal and state governments for distributing Section 201 Facility Planning Grants. 201 planning is the next step in the process of point source control set up by the Clean Water Act. The 201 funds--which fund 75 percent of the cost of a project--are used by local governments to engineer and construct the treatment facility. These three policy items will be used to determine whether a local community's application for 201 planning funds is in conformance with the 208 Plan. Applications not in conformance with these policies will be turned down.

The third policy item tells the federal and state governments which units of government are eligible for 201 grants. These "management agencies" were selected based on criteria established early in the 208 study derived from the rules and regulations of Clean Water Act. In a number of areas, there are currently no management agencies to implement the

THE WASTEWATER TREATMENT PROCESS: NATURAL AND MAN-MADE

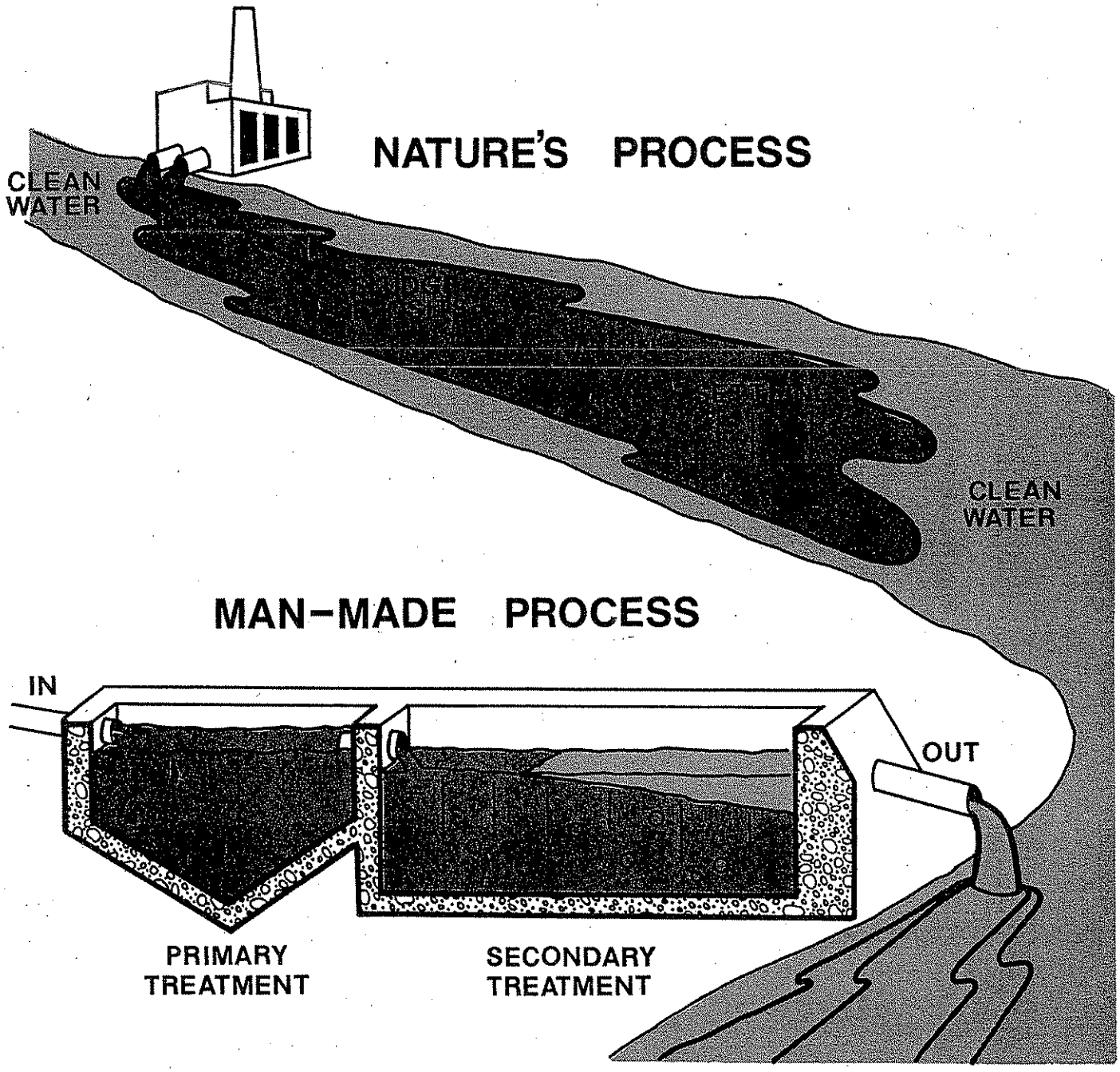

figure 6

URBAN DEVELOPMENT: 1954 – 1975 – 2000

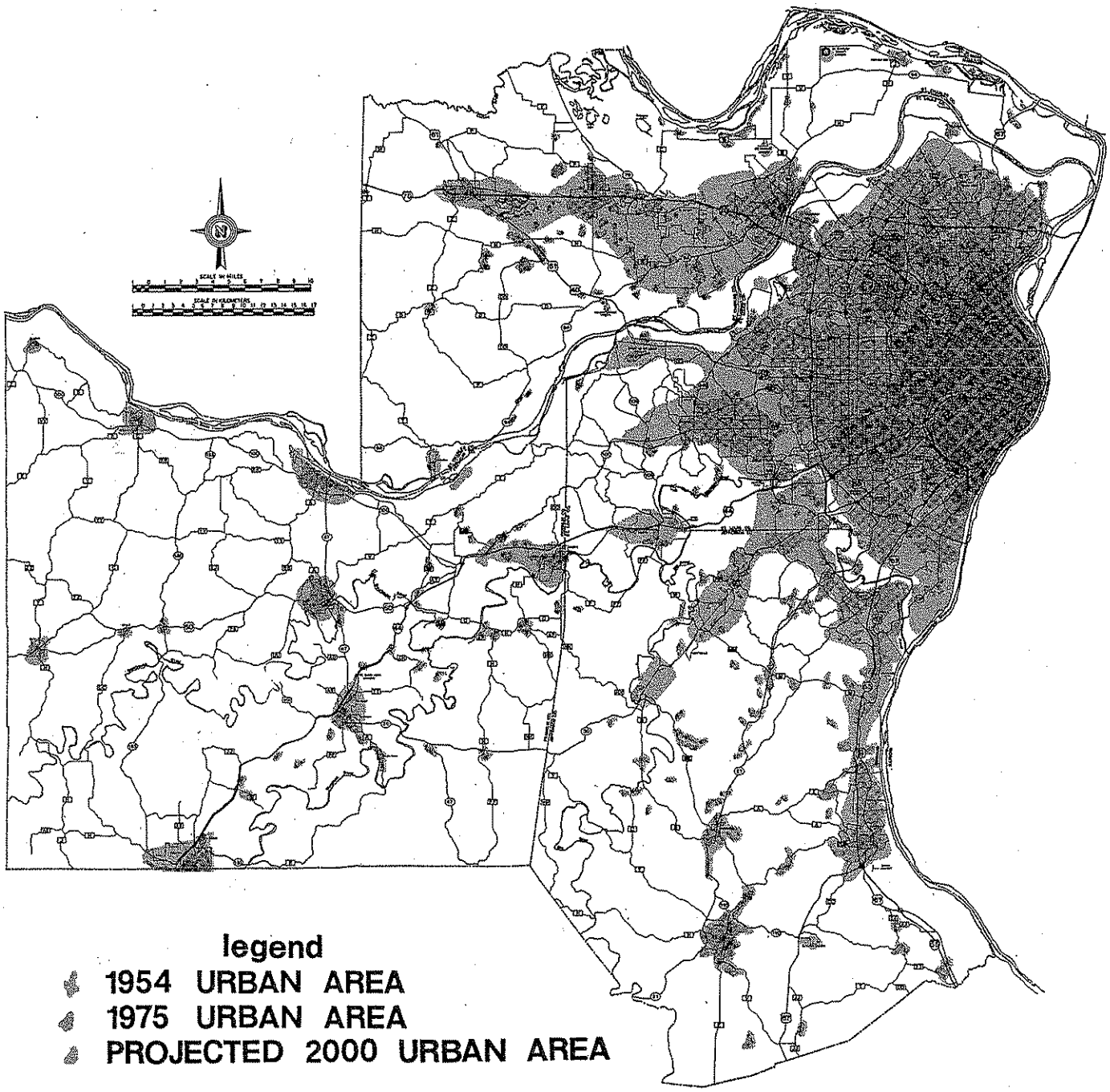

figure 7

point source recommendations. In these areas, interim management agencies--in all cases the County Courts--are designated the responsibility for developing management agencies. These interim management agencies are not eligible for 201 funds.

B. Section 3: Nonpoint Source Control Recommendations

Nonpoint sources of water pollution are all sources of pollution other than point sources. In the St. Louis area, the major nonpoint sources are individual home treatment systems (septic tanks), urban stormwater runoff, and agricultural runoff.[3] This section advances recommendations for controlling nonpoint source pollutions through structural and nonstructural controls.

There are major differences between the impacts of the Plan's point and nonpoint source recommendations. As mentioned above, the point source recommendations will help determine federal and state policy for distributing 201 grants. The nonpoint source recommendations, with the recent exception of septic tank control, do not set policy for any grant programs. Neither urban stormwater runoff nor contruction site runoff controls are eligible for construction grants. Acceptance by local communities of the controls, therefore, is voluntary.

The other major problem with the nonpoint source control, as also mentioned above, is their implementability in second class counties. This issue will be resolved by an opinion from the Missouri Attorney General (see Appendix F).

C. Section 4: Residual Waste Control Recommendations

Residual wastes, commonly referred to as sludges, are the by-products of the wastewater treatment process. They are the inorganic and organic materials removed from the wastewater concentrated into a semi-solid form. Residual wastes must be disposed of in an environmentally suitable manner, or else the organic materials will find their way into streams and pollution will once again result. This section describes the Plan's recommendations for the disposal of residual wastes.

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[3]Agricultural nonpoint source controls are being addressed on a statewide basis by the Missouri Department of Natural Resources.

D. Section 5: Water Quality Effectiveness

An important aspect of 208 planning has been the ability to estimate the future water quality of this area's rivers and streams by using sophisticated computer models. This section describes these models and summarizes the expected water quality of this area's rivers and streams as the recommendations of the Plan are implemented.

E. Section 6: Plan Implementation

This section develops the management system of the Plan--it describes which local governments shall have the responsibility for implementing the Plan's pollution control recommendations; how the recommendations are to be financed; and when the controls are to be implemented. Issues dealing with implementation, which are mentioned elsewhere in the report, are described in detail. This section should be read very carefully because it gives an in-depth analysis of the Plan, its opportunities, and its limitations.

Developing a management system for implementing the pollution control recommendations has been one of the challenges of 208 planning. The current management system wastewater treatment (see Figures 8 through 11) is uncoordinated and in many areas inefficient. The Plan recommends measures to coordinate these management activities, plug gaps in management responsibilities, and upgrade the competence of existing management agencies.

PRESENT WASTEWATER TREATMENT AGENCIES: FRANKLIN COUNTY

legend

PRIVATE

PUBLIC:

MUNICIPALITY

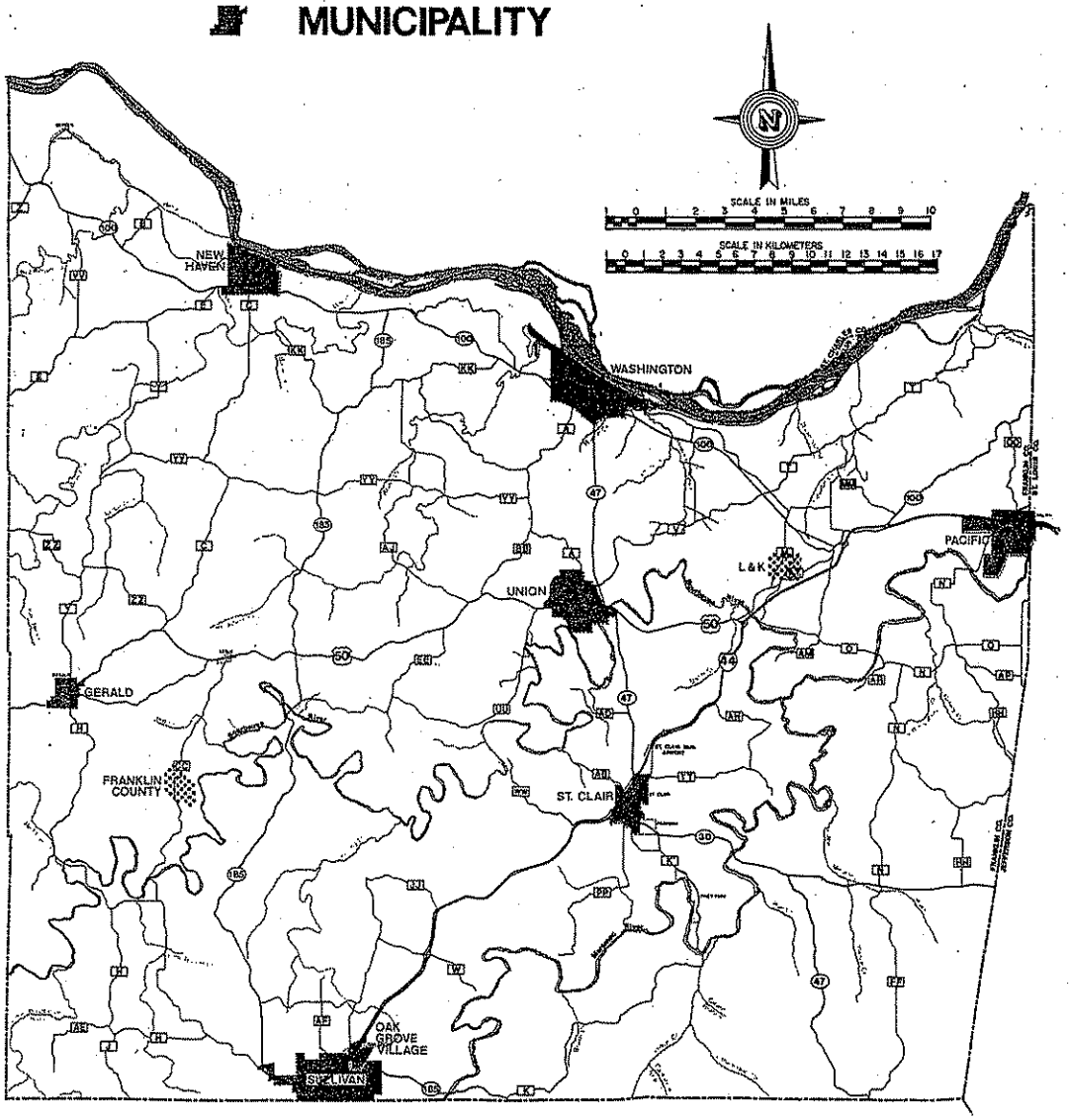


figure 8

PRESENT WASTEWATER TREATMENT AGENCIES: JEFFERSON COUNTY

legend

PRIVATE

PUBLIC:

MUNICIPALITY

SEWER DISTRICT

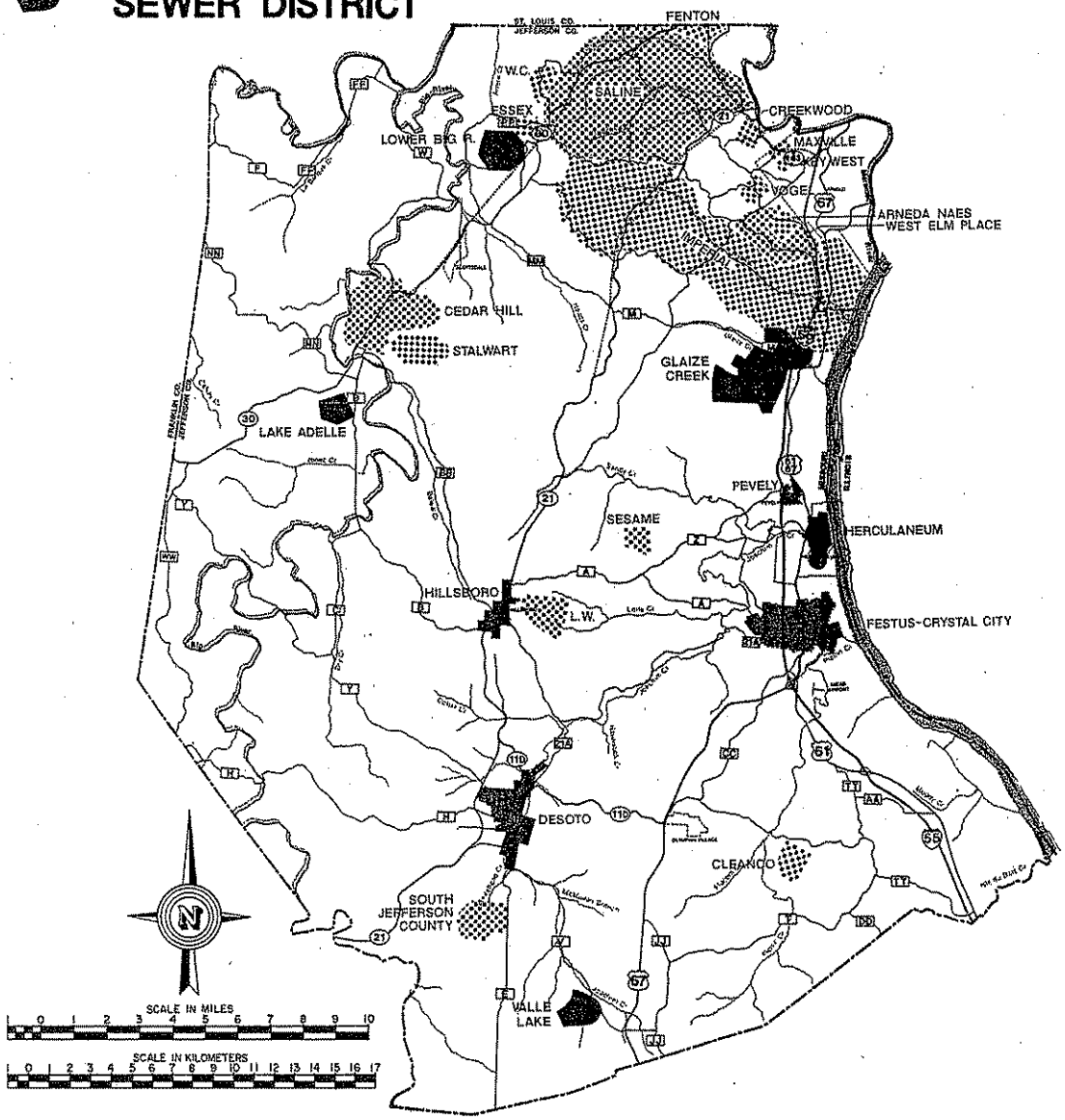


figure 9

PRESENT WASTEWATER TREATMENT AGENCIES: ST. CHARLES COUNTY

legend

PRIVATE

PUBLIC:

MUNICIPALITY

SEWER DISTRICT

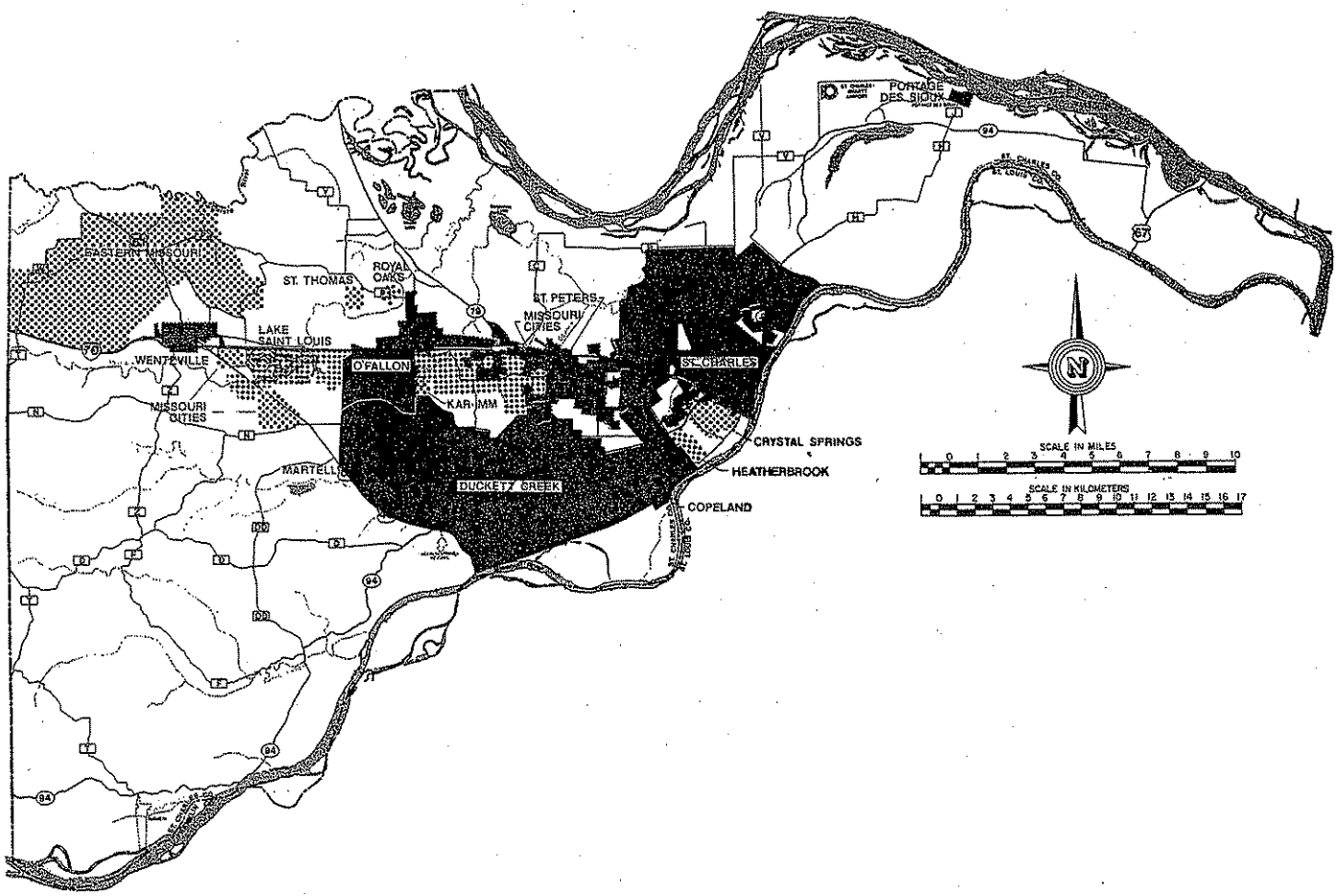


figure 10

PRESENT WASTEWATER TREATMENT AGENCIES: ST. LOUIS CITY/COUNTY

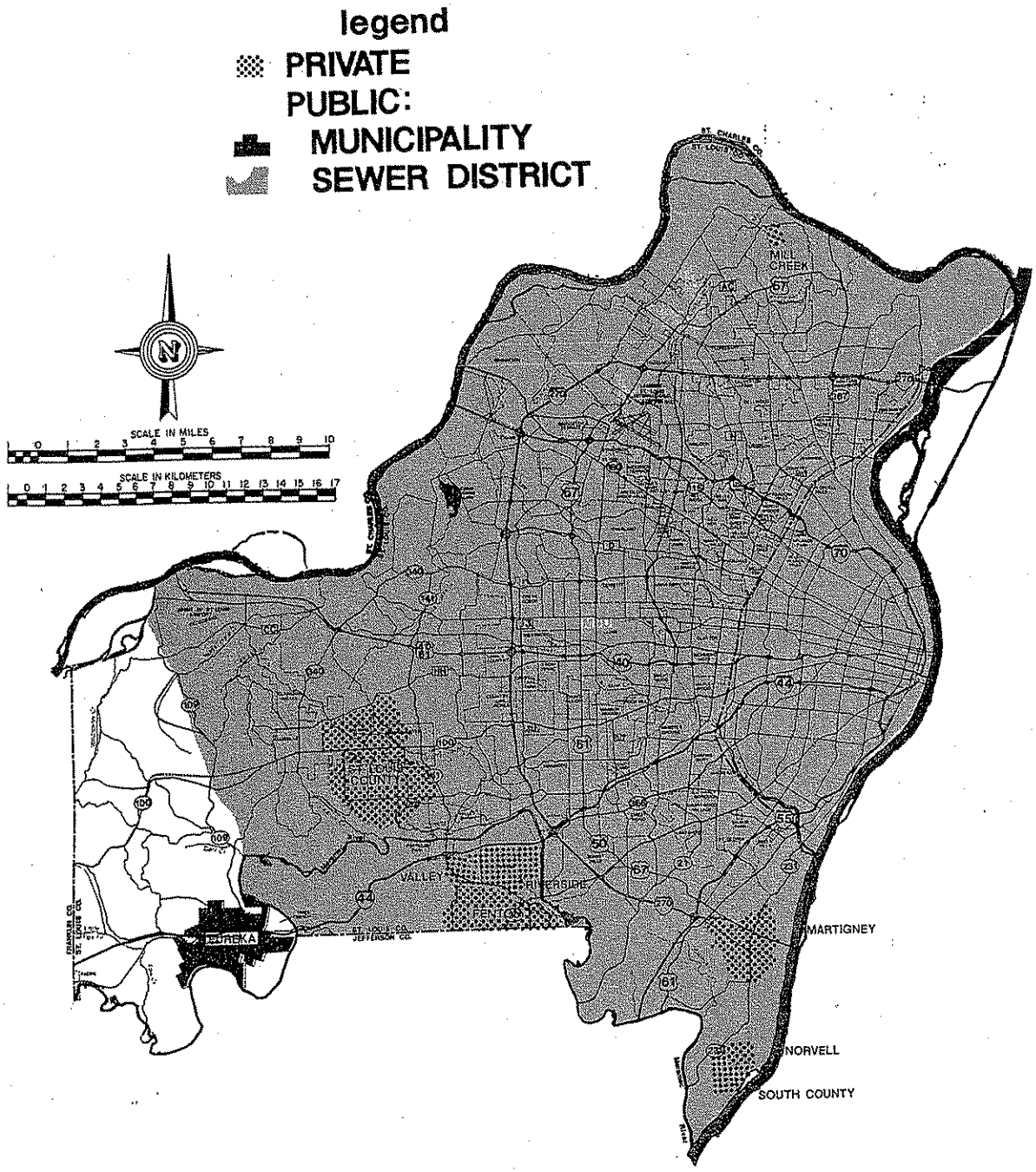


figure 11

2. POINT SOURCE CONTROL MEASURES

I. INTRODUCTION

Growth trends in the St. Louis Region have often resulted in the development of land for residential, commercial and industrial purposes prior to the extension of central sewer systems and treatment. In many areas this has resulted in a proliferation of small treatment facilities located in close proximity. Since these "clusters" of small systems were generally constructed in the absence of overall regulation and coordination, significant technical problems such as inadequate capacities can hinder efforts toward providing more efficient and larger systems through integration of these areas and systems.

Many of the small treatment facilities were initially designed and constructed to meet loading requirements and specifications at that time and due to population growth and stricter stream requirements are no longer adequate. As a result of this overloading and upgraded requirements, they are discharging improperly treated effluent into nearby waterways that do not meet current water quality needs. This situation is further compounded by the general practice of providing inadequate operation and maintenance on the collection system and at the plant sites.

Severe pollution and health problems exist in some areas as a result of the above practices. Many of these problems of surface and underground water pollution involve localized hydrologic and geologic conditions. Many point sources discharge into intermittent, low flow streams. The effluent discharges may, therefore, constitute the entire stream flow during dry periods. The pollution problems are obvious under these circumstances. Groundwater is also endangered in areas where effluents are discharged to watercourses classified as "losing streams." These streams impact some or all of their flow directly into the groundwater.

The water quality of larger streams and rivers is also affected by point source discharges. For example, investigations have shown that a significant portion of existing phosphorous and fecal coliform criteria violations which exist in the study area's larger streams (i.e., Meramec and Missouri Rivers) can be directly attributed to discharges from point sources such as, municipal and industrial treatment plants (see Element 8, 11, 21 and 23 Reports).

II. METHODOLOGY FOR DEVELOPING POINT SOURCE CONTROLS

A. Alternative Development

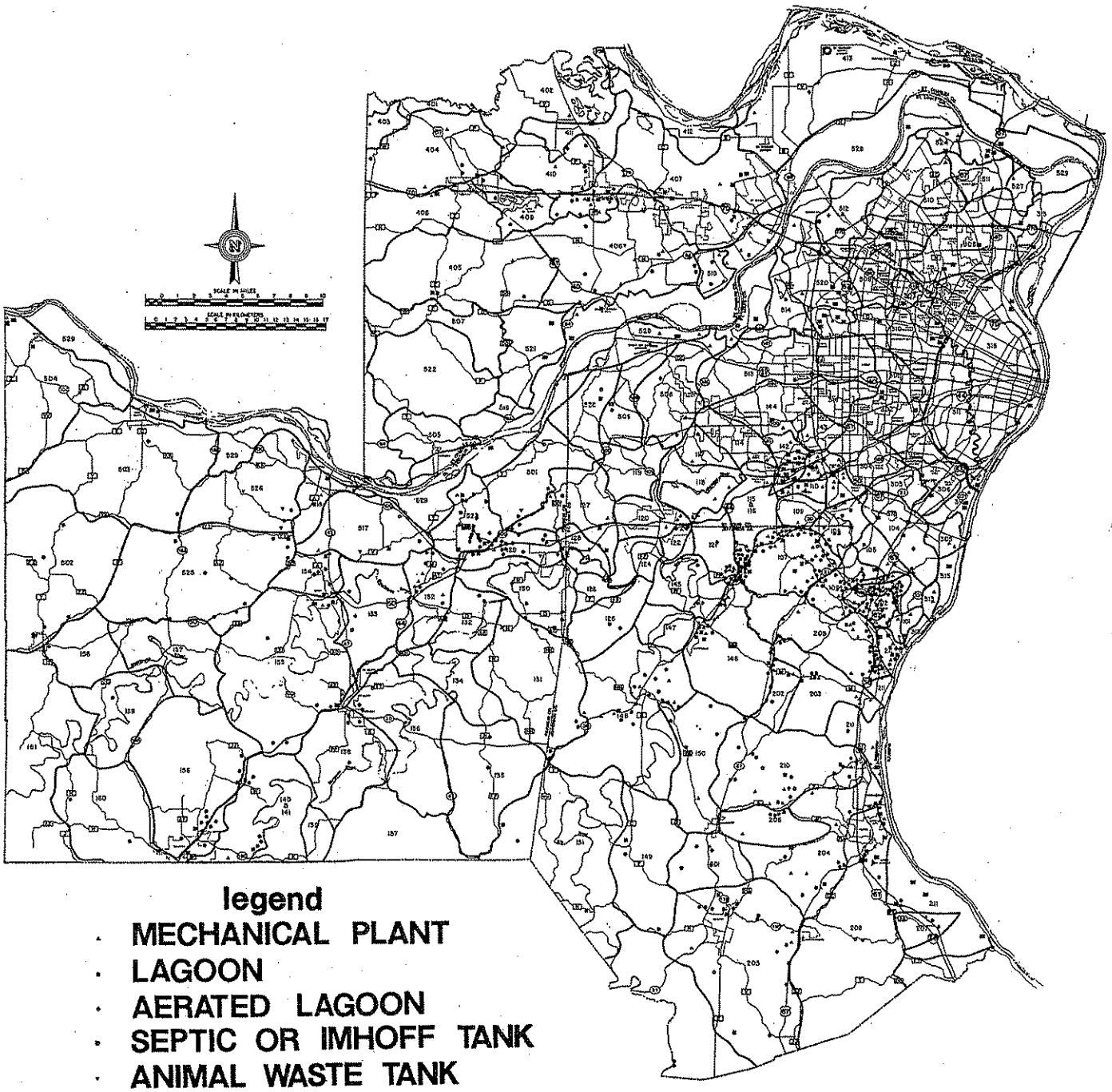
In order to generate and evaluate alternative point source control measures, a determination of the quantity and quality of wastewater to be transported and treated as well as the location of all discharges was necessary. Information on existing discharges was collected from available operating records, EPA storet data, NPDES data, existing sewer studies, onsite interviews and the Missouri Public Service Commission files. This information was assembled onto large scale work maps which provided the baseline data for the alternative evaluation process (see Figure 12).

The methodology for establishing future wastewater flows involved the assessment of, and extrapolations from, data on flows to existing treatment facilities and water consumption figures of waterworks systems. Future industrial flows were based on existing industrial flow contributions plus a nominal allowance for additional land projected to convert to industrial usage. These flow factors were then applied to service area population and land use data to provide projected wastewater flow (see Element 10 and 14 Reports). A fifteen percent projected increase in domestic wastewater flow has been assumed to occur during the planning period. Also, projected flows have an allowance for average infiltration/inflow.

To provide a method of grouping possible individual structural solutions, six general alternative classifications were utilized:

1. Continue Present Trends Plus NPDES Compliance
2. Provide Service to Smaller Communities
3. Consolidation of Systems to Improve Extent and Level of Service
4. Consolidation Toward Regionalization

POINT SOURCE DISCHARGES



legend

- MECHANICAL PLANT
- LAGOON
- AERATED LAGOON
- SEPTIC OR IMHOFF TANK
- ANIMAL WASTE TANK
- INDUSTRIAL PROCESS OR COOLING WATER

figure 12

5. Full Watershed Area Service
6. Full Compliance with Water Quality Goals Criteria

It should be noted that these are general classifications only, and that specific alternatives for individual systems and facilities have been developed. The individual system alternatives have been considered on their own merits and not as just a component of the six general solutions listed above (see Element 10 and 14 Reports).

B. Alternative Evaluation

The point source recommendation summary (beginning on page 42) presents in tabular and narrative form outputs from the alternative evaluation and selection process. Each alternative was analyzed using four major criteria; 1) cost-effectiveness; 2) water quality effectiveness; 3) management/ institutional constraints; and 4) environmental considerations (see Element 24 Report). A major factor common to all four criteria was regional population dynamics. High growth watersheds were identified and these areas underwent small area analysis which involved the development of population dot maps (see Figure 13). The most recognizable use of population dot maps is the development and evaluation of regional alternatives. Technical considerations for regional solutions involve the treatment plant size and location, interceptor routes and size, and economies of scale. A reliable population projection is essential for determining the cost-effective treatment approach. In conjunction with engineering considerations, projections are also a strong determinant in formulating management/institutional arrangements. When presented graphically, they allow the planner to develop future annexation policies and determine possible new management arrangements. Projections also involve costs to be allocated to the individual household, which can determine the cost-effectiveness of a given point source alternative.

Cost-Effectiveness Analysis

U.S. EPA requires that cost-effective analysis be presented on a present worth basis: future costs for construction and operation and maintenance of treatment facilities and collection systems should be expressed in terms of their current cost, as if these expenditures were being made at the present time. In the cost analysis, the total capital investment in

WATERSHEDS DOT-MAPPED

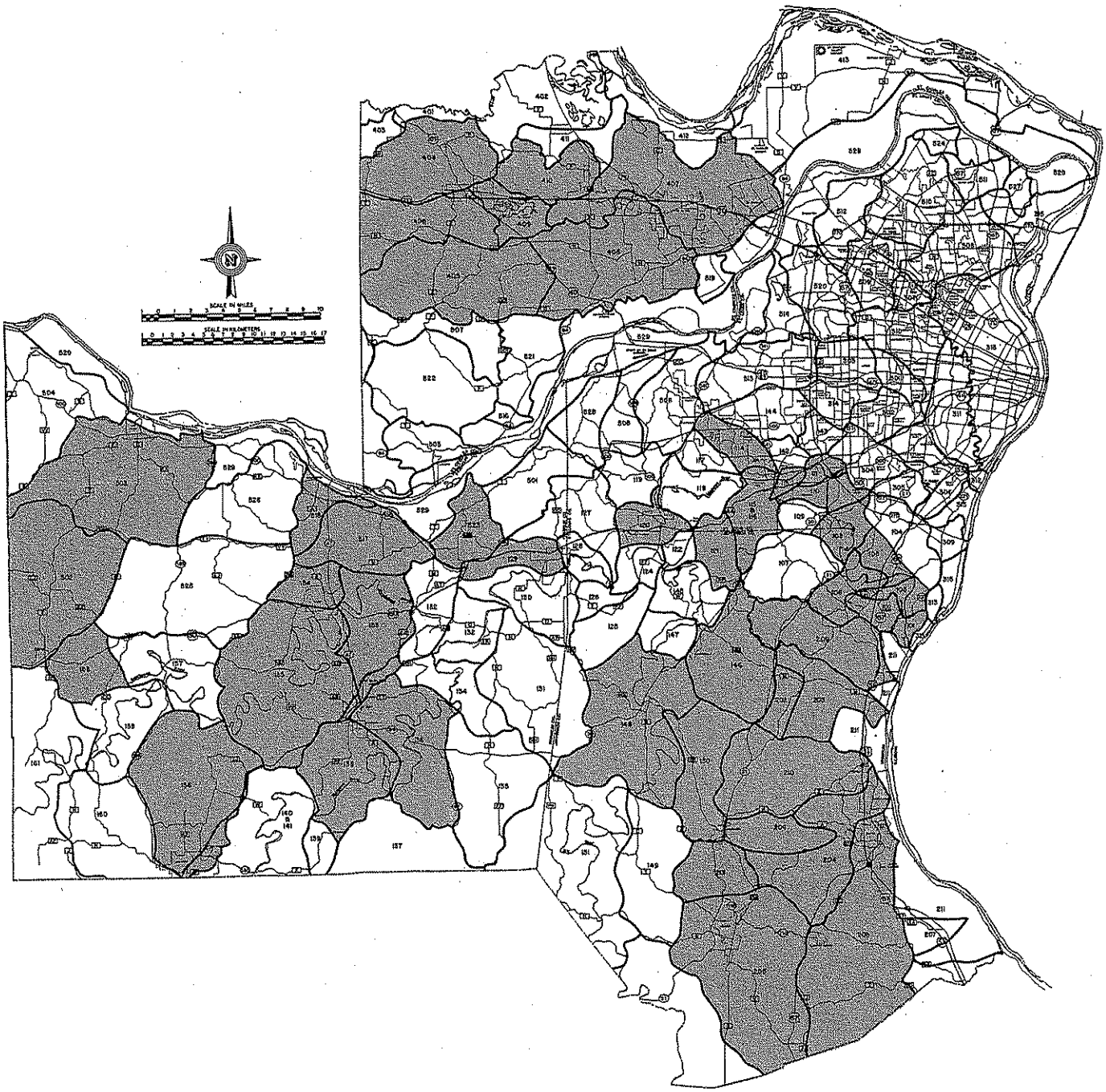


figure 13

wastewater treatment plants and interceptors over the next 25 years have been totaled and an amortized annual estimate has been calculated. This estimate is based on June, 1977 dollars and does not include any inflation factor. Likewise the operation and maintenance cost figures for a typical year in the life of the system are expressed in June, 1977 dollars. Present worth cost estimates allow local residents to evaluate the future value of these systems by comparing present worth to other current expenses. People only compare what it costs them as an individual in each case. When a person takes a bus, for example, the fare put in the box is important, not the total cost of the bus system.

The household cost for the proposed water quality management activities has always been a major concern of the 208 project. Thus, the development of user cost on an annual household basis has been a critical step in the comparative evaluation of all point source alternatives, both in terms of water quality levels and the plans to achieve these levels of water quality. The water quality levels used in evaluating point source alternatives in the St. Louis 208 program were:

> Level 1--Whatever instream conditions would result if only secondary treatment of point sources of pollution were applied;
>
> Level 2--Water quality which meets the State of Missouri's proposed water quality standards* and criteria; and
>
> Level 3--Water quality which meets criteria developed specifically for the St. Louis 208 program which will assure control of algal growth and achievement of the national goals of fishable and swimmable water.

These household cost estimates, therefore, provide a means of choosing from the various plans proposed by the technical consultants. Also, the household cost analysis has helped to answer the question--what level of water quality can the region afford?

The annual estimates of costs for new and expanded treatment systems also provides an indication of the most cost-effective consolidation of treatment plants. Within a

---

*the State of Missouri adopted new water quality standards in December, 1977.

given services area, the number of treatment plants and the design of the interceptor system can vary considerably from one alternative to another, though all systems provide comparable levels of treatment service. There also may be large cost differences between the proposed plans as in the Lower Meramec. In that system, 6 different point source alternatives were developed with a $20 spread in the annual household cost figures. Such cost differentials make it essential to evaluate the fiscal impacts associated with each system on both the total project cost level and the household cost basis.

Water quality effectiveness is discussed in greater detail in Section 5. Management considerations are discussed in Section 6; and the environmental factors are contained in the Environmental Impact Assessment (Element 35 Report).

C. Integration of Ongoing Facility Planning Activity

Another important factor incorporated into the point source alternative development is the status of ongoing 201 studies within the 208 planning area (see Figure 14). 201 Facility Planning refers to that section of P.L. 92-500 dealing with the planing and construction of wastewater facilities. Ideally, 208 planning should be completed before the initialation of 201 Facilities Planning. Because of critical water quality problems, this delay was not feasible for the St. Louis 208 region. Whenever possible, however, 208 population and land use has been utilized by the 201 agencies. Further, if 201 planning was in the initial stages of development, 208 planning and the 201 agency have coordinated their activities and outputs as closely as possible (i.e. MSD Lower Meramec Study). In areas where 201 Facilities Planning is anticipated, the 208 point source recommendation should be considered as the framework for future alternative development. A 201 Facilities Plan, however, may preempt a 208 point source recommendation if the 201 plan demonstrates overriding cost-effective considerations. In this sense, the 208 Plan is not a static list of recommendations but represents a dynamic and progressive policy for guiding future wastewater construction activities.

D. Alternative Selection

The original 6 alternative classifications were evaluated at a series of countywide workshops. Further review and evaluation based on workshop outputs was completed by consultants, staff and 208 citizen committees. From this cycle of public workshops, in-house review and 208 committee

FACILITY PLANNING (201) AREAS

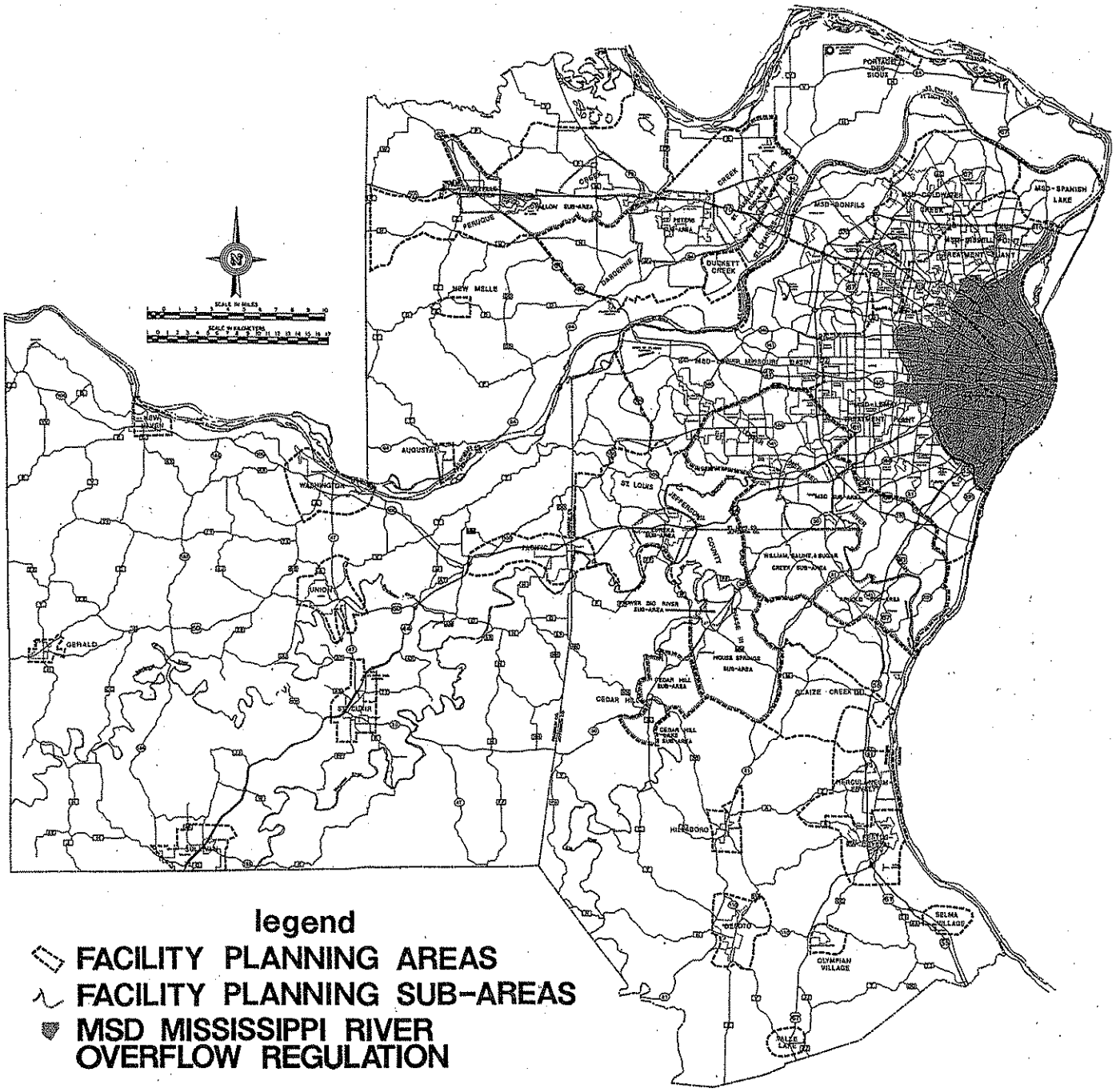


figure 14

review, a narrowing down from the original 6 classifications to about two or three alteratives occurred (see Element 18 Report). The final alternatives were analyzed in depth for cost, management/institutional and water quality factors (see Element 24 Report). The alternatives were recycled again through the above review process: workshop to consultant/staff to 208 committees (see Element 25 Report). Also, all alternatives underwent extensive federal, state and local review. Through this selection process, those alternatives that have been deemed economical and implementable are presented for final consideration.

The point source recommendations are organized by community and by county. Each community recommendation includes a brief description of the proposed system, design considerations, cost summary, management/institutional issues, and an implementation schedule. The community recommendations are classified into two general groups: sewered and nonsewered approaches. Generally, small rural communities have high household costs for conventional sewage treatment projects. Where this situation has occurred, the recommendation will include nonsewered options along with the conventional structural solutions. The following section describes in detail the nonsewered alternative approach. Following this section, there will be a discussion in industrial pretreatment requirements and industrial cost recovery.

III. NONSEWERED ALTERNATIVES IN SMALL COMMUNITIES

Conventional wastewater treatment systems which use gravity collection systems and mechanical or lagoon treatment plants are usually prohibitively expensive for small communities or areas with low population densities. Presently, the U.S. EPA suggests a limit of the annual user charge to one percent of the median annual household income in the area. Based on a national household income average, the annual user charge would be limited to $130 a year, or approximately $11 per month. Many of the small community wastewater systems, even with substantial federal and state grants, result in user charges in excess of $11 per month.

The major causes of the high user fees in small communities are:

1. Small communities do not have collection systems constructed, and the capital costs of these systems are often excessive.

2. Small wastewater treatment plants are expensive to operate. Small wastewater treatment plants have a higher cost per unit of flow than do larger facilities.

3. Small communities usually have lower population densities resulting in a system with a lower contributing population per mile of sewer required to serve a given area. Larger communities are able to construct collection systems with a greater number of users to share in the cost of the collection system increasing the overall efficiency.

4. Most larger communities have already paid for a substantial portion of their wastewater collection and control system. Much of this cost can be included in the property values of the various homes found in larger areas. Small communities without a major collection facility are required to pay for the construction of collection systems at today's higher costs.

5. Several of the small communities are located on streams with a limited flow which requires much higher levels of treatment than larger communities along major rivers such as the Mississippi and Missouri. The water quality and wastewater treatment problems found in small communities are distinctly different than those of the larger cities. Wastewater problems in small communities often are the result of local septic tank failures which effect a limited number of neighbors. These problems are characterized by surface failures of septic systems which may result in the discharge of improperly treated wastewater to ditches, streets, or groundwater systems. The impact of one small community on regional water quality may be minimum and probably will not involve a serious impact on the environment. Collectively, the impact of all the small communities on regional water quality may become significant.

Many small communities do not have the capabilities to develop, analyze, and implement effective wastewater control programs. Federal and state grants are usually not available

to small communities since they lack sufficient priority, based upon the effect on water quality, to be included on current grant lists. Studies of alternative wastewater management procedures for small communities may also be a financial burden since the "economic" technology for small community wastewater treatment systems is not well developed. Small communities do not have the resources to support major research programs to aid in the development of effective small community treatment systems. Much of the federal grant program is directed at helping larger communities provide better wastewater treatment and are not geared toward specialized problems of the small community. The Clean Water Amendments of 1977 point toward a change in federal policy with the institution of the Innovative and Appropriate Technology Program. Under this program, a small community may receive up to 85 percent federal funding for low technology treatment approaches.

A. Technical Alternatives for Wastewater Treatment in Small Communities

Alternative wastewater control systems for small communities or areas with low population densities generally fall into two broad classifications: onsite and offsite. Onsite alternatives usually involve the construction of some form of individual home treatment system; and as such, they should be governed by the design criteria presented in the Element 21 Report, Appendix B (see Table 1). Individual home wastewater treatment can be adequately performed by numerous systems which were outlined in the Element 11 Report. However, a septic tank and soil absorption system which is adequately designed and located in areas with suitable soil provides probably the best and cheapest method of individual home wastewater treatment. Septic tanks also will accumulate sludge from the wastewater and must be periodically cleaned. Costs for such disposal of septage represents an additional wastewater treatment cost and environmental problem which must also be included in the comparison of alternatives. The major thrust of our onsite home treatment program is to insure proper design, location, construction, and operation of all septic tanks in the study area.

Alternatives for offsite wastewater systems in small communities can be grouped into three general combinations of low technology: 1) treatment; 2) collection and treatment; and 3) IHTS, collection and treatment (see Table 1). The first utilizes conventional wastewater treatment technologies but

TABLE 1

ALTERNATIVE APPROACHES:
WASTEWATER TREATMENT IN SMALL COMMUNITIES

On-Site Disposal and Treatment

* Septic tanks -- soil absorption systems
* Septic tanks -- mound soil absorption systems
* Septic tanks -- evapotranspiration soil absorption systems
* Septic tanks -- sand filters with subsurface discharge
* Other individual home treatment systems -- soil absorption systems.

Off-Site Wastewater Treatment, Collection, and Disposal Systems

* Conventional gravity and lagoon treatment systems
* Individual home grinder pumps with pressurized sewer systems and lagoon treatment systems
* Conventional septic tanks with small diameter gravity sewers and lagoon treatment systems. (Septage from septic tanks to be hauled to a central treatment facility.)
* Vacuum sewers with community wastewater treatment
* Septic tanks and soil absorption systems serving several households jointly
* Package wastewater treatment plants

tries to reduce the user charge by providing waste treatment in low operating and maintenance facilities (i.e., lagoons, etc.) A second alternative seeks to reduce the user charge by developing collection systems which are substantially less expensive and also utilizes lagoon treatment systems to reduce operation and maintenance costs. The third group of alternatives tries to reduce the user charge by using a combination of individual home treatment systems with centralized collection systems to reduce operation and maintenance costs. This group of alternatives involves using septic tanks to reduce volume and pumping the effluent in small diameter pipes for central treatment. The two most important factors in an offsite program are design and operation.

Other "nonstructural" controls could be developed by small communities to reduce the overall cost and size of their wastewater treatment facilities. Such controls include the reduction of waste flows and loads through water conservation and waste load reduction. Water conservation measures such as the requirement of low volume flush toilets, low water usage appliances, water restrictors on showers, and other methods designed to reduce water usage should be encouraged or required.

When a small community is considering a new sewer system (including sewers and treatment), it should evaluate the economic feasibility of such an often expensive improvement and compare the cost to the cost of upgrading its existing septic tank system. Other low technology alternatives should also be evaluated. The State of Illinois has recently made such a cost-effective analysis of alternative treatment technology mandatory for all small communities submitting 201 Facility Plans.

IV. INDUSTRIAL COST RECOVERY AND INDUSTRIAL PRETREATMENT

Municipal wastewater treatment systems provide wastewater treatment for several classes of users. The various dischargers are usually grouped into three classes: (A) domestic dischargers such as single family residents and apartment complexes, (B) commercial dischargers such as shopping centers, restaurants and governmental institutions, and (C) industrial dischargers such as manufacturing and processing facilities. The waste discharges from each of the various classes have their own unique characteristics which often dictates not only the type of treatment but also

effects the size and operating cost of the wastewater treatment plant. A major part of a municipal wastewater control program is an effective rate structure which distributes cost to all classes of users uniformly, and a control program which limits the type of waste discharged to a municipal system that could detrimentally effect the treatment methods, capacity and the hydraulic loadings.

Industrial cost recovery and industrial pretreatment requirements, while two separate subjects, must be considered jointly. The objectives of industrial cost recovery (ICR) and industrial pretreatment requirements (IPC) are distinctly different. The objective of ICR is to equally distribute the cost of all classes of users usually based on actual pollution load. On the other hand, the objective of IPR is to control or limit discharges to a municipal system in order to protect that system and to restrict the discharge of pollutants to the environment.

A waste-producing industry, located with access to a public sewerage system and also to a watercourse, has several options regarding the disposal of its wastes. It can:

1. Discharge all wastes to the outlet watercourse following adequate treatment;

2. Discharge its domestic wastes wastes to the public sewerage system and its treated wastes to the watercourse; or

3. Discharges all wastes to the public sewerage system.

The decision is usually an economic one, i.e., providing capital and operational costs for its own treatment facility or pay the public agency facility for treating its wastes.

This latter option may require pretreatment at the industry before discharge to the public facility, again, often an economic decision. If necessary pretreatment to meet limitations is not contemplated, the entire industry's load must be considered in the design of the public treatment facility (IPR).

Limitations requiring pretreatment are usually the result of ordinances placing such limitations on the public sewerage facility discharges. In lieu of pretreatment, an industry may be permitted to pay the public facility for treatment of its entire waste load for any surcharge over the limitations (industrial cost recovery, ICR).

Public sewerage agencies such as municipalities, sanitary districts or other governmental bodies, have the authority to "control" the use of its sewerage system which includes prohibiting any wastes that are not compatible with its treatment processes or involve a hazard such as gasoline to its facilities. Upon such authority, it can prescribe regulations for wastes discharged to its sewerage facilities.

Such regulations can require wastes discharged to meet such limitations as volume of flow, biochemical oxygen demand, suspended or disolved solids, pH, toxic substances, etc. It can charge for the treatment of wastes discharged to its facilities that exceed these established limitations. When a municipality, for example, accepts wastes, it accepts the responsibility for their treatment to meet their planned effluent requirement.

Court decisions have indicated such regulations cannot be general or vague, but must be specific regarding the effect of the wastes in question in relation to the treatment provisions involved.

Where federal grants to public facilities are involved in financing the collection and/or treatment facilities, it requires that an industry pay its share of the capital, operation and maintenance costs through an industry-cost recovery schedule (ICR). Such costs can include credits for the industry's ad valorum tax, if the public facility has an EPA approval user-charge program.

Federal guidelines have been prepared to supplement and interpret regulations with emphasis on the scope of the provisions and criteria for acceptable compliance. Charges are usually based upon volume of flow and constituents that provide organic loadings on the treatment plant. These charges include: 1) economy of scale, 2) improved reliability of treatment through multiple plant units, 3) qualified operational staff, 4) ability of the public agency to acquire adequate land for construction of treatment facilities, 5) value of domestic sewage in providing essential nutrients to make industrial wastes biologically treatable, ability to

select ultimate discharge point to minimize effect of waste discharges on the environment, 7) economy of scale for processing waste sludges generated from treatment processes, and 8) establishment and maintenance of relationships between local government and industry in that they are acting jointly to handle a problem with mutual benefit.

Monitoring of industrial discharges to the public sewers includes several programs. Usually, a municipality relies on the monitoring results submitted by the industry, but with sufficient checks to determine the validity of such reporting. These can be made conditions in the ordinances establishing such a control program.

A relatively new concept is emerging, directed toward regional waste water treatment facilities for only industrial wastes. This is especially adaptable to an industrial complex or area. Some disadvantages may include the high cost of transporting such wastes. No such applications in this 208 area are proposed. It is again desired to emphasize the need for considering all of the above prior to the design of new or expanded public facilities.

Planning a joint municipal/industrial treatment system requires close cooperation between municipal and industrial officials. The planning process involved can be characterized by eight steps outlined below:

1. The municipality should identify and contact all industrial dischargers.

2. A joint study team made up of both industrial and municipal officials should be formed to review and direct future planning efforts.

3. The information requirements of the municipal and industrial officials must be clearly defined. Additionally, raw data inputs must be clearly defined which may require sensitive information from various industrial dischargers. Provisions to protect the industries from disclosure of this information may be necessary.

4. The development and analysis of alternative wastewater treatment systems must be accomplished in a manner which allows a clear

identification of advantages and disadvantages to both industry and municipality involved in joint treatment.

5. All alternative wastewater treatment systems must include estimates of capital costs, operation and maintenance costs, and a preliminary definition of industrial rates.

6. Guidelines for defining the industrial rate structures should be jointly defined by municipal and industrial officials.

7. Drafts of all contractual agreements, regulations, and ordinances should be prepared to eliminate any uncertainties and to provide a clear definition of municipal and industrial roles.

8. The final step of the preliminary planning process should be an adoption of a specific plan with both industrial and municipal agreement.

The development of an industrial cost recovery system requires a detailed knowledge of each individual treatment system and the makeup of the wasteloads to that waste treatment facility. Usually industrial cost recovery systems will be defined by an operating agency for each individual wastewater treatment plant. Industrial cost recovery systems are generally not defined on an areawide basis.

The industrial sewer users rate contains three major parts: 1) local bond retirement or capital recovery; 2) local treatment of plant operation and maintenance cost; and 3) federal grant payback. Table 2 presents a short description of how industrial users fees are determined and the allowable uses of the money.

Effective control of industrial pretreatment requirement must be accomplished by a combination of a good monitoring program and voluntary compliance. The function of the monitoring program should be to spot-check discharges for compliance and to identify unacceptable waste discharges once a particular problem has become known. An extensive education and voluntary compliance program must be developed by the operators of the waste treatment plant. An effective public information and education program must be a continuing

TABLE 2

DETERMINING INDUSTRIAL USER FEES

TYPICAL ELEMENTS IN AN INDUSTRIAL DISCHARGES FEE	BASIS OF FEE	USES OF MONEY
Local Capital Recovery	Based on the relative industrial component of the total wasteload, i.e., 25% of the total wasteload is from industrial dischargers--25% of the local capital recovery is charged to industrial dischargers. Annual payments are also based on the interest rates obtained for local bonds.	Retire local bonds
Local Wastewater Treatment Plant Operation and Maintenance Cost	Based on the relative industrial component of the total wasteload, i.e., 25% of the total wasteload is from industrial dischargers --25% of the total operating and maintenance costs is charged to industrial dischargers.	Provide Operating Funds
Federal Construction Grant Payback	Based on the relative industrial component of the total wasteload, i.e., 25% of the total wasteload is from industrial dischargers-25% of the total federal grant must be paid back by industrial dischargers. Payment of the industrial portion of the construction grant may be accomplished by a single lump sum or paid on equal installments with no interest over 30 years.	Fifty percent of the grant from industrial dischargers must be submitted to the federal treasury. Forty percent of the industrial grant payback must be invested in the U.S. securities for future use by the local authorities. Use of the restricted funds must be approved by the regional administrator of EPA. Ten percent of the industrial construction grant payback may be used in any manner deemed appropriate by the local officials except to reduce industrial users fees.

process in order to insure the integrity of a wastewater treatment facility.

V. POINT SOURCE CONTROL RECOMMENDATION SUMMARY

The following point source control recommendations are organized by county and by proposed service area. The service areas--watersheds, cities, and sewer districts--are the areas that by the year 2000 should be serviced by centralized wastewater collection and treatment systems (see Figures 15, 16, 17 and 21). Portions of many year 2000 service areas are currently "sewered"; in these areas, the 208 Plan recommends that expanding sewer service to the current unsewered areas so that by the year 2000 sewer service is provided to the entire delineated area.

Preceeding each group of county recommendations, a table (Tables 4, 5, 6 and 8) describes the treatment process for each service area which is necessary to meet the Level 2 water quality criteria--the State of Missouri water quality standards of the receiving stream. Certain proposed wastewater treatment facilities will require nitrification to insure meeting state criteria for ammonia (0.1 mg/l NH_3-N un-ionized for A, B, and C streams). The point source summary tables will include nitrification where deemed necessary. In instances where criteria violation is uncertain, the state may require the community to construct a secondary wastewater treatment facility with design flexibility for the addition of nitrification units at a future date. Coupled with this phased construction approach would be an instream monitoring program downstream from the proposed facility. The monitoring program would measure specifically for ammonia violations. Descriptions of the resulting water quality improvements are found in Section 6 of this report.

Each service area recommendation is presented in a format which includes the following items:

- -- A brief description of the service area and recommended point source control
- -- A design table indicating population projections; the control recommendation; and discharge stream
- -- A cost summary table which shows the total project cost, the annual operation and maintenance cost and the annual household cost. All of these costs are in 1977 dollars.

-- An identification of existing sewer agencies and the recommended management agency

-- A brief description of steps necessary to implement the proposal. A more detailed discussion of implementation issues is presented in Section 6.

Table 3 offers brief explanation of the format for presenting the recommendations. For a more detailed discussion of IV and V, see Section 6.

TABLE 3

HOW TO USE THE POINT SOURCE RECOMMENDATION SUMMARY

I. Brief description of recommendation (a more detailed description can be found in the Element 20 Reports)

2000 POPULATION PROJECTION FOR SERVICE AREA

TYPE OF TREATMENT FACILITY CURRENTLY OPERATING IN SERVICE AREA

DESIGN FLOW FOR PROPOSED TREATMENT FACILITY IN MILLION GALLONS PER DAY

SERVICE AREA ANALYZED

1970 POPULATION FOR SERVICE AREA

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream

TOTAL PROJECT COST (1977 DOLLARS)

ANNUAL OPERATION AND MAINTENANCE COST

ANNUAL COST TO USER IN 1990 (1977 DOLLARS)

III. Costs

Total Capital	Annual O&M	Annual Household

EXISTING SEWER AGENCIES WITHIN SERVICE AREA

208 RECOMMENDED AGENCY FOR SERVICE AREA

IV. Management/Institutional

Existing Agency	Recommended Agency

V. Implementation Schedule

Brief timetable for bringing proposal into operation.

RECOMMENDATIONS FOR WASTEWATER TREATMENT: FRANKLIN COUNTY

legend

- ■ UPGRADE AND EXPAND CAPACITY OF PRESENT FACILITY
- ⊖ NEW FACILITY
- ● NEW FACILITY OR NONSEWERED APPROACH
- ⁄ AREAS TO BE SERVICED: YEAR 2000

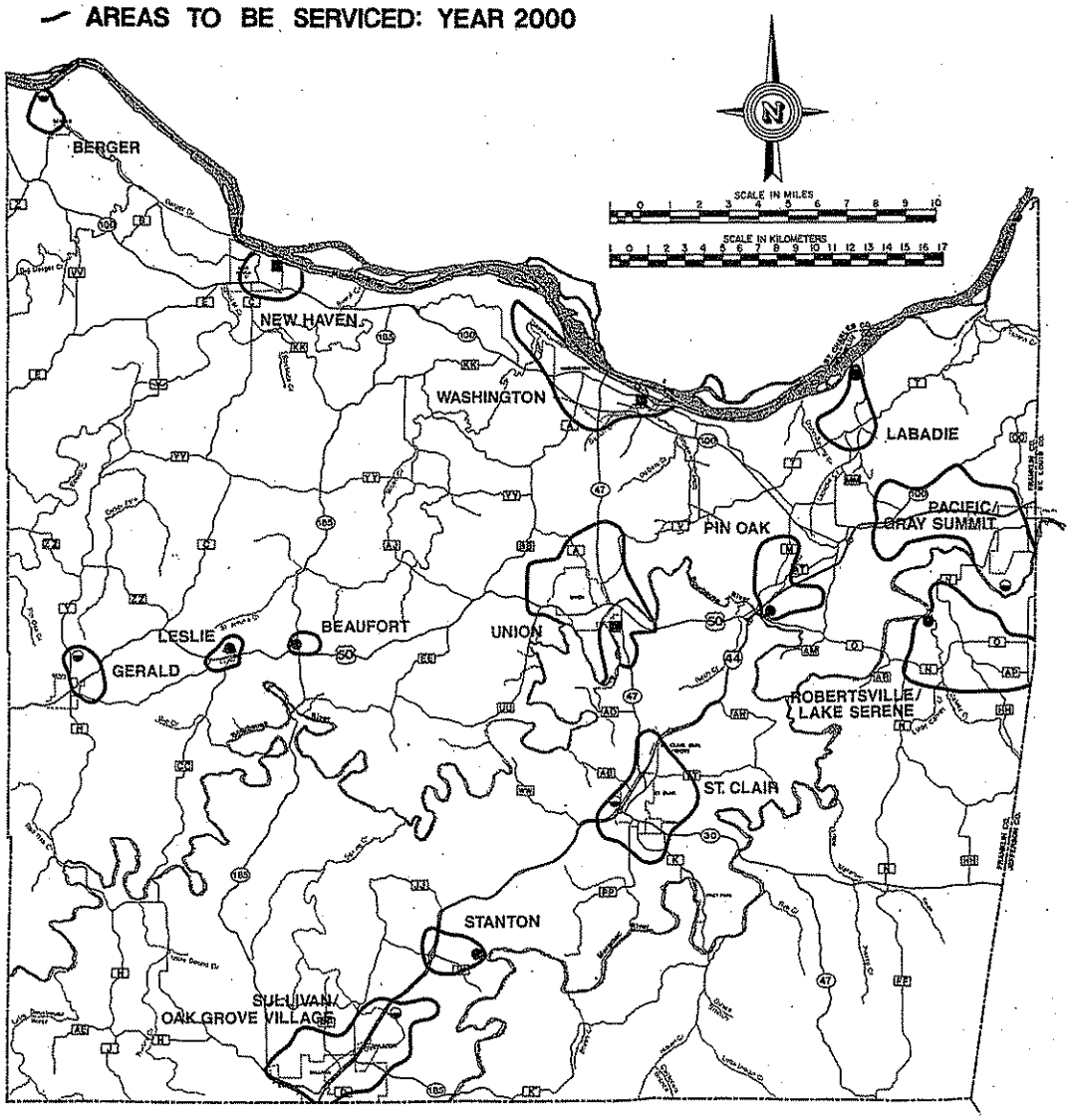


figure 15

TABLE 4

FRANKLIN COUNTY POINT SOURCE
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Pacific-Gray Summit	Secondary treatment plant with nitrification and disinfection	Meramec River
Beaufort	3-cell lagoon with disinfection	St. John's Creek
Berger	3-cell lagoon without disinfection	Berger Creek
Gerald	3-cell lagoon with disinfection	Bourbeuse River
Labadie	3-cell lagoon without disinfection	Missouri River
Leslie	3-cell lagoon with disinfection	St. John's Creek
New Haven	3-cell lagoon without disinfection	Missouri River
Pin Oak	3-cell lagoon with disinfection	Bourbeuse River
Robertsville/Lake Serene	3-cell lagoon with disinfection	Meramec River
Stanton	3-cell lagoon with disinfection	Meramec River
Sullivan/Oak Grove Village	3-cell lagoon with disinfection	Iron Hollow Creek
St. Clair	Secondary treatment plant with nitrification and disinfection	Happy Sock Creek
Union	Secondary treatment plant with nitrification and disinfection	Bourbeuse River

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Washington	Secondary treatment plant without disinfection	Missouri River

PACIFIC/GRAY SUMMIT

I. Description

Pacific is located north of the Meramec River in eastern Franklin County and Gray Summit is an unincorporated area directly north of Pacific. Pacific currently operates a 3-cell lagoon and a privately owned single cell lagoon is located within its city limits. Gray Summit has no centralized sewer system; septic tanks and a subdivision lagoon provide inadequate treatment. The proposal is to build a new treatment facility which would serve both Pacific and Gray Summit.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Pacific/ Gray Summit	3,500	8,958	Lagoons, Septic Tanks	Construct a new treatment facility	0.85	Meramec

III. Costs

Total Capital	Annual O&M	Annual Household
$7,712,000	$206,200	$128

IV. Management/Institutional

Existing Agency	Recommended Agency
Pacific	Pacific

V. Implementation Schedule

Create Gray Summit Sewer District -- January 1979
Intergovernmental Agreement -- October 1979
Initiate 201 Facility Planning -- June 1980
Start Construction -- January 1982

BEAUFORT

I. Description

Beaufort, an unincorporated community in west central Franklin County, currently has septic tanks and a one-cell lagoon. The proposal is to build a central sewer system and a new sewage treatment facility. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Beaufort	125	250	Septic Tanks; One-Cell Lagoons	Construct new treatment facility or non-sewered approach	0.02	Tributary to St. John Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$545,000	$4,960	$141

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a sewer district

V. Implementation Schedule

Establish Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Construct Project -- January 1984

BERGER

I. Description

Berger, located in the northwest corner of Franklin County, has no central collection system. Berger is scheduled for slow to moderate growth during the planning period. The proposal is to construct a collection system and a new wastewater treatment facility for the community. This would eliminate numerous septic tanks which now serve individual homes. Because of the high household costs, a nonsewered approach may be necessary.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Berger	226	440	Septic Tanks	Construct new facility and sewer system or nonsewered approach	0.04	Berger Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$1,218,000	$950	$145

IV. Management/Institutional

Existing Agency	Recommended Agency
Berger	Berger

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Construct project -- January 1984

GERALD

I. Description

Gerald is located on a ridge between Boeuf Creek and the Bourbeuse River. The City is presently served by two single cell lagoons which discharge into branches of each of the major watersheds mentioned above. It is proposed to combine all of the town's flow and treat it at a new wastewater facility in the location of the existing north lagoon.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Gerald	762	1,100	Two 1-cell Lagoons	Construct new facility	0.10	Bourbeuse River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,378,000	$8,940	$121

IV. Management/Institutional

Existing Agency	Recommended Agency
Gerald	Gerald

V. Implementation Schedule

Initiate 201 Facilities Planning -- January, 1978
Begin Construction -- January, 1981

LABADIE

I. Description

Labadie, located in the Missouri floodplain of northeastern Franklin County, is an unsewered rural community that will experience slow growth. This alternative proposes building a central sewer system and a secondary treatment facility discharging to the Missouri River. Because of the high household costs, a nonsewered approach may be necessary.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Labadie	275	300	Septic Tanks, Lagoons	Construct new treatment facility or non-sewered approach	0.02	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$573,000	$5,000	$210

IV. Management/Institutional

Existing Agency	Recommended Agency
L & K Sewer Co. (private)	Franklin County form sewer district

V. Implementation Schedule

Establish Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Begin Construction -- January 1984

LESLIE

I. Description

The Village of Leslie is located in the southwest portion of Franklin County at the intersection of Highways 50 and CC. Presently, Leslie has no central sewer system with the majority of homes utilizing septic tanks. The recommendation is to build a central sewer system and a sewage treatment facility. Because of the high projected household cost, a nonsewered approach may be more practical for the area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Leslie	81	200	IHTS	Construct new facility and sewer system or nonsewered approach	0.02	Tributary to St. Johns Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$717,000	$5,960	$227

IV. Management/Institutional

Existing Agency	Recommended Agency
Leslie	Leslie

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Begin Construction -- January 1984

NEW HAVEN

I. Description

New Haven, located in northwest Franklin County along the Missouri River, is a rural community. New Haven will experience moderate growth during the next 25 years with most of the growth occurring within the existing corporate limits. Presently, the community is served by a single cell lagoon and the proposal is to expand and upgrade this facility.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
New Haven	1,474	2,550	1-Cell Lagoon	Upgrade and expand lagoon and sewer system	0.19	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,562,000	$13,640	$39

IV. Management/Institutional

Existing Agency	Recommended Agency
New Haven	New Haven

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1981
Begin Construction -- January 1984

PIN OAK

I. Description

Pin Oak is an unincorporated rural area west of Pacific. The existing treatment facilities consist of septic tanks and lagoons with effluent discharging into either wet-weather streams or Pin Oak Creek. It is proposed to construct a central sewer system and a new treatment facility on the Bourbeuse River, downstream from the mouth of the Pin Oak Creek. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Pin Oak	N/A	817	Septic Tanks; Lagoons	Construct a new facility and sewer system; or nonsewered approach	0.06	Bourbeuse River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,856,000	$10,880	$135

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a Sewer District

V. Implementation Schedule

Create Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Begin Construction -- January 1984

ROBERTSVILLE/LAKE SERENE

I. Description

Located in the east central portion of Franklin County, these unincorporated areas will experience rapid development during the planning period. Present sewage treatment consists of lagoons and septic tanks. The proposed plan would involve the consolidation of the existing treatment facilities into a single treatment facility located in the vicinity of the confluence of Calvey Creek and the Meramec River. Due to the high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Roberts-ville/Lake Serene	725	1,500	Septic Tanks Lagoons	Construct a new facility or non-sewered approach	0.13	Meramec River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,273,000	$22,900	$164

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a Sewer District

V. Implementation Schedule

Create Sewer District or Incorporate -- January 1981
Begin 201 Facility Planning -- January 1982
Begin Construction -- January 1984

STANTON

I. Description

Stanton is a small unincorporated community located near the Meramec State Park. The present population is served by septic tanks and lagoons. It is proposed that these facilities be eliminated and replaced by a sewer collection system and a new sewage treatment facility. The treatment facility will be located to the east of the community on a wet-weather tributary of the Meramec River. Due to the high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Stanton	160	250	Septic Tanks; Lagoons	Construct a new facility or non-sewered approach	0.04	Meramec River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,405,000	$9,900	$300

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Franklin County form a Sewer District

V. Implementation Schedule

Create Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Begin Construction -- June 1984

SULLIVAN/OAK GROVE VILLAGE

1. Description

Sullivan is located in southwestern Franklin County; Oak Grove Village is a small community located just north of Sullivan. The population of this area is projected to almost double by 2000. Sullivan is currently served by two lagoons and Oak Grove Village has a small lagoon and numerous septic tanks. The recommendation is to construct a new facility located just north of Oak Grove Village on Spring Creek. The existing point sources in the area, including the Sullivan and Grove Village lagoons, will be eliminated.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Sullivan/ Oak Grove Village	5,400	10,250	Sullivan-2 Lagoons; Oak Grove Village-1 Lagoon	Construct a new treatment facility	1.1	Iron Hollow Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$6,052,000	$47,800	$31

IV. Management/Institutional

Existing Agency	Recommended Agency
Sullivan and Oak Grove Village	Sullivan

V. Implementation Schedule

201 Facility Planning has started -- June 1977
Formal Intercity Agreement -- January 1979
Begin Construction--January 1980

ST. CLAIR

I. Description

St. Clair, located in the south central portion of Franklin County, will undergo rapid development in the next 20 years. The City of St. Clair is served by five city operated lagoons and one trickling filter plant. The proposal is to construct a new wastewater treatment facility northwest of the City. The new facility would phase out inadequate lagoon treatment in the projected service area. Sewer service should also be provided to the Village of Parkway.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
St. Clair	2,978	8,000	5 Lagoons and trickling plant	Construct new facility and extend service	0.60	Happy Sock Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$2,500,000	$197,000	$121

IV. Management/Institutional

Existing Agency	Recommended Agency
St. Clair	St. Clair

V. Implementation Schedule

Construction (Step 3) to Begin June 1978
Develop Intercity Agreement With Parkway -- June 1979

UNION

I. Description

Union, in central Franklin County, will experience rapid growth during the next 20 years. The city is served by a 1-cell lagoon and the surrounding area is served by small lagoons and septic tanks which discharge into various wet-weather streams.

The recommendation is to extend the existing sewer system to provide service for outlying areas surrounding the city and to expand and upgrade the existing lagoon to treat all anticipated flows.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Union	5,183	10,500	1-cell lagoon; Septic tanks	Expand and upgrade existing lagoon	1.05	Bourbeuse River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,917,000	$162,400	$89

IV. Management/Institutional

Existing Agency	Recommended Agency
Union	Union

V. Implementation Schedule

201 Facility Plan (Step 1) Completed March 1978
Formalize projected service area -- January 1979
Begin Construction -- January 1981

WASHINGTON

I. Description

Washington, located in the north central portion of Franklin County, will undergo rapid development during the planning period. The city is presently in the process of extending its existing sewer system to unsewered areas to the southwest and northwest portions of the city. Washington is also planning to upgrade and expand its existing primary treatment plant to secondary treatment.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Washington	8,499	14,775	Primary Treatment Facility	Upgrade to secondary treatment and expand sewer system	1.80	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$3,112,000	$113,000	$68

IV. Management/Institutional

Existing Agency	Recommended Agency
Washington	Washington

V. Implementation Schedule

Upgrade to secondary treatment--to be completed November 1978
Formalize service area -- January 1979

RECOMMENDATIONS FOR WASTEWATER TREATMENT: JEFFERSON COUNTY

legend

- □ PRESENT FACILITY ADEQUATE
- ■ UPGRADE AND EXPAND CAPACITY OF PRESENT FACILITY
- ◒ NEW FACILITY
- ● NEW FACILITY OR NONSEWERED APPROACH
- ⌣ AREAS TO BE SERVICED: YEAR 2000

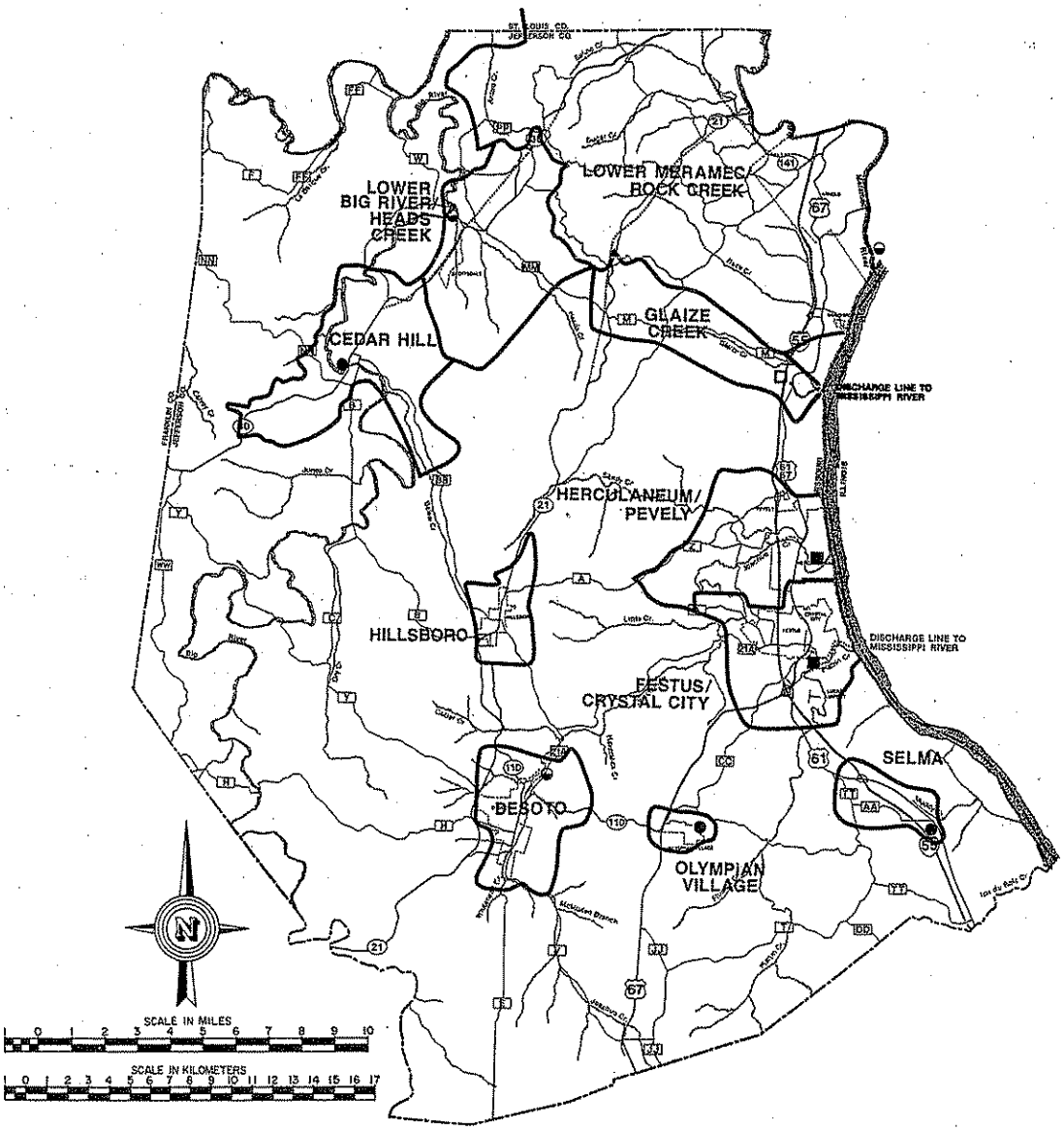


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TABLE 5

JEFFERSON COUNTY POINT SOURCE
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Lower Meramec (including Rock Creek Watershed	Secondary treatment plant without disinfection	Mississippi
Herculaneum/Pevely	Secondary treatment plant without disinfection	Joachim Creek
Lower Big River/ Heads Creek	Secondary treatment plant with nitrification and disinfection	Tributary of Big River
Olympian Village	Secondary treatment plant with nitrification and disinfection	Plattin Creek
Cedar Hills	Secondary treatment plant with nitrification and disinfection	Big River
Desoto	Secondary treatment plant with nitrification	Joachim Creek
Festus/Crystal City	Secondary treatment plant without disinfection	Mississippi River
Glaize Creek Watershed	Secondary treatment plant without disinfection	Mississippi River
Selma	Secondary treatment plant with nitrification	Muddy Creek

LOWER MERAMEC SYSTEM
(Including Rock Creek Watershed)

I. Description

Currently, the Lower Meramec region is experiencing rapid urbanization with numerous inadequate treatment facilities prevalent in the area. The proposal involves the construction of a regional secondary treatment facility in St. Louis County near the confluence of the Meramec and Mississippi Rivers. This regional facility would provide sewer service via major interceptors for the Lower Meramec area (southern St. Louis County and northern Jefferson County) and the entire Rock Creek watershed in Jefferson County.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lower Meramec	Approx. 140,000	263,281	Numerous Discharges; Septic Tanks	Construct new MSD St. Louis County Facility	30.90	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$89,106,000	$1,092,000	$39

IV. Management/Institutional

Existing Agency	Recommended Agency
Arnold and Private Sewer Companies	Jefferson County form a sewer district

V. Implementation Schedule

Arnold
Interceptor Construction Underway -- January 1977

Unincorporated Area
Organize Sewer District -- June 1979
Initiate 201 Facility Planning -- January 1980
Start Interceptor Construction -- July 1981

CEDAR HILLS

I. Description

Cedar Hills is located in the northwestern portion of Jefferson County on Highway 30. The proposal is to construct a new mechanical treatment plant. The service area would include Skullbone Creek, Isum Creek and Sand Creek watersheds, and the Belew Creek watershed including Lake Tishomingo. Due to high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Cedar Hills	300	6,110	Lagoon and Septic Tanks	Construct a new facility or non-sewered approach	0.50	Big River

III. Costs

Total Capital	Annual O&M	Annual Household
$7,127,000	$140,600	$150

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Jefferson County form a sewer district

V. Implementation Schedule

Organize Sewer District -- January 1979
Initiate 201 Facility Planning -- January 1981
Start Construction -- January 1983

DESOTO

I. Description

DeSoto, located in the southern portion of Jefferson County, will experience rapid growth during the next 25 years. Currently, DeSoto has a central sewer system with a lagoon providing sewage treatment. The proposal is to upgrade and expand the existing facility for processing anticipated flows. The service area would be expanded to include growth areas.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
DeSoto	5984	11,000	Lagoon	Upgrade and expand facility	1.68	Joachim Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$3,656,000	$170,000	$98

IV. Management/Institutional

Existing Agency	Recommended Agency
DeSoto	DeSoto

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1980
Start Construction -- January 1982

FESTUS/CRYSTAL CITY

I. Description

Festus/Crystal City, located in the east central portion of Jefferson County will undergo moderate development during the planning period. The existing Festus/Crystal City plant is located 1.5 miles upstream of the Mississippi River along Plattin Creek. The proposal is to expand the existing treatment facility, and to add an outfall to the Mississippi River. The outfall construction is more cost effective than upgrading the existing facility to meet new State standards ($707,000 vs. $1,180,000).

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Festus/ Crystal City	11,428	16,000	Secondary treatment plant	Expand existing facility add discharge line to Miss. River	2.0	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,699,000	$124,800	$70

IV. Management/Institutional

Existing Agency	Recommended Agency
Festus/Crystal Sewage Commission (not grant eligible)	Festus Grant Recipient*

V. Implementation Schedule

Complete 201 Facility Planning -- October 1978
Start Construction -- July 1979

*Festus/Crystal City Sewage Commission: Operating Agency

GLAIZE CREEK WATERSHED

I. Description

The Glaize Creek Sewer District is located in the north eastern portion of Jefferson County along Highway M. It presently serves the lower portion of the Glaize Creek watershed. The existing plant is located along Glaize Creek one mile upstream of the Mississippi River. The proposal is to provide treatment service to upper Glaize Creek above Barnhart and to construct an outfall to the Mississippi River. The outfall construction is considerably less expensive than upgrading the existing facility to meet new state water quality criteria ($472,000 vs. $1,110,000).

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Glaize Creek	Approx. 3,800	9,000	Secondary Treatment Facility	Expand Sewer System and construct outfall to Miss. River	1.0	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$3,636,000	$129,000	$111

IV. Management/Institutional

Existing Agency	Recommended Agency
Glaize Creek Sewer District	Glaize Creek Sewer District

V. Implementation Schedule

Expand Glaize Creek Sewer District -- January 1980
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

HERCULANEUM/PEVELY

I. Description

Herculaneum/Pevely, located in the eastern portion of Jefferson County, will experience rapid development during the planning period. The original 208 proposal of a regional facility for the area in all likelihood will be overridden by current 201 Facility Planning. Based on more recent cost effective considerations, the 201 plan will recommend upgrading the operation at the existing Pevely plant; expanding the treatment facility at Herculaneum; and constructing a new facility to serve Horine. These recommendations are subject to 208 review and approval.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Hercula-neum/Pevely	4,526	15,000	Treatment facility and lagoon	Contingent upon recommendations of facility planning study now underway	1.50	Joachim Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$12,786,000	$144,800	$81

IV. Management/Institutional

Existing Agency	Recommended Agency
Herculaneum Sewer District; Pevely	Contingent upon 201 facility planning

V. Implementation Schedule

Facility Plan Completed -- May 1978
Start Construction -- January 1980

LOWER BIG RIVER/HEADS CREEK

I. Description

The Lower Big River/Heads Creek area, located in the northwest portion of Jefferson County, will develop rapidly during the planning period.

The project area is fragmented into multiple service areas and treatment facilities. The proposal is to construct a treatment facility to combine the service areas of Lake Montowese, Heads Creek and Lower Big River.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lower Big River/Heads Creek	Approx. 3,750	8,500	Lagoons and septic tanks	Construct new facility	0.69	Tributary of Big River

III. Costs

Total Capital	Annual O&M	Annual Household
$6,173,000	$171,700	$113

IV. Management/Institutional

Existing Agency	Recommended Agency
Lower Big River Sewer District	Lower Big River Sewer District

V. Implementation Schedule

Expand Sewer District -- January 1979
Initiate 201 Facility Planning -- January 1981
Start Construction -- January 1983

OLYMPIAN VILLAGE

I. Description

Olympian Village is located in the southern portion of Jefferson County on Highway 67. The proposal is to construct a new treatment facility discharging into Plattin Creek. The service area will include those portions of Olympian Village and surrounding areas within the Plattin Creek watershed. Due to high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Olympian Village	Approx. 750	1,735	Numerous Discharge Septic Tanks	Construct a new facility or nonsewered approach	0.18	Plattin Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$2,387,000	$73,600	$202

IV. Management/Institutional

Existing Agency	Recommended Agency
Olympian Village	Olympian Village

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

SELMA

1. Description

Selma, located in the southeast portion of Jefferson County, will develop slowly during the planning period. The existing treatment facility (Imhoff tank and sandfilter) is nearing capacity and would have to be expanded to accommodate the projected growth. The proposal is to construct a new treatment facility at the existing plant site. Due to the high household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Selma	Approx. 100	560	Treatment Facility	New 50,000 GPD facility or nonsewered approaches	0.05	Muddy Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$260,000	$35,700	$182

IV. Management/Institutional

Existing Agency	Recommended Agency
None	Jefferson County form a sewer district

V. Implementation Schedule

Organize Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

RECOMMENDATIONS FOR WASTEWATER TREATMENT: ST. CHARLES COUNTY

legend

- PRESENT FACILITY ADEQUATE
- EXPAND CAPACITY OF PRESENT FACILITY
- UPGRADE AND EXPAND CAPACITY OF PRESENT FACILITY
- NEW FACILITY
- NEW FACILITY OR NONSEWERED APPROACH
- AREAS TO BE SERVICED: YEAR 2000

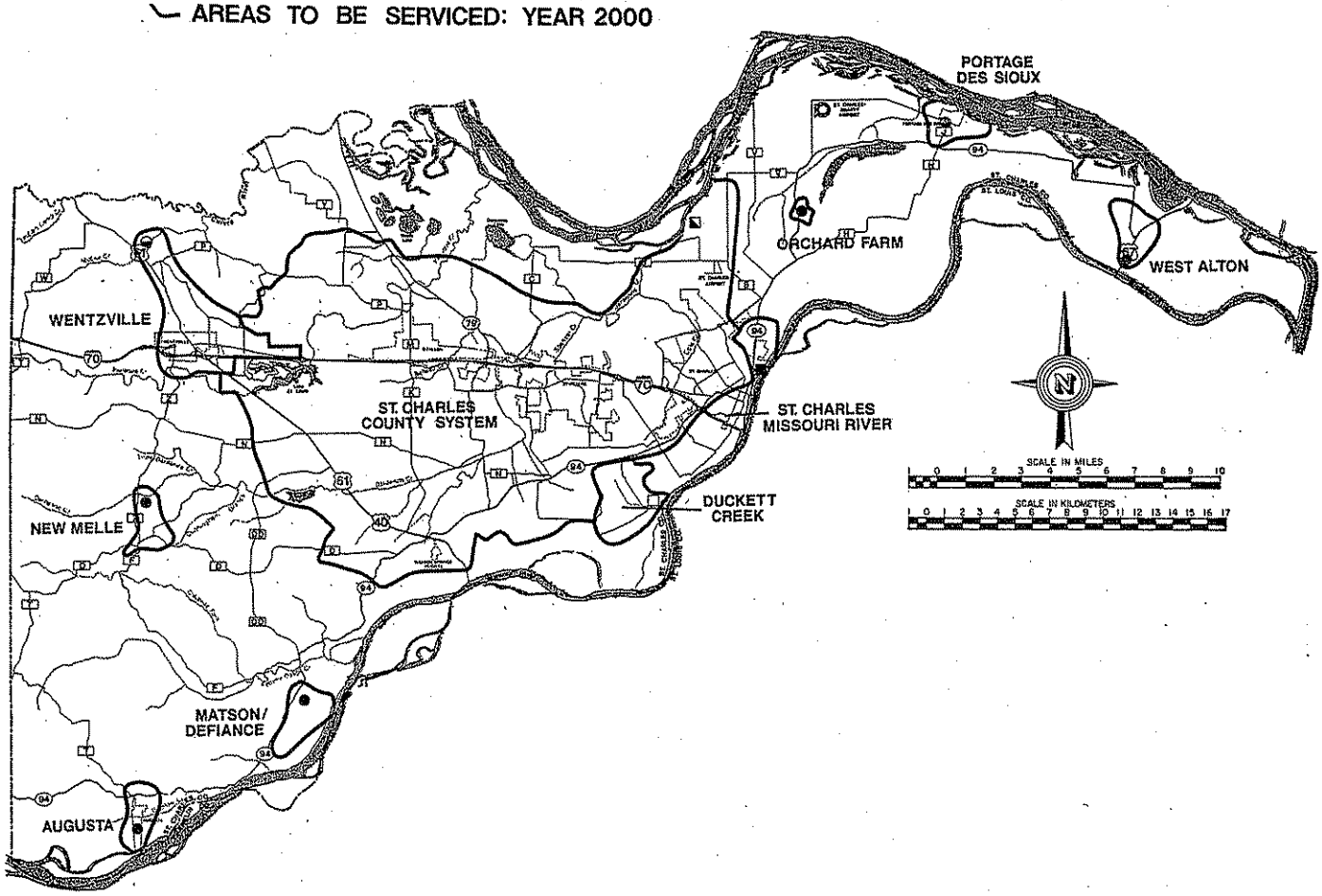

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TABLE 6

ST. CHARLES COUNTY POINT SOURCE
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
St. Charles Consolidated System	Secondary treatment plant with disinfection (operate existing carbon system)	Mississippi River
Augusta	3-cell lagoon without disinfection	Missouri River
Duckett Creek Watershed	Secondary treatment plant without disinfection	Missouri River
Matson/Defiance	3-cell lagoon without disinfection	Missouri River
New Melle	3-cell lagoon with disinfection	Dardenne Creek
Orchard Farm	1-cell lagoon with disinfection and land application	Tributary to Mississippi River
Portage Des Sioux	Secondary treatment plant with disinfection	Mississippi River
St. Charles/ Missouri	Secondary treatment plant without disinfection	Missouri River
West Alton	3-cell lagoon without disinfection	Missouri River
Wentzville	Secondary treatment plant with nitrification and disinfection	McCoy Creek

ST. CHARLES CONSOLIDATED SYSTEM

I. Description

The secondary stage of the St. Charles Mississippi River Plant would be expanded to treat all wastewater from the following watersheds: Spencer Creek, Cole Creek, Sandfort Creek, lower Dardenne Creek, lower Peruque Creek, and the Belleau Creek. All wastewater discharges to streams in the service area would be eliminated. The following communities would be connected: St. Charles (Mississippi watersheds), St. Peters, O'Fallon, Lake Saint Louis, Harvester, Weldon Spring Heights, Kampville, South Shore, and Lake Village Harbor.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
St. Charles Consolidated System	N/A	147,300	Individual community system & private sewer companies	Regional system	16.5	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$69,832,176	$1,736,632	$60

IV. Management/Institutional

Existing Agency	Recommended Agency
St. Charles, O'Fallon Duckett Ck., St. Peters	To be determined by 208 continued planning

V. Implementation Schedule

Organize Sewer District -- October 1979
Initiate 201 Facility Planning -- July 1980
Start Construction -- July 1982

VI. Additional Description

Because the recommendation for a consolidated system represents a major departure from present wastewater treatment practices in St. Charles County, it is necessary to further explain how the recommendation was arrived at. Three alternatives for providing wastewater treatment were evaluated during Phase 3 of the 208 program. These alternatives had survived the Phase II alternative analysis and were judged to be the most cost-effective alternative for further evaluation (see p 23 to 30 of this section). Besides the consolidated system (Alternative 3), the other two alternatives were:

Alternative 1: The City of St. Charles, St. Peters, O'Fallon, and Lake Saint Louis would continue operating their own treatment facilities, expanding their systems to service their immediate unincorporated areas. No watershed-wide treatment would be provided for the lower Dardenne Watershed. The St. Peters, O'Fallon, and Lake Saint Louis facilites would be upgraded to meet State water quality standards and their capacities would be expanded.

Alternative 2: The City of St. Charles Mississippi treatment plant would service the same area as in Alternative 1. A new facility would be built to service St. Peters, the lower Dardenne watershed and Weldon Springs Heights. A new O'Fallon facility would be built which would extend service to Lake Saint Louis.

Alternative 1 was judged as being the least cost-effective alternative. The difference between Alternatives 2 and 3, however, was much smaller. As can be seen in Table 7, the two alternatives are very close in terms of capital outlay. There is a decrease in annual operation and

maintenance costs with Alternative 3. However, the consolidated system (Alternative 3) would provide a water quality advantage since it eliminates all discharges to St. Charles' County streams within the service area. Alternative 3 would also provide some insurance against more stringent water quality standards being imposed at some future date. Staff and consultants, therefore, recommended Alternative 3, the consolidated system.

TABLE 7

Alternative	Capital Costs	Annual O&M	Total Annual	Annual Household
2	$65,721,140	$1,940,526	$2,531,097	$64.89
3	69,832,176	1,736,632	2,364,144	59.91

During the second phase of "bridge-building meetings" (see Section 1) and during the Phase III St. Charles County Workshops, a number of concerns were expressed regarding implementation of Alternative 3. These concerns included who will be the management agency for the service area; how will ongoing facility planning activities be phased into implementation; what type of user cost arrangements would be developed; and, perhaps most important, what powers will the component municipalities and sewer districts have over sewer extensions within their areas of jurisdiction.

Figures 18 and 19 shows two major obstacles to implementation - the current facility planning areas within the proposed service area, and the current management agencies within the proposed service area. Figure 18 shows that current facility planning areas are not coterminous with the service

ST. CHARLES COUNTY CONSOLIDATED SYSTEM: PRESENT FACILITY PLANNING AREAS

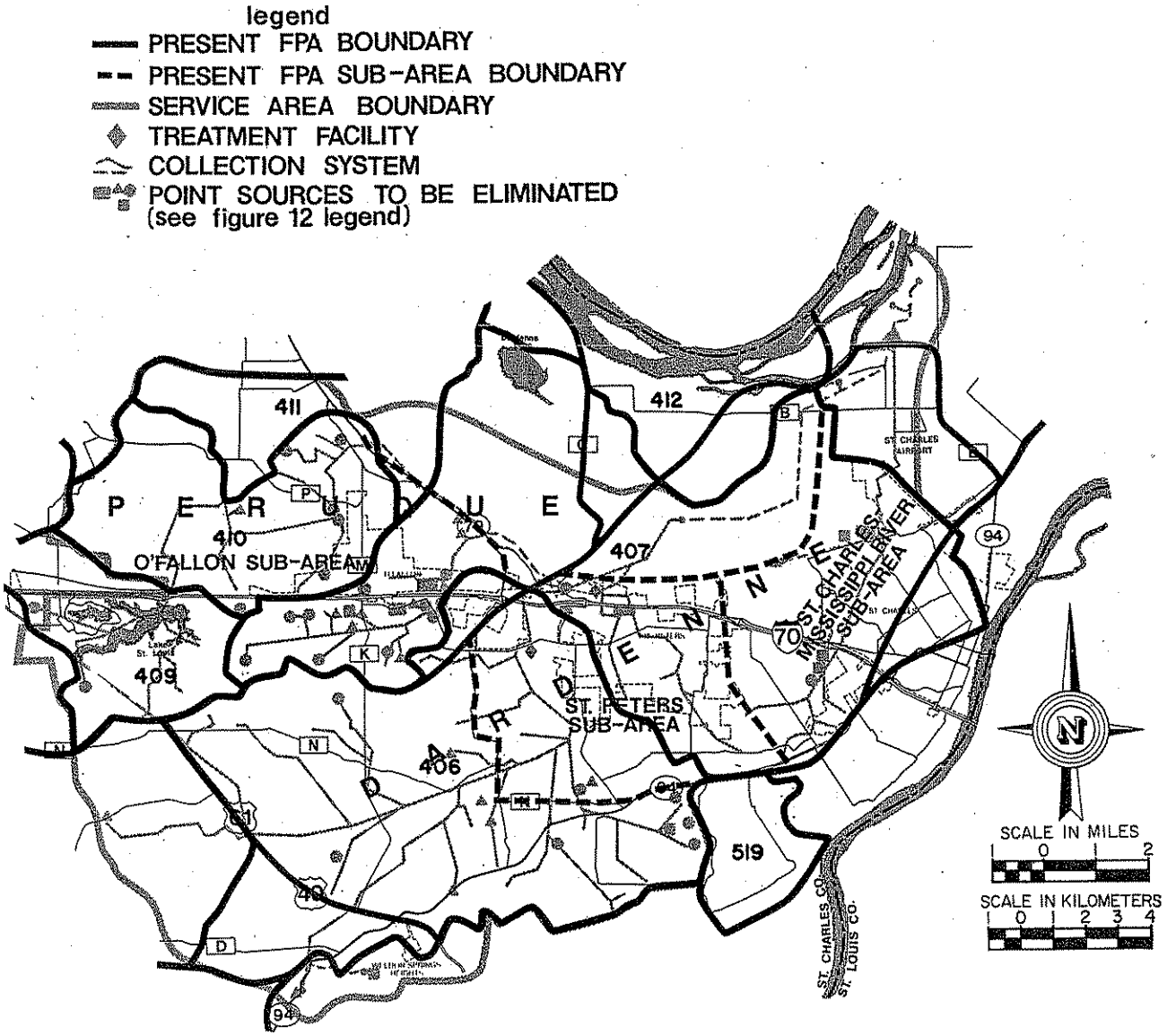


figure 18

ST. CHARLES COUNTY CONSOLIDATED SYSTEM: PRESENT MANAGEMENT AGENCIES

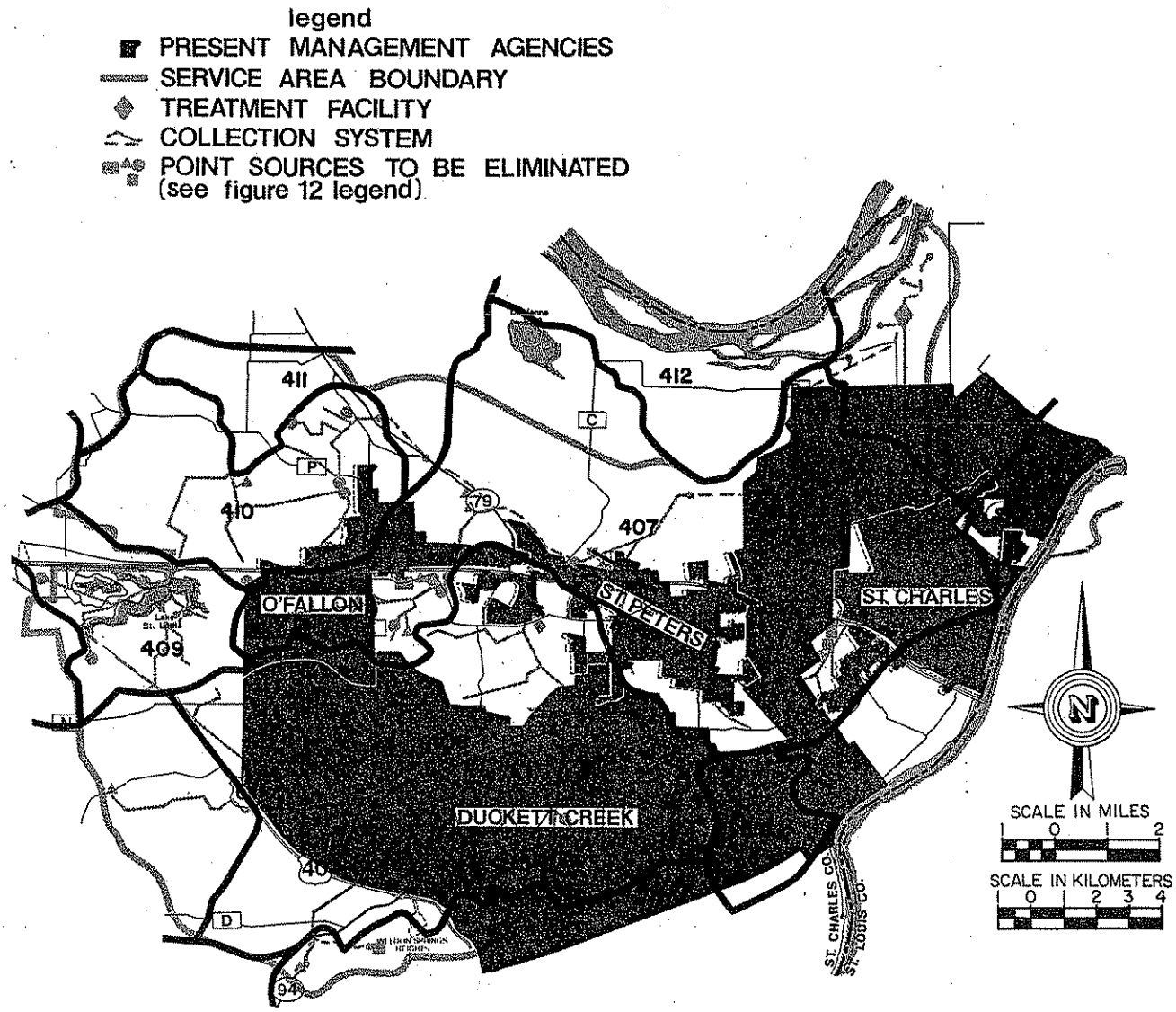


figure 19

area. Facility planning within this area, has not been done in a coordinated manner (Draft Plan, Appendix A); some areas are in Phase 3, others Phase 1, others inactive. A major challenge that emerged from staff discussions, therefore, was to develop an implementation strategy which would address these concerns.

The recommended strategy is the following:

1. The service area should be subdivided into three subdistricts: St. Charles, St. Peters/Duckett Creek, and O'Fallon (see Figure 20). For each subdistrict, the above-mentioned communities and sewer district are recommended to be designated to receive 201 facility planning grants. All future and ongoing facility planning within these subdistricts should be directed at eventually merging into the consolidated system. Based on our recommendation, only trunk sewers and interim facilities would be eligible for Step 2 and 3 grants.

   The jurisdictions within the subdistricts would have total control over the development of subtrunk sewers. Local areas would, therefore, have control over the direction and magnitude of development within their jurisdictions.

2. An agency to manage the trunk and treatment component of the system will not be designated until a consensus is reached among St. Charles County and the component service area jurisdictions. This consensus should be reached by October 1978 in order to meet the implementation schedule.

   208 continued planning funds should be used to help the entities involved reach this important consensus. It is, therefore, recommended that a project commence as as soon as funding is available, that will result in the implementation of this overall management agency. Once the agency is formed, it should immediately initiate facility planning to detail the specific steps necessary toward consolidation.

ST. CHARLES COUNTY CONSOLIDATED SYSTEM: SUBDISTRICTS

legend
- TREATMENT FACILITY
- SUBDISTRICT COLLECTION SYSTEM
- MAJOR CONNECTING TRUNK SEWER
- SUBDISTRICT BOUNDARY
- SERVICE AREA BOUNDARY
- POINT SOURCES TO BE ELIMINATED (see figure 12 legend)

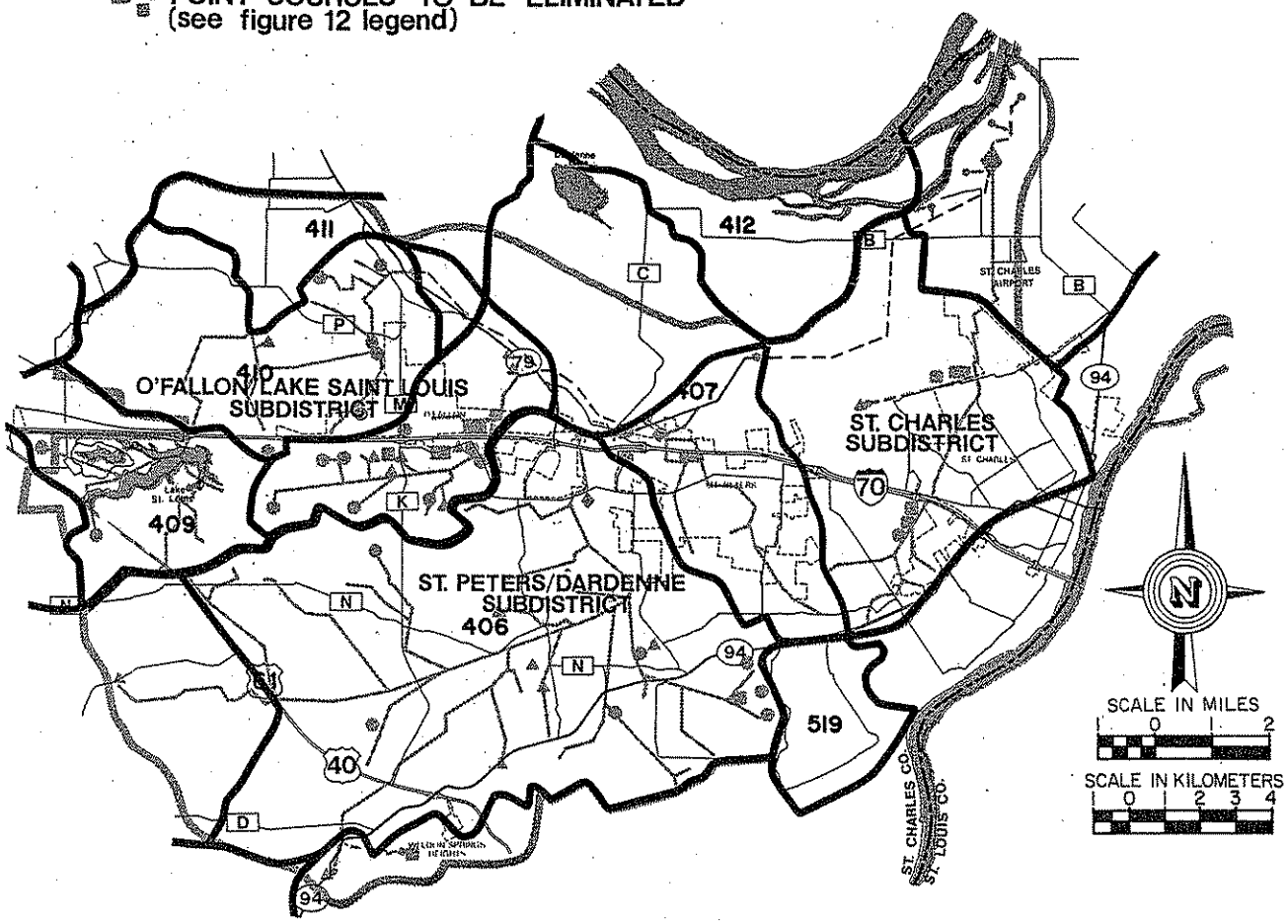


figure 20

AUGUSTA

I. Description

Augusta is located in the southwestern portion of St. Charles County. Presently, Augusta has no treatment system. The proposal is for a secondary treatment facility to serve the main area of the town as well as areas to the north. Discharge from the facility would be through an outfall sewer directly to the Missouri River. Due to the high household costs, a non-sewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Augusta	259	400	IHTS	Secondary treatment facility or non-sewered approaches	0.03	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,342,000	$8,900	$164

IV. Management/Institutional

Existing Agency	Recommended Agency
None	St. Charles County form sewer district

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

DUCKETT CREEK WATERSHED

I. Description

Duckett Creek watershed, located in the eastern portion of St. Charles County, will experience rapid growth during the planning period. The existing secondary treatment facility will have adequate capacity through the next 25 years. The proposal is to extend the existing sewer system to provide treatment for the entire watershed.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Duckett Creek Watershed	Approximately 2,200	7,097	Secondary treatment facility	Expand sewer system	0.61	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,499,000	$58,500	$59

IV. Management/Institutional

Existing Agency	Recommended Agency
Duckett Creek Sewer District	Duckett Creek Sewer District

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

MATSON/DEFIANCE

I. Description

The communities of Matson and Defiance are located on the southeastern tip of St. Charles County. These two small communities have individual septic tank systems and a secondary treatment facility is proposed to serve both communities. Wastewater from Matson would be pumped via a force main to the new plant. Due to the high projected household costs, a non-sewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Matson/ Defiance	175 (est.)	300	Septic Tanks	Construct a new facility or non-sewered approach	0.030	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,248,000	$7,900	$263

IV. Management/Institutional

Existing Agency	Recommended Agency
None	St. Charles County form sewer district

V. Implementation Schedule

Organize Sewer District -- January 1981
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

NEW MELLE

I. Description

New Melle, located in the central western portion of St. Charles County, will remain rural in character over the planning period. Presently, New Melle has no collection and treatment system. A new secondary facility is proposed and will discharge to a tributary stream of Dardenne Creek.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
New Melle	300	550	Septic Tanks	Construct new treatment facility	0.05	Dardenne Creek Tributary

III. Costs

Total Capital	Annual O&M	Annual Household
$995,000	$8,900	$195

IV. Management/Institutional

Existing Agency	Recommended Agency
New Melle	St. Charles County form sewer district

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

ORCHARD FARM

I. Description

Orchard Farm is a small rural community, located in the eastern portion of St. Charles County. The community is presently served by individual home treatment systems. It is proposed to construct a sewer system and storage lagoon for the community with the effluent being utilized for irrigation purposes. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Orchard Farm	175	200	Septic Tanks	Construct a storage lagoon or nonsewered approach	0.01	None

III. Costs

Total Capital	Annual O&M	Annual Household
$554,000	$5,000	$144

IV. Management/Institutional

Existing Agency	Recommended Agency
Orchard Farm	St. Charles County form sewer district

V. Implementation Schedule

Organize Sewer District or Incorporate -- January 1981
Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

PORTAGE DES SIOUX

I. Description

The community of Portage Des Sioux, located in eastern St. Charles County will undergo moderate growth in the next 25 years. Portage Des Sioux is presently served by a community septic tank. A new secondary facility discharging to the Mississippi River, is proposed for the service area. Due to space limitations, a 3-cell lagoon system is not a feasible alternative.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Portage Des Sioux	509	759	Community Septic Tank	Construct a new facility	0.06	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$760,000	$16,100	$97

IV. Management/Institutional

Existing Agency	Recommended Agency
Portage Des Sioux	Portage Des Sioux

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1978
Start Construction -- January 1981

ST. CHARLES-MISSOURI RIVER

I. Description

The city of St. Charles is currently in the process of expanding and upgrading its Missouri River primary treatment plant to a secondary facility to meet effluent discharge requirements. This would also include expanding the existing sewer system to include developed areas to the northeast of the city.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
St. Charles-Missouri River	N/A	22,600	Primary treatment facility	Upgrade to secondary treatment and expand	3.33	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$4,579,000	$185,000	$60

IV. Management/Institutional

Existing Agency	Recommended Agency
City of St. Charles	City of St. Charles

V. Implementation Schedule

Completing 201 Facility Planning -- July 1978
Start Construction -- July 1979

WENTZVILLE

I. Description

Wentzville has recently received funding to construct a 1.0 MGD capacity contact stabilization plant that will treat all wastewater from the Wentzville/Flint Hill area. Effluent will be discharged directly to McCoy Creek. Under new State standards (208 Level 2 criteria), the facility under construction will eventually require upgrading which involves nitrification and disinfection.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Wentzville	3,223	10,000	2 lagoons & trickling filter	Upgrade facility	1.00	McCoy Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$2,200,000	$147,000	$87

IV. Management/Institutional

Existing Agency	Recommended Agency
Wentzville	Wentzville

V. Implementation Schedule

Complete Construction -- January 1979

WEST ALTON

I. Description

West Alton is located in the eastern portion of St. Charles County. The only facility operating in the area presently is a small package plant serving the West Alton Recreation Area west of town. The proposal is to construct a new secondary facility and central sewer system to serve the area. Due to the high projected household costs, a nonsewered approach may be more practical.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
West Alton	425	675	Septic Tanks	Construct a new facility or non-sewered approach	0.05	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,736,000	$9,800	$123

IV. Management/Institutional

Existing Agency	Recommended Agency
None	St. Charles County form sewer district

V. Implementation Schedule

Incorporate or Form Sewer District -- January 1981
Initiate Facility Planning -- January 1982
Start Construction -- January 1984

RECOMMENDATIONS FOR WASTEWATER TREATMENT: ST. LOUIS CITY/COUNTY

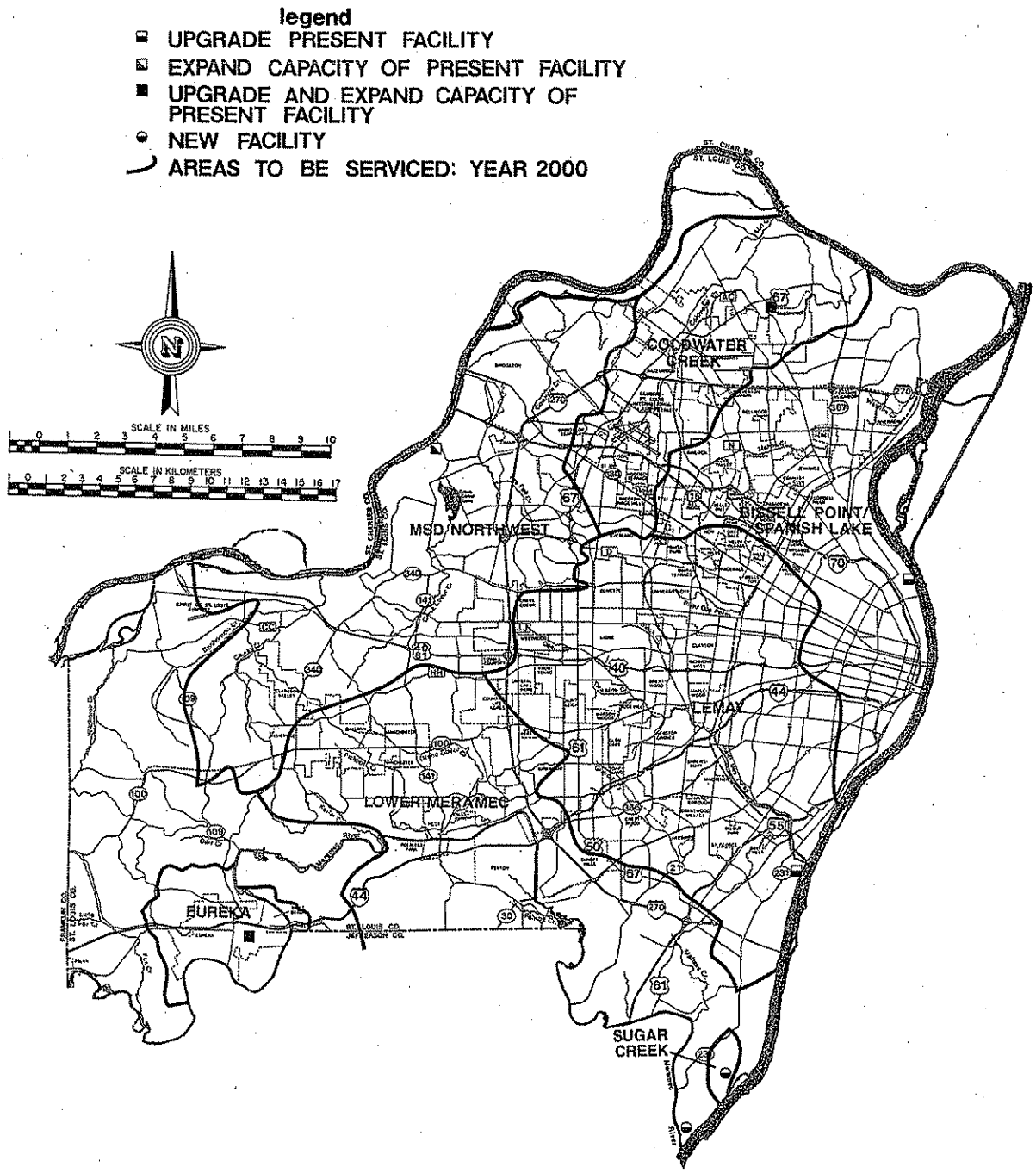


figure 21

TABLE 8

ST. LOUIS CITY/COUNTY
PROCESS RECOMMENDATIONS

SYSTEM NAME	PROPOSED TREATMENT PROCESS	DISCHARGE STREAM
Lower Meramec	Secondary treatment plant without disinfection	Mississippi River
Caulks, Creve Coeur, Cowmire Creeks (MSD Northwest)	Secondary treatment plant without disinfection	Missouri River
Bissell Point(including Spanish Lake)	Secondary treatment plant without disinfection	Mississippi River
Coldwater Creek Watershed	Secondary treatment plant with nitrification and disinfection	Coldwater Creek
Lemay (including Martigney Creek Watershed)	Secondary treatment plant without disinfection	Mississippi River
Eureka/Times Beach	Secondary treatment plant with nitrification and disinfection	Meramec River
Sugar Creek Watershed	Secondary treatment plant without disinfection	Mississippi River

LOWER MERAMEC SYSTEM
(Including Rock Creek Watershed)

I. Description

Currently, the Lower Meramec region is experiencing rapid urbanization with numerous inadequate treatment facilities prevelant in the area. The proposal involves the construction of a regional secondary treatment facility in St. Louis County near the confluence of the Meramec and Mississippi Rivers. This regional facility would provide sewer service via major interceptors for the Lower Meramec area (southern St. Louis County and northern Jefferson County) and the entire Rock Creek Watershed in Jefferson County

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lower Meramec	Approx. 140,000	263,281	Numerous Discharges; Septic Tanks	Construct new MSD St. Louis County Facility	30.90	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$89,106,000	$1,092,000	$39

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Facility Plan Completed -- May 1978
Start Construction -- January 1979

BISSELL POINT

I. Description

The existing MSD primary treatment plant located along the Mississippi River north of downtown St. Louis currently serves approximately 60% of the City of St. Louis and a portion of St. Louis County. The present flow to the 250 MGD plant is approximately 130 MGD. The proposal is to upgrade the existing primary plant to secondary treatment and to expand the existing sewer service area to include flow from the Spanish Lake area in north St. Louis County.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Bissell Point/ Spanish Lake	N/A	579,031	Primary Plant; Spanish Lake facility	Upgrade and expand Bissell Point plant expand sewer system	132.1	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$56,800,000	$2,500,000	Bissell Pt. - $33 Spanish Lake - $14

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Design (Step 2) to be Completed -- September 1978

Start Construction -- January 1979

CAULKS CREEK, CREVE COEUR, COWMIRE CREEK WATERSHEDS
(MSD NORTHWEST)

I. Description

The existing Fee Fee treatment facility (10 MGD rated capacity) serves Fee Fee Creek and Creve Coeur Creek watersheds. The Caulks Creek area is presently served by several small treatment facilities and Cowmire Creek area contains two major treatment facilities: Bonfils and Berry Hills, and other smaller facilities. The Fee Fee treatment plant will be expanded and trunk sewers will be constructed to phase out the existing facilities in Caulks Creek and Cowmire Creek watersheds.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Caulks Creek Creve Coeur Cowmire Creek	N/A	151,510	Fee Fee Master Plant	Expanded Fee Fee Plant and construct new trunk sewers	20.59	Missouri River

III. Costs

Total Capital	Annual O&M	Annual Household
$26,340,000	$739,500	$40

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- June 1978
Start Construction -- January 1980

COLDWATER CREEK WATERSHED

I. Descirption

The Coldwater Creek secondary treatment plant, operated by MSD, is approaching overloaded conditions. The alternative of pumping effluent to the Missouri River from this facility versus upgrading the facility to meet new State standards are analyzed. A slight cost advantage toward upgrading the facility was indicated; however, both alternatives should be studied in greater detail during 201 Facility Planning. The proposal is to expand and upgrade the existing facility and to include the entire Mill Creek watershed in the service area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Coldwater Creek	N/A	194,000	Secondary treatment facility	Upgrade and expand existing facilities	28.30	Coldwater Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$9,746,000	$1,121,000	$29

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- May 1978
Start Construction -- July 1979

EUREKA/TIMES BEACH

1. Description

The Cities of Eureka and Times Beach, located in the western portion of St. Louis County, will experience rapid growth during the planning period. The City of Eureka is served by a secondary treatment facility followed by a polishing pond. The City of Times Beach has no central sewer system and relies mainly on septic tanks. The proposal is to upgrade and expand the existing facility and to expand the service area to include Times Beach and Six Flags' commercial area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Eureka/ Times Beach	2,384	4,700	Treatment plant and polishing lagoon	Upgrade and expand facility	0.67	Meramec River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,791,000	$144,200	$29

IV. Management/Institutional

Existing Agency	Recommended Agency
Eureka/Times Beach	Eureka

V. Implementation Schedule

201 Facility Planning to be Completed -- June 1978
Formalize Intercity Agreement -- October 1978
Begin Construction -- January 1980

LEMAY

I. Description

The existing MSD primary treatment facility serves south St. Louis and southwestern portions of St. Louis County. The proposal is to upgrade the Lemay facility to secondary treatment and to include Martigney Creek watershed in the service area. Plant capacity would be decreased from the 175 MGD to the secondary treatment design of 125 MGD. The new plant design would utilize existing structures as much as possible.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Lemay	N/A	644,777	Primary Facility (175 MGD)	Upgrade facility to secondary treatment	125.00	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$53,600,000	$2,254,000	$29

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Construction (Step III) started -- January 1977

MARTIGNEY CREEK WATERSHED

I. Description

The Martigney Creek watershed, located in the southeastern portion of St. Louis County, will undergo moderate growth during the next 25 years. The area is currently served by 2.0 MGD secondary treatment facility. Due to the proximity of a MSD pump station, the plan is to phase out the existing facility and route the flow through the pump station to MSD's Lemay treatment plant.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Martigney Creek	8,060	11,951	Two contact stabilization facilities	Expanded sewer system and connect to MSD's Lemay plant	1.40	Martigney Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$894,000	$110,000	$38

IV. Management/Institutional

Existing Agency	Recommended Agency
Martigney Creek Sewer Co. and MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

SPANISH LAKE

I. Description

The Spanish Lake area, located in northern St. Louis County, is served by a MSD secondary treatment facility. Approximately 48 percent of the Spanish Lake service area is presently unsewered. The proposal is to abandon the Spanish Lake treatment facility and pump the flow to the MSD Bissell Point secondary treatment plant. Sewer service would be provided for the entire Spanish Lake Creek watershed area.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Spanish Lake	N/A	8,080	Treatment Plant	Abandon facility and pump flow to Bissell point	1.40	Mississippi River

III. Costs

Total Capital	Annual O&M	Annual Household
$1,908,000	$16,000	$14

IV. Management/Institutional

Existing Agency	Recommended Agency
MSD	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- June 1978
Start Construction -- July 1980

SUGAR CREEK WATERSHED

I. Description

The Sugar Creek watershed located in southeastern St. Louis County, will develop rapidly over the planning period. Currently, the area has a secondary treatment facility. The proposal is to extend service to the remainder of the watershed. During 201 Facility Planning, the alternative of routing sewage flow to the proposed Lower Meramec treatment plant should be examined closely.

II. Design Considerations

Area	1970 Population	2000 Population	Existing System	Recommendations	Design Flow (MGD)	Discharge Stream
Sugar Creek	1520	3140	Extended aeration plant	Expand sewer system to entire watershed	0.40	Sugar Creek

III. Costs

Total Capital	Annual O&M	Annual Household
$1,012,000	$28,600	$63

IV. Management/Institutional

Existing Agency	Recommended Agency
South County Sewer Co.	MSD

V. Implementation Schedule

Initiate 201 Facility Planning -- January 1982
Start Construction -- January 1984

3. NONPOINT SOURCE CONTROL MEASURES

I. INTRODUCTION

Immense quantities of pollution enter practically all streams without ever flowing through pipes, sewers, treatment plants or stormwater outfall structures. Such wastewater sources have been characterized as "sources without a post office address." Wastes in this category include runoff from land surfaces, roof downspouts, streets, parking lots and construction sites. Such wastes can have detrimental effects on groundwater and surface water resources. The particular use of the land often determines the extent and seriousness of such nonpoint pollution sources.

Recognition of the seriousness of nonpoint source pollution has increased during the recent years; yet, there has been little evidence of constructive programs for its regulation. The importance of nonpoint sources of pollution and methods for their control has only been brought into sharp focus through the current 208 Water Quality Management studies. While nonpoint source problems have long been recognized by pollution control agencies, point sources, such as municipal and industrial waste discharges, were not only more definitive, but administratively and technically much easier to control and demonstrate a beneficial effect on water quality. However, with the recognition that current water quality standards cannot be attained without the control of nonpoint sources, attention is now being focused on the necessary controls of such sources.

Control of nonpoint sources of pollution is an essential part of a water quality management program. Relating the conclusions of a recent study by the Federal Council on Environmental Quality to the St. Louis 208 study area, it can be estimated that from 40 to 80 percent of the total pollution entering surface waters in a metropolitan area comes from sources other than municipal or industrial waste treatment plant discharges.

There are two ways nonpoint source pollution can be controlled: 1) through treatment of all land runoff (termed structural control measures), which is rarely economically feasible for all sources; or 2) controlling how the land is developed and utilized by preventing or minimizing pollution runoff discharges from it (termed nonstructural control measures).

Structural control measures do not strive to eliminate sources of pollution or actions that cause it, but collect and concentrate pollutants for treatment. Structural control measures for controlling urban runoff are physical actions that collect, store and treat the runoff water, or through contour landscaping, strive to imitate the pre-development hydrology of a site after it is developed.

A nonstructural control measure is an action, either physical or legislative, which attempts to prevent pollution from occurring. An example of a nonstructural control is an ordinance which regulates the use of septic tanks in areas determined to be environmentally sensitive; or, an innovative approach to streetsweeping so that more potential pollutants can be removed from urban surfaces.

A full range of structural and nonstructural control measures were developed during Phase 2 of the 208 program (Element 11 Report). They were evaluated for cost-effectiveness and implementability in each of the counties. The nonpoint source control recommendations presented in this section are a composite of the most appropriate structural and nonstructural controls for addressing this area's nonpoint problems.

In our nonpoint source control recommendations, nonstructural controls are emphasized. Nonstructural controls are less expensive and are often more implementable than structural controls. The lack of federal and state grant assistance to governments who are willing to implement structural controls is a major impediment; without grants, these governments are often faced with costs that are both politically and practically too high.

II. METHODOLOGY FOR DEVELOPING NONPOINT SOURCE CONTROLS

Nonpoint source problems were identified, by constituent, for each of the watershed areas within each of the counties in the St. Louis 208 area. Total annual loadings of nonpoint source pollution were then compared to annual point source loadings and conclusions were drawn regarding relative significance (Element 11, Appendix B). Nonpoint source

pollution constituents natural in origin were separated from those anticipated to be man-induced.

As the pollution sources were revealed and the 208 water quality goals formulated, pollution control strategies were developed. An example of this method was the development of the pollution control strategy for individual home treatment systems (IHTS). From this overall strategy, specific nonpoint source controls, such as minimum lot size and site inspection, were detailed. Thus, the plan formulation involved four basic steps:

1. Problem identification.

2. Setting of goals

3. Development of control strategies

4. The design of nonpoint pollution controls

Problem Identification

Through the use of computer modeling and supplemental sampling, the major sources of nonpoint pollution in the St. Louis 208 area were determined to be:

1. Stormwater runoff of sediments and several contaminants from developed urban areas.

2. Stormwater runoff of sediments from unprotected soil exposed by construction activities.

3. Proliferation of poorly designed and installed individual home treatment systems (IHTS), along with inadequately maintained or malfunctioning septic tanks and other IHTS.

4. Runoff of sediment and chemical nutrients from agricultural lands.

The development of a comprehensive problem statement resulted in the formulation of a number of overall nonpoint source program goals.

Setting of Goals

Four major goals were identified which provided the framework for future nonpoint source activities:

1. To reduce concentrations of fecal coliform, phosphate, ammonia, oil and phenols in area watercourses.

2. To coordinate point and nonpoint source controls for optimum water quality improvement.

3. To reduce pollution loadings from urban runoff, septic tank seepage and agricultural runoff.

4. To establish a waste load allocation system for the Mississippi River drainage on a multi-state basis.

Development of Control Strategies

Control strategies were devised which detailed the kind of specific actions necessary to meet the overall nonpoint source program goals. The strategies evolve from three general areas of nonpoint control considered critical to the 208 St. Louis area: urban runoff, construction site runoff, and individual home treatment systems. These strategies are:

--Urban runoff pollution from existing and new developments should be minimized to the extent that is economically feasible. This strategy contains elements of environmental design; combined sewer control; commercial, industrial and high density residential controls.

--Construction site runoff strategy requires sediment control. Because many areas in the metropolitan region will undergo development or redevelopment over the next 25 years, water quality should be protected by reducing sediment loading at the construction site.

--The IHTS control strategy consists of two aspects: IHTS performance can be improved by assuring that new systems are developed in environmentally suitable manner; the performance of existing IHTS can be upgraded with a comprehensive operation and maintenance program.

The Design of Nonpoint Pollution Controls

Nonpoint source controls were developed during the second phase of the 208 study by designing systems based on the three strategies outlined above. An initial analysis examined a full range of structural and nonstructural controls for nonpoint pollution problems within each county (Element 11, Chapters 3 and 4). This set of Phase 2 controls was devised as a response to anticipated nonpoint source problems; effectiveness and feasibility of enforcement and implementation were considered in the development of these controls. The controls were presented for public evaluation and review at the February, 1976, Citizen Workshops. Participants were asked to determine which controls merited further investigation during Phase 3 of the study (Element 18 Report). Staff and consultants also eliminated some of the obviously expensive and impractical controls prior to Phase 3.

During Phase 3 of the study, the remaining nonpoint source controls were evaluated based on these criteria: water quality effectiveness, cost, and implementability. Three levels of desired water quality were used to evaluate effectiveness (Element 23, Chapters 2 and 3):

Level 1--Current nonpoint source controls would be adequate; no additional controls would be necessary.

Level 2--The objective of this level is to achieve the State of Missouri's proposed water quality standards. From a nonpoint source standpoint, this means that all controls devised will be directed at reducing sediment and peak runoff. It is important to note that reductions in sediment discharges would also reduce loadings of phosphate, BOD, ammonia, and some fecal coliform as an incidental benefit.

Level 3--This level is directed at obtaining the water use objectives developed in the St. Louis 208 Program. In general, the standards that would have to be met are more stringent

than the proposed State of Missouri standards. Most notably, Level 3 established a criteria of 0.05mg/l for phosphate (the State has not established a criteria) and more stringent criteria for fecal coliform and ammonia than proposed by the State. Nonpoint source controls for Level 3 would not only require detention of runoff, but also treatment for the constituents mentioned above.

Nonpoint source controls were categorized by the water quality level that could be achieved. Further, a detailed inventory of existing nonpoint sources practices was compiled by county. An assessment was made as to the feasibility of enforcement and implementation of specific controls within each county. Costs were developed for each control using different methodologies for the respective control measures (Element 11 and Element 24). Cost information was presented at workshops, committee meetings and state and federal meetings with the primary objective of determining the most effective nonpoint source control strategy to pursue. Through this review procedure, Level 2 control measures were deemed the most practical and implementable of the three levels. Further, Level 2 controls will aid in the attainment of the overall program goal of fishable and swimmable waters by 1983.

III. NONPOINT SOURCE CONTROL MEASURES

Using the methodology described above, recommendations for the control of nonpoint sources of pollution in the 208 study area have been developed. The nonpoint source control recommendations in this Plan report are a summary of the detailed recommendations which can be found in the Element 21 Reports; those reports should be consulted for more detailed information.

The format for presenting these recommendations is as follows: for the two major categories of nonpoint source pollution--individual home treatment systems and urban stormwater runoff--

1. A general description of the problems caused by the nonpoint source is given.

2. The specific recommendations are described.

3. The cost of the recommendations are presented.

4. A county-by-county analysis of implementation issues is provided. A more detailed analysis is presented in Section 6 of this report.

Although the effect of agricultural runoff on nonpoint source loading in the study area has been estimated, agricultural nonpoint control measures have not been developed in this Plan. The State of Missouri is developing control measures for agricultural runoff on a state-wide basis. Obviously, for a complete and effective nonpoint source control program, both urban and rural aspects must be coordinated; during 208 continued planning, the State's agricultural runoff recommendations should be integrated into the nonpoint source control program for this study area.

Individual Home Treatment Systems (IHTS)

In 1975, individual systems were used by more than 136,000 people in the study area (Element 11 Report, Appendix F). Eight watersheds each had more than 5,000 people using these systems. Improper installation, operation and management of these systems cause water quality problems throughout the 208 study area.

Problems caused by these systems can be easily identified, as when effluent from a drain field runs off onto adjacent property; or they can be just one of a number of sources which contribute to the degradation of a stream. Throughout the 208 study, numerous identified problems were brought to staff's attention by citizens. Based on this experience, and in the opinion of local officials, there are many malfunctioning systems within the study area. The 208 study also estimated the relative impact of individual systems on water quality by estimating the pollution loading they contribute as a percentage of the total pollution loading in a stream (Element 11 Report, Appendix B).

A. Control Recommendations

The objective of an IHTS control program is to minimize public health and nuisance problems and local water quality problems. An effective IHTS control program is designed around four basic areas:

1. Insure proper location, design and installation of new systems.

2. Insure the proper operation and maintenance of new and old systems.

3. Provide means for the proper disposal of IHTS residue (septage).

4. Provide special controls for problem sites.

A detailed description of the recommendations for each of these areas is as follows:

1. Insure proper location, design, and installation of new systems. The key aspect of these controls is the building permit: the use of an IHTS would be an important element of the permit application. The following factors should be considered by a county or municipal building department before a permit is issued for a lot with an IHTS:

a. Lot Size. For subdivisions of between 2 and 10 houses, a minimum lot size of 15,000 square feet is permissible as long as the IHTS drain fields are separated by at least 300 feet. For subdivisions of between 11 and 25 houses, a minimum lot size of 30,000 square feet is permissible as long as the IHTS drain fields are separated by at least 400 feet (see Figure 22). Individual systems are not recommended for subdivisions of more than 25 houses. The combination of the minimum lot sizes and distances between drain fields are aimed at achieving an overall development density of one discharging IHTS per 2 acres. This density includes a factor of safety to protect water quality from potential pollution sources.

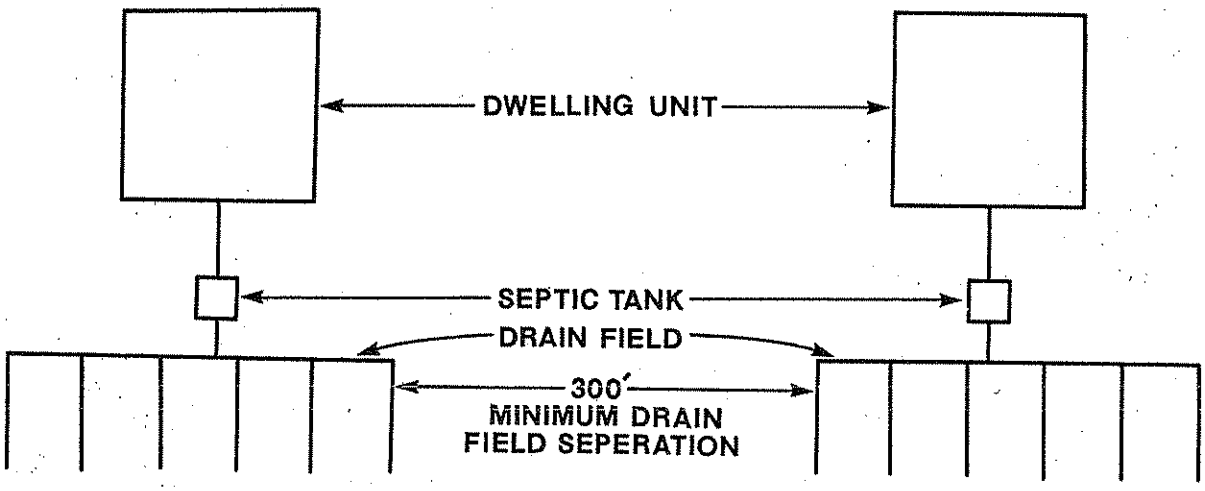
While in some instances such a density of one IHTS per 2 acres may exceed the amount necessary, reductions can be considered depending upon such factors as shape and dimension of lots; the location and layout of the disposal field; and the proximity of drinking water sources, especially on adjacent property. Any modifications in area should depend on the evaluation of the particular installation by the permitting local authority.

b. Inspection and tests. Site inspection by a Registered Professional Engineer (or a trained technician) should be carried out prior to application for a building permit. If the site is determined by the inspector to be environmentally sensitive, a sample of soil from the proposed location of the absorption field should be collected and submitted for a laboratory permeability test. The results of the test will be used as a guide for determining the type of IHTS that should be used (or what modifications may be necessary) and the size of the soil absorption field.

c. Site design. An engineering design of the proposed IHTS should be submitted with the application for a building permit. This design should include:

IHTS LOT SIZE AND SEPARATION RECOMMENDATIONS

2-10 HOUSING UNITS
MINIMUM LOT SIZE = 15,000 SQ. FT.



11-25 HOUSING UNITS
MINIMUM LOT SIZE = 30,000 SQ. FT.

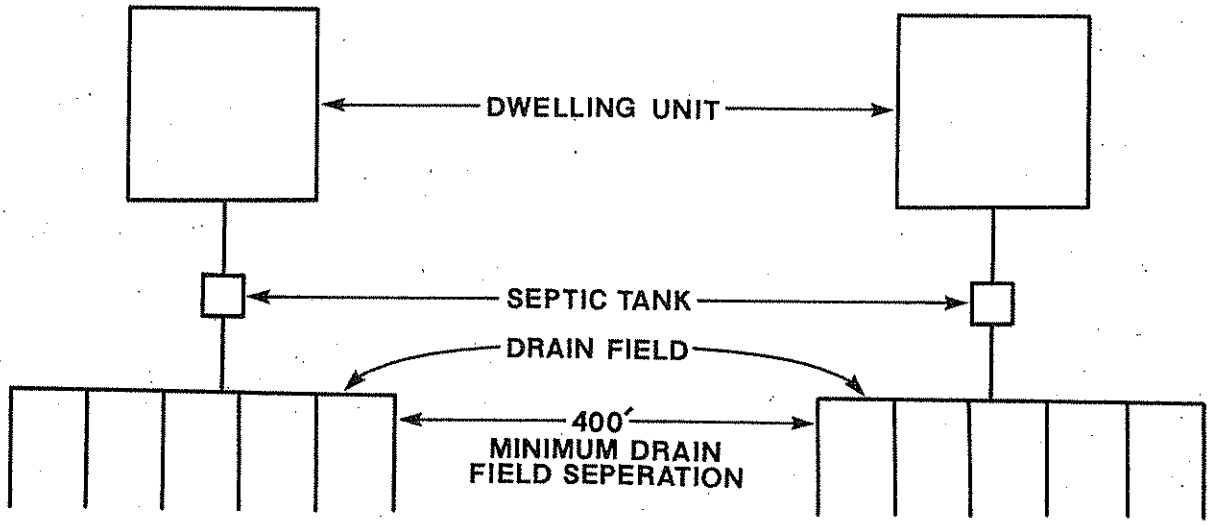


figure 22

--A general description of the site.

--Specific comments on the characteristics of the site, such as soil type, soil thickness, soil permeability (percolation); surface slope; underlying geology; proximity to lakes, streams, drainage ways, and depth to groundwater.

--A description of the proposed IHTS to be used on site (see Figure 23 for examples).

--A site plan showing location of all IHTS components as well as location on the property of all existing and proposed structures; pipelines and other buried utilities; property boundaries; water supply wells; lakes; ponds; streams; sinkholes and other subsurface features (such as abandoned cisterns) which could affect the operation of the IHTS.

This engineering design should be submitted to the county building department for review. The department may request further explanation or documentation of design procedures from the design engineer if necessary. Upon the approval by the county building department of the engineering design, a building permit will be granted.

d. System requirements. There are several types of IHTS which are acceptable in the 208 study area (the specific IHTS model must meet 208 criteria and installation requirements as outlined in section e.):

--A septic tank/soil absorption system which is properly designed for local conditions during the building permit process.

--An aerated individual wastewater treatment system with either:

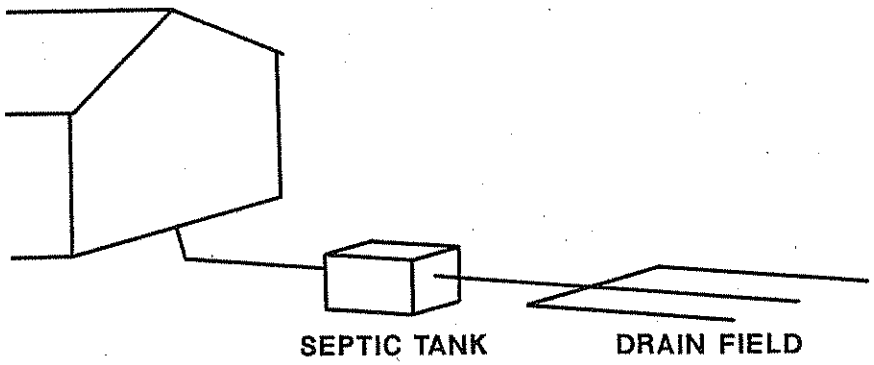
1) An adequately designed soil absorption or sand filter system, designed by a Registered Professional Engineer.

2) An effluent holding chamber with disinfection system and sprinkler or other controlled surface distribution system which discharges all effluent on property. Public access to the area should be limited for health reasons in case the chlorinator fails.

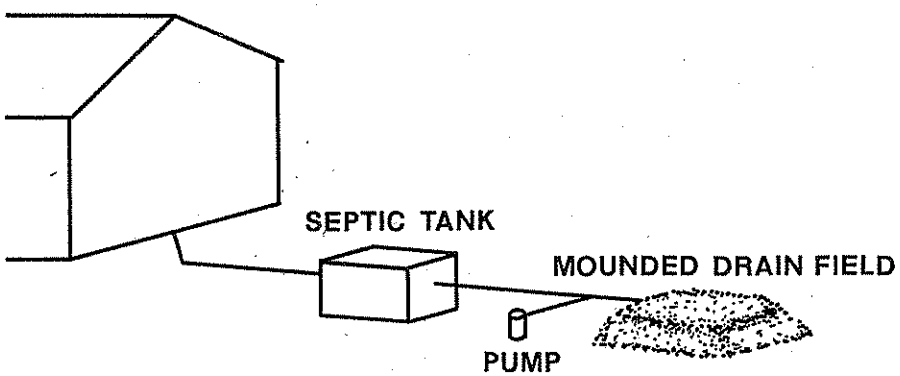
--Alternative home treatment systems would be acceptable if they are in compliance with 208 criteria and requirements (examples of alternative IHTS's can be found on pages 3-61 through 3-63 of the Element 11 Report).

EXAMPLES OF INDIVIDUAL HOME TREATMENT SYSTEMS (IHTS)

IHTS WITH TRADITIONAL DRAIN FIELD



IHTS WITH MOUNDED DRAIN FIELD



AERATED IHTS

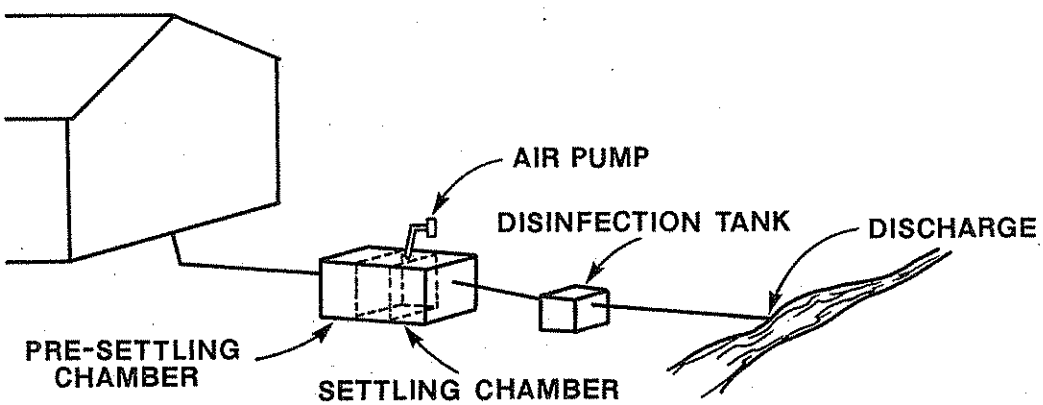


figure 23

e. Installation requirements. Presently, installers of IHTS units are not licensed or bonded by county or local authorities within the 208 study area. Since it is recommended that the installation of units be supervised by a trained inspector from the building department, regulation of IHTS installers would not be necessary. The inspectors will provide the proper safeguards regarding the performance and installation of the unit. Prior to burial of the unit, one final inspection should be made to determine that the system was installed as specified in the site design.

2. Insure Proper Operation and Maintenance.

a. Operation permits. Operation permits would be required for all systems after inspection determined the system to be working properly. Permits would expire every two to three years and would be renewed after an inspection by the building department determined the system to be working properly.

b. Maintenance and repairs. Maintenance and repairs would still be voluntary unless the system failed and the owner would not or could not effect necessary repairs. If an inspection resulting from a private complaint or the regular two-to-three-year inspection revealed system failure, the owner would be denied an operation permit and given 90 days to correct the problem. If the problem was corrected in that interval, the permit would be reissued. Otherwise, the owner would be fined. (Inspection would be required to determine that th problem had been corrected. If the tank was pumped, the owner would submit a receipt from a septage hauler.)

If the owner still did not repair or maintain the system, the building department could:

--Deny an occupancy permit so that if the property was sold, the house could not be occupied until the IHTS was put in working order.

--Levy additional fines until the system is repaired; or put a lien on the offender's property.

--Make necessary repairs and bill the owner. If the owner refused to pay, a lien could be placed on the property.

3. Disposal of IHTS Waste Sludge. An important element of an IHTS regulatory program is to provide the means for the property removal and disposal of the waste sludge (septage). To function properly, the system must be periodically pumped of its septage; without periodic pumping, the system

provides practically no treatment. Proper disposal of the septage must be assured; pollution problems could result from disposing the septage improperly.

a. Removal of septage. Septage haulers should be licensed by the building department to insure that they pump and dispose septage in the proper manner. Licenses should expire every two to three years. All haulers should keep records of systems pumped and receipts from septage disposal plants showing how many loads of septage were discharged.

According to these records, if the septage pumped by a hauler exceeded the amount legally discharged by more than 5 percent, the hauler's license could be suspended. Repeat offenses could result in longer suspensions, fines or permanent revocation of the license.

The licensing program would be operated jointly with the IHTS operation permit program. For IHTS users to receive an operation permit, proof that their system was properly pumped (a receipt from a hauler) would be sent to the regulatory agency. This receipt could be used to make spot-checks on the accuracy of the information provided by the haulers.

b. Disposal of Septage. The 208 Plan recommends developing a system of Regional Sludge Processing Centers that would be utilized by haulers to dispose of septage. The location of these centers and their service areas are described in Section 4 of this report.

4. Controls for Problem Sites. During inspection and testing of the proposed system site, if the inspector determines the area to be one of 7 types of environmentally sensitive areas-areas with thin soils; soils with low permeability; areas underlain by solutioned or fractured limestone; aquifier recharge areas; moderate to steep land surface slope; lake-stream border areas; high watertable areas--special precautions must be taken to insure that the system does not adversely affect water quality. The recommendations presented below are general; the inspector and regulatory agency should design site specific solutions.

a. Areas with thin soils. Acceptable systems for thin soil include but are not limited to:

--Evapotranspiration systems, with either:

1) An extra large shallow drain field designed so that no part of the system is more than 30 inches below the ground surface. Criteria for sizing the drain field to utilize evapotranspiration effectively are given in the Element 21 Report, Appendix B.

2) An aerated tank equipped with a holding tank followed by chlorinator; and controlled surface distribution system for use of effluent for irrigation.

--Augmentation or replacement of soil for absorption system using:

1) Mounded soil absorption system.

2) Sand filter (to be used with aerated tank only). Design criteria for sand filters and mounded soil absorption fields are given in the Element 21 Report, Appendix B.

--Water conservation devices such as low-volume flush toilets and pressure reducing valves. With water conservation measures in use, soil absorption fields can be sized smaller in proportion to the reduction of household wastewater discharge.

--Separate gray water/black water system in which black water is treated in a septic tank-soil absorption system or an aerated system and gray water is recycled where possible and treated in a separate soil absorption field.

b. Soil with low permeability. In addition to those systems recommended for areas with thin soils, these systems could also be used:

--System sized on the basis of soil absorption trench sidewall area, instead of or in addition to bottom area. Sidewall area alone could be used where permeability of compacted soil on trench bottom is insufficient to allow infiltration of normal volume of effluent. Trench area should be sized so that required average flow rate through the trench walls is no greater than 75 percent of the laboratory coefficient of permeability of the soil in gpd/ft.

--System with two soil absorption fields, each designed for full capacity of IHTS effluent. These absorption fields are to be operated one at a time on an alternating basis to allow the soil in each to dry and recover its permeability and treatment capability between uses.

c. Areas underlain by solutioned or fractured limestone. System should not be located where structural failures are likely to occur; where rapid flow of effluent through limestone is likely to endanger quality of nearby surface or groundwater; or where change in water table elevation due to use of a discharging IHTS is likely to cause structural failure.

--Use of evapotranspiration systems with disinfection of effluent is required if probable movement of effluent to surface of subsurface potable water supplies is suspected by inspector.

--Water conservation measures would be beneficial.

d. Aquifier recharge areas. Acceptable systems for recharge areas include but are not limited to:

--Use of adequate soil absorption system for removal of bacteria and nitrate. Alternate use of two full-sized absorption fields is highly desirable.

--Evapotranspiration systems.

e. Moderate to steep land surface slopes. Acceptable systems include but are not limited to:

--Contoured or stepped soil absorption fields, sized according to soil and geologic considerations.

--Mounded soil absorption field.

--Terraced or stepped sand filter system.

(Design criteria for these systems are given in the Element 21 Report, Appendix B.)

--Water conservation devices such as low-volume flush toilets and pressure reducing valves.

f. Lake-stream border areas. Distances between wells, lakes and streams and the IHTS should be determined by an inspector on the basis of site inspection and a soil permeability test. Measures to protect lakes and streams should include all the following:

--Surface discharge into intermittent streams, wet-weather drainageways and roadside ditches should not be permitted even if such ditches and drainageways cross the property of the IHTS owner.

--Distances of absorption field for lakes, wells and streams should be great enough so that effluent undergoes sufficient contact with soil under aerobic conditions to remove most phosphates, nitrates and bacteria.

--IHTS discharge should be prohibited in fractured or solutioned limestone areas near lakes or streams unless the inspector provides evidence that special measures have been taken to ensure that effluent undergoes sufficient soil contact for treatment, as specified in the above, before it reaches bedrock.

Criteria for determining minimum distances for the above recommendations are given in the Element 21 Report, Appendix B.

g. High water table areas. Installation of IHTS should be prohibited where the long-term maximum water table elevation is less than five feet below the bottom of the soil absorption field.

IHTS installation should also be prohibited unless a properly designed mounded soil absorption field allows for flow of effluent vertically downward through at least 5 feet of soil before it reaches the water table.

Justification of this criteria is given in the Element 21 Report, Appendix B.

B. Cost of Recommendations

IHTS control is anticipated to cost $680,000 per year in the St. Louis 208 study area. This translates into annual operating cost of between $150 and $200 per household using IHTS units. Table 9, abstracted from the 21 Reports, presents the estimated cost to households.

The Clean Water Act of 1977 has made some of the costs of maintaining individual systems grant eligible as long as a public agency runs the maintenance program. The capital costs of a maintenance program--septic tank pumpers for instance--could be eligible for federal grants of up to 85 percent of their cost. Communities or sewer districts who take advantage of this program could substantially reduce the cost of proper IHTS maintenance to their constituents. In 208 continued planning, efforts will be made to establish IHTS maintenance programs.

TABLE 9

COST OF IHTS CONTROL PER HOUSEHOLD

	New or Replaced System	Renovated System	Old System
CAPITAL COSTS PER HOUSEHOLD			
Engineering Design and Inspection	$550	$450	--
Agency Review or Inspection	50	50	--
Installed System	2,100	1,600	--
TOTAL CAPITAL COST	2,700	2,100	--
ANNUAL O&M COSTS PER HOUSEHOLD			
Permit Inspection	25	25	25
Permit Administration	5	5	5
Pumping and Cleaning	75	75	75
Supplies and Power	90	50	--
TOTAL ANNUAL COST	$195	$155	$105

C. Implementation of IHTS Recommendations

FRANKLIN COUNTY:

Present IHTS Regulations

1) Location, Design, Installation

The minimum lot size for IHTS installation is 20,000 square feet. A percolation test is required for lots of one acre or less to receive a building permit. A site engineering design is not required for the application of a building permit.

There are two types of systems approved in Franklin County:

a. A septic tank designed and installed according to the Building Official Conference of America BOCA Code.

b. An aerated system with or without drain fields (if discharge is contained on the owner's property).

A Building Department inspection of the system is required before the unit is buried as a condition of the building permit.

2) Operation and Maintenance

Operation permits are not required. Maintenance and repair is on a voluntary basis by the owner. Conventional septic tank systems, particularly those installed prior to the control of IHTS by the County Building Department, are maintained by pumping only when failure is evident. The County Building Department will respond to complaints regarding the systems. The Building Department has no enforcement capability of its own and compliance is generally voluntary.

3) Disposal of Waste Sludge

Haulers are not licensed and records are not maintained of either septage pumped or the septage discharged at treatment plants.

4) Special Problem Sites

For areas with thin soils, recommendations are made on an individual basis between the property owner and the County

Building Department. Presently, aerated systems with surface discharges are used with some systems freely discharging and others contained in tanks and ponds. There is a small percentage of areas underlain by solutioned or fractured limestone. For areas with steep-to-moderate slopes, systems are designed on an individual basis by agreement of the property owner and the County Building Department. Generally, the absorption field or surface discharge point is located a sufficient distance from the downslope boundary insuring that effluent is contained on the property. Distances to wells, lakes and streams from an IHTS tank and absorption field are specified in the BOCA Code. The direct discharge of IHTS effluent to lakes and streams is not permitted; however, in discharging to road ditches on the property, the flow often ends up in lakes and streams.

Recommendations for Improving Present Franklin County IHTS Regulations

There are two issues which must be addressed before Franklin County can implement the 208 IHTS recommendations:

1) There is a question concerning whether Franklin County, as a Missouri second class County, has the statutory powers to implement the full set of recommended IHTS controls. It is questionable whether the county can regulate IHTS through a permit system, and enforce IHTS regulations through fines and property liens. Clarification of this issue has been sought through an opinion from the Missouri Attorney General (see Appendix F).

2) The cost of the recommendations to the homeowners is high. Without some method of lessening this financial burden, implementation of the controls will be resisted by County residents. The 1977 Clean Water Act provides this needed financial assistance through federal grants of up to 85 percent of the costs of installing and maintaining "innovative and alternative" treatment systems, which include IHTS. To be eligible for these grants, an area must be under the jurisdiction of a public management agency; the County itself is not grant eligible. Public management agencies-sewer districts--must be created in unincorporated areas as a precursor to grant eligibility.

In the light of these issues, the following actions could be taken by Franklin County to upgrade their present IHTS regulations. It is emphasized that these actions are not binding on the County; ultimate decisions on the extent and format of IHTS control lies with the County.

1) To help administer and enforce an upgraded IHTS program, County Public Health and Public Works Departments should be established. These new departments could work with the present IHTS regulatory agencies--the Planning and Building Departments-to develop a comprehensive regulatory program.

2) A Registered Professional Engineer (or a trained technician) should be used by the building department staff to inspect IHTS units.

3) The U.S. Soil Conservation Service is currently undertaking an extensive soil analysis of Franklin County. When completed, information from this analysis should be used to develop measures to mitigate IHTS problems in unfavorable soil conditions.

4) The Building Department must gain increased support from the Prosecuting Attorney in the area of enforcement, as well as partaking in a more active role in the licensing of septage haulers.

5) For new developments of two to 25 homes using IHTS as a method of wastewater treatment, an overall density of one system per two acres should be maintained. The Building and Planning Departments could work with the developer to develop methods of meeting this goal at the lowest possible cost. Modifications could be made based on local geological conditions.

6) The County Court should form sewer districts where necessary for the purpose of IHTS regulation. These districts could be eligibile for federal and state grants which would defray the cost to the homeowners.

JEFFERSON COUNTY:

Present IHTS Regulations

1) Location, Design, Installation

The present minimum lot size for IHTS installation is 20,000 square feet. Site inspection is carried out by an official of the County Building Department as a requirement for obtaining a building permit. The permit can be denied if the plan includes an IHTS and the inspector determines that the site is unsuitable for it. A percolation test is required. A Site Engineering Design is not required for a building permit.

There are two types of systems approved by the Jefferson County Building Department:

a. A septic tank with a conventional soil absorption system, sand filter or waste stabilization lagoon.

b. Eco-robic (brand name) system, with or without further treatment devices.

A Building Department inspection of the system is required before the unit is buried as a condition of the building permit.

2) Operation and Maintenance

An operation permit is not required. Maintenance and repair is on a voluntary basis by the owner. Conventional septic tank systems, particularly those installed prior to the control of IHTS by the County Building Department, are maintained by pumping only when failure is evident. The County Building Department will respond to complaints regarding the systems. The Building Department has no enforcement capability of its own and compliance is generally voluntary.

3) Disposal of Waste Sludge

Haulers are not licensed and records are not maintained of either the septage pumped or the septage discharged at treatment plants.

4) Special Problem Sites

In areas with this soil, the Building Department may deny a building permit or allow only these systems: a shallow drain field utilizing evapotranspiration, or a holding tank system with a chlorinator and effluent surface spray. Much of northern Jefferson County is underlain by solutioned or fractured limestone. Inspection of proposed sites prevents the development of systems in these areas. On areas of moderate to steep slopes, Jefferson County can allow a stepped or contoured soil absorption field or they may deny a permit. The minimum distance to lakes, streams, wells and other surface waters is specified in the County Building Code. An IHTS cannot be placed in an area where the maximum seasonal groundwater elevation is less than four feet below the bottom of the absorption field trench.

Recommendations for Improving Present Jefferson County IHTS Regulations

Jefferson County faces the same issues that Franklin County does in implementing the IHTS recommendations. In addition, the County does not have a planning department to coordinate a comprehensive control program. When the County achieves first class status, questions concerning its ability to enact and enforce IHTS controls will be resolved and the County could form a planning department without a popular vote.

In the light of these issues, the following actions could be taken by Jefferson County to upgrade their present IHTS regulations. It is emphasized that these actions are not binding on the County; the ultimate decision on the extent and format of IHTS lies with the County.

1) Jefferson County Planning Department should be formed to enact a comprehensive IHTS control program .

2) A Registered Professional Engineer (or trained technician) should be used by the Building Department to inspect IHTS units.

3) An analysis of county soils should be performed which can be used to mitigate IHTS problems in unfavorable soil conditions.

4) The Building Department must gain increased support from the prosecuting attorney in the area of enforcement, as well as partaking in a more active role in the licensing of septic haulers.

5) For development of two to 25 homes using IHTS as a method of wastewater treatment, an overall density of one system per two acres should be maintained. The Building Department could work with the developer to develop methods of meeting this goal at the lowest possible cost. Modifications could be made based on local geologic conditions.

ST. CHARLES COUNTY:

Present IHTS Regulations

1) Location, Design, Installation

The minimum lot size for IHTS installation is 18,000 square feet. Site inspection is carried out by an official of the

County Building Department as a requirement for obtaining a building permit. The permit can be denied if the Plan includes an IHTS and the inspector determines the site is unsuitable for it. A percolation test is not required. However, the hydraulic characteristics of the soil are analyzed. A site engineering design is not required for the application of a building permit.

St. Charles County requires a three chamber 1,250 gallon tank with either:

a. A soil absorption field sized for 100-125 square feet of absorption area per bedroom.

b. Effluent holding tanks periodically pumped.

c. Effluent holding tanks equipped with a chlorinator and irrigation system.

The Building Department must inspect the system before it is buried as a condition of the building permit.

2) Operation and Maintenance

St. Charles County does not require operation permits. The systems are voluntarily maintained and repaired by the owner. Conventional septic tank systems, particularly those installed prior to the control of IHTS by the County Building Department, are maintained by pumping, generally only when failure is evident. The County Building Department can respond to complaints regarding systems under the permit program. Compliance is generally voluntary because the Building Department has no enforcement capability of its own.

3) Disposal of Waste Sludge

Haulers are not licensed and records are not maintained of either septage pumped or septage discharged at treatment plants.

4) Special Problem Sites

Measures presently used where soils are thin include:

a. A shallow soil absorption field designed to utilize evapotranspiration to discharge part of the effluent.

b. A treatment tank effluent holding tank which is pumped periodically.

c. An effluent holding tank equipped with a chlorinator and hooked to a sprinkler system, which discharges the effluent on the property as irrigation water.

Most of the areas underlain by solutioned or fractured limestone are in the southwestern part of the County; special considerations are given for IHTS units to be located there. In areas where slopes are significant, stepped or contoured solid absorption fields are recommended.

Minimum distance to lakes, streams, walls and other surface waters are specified in the County Building Code. The use of IHTS in highwater table areas is not permitted. Denial of a permit for this reason is based on a site inspection by a County Building Department inspector.

Recommendations for Improving Present St. Charles County IHTS Regulations

St. Charles County faces the same issues described for Franklin County regarding implementation of the recommended 208 IHTS controls. The following actions could be taken by the County to upgrade their present IHTS regulations. It is emphasized that these actions are not binding on the County; ultimate decisions on the extent and format of IHTS control lies with the County.

1) A Registered Professional Engineer (or trained technician) should be used by the Building Department staff to inspect IHTS units.

2) Information from the U.S. Soil Conservation Services detailed soil analysis of St. Charles County should be used to develop specific measures to modify IHTS units in unfavorable soil conditions.

3) The Building Department must take a stronger role in enforcement of IHTS regulations, as well as partaking in a more active role in the licensing of septage haulers.

4) For new developments of two to 25 homes using IHTS as a method of wastewater treatment, an overall density of one system per two acres should be maintained. The Building Department could work with the developer to develop methods of meeting this goal at the lowest possible cost. Modifications could be made based on local geological conditions.

ST. LOUIS COUNTY:

Present IHTS Regulations

1) Location, Design, Installation

The present minimum lot size is 20,000 feet. IHTS are not permitted in subdivisions having more than ten homes. Site inspection is carried out by an official of the Public Works Department as a requirement for obtaining a building permit. The permit can be denied if the plan includes an IHTS and the inspector determines that the site is unsuitable for it. A percolation test is required. A site engineering design is not required for a building permit.

Two types of septic tanks are approved for use in St. Louis County--the Jet Home Treatment Plant and the Brooks Anti-Septic System. Based on a percolation test, either a conventional system or an upflow sand filter is required for all systems.

A Building Department inspection is required before the unit is buried. A $5,000 surety bond is also required of the installer before the unit is buried.

2) Operation and Maintenance

Operation permits are not required. Maintenance and repair are voluntary by the owner. The County Health Department responds to complaints of failed systems and is fairly effective in gaining the cooperation of owners of failed systems in making necessary repairs.

3) Disposal of Waste Sludge

Haulers are licensed and required to dispose of septage in one of two approved locations: one at MSD Coldwater Creek Treatment Plant and the MSD Lemay Treatment Plant. However, no records are maintained of amounts of septage collected and disposed of by each hauler; illegal discharges of septage are known to take place.

4) Special Problem Sites

On the basis of site inspection, two measures may be taken in thin soil areas:

a. The building permit can be denied on the basis of the inspector's judgement that the soil is too thin to provide adequate filtering and absorption.

b. A sand filter can be installed. This effectively replaces the soil as the filtering and absorption medium.

On the basis of percolation test results, three measures can be taken in areas where soil permeability is low:

a. The building permit can be denied on the basis of unfavorable percolation test results.

b. A sand filter can be installed as the absorption medium in place of the unsuitable soil.

c. An extra large soil absorption field sized on the basis of the percolation test can be installed.

In areas underlain by solutioned or fractured limestone, a building permit may be denied because the site is unsuitable for placement and operation of IHTS. The "Land-Block" soil absorption field is used in hilly areas of St. Louis County. This is a stepped drain field in which level soil absorption trenches are placed at different elevations along the ground contours and connected with water-tight pipes. Distance to wells, lakes and streams from IHTS tank and absorption field are specified in BOCA. In high watertable areas, the percolation test procedure requires that a hole be made to a depth of at least six feet below the finish grade of the proposed soil absorption field. If standing water occurs in the hole, the site is deemed unsuitable for an IHTS.

Recommendations for Improving Present St. Louis County IHTS Regulations

St. Louis County presently has an acceptable IHTS control program.

Urban Stormwater Runoff

A comprehensive program for controlling the pollution caused by urban runoff should consist of measures that reduce the quantity and prevent the degradation of the quality of the runoff. Both nonstructural and structural controls can be used for these purposes.

Nonstructural control measures are actions, either physical or legislative, which attempt to prevent pollution before it

becomes a problem. A nonstructural control could be an ordinance requiring developers to limit the runoff from a developed site at pre-development levels; or such a control can require a developer to build a stormwater detention basin as part of a development plan. Structural controls do not strive to eliminate sources of pollution or actions that cause it; rather, they collect and concentrate pollutants for treatment. Structural controls are generally instituted as remedial actions to address problems caused by development. Nonstructural controls have been given emphasis in the recommendations for urban stormwater runoff controls because prevention of pollution problems is less expensive than correcting them after they occur. In the light of the lack of federal grant programs for the construction of urban runoff structural controls, using ordinances and regulations to control runoff is an attractive alternative to constructing detention ponds: both controls accomplish the same purpose; the latter approach, however, is more expensive. Major emphasis in the urban runoff recommendations, therefore, is placed on approaches that can be integrated into existing agency programs at minimal costs.

The 208 recommendations for the control of urban stormwater runoff are divided into three categories of control that are designed to address the quantity and quality aspects of urban runoff: control of stormwater runoff; onsite detention; and urban cleanliness programs. The first two categories affect quantity and quality; the latter category affects only quality. These recommendations apply to the urban and urbanizing portions of the 208 study area: St. Louis City and County; northern Jefferson County; the urbanizing sections of St. Charles County (the "golden triangle" area). In Franklin County, these controls apply to watersheds in the eastern portion of the County and watersheds which include Union, Washington, and Sullivan.

A. Control of Construction Site Runoff

Because construction activity requires the use of heavy equipment and other contrivances for removal of vegetation, site grading and preparation, access roads, foundation work, and delivery of supplies, resultant soil erosion can pose a significant water quality problem if uncontrolled. Soil erosion from construction sites can be from 10 to 1,000 times that found on deposition in storm sewers, catch basins, streams and lakes. Sedimentation is injurious to the receiving water course and its resident aquatic wildlife. In addition to sediment, runoff from construction sites also can contain nitrates and phosphates used for fertilizer, and

other chemical pollutants such as paints, oil, herbicides and pesticides. However, most of these constituents will fix to sediment, so if sediment controls are involved, these other pollutants are also controlled.

To control sediment from construction sites, it is recommended that developers provide "erosion control plans" as one prerequisite for obtaining building permits. This requirement would be applicable to all development and redevelopment sites of an acre or more. The goal of the erosion plan is to limit the amount of sediment washing off a construction site to no more than 5 tons per year. The plans should be reviewed by a Registered Professional Engineer from the building or planning department and should incorporate some of the following practices for pollution abatement:

--Structures and vegetative measures that will protect environmentally sensitive areas.

--Measures to control the speed and volume of water runoff; detain storm water on the construction site; divert water away from graded areas; and trap sediment on the site.

--Stabilize exposed soils by adhering to time limits set out in the schedules for site grading, seeding and mulching. Use of staged grading, seeding and sodding.

--Require an outline of procedures for the maintenance and inspection of structural and vegetative controls for graded areas, borrow pit areas, stockpile areas and other disturbed areas.

The actual methods used for control-sedimentation ponds, diversion basins, mulches, bedding, etc., would be up to the discretion of the developer and would be determined by site characteristics and economics. Methods used to limit runoff during construction should be integrated into the design of the on-site detention measures that limit runoff for the life of the development.

1. Cost of Construction Site Runoff Controls. The cost of construction site runoff controls will be borne by developers and ultimately passed on to the purchasers. In other areas of the United States which have regulations similar to those recommended in this Plan, the cost to developers averages $1000 per acre. For a three-house per acre development, therefore, the cost to the buyer would increase $333. There is a lack of St. Louis area data on

these costs; it can be assumed, however, that local costs would not vary from the national experience.

B. On-Site Detention of Urban Runoff

The purpose of on-site detention is to reduce sediments and peak runoff. This lowers turbidity, instream erosion, and scouring. As a result, the utility of the stream for aquatic life and its aesthetic value is improved. On-site detention requires that all new development and redevelopment limit the volume of stormwater runoff and sediments to pre-development levels.

There are three elements of the 208 recommended controls for on-site detention of urban runoffs:

1. Predesign runoff control plans should be developed for watersheds in the 208 area expected to have significant amounts of growth.

The runoff plans should define specific treatment systems and other controls to reduce the peak flow from a 15-year storm on the developed site to the peak flow of a 15-year storm on the undeveloped site. In addition, the sediment discharge from a 5-year storm on a developed site should be reduced to the sediment discharge from an undeveloped site with natural or grass vegetation cover.

The runoff plan should include the following information:

a. Physical description of the watershed showing soil type, potential for erosion, existing land uses, proposed land use and mapping of the watershed before and after development.

b. Estimates of the amounts of runoff before, during and after development.

c. Development of construction erosion controls.

d. Development and design of permanent runoff control facilities stating the location, size and cost.

e. Development of specific guidelines to be used by developers in the design of subdivision and other types

of development to ensure the new development is consistent with the watershed plan.

f. Methodology for operating, financing and implementing of the watershed stormwater runoff control plan.

2. Ordinances should be designed to implement the urban stormwater runoff control plans and provide the authority to set or adopt specific technical design criteria and guidelines for the design of a stormwater runoff control system.

The design criteria and guidelines should be updated and modified as conditions change and new control technologies are developed. The change to the design criteria and guidelines could be made without changing or amending the enabling ordinance. An outline of a model stormwater control ordinance can be found in the Element 21 Report, Appendix A.

The ordinance will set design criteria and guidelines for all new development in areas not covered by the watershed stormwater control plans discussed above. In areas where these control plans have been developed, the ordinance requirements would be superceded.

3. The counties should develop and adopt a specific set of design criteria and guidelines for the design and construction of stormwater runoff control systems.

The design criteria and guidelines should establish the analytical procedures and design standards to be used in the runoff control plans and for the design location and construction of runoff control facilities. A preliminary draft of suggested design criteria and guidelines for the control of urban stormwater runoff can be found in the Element 21 Report, Appendix A. The design criteria and guidelines should contain the analysis of stormwater runoff events and the design of stormwater treatment facilities.

4. Developers will be encouraged to limit the amount of impervious area and to reduce the buildup of pollutants on the land surface.

The stormwater treatment systems will usually involve some form of a detention pond similar to Figure 4 in Appendix A of the Element 21 Reports. The stormwater treatment system

will consist of a bar screen and trash chamber followed by a sedimentation pond with a volume large enough to provide the required flow storage to reduce the 15-year storm peak flow rate to predevelopment levels and a volume large enough to provide storage of the removed sediment from a 5-year storm. The amount of sediment storage should depend on the expected cleaning frequency and the requirements of the sediment disposal system. An outlet structure would be designed to provide the required discharge flow rate for the design storm while an overflow would allow the discharge from larger storms without structural damage to the facility. Two example basins have been analyzed and preliminary urban runoff control systems developed. Element 21, Appendix A, presents runoff control systems for Coldwater Creek and Fishpot Creek watersheds in St. Louis County which represent the type of control systems which could be developed in urbanizing areas. Examples of stormwater control measures are shown in Figure 24.

1. Cost of On-Site Detention. The estimated cost of providing on-site detention for new development through the development of comprehensive urban stormwater control plans is shown in Table 10. These costs were estimated in the following manner (detailed cost methodologies are presented in the Element 11 and Element 21 Reports):

--Land use projections were used to determine in acres the extent and location of the commercial, industrial and residential growth between 1975 and 2000.

--The projected changes in acreage were multiplied by a capital cost of $6,000 per acre and an annual operation and maintenance cost of $85 per acre, costs incurred for similar programs in other parts of the country.

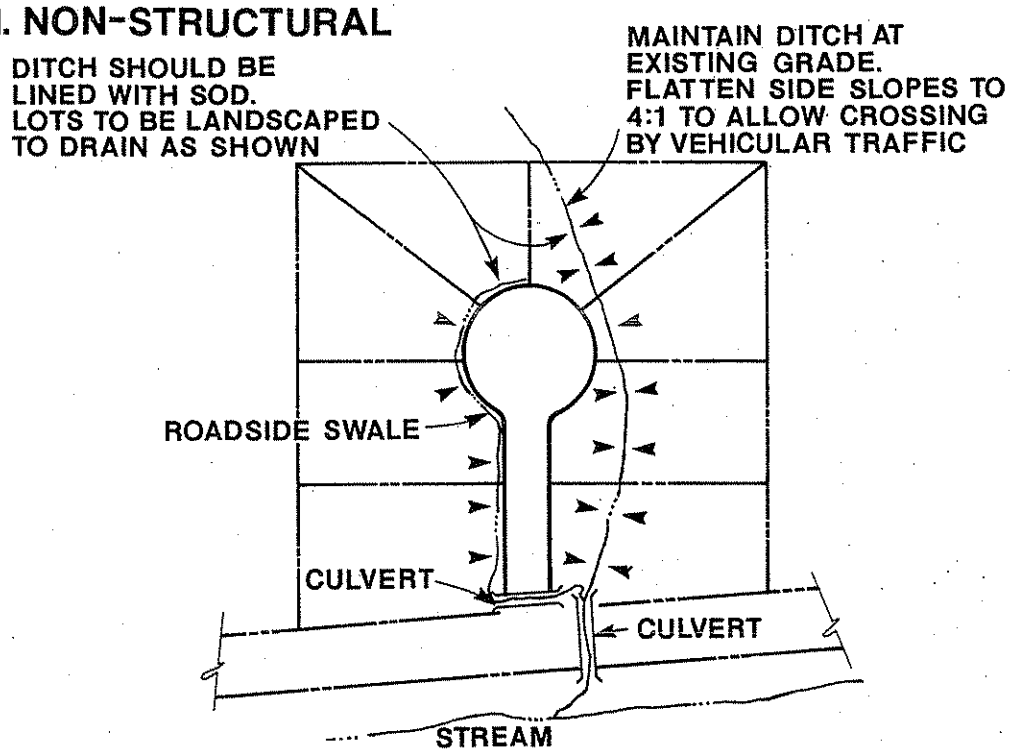
C. Urban Cleanliness Programs

Urban cleanliness programs help prevent excessive degradation of urban runoff by removing potential pollutants from the urban surface prior to rain washing them away. These measures help to reduce the adverse effects of "shock loading"--the rapid increase in pollution caused by a runoff event--by preventing pollutants from being washed into rivers and streams. The recommended urban cleanliness program applies to the developed and developing areas of St. Charles County and St. Louis City and County.

There are three elements of the recommended urban cleanliness program:

EXAMPLES OF URBAN RUNOFF CONTROL

1. NON-STRUCTURAL



2. STRUCTURAL

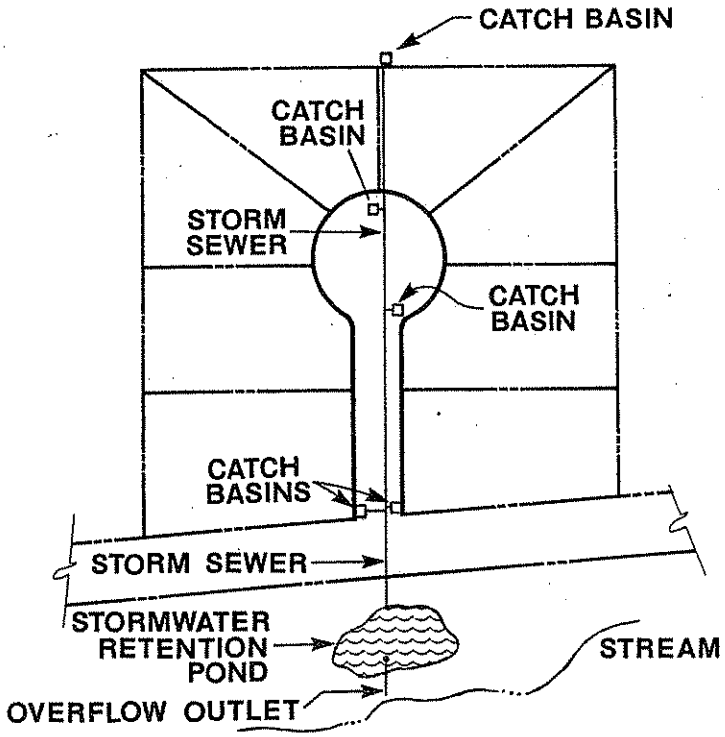


figure 24

TABLE 10

ON-SITE DETENTION COSTS FOR NEW DEVELOPMENT: 1975-2000

County	Land Use	Capital Cost ($)	Annual Operation & Maintenance Cost ($)
Franklin	Commercial	6,300,000	89,200
	Industrial	6,516,000	92,300
	Residential	64,932,000	920,000
	TOTAL	77,748,000	1,101,500
Jefferson	Commercial	8,928,000	126,500
	Industrial	6,486,000	91,900
	Residential	94,764,000	1,120,200
	TOTAL	110,178,000	1,338,600
St. Charles	Commercial	3,870,000	54,900
	Industrial	41,430,000	586,800
	Residential	111,000,000	1,572,500
	TOTAL	156,300,000	2,214,200
St. Louis	Commercial	30,414,000	531,600
	Industrial	42,414,000	600,000
	Residential	164,052,000	2,323,600
	TOTAL	236,880,000	3,455,200
208 Study Area	Commercial	49,512,000	802,200
	Industrial	96,846,000	1,371,000
	Residential	434,748,000	5,936,300
	TOTAL	581,106,000	8,109,500

--Improved streetsweeping techniques.

--Private parking lot maintenance

--Leaf collection and disposal.

A fourth program element--catch basin maintenance--applies only to the combined sewer area of St. Louis City and County.

1. Improved Streetsweeping Techniques. Many municipalities in the St. Louis region have streetsweeping programs. In almost all cases, broom-type sweepers are used. These are typically very efficient at picking up coarse debris; however, since most of the material on street surfaces that is detrimental to water quality is too small to be picked up by these machines, the benefit of broom sweeping as a water quality control measure is limited.

To improve the water quality benefits of streetsweeping, vacuum streetsweepers should eventually be substituted for broom-type sweepers. Vacuum sweepers have the capability of picking up minute particles; they can remove 90 percent of contaminants found on street surfaces.

Streetsweeping to achieve water quality benefits should be done with the following frequency: high density residential and commercial area--at least once a week; central business districts--daily. Emphasis should be placed on sweeping areas that do not have on-site detention ordinances.

2. Private Parking Lot Maintenance. Parking lots, as do street surfaces, accumulate surface debris from vehicles and air pollution fallout. They must, therefore, also be swept periodically to prevent excessive amounts of surface build-up from washing away. Parking lots greater than one acre in size should be swept at least three times a week; this will result in a 75 percent removal of surface pollutants.

3. Leaf Collection. Rotting leaves are a source of phosphate and biochemical oxygen demand (BOD). They also increase the costs for catch basin maintenance and streetsweeping. Leaf collection will not in itself markedly reduce urban runoff problems; it is, however, a necessary component of an effective urban cleanliness program.

Removing fallen leaves will not only reduce the frequency of catch basin maintenance and alleviate streetsweeping problems, it will also reduce operation and maintenance costs at on-site detention basins and at the two major treatment facilities that service MSD's combined sewer system.

4. Catch Basin Maintenance (applicable only to St. Louis City/County Combined Sewer Area). Catch basins are small, rudimentary sedimentation basins which trap and collect coarse materials discharged to a storm sewerage system. Frequent cleaning of catch basins can result in the removal of large volumes of sediments, vegetative debris, litter, waste oil and other materials. If the basins are not cleaned, these materials are discharged to the receiving water during the next major storm. Because many of the trapped organics decompose between storms, the discharge of these materials can exert significant amounts of BOD upon entering a watercourse.

With proper maintenance, catch basins can remove 40 percent of the BOD and 55 percent of the suspended solids in stormwater runoff. It is recommended that basins be cleaned twice a year, assuming other elements of the urban cleanliness program are implemented; frequent cleaning would be necessary if they are not implemented.

Cost of Urban Cleanliness Programs

Costs for the four elements of the recommended urban cleanliness program are presented in Table 11. This is a summary of more detailed tables presented in the Element 21 Reports; these reports should be consulted for detailed cost methodologies and assumptions.

D. Implementation of Urban Stormwater Runoff Control Recommendations

There are three challenges to implementing the recommended urban stormwater runoff control program: the three program elements must be applied in a coordinated manner; the program should be instituted on a watershed, rather than political subdivision basis; methods must be found for defraying the costs of the program. Each challenge presents many complicated issues, many of them beyond the scope of this Plan. They are issues that are being faced by water quality planning efforts nationwide.

These issues will be addressed in greater detail during continued 208 planning. During the next phase of this program, detailed analysis can be targeted to watersheds where stormwater problems are evident. Stormwater control plans will be developed for urbanizing watersheds and the anticipated water quality improvements will be estimated by computer

TABLE 11

URBAN CLEANLINESS COSTS FOR YEAR 2000

Control	County	Land Use Control Application	Capital Cost[1] ($)	Annual Operation & Maintenance Cost[1] ($)
STREETSWEEPING	St. Charles	Residential	38,000	--
		Industrial	114,000	--
		TOTAL	152,000	466,900[2]
	St. Louis City/County	Commercial	369,700	970,500
		Industrial	248,100	596,400
		Residential	901,800	2,176,300
		TOTAL	1,889,300	3,743,200
PRIVATE PARKING LOT MAINTENANCE	St. Charles	Commercial	--	155,500
	St. Louis City/County	Commercial	--	3,801,600
LEAF COLLECTION & DISPOSAL	St. Charles	Residential	414,000	488,400
	St. Louis City/County	Residential	7,192,000	2,436,000
CATCH BASIN MAINTENANCE	St. Louis City/County	Combined Sewer Area	--	506,318

[1]1977 Dollars.

[2]Cost for application to all urban land uses.

analyses. Presented below is a discussion of how the urban stormwater runoff control recommendations related to the 208 study area counties. Table 12 from the Element 13 Report shows the result of a survey of selected jurisdictions to determine the extent of urban stormwater runoff regulations within the study area.

a. Franklin County. Construction site runoff and on-site detention controls are recommended for new development in the urban and urbanizing portions of Franklin County, specifically the high growth watersheds in the eastern portion of the county and watersheds which include Union, Washington and Sullivan.

In other portions of the County, urban stormwater runoff is not projected to be a problem. Franklin County and Union both have regulations for controlling erosion during construction. There are no on-site detention requirements currently in force within the County.

Watershed stormwater runoff plans should be developed cooperatively by the County Planning Department, the affected municipality, and East-West Gateway (through the Franklin County Water Quality Board). Guidelines, criteria and ordinances should also be developed through this planning effort, which could be funded by 208 continued planning grants.

b. Jefferson County. Construction site runoff and on-site detention controls are recommended for new development in the lower Meramec watersheds including the City of Arnold (Watersheds #101, 102, 103, 106, 107, see Figure 5, p. 11). Construction site runoff controls are recommended for other urban and urbanizing areas of the County. Our survey of current stormwater runoff regulations indicated that the County and Arnold have limited regulations for controlling construction site runoff. There are no on-site detention regulations currently in force within the County.

Watershed stormwater runoff control plans should be developed for the lower Meramec watersheds. These plans should be developed cooperatively by Arnold, the County Building Department, and East-West Gateway (through the Jefferson County Water Quality Board). Guidelines, criteria, and ordinances should also be developed by this planning effort, which can be funded by 208 continued planning grants.

c. St. Charles County. Construction site runoff controls are recommended for new development in all developed and developing areas of the County. On-site detention

TABLE 12
SUMMARY OF CURRENT URBAN RUNOFF CONTROL MEASURES IN SELECTED JURISDICTIONS

Control Measure / Jurisdictions	Erosion Control				Storm Water			
	Grading Regulations	Erosion Control Regs. During Const.	Erosion Control Regs. Long Term	Sediment Discharge Regulations	Regulations Against Open Stockpiling of Raw Materials	Prohibition Against Increased Stormwater Runoff Due to Development	On-Site Detention of Stormwater	Limits on Amount of Impervious Area on a Site
CITY OF ST. LOUIS								
ST. LOUIS COUNTY	●	●	✱			●	●	
Creve Coeur	●	●	●			●	●	○
Eureka								
Fenton	Contract w/ St. Louis Co.					Contract with St. Louis Co.		
Florissant								
Kirkwood	○	○	○			○	○	
Manchester	○	○	○			○	○	
Maplewood								
Olivette	●	●	●			○	○	○
University City								○
ST. CHARLES COUNTY		○	○					
City of St. Charles	●	○						
Lake Saint Louis	●							
St. Peters		○	○		○			
FRANKLIN COUNTY	●	●						
Pacific					○	○		
Union	●	●						
JEFFERSON COUNTY		○	○					
Arnold	○							
Herculaneum					○			
METROPOLITAN SEWER DISTRICT						○	○	○

● Regulation exists ○ limited regulation exists ✱ regulations being developed

controls, including the development of urban stormwater runoff control plans are recommended for developed and developing areas in these watersheds: Cole Creek, Sandfort Creek, Spencer Creek, lower Dardenne Creek, Belleau Creek, lower Peruque Creek (Watershed numbers 406, 407, 409, 410, see Figure 5, P. 11). Urban cleanliness programs are recommended for these areas: the Cities of St. Charles, St. Peters, Lake Saint Louis, and O'Fallon; developed and developing unincorporated areas.

Our survey of current stormwater regulations indicated that St. Charles County and the cities of St. Charles, St. Peters and Lake Saint Louis have regulations for controlling construction site runoff. The City of St. Charles has a street-sweeping program.

Application of these controls will require coordination between the County government, the affected municipalities, and East-West Gateway (through the St. Charles County Water Quality Board). The County Soil Conservation District should also be involved in developing the control plans since they are currently involved in sediment control planning. Continued 208 planning grants could be used for developing the necessary control plans, criteria and ordinances.

d. St. Louis City and County. Construction site runoff, on-site detention and urban cleanliness controls are applicable to all watersheds within the City and almost all watersheds within the County. Construction site runoff and on-site detention controls are especially critical to the developing western portions of the county: Grand Glaize, Fishpot, Caulks, and Creve Coeur Creek watersheds.

St. Louis County has comprehensive regulations for construction site runoff and on-site detention. Of the County municipalities surveyed, Olivette and Creve Coeur have construction site runoff controls and limited on-site detention controls; Kirkwood and Manchester have limited construction site and on-site detention controls.

Some of the necessary actions required to improve stormwater control in the City and County are:

--All stormwater control ordinances within watersheds should be standardized.

--Stormwater control plans should be developed for all applicable watersheds.

--All stormwater ordinances and regulations within watersheds should address the control requirements of the watershed and should be standardized between communities.

--Stormwater control planning by the County, MSD and municipalities should be coordinated.

These actions could be funded through 208 continued planning grants. The St. Louis City/County Water Quality Board should be involved in these planning efforts.

4. RESIDUAL WASTE CONTROL MEASURES

I. INTRODUCTION

To fully evaluate the problems, the solutions, and the environmental impact of residual waste disposal and management, it is necessary to first review some basic concepts. Residual wastes in the context of this Report are the residues removed from the various sources of domestic and industrial waste streams.

One of the basic concepts is the fact that matter cannot be destroyed, it can only be moved from one place to another in our environment. The residual waste challenge is how to dispose of these materials yet do the least damage to our air, water or soil.

Wastewater treatment processes are designed to remove solids and produce a "liquid effluent" suitable for discharge to a nearby watercourse. There is, however, an equally important "solids effluent," or residual waste. These wastes are often merely discharged to the soil. Since the passage of the 1972 Clean Water Act, renewed emphasis has been placed on the quality and disposal of the liquid effluent. The proper disposal of the "solids effluent," however, is also becoming increasingly important in the protection of our environment. Solids effluent disposal can involve potential protection of the soil, underground waters and the air. Conversely, it can potentially become a hazard to these elements of our environment if not handled correctly. This section is devoted to this final phase of the wastewater treatment process.

The ultimate and satisfactory disposal of residual wastes is dictated by many factors including the volume and character (constituents of the wastes); the location of residual waste sources; and the environmental impact of the disposal method on the disposal site location. Each method and disposal site requires its own particular evaluation.

The real purpose of residual waste treatment and proper disposal is basically a hygenic one--to reduce the number of

disease producing organisms and worm eggs and to prevent foul odors. Any types of treatment and disposal has to fulfill these basic environmental requirements in addition to being economically feasible, easy to operate and, if possible, it should yield usable "by-products."

The current major source of residual wastes is sewage, primarily from municipal systems but also from individual home treatment facilities. As a rule of thumb, domestic sewage contains 200 parts per million of solids or 1660 pounds of solids in a million gallons of sewage. In simplier terms, this is equivalent to about 1/2 teaspoon of solids in a barrel of water. Sewage derived solids are often augmented by the discharge of industrial wastes into the municipal sewer system. Such wastes may contain large amounts of solids and often exotic or toxic wastes. These additives may complicate the problem of treatment and ultimate disposal of the residues. Where a drinking water treatment plant is operating, disposal of solids used in water treatment processes may add to the residual waste problem at the wastewater treatment plant. This is especially true if the water supply is softened.

It is a 208 requirement that residual waste treatment and disposal planning and management must consider not only current sources of solid wastes, but those anticipated because of projected municipal and/or industrial expansion. All of these factors re-emphasize the need to evaluate each individual area's problems and develop recommendations for treatment methods best suited to that area's economy, environment, and above all, available land.

II. RESIDUAL WASTE DISPOSAL ALTERNATIVES

The simpliest and often the most economical residual disposal method is incorporating it into the other refuse, often in a semi-liquid state in a landfill. Some areas in this region have limitations on this method, permitting these practices only on specially designated sites and regulating the maximum amount of liquid residual wastes per ton of refuse in the fill.

Land application is another approach. It requires some form of pretreatment such as anarobic digestion, where the gases can be collected and utilized. The dried digested sludge is spread on land; or sometimes it is spread in a liquid form on the land. Careful controls are required to prevent noxious odors and to assure the applied sludge has been well

digested or well stabilized. Raw solids or inadequately digested sludge will generate obnoxious odors.

Using sludge cake as a soil conditioner, such as on reclaimed land, is another disposal method. This approach is preceded by some type of sludge conditioning and dewatering. However, the use of residual waste as a soil fertilizer, once popular, have been superceded by the use of commercial fertilizers. One reason for this change is that sludge conditioning and dewatering is accomplished by using some mechanical device such as vacuum filtration, filter presses, or centrifuge method. All of these devices are costly to operate because of the chemicals required to "condition" the sludge and power to run them.

Additional problems with odor, weed seeds, etc. arise with the use of dried sludge in urban areas. Also, the use of sludge on gardens where vegetables are eaten uncooked, involves a potential health hazard. Disease producing organisms may remain after the sludge is conditioned.

Waste incineration, either wet or dry, is yet a third method of disposal. This method must be carefully evaluated due to its potential air pollution impact, especially if the incinerated sludge contains heavy metals, such as mercury, lead or cadmium. It must also be recognized that even with incineration, an estimated one third of the orginal residual mass will be returned to the soil as incinerator ash. The disposal of this ash also involves potential hazards once it is placed in the soil.

The use of lagoons for residual waste storage and the transmission of residual wastes by pipeline are other possible alternatives to be tested in arriving at the most feasible methods for ultimate disposal. The emphasis that is and will increasingly be placed on the regulated disposal of hazardous waste will compound the problems of residual waste control. Missouri has recently passed new legislation in this area.

It is anticipated that industrial wastes containing hazardous material will be required, through permitting process, to remove certain wastes through pretreatment prior to discharging these wastes into a municipal sewerage system. This approach will pose a problem for proper disposal of these removed wastes. Incineration is a possibility, however, the most feasible approach will involve land fill disposal.

It must also be noted that land for use as landfills or for sludge storage lagoons which was often found close to the treatment works, is currently becoming rare. The distance

the residuals must be transported to an appropriate disposal site becomes an important consideration in choosing a disposal alternative. The effective, economical and practical implementation of these concepts for handling residual wastes was the basis for the alternative evaluation and the final recommendations in this section of this Report. The recommendations are summarized later in this section for each county in the 208 area.

Local Innovative Residual Waste Disposal Approaches

Before discussing the regional residual waste treatment centers, two innovative regional programs should be briefly discussed.

A. Bi-State Trash to Energy Program

At this time, the Bi-State Development Agency is evaluating the impact of creating and operating a series of regional solid waste disposal facilities. The goal of these facilities is three fold: alleviate the projected crush of solid waste; recycle certain materials; and produce, in conjunction with Union Electric, energy. The basic process is to collect solid waste, extract reusable materials, and burn the residue to produce electricity.

In disposing of wastewater treatment residuals, the burning for energy process presents an added alternative. Bi-State is looking at this option; however, transportation costs may be a limiting factor.

B. Industrial Waste Exchange

A second innovative regional activity is the Industrial Waste Exchange. The exchange, sponsored by the St. Louis Regional Commerce and Growth Association (RCGA), has had an immediate and positive 208 impact.

The Waste Exchange concept is based on the fact that some industries produce materials as by-products for which they have no use, but which may be useful to other industries. For example, acetylene manufacturers generate large amounts of contaminated lime waste and often must dispose of the lime in landfills at high costs. Steel mills can use lime to neutralize acid wastes in order to meet pH discharge regulations. If these two industries are brought together by an industrial waste exchange, both will benefit; the steel mill will have a cheaper source of lime, and the acetylene manufacturer will have additional income rather

than disposal costs. Just as significant are the environmental benefits. Some wastes, such as lime, are difficult to dispose of without endangering the environment through air or water contamination. Further, some sources of raw materials are rapidly being depleted and may soon become scarce. Through a waste exchange, industries can reduce both of these problems while benefiting themselves and the public.

The Exchange is a trading organization through which companies could offer waste products for sale and buyers bid for them. In its first year, the Exchange produced at least 13 deals. Since then, participation in the Exchange has been steadily increasing. The Exchange concept has been spreading throughout the country; Iowa, Texas, and Georgia have begun regional waste exchanges of their own.

The St. Louis Industrial Waste Exchange is a direct service to industry and the environment. It is also a resource conservation service to the general public. By putting waste users in contact with waste producers, the Exchange helps industry to find not only buyers for their wastes, but also cheaper sources for raw materials. Industrial wastes become resources instead of liabilities, reducing disposal costs, reducing costs of material acquisition, and conserving natural resources, including water quality. The Exchange may bring income to waste producers and may decrease the possibility of improper disposal or careless handling of what are often toxic waste materials.

The Exchange has the active support of governmental agencies and environmental groups. EPA has stated that it views the St. Louis project as a model for other industrial areas, and in March of 1977, presented the RCGA with an Environmental Quality Award for establishing the Exchange.

Clearly, this program is of great importance to 208 already and should be a greater resource in the future. The program should be expanded through continued 208 funding to serve a wider geographic area.

III. RESIDUAL WASTE CONTROL RECOMMENDATIONS

Since many of the wastewater problems are common throughout the St. Louis 208 region, the following section presents the proposed sludge management scheme on a regional basis. Each section describes the sludge handling systems proposed for subareas within the county. A general description of the

sludge processing facilities and disposal methods for the regional system are included. The proposed location of the sludge processing facilities and their service areas are shown in Figure 25. The capital and operations and maintenance costs of the centers are shown in Table 13. The capital cost for the system includes local equipment, transportation and regional sludge processing and disposal equipment. Allocation of the cost of the regional residuals waste centers to the individual household is described in Section 6. These costs and the facility descriptions are abstracted from the Element 22 Report.

Following the regional center discussion is a brief section on management concerns.

A. Franklin County

The proposed sludge management system for Franklin County includes the development of five regional processing centers at New Haven, Washington, Union, Sullivan and Pacific.

1. New Haven Regional Sludge Processing Center. This facility would process sludge from the New Haven treatment facility and the Zero Manufacturing Company. Sludge would be transported from Zero Manufacturing Company by truck, undergo aerobic digestion with New Haven sludge, and be pumped to a short-term sludge storage lagoon for a minimum of 90 days storage. Sludge would then be used for spreading in low rate agricultural re-use systems on farmland adjacent to New Haven.

2. Washington Regional Sludge Processing Center. A sludge processing center should be developed adjacent to the Washington wastewater treatment plant which would process sludge from nearby treatment facilities. Washington has also been designated as a regional center for receiving septage. Sludge from Washington and the other small treatment plants will undergo aerobic digestion prior to being pumped into short-term sludge storage lagoons. The sludge will receive a minimum of 90 days storage prior to being used for land spreading in the vicinity. The land spreading sites for low rate agricultural re-use of sludge are assumed to be within an average haul distance of ten miles from the treatment plant.

3. Union Regional Sludge Processing Center. A sludge processing center should be developed at Union to receive waste from the St. Clair treatment facility and other smaller facilities located between St. Clair and Union. Sludge from these facilities will be transported to the

REGIONAL SLUDGE PROCESSING CENTERS AND SERVICE AREAS

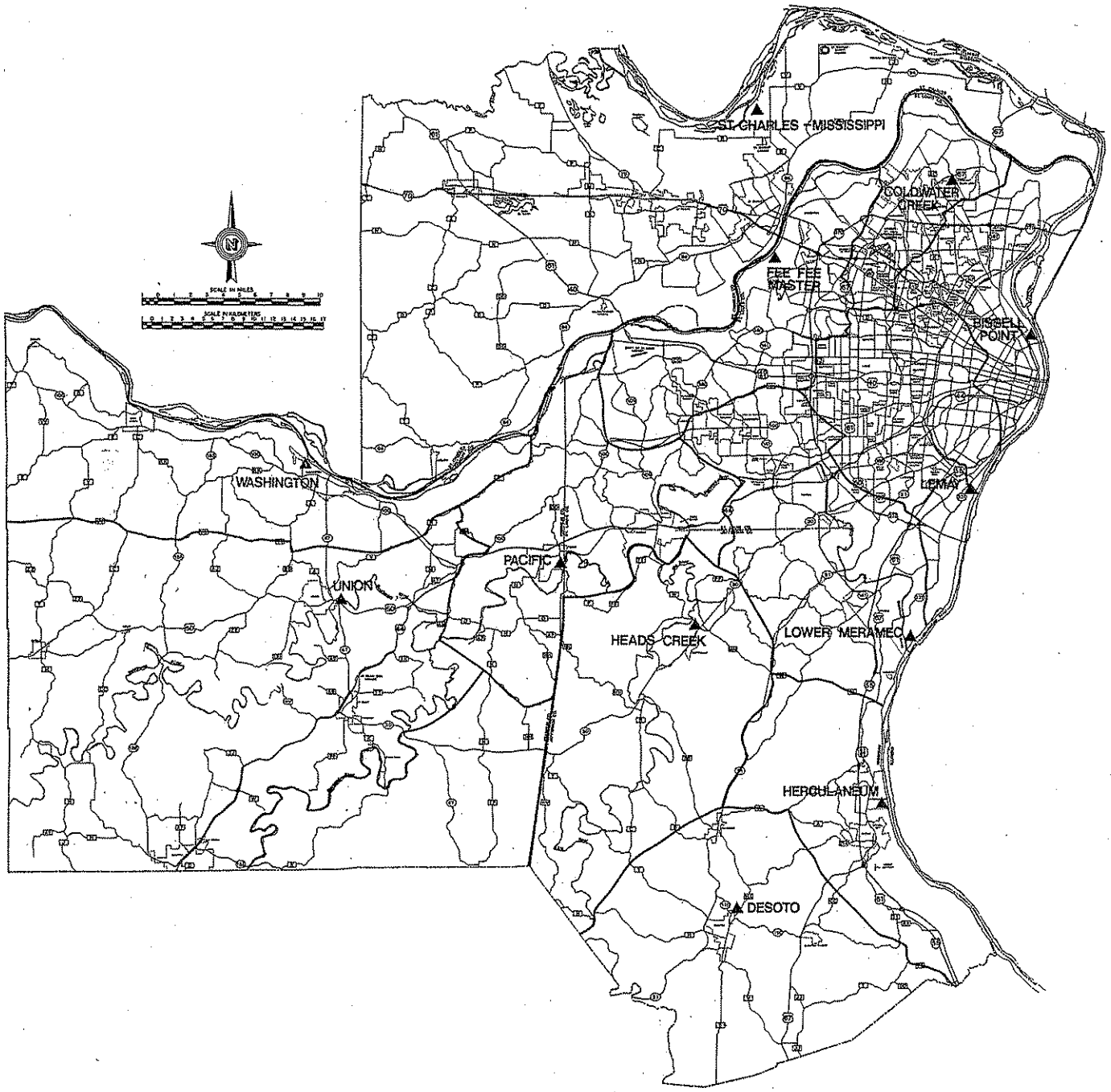


figure 25

TABLE 13

COST OF REGIONAL SLUDGE PROCESSING CENTERS

Regional Centers	Capital Cost*	Operation and Maintenance Cost* 1990	2000
FRANKLIN COUNTY			
New Haven	$ 274,000	$ 41,500	$ 54,000
Washington	755,000	139,000	146,000
Union	1,407,000	270,500	285,000
Sullivan/Oak Grove Village	601,000	105,000	112,000
Pacific	981,000	153,000	163,000
JEFFERSON COUNTY			
Herculaneum	2,216,000	470,000	495,000
DeSoto	1,188,000	124,000	144,000
Lower Big River/ Heads Creek	1,901,000	205,000	217,000
Lower Meramec**	5,204,000	1,152,000	1,213,000
ST. CHARLES COUNTY			
St. Charles Mississippi	4,700,000	1,214,000	1,278,000
ST. LOUIS CITY/COUNTY			
Coldwater Creek	10,000	635,000	2,000
Fee Fee Master	3,392,000	808,000	850,000
Lower Meramec**	5,204,000	1,152,000	1,213,000
Lemay	16,722,000	4,223,500	4,446,000
Bissell Point	6,467,000	4,371,000	4,601,000

* 1977 Dollars
** Includes Jefferson and St. Louis Counties

Union processing center by truck and will be combined with septage from the area and the waste from Union. Aerobic digestion will be the method of treatment. Sludge will then be pumped to a short-term sludge storage lagoon to receive a minimum of 90 days storage prior to discharge for low rate agricultural re-use. Re-use sites are assumed to be within ten miles of Union.

4. Sullivan Regional Sludge Processing Center. The proposed Sullivan/Oak Grove Village wastewater treatment facility has been designated as a site for the development of the regional sludge processing center. Sludge would be transported to the facility from the Meramec Lake Park treatment facility. Sludge will undergo aerobic digestion followed by short-term sludge storage in a lagoon with a minimum of 90 days storage time. Sludge will then be loaded on trucks for haul to land spreading sites assumed to be within 10 miles of the treatment facility.

5. Pacific Regional Sludge Processing Center. The proposed treatment facility at Pacific has been selected for the development as a regional sludge processing center and would receive septage from the immediate vicinity. The treatment plant will also receive waste sludge from the Eureka facility and nearby small treatment plants.

Sludge will be transported to the regional sludge facility by truck. The sludge will undergo aerobic digestion and will be stored in a short-term sludge storage lagoon for a minimum of 90 days prior to being trucked to land spreading sites found within 10 miles of the City. If suitable agricultural re-use sites cannot be located, an alternative sludge treatment would be aerobic digestion followed by floatation thickening and filter press prior to landfill disposal.

B. Jefferson County

The sludge management system proposed for Jefferson County includes the development of four regional sludge facilities at Herculaneum, DeSoto, Lower Big River/Heads Creek and the Lower Meramec.

1. Lower Meramec Regional Sludge Processing Center. The proposed Lower Meramec facility has been designated as a regional sludge processing center. Sludge processing will involve air floatation of waste activated sludge with gravity thickening for the primary sludge. The thickened sludge with an expected solids concentration in

the neighborhood of three to six percent will then be subject to anaerobic digestion prior to being pumped into long-term sludge storage lagoons. Sludge lagoons to be located near the facility will have a designed storage life of approximately 20 years. The ponds will either have to be abandoned and new ponds constructed or cleaned at the end of 20 years.

It should be noted that several researchers, those involved with the Lower Meramec 201 Plan and the 208 Plan, have examined alternative methods of handling the sludge from the Lower Meramec facility. The alternative to the above recommendation would be to construct a pump station and force main to transport the sludge from the Lower Meramec facility to the Lemay plant where it would be burned. Preliminary economic analysis indicates that this alternative will be more expensive than the process outlined above.

2. Herculaneum Regional Sludge Processing Center. Herculaneum Sewer District treatment facility has been recommended for the development of a regional sludge processing center. This plant will receive sludge from several outlying plants which include Glaize Creek Sewer District and Festus/Crystal City.

The sludge will be transported to the processing center by trucks. However, sludge from Glaize Creek and Festus/Crystal City would have to be thickened in order to reduce transportation and sludge processing costs. Glaize Creek Sewer District would provide a sludge pump station to be followed by chemical conditioning and gravity dewatering. Sludge from the gravity dewatering is expected to have a concentration of approximately 4 to 6 percent solids and will then be transported to the regional sludge facility by truck.

A similar thickening process is envisioned for Festus/Crystal City (which is also designated to receive septage from the area). Sludge from the Festus/Crystal City plant will be pumped through chemical conditioning to a gravity thickener. Sludge from the gravity thickener (which is expected to also have solids concentrations of 4 to 6 percent) will then be transported by truck to the Herculaneum facility.

The Herculaneum facility would also provide a sludge pump station and chemical conditioning prior to gravity thickening for the sludge generated in their plant. The sludge from the area will be subject to anaerobic digestion and dewatered by the use of centrifuges. The centrifuge cake, which is expected to have a solids content in excess of 20

percent, would then be trucked to the Valley Disposal Landfill for incorporation into the landfill with refuse.

3. City of DeSoto Regional Sludge Processing Center. The City of DeSoto has been selected for the development of a regional sludge processing center. Sludge would be trucked to the processing center from Hillsboro and several small outlying treatment facilities.

Sludge from DeSoto and the outlying plants would be subject to aerobic digestion prior to discharge on sand drying beds. The cake from the sand drying bed would then be collected and placed in trucks for transport to the Valley Disposal Landfill for incorporation with municipal refuse.

4. Lower Big River/Heads Creek Regional Sludge Processing Center. The proposed Lower Big River/Heads Creek treatment facility has been selected for the development of a regional sludge processing center. Sludge would be collected from several small outlying treatment facilities in the Lake Montowese area.

The sludge would be transported from these various small treatment plants by truck. Sludge stabilization at the processing center should be accomplished by aerobic digestion. Sludge would be pumped to sand drying beds for drying, and then it would be disposed of at Valley Disposal Landfill.

C. St. Charles County

There were two sludge management alternatives analyzed for St. Charles County: 1) two subregional facilities serving the entire county; or 2) one sludge facility serving the entire county. In the first alternative, the proposed O'Fallon treatment facility and the existing St. Charles Mississippi facility would be the subregional centers. In the one facility alternative, the St. Charles Mississippi plant would be the sludge processing center for the county. Due to the capital cost advantage inherent with Alternative No. 2, a single sludge processing center to be located at the St. Charles Mississippi facility is recommended.

The City of Wentzville has been included in the single processing center approach. Due to the haul distance involved, a detailed cost-effective analysis should be included during 201 Facility Planning which would evaluate sludge processing at the Wentzville treatment plant versus hauling to the regional sludge center.

1. St. Charles Mississippi River Regional Center. Due to the the volume of sludge that would be generated at the facility (since the flow to the facility will be increased), the present sludge disposal system would require modification and expansion. The basic flow design of chemical conditioning, dewatering, incineration and ash pond disposal, however, should remain the same.

D. St. Louis City/County

The 208 Plan recommends development of five St. Louis City/County regional sludge processing centers at Coldwater Creek, Fee Fee Master, Lower Meramec, Lemay, and Bissell Point.

1. Lower Meramec Regional Sludge Processing Center. This facility is described on page 147.

2. Coldwater Creek Sludge Processing Center. The existing sludge processing equipment at the Coldwater Creek plant should be able to handle the additional sludge to be generated at the facility and from a small treatment plant at Lock and Dam 26 and the proposed West Alton facility. The existing anaerobic digestion sludge pumping stations and sludge storage lagoons have an adequate capacity to provide acceptable sludge storage for a 20-year planning period. The existing sludge lagoons are presently achieving solids concentrations in the neighborhood of 40 to 50 percent dry solids. With an increase flow to the Coldwater Creek Plant, the expected digestion performance should be somewhat lower than is presently being achieved. Even with the lower overall digestion performance, the sludge storage ponds are believed to have an adequate capacity for the planning period.

3. Fee Fee Master Regional Sludge Processing Center. Fee Fee Master Plant has been designated as a reional sludge management center. Sludge should be trucked from small treatment plants in the projected service area to the processing center.

Sludge treatment and stabilization will involve pumping waste activated sludge through chemical conditioning into a floatation thickener. The thickened sludge (expected to be about 3 percent solids) will then be combined with the primary sludge for anaerobic digestion. The stablized sludge will then be pumped to the large sludge storage lagoons with a design life of at least 20 years. It should be noted that periodically, or at least once every 20 years, sludge would be pumped from the ponds to some other alternate disposal

site. If the ponds are not cleaned, new ponds with an additional life must be constructed at the end of 20 years.

4. Lemay Regional Sludge Processing Center. The Lemay Plant has been designated as a regional sludge processing center and would receive waste sludge by truck from the Sugar Creek Plant. The Sugar Creek sludge would be combined with raw primary sludge. Waste activated sludge from the new secondary facility will be pumped through chemical conditioning and thickened with air flotation. The combined sludge will then be subjected to additional chemical conditioning and vacuum filters. Sludge cake from the vacuum filters will then be burned in the expanded incinerators and the ash pumped to ash storage ponds.* The vacuum filters and incinerators at the Lemay Plant would have to be expanded to accommodate the increased solids loads.

5. Bissell Point Regional Sludge Processing Center. The solids handling process at Bissell Point should be expanded to handle the increased solids loads expected with the development of a secondary treatment system. Waste activated sludge will be pumped through a chemical conditioning and thickened with air flotation. After thickening to a solids concentration of 3 to 6 percent, it will be combined with primary sludge and subject to further chemical conditioning and dewatering with vacuum filters. The cake from the vacuum filters will then be burned in the incinerators with the ash stored in ash storage ponds.* These ponds have limited storage capacity and require cleaning every three years. Operation costs include this periodic cleaning. The existing vacuum filters and incinerators will be expanded to accommodate the expected sludge load increases anticipated with the development of the secondary treatment system.

IV. RESIDUAL WASTE CONTROL RECOMMENDATIONS: IMPLEMENTATION ISSUES

Reviewing the residual waste program, there are a number of legal issues that have to be addressed. The first is that the system's capacity is based upon the adoption of the requirement that existing and future septic tanks be cleaned

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*These storage ponds have limited capacity and require cleaning every three years. Ultimate ash disposal is currently the subject of a MSD 201 Facility Plan and the results of this effort will be integrated into ongoing 208 planning.

periodically. The body of law upon which such regulation rests is the requirement for privy and cesspool cleaning and inspection. Other authorities who have researched this issue believe that this basis for septic tank inspection and pumping has a solid legal foundation. In a recent EPA sponsored report, Legal and Institutional Approaches to Water Quality Management Planning and Implementation (March, 1977), ordinances requiring that cesspools and privys be cleaned and inspected are specifically cited as the basis for public action. All authorities agree that this is a reasonable exercise of the power to protect public health and safety. Not only does this EPA volume cite the fact that the regulations to keep these facilities inspected and cleaned are valid, but furthermore, that if the public health is involved, the government may choose to insure sanitary practices by taking maintenance away from the individual owner or occupant and assuming the function itself or contracting out for the performance of this service. The courts have gone so far as to approve ordinances stating that charges for such activities may become liens upon the property if the property holder does not compensate the city for the services. Clearly an unclean cesspool is not the same health hazard as an unclean septic tank in a rural area, yet the requirement of protecting the public health and safety does apply in both cases and it is felt by the courts that this type of ordinance should be upheld.

The second critical link in the residual waste program proposed is the regulation of the hauling of septage. This is discussed in Section 3 but bears a quick review. It is generally recognized that because of the problems associated with hauling septage, septic tank haulers and pumpers should be licensed. A number of states (e.g., Connecticut and Maryland) and certain counties such as St. Louis County have required such permits. The requirements on some of these permits go so far as to be inspected before an initial license is granted and annually thereafter.

Linked to the licensing of haulers which is recommended strongly for this region is a third concern that is important to the residual center's concept. There must be a guarantee that septage, once pumped, must be deposited and disposed of within the regional centers system as proposed. Under many state and local regulations that have been reviewed, there are specific requirements that septage be disposed of only at sites which the governing agency has approved in writing. Therefore, the proposal to limit each septage hauler's permit or license to specific disposal sites has established precedent. A violation of the place of disposal would jeopardize any septage hauler's license.

A Connecticut draft regulation proposes that any person or municipality holding a hauling permit must file a monthly written report with the State showing the address of the system serviced and the location where the septage was discharged. This is a very tight control system and is one that bears further thought if the St. Louis residual waste program is to be implemented.

While state and local legislation has been upheld, it is recommended that local (i.e., County) legislation be pursued in St. Louis. This appears to be both the quickest and most politically feasible approach.

Another major implementation issue is financing the sludge processing centers. EPA funds are available for the development of septage and residual waste disposal centers. These funds may now even be applied to the acquisition of public hauling vehicles. Nevertheless, the development and governing issues remain. The creation of special residual waste districts to develop and operate the regional centers would necessitate the overlaying of another district--a residual waste district--upon the treatment districts. This would produce confusion and might well hurt the overall program. A simplier approach would be for the designated regional centers to secure guarantees of participation through contracts with all residual waste contributors (public and private). These agreements would have to cover cost allocation formula, hauling permits, septic tank cleaning regulations etc. Admittedly, this would be a difficult process, yet it should be explored with the County Water Quality Boards during the continuing planning phase of this project. If rejected, water quality and costs will not be as projected in this Plan.

5. WATER QUALITY EFFECTIVENESS

I. INTRODUCTION

Three different approaches to water pollution control were defined during the 208 study. Each approach or level of pollution control will produce a different water quality in the rivers and streams of the study area at a different cost. This approach to water quality management allows decisions to be made on the basis of costs incurred to achieve various levels of water quality.

The three levels of water quality used in the 208 study in ascending order of stringency were:

> Level 1--Provides for the secondary treatment of point sources and a continuation of existing practices and controls for nonpoint sources.
>
> Level 2--Requires the control of point and nonpoint sources necessary to meet the State of Missouri's proposed water quality standards and streams use goals.
>
> Level 3--Calls for more stringent control of point and nonpoint sources of pollution in order to meet the water quality goals developed during the 208 study. It also requires that a higher quality of water be attained than that of Level 2.

Control strategies and their cost were developed for each water quality level. The future of water quality of this region's rivers and streams was then estimated based on the assumption that the control strategies for each respective water quality level would be implemented. This was in effect the cost-effectiveness analysis of the 208 study.

The cost-effectiveness analysis were presented to the public at the Phase III Workshops, held in November 1977. (Element 25 Report) Participants were asked to indicate their preference for a level of water quality which would be used

to develop the final pollution control recommendations. By indicating their preference, the participants indicated to staff and consultants what level of water quality the citizens of the region would be willing to pay for. The participants overwhelmingly chose Level 2 water quality; this is the level of water quality to which the control recommendations in this 208 Plan are attuned.

This section describes how the effectiveness analysis was performed and indicates generally what the resulting water quality would be if Levels 1, 2, or 3 controls are implemented. The water quality analysis for specific streams within the study area can be found in the Element 23 Report. The effectiveness evaluation of point source controls for each water quality level is described in the Element 20 Report.*

II. FORECASTING FUTURE WATER QUALITY

The key to the 208 effectiveness analysis was the ability to forecast future water quality by using two water quality computer models: the Hydrologic Simulation Program (HSP) model developed by Hydrocomp, Inc., and the LOADS model developed especially for the St. Louis 208 study. These two models account for all sources of pollution and simulate the physical, chemical and biological processes which occur in the aquatic environment. The models do not simulate every water quality constituent; the modelled constituents, however, represented the major water quality indices including fecal coliform, phosphate and ammonia.

A. Hydrologic Simulation Program (HSP)

The HSP model simulates the hydrologic cycle by using the following components (or modules): LANDS, CHANNEL and QUALITY. A comprehensive description of the HSP model can be found in the Element 8 Report. A general description of the model and its components is provided below.

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*Based on the strict technical definition and for the purposes of this study, all St. Louis 208 streams, except the Missouri and Mississippi Rivers, have been classified as water quality limited. The State of Missouri, however, has a process of classifying streams either water quality or effluent limited by including specific management criteria. Therefore, the State's method of stream classification may result in stream classifications different from those presented in the 208 Plan.

1. LANDS--Simulated the land surface phase of the hydrologic cycle to yield runoff which was used as inflow to the CHANNELS modules. The meteorologic conditions of the model area were represented by the data from existing climatologic stations. Each study area watershed was divided into 25 land segments. The division process was one of compromise between delineating segments which homogeneous runoff producing factors and the limitations of computer memory.

   The first analytical step was selection of watersheds with precipitation, flow and water quality records adequate for calibration purposes. The Meramec River basin below the U.S.G.S. gages at Sullivan, DeSoto and Union was selected. In addition, three tributaries to the Meramec River--Grand Glaize Creek, Fishpot Creek and Fox Creek--also had the flow and precipitation records required for water quality calibration.

   The second step was preparation of maps and other data showing areas of essentially homogenous runoff producing factors. The following factors were considered: rain gage location, soil types, geologic controls, vegetative cover and urbanization.

   In the final step, subwatersheds defined by hydrologic boundaries were combined to 25 land segments representing significant differences in these runoff producing factors.

2. CHANNEL--The river system was divided into reaches based on the physical characteristics of the river system and on the locations at which simulated water quantity and quality were desired. Each such location was the downstream terminus of a reach. The reach length was governed by the location of point sources and tributaries which would significantly affect the flow of the river. Every segment contained at least one reach, as the model has no provision for routing flow from more than one land segment into a reach. Task Report 8.q deals with the attainment of this data and lists the hydraulic features of these channel reaches. Task Report 8.p also reviewed several physical traits of area streams.

3. QUALITY--The water quality simulation model used the LANDS segments and CHANNEL reach setup. Land segment runoff from impervious surface, pervious surface and subsurface components was read into computer data files and utilized by the QUALITY model. The channel reach system is the same, but the QUALITY model has flow routing algorithms independent of CHANNEL.

Daily boundary conditions for the Meramec River near Sullivan, the Big River near DeSoto, and the Bourbeuse River near Union included quality parameters as well as flow. These parameters were temperature, dissolved oxygen, five-day biochemical oxygen demand, total dissolved solids, fecal coliforms, fecal streptococci, nitrate, ammonia, total phosphorus, phenol, and pH as related to alkalinity, dissolved carbon dioxide and total inorganic carbon. Values for these same quality perameters were obtained on a semi-monthly basis for 62 point sources of pollutants on the Meramec River.

B. PROGRAM LOADS

For those areas outside the Meramec River and Coldwater Creek, a special computer program was developed to assess proposed control strategies and resultant pollutant loads. Estimates of mean annual loads of 12 selected pollutants and corresponding pollution indices were calculated for each land segment in the St. Louis 208 study area. A pollution index is the quantity of a certain constituent which enters the stream system from one acre of land including the underlying groundwater, in a typical year. This index is valuable as an indicator of pollution intensity and is used as an aid in pinpointing areas in which water pollution problems are serious. Proposed alternative solutions for these problem areas can also be checked for efficiency using pollution indices. A new pollution index can be computed with a proposed solution in effect then compared with the original pollution index to analyze the relative change in pollutant load due to the proposed solution.

Pollution loads and indices were calculated for each segment using a computer program which sums loads of each pollutant according to land use and geophysical characteristics of the segment (i.e., geology, soil type and topography). After results were obtained from PROGRAM LOADS, corrections were made to account for the contribution of septic tanks to the annual loads of several constituents, as these contributions were not included in the loading factors input to the program.

The computer program which was written for the purpose of estimating total annual pollutant loads from all study area land segments is conceptually simple. The program operation consists of the following steps (for a more detailed description of PROGRAM LOADS, see the Element 11 Report, Appendix B):

A. The following general information is input:

1. A matrix of annual constituent loads to the stream, including flow. These loads are defined on a per acre basis for each combination of land use and geophysical type that exists in the study area.

2. A set of factors used in testing alternatives or local variations in existing conditions. These factors can be used to model reduction in loads of any combination of constituents due to proposed pollution control measures. They may also be increased to reflect higher pollution loads in the future if conditions are allowed to worsen.

B. For each segment the following information is input:

1. Segment area, divided according to land use. There are ten categories of land use designated for the study area.

2. Geophysical type of the land segment.

C. For each land use area within the segment, the program then selects an appropriate set of values for constituent loads per acre from the matrix, based on land use and geophysical type. Each constituent load per acre is multiplied by the land use area and, if applicable a multiplying factor, resulting in the annual load of that constituent from a particular land use area within the segment.

D. Step C is repeated until an annual load is obtained for each constituent from each land use area within the segment. The constituent loads for each land use are then summed to obtain constituent loads for the segment as a whole.

E. Results are printed out in tubular form and are found in the Element 28 Reports.

III. FUTURE WATER QUALITY

The following general comments are based on results from the computer modeling effort. Future water quality is described for each county assuming implementation of the three levels of water quality controls. Level 2 controls have been deemed the most implementable and economical; although, in some instances, Level 2 controls will not meet state standards.

FRANKLIN COUNTY

Level 1--Controls will result in little or no decrease in the number of fecal coliform and phosphate violations. Violations may even increase in areas of high growth.

Level 2--Controls will result in fewer fecal coliform violations in the Bourbeuse and Upper Meramec Watershed areas, but essentially no change in the Upper Missouri area. Phosphate violations will increase and poorer aesthetics will result.

Level 3--Fecal coliform violations will be largely eliminated in the Upper Meramec and Bourbeuse Watershed areas, while a few fecal coliform violations will continue to occur in the Upper Missouri area. The number of phosphate violations will remain constant, and future algal growth will be about as severe as present conditions.

JEFFERSON COUNTY

Level 1--Controls will result in little or no reduction in the number of fecal coliform and phosphate violations, except in the Lower Meramec, where a diversion of wastewater discharges is planned. Degradation from present conditions may occur in areas of rapid population growth. The number of ammonia violations will be reduced except in areas where expanding wastewater treatment plants discharge to smaller streams, such as Belew Creek in the Big River drainage. Ammonia violations in the Lower Meramec below Keifer Creek will be greatly reduced because wastes

presently discharged to that reach will be piped to the Mississippi River.

Level 2--Where treatment plant impacts are significant, controls will result in much fewer fecal coliform violations because of disinfection of wastewater effluents. Ammonia violations will be largely eliminated. The number of phosphate violations will increase in the Lower Mississippi Watershed area, remain at approximately present levels in the Big River and be slightly reduced in the Lower Meramec because of the wastewater diversion.

Level 3--Controls will result in slight improvements over Level 2 conditions in the Lower Mississippi and Lower Meramec Watershed areas. The number of phosphate violations will be significantly reduced in the Big River Watershed area.

ST. CHARLES COUNTY

Level 1--Controls will result in little or no reduction in the number of fecal coliform and phosphate violations, except in the Weldon Spring watershed area, where the improvements are expected to be modest. In the remainder of the County, some increase in the number of violations is expected due to population growth resulting in increased point source loads and urban runoff. Much of the point source load, however, will enter the Missouri or Mississippi Rivers, and will not impact the small tributaries. Some of these tributaries may actually experience improved quality due to consolidation and upgrading of point sources.

Level 2--Controls will result in much fewer fecal coliform violations in those locations where treatment plant discharges significantly impact water quality. The phosphate and ammonia violations would be virtually eliminated in those streams affected by the consolidated system. The number of phosphate violations, however, are not expected to decrease significantly outside the consolidated system service area.

Level 3--Controls will result in slight reductions over Level 2 in phosphate and ammonia violations, and significant reductions in fecal coliform violations, due to further disinfection of point source contributions.

ST. LOUIS CITY/ST. LOUIS COUNTY

Level 1--Controls will result in little or no reduction in the number of fecal coliform and phosphate violations except in the Lower Meramec. Because Level 1 controls do not require more stringent nonpoint source controls than presently exist, water quality will degrade in those areas of the county where urban runoff will be a significant pollution source. This will occur in the western part of the St. Louis County where new development is projected to be the greatest. The most significant pollution constituents will be BOD, metals, phenols and oil.

Level 2--Controls will result in significant reduction in the number of fecal coliform violations in these areas where treatment plants discharge to the small streams. Oil violations, and to a lesser extent phenol violations, will be fewer than the number occurring under Level 1 in these watersheds which will experience considerable development between the present and year 2000. All the urban areas, new and old development, will experience moderate (25 - 35 percent) reductions in the nonpoint contributions of BOD, aquatic growth nutrients (nitrogen and phosphorus) and fecal coliform bacteria. Most of these reductions in nonpoint contributions will prevent the water quality from deteriorating from the present conditions but will not result in dramatic improvements over the present conditions. The situation in the Lower Meramec River will not change much from Level 1 because the same regional collection of wastewater below Keifer Creek is projected. However, the urbanized tributaries of the Lower Meramec will show some improvement over Level 1.

Level 3--Controls will result in substantial improvement in the nonpoint problems due to the forecasted treatment of urban storm runoff. Level 3 controls will result in slight reductions over Level 2 in

phosphate and ammonia violations, and significant reductions in fecal coliform violations in the small streams receiving urban runoff due to disinfection of urban stormwater. The aesthetics of the waters in St. Louis County are forecasted to improve over the present conditions. The Lower Meramec quality will show some improvements over Level 2 due to the improvement in the upstream sources.

6. PLAN IMPLEMENTATION

I. INTRODUCTION

Areawide 208 planning is, by its very nature, planning for implementation. Moreover, the ultimate implementation of approved plans has been clearly mandated by Congress in the language of Section 208 as well as in other sections of the Federal Water Pollution Control Act of 1972 (P.L. 92-500). Both the letter and spirit of this law clearly emphasize the necessity for implementation as the prime objective of the entire planning process. In addition, the Environmental Protection Agency, in drafting guidelines and regulations for the 208 program, has gone even further to assure that final plans will, in fact, be carried out. To assure implementation, EPA has encouraged 208 planning agencies like Gateway to design an institutional system that is directly linked to this region's water quality and financial needs as well as to its particular governmental structure.

Many of the specific requirements for the 208 management system are set forth in the controlling federal law. These requirements relate, in part, to the financing, construction, operation and maintenance of wastewater treatment works. The law also includes a general requirement that pertains to the entire management/institutional program. This requirement states simply that the management program must be able to carry out the approved 208 plan. This general feature of the law goes beyond those plan elements relating to treatment works, to insure that all management functions called for in the 208 plan are handled effectively by the system. Furthermore, it requires that the final management/institutional strategy be politically feasible and be built upon organizations that either exist or that are likely to be created with enough power and funding to do the job that needs to be done.

Thus, the prime objective of the implementation program has been to develop a management/institutional program that will revolve around competent decision-making bodies working together for the achievement of water quality objectives at the lowest economic, social, political and environmental cost.

II. METHODOLOGY

A. Financial Analysis and Recommendations

Introduction. An important preliminary step which underlies the broad management recommendations presented in a later section is the financial analysis of alternative point and nonpoint source pollution control techniques. An understanding of the financial analysis presented below is critical to an objective evaluation of management/institutional options presented later.

In this final plan, annual household cost estimates are presented for each of the recommended point and nonpoint source alternatives. These cost figures represent the culmination of a lengthy process of surveying existing water quality costs, estimating future costs, and eliminating excessively costly alternatives. The annual cost to local residents of the proposed water quality measures has certainly been a major concern of this 208 project.

Financial analysis is one thread that ties various elements of the planning process together. Certain fiscal criteria, including adequate and flexible financial powers, economies of scale, and effective administrative structure, were used to evaluate the management alternatives. Cost effectiveness guidelines were applied to each point source and nonpoint source alternative proposed by the technical consultants, thereby aiding the elimination of the least feasible projects. Finally, annual costs provided a common basis for comparison of all the alternatives. The point source control recommendations which are included in this final plan are actions which will provide the St. Louis region with the best water quality possible at the least cost.

The financial analysis component of the 208 project included three phases: examination of existing conditions, costs and powers; estimation of alternative costs; and elimination of alternatives and refinement of costs. Each element built upon the products of previous work to move continuously toward providing cost estimates and other data for the evaluation of each recommended action.

Financial Background Data.

a. Glossary. In order for those involved in water quality management planning to understand the financial techniques involved in implementing an alternative, a glossary of basic financial terms was prepared (Element 13, Appendix 1). Included in this section were definitions and explanations of advantages and disadvantages associated with such financing tools as general obligation bonds, revenue bonds, intergovernmental grants, ad valorem taxes, and industrial cost recovery. These terms commonly appear in discussions of public finance and they were referred to frequently in the survey of existing management agencies. An understanding of financial tools and operations was important in many later phases of the 208 project.

b. Survey of Existing Financial Conditions. Early in the St. Louis 208 study (Element 9 Report), a survey was conducted of existing operating agencies to provide a base line of current practices in water quality management activities. This survey did not, however, include questions relating specifically to financial matters. Since it was felt that an understanding of current financial conditions would be necessary in assessing the financial impact or any proposed action, a much more detailed financial survey was made of 18 public and private sewer entities (Element 13, Report). Financial data was collected for each agency, including current operating and maintenance costs, sources and amounts of revenue, indebtedness and annual user costs. The survey results were supplemented by information from the agencies' financial statements to provide a consistent set of financial data.

The financial survey covered a variety of agencies ranging from small municipal systems and private companies to the vast scale of the Metropolitan Sewer District. The bottom line of the survey was the calculation of per capita cost. It was found that differences in size of service area, treatment capacity and level of treatment led to wide differences in the costs of operating the system, the types of revenues raised and the methods of financing the present operations and future plans of the system.

The results of the survey are summarized in Table 14. Several significant conclusions were drawn from these results:

1. Present costs of wastewater treatment are generally low with annual per capita costs ranging from $12 to $93.

2. Large cost benefits can be derived from the economies of scale of wastewater treatment. Small facilities

TABLE 14

FINANCIAL PROFILES OF SURVEYED WASTEWATER TREATMENT AGENCIES

CHARACTERISTIC	ARNOLD	EUREKA	FESTUS/ CRYSTAL CITY	O'FALLON[x]	MANCHESTER	PACIFIC	ST. CHARLES	ST. PETERS	UNION
GENERAL									
Type of System - e.g.: Sewer District / Municipality / Private System	Municipality	Municipality	Sewage Commission	Municipality	Municipality	Municipality	Municipality	Municipality	Municipality
For Municipal System - Are service area boundaries coterminious with municipal lines	No	No	No	Yes	No	Yes	No	No	Yes
1976 Population of Service Area	23,000 (1) 3,000 serviced	3,400 (1)	12,000 (1)	8,500 (1)	4,500 (1)	4,101 (1)	40,000 (1)	8,000 serviced (1) 15,000	5,740 (1)
Estimated 1996 Population of Service Area	ID	7,000 (1)	25,000 ('81) (1)	17,500 (1)	9,500 (1)	ID	94,000 (1)	90,000 (1)	6,300 ('81) (1)
Number of Households in Service Area - (1976)	800 serviced (1)	970 (1)	3,000 (1)	1,800 (1)	1,125 (1)	1,223 (1)	12,000 (1)	2,200 serviced (1) 4,000	1,828 (1)
Size of System - 1976 Capacity in million gallons/day	ID	.5 mgd (1)	1.02 mgd (1)	1.5 mgd (1)	.45 mgd (1)	ID	8.5 mgd (1)	Spencer Cr. .6 mgd (Dardenne Cr. ID	.98 mgd (1)
Actual utilization of system in million gallons/day	ID	50% .25 mgd (1)	100% (1)	75% 1.125 mgd (5)	133% .5985 mgd (1)	ID	45% 3.8 mgd (1)	Spencer Cr. - 100% (Dardenne Cr. - 60%	47% .46 mgd (1)
CAPITAL FUNDING									
Assessed Property Valuation of Service Area	$17,000,000 (5)	$8,200,000*	ID	$21,000,000 (1)	ID	$7,316,462 (1)	$92,000,000 (1)	$20,000,000 (1)	Approx. $9,000,000 (1)
Statutory debt limit: General Obligation bonds	$ 3,500,000 (5)	$ 820,000*	ID	$ 2,100,000 (1)	ID	$1,463,292 (1)	$18,400,000 (1)	$ 2,000,000 (1)	$1,000,000 (1)
Long-term bonded indebtedness for WQM: General Obligation	---- (1)	$ 180,000*	ID	ID	$205,000 (2)	$ 646,000 for both general obligation & revenue	$ 987,000 (2)	---- (1)	---- (1)
Long-term bonded indebtedness for WQM: Loans or Revenue bonds	$ 2,500,000 (1)	$2,600,000 (1)	Both cities are paying off revenue bonds	----	$ 36,000 (2)		$ 1,100,000 (2)	$ 1,100,000 (1)	$ 193,000 (2)
Remaining debt capacity: General Obligation bonds	$ 3,500,000 (3)	$ 640,000 (5)	ID	$ 1,100,000 (1)	ID	$ 817,292 (1)	$12,700,000 (1)	$ 1,901,000 (3)	$1,000,000 (1)
Annual debt service: (principal + interest per year) for WQM General Obligation	---- (1)	$ 12,710 (1)	ID	ID	$ 49,150 (2)	$ 21,990 (1)	$ 138,600 (2)	---- (1)	---- (1)
Annual debt service: Revenue bonds for WQM	$ 250,000** (3)	$ 260,000 (3)	ID	----	$ 6,742 (2)	$ 13,450 (1)	$ 80,100 (2)	$ 110,000 (3)	$ 23,368 (2)
Debt per person for WQM: (total long-term indebtedness / total population)	$108.69 (3)	$817.65 (3)	ID	ID	$53.55 (3)	$157.52	$52.18 (3)	$137.50 (3)	$33.62 (3)
REVENUE SOURCES									
Revenues from 1976 Property tax levy for WQM	---- (1)	ID	---- (4)	ID	$ 31,252 (2)	ID	$ 88,259 (2)	NA	---- (1)
1976 Property Tax Assessment for WQM	---- (1)	40¢/$100 A.V. (4)	---- (4)	90¢/$100 A.V. (4)	98¢/$100 A.V. (4)	12¢/$100 A.V.	9¢/$100 A.V.	NA	---- (1)
Revenues from Connection (tap-in) Fees	---- (1)	$ 9,625 (1)	---- (1)	$ 12,000 (1)	$ 12,535 (2)	---- (1)	$ 60,000 (1)	$ 1,500 (2)	---- (1)
Total Users Fees 1976 (See Appendix for actual user charges, rates)	$ 67,200*** (2)	$ 34,992 (5)	$ 63,618 (2)	$ 120,000 (1)	$ 40,583 (2)	$ 77,461* (2)	$ 720,000 (2)	$ 124,543* (2)	$ 50,000 (1)
Special Assessment Charges (amount per customer)	---- (1)	---- (1)	---- (1)	---- (1)	---- (1)	---- (1)	---- (1)	---- (1)	---- (1)
Total Revenues Collected (1976 from all sources)	$ 67,200*** (2)	$ 84,615 (5)	$ 63,905 (2)	$ 180,000 (5)	$131,667 (2)	$ 86,334* (2)	$ 852,300 (2)	$ 139,136* (2)	$ 207,385* (2)
COST DISTRIBUTION									
Cost of Operations (1976)	$ 13,810 (1)	$ 60,186 (2)	$ 64,365 (2)	ID	$116,958 (2)	$ 88,439* (2)	$ 1,075,875 (2)	$ 164,926* (2)	$ 81,433* (2)
Total Debt Service + Cost of Operations	$ 263,810 (3)	$ 332,896 (3)	ID	ID	$172,850 (3)	$ 123,879* (3)	$ 1,293,175 (3)	$ 274,926* (3)	$ 104,891* (2)
Annual cost per person: Total debt service + operation costs / population	$ 11.47 (3)	$ 97.91 (3)	ID	ID	$38.41 (3)	$ 30.21* (3)	$32.33 (3)	$ 34.37* (3)	$18.26* (3)
FUTURE PLANS									
What type of expansion or improvements are planned?	Consolidation with city-wide system, construct new treatment plant	201 Facility plan to replace present system	Double plant capacity & replace antiquated trunk sewers	Expansion of treatment plant (1)	Expanding treatment capacity; agreement with MSD	201 Facility Plan	Extension of sewer lines and upgrade facility	To treat effl. from lower Dard. & Spenc. Creek watersheds	Extension & replacement of current system
What capacity will new facilities have?	ID	1 mgd or 1.5 mgd	ID	2 or 3 mgd (1)	Additional .55 mgd	ID	ID	New centralized plan (1)	ID
What is estimated cost of new facilities?	$15,000,000	1 mgd - $1,000,000 1.5 mgd - $2,500,000	$2,000,000	$ 750,000 - 2 mgd $1,250,000 - 3 mgd	ID	ID	$10,000,000 (1)	ID	$1,000,000 (1)
How will these facilities be financed?	Grants/Revenue bonds	Collector lines, $600,000 Grants	Grants	EPA Grant	Grants/Bonds	Grants/Bonds	Grants/Bonds	Grants	Grants/Bonds

(1) = Survey
(2) = Financial Statements
(3) = EWGCC, Team Four calculations
(4) = Special Inquiry
(5) = In response to profile in Interim M/I Report
ID = Insufficient Data
NA = Not Applicable
* = Includes funds for water works and sanitary sewer system

**Estimated debt service, no bond revenues spent to date.

***Budgeted for 9/1/76-8/31/77.

[x] No financial statements available.

TABLE 14 (Cont.)

FINANCIAL PROFILES OF SURVEYED WASTEWATER TREATMENT AGENCIES

CHARACTERISTIC	WASHINGTON	WENTZVILLE	HERCULANEUM SEWER DISTRICT	LAKE ADELLE	ST. CHARLES REGIONAL SEWER DISTRICT	MSD	FEE-FEE	IMPERIAL	VALLEY SEWAGE
GENERAL									
Type of System - e.g.: Sewer District / Municipality / Private System	Municipality	Municipality	Sewer District	Sewer District	Not Yet Functioning	Sewer District	Private	Private System	Private
For Municipal System - Are service area boundaries coterminious with municipal lines	No (1)	Yes (1)	NA	NA		NA	NA	NA	NA
1976 Population of Service Area	8,700 serviced 9,000 (1)	5,000 (1)	2,500 (1)	280 (1)		1,397,991 ser- 1,423,981 viced (1)	132,650 (1)	1,202 (1)	2,625 serviced 6,250 (1)
Estimated 1996 Population of Service Area	12,500 (1)	11,000 (1)	3,500 (1)	300 ('81) (1)		1,460,012 (1)	384,000 (1)	6,750 ('81) (1)	ID
Number of Households in Service Area - (1976)	2,800 serviced 2,868 (1)	1,204 (1)	550 (1)	70 (1)		261,024 ser- 267,898 viced (1)	40,580 (1)	325 (1)	1,500 (1)
Size of System - 1976 Capacity in million gallons/day	2.25 mgd (1)	.347 mgd (1)	.3 mgd (1)	3 mgd (1)		443.5 mgd	15.5 mgd (1)	1.75 mgd (1)	
Actual utilization of system in million gallons/day	41.8% .94 mgd (1)	105% .364 mgd (1)	80% .24 mgd (1)	23% .69 mgd (1)		57% 2528 mgd	98% 15.1 mgd (1)	10% .175 mgd (1)	65% (5)
CAPITAL FUNDING									
Assessed Property Valuation of Service Area	$18,610,384 (1)	ID	$8,000,000 (1)	$100,000 (1)		ID	ID	ID	$59,700 (5)
Statutory debt limit: General Obligation bonds	$ 3,722,076 (1)	ID	ID	$ 25,000 (1)		$115,788,000 (1)	NA	NA	NA
Long-term bonded indebtedness for WQM: General Obligation	$ 610,000 (1)	$ 322,000* (2)	---- (1)	---- (1)		$ 48,549,000 (1)	NA	NA	NA
Long-term bonded indebtedness for WQM: Loans or Revenue bonds	---- (1)	$ 43,000* (2)	$ 256,000 (1)	$ 10,000 (1)		ID	$2,186,500 (1)	$300,000 (1)	$47,818 (2)
Remaining debt capacity: General Obligation bonds	$ 2,736,637 (1)	ID	ID	---- (1)		$ 67,239,000 (3)	NA	NA	NA
Annual debt service: (principal + interest per year) for WQM General Obligation	$ 68,230 (2)	$ 37,814* (2)	---- (1)	---- (1)		$ 4,844,000 (1)	NA	NA	NA
Annual debt service: Revenue bonds for WQM	---- (2)	$ 8,196* (2)	$ 24,821 (1)	$ 1,070 (1)		$ 550,000 (1)	$ 525,832 (1)	$ 36,000 (3)	$ 5,700 (3
Debt per person for WQM: (total long-term indebtedness / total population)	$70.11 (3)	$73.00* (3)	$102.40 (3)	$35.71 (3)		$34.73 (3)	$16.48 (3)	$249.58	$18.22
REVENUE SOURCES									
Revenues from 1976 Property tax levy for WQM	$ 73,548 (2)	$ 66,517* (2)	---- (1)	---- (1)		$ 2,856,000 (1)	NA	NA	NA
1976 Property Tax Assessment for WQM	40¢/$100 A.V. (4)	67¢/$100 A.V. (4)	---- (1)	---- (1)		20¢/$100 A.V. (4)	NA	NA	NA
Revenues from Connection (tap-in) Fees	---- (1)	ID	$ 4,000 (1)	$ 350 (1)		$ 52,000 (1)	$1,200,000 (1)	$ 75,000 (1)	$ 1,250 (1
Total Users Fees 1976 (See Appendix for actual user charges, rates)	$ 48,123 (2)	$ 24,710 (2)	$ 39,000 (1)	$ 5,800 (1)		$ 11,875,000 (1)	$2,750,000 (5)	$ 40,000 (1)	$62,100 (1
Special Assessment Charges (amount per customer)	---- (1)	---- (1)	---- (1)	---- (1)		---- (1)	---- (1)	---- (1)	----
Total Revenues Collected (1976 from all sources)	$ 95,876 (2)	$ 108,424* (2)	$ 43,000 (1)	$ 6,150 (1)		$ 17,182,000 (1)	$3,950,000 (3)	$115,000 (1)	$68,950 (1
COST DISTRIBUTION									
Cost of Operations (1976)	$ 97,871 (2)	$ 98,520* (2)	$ 33,400 (1)	$ 6,498 (2)		$ 16,273,802 (1)	$1,663,000** (1)	$100,000 (1)	$55,389 (1
Total Debt Service + Cost of Operations	$ 166,101 (3)	$ 144,530 (3)	$ 58,221 (3)	$ 7,568 (3)		$ 21,667,802 (3)	$2,188,832 (3)	$136,000 (3)	$61,089 (3
Annual cost per person: Total debt service + operation costs / population	$19.09	$29.91 (3)	$ 23.29	$27.03 (3)		$15.50 (3)	$16.50 (3)	$113.14	$23.27 (3
FUTURE PLANS									
What type of expansion or improvements are planned?	Secondary sewage treatment	New treatment plant (1)	Extend service area 201 phase II new facility	Expanded trunk lines		System Improvements	Consolidation with MSD or construction of new facility	New plant to replace 3 existing; line extensions	None - possible with drawal from busines
What capacity will new facilities have?	1.8 mgd	1.1 mgd (1)	ID	----		ID	ID	Same	
What is estimated cost of new facilities?	$ 1,500,000	$1,000,000 (1)	$1,000,000	----		$236,000,000	$6,000,000	$500,000	
How will these facilities be financed?	Grants	Grants	Grants	Revenues		Grants, Revenues	Bank Loan	User charges & Loans	

**Estimate

(1) = Survey
(2) = Financial Statements
(3) = EWGCC, Team Four calculations
(4) = Special Inquiry
(5) = In response to profile in Interim M/I Report
ID = Insufficient Data
NA = Not Applicable
* = Includes funds for water works and sanitary sewer system

must operate at a less efficient scale and thereby incur higher operating costs.

3. Public agencies depend upon federal and state grants to reduce the significant capital costs of wastewater treatment facilities.

4. It is economically unfeasible for private sewer companies which are ineligible for government assistance to make the improvements to their systems necessitated by P.L. 92-500.

5. Most agencies are planning expansions and/or improvements to their systems under the assumption that federal and state grants will be available to subsidize their capital costs. Survey responses indicated excessive demand for limited intergovernmental grants.

6. Numerous factors influence the true cost to the consumer of wastewater treatment. Such variables include the level of treatment, operating level of the plant, ability of the agency to obtain grants, capital financing capabilities of the community and administrative efficiency or the operating agency.

7. Funds required for both daily operation and maintenance costs and amortization of debt are being raised through a variety of mechanisms. Agencies differ widely on their utilization of particular fiscal tools.

8. Consumers may pay several different charges for their sewer service including tax levies, service charges, connection fees and special assessments.

Based on these conclusions, three fiscally-related issues of long term significance were identified. First, the survey pointed up the need to obtain assurances from the State of Missouri on the future availability of State aid for wastewater treatment facilities. Second, regional wastewater treatment projects have to be prioritized so that available funds can go to the areas with the most pressing problems. Finally, acquisition of private sewer companies by public agencies is necessary to achieve the national water quality goals mandated by Congress. Efforts have been made throughout subsequent stages of the 208 program to resolve these early financial concerns.

c. Legal Analysis. The third element in the development of a financial conditions data base was a consideration of the constraints imposed by Missouri law on the

financial operations of various management/institutional agencies (Element 9, P. 26-44; Element 13, P. 85-100). The development of effective financing arrangements to implement the 208 plan hinged upon a clear understanding of the current fiscal tools available to and limitation imposed upon wastewater management entities. The designated management agencies must have the legal capability to raise the revenues needed to carry out alternative water quality control programs.

In addition, Section 208(c)(2) of P.L. 92-500 specifies four powers related to financial capability that the management structure must possess: the authority to (1) accept and utilize grants; (2) raise revenues and assess user charges; (3) incur debt; and (4) assure proportional community payments for use of the facilities. Since compliance with both federal requirements and State statutory constraints is essential, Missouri laws were reviewed early in the study to determine the extent of fiscal powers a water quality management agency can utilize. Constitutional amendments and/or legislative changes would have been necessary if local agencies lacked sufficient authority to finance the actions being proposed under the 208 program.

Table 15 summarizes the fiscal tools available to municipalities, sewer districts and private sewer companies operating in Missouri. Each operating entity now possesses sufficient authority to meet the federal criteria for management agencies, although clarification of certain powers may be desirable. The study indicated that the St. Louis Metropolitan Sewer District has the broadest range of revenue-raising, tax assessment and bonding powers. These wide fiscal powers will be of great assistance in implementing the St. Louis 208 Plan.

Estimation of Alternative Costs. Water quality management plans prepared in accordance with Section 208 of P.L. 92-500 must identify "measures necessary to carry out the plan (including financing)" and must also make preliminary determinations of cost-effective treatment systems. Towards this end, cost estimates were prepared, in cooperation with the technical consultants, for over 100 point source alternatives. Given the regional focus of 208 planning, detailed financial planning for each service area is not possible. The development of user charge systems and industrial cost recovery arrangements (see Section 2, P. 34) are functions, rather, of 201 facilities planning studies. The cost estimates developed in the 208 project have been valuable, however, in identifying the most cost-effective configuration of treatment plants, in determining the level

TABLE 15

FINANCIAL POWERS AND CONSTRAINTS OF WASTEWATER MANAGEMENT AGENCIES

Type of Agency	Example	DEBT LIMITATIONS		REVENUE SOURCES				
		General Obligation	Revenue	Ad Valorem Property Tax	User Fees/ Service Charges	Special Assessments	Connection or Tap-in Fees	Public Grants
Municipalities	-Manchester -Pacific -Union -Arnold -Eureka -Wentzville -Washington -St. Charles -St. Peters -O'Fallon (All of above responded to the long form of the 208 Management/ Institutional survey)	Yes ·Total city debt not to exceed total annual income and revenue plus balance. ·2/3 voter approval limit at up to 20% assessed value (a.v.)1) ·Repay all bonds within 20 years. ·6% interest 8% in certain instances. ·Must have annual real property tax to repay.	Yes ·No total limit. ·4/7 maj. approval. ·35 year maximum period. ·6% rate maximum (8% poss.) ·Pay with revenue from sewer system, not taxes.	Yes ·Part of $1.00/ $100 a.v. limit unless earmarked for repayment of a bond issue.	Yes ·Just and equitable charges or rent" to users. ·"May charge higher rate to customers outside city.	Yes ·For special benefit to area or class of residents.	Yes ·As special assessment ·No guidelines.	Yes
Sewer District (Three Alternative Types) ·County Court District (operated by county court)		Yes ·Same limits as municipality	Yes ·Same as municipal	Yes ·Same as municipal	Yes ·Based on amount of water used.	Yes ·May not exceed 1/2% A.V. or .005¢/$100 a.v.	Yes	Yes
·Second Class County District (More autonomous from county court)	·Herculaneum ·Lake Adelle ·Grey Summit (proposed)	Yes ·Same as above	Yes ·Same, but can differ with impact of different users.	Yes Same, to defray annual operating costs.	Yes ·Can differ with different cost of treatment	No	Yes	Yes
·Common Sewer District (oriented to county wide or large watershed coverage)	RSD, St. Charles County	No -	Yes	No	Yes To pay O&M as well as debt service on revenue bonds. ·Charges to be "reasonable". ·Based upon volume of water used may charge residents of municipalities user fees.	No	Yes	Yes Including contributions from county or municipal governments.
St. Louis Metropolitan Sewer District ·Authorized by Missouri Constitution, Specific Powers by Charter	MSD	Yes ·Total debt not to exceed 5% of all taxable property in district. ·Same period, rate and approval limits as municipal	Yes ·Same limits as municipalities.	Yes ·At least sufficient no pay P&I on bonded indebtedness within 20 years. ·Maximum rate @10¢/$100 a.v. ·Rate set annually. ·May pay part of O&M as well.	Yes ·Charged semi-annually May base on: -water use -plumbing fixtures -persons served	Yes ·May use to pay off G.O. Bonds. ·May from subdistricts to pay for improvements in subdistricts.	Yes	Yes
Private Sewer Companies	·Fee Fee ·Imperial	No ·Relies on private commercial borrowing to finance debt.	No	No	Yes ·Can include service contracts w/customers	No	Yes	No
Counties (same powers as Municipalities can be implied)		Yes	Yes	Yes	Yes	Yes	Yes	Yes
State of Missouri		Yes, Up to $150 M, intended to assist local governments in matching federal grants.						

1) A.V. will be used to abbreviate "assessed valuation"
2) O&M is an abbreviation for "Operations & Maintenance"
3) P&I is an abbreviation for "Principal & Interest"

of water quality the region can afford and in indicating the financial impacts that water quality management activities will have on St. Louis residents.

Prior to receiving any cost estimates from the technical consultants, two methodologies were developed for the financial analysis of the point source and nonpoint source alternatives (Element 13, P. 112). These preliminary methodologies indicated that certain basic assumptions would have to be made in order to provide a meaningful analysis of local financial impacts. Assumptions were made regarding the level and availability of federal and state grants, the interest rate on long-term municipal bonds, the length of the amortization period and the fiscal capabilities of the management agency. The steps included in the methodology illustrated the concepts underlying the allocation of costs to residents and governmental bodies while indicating the procedures involved in financial analysis. Through these methodologies, a better understanding was gained of the financial difficulties the region will face in implementing the 208 Plan.

Extensive work by the technical consultants provided the study team with specific cost estimates for each of the service areas. Capital construction cost estimates were developed as well as year 2000 operation and maintenance costs for each new or expanded system. In applying the methodology to each alternative, cost allocations were made to the federal and state government and to service area households.

The broad steps identified in the Phase II methodologies provided the basis for the detailed fiscal evaluations of the point source alternative costs. Certain changes were made in the assumptions of the methodology to comply with federal regulations for cost-effectiveness studies and to agree with more recent management proposals. However, the general procedures used in allocating actual costs were based upon the preliminary methodology.

EPA requires that "present worth analysis" be used in evaluating all water quality projects. Present worth analysis means that future costs for construction and operation and maintenance are all expressed in terms of their current cost as if these expenditures were being made at the present time. Thus, in this analysis, the sum total of the capital investments in plants and pipes that will be made over the next 25 years have been totaled and an annual estimate of all future investments has been calculated. This estimate is based on June, 1977, dollars and does <u>not</u> include any

inflation factor. Likewise, the operation and maintenance cost figures for a year in the life of the system are expressed in June, 1977, dollars. Present worth analysis, in effect, allows local residents to evaluate the future value of these systems by comparing their present worth to other expenses the household currently has.

A more accurate estimate of annual household cost would be possible if operations and maintenance costs could be based on the flows of an interim year of the system's life. Year 2000 operation and maintenance costs represent the level of costs that can be expected when the system is operating at its designed capacity and its most cost efficient level. However, the plants will be operating at somewhat less efficient levels for the intervening years. The year 1990 was selected as more reflective of the average operations and maintenance cost for the system. The engineers calculated the operating and maintenance costs for each service area based on projected 1990 flows. At this point, annual operating and maintenance costs related to commercial and industrial users were separated from residential treatment costs. The financial impacts of each project would now more closely reflect the true costs to residential users. Such detailed cost estimates have been vital in accurately projecting the economic effects of the proposed projects. Table 16 summarizes the methodology for developing household cost estimates.

Elimination of Alternatives and Refinement of Cost Estimates. By this point in the project extensive data had been developed on water quality impacts, management options and issues, and public acceptance and political feasibility of implementing particular point source alternatives (Element 18 Report). Costs for levels one, two and three treatment standards (see Section 2, p. 27) were also available. Local residents could choose the level of water quality they preferred based on how much they wished to pay.

Each of these factors were considered in eliminating those systems considered unlikely to be implemented. In formulating their recommendations, the technical consultants rejected level one alternatives because the effluent quality of these systems would not meet State of Missouri water quality standards. Cost-effectiveness criteria were the basis for elimination of level three alternatives; the improvements in water quality achieved under level three procedures could not be justified by the substantial increases in capital and operating and maintenance costs. Level two treatment was judged to be the most cost-effective alternative, providing the highest water quality possible at the least cost.

TABLE 16
THE HOUSEHOLD COST EQUATION

Capital Costs for Treatment Plans, Sewer Systems, Pump Stations, etc.	+	Capital Costs for Residual Waste Facilities	=	Total Capital Costs				
Total Capital Costs	=	75% Federal Assistance	+	15% State Assistance	+	10% Local Share		
10% Local Share	X	Capital Recovery Factor	=	Annual Debt Service Payment				
Annual Debt Service Payment	+	Annual O&M Residential Treatment	+	Annual O&M Collection System	+	Annual O&M Residual Waste	=	Annual Community Cost
Annual Community Cost	÷	Estimated Number of Households in Service Area	=	Estimated Annual Household Cost				

Recommendations for particular point source alternatives were made for many of the service areas. But the initial review of alternatives also indicated that new configurations of plants should be developed for some service areas. Revised designs and cost estimates were prepared for systems in Jefferson and St. Charles County. In other service areas, the competing water quality cost factors and political considerations were so strong that the consultants did not feel justified at this point in recommending one alternative over another. In later phases of the project, discussions with area residents regarding these alternatives and additional technical information aided the project team in making final recommendations.

The last major refinement of annual cost estimates was the inclusion of capital and operating and maintenance costs related to residual waste facilities. While these costs did not influence the relative costs of different point source alternatives, inclusion of these expenses in the household cost estimates enabled a more accurate evaluation of the financial impacts of the recommended plans.

Estimated annual cost figures were presented at the Phase III workshops for each recommended new or expanded system (Element 24 Reports). The annual cost to each household represents the household's share of the community investment in constructing a wastewater treatment plant and collection system plus payment for the benefits the household receives in having its wastewater treatment by the community facilities. The estimates are useful for comparison purposes and to indicate broad economic impacts of proposed actions. The figures represent a portion of the total estimated 1990 user charge for wastewater treatment. Precise cost estimates and detailed financing plans are not within the scope of the 208 project. The detailed collection and treatment costs of the 201 plans will provide the basis for choosing specific revenue-raising options and cost assessment alternatives.

Recommendations. With approval of the 208 plan, each of the designated management and operating agencies will have to take certain steps toward the implementation of the plan. The function of the 208 plan has been to identify those broad measures that are necessary to carry out a regional water quality plan. Specific programs for financing the local costs of these systems will be formulated during 201 facility planning. Based on the financial evaluation, the following critical issues relating to financing the pollution control recommendations are:

a. The future availability of State grants. Within the next few years, the State is expected to have committed the entire $150 million in water pollution bonds authorized by the voters in 1971. Local communities now depend upon this State aid to subsidize the capital costs of treatment plants and collection systems. Without additional bonds, many of these projects cannot be implemented.

b. The development of the county and regional water quality boards. Coordination, planning and monitoring tasks will be the responsibility of these boards. The boards may be important in mediating between local service areas and influencing priority for government funds.

c. The development of cooperative arrangements among the various operating entities. These contractual arrangements will have fiscal impacts which cannot be ignored, particularly in the lower Meramec where management of the water quality activities is complicated by a two-county service area. As a result, joint capital financing schemes by the St. Louis Metropolitan Sewer District and a Jefferson County agency will have to be worked out. The legal feasibility, public acceptability and costs of such contractual arrangements and assessment methods need to be evaluated during 208 continued planning.

d. The development of detailed implementation schedules. Detailed implementation schedules will be developed through the 201 facilities plan. However, in the next six months, the operating agencies could consider broad plans in designing their long-term implementation schedule. The recommended actions will be implemented over a period of years. The timing of acquisition of existing facilities and the phasing of new construction will determine how much and when additional capital funds must be allocated to investment in waste treatment facilities. As specific plans are produced by the 201 process, more detailed financing arrangements can be developed. In the meantime, management agencies can gain a familiarity with the issues involved and begin to solve the complicated problems of financing the construction and operation of waste treatment systems.

B. Management/Institutional Analysis and Recommendations

Introduction. The management/institutional analysis completed by Gateway led to the selection of the recommended management system and implementation program presented

in this Final Plan. In undertaking the management/institutional analysis, objectives and criteria were developed for the assessment of existing agencies and management alternatives evaluated later in the planning process (Element 9, p. 6).

Four main areas of investigation were undertaken. Local management agency profiles, jurisdictional/watershed profiles, an authority/utilization report, and a research bibliography were prepared for the purpose of reaching some interim conclusions about the current wastewater management system and the potential resources and problems that bear on the 208 strategy implementation. The methodology for undertaking this assignment is shown graphically in Figure 26 and explained below.

Local Management Agency Profiles. The collection and organization of data on individual sewage treatment agencies required the handcrafted development of a series of data collection forms. Because of time and efficiency considerations, it was determined that a sample survey would be utilized (Element 9, Appendix C). The goal of the survey was to fulfill the study's data needs and at the same time give an accurate picture of the variety of water treatment agencies operating in the region. Questionnaire forms were mailed to the appropriate agencies with Gateway making follow-up telephone calls to offer assistance and to encourage the agencies to complete and return the questionnaires. In addition to the survey data, many personal interviews were conducted to obtain more information about the actual day-to-day operations of the key sample agencies.

Jurisdictional/Watershed Profiles. The jurisdictional/watershed profiles (Element 9, p. 45) were prepared by a different method. Regional maps were prepared with stream basins and treatment agency jurisdictions outlined to allow comparison of watersheds to jurisdictional coverage.

Research Bibliography. Another aspect of the data collection system was aimed at providing a view of the "state of the art" of management/institutional planning related to waste water treatment. A bibliographic search was undertaken, a project library established, and a research bibliography compiled (Element 9, Appendix C).

Authority/Utilization Report. The fourth aspect of the management/institutional analysis produced a legal authority/utilization report and matrix (Element 9 - p. 31). The matrix shows the required 208 functions and

INTERIM MANAGEMENT FLOW CHART

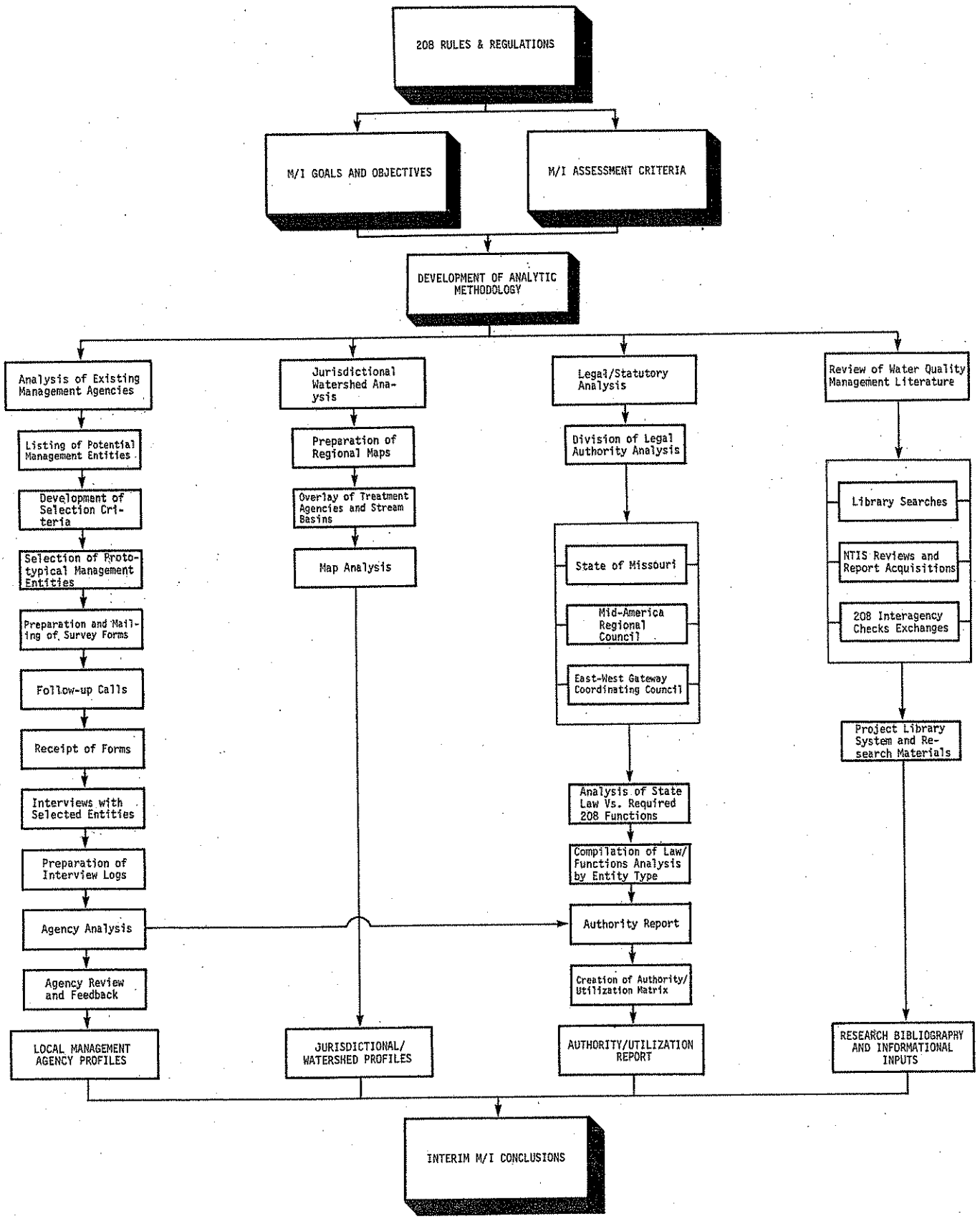

figure 26

the agencies that have the statutory authority to perform these functions. In addition, an analysis was conducted to determine the extent to which required 208 functions were actually being exercised by these entities. This information was helpful not only in understanding the statutory "gray areas," but also in more fully appreciating the relationship between various major actors.

The resulting matrix (Figure 27) demonstrates the difficulty of finding a single agency type that possesses the legal authority or the resources to act as a sole areawide waste treatment management agency. The necessity of creating an optimum combination of private, local, county, regional and state agencies to implement and manage the areawide plan was thus identified.

Development and Evaluation of Alternatives. A most important analytical effort that was built around these initial efforts was the development and evaluation of six major management/institutional alternatives (Element B, Chapter II). These alternatives were evaluated in a number of ways:

a. The alternatives were considered in terms of the management/institutional criteria developed earlier in the study.

b. The alternatives were weighted on the basis of their capacity to be implemented in a phased, incremental manner.

c. The alternatives were tested on the basis of their county-by-county viability.

d. Area citizens and policy-makers evaluated the alternatives in a variety of meetings and regional workshops.

This evaluation process allowed for a narrowing of alternatives and permitted the selected management/institutional options to be measured against the detailed engineering and financing proposals that were evolving. This match-up was absolutely critical to the development of alternatives that are economically viable, politically realistic and technically feasible.

Having completed an evaluation of the existing areawide wastewater management system, it was possible to start exploring alternative systems that could improve this region's ability to implement its adopted 208 plan. Instead

208 MANAGEMENT MATRIX

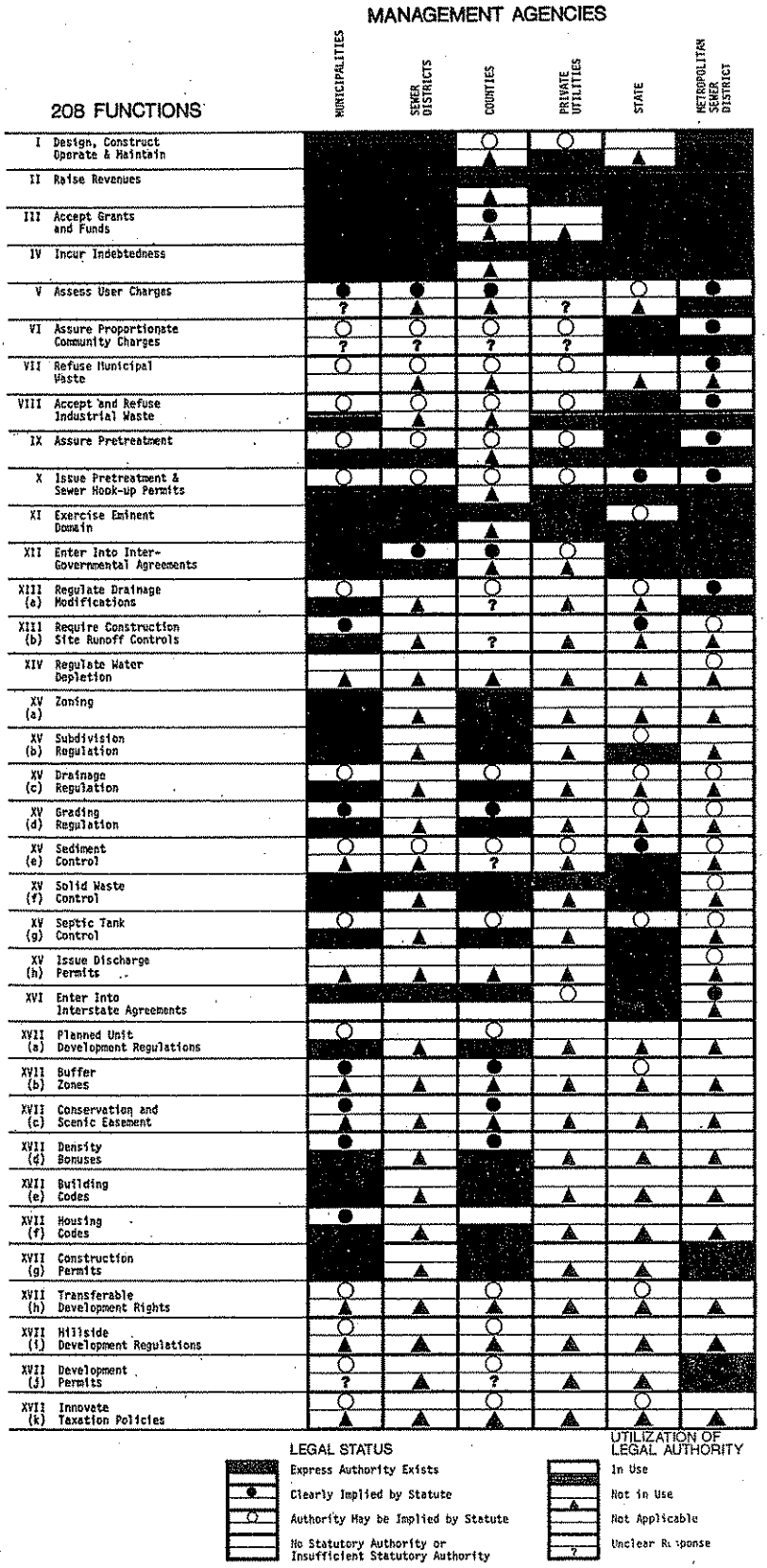

figure 27

of merely working with variations on the present system-shifting powers and responsibilities about from one actor to another--a special research task was undertaken.

An analysis was conducted of the existing institutional arrangements other regions have devised to achieve improved water quality (Element 23, Technical Supplement). This effort evaluated a variety of approaches from different metropolitan areas of the country, ranging from Atlanta to Chicago and Minneapolis. A number of ideas emerged from this review and lead directly to the development of the six broad institutional alternatives.

Ten basic management/regulatory entities were considered as possible actors within these institutional arrangements:

1. Federal Government
2. State of Missouri
3. Bi-State Development Agency
4. East-West Gateway Coordinating Council
5. Sewer Districts
6. Metropolitan Sewer District (MSD)
7. Counties
8. Private Companies
9. Municipalities
10. Soil and Water Conservation Districts.

The alternatives considered were as follows:

I. Present System Continued
II. State Centered Approach
III. Regionalized System (a) MSD
(b) Bi-State
IV. Subregional System
V. Coordinated Public System

a. Present System Continued. It was concluded that to continue the existing system would be to perpetuate an uncoordinated management program, lacking any single agency with the authority and resources needed for true oversight and assessment. Moreover, the mandated water quality goals of P.L. 92-500 would simply not be met.

b. State-Centered Approach. Pursuant to this alternative, the State of Missouri would have moved more vigorously into water quality management, assuming the role of environmental supervisor and coordinator as well as planner for all water quality related factors within this study area.

The State-centered concept, it was concluded, had both political and operational problems. The State, while anxious to participate in water quality management on a broad scale, did desire a more centralized and expanded management role. In fact, because of detailed regional needs, these functions had already been allocated by the State on a more localized basis among various regional planning agencies and local political jurisdictions.

The 208 program area designations themselves evidenced the State's desire in this regard. Thus, it was felt that centralization needed to evolve from the local level and not from the State. Moreover, it was unlikely that a proposed State review of environmental impacts arising from land development would be enacted by the Missouri legislature.

c. Regionalized Systems. Two potential regionalized approaches were considered as the means for centralizing the water quality management responsibilities as well as for securing overall geographic coverage and the best technical competence.

One approach, revolving around an expanded role for the St. Louis Metropolitan Sewer District (MSD) was certainly, in some respects, a logical concept since MSD is today the major wastewater treatment operating agency in the region. MSD, under this concept, would have secured the legal authority to extend its geographic coverage over the entire 208 study area. It was noted, however, that an enlargement of MSD's potential jurisdiction would be very difficult to achieve, requiring an amendment of the Missouri Constitution.

A second approach was based upon activating the Bi-State Development Agency's latent powers (water quality management). Wastewater would have become merely another operating arm of the agency as are transit and port operations.

These concepts cored poorly in terms of feasibility. Neither MSD nor Bi-State indicated any interest in pursuing such options. More importantly, citizens and public officials alike were uniformly opposed to these alternatives.

d. Subregional System. A basic determinant in this alternative was that MSD's basic operational area would be confined, as its Charter now limits it, to St. Louis City/County-the most heavily urbanized sectors of the region. However, any other major treatment would be on a subregional basis using a new sewer district or districts

for the other urbanizing sectors of the region. Alternatively, a single subregional sewer district would have been created to coordinate treatment in all three of the non-MSD counties.

Regional sewer districts created either at the county or tri-county level presented a major issue for resolution. It was agreed that for purposes of coordination and jurisdictional authority over the impact areas, there was some logic to this idea. Yet, serious questions were raised as to whether this concept was truly implementable from an operational or engineering vantage point in Franklin, Jefferson and St. Charles Counties.

e. Coordinated Public System. Of all the alternatives, this concept would be most similar to present practices. Without radically changing the existing system, this alternative would add the consolidation and coordination of responsibilities necessary to meet the challenges of 208. Consolidation would result from a number of changes. First, private sewer corporations would be eliminated from the scenario because their financial status makes them unlikely actors in any future water quality plan. Second, this alternative would create a single program planner, supervisor and coordinator--East-West Gateway.

In the area of point source control and facility operation and management, MSD would basically work within its chartered jurisdiction with a continued effort to involve MSD by contract in other parts of the study area, where such involvement was locally desired. In Jefferson County, St. Charles County, and Franklin County, sewer districts and municipalities would continue to play a significant role in point source treatment and regulation.

While this alternative would foresee a much stronger role for sewer districts in providing service and coordination than such entities currently provide, these districts would be less powerful than the subregional sewer district proposed in Alternative IV. In this coordinated public system, the sewer district would, rather than pre-empting municipal power, attempt to work hand-in-hand with municipal operators to assure the greatest possible coverage and quality of service. In the area of nonpoint source control, this alternative would not be radically different from present practice.

It was felt that this alternative would be the most politically feasible; it would not radically change the existing

functions of either the state, MSD, or municipal operators; it also would not necessarily require the creation of numerous large-scale sewer districts. On the other hand, new sewer districts would, at a minimum, be created to serve currently unserviced areas.

It was determined that this alternative, while in some ways not significantly different from present practices, would, if successfully implemented, provide the region with a strong management/institutional system.

Recommendations. The management/institutional analysis had thus proposed a number of broadly stated alternatives in which responsibility for the key 208 functions had been allocated to various levels of government, with various degrees of centralization or decentralization. Through this evaluative process, project staff and citizens alike recognized that the present management system in the region was inadequate to fulfill the mandate of Federal law. The consensus moreover was that a relatively decentralized system with significant local control would provide the basic framework for the management system that is now recommended as part of this final 208 Plan.

The consensus suggested also that the proposed system would most closely resemble the Corodinated Public System alternative (Figure 28). To translate this alternative into an actual implementation program required overcoming a number of obstacles. As illustrated in Figure 28, the conceptual alternative made no attempt to either group the required 208 functions into a manageable number or to allocate ultimate responsiblity to a particular entity.

III. THE RECOMMENDED ST. LOUIS, MISSOURI, 208 MANAGEMENT SYSTEM

A. Introduction

An important methodological step in moving from an evaluation of alternatives to the proposed 208 management system was to group the eight functions developed earlier in the study into a smaller, more manageable number of "functional groupings." This grouping of functions was pursued for reasons other than mere practicality. The groupings are, in fact, one of the logical cornerstones of the proposed management systems.

SELECTED MANAGEMENT APPROACH: COORDINATED PUBLIC SYSTEM

208 FUNCTIONS	FEDERAL	STATE	BI-STATE	GATEWAY	MSD	SEWER DISTRICTS	COUNTIES	PRIVATE CORPS.	CITIES	SOIL/ WATER DIST.
PROGRAM SUPERVISION AND COORDINATION				*						
PLANNING				*						
STANDARD SETTING	*	*							*	
POINT SOURCE REGULATION		*			*	*			*	
NONPOINT REGULATION				*	*	*	*		*	
PLANT DEVELOPMENT OPERATION AND MAINTENANCE					*	*			*	
FINANCE	*	*			*	*			*	
MONITORING AND ENFORCEMENT		*								

* ASSIGNED RESPONSIBILITY

figure 28

1. Program planning, supervision and coordination. Water pollution control measures should be viewed not only as solutions to local problems, but also as parts of a coordinated strategy to control water pollution throughout the area. Federal law requires that a management system be created to oversee implementation of the 208 Plan and its provisions. This management system must have the power to deal with implementation on a regional basis and yet still be sensitive to the wishes of the counties and their municipalities.

2. Point source regulation and compliance including point source permitting, standard setting, monitoring and enforcement) Legal sanctions are a necessary aspect of a water pollution control program. 208 requires that management agencies have the power to regulate the volume, strength and composition of discharge through permit; monitor this discharge; and enforce the terms of discharge permits if violated. A management agency must also have the power to set standards for insuring a desired level of instream water quality.

3. Treatment Plant development, finance, operation and maintenance. Properly planned, designed, and correctly operated and maintained, sewage treatment plants can be one of the most important mechanisms for controlling water pollution. The federal government and the State of Missouri are well aware of this fact, as evidenced by their combined 90 percent grant funding of new wastewater treatment plants and upgrading and expanding of existing ones.

Section 208 requires that certain agencies be designated to receive these federal and state grants. This is done to insure that these agencies have the financial powers to meet their 10 percent share of the total project cost, and have the expertise to operate the treatment facility and collection system in a proper and efficient manner.

4. Management of Nonpoint Source Controls. 208 requires that there be agencies designated to develop, apply and enforce nonpoint source control measures.

Before turning to the proposed allocation of responsibilities within the four management groupings identified above, the basic philosophy of the proposed coordinated public system should be stated. This philosophy is one of logically dividing 208 responsibilities among three key levels of government at work in the study area--regional, state and local (county/municipal).

It is, thus, proposed that certain 208 management functions need to be handled at the State level, other functions should fall to regional government and a great variety of functions should be dealt with at the local level. We turn first to those functions which should and can be most effectively dealt with at the regional level of government.

B. Program Planning, Supervision, and Coordination

East-West Gateway Coordinating Council is recommended as this area's water quality planner-coordinator. Gateway is the St. Louis Area Council of Governments; its Board of Directors is comprised of elected officials and agency representatives from the State, County and municipal levels and citizens appointed by elected officials. Its area of coverage gives Gateway the ability to address water quality problems on an areawide basis; at the same time, as illustrated by its composition, Gateway can be sensitive to local concerns. Moreover, Gateway is recommended as the 208 Coordinator because its strengths-experience, regional scope, and commitment to 208 planning-override its major weakness-lack of direct enforcement powers.

To insure that the concerns and inputs of local plant operators, planning commissions and sewer district representatives are adequately addressed, development of a two-tiered Water Quality Board to work with Gateway on implementation of the 208 Plan will be an important feature of the management system.

A Regional Water Quality Board will be formed and integrated into the Gateway structure. The Board will be the formal mechanism through which Gateway's planning and supervisory decisions are channelled. The proposed placement of the Board within Gateway hierachy is shown in Figure 29.

The Board should meet monthly and will, with the assistance of Gateway personnel, assure that the 208 program is moving ahead at an acceptable pace, sensitive to local needs, yet consistent with the objectives of the 208 Plan.

The Regional Water Quality Board should, at a minimum, be composed of the following 15 voting members:

Director of Planning, Franklin County
Director of Planning, St. Charles County
Director of Planning, St. Louis County
Director of Planning, Jefferson County (when Planning Commission is established)

Director of Planning, City of St. Louis
2 Representatives--Jefferson County Water Quality Board (CWQB) Municipal and Sewer District Representatives (1 each)
2 Representatives--St. Louis County Water Quality Board Municipal and Sewer District Representatives (1 each)
2 Representatives--Franklin County Water Quality Board Municipal and Sewer District Representatives (1 each)
2 Representatives--St. Charles County Water Quality Board Municipal and Sewer District Representatives (1 each)
2 "At Large" Citizens--appointed by Water Quality Task Force.

The actual composition of the Board will be formalized over the next few months. The 208 Policy Advisory Committee and Water Quality Task Force will assist the Gateway staff in forming the committee and writing its by-laws.

PROPOSED PLACEMENT OF THE WATER QUALITY BOARDS WITHIN GATEWAY

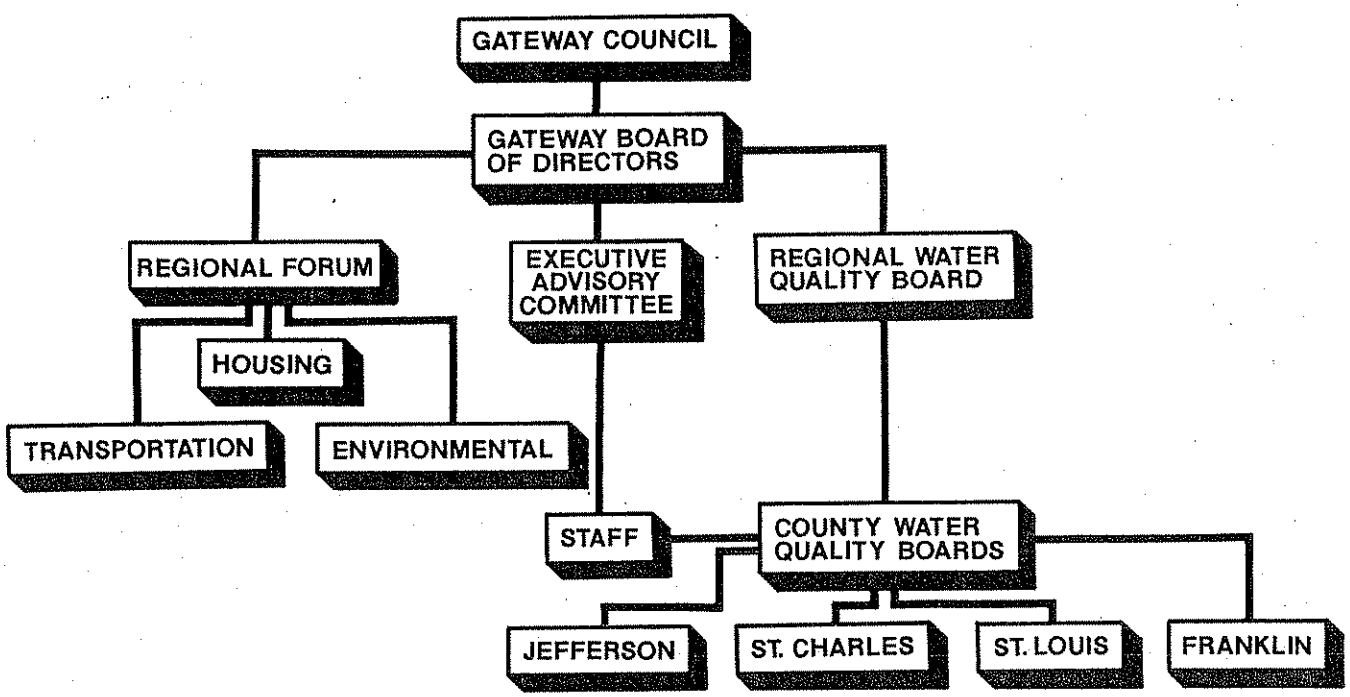

figure 29

The make-up of the Board reflects the degree to which this new entity within Gateway and will be composed of influential, knowledgeable and locally appointed representatives. The key to such representation is the proposed link between this Regional Board and four County Water Quality Boards.

The County Water Quality Boards will be set up in each of the affected Counties in order to attract its key decision-makers and establish the kind of meaningful dialogue that can lead to successful review and implementation of the alternative water quality plans developed for each county.

The County Water Quality Boards will be voluntary bodies set up pursuant to intergovernmental agreements rather than as a result of statutory enactment. The Boards, to be created in St. Charles, Jefferson and Franklin Counties, in addition to joint St. Louis County/City Board, will represent the interests of all levels of government active in wastewater management, including municipalities, sewer districts and county governments. It will be comprised of voting and non-voting members, as shown in Table 17. The actual composition of the County Boards and the necessary intergovernmental agreements will be developed during 208 continued planning.

Notwithstanding their lack of enforcement powers, County Water Quality Boards can be highly meaningful bodies, particularly once successfully integrated through their representatives into the Regional Water Quality Board. These bodies can be the counties' voice at the regional, federal and state levels on the whole range of water quality issues.

The County Water Quality Boards will have, among other things, the following functions:

a. Each of the County Water Quality Boards will be the liaison between the County and Gateway regarding the State of Missouri programs of discharge permitting, standard setting and monitoring. The Board should be notified of new State-issued discharge permits within the County. The Board should have an opportunity to comment on whether granting the discharge permit is consistent with local water quality goals.

TABLE 17
COUNTY WATER QUALITY BOARD

VOTING

1 County Court Judge (in St. Louis County, member of County Council)

2 Prosecuting Attorney (in St. Louis County, County Counselor)

3 County Building Commissioner (in St. Louis County, member of the Public Works Department)

4 County Health Department Director

5 County Director of Planning

6 Representatives of Designated 208 Management Agencies (Municipalities or Sewer Districts)

St. Charles:	Approximately 5 (assume County Court Agency for rural areas)
Franklin:	Approximately 11 (assume County Court Agency for rural areas)
Jefferson:	Approximately 7 (assume County Court Agency for rural areas)
St. Louis:	Approximately 2

7 County Citizen (appointed initially by Gateway 208 Water Quality Task Force)

NON-VOTING

1 Representatives of Additional Operating Agencies (not deisgnated as management agency by 208 Plan)

2 Home Builders Association Representative

3 Soil and Water Conservation District Representative

4 Gateway Representative

5 State DNR Representative (1)

b. The Board will monitor the management changes that are necessary for implementing point source controls. Issues created by the need for expansion of jurisdictional scope, intergovernmental agreement, and new management agencies can be addressed through the expertise and leadership of the Board members.

c. The County Water Quality Boards should meet with municipal and county representatives for the purpose of developing a set of model nonpoint source programs and ordinances that could be adopted countywide.

The creation of a two-tiered Water Quality Board system, as illustrated in Figure 29, will not, of course, overcome Gateway's lack of enforcement powers but should greatly increase the agency's ability to achieve voluntary compliance.

Other means exist for increasing Gateway's power to implement the Plan's recommendations. One approach would be to have Gateway make more forceful use of its "A-95" review function. As a regional Council of Governments, Gateway is required by federal law (OMB Circular A-95) to review and support or oppose a variety of Federal grant requests. A negative finding by Gateway greatly diminishes the likelihood that the federal granting agency will authorize requested funding. A policy decision to reject "201" treatment facility grant proposals where they are inconsistent with future regional 208 goals would, if given support by EPA, become an important supervision tool for Gateway. Should it be determined, as the 208 program progresses, that Gateway is incapable of coordinating the regional program on a primarily voluntary basis, then it becomes necessary to turn to some other type of regional entity. Barring such a possibility, East-West Gateway Coordinating Council, aided by a Regional Water Quality Board, should be well equipped to handle the 208 planning, supervision and coordination functions and provide the following additional services:

a. Provide technical assistance to local communities. Gateway would help local communities develop the institutional arrangement and intergovernmental agreements that are necessary for implementing local control measures including forming sewer districts. Gateway would help mediate disputes between competing entities by developing solutions amenable to all parties. Gateway will also assist local communities by making sure their applications for grant assistance are based on a plan of study in conformance with the 208 plan.

b. Assess the effectiveness of the Plan's control measures. As the control measures are put into effect--new treatment plants built, existing treatment plants upgraded or expanded, nonpoint source control measures adopted--Gateway would assess the resulting improvements in local and areawide water quality.

c. Update and revise Plan recommendations. By evaluating the effectiveness of the control measures and updating its population projections, Gateway will update the provisions of the Plan: the capacity, area of coverage, and level of treatment of proposed wastewater treatment facilities as well as the effectiveness of implemented nonpoint source controls. Gateway will also make more detailed studies of nonpoint source problems, especially urban stormwater runoff and individual home treatment systems. With the assistance of local governments, Gateway will institute watershed level control programs for control of the above-mentioned sources.

C. Point Source Regulatory and Compliance Functions

It is recommended that the State of Missouri continue to assume responsibility for assuring 208 point source compliance. Both past practices and current attitudes seem clearly to dictate this result.

The State of Missouri is already the dominant actor in point source permitting and standard setting. The State is also clearly responsible for administering the existing monitoring program. The State, in exercising these functions, has in many ways been responding to the mandate imposed upon it by the federal government under P.L. 92-500 and related legislation and regulation. There seems to be no question that responsibility for monitoring, standard setting, and the NPDES program (which is at the heart of point source permitting) mut remain with the State of Missouri.

Enforcement has been included in the grouping of functions delegated to the State. It is important to note that in allocating enforcement responsibilities to the State, the term "enforcement" is being used in a fairly narrow sense, only for point sources. In particular, this means enforcement of NPDES provisions. Enforcement as described here does not refer to nonpoint source regulations, which are more localized in nature and should be dealt with at either a municipal or county level.

Notwithstanding the State's continued role as the region's chief point source regulator, the efforts of the Department of Natural Resources, the Clean Water Commission and other State agencies can be positively influenced through the more active involvement of local agencies and decision-makers.

For example, while future decisions regarding standard setting in the 208 study area are likely to be made by the Clean Water Commission, formalized local input into the standard setting function remains a distinct possibility. As the region's current 208 planners, Gateway has attempted to bring to the Clean Water Commission's attention the attitudes and needs of local residents. State standards have created some controversy in this 208 region and this suggests the importance of these standards to local governmental officials and other interested citizens. The State must remain cognizant of the need for submitting its standards to public scrutiny and input. Local governments and other management agencies involved in implementing the 208 process will have to maintain clear channels to the State so that standards consistent with both local needs and federal requirements can be established. Relatedly, although DNR and the Clean Water Commission have been seeking some voluntary compliance with the State monitoring program, local input into the monitoring process has been fairly limited. Given the objective of a truly comprehensive and thorough monitoring effort, the 208 program for the St. Louis region must encourage a stronger program at the State level since successful implementation of the 208 plan demands the pinpointing of non-conpliance. At the same time, a program of greater involvement from the area's wastewater treatment entities is necessary both to bolster State enforcement efforts and to provide the kind of data that continued 208 planning and research will require. As is detailed in Appendix B, a highly detailed water quality monitoring program has been proposed for the 208 study area. Various types of monitoring efforts are recommended as part of a very comprehensive monitoring program. These efforts include monitoring for point source effluent major streams, urban streams, detailed urban runoff and individual home treatment system effluent (see Figure 30 and Table 18). The proposed program places monitoring for NPDES purposes at the top of its priority list. Yet, as the program emphasizes, data used for enforcement and establishment of standards may be useful for continuing planning as well. To make the most out of the limited funding and staffing that are available from various sources for monitoring purposes, Gateway, as 208 supervisor, must develop a program to coordinate the efforts of the dozen or more entities that currently contribute to the area's water quality data. While the State

RECOMMENDED MONITORING SITES

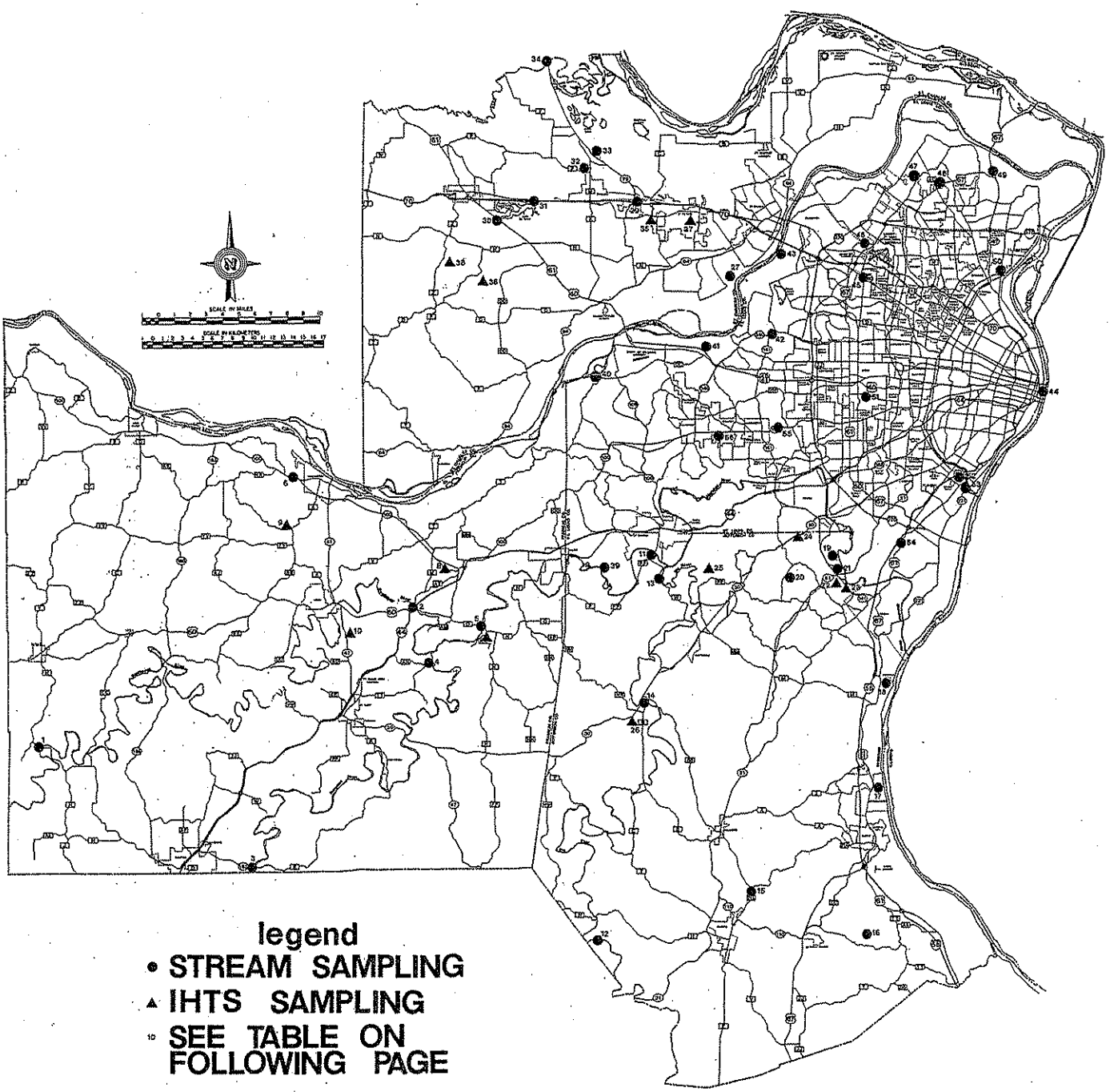

figure 30

TABLE 18

RECOMMENDED WATER QUALITY MONITORING SITES

Monitoring Program Elements (For Description, See Appendix B)

A = Major Stream
B = Urban Stream
C = Detailed Urban Runoff
D = Biota Sampling
E = Significant Individual Home Treatment System Discharge

Site Location Number	Location	Program Element	Type
1	Upper Bourbeuse @ Hwy. H	A	Instream: boundary inflow
2	Bourbeuse @ I-44	A	Instream: Impact of Development & growth
3	Upper Meramec Near Sullivan (Hwy. 185)	A	Instream: Boundary inflow
4	Meramec Above Bourbeuse Near Hwy. AM	A	Instream: Quality Above Impact of Bourbeuse
5	Meramec Near Robertsville @ Hwy. N	A	Instream: Impact of Bourbeuse, Before Pacific
6	St. Johns Creek @ Hwy. 100	A	Instream: Rural Nonpoint & IHTS
7	Robertsville	E	IHTS receiving water
8	Villa Ridge	E	IHTS receiving water
9	Krakow	E	IHTS receiving water
10	South of Union	E	IHTS receiving water
11	Meramec at Eureka @ Hwy. W	A	Instream: Impact of Pacific
12	Big River near DeSoto @ Mammoth Bridge	A	Instream: Boundary inflow
13	Big River @ mouth near Hwy. W	A	Instream: Point Source Impact, Growth
14	Belew Creek @ Mouth Near Hwy. BB	A	Instream: Point Source Impact (208 alternative has discharge to creek)
15	Joachim Creek @ Victoria	A	Instream: Point Source
16	Plattin Creek Near Village of Plattin	A	Instream: Point Source
17	Joachim Creek near Mouth @ Hwy 61-67	A	Instream: Urban Impact, Growth
18	Rock Creek @ Hwy. K	A	Instream: Impact of Growth, Removal of Point Sources
19	Saline Creek @ Hwy. 141	A	Instream: Impact of growth, removal of IHTS
20	Sugar Creek (tributary of Saline) north of Rock Creek	C,E	Instream: Urban, IHTS

TABLE 18
(Continued)

Site Location Number	Location	Program Element	Type
21	Meramec River at Paulina Hills	A,D	Instream: Biota (weekly sampling for Instream)
22	Meramec Meadows Lake (near Dutch Bottom Road @ Hwy. 141)	E	IHTS receiving water
23	Lonedell Terrace, Lonedell Road west of Hwy. 141	E	IHTS receiving water
24	Murphy	E	IHTS receiving water
25	Upper Antire	E	IHTS receiving water
26	Cedar Hills Lakes	E	IHTS receiving water
27	Duckett Creek near Mile 1.0	A	Instream: Urban Development
28	Dardenne Creek @ Hwy. 40-61	A	Instream: Upstream of Developed Area
29	Dardenne Creek @ I-70	A	Instream: Impact of Development
30	Peruque Creek above Lake St. Louis @ Hwy. 40-61	A	Instream: Upstream of Developed Area
31	Peruque Creek below Lake St. Louis @ I-70	A	Instream: Impact of Development
32	Peruque Creek @ Hwy. P	A,D	Instream: Removal of Point Source
33	Peruque Creek and Downstream of O'Fallon	D	Instream: STP Impact
34	Cuivre River @ Hwy. 79	A	Instream: Rural Nonpoint Impact
35	O'Fallon Hills-Drainage Ditch	E	IHTS receiving water
36	Cedar Lake Estates--Receiving Stream	E	IHTS receiving water
37	St. Peters Road--Receiving Stream	E	IHTS receiving water
38	Koch Subdivision--Drainage Ditch	E	IHTS receiving water
39	Fox Creek @ Old Hwy. 66	D	Instream: Rural Nonpoint, Future Development
40	Wild Horse Creek @ Wild Horse Creek Road	A	Instream: Rural Nonpoint
41	Bonhomme Creek @ Hwy. 40	A	Instream: Development
42	Creve Coeur Creek @ Olive Street Road	A	Instream: Urban and Rural Impact on Lake
43	Creve Coeur Creek @ I-70	A	Instream: Impact of Development
44	Mississippi River at Eads Bridge	A	Instream: Long-term Quality Change
45	Coldwater Creek Tributary, south of St. Charles Rock Road, St. Ann	C	Urban, Urban Runoff: High Density, Single Family Residential

TABLE 18
(Continued)

Site Location Number	Location	Program Element	Type
46	Coldwater Creek Tributary, Hazelwood, north of Lambert Airport	C	Urban, Urban Runoff: Commercial, light industrial
47	Coldwater Creek Tributary, northwest of Coldwater School, St. Ferdinand	C	Urban, Urban Runoff: Developing Area
48	Coldwater Creek @ Old Halls Ferry Road	B	Urban: Urban Instream Impact
49	Coldwater Creek @ Hwy. 67	B	Urban: Urban Instream Impact, Point Source
50	Maline Creek @ Goodfellow Road	B	Urban: Urban Instream Impact
51	Deer Creek in Warson Woods	C	Urban, Urban Runoff: Residential
52	Gravois Creek above Confluence with River Des Peres	C	Urban, Urban Runoff: Developed area
53	River Des Peres @ Broadway	C	Urban, Urban Runoff: Combined sewer overflow and impact of MSD, control combined sewer overflow
54	Mattese Creek @ I-55	C	Urban, Urban Runoff: Residential and commercial
55	Grand Glaize Creek @ Manchester Road	C	Urban, Urban Runoff: Single family residential
56	Fishpot Creek @ Ballwin Road	C	Urban, Urban Runoff: Impact of change from urban undeveloped to residential

(through DNR, the Department of Conservation and the Geological Survey) can greatly assist Gateway in this coordinating effort, the cooperation of other monitoring entities such as the Corps of Engineers, MSD, the U.S. Geological Survey, EPA, various private laboratories and universities (both state and private) is also required. Developing a coordinated monitoring program should be a critical continued 208 planning assignment for Gateway, undertaken with the assistance of its newly formed Regional Water Quality Board.

Using the management/institutional criteria developed in the early stages of this project, the decision to promote the State of Missouri as the prime point source regulatory body seems quite appropriate. The State has the clear and sufficient legal authority needed to carry out these functions. The State has adequate financial powers to fund these efforts although the availability of funding is always a question mark. In addition, the State certainly has sufficient geographic authority to administer these functions.

In the area of staffing, the State must, on its own initiative, seek the staff additions that an expanded 208 regulatory role requires. For example, the Clean Water Commission must work with the Attorney General's office to assure that the latter hire more attorneys to assist in prosecuting water quality violations.

D. Plant, Finance, Development, Operation and Maintenance

The funding, development, operation and maintenance of sewage treatment facilities have been the responsibilities of municipal governments, sewer districts, and private treatment companies. Given citizen opinion as well as strong practical and political considerations, there is little reason to suggest a major shift in these responsibilities except as relates to private utilities. Allocation of management responsibilities related to plant operation must begin by excluding private sewer companies from consideration. The inability of these private utilities to receive State and Federal financial assistance prevents such bodies from assuring the continued high quality, low-cost treatment service that federal law and local citizens demand. Municipalities and sewer districts will, therfore, be strongly encouraged to continue their acquisition of private utilities.

The strengths of both the municipal and district approaches to plant operation are significant. Both municipalities and sewer districts have the clear and sufficient legal authority necessary to operate treatment plants. Both entities have available the adequate and flexible financial powers needed to raise the local share required for matching Federal and state facilities grant programs. Staffing is an issue that varies from system to system. Yet, the overall quality or supply of existing operators does not seem an insurmountable obstacle. In political and practical terms, sewer districts and municipalities have the track record and local support necessary to continue to play a major role in excercising plant operational functions. Both systems are, in addition, readily accessible to the public and answerable to citizen complaints and suggestions.

It is unreasonable to suggest that one or the other approach is preferable within the 208 study area. Rather, the type of management entity designation will vary from county to county and from watershed to watershed. In St. Louis County the district approach will dominate because of MSD. In St. Charles County, water quality and cost-effectiveness suggest the long-range information of a countywide district, although some municipal systems will continue to function as collection agencies, even if most of the County is serviced by such a major district. New sewer districts operating in the Counties are also necessary in Franklin and Jefferson Counties. These districts will share responsiblity with existing municipal systems.

There is thus no set regional formula for describing how sewer districts and municipalities should respond to the future responsibilities imposed by the plant design and operation function. Yet, once it is accepted that both entities will play a role, albeit varied, in each County, the 208 plan can attempt to define the level of coordination necessary to assure a high level of wastewater treatment.

The 208 Plan seeks to establish the degree of coordination necessary to assure a high level of quality in wastewater treatment. It will not be enough simply to encourage sewer districts and municipal systems to work together. Rather, the County Water Quality Boards created in each county will generally oversee the activities of treatment plant operators. The County Board, when coupled with the existing operational strengths of the municipalities and sewer districts, will provide each county with an effective management system for assuring successful point source treatment.

E. Nonpoint Regulation

The development of a nonpoint source control program that both satisfies the mandates of 208 and is implementable is perhaps the most difficult task of the 208 program. There are a number of factors which greatly complicate development of adequate solutions to the problems of nonpoint source regulation.

There is a multiplicity of entities currently involved in some form of nonpoint regulation. The greatest split in authority over nonpoint source regulation exists between various county and municipal governments. Through incorporation, municipalities have generally immunized themselves from county land use controls and their related nonpoint source controls; various municipalities conduct their own regulatory programs and exclude county government controls. County governments conversely are limited in their jurisdictional scope when dealing within incorporated areas.

The State of Missouri also has a role in nonpoint regulation, specifically relating to individual home treatment systems in subdivisions. Sewer districts and soil and water conservation districts are other entities that have, in varying degrees, an advisory role in nonpoint regulation. The allocation of responsibilities is even broader when one considers the various bodies within either municipal or county government that become involved in nonpoint regulation. These include building commissions, health departments, planning and zoning commissions, and departments of public works.

This many-actored, uncoordinated system makes it difficult to determine how nonpoint source control authority should be delegated and what role, if any, each of the entities described above should ideally play in a 208 nonpoint strategy. The situation is further complicated by the fact that nonpoint source programs can involve significant costs, not only for the governmental body that seeks to enforce such programs, but also for those on whom the ordinance is imposed. Thus, neither county nor municipal government is likely to adopt such regulations unless (1) a clear-cut problem in need of a response has been identified; (2) the proposed regulation responds directly to that problem in a cost-effective manner; and (3) the county or municipality can be assured that it will not be acting alone when it adopts a regulation of this kind.

Two overriding concerns thus dominate this analysis. First, the 208 program must assure communities that nonpoint source

regulations actually do need to be adopted, and second, the program must attempt to assure that regulations are, to the fullest extent possible, being consistently applied in problem areas throughout each county. It is this latter concern that the proposed nonpoint source management system must respond to.

Under the recommended nonpoint source program, primary responsibility for developing and enforcing nonpoint controls will continue to be shared by municipal and county governments within their respective jurisdiction. Since it is highly unlikely from either a legal or political standpoint that jurisdictional boundaries can be reached for nonpoint source purposes, municipal governments will have to be content with retaining responsibility for adopting those regulations that can improve water quality in their own communities while county governments remain responsible solely for unincorporated areas. This does not mean that present nonpoint source practices should necessarily continue without change. Many of the municipal and county governments have not developed the type of mechanisms necessary to alleviate the water pollution that arises from urban runoff, inadequately built and maintained home treatment systems, and other forms of nonpoint source pollution. Rather than involve new enforcement entities in this process, it is proposed that municipalities and county governments be given the legal authority and technical assistance to adopt effective local programs. For example, the second class counties in the study area (Jefferson, St. Charles, Franklin) faces a major obstacle in simply attempting to impose nonpoint controls within their own unincorporated areas. The Attorney General of Missouri must clarify the extent to which second class county governments can impose nonpoint source controls under existing legislation. Legislative change to remedy this particular statutory shortcoming will bear a fair chance of passage so long as it does not infringe upon municipal land use autonomy. This kind of strategy change is in fact a critical recommendation of this 208 program.

Sewer districts could greatly assist municipal and county governments in developing and enforcing nonpoint source controls. However, again, statutory and practical burdens exist. The Metropolitan Sewer District, with its expansive powers to deal with stormwater on a county-wide basis, is the best equipped of any existing sewer district in the study area to take on nonpoint source responsibilities. However, in certain key respects, MSD is atypical. MSD draws its sewer district powers from a special charter and not from the Missouri statutes. The MSD charter is much broader than the State statutes that authorize the creation of other

sewer districts. As a result, MSD's involvement in nonpoint source controls seems far more clearly authorized than does, for example, St. Charles County's Regional Sewer Districts (RSD). RSD was created pursuant to so called "common sewer district" legislation which is the most generous of any available sewer district legislation in terms of the district powers it authorizes. Yet RSD seems clearly lacking in even the indirect authority needed to take on NPS controls linked to land use management. Relatedly, "second class county" and "county court" sewer districts set up in Jefferson County and St. Charles County suffer from the same inability to become legally involved in controlling land use.

Because of legal and political constraints, only MSD, among existing sewer districts, has served even as a nonpoint source technical advisor. Such constraints would make ill-advised a recommendation that any sewer district play an expanded role. However, the link between point and nonpoint source pollution is sufficiently strong that all sewer districts should at least be consulted on nonpoint source decision-making.

The obvious drawback in this management system for nonpoint source controls is that it requires a much stronger degree of coordination among municipalities, county governments and the various districts than has heretofore been exhibited in the region. To overcome this drawback, the two-tiered Water Quality Board has been proposed as the vital coordinating mechanism the 208 nonpoint source control recommendation. The Water Quality Board would have these nonpoint source responsibilities:

1. The Board will meet with municipal and county representatives for the purpose of developing a set of model nonpoint source programs and ordinances that could be adopted universally throughout the county. Assuming in turn that representatives from the County Water Quality Board will be able to effectively influence decision-making on the Regional Water Quality Board, adoption of region-wide model ordinances could be a feasible objective.

2. The Boards will also serve as the forum in which municipalities and county governments will receive formal comment and review on proposed nonpoint programs from sewer districts and soil and water conservation districts.

3. The County Boards will also work with Gateway and the Regional Board in developing erosion control plans, criteria, and ordinances for urban stormwater management. The Boards will be involved in ongoing evaluation of the region's nonpoint problems including future monitoring efforts geared toward determining the contribution of nonpoint sources to overall stream quality. A continued study of environmentally sensitive areas or "hot spots" in the region will assist in identifying those watersheds most in need of nonpoint source controls.

Having the State of Missouri become more involved in land use controls relating to nonpoint source pollution raises severe legal and political problems. The State has generally been limited by law to a "hands-off" policy regarding local or county land use regulations. While the State, under the 208 program, would seem to have the added authority needed to develop nonpoint source controls and to require their imposition at the local level, the likelihood of such an occurrence is minimal. The State of Missouri has given indication that it is not interested in local nonpoint source control; in fact, the State seems very much disposed toward having the nonpoint source programs established and implemented strictly at the local level. If, however, future study, implementation difficulties, and citizen interests suggests that a more forceful and aggressive program is justified, then a State-mandated nonpoint source management system may have to be reconsidered.

IV. POINT SOURCE CONTROL RECOMMENDATIONS: MANAGEMENT ISSUES AND IMPLEMENTATION OPTIONS

A. Issues and Options

Introduction. In Section 2 of this report, point source control recommendations for the St. Louis 208 region were presented. These recommendations were selected from a group of alternatives developed early in the 208 program (Element 10, Element 20, Element 24).

For the most part, the process of eliminating certain alternatives and making recommendations revolved around four major analytical criteria: 1) water quality effectiveness; 2) cost, 3) management/institutional considerations; and 4) environmental assessment. More specifically, a set of alternative measures for addressing an area's point source problems were developed and the following questions were asked: What level of water quality can be achieved with the various alternatives?

What will the overall cost of the alternatives be? What will the per household cost be? What is the political feasibility of each alternative? Will each of the alternatives be publically acceptable? Is there a management entity available to take on the responsibility of implementing the various alternatives? What is the environmental impact of the various alternatives?

While the above list of questions does not represent the total consideration that was applied to each alternative, it does suggest the breadth of issues that were considered in arriving at a single recommended technical solution for each major service area.

The purpose of this section of the report is to focus on the management issues and implementation options that arise as a result of the selection of a particular recommendation and to advance a recommended implementation strategy. This analysis will be pursued on a county-by-county basis with a summary discussion detailing the problems that the region as a whole must confront in implementing the recommendations presented in this report.

Alternative Institutional Solutions. The point source control recommendations invariably dictate one of three different kinds of institutional situations in which a management solution must be finalized. These three situations might be termed: expansion, creation, or consolidation. More fully developed, the alternative institutional situations are as follows:

a. Expansion of Service Area. Many of the recommendations inevitably will result in the expansion of an existing public wastewater treatment system's service area. In other words, the recommendation will suggest that an existing public system (usually a municipal system) serve an area larger than it is currently serving. The problem inherent in an expansion of this kind is that there is geneally a very good reason why a particular system is currently serving a given area. For example, a municipal system will normally be serving those who live within the incorporated boundaries of that municipality. Alternatively, a treatment plant operated by a sewer district will be serving those people who chose to be within the original boundaries set up for the service district. Notwithstanding this situation, a municipality or sewer district may be more than anxious to serve a larger area, assuming such expansion is economically and politically feasible. Opposition may come, however, from those who are currently not within the service boundaries

and who may, depending upon the means used by the management agency, fight expansion. Assuming that expansion of an existing public system is the overriding institutional situation in which a management alternative must be developed, four alternative approaches should be considered.

1. Annexation--option is for the existing agency to annex the area in which it is to expand its service. Annexaation procedures for municipalities are clearly set out in Missouri statutes and, although some differences exist in procedural rules (depending upon the classification of the municipality involved) a fairly straightforward procedure can be followed.

   Annexation is of course a significant step both from the perspective of a local government as well as those who are about to be annexed. Annexation cannot simply be pursued for the sole purpose of expanding sewage treatment service areas; if successfully implemented, it requires a municipality to provide a broad range of services to annexed areas and subjects previously unincorporated areas to municipal taxes and other responsibilities. Thus, there are a number of considerations that enter into an annexation decision and procedural steps such as elections that must be dealt with.

   Annexation makes sense from a municipal standpoint if local government is otherwise convinced that such a step is in the city's best interest. Certainly once an annexation has been accomplished, it is far easier for a municipality to provide sewer service since it has both control over and a vested interest in its expansion area. However, if a municipality feels that it cannot justify annexation or alternatively decides that opposition from its own citizens or from those in the unincorporated area is too great to surmount, then an alternative approach has to be sought.

   If a recommendation calls for the expansion of a sewer district service area, state statutes also set out a procedure for accomplishing this objective. It should be noted that a recent lawsuit regarding the Glaize Creek Sewer District in Jefferson County raised some serious legal questions about second class county sewer district annexation provisions and this issue must be resolved before sewer districts become too actively involved in annexation programs.

2. Service Contract--An alternative for expanding service area without annexation is to use service contracts. Sewer districts and municipalities have the legal authority to service areas that are not within their incorporated boundaries if a service contract has been entered into. Since state statutes specifically authorize municipalities to charge an increased service fee to unincorporated areas outside municipal boundaries, extended service of this kind may prove economical to existing municipal systems. In situations in which annexation is opposed by either the public entity or outlying service areas, such a contractual alternative should be considered.

   The disadvantage in this approach is that unincorporated areas, despite being served by municipal systems, will remain subject to the overall control of county government. The municipality, therefore, is left without any say regarding the development of that area which it has agreed to serve. Continued division of responsibility and potential conflict are both negative features of the service approach.

3. Form Sewer District in Expansion Area--The third alternative, given this particular institutional situation is to encourage an unincorporated, unserviced area to create a sewer district which would in turn sign a service agreement with an existing municipal system. The advantage in this approach is that the municipal system could sign a single service agreement with the district rather than having to deal individually with each homeowner desiring service.

4. Form Sewer District for Total Service Area--The fourth alternative would be to form a new sewer district in a proposed expansion area and designate this new district as the management agency for both the existing service area as well as the expansion area. In other words, a new sewer district would be formed to serve both areas and responsibility for collection and treatment would be transferred from the municipality to the sewer district. This was the pattern followed by the Metropolitan Sewer District in its initial development and recent annexation program.

   Implementing this approach on a small scale can present difficulties. A municipality may see no reason for turning over responsibility for operation of its own plant to a newly formed sewer district. Thus, such an approach would only be likely where a municipality

can be convinced that, from the economic and political standpoint, it will gain from such a step by relieving the City of the burden of operating a sewage treatment plant.

b. Creation of a New Management Entity. A second major institutional category in which management solutions must be developed involves those areas in which a new treatment system is proposed and yet no management agency currently exists within that service area to assume the responsibility involved. In these situations, three alternative management solutions should be considered:

1. Annexation of Service Contract--Rather than try to develop a new management agency to take on treatment system responsibilities, a service area can look to a neighboring municipality or sewer district to service that area pursuant to contracts or annexation. If this option is unavailable because there either is no neighboring management entity or no interest in this kind of arrangement, a new management agency must be designated.

2. Incorporation--A new agency might either be a proposed new sewer district or a proposed new municipality. Encouraging a community to incorporate to gain the statutory powers necessary to develop and operate a treatment system is viable only in those areas in which a fairly strong sense of community already exists and where other reasons for incorporation are also a factor. The obligations and the responsibilities that befall a local government as well as its citizens in a case of incorporation are substantial and may not be justifiable if the only purpose for such action is to accommodate a sewage treatment alternative.

3. Form Sewer District--The more likely approach is to form a sewer district. It is a management entity specifically authorized under Missouri law as a special service district and thus better suited toward providing a framework for the provision of a single service such as sewage treatment.

In addition to MSD, every kind of sewer district authorized under Missouri law has been created somewhere in the St. Louis 208 region. A "common sewer district" has been authorized by the voters in St. Charles County (although RSD remains a nonfunctioning entity at this time). "Second class county sewer districts" have been formed in Jefferson County and St. Charles County. Although sewer districts are an extremely important part of the 208 implementation program, the difficulty of getting such a district into

functioning order must be emphasized. The process requires dedicated leadership and patience; a number of time-consuming procedural steps must be taken to create such a district and get it to the point where it can, in fact, assume management responsibilities. A particular difficulty of a new sewer district is raising its local share of funding costs to match grants from the federal and state governments.

An added problem in unincorporated communities is the lack of an existing governing body to spearhead the process of sewer district creation. As noted above, there are many steps that must be taken before such a district can come into being. Among these steps is the selection of the type of district to be created as well as the election or appointment of the district's leadership body. Yet these points in the process cannot be reached without the initiative of some existing governmental entity. Federal 208 policy, in fact, requires that the responsibility for creating newly proposed management agencies rest with existing management agencies. In other words, the responsibility for merely initiating the sewer district process must rest with an existing governmental entity. Such a designation thus precludes unincorporated areas from accepting current wastewater management responsibilities.

As of yet, undeveloped sewer districts cannot be given the responsibility for implementing a point source program. In such instances, the 208 program turns to the various County Courts who have the legal authority to create localized sewer districts. Where the County has been named the designated management agency for a particular watershed, the responsibilities imposed on the County Court are twofold: either directly create a so-called "county court sewer district" or, alternatively, be responsible for organizing local citizens so they in turn can set up their own district.

The course of action to be taken by the County Courts will and should vary within different geographic areas. A consistent County objective should, of course, be a desire to satisfy citizen concerns regarding local decision-making and to achieve improved water quality. The allocation of responsibility to the County in such instances should be viewed as an interim designation with final designation for 201 funding purposes shifting to the appropriate local sewer district once that agency has come into existence.

c. Consolidation of Existing Systems. The third institutional situation particular to the 208 point source recommendations is where consolidation of existing treatment systems into a new, larger system appears advisable. This institutional category suggests that a large scale service area, perhaps county-wide in nature, is required from a water quality and fiscal standpoint. It, therefore, demands from a management perspective the consolidation of existing sewer districts and/or municipal systems. There are two management approaches to solving this type of institutional situation:

1. Regional Collection and Treatment--In the first approach, existing systems are phased out of operation and replaced with a large scale system serving all previously serviced areas. All operational and management responsibilities are turned over to a single entity which would most likely be a new sewer district.

   The obvious difficulty to this approach is gaining the support of those municipalities or small sewer districts whose plants will be put out of operation and whose control over sewer service may seem diminished by transfer of control to a large scale district. An acceptable political arrangement for this kind of situation does seem negotiable and reasonable under existing sewer district legislation, assuming municipalities and other small districts can be convinced of the viability of this approach and particularly the long-term financial and environmental benefits to local residents.

   The proposed creation of large scale or county-wide districts is the most difficult from a political and management perspective and is the most difficult to generalize about. Phasing, for example, may be one means of ultimately establishing a large scale sewer district through the incremental combination of existing systems.

2. Regional Treatment; Local Collection--A second approach would limit the role of the large scale sewer district to that of a treatment agency, leaving collection systems under local control. The large scale district, through intergovernmental agreements, would coordinate activities within the total service area.

In the following sections of this memorandum the various technical alternatives for each of the four counties is considered in terms of the institutional situation described

above. An effort is made to identify the situation into which each technical alternative fits and in some cases to describe which of the management solutions to that situation seem preferable. In a number of cases the management alternative cannot be identified at this time. However, the options available to a community should be narrow and limited enough so that a clear course of action can be determined and steps in that direction begun.

B. County-Specific Management Recommendations

Franklin County. The point source recommendations for Franklin County create six specific institutional situations dictating expansion of an existing public wastewater treatment system service area beyond current jurisdictional limits. These institutional situations are noted below to gether with a designation of a single management entity to be given responsibility for implementing a management solution within the recommended treatment service areas.

a. Expansion of Service Area (see Figure 15, P. 42).

Service Area	Designated Management Agency
St. Clair	St. Clair
New Haven	New Haven
Union	Union
Gerald	Gerald
Washington	Washington
Pacific	Pacific

St. Clair:

It is recommended that a new facility be constructed northwest of the City of St. Clair. This recommendation is consistent with the city's own 201 Facilities Plan. Expansion of the service area as proposed will include Parkway Village and thus leave St. Clair with the option of either annexing the proposed expansion area or entering into a service contract. This report makes no specific proposal regarding the best means for the City to accomplish this expansion; this should be a local decision with the County Water Quality Board and Gateway available for technical assistance.

New Haven:

It has been proposed that the existing tributary system accommodating flows from the City of New Haven be expanded not only to handle the increased flow generated by the City of New Haven, but also certain surrounding areas. The City of New Haven is designated as the management agency and given the option of either annexing or entering into a service contract with the expansion area.

Union:

The recommendation for Union would provide service for outlying unincorporated areas surrounding the City and upgrade and expand the existing lagoon to treat all anticipated flows. The City has, in the past, expressed interest in annexation of the proposed expansion area and this management solution would be perfectly acceptable from a 208 management perspective.

Gerald:

The proposal for the City of Gerald would combine all the city's flow as well as an expansion area and treat it at a new lagoon. Service contracts would appear to be the best way for the City of Gerald to accommodate this aspect of its management responsibilities.

Washington:

The technical proposal for the City of Washington would extend the municipal sewer system to serve unincorporated areas to the southwest and northwest of the City. This proposal is consistent with Washington's own 201 Facilities Plan and the City seems clearly ammenable to annexing this area or negotiating service contracts if the former alternative does not prove practical.

Pacific:

The recommendation for Pacific calls for the enlarging and upgrading of the existing Pacific sewer system and construction of a new treatment facility. The expansion would include both Pacific and the Gray Summit community as well as the surrounding unincorporated area in Labadie Creek Watershed.

As the 208 project has evolved, the community of Gray Summit has looked to the City of Pacific to assist it as well as the rest of Brush Creek watershed in combating water quality

problems. The recommendation will support Gray Summit and the proposed Brush Creek Sewer District in their efforts to work with the City of Pacific toward a water quality solution. The 208 program supports that effort. Although the City of Pacific has in the past expressed some unwillingness to expand its service area to take in these neighboring communities, there seems little justification for such a rejection. The 208 program designates the City of Pacific as the management agency responsible for implementation of the point source control.

It should be noted that significant expansion of the Pacific system as recommended herein will not totally relieve the Labadie area of management responsibilities. A new plant may, in fact, have to be built and a sewer district formed to spearhead that effort. An "unsewered" alternative for Labadie should also be considered. Yet, as will be noted below, the responsibilities of this new district will be significantly less severe because of the shift in responsibilities to the City of Pacific.

b. Creation of a New Management Entity.

Service Areas (See Figure 15, P.42)	Designated Management Agency
Berger	Berger
Leslie	Leslie
Pin Oak	Franklin Co. (Interim)
Stanton	Franklin Co. (Interim)
Beaufort	Franklin Co. (Interim)
Robertsville/Lake Serene	Franklin Co. (Interim)
Labadie	Franklin Co. (Interim)

The above recommendations present similar institutional situations. In each area, the 208 plan calls for new wastewater facilities in areas that currently have no centralized sewer systems and have relied on individual home treatment systems, lagoons, or small package plants. In each service area there is an identifiable community with a small population. There is one significant factor, however, which distinguishes certain of these communities. While some have remained unincorporated, others have established themselves as incorporated governmental entities and as towns, villages or fourth class municipalities have established local governments. For the purposes of the 208 program, this distinguishing feature is critical in designating a responsibile management agency. As noted earlier, federal policy requires the 208 plan to designate only those management agencies that currently have the legal authority to exercise the functions

assigned to it. Thus, management responsibility for implementing the point source proposals for unincorporated Pin Oak, Stanton, Beaufort, Robertsville/Lake Serene and Labadie is designated to Franklin County.

Where Franklin County has been named the designated management agency for a particular watershed, the responsibilities imposed on the County Court are as follows: either directly create a so-called "county court sewer district" or be responsible for organizing local citizens so that they in turn can set up their own district with locally elected representatives serving on a sewer district's Board of Trustees. The course of action to be taken by the County Courts will and should vary within different geographic areas. A consistent County objective should be satisfying citizen concerns regarding local decision-making as well as achieving improved water quality. The allocation of responsibility to the County in such instances should be viewed as an interim designation with final designation for 201 funding purposes shifting to the appropriate local sewer district once that agency has come into existence.

From a management perspective, the clear alternative for incorporated Berger and Leslie seems to be to designate each of the individual communities as the responsible management entity. These two communities may either accept the responsibility and power authorized under Missouri law or seek to form a sewer district to which wastewater management responsibilities might be allocated. Either of these options would appear to be acceptable as long as the choice reflects the desires of the local community.

Particular reference should be made of Labadie because of its relationship to the Pacific recommendation discussed above. As noted in that discussion, the major responsibility for Pacific, Gray Summit and the Brush Creek Watershed has been allocated to the City of Pacific. Nonetheless, the specific proposal for Labadie still requires the construction of a treatment facility to serve Labadie and its surrounding area. Franklin County has been designated to initiate the formation of a sewer district, for the purpose of implementing the Labadie proposal.

c. Consolidation of Existing Systems.

Service Area (See Figure 15, P. 42)	Designated Management Agency
Sullivan/Oak Grove Village	Sullivan

The final type of institutional situation is one in which two treatment systems, each with its own management agency, should be consolidated into one new system. This situation applies to the Sullivan/Oak Grove Village area since both of these communities currently operate treatment facilities. The recommendation calls for developing one treatment plant to serve the entire area.

Because Sullivan is the larger community, the 208 plan designates it as the management agency responsible for implementing the point source recommendation. Sullivan, as part of its designation agreement, will work with Oak Grove Village to make certain it is properly serviced by the proposed treatment facility.

A number of management options could be exercised in this situation. The two communities could form a joint sewer commission (such as that found in Festus/Crystal City) with both communities sharing certain responsibilities. Alternatively, Sullivan might be the sole management agency with a service contract to serve the Oak Grove Village area. To avoid controversy between the two communities, a sewer district might be formed with representatives from both communities. Any of these management options would be acceptable as long as they reflect local decision-making and will help facilitate the construction of the proposed plant. Continued 208 planning, through the Franklin County Water Quality Board, could help the communities arrive at an acceptable solution.

Jefferson County. The point source control recommendations for Jefferson County propose six service areas which dictate expansion of an existing public wastewater treatment system service area beyond its current jurisdictional limits. These institutional situations are noted below together with the designation of a single management entity to be given responsibility for implementing a management solution within that particular service area.

a. Expansion of Service Area.

Service Area (See Figure 16, P. 59)	Designated Management Agency
Festus/Crystal City	Festus
Glaize Creek Watershed	Glaize Creek Sewer District
DeSoto	DeSoto
Olympian Village	Olympian Village
Lower Big River Watershed	Lower Big River S.D.
Hillsboro	Hillsboro

Festus/Crystal City:

The recommendation for Festus/Crystal City calls for expansion of the current service area boundaries to include areas located south of the City of Festus. The existing management option being pursued by these two municipalities is unique in the 208 region and should not be affected by the implementation of this recommendation.

Although both municipalities share in the decision-making of the Festus/Crystal City Sewer Commission, federal requirements have necessitated that only one of the municipalities be designated as the future grant recipient. Festus, because it has applied for and has been the recipient of wastewater treatment grants, is designated as the management agency for the service area. However, the designation agreement signed by Festus should reiterate the municipalities' commitment to the joint sewer commission and toward Crystal City's continuing share in management responsibility.

Although Festus might wish to annex the area included in the expanded service area, political considerations suggest that a service contract arrangement might make more sense. Despite other difficulties in their working relationships, Festus and Crystal City seem to have worked out a solution to wastewater management; Festus must be certain to maintain this relationship as part of its responsibilities as management entity for the area.

Glaize Creek Watershed:

Parts of the Glaize Creek watershed, including the City of Barnhart and surrounding areas, are served by the Glaize Creek Sewer District. The recommendation calls for expanding the service area to the entire watershed. Since the area of proposed expansion is unincorporated, expansion of the Glaize Creek Sewer District is the obvious institutional approach.

Glaize Creek Sewer District is designated as the management agency for the proposed service area and is given the responsibility of extending service to the expanded service area. It should be noted that a recent attempt by the District to expand its service area through annexation has been challenged in court; and until this suit (which disputes the general viability of the annexation powers of a second class county district) is resolved, the District may have trouble carrying out the recommendation.

If it appears that legal problems will prevent the District from expanding an effort should be made to create a new sewer district in the expansion area and have it enter into a service contract with the Glaize Creek Sewer District. To avoid further legal challenges, the District might alternatively seek a service contract with the expansion area and thereby avoid annexation. This option is, however, less desirable and should not be pursued unless the District is convinced that it has no other viable alternative.

DeSoto:

The recommendation for DeSoto calls for extension of the existing service area to include areas north of DeSoto. Annexation and contracting for service are both options DeSoto should pursue.

Olympian Village:

Olympian Village is a small community who's growth potential warrants the development of a new sewage treatment facility to serve both the existing community and its surrounding areas. The most logical management solution is to designate Olympian Village as the management agency and give it the option of either annexing the proposed expansion area or developing some type of service contract. The need for some centralized authority in this type of growth area would suggest that annexation by Olympian Village is the preferred alternative. Some service arrangement would be possible if annexation proves impractical.

Lower Big River/Heads Creek Watershed:

The Lower Big River Sewer District is currently serving the unincorporated lake development of Lake Montowese. The recommendation for this area calls for the construction of a new facility to serve the lower portion of Heads Creek and all of Lake Montowese Watersheds. The Lower Big River Sewer District is designated as the management agency for this recommendation. As the responsible management agency, the district should accept responsibility for expanding its service area to take in the proposed watersheds. Sewer district annexation would appear to be the most logical management option for implementing this proposal.

b. Creation of a New Management Entity.

Service Area (See Figure 16, P. 49)	Designated Management Agency
Selma	Jefferson Co. (Interim)
Cedar Hills	Jefferson Co. (Interim)

These above recommendations present similar institutional situations. In both areas, the 208 plan calls for new wastewater facilities where centralized systems have to date not been relied upon. Within both service areas, there is an identifiable, but unincorporated, community with a small population.

As noted earlier, federal policy requires the 208 plan to designate only those management agencies that currently have the legal authority to exercise the functions assigned to it. Thus, management responsibility for implementing these recommendations is designated to Jefferson County. Where Jefferson County has been named the designated management agency for a particular watershed, the responsibilities imposed on the County Court are as follows: either directly create a so-called "county court sewer district," or be responsible for organizing local citizens so that they in turn can set up their own district with locally elected representatives serving on a sewer district's Board of Trustees. The course of action to be taken by the County Courts will and should vary within different geographic areas.

A consistent County objective should, of course, be the satisfaction of citizen concerns regarding local decision-making and the achievement of improved water quality. The allocation of responsibility to the County in such instances should be viewed as an interim designation with final designation for 201 funding purposes shifting to the appropriate local sewer district once that agency has come into existence.

c. Consolidation of Existing Systems

Service Area (See Figure 16, P. 49)	Designated Management Agency
Lower Meramec (including Rock Creek Watershed)	Jefferson Co. (Interim) Metropolitan Sewer District (St. Louis County portion)
Herculaneum/Pevely	Herculaneum Sewer District

Lower Meramec:

Providing adequate treatment to the Lower Meramec Watershed is one of the most important recommendations of the St. Louis 208 Program. Since the Lower Meramec and its severe water quality problems affect both St. Louis and Jefferson Counties, both counties must be partners in the management solution.

To satisfy initial political concerns, earlier technical proposals suggested that treatment facilities might be developed in both Jefferson County and St. Louis County. It became quite clear, however, that from a technical and economic standpoint, the construction of two facilities would be impractical (Element 20, Element 24). This fact has generally been acknowledged by decision-makers as well as local citizens from Jefferson County. The recommendation, therefore, is to construct a facility in St. Louis County that will serve that County as well as Jefferson County.

The St. Louis Metropolitan Sewer District (MSD) has completed a Step 1 facility plan for this facility and is designated as one of the management entities responsible for implementing the recommendation. This is, however, a unique situation within the 208 study area; it demands that another management agency be designated in Jefferson County to develop the trunk sewer system in that county as an integral part of the total control recommendation.

A Jefferson County/Lower Meramec sewer district is necessary because MSD cannot legally expand its jurisdiction into Jefferson County. This Lower Meramec sewer district would be responsible for developing the trunk sewer system and for contracting with MSD for treatment service.

There are options involved in forming this sewer district. There are three kinds of sewer districts that can be formed under Missouri statute; the one appropriate for the service area should be selected. The City of Arnold is located with the proposed service area and has been aggressively pursuing a program of treatment system consolidation and negotiation with MSD; how Arnold fits into the sewer district must be determined. The Rock Creek Watershed is also included in the service area; its relationship to the overall management structure of the district must, too, be defined.

It is recommended that a high priority of continued 208 planning be a project to address the above-mentioned and implement a sewer district for this area. This project

should be undertaken in conjunction with the County Court and a committee comprised of local decision-makers and citizens.

Herculaneum/Pevely:*

The recommendation for Herculaneum/Pevely is to expand the facility currently operated by the Herculaneum Sewer District to serve Pevely, Sandy Creek Watershed and the Lower Joachim Creek Watershed. The two existing management entities in this area are the Sewer District and the City of Pevely. The Herculaneum Sewer District is recommended as the management agency.

The Sewer District would be required to enter into a service agreement with the City of Pevely and also to expand its boundaries to take in the Sandy Creek Watershed. Although the City of Pevely has expressed opposition to our management recommendation, that municipality has expressed interest in the past in being served by the Herculaneum Sewer District and this option should be implemented as part of the 208 program.

St. Charles County.

a. Expansion of Service Area.

Service Areas (See Figure 17, P. 70)	Designated Management Agency
St. Charles-Missouri River	City of St. Charles
Wentzville	Wentzville
Portage Des Sioux	Portage Des Sioux
Duckett Creek Watershed	Duckett Creek Sewer District

St. Charles-Missouri River

The recommendation for this area is to upgrade the treatment facility to secondary treatment and expand the existing sewer system to include a number of areas outside of the city's jurisdictional boundaries, northeast and southwest of the City.

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*This management recommendation is subject to change based on the recommendation of the Step 1 Facility Planning Study now underway.

It seems quite clear from a management perspective that expansion of the St. Charles system to cover these areas is appropriate and that the City of St. Charles should be designated a management agency for accomplishing this expansion. To accomplish this objective, the city will have to purchase two existing private treatment companies and service a number of subdivisions that have sprung up in unincorporated areas surrounding the city limits. This report makes no specific proposal at this time regarding the best means for the city to accomplish this expansion. Annexation of the unincorporated area may well be the best solution; however, some type of service arrangement between the city and the expansion area is also a viable option.

Wentzville:

A new treatment facility to serve Wentzville and surrounding areas is under construction. This facility, located in the Flint Hill area north of the city, has been designed to serve areas outside of current municipal boundaries. Such an expansion of Wentzville's current service area is consistent with anticipated growth in the area and should logically be accommodated by Wentzville either through the annexation of the neighboring area or through service contracts. The method used by the City in accomplishing this service expansion should be decided locally, with assistance by the St. Charles County Water Quality Board.

Portage Des Sioux:

A new secondary treatment facility is recommended for the area currently served by the town of Portage Des Sioux as well as some fringe areas to the east and west of the town. The town is the logical management agency and has the responsibility for working out an agreement with those fringe areas that will be included in its ultimate service area. The number of additional persons to be served by the expanded service area is not significant and thus service contracts might be fairly easy to facilitate. In addition, the town might be anxious to directly benefit from the increased population in this expanded service area.

Duckett Creek Watershed:

The recommendation is to expand existing sewer system to the entire watershed. The Duckett Creek Sewer District, established and managed by the St. Charles County Court, is designated as the management agency.

b. Creation of a New Management Entity.

Service Area See Figure 17, P. 70)	Designated Management Agency
Augusta	Augusta
New Melle	New Melle
West Alton	St. Charles County (Interim)
Orchard Farm	St. Charles County (Interim)
Matson/Defiance	St. Charles County (Interim)

The above recommendations present similar institutional situations. In each area, the 208 plan calls for new wastewater facilities in areas that currently have no sewer systems and have relied on individual home treatment systems, lagoons, or small package plants. In each service area there is an identifiable community with a small population. There is one significant factor, however, which distinguishes certain of these communities. While some have remained unincorporated, others have established themselves as incorporated governmental entities and, as towns, villages, or fourth class municipalities, have established local governments. For the purpose of the 208 program, this distinguishing feature is critical in designating a responsible management agency. As noted earlier, federal policy requires the 208 plan to designate only those management agencies that currently have the legal authority to exercise the functions assigned to it. This management responsibility for implementing the point source proposals for unincorporated West Alton, Orchard Farm and Matson/Defiance is delegated to St. Charles County.

Where St. Charles County has been named the designated management agency for a particular watershed, the responsibilities imposed on the County Court are as follows: either directly create a so-called "county court sewer district," or alternatively be responsible for organizing local citizens so that they in turn can set up their own district with locally elected representatives serving on a sewer district's Board of Trustees. The course of action to be taken by the County Courts will and should vary within different geographic areas. A consistent County objective should be satisfying citizen concerns regarding local decision-making as well as achieving improved water quality. The allocation of responsibility to the County in such instances should be viewed as an interim designation with final designation for 201 funding purposes shifting to the appropriate local sewer district once that agency has come into existence.

The incorporated communities of Augusta and New Melle (the latter is currently in the process of incorporation) have 2 options available in order to accept the management responsibility involved. The community must either use the statutory authority available to it to directly seek funding for developing a treatment facility or set up a sewer district for the sole purpose of point source treatment. Either option would appear to be acceptable; the choice should rest with the local community.

In all these communities, it should be the responsibility of the designated management agency to work with St. Charles County and the Water Quality Boards to implement an improved program for individual home treatment systems as recommended in Section 3 of this plan. This commitment is particularly important since developing central treatment systems in these communities will take a number of years and, more importantly, central treatment systems may be too costly for these communities to afford. Effective individual home treatment system control programs should be developed through continued 208 planning.

c. Consolidation of Existing Systems

Service Area (Figure 17, P. 70)	Designated Management Agency
St. Charles Consolidated System:	Interim Recommendation:
St. Charles-Mississippi River Watershed; St. Peters; O'Fallon; Lake St. Louis; Dardenne Creek Watershed; Weldon Springs Heights	St. Charles County develop overall management system; O'Fallon, St. Peters/Duckett Creek Sewer District, City of St. Charles--eligible for 201 grants for development of interim-facilities and trunk sewers

The most difficult institutional situation that will have to be dealt with in St. Charles County involves this recommendation. In terms of anticipated water quality as well as cost-effectiveness, however, this recommendation is the most desirable of the alternatives that have been considered for this area (Element 20, Element 24 Reports). The

creation of this service area would not only consolidate collection systems and eliminate numerous treatment facilities, but would also provide service to unincorporated areas that are not receiving centralized wastewater treatment at this time. Point source discharges to the streams within this area would be eliminated. Thus, the challenge is to determine a management solution to accompany this recommendation.

Given a situation in which two or more treatment systems, each with its own management agency are to be consolidated into a new system, the management options would appear to be two-fold.

The first option is to designate one of the existing management agencies as the agency responsible for the expanded service area. Since centralized treatment under the recommendation would be at the City of St. Charles-Mississippi River Facility, that city might logically be the designated agency were this option pursued. Yet, it certainly could be argued that the only justification for such a designation is the physical proximity of the centralized plant to the City of St. Charles and that the city is in no other way more qualified than any other existing management agency to take on this responsibility. In addition, this municipal approach does not provide the institutional framework in which a number of other municipalities and the county could work together. The more feasible approach would seem to be the creation of a sewer district which would represent both municipal and county interests.

It is recommended that the expanded St. Charles-Mississippi River Plant be operated by a Common Sewer District. This type of sewer district is specifically authorized under Missouri law and is the most effective mechanism provided by Missouri sewer district legislation for managing wastewater treatment in an institutionally diverse area. This type of district is potentially county-wide in jurisdiction. It can be divided into subdistricts which can include municipalities and other types of sewer districts. The common sewer district is authorized to coordinate subdistrict activity through joint agreements; yet, the district has complete power to fund, own and operate major treatment facilities. The governing body of a common sewer district is a five-person board of trustees appointed by the county court. The district is also required to set up an advisory board comprised of subdistrict representatives who are to work with the district trustees on the matters of construction and operation as well as any future rate structures.

Appointment of the board of trustees by the county court is a potential stumbling block to acceptance of this management concept to the extent that it could limit input from municipalities into district policy decisions. Although it is recommended that the St. Charles County Court be designated as the management agency responsible for implementing the overall management structure, it is quite clear that from a political standpoint, that the composite communities have input into the implementation process. Thus, it is proposed that in order to receive 208 management designation, the St. Charles County Court agrees not only to work towards the creation of a functioning common sewer district to operate the major regional plant, but also to appoint an equitable number of representatives from major municipal subdistricts to positions on the Boards' trustee group.

It could, of course, be suggested that if the proposed management solution calls for common sewer district control, then the logical management entity should be St. Charles' existing common sewer district--RSD. RSD may ultimately prove to be the organization that controls the expanded St. Charles Mississippi River Plant. Because this entity has already received voter approval, it has a major advantage over any new common sewer district that might be initiated. On the other hand, because of its failure to receive public financial support, RSD has been dormant for a number of years and as such, may not be a viable management agency from the public's point of view.

Helping to develop an overall management structure for this service area should be the first task of the St. Charles County Water Quality Board. Working through Gateway, the Board can assist in a project which would select the appropriate management structure (a new common sewer district; RSD; other arrangements) and implement it and resolve the difficult implementation issues inherent to this recommendation. These issues include the control of local collection systems, rate structure, phasing of current wastewater projects and financing. 208 continued planning grants could be made available for this project.

St. Louis City/County

The Metropolitan Sewer District has jurisdiction over all point source control recommendations other than Eureka/Times Beach. Eureka is currently completing Step 1 of a Facility Plan and should begin to formalize an agreement to service Times Beach.

V. NONPOINT SOURCE CONTROL RECOMMENDATIONS: MANAGEMENT ISSUES AND IMPLEMENTATION OPTIONS

A. Nonpoint Source Control Recommendations

In section 3 of this report, recommendations are made for two major categories of nonpoint problems: individual home treatment systems and urban stormwater runoff. For each category, comprehensive programs have been developed for the five counties within the 208 region. Although many of the same programs are recommended for each county, certain significant differences do exist. More importantly, certain strategies which are strongly recommended for one county are de-emphasized in others. As explained in Section 3, an effort has been made to match problem solving programs with significant localized problems; a nonpoint source control program has been developed which can be both regional in its approach and localized in terms of application.

The following discussion attempts to evaluate the proposed nonpoint source programs, discuss their implications, and suggest alternative means for implementing the controls in each major area within the 208 region.

1) Individual Home Treatment System Controls: Management Recommendations. An extremely important part of the overall program for dealing with nonpoint sources of water pollution relates to future control over individual home treatment systems. The improper location, installation and operation of such systems have caused water quality problems throughout the St. Louis 208 region, especially in urbanizing areas.

Section 3 of this report details a program which addresses IHTS control. First, measures are proposed to insure that systems are properly located, designed and installed; second, recommendations are made to insure proper operation and maintenance of systems; third, provisions are made for properly disposing of IHTS residue; and fourth, special controls are recommended for problem sites.

The recommendations presented in this Plan do not vary significantly from county to county. What does vary are the issues faced in implementing the recommendations in each county. To address these county specific issues (which are also described briefly in Section 3), the newly formed County Water Quality Boards need to examine the program that has been developed, carefully evaluate its strengths and weaknesses, and fine-tune the program wherever it appears appropriate.

The program as set out will have an impact on land development and the housing market in each county. Therefore, organizations like the Home Builders Association should have input into the process of developing the localized IHTS programs. At the same time, entities that are likely to be allocated new and/or expanded responsibilities, for example, the county building departments, should be encouraged to participate in program design especially on issues related to increased costs and staffing demands that will arise as a result of the more comprehensive IHTS controls envisioned in the 208 Plan. The IHTS program will demand not only an administrative plan of action but also some ordinance changes to put the program into effect. Model ordinances to assist local action will be required. Concurrent with this effort, the Regional Water Quality Board and Gateway staff should also be evaluating how to fund the development of this new and comprehensive program.

More specific management recommendations for the four areas of IHTS control areas follows:

--Insure proper location, design, and installation of new systems.

a. Lot Size. The new IHTS program to be adopted in each of the counties would increase the minimum lot size permitted for a discharging IHTS in each county to one IHTS per 2 acre lot. Such lot size requirements will have the effect of perpetuating a pattern of large lots in rural areas where septic tanks and other systems are expected to be part of future development proposals.

This type of lot size regulation, if incorporated into various applicable local building and development codes, may, in some cases, conflict with current land use policies and zoning codes. Alternatively, adopting recommendations would, in effect, impose land use restrictions where no zoning or other development regulations currently exist. Thus, the lot size regulation proposed will effect growth and development patterns. It will encourage a very low population density in those areas that are dependent upon individual home treatment systems. While such a policy may, because of water quality concerns, make sense from a technical standpoint, those communities that are to adopt the proposed increased acreage requirements will need to be cognizant of the impact of such action and make provisions to deal with the associated impacts of their decision.

b. Inspection and Tests. It is recommended that an inspection of any proposed IHTS site be conducted by a

Registered Professional Engineer (or trained technician) and that this inspector undertake the tasks outlined in Section 3, P. 106 of this report. Requiring this kind of pre-installation inspection will set higher standards than those currently used. Although each of the counties within the study area have been involved in some degree of site inspection, the frequency and quality of these inspections is not consistent. Some inspections are mandated while others are strictly voluntary.

To make this recommendation on inspections effective, specific changes in existing local building codes relating to individual home treatment systems will have to be adopted. In addition, the increase in local management expenses will have to be absorbed if this important component of the IHTS program is to be put into effect. It has been suggested that the responsibility and expense of hiring a Registered Professional Engineer should fall on the individual land developer. County or municipal building departments could assist in this process, at least to the extent of providing a list of Professional Engineers who are available to perform this service, although the inspection cost would still fall upon the developer. A third alternative would be to augment the staff currently available to local building departments so that a Professional Engineer could be employed directly by the department for this purpose and the cost would be defrayed by developer application fees.

c. Site Design Review. An increase in the professional engineering capabilities of the various building departments or public works departments is in any case a significant part of this overall IHTS proposal. It has been recommended that as part of a building application, a developer not only provides as discussed above for site inspection, but also an engineering design of the proposed individual home treatment system. It was suggested further that this design plan, the details of which are presented in Section 3 of this report, be submitted to the County Building Department or Public Works Department for review by a Professional Engineer.

This proposed engineering design plan would be a new element of individual home treatment system control throughout the St. Louis 208 region and may be opposed by developers because of increased costs and time involved in preparing site plans of this kind. However, it appears that this extra burden can be justified from a broader public standpoint given the goal of improved regional water quality that can be obtained if this system is implemented.

Improved site inspection and submission of engineering design plans prior to issuance of a building permit will allow public agencies to far more carefully evaluate the granting of future building permits. Section 3 of this report illustrates the kinds of responses that will be possible once building departments are given the level of information that will be obtained from professionally prepared and thorough site plans. For example, this report details the kinds of IHTS that should be approved given various kinds of soil permeability. Clearly, building departments throughout the region must be willing to undertake the technical review and negotiation with developers that this regulation system envisions.

This approach does not seem unreasonable. Each of the counties has, to varying degrees, already attempted to limit new individual home treatment systems in a manner that best serves public health considerations. Thus, this call for a stronger program should not surprise the building departments or developers in the region. It is merely a refinement of a system they know.

d. Installation. The proposed comprehensive program for individual treatment systems does go a number of steps beyond the initial granting of a building permit, discussed above. It is recognized throughout the region that many of the problems associated with individual home treatment systems are the result of improper installation. The proposed program suggests two methods of dealing with installation. The preferred method would be to include in the modified building codes a requirement not only that a Registered Professional Engineer design septic tanks, but also that the same engineer be responsible for supervising the installation of the system. In a number of areas, contractors and private individuals have been allowed to install individual home treatment systems and that practice has lead to numerous problems. If it is felt that this practice should be allowed to continue without supervision of a Professional Engineer, then it is alternatively proposed that a licensing program be developed for private installers. This latter approach is probably more cumbersome and expensive since the building department may have to be responsible for conducting the licensing program and the results of such an effort may still not prove highly satisfactory. On the other hand, the cost of such a program may be less than that required by any increase in professional engineers on the Building Commission staff.

If, in considering this program, a County Water Quality Board would propose a licensing system, then it has been further suggested that the Board also consider linking the licensing program to a performance bond requirement. This bonding requirement would be adopted as part of the building code amendment. The performance bond program would be addressed to the possibility of inconsistent installation, not withstanding improved licensing techniques. Thus, an individual home treatment system user would be required to post a performance bond to assure that improper installation of the system would be remedied by the homeowner subject to the possible loss of the bond amount.

Regardless of whether the system turns to professional engineers (hired by developers or staffed by the Building Commission), the proposed IHTS program would require that there be a post-installation inspection by the County Building Department or Public Works Department to determine consistency with the earlier submitted engineering design plan. The design plan would be particularly critical to this step, since it would allow the department a means of comparing system requirements with actual installation techniques.

The County Water Quality Board must see to it that to the fullest extent possible, whatever approach is selected for use in the County be adopted as universally as possible. Since the Board's suggestion will be voluntary in nature, there is certainly some risk that some communities may adopt a different approach from others and that this inconsistency will engender conflict between various programs and communities.

e. Maintenance. The problems associated with individual home treatment systems will continue to persist as they have in the past unless proper maintenance of installed systems can be guaranteed. To respond to this issue, a new operating permit system is proposed for all individual home treatment systems. This is an extremely important part of the comprehensive program. Permits would be required for all existing systems as well as those installed in the future. Thus, a newly installed system that had been approved as part of the building permit process would, at the same time, receive an operating permit. Pre-existing systems could only receive an operating permit following an inspection and system operating approval.

The inspection program proposed may present an extremely severe staffing problem to some locales. Yet, absent such an inspection program, the operating permit system could not

overcome the problems of existing systems. An additional implementation obstacle relating to in-place systems is that the measures required to make a system properly operational might require alterations that were extremely costly or could not be realistically accomplished. For example, an increase in acreage to achieve an adequate lot size may not be possible given surrounding development that has occurred since a building permit was initially issued. Thus, some degree of discretion and compromise may be necessary before issuing an operating permit to an in-place system. Nevertheless, even with compromises, an individual system maintenance will improve following the site inspections and issuance of conditional and final permits.

The proposed system envisions operating permits which would expire every two to three years. Re-inspection would be required at expiration. This step would not be as overwhelming as the initial catch-up inspections on existing units, since operating permits would be issued on a phased termination basis, allowing systems to be incrementally inspected for permit renewal. The proposed maintenance program would leave considerable flexibility to local enforcement agencies in determining the extent to which maintenance and repairs will be required for individual systems. It is clear, however, there is a minimum--the owner must be forced to keep the system operational.

The public agency involved in supervision of the IHTS regulatory program must have specific legal tools available to it to enforce its maintenance requirements. A number of alternatives exist. However, change in existing building codes will be necessary to establish the authority needed to undertake this regulatory program. One alternative for those areas that presently have occupancy permit programs is to link the IHTS operation permit to the homeowner's occupancy permit. Thus, the home inspection prior to issuance of an occpancy permit would include an evaluation of the treatment system. The operation permit would be obtained as part of this process. Assumedly the pressure imposed by the linkage to the occuancy permit program would compel bringing treatment system into working order. Yet, the link-up of occupancy and operational permits is not likely to compel areas to adopt occupancy permits unless other forces move a community in that direction. A drawback of this approach is that it alone would have little impact on an owner of an individual home treatment system until such time as he chooses to sell his property. Other approaches, however, can fill that void.

A basic measure would provide that the Building Commission have the power to levy fines on those who refuse to keep their systems in operating order. But, the fine system will only work if the Prosecuting Attorney and courts back up complaints.

A third tool that has been suggested for these cases where homeowners refuse to make repairs is that the County or municipality service inoperable systems and then bill the owner. This is not a very practical approach, since the recalcitrant owner may refuse to pay the bill and thus create the burden of placing a lien on the property. But it should be considered as a last resort.

The best regulatory system would empower a variety of actions depending upon the severity and nature of the problem. The use of operating permits is especially promising but must be linked with other tools discussed above.

f) Septage Haulers. The proposed program for dealing with individual home treatment systems must go beyond regulating maintenance and operation. It must be recognized that part of the water quality problem caused by individual home treatment systems arises from the fact that the residue from these systems must eventually be pumped out and disposed of if the system is to be maintained. Septage haulers are employed for this job. In the past, their unregulated actions have led to serious water quality problems. Illegal discharge of septage into local streams, for example, has been known to take place. This facet of IHTS operations must be improved either by arterial existing licensing programs for haulers or developing licensing programs. In addition, the provision of adequate residual waste facilities, as discussed in Section 4, must be assured.

It is, therefore, proposed that a new septage hauler license program be developed. The requirements for obtaining a license are contained in Section 3 of this report and should be evaluated by the County Water Quality Board before such a program is put into effect. Unlike other portions of the nonpoint program which will require a great deal of cooperation among municipalities and counties, this program should be carried on primarily by County governments with working aggrements on particular parts of the program at the local level. The responsibility would most probably again fall upon the county building departments. The St. Louis County program is a useful basic model. Haulers are presently licensed by the County and required to dispose of septage in one or two approved locations in St. Louis County and City.

This program, however, is not as stringent as those proposed in this report since it does not require sufficient record-keeping to cross-check the amounts of septage collected and disposed by each hauler.

The proposed control system raises certain practical problems that are inherent in the 208 regulatory program. Increased staffing will be necessary to keep the records that are necessary to make this program effective. Enforcement will be a problem regardless of adequate staffing, since septage haulers may still find illegal dumping cheaper or easier than hauling to accepted locations. Suggestions for inducing haulers to properly dispose of septage include the reduction of disposal fees at treatment plants and a shifting of the burden of paying disposal fees to treatment system owners rather than to the hauler. The Residual Waste section of this report contains further discussions of these issues.

g). Summary. Citizens throughout the 208 region have consistently identified individual home treatment systems as a visible source of water pollution. Thus, it appears that the citizenry may be willing to accept an increase in cost that may arise from more elaborate controls. It may well be that developers, who will be asked to abosrb much of the additional cost of such a program initially, will be able to pass such costs on to future homeowners without considerable resistance. Administrative costs of a greatly strengthened program of this kind will have to be absorbed by the public through an increase in taxes or some other kind of assessment. This may be an unpopular approach for any local government to take. On the other hand, it must be recognized that the individual home treatment systems are in some areas an alternative to centralized treatment. Those who are dependent upon septic tanks must recognize that what they are using is an alternative to the cost of supporting a central sewer system. In other words, a properly run individual home treatment system will create administrative costs that must be absorbed in just the same way as a centralized system creates public costs that must be absorbed.

This program also raises a number of questions about the ability of public enforcement to accept the increased staffing and administrative responsibilities that the program dictates. Most responsibility as discussed above is allocated at the building commission level, and it is not clear whether building commissions both at the county and municipal level are ready to take on this responsibility without additional funding. It may well be that the building commissions can gain technical support and perhaps even funding

support from existing or evolving sewer districts. Certainly a cooperative effort involving the Water Quality Board, sewer districts, the counties and especially all various building commissions plus the public at large will be essential to developing a program for individual home treatment systems that can produce the desired results on a cost-effective and politically acceptable basis.

2) Urban Stormwater Runoff Controls: Management Recommendations

Urban runoff also has been identified as a critical nonpoint source problem within each of the 208 area counties. Fecal coliform and phosphates, which are both serious nonpoint source problems, are very much linked to urban runoff, particularly in those areas that have been subject to considerable development. To the extent that, in some areas such as Franklin County, significant urbanization is yet to be realized, current nonpoint problems tend to be more closely linked to agricultural rather than urban runoff. In contrast, for St. Louis County and the City of St. Louis, the link between urban runoff and nonpoint problems is extremely critical. A number of devices are proposed to reduce the negative impact of urban runoff.

a. Control of Construction Site Runoff. The recommendations for the control of construction site runoff seeks to limit the amount of sediments washing off construction sites to no more than 5 tons per acre per year. The burden for meeting such an objective would again rest on land developers throughout the 208 region. It is proposed that such controls be implemented on a county-wide basis in each of the major counties in the study area.

To achieve such an objective again requires turning to the various County Water Quality Boards as the mechanism for achieving county-wide agreement on the development of a new erosion control ordinance. Since county-wide strategies can only be implemented where both county governments and municipal governments agree on implementation techniques, the various County Water Quality Boards could be the best forum in which the proposals for erosion control set out in this report would be evaluated and a model ordinance containing such proposals be developed. While the Water Quality Board might wish to follow the lead of this final plan in identifying certain watersheds in which erosion control would be most important, the overall importance of county-wide coverage cannot be overemphasized.

The model erosion control ordinance would ideally be adopted throughout the County and would contain a basic regulatory process. The key to this process would seem logically to be the building permit. The building departments both within county and municipal government would require that developers submit "Erosion Control Plans" as part of the building permit application process. These plans would be required to contain information regarding on-site detention as well as erosion control. The plans would, therefore, deal with both structural and nonstructural controls relating to the development site.

The final plan has identified a number of tasks which will fall to an agency with administrative responsibility in this area. For example, the agency must have the legal capability to set the required performance standards, linking the standards to the size of acreage involved. In addition, this agency, or perhaps agencies, need to be able to have the expertise to review erosion control plans, inspect sites for development, grant permits where compliance has been achieved, and enforce the erosion control through penalties where necessary.

Each of the counties has, to some extent, been involved in erosion control planning in the past, and thus an improved program such as propsed herein does not represent a radical step. On the other hand, the increased standards that have been proposed in this plan will make it tougher for developers to use their property without responding to water quality issues. This will, in turn, make the job of enforcement more difficult and will require a rethinking of agency responsibilities in this area. It is proposed that in each of the counties, the building department be the chief administrative entity, since it appears to have the expertise required to handle this particular construction-related program. On the other hand, in each of the counties, a stronger link needs to be established between the planning departments and the building commission in order to assure the planning commissions the right to review construction plans and determine that the required and appropriate erosion control measures are being implemented.

Obviously, certain local circumstances will again come into play in implementing this program. This program again points out the need for a Jefferson County Planning Commission as well as a Soil Conservation District. MSD will again play an important role in St. Louis County because of its existing status, and evolving sewer districts in other counties

will need to be looked to for input into this area. In dealing with on-site detention as well as erosion control, enforcement mechanisms will need to be strengthened and this will require a greater involvement from the various Prosecuting Attorneys' offices.

It must also be recognized that an increase in construction costs will evolve as a result of tougher erosion controls. This increase will be passed onto consumers, who should, in turn, be made aware of the reasons for the increase in costs due to water quality demands.

b. On-Site Detention of Urban Runoff. The proposed on-site detention program is unique among the recommendations for dealing with urban stormwater runoff in that the detention program puts primary emphasis on structural control measures. Nonpoint controls are generally nonstructural in nature. In other words, they rarely call for the actual construction of physical control devices. However, the on-site detention program puts considerable stress on the construction of runoff control facilities such as detention ponds. Because of the structural aspects of the on-site detention program, some overriding implementation problems must be recognized at the outset. Most importantly, the structural nature of this program will impose some significant costs related to the design and construction of the runoff control systems. The lack of federal or state funds to pay for these structures will greatly impair the ability of local communities to implement this approach. Even if private developers bear a substantial part of the financial burden, they will surely pass these costs onto purchasers which will have a significant financial and growth impact. Since additional costs will also be incurred after construction in the operation and maintenance of the runoff control system, the lack of funding sources is even more of a problem. Thus, it appears that an overriding recommendation of the nonpoint program is that the future 208 coordinator--East-West Gateway and the Regional Water Quality Board--investigate with the State DNR and U.S. EPA the future possibilities for public funding to assist in the construction of on-site stormwater runoff facilities.

A second overriding concern is that the system for on-site detention proposed for each of the counties in the study area is modeled to a great extent on the system that currently is serving the City of St. Louis and St. Louis County. The specific proposal for improving on-site detention in St. Louis County looks very much to the Metropolitan Sewer District (MSD) to be the single agency to develop, construct

and operate urban stormwater control facilities. While the future of MSD regarding such stormwater control facilities is uncertain, the presence of MSD alone makes viable the recommended single stormwater coordinator approach. For a number of reasons, a comparable situation outside of St. Louis County seems highly unlikely, and thus a significantly less coordinated stormwater system may have to be made acceptable.

The obvious first step in implementing the proposed urban runoff control program applies as much to the development of on-site detention facilities as to any of the other aspects of the runoff program. One of the very first assignments that will befall both the Regional Water Quality Board as well as the Boards set up in the individual counties is the task of evaluating urban runoff. This evaluation will require developing urban basin stormwater runoff plans as outlined in the technical portions of this report. The nature of these plans suggests, at least in part, why an on-site detention program can only be effectively implemented if put together by an organization like a County Water Quality Board. These control plans could be developed through continued 208 planning funds.

The proposed urban runoff plans are premised on the idea that more stringent controls and more extensive stormwater facilities need to be developed in certain urban watersheds, which require such intensive efforts because of anticipated growth. Since these watersheds (as described in Section 3 of this report) cut across existing jurisdictional lines, taking in both incorporated and unincorporated portions of each of the four major counties, the planning for such watersheds requires a joint effort of county and municipal planners. The development of these plans will also require a level of engineering expertise that, if not available at the County level, can be supplemented through assistance from Gateway and the Regional Water Quality Board. In fact, it may be preferable to have the 208 coordinator prepare a model runoff control plan based upon the level of detail presented in the engineering portions of this report. This effort at drafting a model plan would tend to illustrate the type of detail and effort that would be required to provide information suggested in this report, such as soil type, potential for erosion, existing land uses, and extensive mapping of the watershed before and after expected development. The plan must also deal with questions of location, size, and costs of proposed permanent runoff control facilities and begin to tackle the development of specific guidelines to be used by developers to insure development consistent with the watershed runoff plan. Gateway and the Regional Water Quality Board, in developing a model urban basin runoff control plan, should also spell out alternatives for financing the

operation and maintenance costs to be incurred in the runoff plan. This model plan could then be used by each of the County Water Quality Boards to illustrate the kind of effort that would be required of them.

The likelihood that a County Water Quality Board can successfully draft runoff control plans is greatly affected by the proposed impact of these plans once completed. In other words, it must be clear from the outset whether these plans are merely advisory. If, alternatively, they are to be enforced, who will see to their effectuation? It has been recommended elsewhere in this report that the outputs of the County Water Quality Board be advisory in nature. This recommendation would apply to the urban watershed runoff control plans as well. Yet this does not mean that both local municipalities and County government should not attempt to put the force of law behind the plans that are developed. It is recommended, that the County Water Quality Boards perhaps with the assistance of the Regional Water Quality Board, develop model ordinances that will incorporate the stormwater runoff control plan concept by requiring developers to comply with applicable urban basin plans. The outline of such a model ordinance is presented in the Element 21 Reports, Appendix A.

This ordinance would initially recognize that drainage plans have been and are being prepared for various areas and would detail the kinds of stormwater runoff facilities that are required as part of the development of all environmentally critical areas. It is proposed that the result of this effort be a stormwater runoff control ordinance tailored for use in each county and adopted by the County Council or County Court within each county, as well as by those individual municipalities where a new stormwater ordinance would be required because of existing runoff problems. There seems to be no question that ordinances will have to be adopted and enforced if the detail set out in the urban basin runoff plans, including specific design criteria, is to be complied with.

Assuming that the criteria and runoff plans as incorporated into the ordinance are as detailed as those currently set out in St. Louis County's Stormwater Detention Design Criteria, the impact on land developers throughout the region may be significant. Developers or redevelopers throughout the region must be made responsible for the control of stormwater runoff from their respective sites. Since this requirement will have an impact not only on the way in which land is used both before and during construction but also on the necessity for detention facilities, urban runoff control will be a

major factor to be considered in any future development program. Added costs, time and effort may well be resisted by developers unless local government can make such controls mandatory where they are essential.

While developers should be responsible ultimately for reducing runoff from their sites, the final responsibility for design and operation of stormwater facilities may logically rest with a single public body. It clearly would be advantageous to have an organization like MSD continue to play a significant role in the development of urban stormwater control facilities. Centralization of such authority in an entity that has significant powers, such as eminent domain to acquire land where needed for stormwater facility purposes, has some clear advantages. Such centralization would also be likely to reduce operational and maintenance costs, provide a single source for the competent staff required to operate stormwater control facilities, and basically tie together a large-scale stormwater control system. For these reasons, it is recommended that MSD play a major role in stormwater facility planning and operation. Outside of St. Louis County, 208 funds should be used to develop a stormwater management system in conjunction with the County Water Quality Boards.

Outside of the City of St. Louis and St. Louis County, much of the on-site detention program will be a new item, requiring considerable selling to local residents and land developers. St. Louis County fortunately does offer a good local model upon which efforts in Franklin, St. Charles, and Jefferson Counties can be developed. Moreover, it is hoped that the kind of detail provided in the model design criteria and guidelines presented in this report will help the Regional as well as County Water Quality Boards in developing an appropriate program for analyzing stormwater runoff events and then designing the necessary treatment facilities.

It may prove extremely difficult for sewer districts or any other public entity outside of St. Louis County to take on the kind of sweeping responsibility that has been recommended for the Metropolitan Sewer District. Legal obstacles will have to be overcome as well as some very practical hurdles before sewer districts can achieve the kind of role that MSD currently plays. However, even if the on-site detention programs in the less urbanized areas merely move in the direction of urban basin runoff plans and implementing ordinances, then these areas will have taken major steps toward improving their posture on urban runoff.

Clearly, the on-site detention program will be of greatest significance to St. Louis County with its continuing patterns of rapid development. At the same time, St. Louis County has been the only part of the general study area which has made a serious effort at trying to legislate in response to the urban runoff problem. As a result, the proposed on-site detention program for St. Louis County is basically an expansion and improvement of present practices. Thus, while in other counties a new stormwater runoff ordinance would be required, mere modification of the existing St. Louis County ordinance will help deal with problems in the unincorporated portions of the County. In municipal areas, there are the models already being offered by the Cities of Creve Coeur and Olivette. All municipalities should be encouraged to adopt some variation of these controls. Because the stormwater runoff program is already fairly well developed in St. Louis County, the County Building Department and Public Works Department are clearly going to be major actors in this process. The St. Louis County Planning and Zoning Commission and the Homebuilders Association will also need to have some impact on the further development of urban basin plans and design criteria.

The major shift in this process will be the emphasis on bringing these parties together through a County Water Quality Board. This approach should, among other things, enable those parties that have already developed stormwater controls to influence and encourage similar planning and legislative efforts in various other municipalities. A similar process will need to be followed in Franklin, Jefferson and St. Charles Counties. In these areas, the key actors are less easy to identify. Certainly, the County Courts and County Building Departments as well as Planning Departments (where they currently exist) will be important members of the County Water Quality Boards and will need to provide much of the input into the development of urban basin plans. Additionally, the Soil Conservation Service (SCS), which should play a role in design of runoff plans in St. Louis County, should play an even larger technical role in St. Charles and Franklin Counties. Unfortunately, the lack of an SCS entity in Jefferson County creates a void that should be filled as part of the effort to counter nonpoint pollution in that county.

C. Urban Cleanliness Programs

Improved Streetsweeping Techniques. The objective of the proposed vacuum streetsweeping program is to reduce sewer overflows by removing leaves from the streets and preventing them from entering storm sewers, thereby

lowering the maintenance and treatment costs of point source facilities. Additionally, in some areas such as St. Charles County, streetsweeping can be seen as a partial alternative to the development of structural controls to deal with stormwater. The key to successful implementation of the streetsweeping program in those counties where it has been recommended is not the development of a regulatory program but rather a commitment by local governments to adopt some of the specific proposals contained in this report. The reason for this is that the real burden in streetsweeping must be on the public sector in terms of the degree to which streets are swept, and the kind of machinery that is used in implementing a program of this kind. The proposed street-sweeping program calls for the use of more efficient sweepers and increased cleaning sweepers being put into service over the next five to ten years. It should be noted that street-sweeping has only been recommended as an important program in two of the major areas within the greater St. Louis 208 region. The reason for excluding such a recommendation from Jefferson and Franklin Counties is simply one of cost-effectiveness.

In St. Louis County and St. Charles County, the burden should again fall on the County Water Quality Boards to review the specific recommendations regarding streetsweeping set out in this report, and to encourage that these recommended alternatives be pursued as widely as reasonable. Streetsweeping does not appear to be the kind of program that can be regulated by ordinance. It seems highly unlikely that streetsweeping programs will be increased or improved in the manner set out unless local governments can be convinced of the cost-effectiveness of such a program.

The information that has been produced as a result of the 208 study should be sufficient to justify such a response, particularly because of the important benefits that street-sweeping can have in terms of reducing operating and maintenance costs associated with the operation of point source treatment facilities.

It might be added that while this report has not recommended a streetsweeping program for Jefferson County, the City of Arnold, in particular, should give further consideration to the specific streetsweeping recommendations and strongly consider adopting many of the set proposals. While anticipated growth in other parts of Jefferson County and Franklin County does not currently justify a streetsweeping program, the City of Arnold and its surrounding area are subject to the kind of growth pressures that may, in the short-range, justify a more advanced streetsweeping approach.

Private Parking Lot Maintenance. The purpose of this program is to complement the improved streetsweeping program recommended above. The program has only been recommended for serious consideration in St. Louis City and County and St. Charles County, given the more urbanized nature of these two counties. The goals here would primarily be to assure that critical areas received the type of maintenance that is essential and that maintenance controls be applied as consistently as possible with an eye toward water quality as well as urban aesthetics. To implement this program, either new ordinances dealing with private parking lot maintenance need to be established or, more likely, provisions in building codes need to be modified in order to strengthen the requirements that are imposed upon those responsible for major shopping center parking lots. Here again, the various County Water Quality Boards could serve as the forum for identifying those areas most in need of improved parking lot maintenance and establishing the type of ordinance modifications needed to put an improved maintenance program into effect. The Boards could then work to see that these ordinances are implemented where needed. Since the changes in regulation would most likely fall under the building code, the building commissioner and staff at either municipal or county level would be responsible for enforcement of private parking lot maintenance. Unquestionably, this is a difficult assignment and will be difficult to police. It will, therefore, be an important implementation step to educate the public and lot owners of the significant water quality advantages that can be achieved through a reduction of urban runoff from parking lots.

Leaf Collection and Disposal. The purpose of this program is to reduce the amount of material entering storm sewage systems. This reduction will limit the load of pollutants and lower operation and maintenance costs for storm sewers, catch basins, and treatment plants. Implementation of this program basically requires that those local communities in St. Louis County who do not provide this service be convinced to initiate such programs as soon as possible. An even stronger job of soliciting community action is necessary in St. Charles County where no municipalities currently provide collection services. It is clear that the present growth rate in St. Charles County requires that this program be implemented as soon as possible. Comparable programs for Jefferson and Franklin Counties have not been highlighted because of the less urban nature of these two areas. These programs should, however, be considered as perhaps future improvement programs. There is little regulatory action required to implement and improve the leaf collection program. The responsibility must rest

on local governments with minimal assistance from local residents. As part of its overall nonpoint control program, the St. Louis County and St. Charles County Water Quality Boards should promote a model leaf collection program and encourage municipalities and County governments (St. Charles County in particular) to adopt programs of this kind. The minimal increase in costs associated with the program can be absorbed with little fiscal impact upon local residents.

Catch Basin Maintenance. The Plan advocates this program only in St. Louis County because outside of the combined sewer area, the number of catch basins is considered to be negligible. Responsibility for implementing the more effective catch basin program outlined in this report would seem to fall on the Metropolitan Sewer District. The past efforts of MSD in this regard suggest that this responsibility can be clearly allocated to that entity. The most significant implementation problem that must be acknowledged is that there may be a marked increase in maintenance costs which could, in turn, result in a service change increase being passed on from MSD to those served throughout the City of St. Louis and St. Louis County. This increase may be difficult to sell to the public unless the importance of an improved catch basin maintenance program can be publically established.

D. County-Specific Nonpoint Recommendations

Franklin County. It is recommended that Franklin County's nonpoint source control program primarily emphasize an improved system for dealing with individual home treatment systems, both new and existing. Of secondary importance is a program of on-site detention of urban runoff used together with a program to control construction site runoff. Other control programs such as streetsweeping and catch basin maintenance, are not justifiable anywhere within Franklin County given the current level of development and cost-effectiveness. If Franklin County can successfully tackle its most visible problem--individual home treatment systems--and reduce through onsite dentention and erosion control programs the impact of urban runoff that will be experienced as the county continues to grow, it will have made great strides toward combating nonpoint pollution.

a. Individual Home Treatment Systems

1. Franklin County Water Quality Board should consider individual home treatment system proposals and develop a recommended model program for IHTS control throughout Franklin County.

2. Franklin County Planning Department and Building Department must play major roles in development of model IHTS programming because the generally rural and unincorporated nature of Franklin County places major responsibility at the County level. The County Court should consider forming sewer districts for the purpose of managing individual treatment systems.

3. Franklin County Building Code should be modified to require site inspections by a Registered Engineer.

4. A Professional Engineer should be added to the staff of the Franklin County Building Department.

5. Franklin County must gain voter approval for a Health Department to assist in the IHTS program.

6. The Building Department must also consider the addition of an extra staff member to be responsible for the IHTS operation permit program, including initial and periodic inspection to assure proper maintenance and operation.

7. The Building Department must gain increased support from the Prosecuting Attorney in the area of enforcement of fines so that the Department will generally have the "teeth" required to assure effective operations.

8. The Building Department must play a more active role in the county licensing of septage haulers.

b. On-Site Detention/Construction Site Runoff. The Franklin County Planning Department should be involved in the development of urban watershed stormwater runoff plans in the areas outlined in Section 3 of this report. If a Franklin County Water Quality Board can be set up quickly, it might be possible for this responsibility to be turned over to the Board itself with primary input coming from the County Planning Department staff. The advantage of the second approach is that it would clearly involve the major Franklin County municipalities in drafting these plans. This is important to developing an initial sense of cohesion in this effort. In any case, the potential contribution of

the Franklin County Planning Department must be emphasized since its past track record suggests both the interest and capability needed to take on this particular assignment.

Once the urban basin stormwater plans have been drafted, the Franklin County Water Quality Board will need to turn to drafting a model stormwater ordinance dealing primarily with the construction of on-site detention facilities and limitations on development sites related to erosion control. The Board must then work toward achieving a voluntary agreement between the County and various municipalities to adopt the model ordinance as proposed. The possible inability of the Franklin County Court to adopt this type of ordinance because of its second class county status will need to be clarified so that a means of putting this type of program into effect can be established. An opinion has been requested from the Missouri Attorney General on this point (see Appendix F). A means to do the job may be through the County Building Code. It appears that much of the substance of a stormwater control ordinance could be incorporated into modifications of the Building Code and this would, hopefully, produce the desired results without straining the powers of the County Court to adopt a new ordinance of this kind. If this step is taken, the major responsibility for controlling and enforcing the erosion and on-site detention programs will be the County Building Department. A key step in the implementation process would then be a reevaluation of the Building Department's current staff and funding. The likely result is that the Department will have to be increased in size and professional breadth in order to take on these expanded responsibilities.

To bolster the strength of the Building Department, a more formal tie between it and the County Planning Department should be established to assure that the Planning Department will review all of the site plans prepared by developers in accordance with the new requirements of the erosion control program.

Jefferson County. Emphasis in the implementation program must be on individual home treatment systems and on on-site detention/construction site runoff control. Other urban runoff techniques such as streetsweeping, leaf collection, etc. should be de-emphasized.

a. Individual Home Treatment Systems

1. A concentrated effort must be made to reinstitute Jefferson County Planning Department. Emphasis should be on promoting the importance of such a department to future water quality and sewer service in the County.

2. Concurrent with the effort to reinstitute County Planning Department, a Jefferson County Water Quality Board should be established with major assistance from Gateway planners until County Planning Department has been created.

3. Jefferson County Water Quality Board should consider individual home treatment system proposals and develop a recommended model program for IHTS control in Jefferson County.

4. Jefferson County Planning Department and Building Department must play major roles in development of model IHTS programming because the generally rural and unincorporated nature of Jefferson County places major responsibility at County level.

5. Jefferson County Building Code should be modified to require site inspections by a Registered Engineer.

6. A Professional Engineer should be added to the staff of the Jefferson County Building Department.

7. The Building Department must also consider the addition of an extra staff member to be responsible for the IHTS operation permit program, including initial and periodic inspection to assure proper maintenance and operation.

8. The Building Department must gain increased support from the Prosecuting Attorney in the area of enforcement of fines so that the Department will generally have the "teeth" required to assure effective operations.

9. The Building Department must play a more active role in the licensing of septage haulers.

b. <u>On-Site Detention/Construction Site Runoff</u>.

1. Jefferson County Water Quality Board should develop urban basin stormwater runoff plans, including identification of particularly critical areas.

2. The County Water Quality Board should spearhead a drive to create Soil Conservation Service representation in Jefferson County to help assist the Board in the development of erosion control techniques and other nonpoint source controls.

3. The Water Quality Board should adopt a model erosion control ordinance. The Board should attempt to have the ordinance adopted by agreements at the municipal level and recommend similar adoption by Jefferson County Court either through ordinance or (if this option is statutorily unavailable) through Building Code amendments.

4. Size and professional expertise of Jefferson County Building Departments should be increased.

5. Assuming County Planning Department has been created, a formal link between it and County Building Department should be developed to assure that Planning Department will review all site plans prepared by developers in accordance with new erosion control program.

St. Charles County. As in Franklin and Jefferson Counties, individual home treatment system control programs and on-site detention/erosion control are the most important aspects of a comprehensive nonpoint source control program. However, the County's current rate of urban growth and significant potential for future growth require that certain best management practices for dealing with urban runoff also be pursued. These include streetsweeping, private parking lot maintenance and leaf collection disposal.

a. Individual Home Treatment Systems

1. Creation of St. Charles County Water Quality Board is critical since municipalities play an extremely important role in the County. They must be represented in nonpoint source control decision-making and the Board will provide the most logical forum.

2. St. Charles County Water Quality Board should consider individual home treatment system proposals and develop a recommended model program for IHTS control in St. Charles County.

3. St. Charles County Planning Department and Building Department must play major roles in development of model IHTS programming because the generally rural and unincorporated nature of St. Charles County places major responsibility at County level.

4. St. Charles County Building Code should be modified to require site inspections by a Registered Engineer.

5. A Professional Engineer should be added to the staff of the St. Charles County Building Department.

6. The Building Department must also consider the addition of an extra staff member to be responsible for the IHTS operation permit program, including initial and periodic inspection to assure proper maintenance and operation.

7. The Building Department must gain increased support from the Prosecuting Attorney in the area of enforcement of fines so that the Department will generally have the "teeth" to assure effective operations.

8. The Building Department must play a more active role in the licensing of septage haulers.

b. On-Site Detention/Construction Site Runoff.

1. St. Charles County Water Quality Board should draft urban basin stormwater plans together with model ordinances.

2. The Board must move toward adoption of inter-governmental agreements to assure that controls at County and municipal level are as comparable as possible to avoid conflict.

3. At county level, changes in development control may have to be adopted through amendment of Building Code because of limitations imposed upon St. Charles County Court.

4. Staff of Building Department must be expanded in size and professional expertise.

5. There should be a stronger link between the County Building and Planning Departments.

c. Streetsweeping

1. Streetsweeping in certain parts of St. Charles County can be seen as an alternative to the development of structural controls to deal with stormwater. This point should be emphasized in the effort to encourage local governments to adopt more advanced streetsweeping programs.

2. The St. Charles County Water Quality Board should include, as an important goal of its initial program, achieving the cooperation of St. Charles County's major municipalities in adopting streetsweeping recommendations.

3. Streetsweeping is not the kind of program that can be regulated by ordinance.

d. Private Parking Lot Maintenance

1. The St. Charles County Water Quality Board must serve as the forum for identifying those areas most in need of improved parking lot maintenance.

2. The Board must establish the type of ordinance modifications needed to put an improved maintenance program into effect.

3. County Water Quality Board must determine whether improvement of private parking lot maintenance will best be achieved by modification of existing building codes or by new ordinances. It appears that the building code modification approach would be preferable.

e. Leaf Collection and Disposal

1. No municipalities in St. Charles County currently provides leaf collection service.

2. It is most critical that municipalities adopt leaf collection programs and that the St. Charles County Water Quality Board attempt to achieve optimum use of these kinds of programs.

St. Louis City/County. The nonpoint source program recommended for St. Louis City/County is clearly the most comprehensive being recommended anywhere in the St. Louis 208 region. St. Louis City and County require controls ranging from the most rurally oriented controls--individual home treatment system controls--to those controls mostly associated with high density urban development, including streetsweeping and leaf collection. St. Louis City and County area, on the other hand, is the most advanced in the region in terms of currently dealing with nonpoint source problems. Many solutions, therefore, can result from modifications of existing programs rather than the development of totally new programs.

a. Individual Home Treatment Systems

1. The initial responsibility again rests with the newly formed St. Louis County Water Quality Board. The Board needs to have active participation from the Metropolitan Sewer District, the Home Builders Association, St. Louis County Public Works Department, and various major

municipalities if realistic urban stormwater runoff control plans are to be developed.

2. St. Louis County Water Quality Board should consider individual home treatment system proposals and develop a recommended model program for IHTS control in St. Louis County.

3. St. Louis County Planning Department and Building Department must play major roles in development of model IHTS programming because the generally rural and unincorporated nature of St. Louis County places major responsibility at County level.

4. St. Louis County Building Code should be modified to require site inspections by Registered Engineer.

5. A Professional Engineer should be added to the staff of the St. Louis County Building Department.

7. The Building Department must also consider the addition of an extra staff member to be responsible for the IHTS operation permit program, including initial and periodic inspection to assure proper maintenance and operation.

8. The Building Department must gain increased support from the Prosecuting Attorney in the area of enforcement of fines so that the Department will generally have the "teeth" required to assure effective operations.

9. The Building Department must play a more active role in the licensing of septage haulers.

b. On-Site Detention/Construction Site Runoff

1. Input from MSD in terms of its own stormwater plans is particularly critical to the development of any future stormwater planning done by the Water Quality Board.

2. To the fullest extent possible, the Water Quality Board should encourage MSD to be the single agency responsible for developing, constructing and operating urban stormwater control facilities.

3. St. Louis County's Stormwater Detention Design Criteria should be re-evaluated in terms of the specific proposals set out in the 208 Plan and modification made where appropriate by the St. Louis County Water Quality Board. The Board should then attempt to have these criteria

adopted in a number of munnicipalities which do not have the stringent stormwater controls at this time.

4. Local erosion and stormwater control ordinances such as adopted in the City of Creve Coeur should also be evaluated as local programs that may serve as model control ordinances.

5. St. Louis County is not limited in its statutory ability to adopt ordinances as are the other counties. It is a charter county and thus can adopt the kind of detailed controls proposed in the plan.

6. MSD should continue to assist St. Louis County in reviewing site plans for their impact on stormwater runoff.

7. The active St. Louis County Soil Conservation Service should also be looked to for considerable assistance on the County Water Quality Board in the drafting of improved ordinances.

c. Streetsweeping, Private Parking Lot Maintenance, Leaf Collection. Same points here as in the discussion of St. Charles County. Note, however, that at both the County and municipal levels St. Louis County is already involved in some of these programs to a greater extent than is St. Charles County and, thus, again local models are more readily available and modification may be preferable to the development of new programs.

VI. PLAN IMPLEMENTATION AND SCHEDULING

Introduction. The 208 recommendations are the blueprint for controlling water pollution in the St. Louis area through the Year 2000. The controls were not developed to be ends in themselves; they were designed to fit together, as part of an areawide wastewater management strategy. If only parts of the Plan are put into effect, water quality problems will still exist in area streams; the goals of the Clean Water Act will not be reached in the St. Louis area.

Insuring that the pollution control recommendations are implemented in a timely manner will require a coordinated effort from all agencies involved in water quality management. The State of Missouri must provide the funds necessary to match Federal grants; lack of grants will delay necessary improvements. East-West Gateway, as 208 coordinator-planner, must have the money from Federal and local

sources to establish an ongoing water quality management program, to help communities through technical assistance and update the Plan through monitoring to reflect changing conditions. Gateway must be able to staff the Regional Water Quality Board, helping it make informed policy decisions.

County and local government, too, have important roles in 208 Plan implementation. They must provide initiative in dealing with local water quality problems. Local communities carry many 208 responsibilities: they are responsible for developing local pollution control plans through the facility planning process; developing the necessary institutional agreements to service areas outside their current boundaries of jurisdictions; and raising revenues to finance, operate and maintain their treatment systems. To help local communities meet their responsibilities, the County Water Quality Board should be formed immediately. The Boards should assign priorities to the problems within their county; develop a schedule for advancing solutions; and work with the management agencies involved.

Finally, the citizens of the St. Louis area have a major role to play in implementing the 208 Plan. They are the clients for whom the 208 Plan was developed; they reap the benefits from clean water. Citizen participation during formulation of the 208 Plan helped develop a plan sensitive to local concerns. Citizens should have a continued, and more vigorous role during Plan implementation--working on the Water Quality Boards; lobbying for continued grant programs; and informing their neighbors of the water quality management program.

This section of the 208 Plan approaches the critical issue of implementation responsibilities and scheduling from a number of separate but interrelated vantage points. First, it presents a broad evaluation of implementation priorities based on regional needs and requirements. Second, it identifies the major responsibilities of key 208 management agencies and in accompanying tables, proposes a detailed short-range schedule for undertaking these responsibilities. Recognizing the critical need for major development and expansion, a separate point source control timetable is then presented for each of the counties in the study area. In a fourth analytical section, an in-depth chart is presented in which the four major categories of 208 management responsibility are used as the basis for a long-range implementation schedule. Finally, the concluding section of the Plan Implementation Section presents proposals for specific state legislative measures that are critical to the implementation of the St. Louis 208 Program.

A. Priorities for Implementing 208 Control Measures

The following control measures contained in the Water Quality Management Plan for the St. Louis region are listed in an order of priority based on regional needs and requirements. These priorities reflect studies conducted during the course of the 208 Program in which problems were identified and criteria for establishing priorities were agreed upon. Detailed analysis of this material was presented in the Element 20.c Report. Based upon this work the following priorities were established.

a. First Priority

1. Develop a continuing planning program to effectively analyze regional and local water quality problems.

2. Control the proliferation of future small sewerage systems.

3. Develop regional or subregional sewage systems to eliminate many of the existing point sources. Regional and subregional systems should be developed for the following areas:

   a. The Lower Meramec Watershed below Keifer Creek.

   b. The St. Charles Watershed, particularly in Dardenne Creek and Peruque Creek.

   c. Creve Coeur and Fee Fee Creek.

   d. The smaller population centers, such as Gray Summit, Festus, Crystal City, Cedar Hills, Herculaneum, Pacific, Union and Washington.

4. Provide effluent disinfection for all point sources in accordance with the policies of the Clean Water Commission.

5. Develop effective septic tank controls which include adequate disposal of septage for each of the four counties.

b. Second Priority

1. Ensure proper operation and maintenance of all point source controls including the proper disposal of sludge and monitoring of effluent quality.

2. Establish construction priorities for the various wastewater treatment facilities.

3. Monitor the Plan's progress in accomplishing its objectives.

c. Third Priority

1. Encourage point sources to discharge into major rivers such as the Missouri or Mississippi River to avoid discharge into small streams which may not be able to assimilate the effluents.

2. Adopt ordinances for controlling sediment from new development both during and after construction.

3. Develop a program to control the disposal of hazardous or toxic waste.

4. Develop and adopt controls for adequate disposal of residual waste such as sludges from sewage and water treatment plants.

d. Fourth Priority

1. Integrate agricultural controls developed by the State of Missouri into the St. Louis 208 management program.

2. Modify existing urban house-cleaning activities, such as streetsweeping, refuse collection, etc., to reduce pollutant discharges to the streams.

3 Modify the existing instream water quality monitoring program by increasing the number of sampling stations, the frequency of sampling, and parameters measured.

e. Fifth Priority

1. Develop phosphate criteria needed to adequately control aquatic growth in the area's streams, such as the Lower Meramec and its small tributary streams. These criteria should also include a wasteload allocation for phosphorus for the various sources, such as point sources, urban runoff, and agricultural sources.

2. Identify and develop best management practices for the general control of urban runoff and other nonpoint sources from both existing and future development. It should be recognized that many of the previous issues

or problems would result in the development of best management practices. The intention here is to develop a general and broad base set of best management practices.

3. Develop a program to protect and improve the St. Louis combined sewage/stormwater collection system.

f. Sixth Priority

1. Develop specific criteria for the location of residual waste disposal sites.

2. Develop specific nonpoint source structural controls for the protection of lakes and streams, such as Lake St. Louis, Creve Coeur Lake, and Gravois Creek.

3. Request federal wasteload allocations for the major metropolitan areas on the multi-state basis for the Missouri and Mississippi Rivers.

4. Develop secondary treatment systems for the two large primary plants presently serving the City of St. Louis.

5. Develop controls for reducing the combined sewer overflows from the St. Louis metropolitan area.

6. Develop specific phosphate controls (construction of phosphate removal systems or the elemination of phosphate detergents) to control or eliminate aquatic growth in the Meramec River and its smaller tributaries.

g. Seventh Priority

1. Develop a general metropolitan or a regional urban runoff mechanical treatment system.

B. Management Agency Responsibilities

The 208 Plan has identified a number of key entities who will have major responsibilities in implementing the specifics of the areawide wastewater management program. These key entities are East-West Gateway Coordinating Council (208 Coordinator-Planner), the State of Missouri, a newly formed Regional Water Quality Board, individual County Water Quality Boards set up for the first time in Franklin, Jefferson and St. Charles Counties, as well as St. Louis City/County. Additional key entities are a variety of municipalities, sewer districts and county governments designated as wastewater treatment operators. Earlier in this Final Plan, the respective roles of each of these entities have been described.

It is important that each of these entities understands the key steps that must be pursued both in the short- and long-term in order to effectuate the 208 Plan.

In the six months/one year following the approval of the 208 plan by the Environmental Protection Agency and the Governor of the State of Missouri, the two dominant figures in 208 implementation will have to be the State of Missouri and Gateway. Although both entities will continue to play extremely significant roles throughout the course of 208 implementation, their respective responsibilities will be particularly substantial in the start-up phase of the 208 implementation program.

1. State of Missouri. The State has a number of major responsibilities that must be pursued in the first year of 208 implementation. These responsibilities, in Table 19, are in order of priority:

1. The State must ask Missouri voters as soon as possible for approval of another major sale of bonds for the purpose of supplementing the existing Water Pollution Control Fund. This fund has been the source of State matching grants for wastewater facility construction. All indications are that the existing funds are insufficient to provide the matching State grants needed to effectuate the technical proposals recommended in the St. Louis 208 Program. Prompt action by the State will serve as a strong indicator of the State's support of the 208 Plan and will assure communities of the fiscal support needed to put major facility improvements into effect.

2. The State's own ongoing 208 study, particularly as it relates to agricultural nonpoint source controls, must be closely coordinated with the nonpoint source findings and recommendations of the St. Louis 208 study. This effort should be part of a broader ongoing working relationship that must develop between the State and Gateway.

3. The State must work with the Attorney General's Office in lobbying the State Legislature for the budgetary allocations needed to increase the staffing available to the Attorney General's Office for dealing with water pollution problems. DNR needs additional attorneys who can work with the State's environmental agencies to assure increased enforcement of NPDES violations and related water quality problems. The chairman of the State's Clean Water Commission has expressed clear support for this effort and this kind of support needs to be translated into immediate action.

TABLE 19

STATE OF MISSOURI IMPLEMENTATION RESPONSIBILITIES

RESPONSIBILITIES	JUNE, 1978	JANUARY, 1979	JUNE, 1979	CONTINUING
Seek approval of bond sales to supplement existing Water Pollution Control Fund	●———	———●		
Coordinate State 208 study and implementation plan with St. Louis 208 plan.	●———	———	———	———→
Lobby State Legislature for allocations to increase staff of the office of the Attorney General	●———	———	———●	
Department of Natural Resources and Division of Environmental Quality should review, staff capabilities in light of ongoing 208 responsibilities	●———	———●		
Develop policy statement and program for relating future 201 planning to 208 plan.	●———	———●		

4. DNR needs to review its current staff capabilities to assure that it has adequate personnel to administer the NPDES program as well as play an increased role in monitoring. Additional staffing appears to be necessary.

5. The State needs to develop a policy statement and program on the relationship between future 201 construction grants and 208 final plan recommendations. The State must make extremely clear what action it will take against any designated management agency which fails to carry out the responsibilities agreed to in the management designation statements signed by the agency and Gateway. The State should make clear in such a written statement that it will oppose the granting of any State wastewater management funds to an entity that is not living up to its responsibilities as set out and agreed to as part of the final 208 Plan. Absent such a statement and a willingness to act assertively in cases of noncompliance, the management statements will hardly be binding since Gateway, as the 208 coordinator, has itself no direct enforcement capabilities.

2. East-West Gateway. As the St. Louis 208 planner and coordinator, Gateway will have numerous responsibilities. Its success in assuming these responsibilities will greatly determine the effectiveness of the St. Louis 208 program. Among the most critical assignments, shown in Table 20, facing Gateway are the following:

1. Gateway must be the spokesman for the St. Louis 208 region. As such, it must continually push the State of Missouri to move in the various directions outlined above. The relationship of Gateway and the State is particularly critical because of the State's "back-up" enforcement powers. East-West Gateway must use the 208 plan as a proposed agenda for itself and the State.

2. A very important item for Gateway in its dealings with the State will be to resolve any differences regarding the Clean Water Commission's priority system for 201 grants. Gateway needs to make the State aware of the priorities set by the final 208 Plan particularly where they may differ with current Clean Water Commission projections.

TABLE 20

EAST-WEST GATEWAY
IMPLEMENTATION RESPONSIBILITIES

RESPONSIBILITIES	JUNE, 1978	JANUARY, 1979	JUNE, 1979	CONTINUING
Develop a funded continued planning program	●	●		
Speak for the St. Louis 208 Region in dealing with State	●	→	→	→
Resolve 201 priority policy with Clean Water Commission	●	●		
Provide technical assistance to Regional and County Water Quality Boards	●	→	→	→
Undertake ongoing special planning studies	●	→	→	→
Establish functioning county and Regional Water Quality Boards	●	●		
Work with designated management agencies to resolve service area and inter-governmental agreement problems	●	●		
Continue efforts to keep public informed and to maintain public participation	●	→	→	→

3. Gateway must detail out a continued planning program in which it identifies its specific responsibilities and determines the type of staffing and funding needs that will be associated with fulfilling these responsibilities. Gateway must develop a kind of 208 "scope of services" for itself. This effort will not only allow it to set its own priorities and needs, but also, through self-evaluation, to develop a program upon which Gateway can justify continued funding. Continued Gateway involvement can be a reality only if new funding sources can be tapped. To do ongoing planning and management Gateway will be looking beyond the federal government since EPA will fund at best no more than 85 percent of the costs involved. The necessity of looking to the state and/or local governments for funding assistance makes it even more imperative that a thoughtful and well-documented continuing planning proposal. This effort must be completed promptly yet thoughtfully.

4. Aside from general operating expenses, Gateway will need to obtain the funding required to staff the Regional Water Quality Board as well as provide technical assistance to the various County Water Quality Boards. Funding to allow Gateway to work actively with the Regional and County Boards is particularly critical since, at least for an interim period, the Boards themselves will have no visible means of fiscal support. Gateway will also need funding to help undertake a number of special study efforts. For example, one such study should focus in on the monitoring process and determine in detail the types of water quality monitoring that need to be done and to allocate responsibilities for assuming these monitoring tasks. Relatedly, a special study should be done utilizing both monitoring techniques as well as the water quality model to determine in greatly increased detail the contribution of nonpoint sources to water quality problems in the St. Louis 208 region. Finally, the issue of private sewer acquisition should be subject to extensive study so that Gateway and the Regional Water Quality Board can assist those municipalities and sewer districts that are and will be involved in purchases.

5. The Water Quality Board concept is critical to the successful implementation of the management/institutional program of the 208 region. East-West Gateway must take the responsibility for initiating this program both at the regional and county levels. This will require that Gateway commit staff to the task of setting up these

various boards. Gateway has developed considerable credibility as well as numerous contacts throughout the two and one-half year planning process and these, Gateway's strengths, will have to be brought to bear in bringing together from each county those people who will sit on the four County Water Quality Boards. Since the Regional Water Quality Board will draw its membership in part from representatives sent to it by the County Boards, the success of the latter will be critical to the start-up of the Regional Board. A concurrent effort nonetheless must be made by Gateway to get the Regional Water Quality Board off the ground, particularly in establishing a place for the Board within the overall Gateway organizational hierarchy.

6. Gateway will need to work with various designated management agencies in the next six months to resolve any problems regarding proposed service areas and inter-governmental agreements needed to initiate point source planning or construction efforts. This process has already progressed to a great extent as a result of Gateway's two-phased "bridge-building" process. However, this program needs to continue with particular emphasis in those areas in which difficult institutional solutions need to be developed (e.g., St. Charles County, Lower Meramec, and Pacific-Labadie area in Frankin County). The A-95 process, which has always been an extremely important Gateway function, will be even more critical in the future in the area of 201 facility plan approval. A-95 is one of the few real mechanisms available to Gateway to help gain compliance with the 208 Plan. Gateway must carefully evaluate, with input from the State and particularly from EPA, the degree to which the A-95 process can be used as a kind of enforcement device. Certainly Gateway must carefully review 201 facility plans and deny its approval to any plan which does not conform to the policies of the 208 Plan. EPA's support for Gateway A-95 decision-making is essential to its effectiveness.

8. A critical ongoing function of East-West Gateway must be continued through public participation in water quality programs. While citizen-at-large memberships on the Regional and County Water Quality Boards are a step in this direction, Gateway will need to continue its efforts at informing the public about the 208 implementation program. Maximum public support for these efforts is critical.

It should be emphasized that each of the critical Gateway functions noted above is to be initiated as part of the final plan development process and then actively pursued in the first six months following the adoption of the final 208 Plan. A number of the functions will, of course, continue throughout the implementation of the 208 program, and Gateway's direct responsibility for exercising some of these functions may vary as time goes on. For example, as has been previously noted, Gateway will be working very closely with newly formed County Water Quality Boards and a new Regional Water Quality Board. Responsibilities initially allocated to Gateway staff can, in the future, be shared with the County and Regional Boards once the latter has become viable. For this reason, it is even more important that Gateway move quickly to set up the Board system. It is proposed that East-West Gateway use January 1, 1979, as the absolute deadline for functioning County and Regional Water Quality Boards. While it is true that only local officials can guarantee the ultimate success or failure of the Boards, there is no question that the impetus for starting these new entities must come from Gateway. Although the process of instituting the County and Regional Boards should be pursued concurrently the primary emphasis should be on establishing the County Boards since they will, in turn, select representatives to serve on the Regional Board.

3. County Water Quality Boards. The responsibilities of the County Water Quality Boards, shown in Table 21, are in order of priority:

1. The first task for a County Water Quality Board is to set itself up as a viable entity. This requires achieving the kind of comprehensive representation which would include county, municipal and sewer district officials as well as a number of other representatives. Once a willingness to participate in such an organization can be achieved, local governmental agreements must be made in which the various representative entity will agree to support to the fullest extent program policies of the County Water Quality Board as well as the Regional Board. Because the Board is seen as a voluntary designation, the need for inter-governmental agreement is even more critical. Decisions will have to be made regarding the final voting/non-voting status of representatives, the possibility of some funding being contributed by each representative organization to support at least in small part the activities of the Board, the chairmanship of the organization and a wide range of other organizational issues.

TABLE 21

COUNTY WATER QUALITY BOARD
IMPLEMENTATION RESPONSIBILITIES

RESPONSIBILITIES	JUNE, 1978	JANUARY, 1979	JUNE, 1979	CONTINUING
Establish itself as viable representative entity	●———	———●		
Serve as forum for resolution of institutional problems.		●———	———	———→
Study nonpoint control measures proposed in final plan in order to devise model ordinances		●———	———●	
Examine monitoring program to determine proper role of local government		●———	———●	
Elect representatives to the Regional Water Quality Board	●———	———●		
Provide input to Gateway planning and implementation studies		●———	———	———→

2. The County Water Quality Board must serve as a forum for resolving a number of the more difficult institutional situations that will be created as a result of the point source proposals contained in the final 208 plan. For example, the overall technical proposal for dealing with wastewater in St. Charles County will require a great deal of cooperation and negotiation between numerous entities concerned with wastewater management in that county. The St. Charles County Water Quality Board must serve as the forum for bringing these various parties together and resolving the differences that currently exist between potentially competing entities.

   The County Water Quality Boards will also have to serve as the forum for resolving less dramatic institutional dilemmas such as the various arrangements that will have to be developed between currently unserviced unincorporated areas and designated management agencies. In many instances, decisions regarding annexation versus service contracts may well benefit from the guidance that a representative County Board can provide.

3. A critical high priority item for the agenda of each County Water Quality Board is an examination of the nonpoint source control measures proposed in the Final 208 Plan. The Plan calls for the adoption by each County Water Quality Board of model ordinances to be adopted by county and municipal governments. Widespread use of these ordinances will be possible only if the County Board can gain a consensus on the type of model ordinance that will best serve the needs of the county and respond to its particular nonpoint source problems.

4. The County Boards will need to carefully examine the monitoring program proposed in the Plan and help Gateway, the Regional Water Quality Board, and the State of Missouri in determining the proper role of local government in the monitoring process.

5. The handling of residual waste is a problem that can only be adequately dealt with from a county and regional perspective. Neither county governments nor municipal or sewer district entities can respond to the residual waste issue without considerable cooperation and a combined effort. The County Board's position in implementing residual waste alternatives will provide valuable input also to the Regional Water Quality Board and Gateway in terms of the latter's planning decisions regarding region-wide residual waste treatment.

6. The County Water Quality Boards must promptly elect two representatives to serve on the Regional Water Quality Board. These representatives will not only be that county's representatives on the regional body but will, in turn, keep the County Board fully abreast of the activities of Gateway, the State, and the Regional Board. For example, the County Board needs to be continually informed as to the enforcement activities of the State, the priority setting of the Clean Water Commission, the planning and other studies being undertaken by Gateway and a host of other more regionalized wastewater management issues.

7. The County Water Quality Board will have East-West Gateway staff available to it, and the Board should develop its own list of priorities as to studies in which it would play a viable part. In other words, a number of planning and implementation studies that will be undertaken by Gateway should and will require input from local wastewater management representatives. The individual County Boards need to parcel out certain responsibilities in these studies to their own members and, with the assistance of Gateway, assure that regional studies adequately present the concerns of their own representatives.

Unlike the Regional Water Quality Board which will be established within an existing organization--East-West Gateway--the County Water Quality Boards will be more independent and free-floating entities. While this situation will make the County Boards more difficult to establish, their independence, once functioning, should allow for a major local contribution.

4. Regional Water Quality Board. As with the County Water Quality Boards, the Regional Board set up within the East-West Gateway framework must have a list of high priority responsibilities from which it can work once created and functioning. The most critical of these functions, shown in Table 22, would include the following:

1. Perhaps the most critical task for the Regional Water Quality Board is to clearly establish itself within the Gateway hierarchy. Certainly existing divisions within Gateway will be extremely important in developing a place for this new organization. Particularly important will be the relationship between the Environmental Task Force, the 208 Policy Advisory Committee and the Citizens Committee. In particular, the Citizens Committee (Water Quality Task Force) may wish to select representatives from its membership to become the

TABLE 22

REGIONAL WATER QUALITY BOARD
IMPLEMENTATION RESPONSIBILITIES

RESPONSIBILITIES	JUNE, 1978	JANUARY, 1979	JUNE, 1979	CONTINUING
Establish itself within Gateway organizational heirarchy.	●———	———●		
Provide input to Gateway special studies for implementation and planning		●———	———	———→
Function as liaison between County Water Quality Boards and Gateway, and between County Water Quality Boards and the State		●———	———	———→
Serve as "watchdog" as well as working partner of Gateway		●———	———	———→

citizen members on the regional Water Quality Board. Since the Citizens Committee will be phased out in the months following the final plan adoption, the selection of representatives from this group to sit on a Regional Water Quality Board can provide an excellent transitional opportunity for continued citizen input.

2. Once the Board has been established, it must immediately begin to assume some of the responsibilities that will, of necessity, have fallen totally on Gateway staff in the interim prior to the Board's creation. The Regional Water Quality Board must be a working Board willing to work directly with Gateway performing some of the difficult tasks of implementation and future planning work. Thus, the Board will have to make a committee of time and effort on a number of the special studies that Gateway will most likely be undertaking (e.g., related to monitoring, acquisition of private sewer utilities, and model nonpoint source control measures). While Gateway staff will be looked to for providing the majority of technical skills and time commitment, the Board, given its composition, would have the experience and technical knowledge related to wastewater management needed to assure the quality of Gateway's work.

3. The Regional Water Quality Board must establish itself as the liaison between the County Water Quality Boards and East-West Gateway. It might also develop a similar relationship with the State of Missouri. The result of such a successful liaison would ideally allow the State and EPA to deal exclusively with the Regional Water Quality Board and still maintain sufficiently close contact with more localized levels of government.

4. Beyond its role of working partner, the Regional Water Quality Board must be in a sense East-West Gateway's 208 "watchdog," assuring the quality and effectiveness of Gateway's effort as 208 coordinator.

5. **Designated 208 Operating Agencies.** In addition to the responsibilities that will have to be assumed at the state, regional and county levels of government, there will be numerous communities and sewer districts that will, by virtue of signed management designation statements, have agreed to accept considerable responsibility for the successful implementation of the 208 program, particularly as regards the treatment of point sources of water pollution. These designated operating agencies will have accepted responsibility for implementing the detailed technical alternatives that have been proposed as part of the Final

208 Plan. These agencies will have a number of responsibilities which must be prioritized and scheduled. These responsibilities, shown in Table 23, include the following:

1. The designated 208 operating agencies must develop, in the six months following the approval of the 208 plan, an implementation schedule for putting the proposed technical solution for their service into effect. The first step in this process will be to consider methods of funding the proposed alternative, particularly because in some instances, such an evalution will suggest the need to consider non-sewered alternatives and individual home treatment systems as alternatives to the cost of mechanical treatment plants. While this alternative process for smaller service areas is more appropriately a part of the 201 facility planning process, a recognition of this responsibility is essential for an understanding of the responsibilities being accepted by a 208 operating agency.

2. The proposals for dealing with point source pollution in any area will require some kind of institutional change. At the very least, a designated management agency will have to begin to explore how best to service an area larger than its existing service area.

   An investigation of annexation possibilities or service contracting should begin immediately so that a move in the selected institutional direction can be implemented as promptly as possible. This decision will, of course, be tied to the general question of how best to spread the cost of a proposed system when servicing a large area. In more complicated institutional situations, such as in St. Charles County and the Lower Meramec area, efforts to allocate management responsibilities to as yet nonfunctioning sewer districts and other new management entities must begin. Governmental bodies such as the County Court in Jefferson County which have not been involved actively in wastewater management needs to develop strategies for implementing service plans for unincorporated portions of the county which have either existing or proposed management entities on whom responsibility can be placed.

3. Individual operating agencies must commit to and begin working with the County Water Quality Board developed within each jurisdiction. The County Water Quality Boards, as noted earlier, can provide individual communities with technical assistance as well as a public forum in which individual operating problems can be resolved.

TABLE 23

DESIGNATED 208 OPERATING AGENCIES
IMPLEMENTATION RESPONSIBILITIES

RESPONSIBILITIES	JUNE, 1978	JANUARY, 1979	JUNE, 1979	CONTINUING
Develop an implementation schedule for effecting proposed technical solution for the service area	●———	———●		
Investigate institutional alternatives for expanding service areas	●———	———●		
Make commitment to and begin working with appropriate County Water Quality Board	●———	———●		
Make commitment to work with County Water Quality Board to develop model nonpoint source controls	●———	———●		

4. Since there is a clear overlap in governmental responsibility for both point source and nonpoint source control, the designated operating agencies will also need to commit to working with County Water Quality Boards in their efforts to develop model nonpoint source controls.

6. Local Governments. Local governments throughout the St. Louis 208 region should understand that they have responsibilities and 208 priorities that are distinguishable from those responsibilities that might concurrently be placed on these governments because of representation on the Regional and/or County Water Quality Board as 208 operating agnecies. Because much of what the Regional and County Water Quality Boards as well as East-West Gateway do is voluntary in nature, the final step in certain aspects of 208 implementation will rest ultimately upon local government. This fact raises a number of identifiable short-range 208 responsibilities for local governments. These responsibilities, shown in Table 24, are as follows:

1. The commitment of local governments to 208 implementation must go beyond the willingness to sent representatives to the newly established Boards. Local governments must be willing to seriously consider the proposals that will be evolving from the Boards and act upon their recommendations, particularly as relates to nonpoint source controls. Moreover, even a willingness to adopt changes in local legislation to conform to model ordinance proposals will be meaningless unless local enforcement is pursued as well.

2. Local governments should begin now to consider possible means of helping to fund the fforts of the County and Regional Water Quality Boards. Although it seems likely that the great bulk of funding can come from federal sources, the need for matching funds is imperative and needs to be met in some equitable and reasonable way by local communities.

C. Priorities and Schedule for Point Source Improvements

Section 208(b)(2)(B) of the 1972 Clean Water Act requires "the establishment of construction priorities . . . and time schedules for initiation and completion of all treatment works" as an output of the 208 Plan. Table 25 lists the construction priorities for the Plan's point source control recommendations.* It is recommended that all point source control recommendations be implemented by 1985 to meet the

*The 208 ranking of municipal point sources is not intended to supersede the statewide construction priority list but is intended to provide input into the statewide construction grant program. Statewide priorities may differ significantly from a listing based solely on regional goals and objectives.

TABLE 24

LOCAL GOVERNMENT (COUNTY AND MUNICIPAL)
IMPLEMENTATION RESPONSIBILITIES

RESPONSIBILITIES	JUNE, 1978	JANUARY, 1979	JUNE, 1979	CONTINUING
Participate fully in activities of County Water Quality Boards	●———	———	———	———→
Investigate means of helping to fund County and Regional Water Quality Boards	●———	——●		

national water quality goals. Table 26 presents a schedule of the actions necessary to meet the initial operation dates of the controls. Both management actions--forming sewer districts and intergovernmental agreements--and facility planning actions are detailed. The following symbols are used in the Table to illustrate the necessary actions:

☆ Organize Sewer District

□ Expand Service Area

▲ Initiate 201 Facility Planning

● Complete 201 Facility Planning

○ Begin Construction

D. Major Management Functions: Long-Range Scheduling and Allocation

There are four groupings of management functions (described earlier in this Section) which have been allocated to the various government entities designated in this Plan to be part of this region's water quality management system. Each functional grouping includes a set of specific management responsibilities. These responsibilities and the management agencies they have been assigned to are detailed in Table 27.

E. Legislative Priorities and Scheduling

In addition to the other implementation priorities noted above, there are a number of possible changes in Missouri statutes that could substantially improve wastewater management in the State. These changes would, among other things, affect the ability of sewer districts and second class county governments to play an active role as 208 management entities.

1. Increased Powers for Second Class Counties. As indicated in the draft correspondence between the Missouri Department of Natural Resources and the State Attorney General's Office (see Appendix I), there exist serious questions regarding the legal authority of second class counties to adopt and enforce the variety of nonpoint source pollution controls recommended in this 208 plan. Resolving these issues is critical to the plan because three of the major counties in the study area--St. Charles, Jefferson and Franklin--currently operate under second class county legislation. Moreover, it is essential that responsibility for

TABLE 25
CONSTRUCTION PRIORITIES
FOR POINT SOURCE CONTROL RECOMMENDATIONS

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
1	Lower Meramec	January, 1982	This control permits the development of a regional system which provides for elimination of numerous point sources from the water quality sensitive Lower Meramec River. This regional system would affect the greatest number of people and eliminate the largest sources of any system within the St. Louis 208 area.
2	St. Charles Consolidated System	January, 1984	This control would provide for the development of a regional system in a large portion of St. Charles County. Numerous smaller facilities would be eliminated which presently discharge to Peruque, Belleau, Dardenne, Spencer, Cole, and Sandfort Creeks.
3.	MSD Northwest	January, 1982	This control provides for development of a regional system affecting a significant number of people and point source discharges from smaller creeks in Northwest St. Louis area.
4	Sullivan/Oak Grove	January, 1983	This control provides for a subregional system serving the general Sullivan/Oak Grove area and permits the elimination of several small point sources presently discharging to tributaries of the Borbeuse River.
5	Herculaneum/Pevely	January, 1981	This control provides for a subregional system servicing the greater Herculaneum area and permits elimination of smaller facilities now discharging to Sandy and Joachim Creeks.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
6	Coldwater Creek	January, 1980	This control provides for advanced treatment at the existing expanded plant before discharge to Coldwater Creek.
7	Pacific/Gray Summit	January, 1983	This control would provide for the formation of a subregional system to serve the entire Pacific-Gray Summit area thus eliminating numerous small facilities and discharging to Brush and Labadie Creek Watersheds.
8	DeSoto	January, 1983	This control provides for a subregional system to serve the City of DeSoto and the immediate surrounding area. It also permits the elimination of several smaller facilities located to the north discharging to Fritz and Ball Branch Creeks.
9	Eureka/Times Beach	January, 1982	This control provides for the creation of a subregional system for the greater Eureka/Times Beach area and eliminates several existing smaller facilities now discharging to low flow streams.
10	Union	January, 1982	This control provides for a subregional system serving the greater Union area eliminating several smaller facilities in the surrounding area, now discharging to small tributaries of the Bourbeuse.
11	Festus/Crystal City	January, 1980	This control provides for a subregional system servicing the greater Festus/Crystal City area and permits elimination of several smaller facilities discharging into Plattin Creek. Expansion is currently under construction and should be completed.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
12	Wentzville	January, 1979	Construction is near completion.
13	St. Clair	January, 1980	This control provides for a subregional system to serve the greater St. Clair area permitting the elimination of the existing five city plants and several smaller facilities in the surrounding area. Expansion is currently in Step 3 and should be completed.
14	Lower Big River/Heads Creek	January, 1985	This control would create a subregional system for the general Lake Montowese area including the existing Lower Big River Sewer District Service area. It allows for the elimination of several smaller plants in this general area now discharging to smaller streams.
15	Cedar Hills	January, 1985	This control provides for creation of a subregional system thereby eliminating numerous small facilities in this area along the Big River, and insuring against the proliferation of these types of facilities in the future.
16	Pin Oak Creek	January, 1985	This control would establish a centralized treatment system to eliminate numerous smaller facilities presently in this area discharging to tributaries of Pin Oak Creek. It would also deter the proliferation of smaller facilities in this area in the future.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
17	Stanton	January, 1985	This control provides for the establishment of a community system for the Stanton area which would eliminate several small treatment facilities and numerous septic tanks.
18	Robertsville/Lake Serene	January, 1985	This control provides for the creation of a centralized treatment system which would eliminate numerous small facilities now discharging to Lake Serene, Evergreen Lakes, Winch Creek, and Calvey Creek. It would also control the proliferation of such smaller facilities in the future.
19	Sugar Creek Watershed	January, 1985	This control provides for the formation of a subregional system to serve the entire Sugar Creek Watershed, thereby limiting the proliferation of small treatment plants.
20	Gerald	January, 1985	This control provides for a subregional system for the City of Gerald and surrounding areas. It would eliminate the two existing city facilities and control any future proliferation of smaller facilities in the outlying areas.
21	Olympian Village	January, 1985	This control provides for the formation of a centralized treatment system to control the proliferation of smaller facilities which is now occurring in this area and expected to occur in the future.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
22	Selma	January, 1985	This control provides for the creation of a centralized treatment system for the greater Selma area thereby eliminating several smaller facilities located in Muddy and Plattin Creek watersheds, as well as controlling the proliferation of such facilities in the future in these areas.
23	New Melle	January, 1985	This control provides for the establishment of a community treatment system to eliminate existing and future proliferation of individual septic tank units.
24	Beaufort	January, 1985	This control provides for the formation of a community system thereby eliminating numerous home septic units and one small treatment facility.
25	Martigney Creek	January, 1985	This control would eliminate the Martigney Creek Plant; the watershed would be serviced by MSD's Lemay Facility.
26	Glaize Creek Watershed	January, 1985	This control provides for extension of an existing system into a subregional system theteby eliminating numerous smaller facilities in the Upper Glaize Creek and Eastern Heads Creek Watersheds.
27	Duckett Creek Watershed	January, 1985	This control provides for the extension of an existing subregional system to eliminate several smaller facilities and control the proliferation of future small sewage systems in Duckett Creek Watershed.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
28	Berger	January, 1985	This control provides for the establishment of a community treatment system to eliminate existing and future proliferation of individual septic tank units as well as eliminate a few small treatment systems.
29	New Haven	January, 1985	This control provides for the expansion of an existing subregional system to serve the projected future growth for the greater New Haven area.
30	Augusta	January, 1985	This control provides for the establishment of a community system to eliminate existing and any future proliferation of individual home septic tank systems.
31	West Alton	January, 1985	This control provides for the establishment of a community treatment system to eliminate existing and future proliferation of individual septic tank units.
32	Matson/Defiance	January, 1985	This control permits the formation of a treatment system to provide service to the two closely situated communities thereby eliminating any existing or future septic tank systems in the general area.
33	Labadie	January, 1985	This control provides for the establishment of a community system thereby eliminating numerous individual home septic tank systems as well as several small treatment facilities in the surrounding area.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
34	Portage Des Sioux	January, 1985	This control would provide the necessary treatment system to sufficiently handle all expected future flows from the community of Portage Des Sioux eliminating the existing community septic tank and any individual septic tank systems in operation.
35	Leslie	January, 1985	This control provides for the formation of a community system thereby eliminating numerous home septic tank units now in operation.
36	Orchard Farm	January, 1985	This control provides for the establishment of a community treatment system to eliminate individual home septic tank units now existing in Orchard Farm.
37	Spanish Lake	January, 1982	This control provides for the elimination of a significant point source discharge from Spanish Lake Creek with flows now being treated and discharged to the Mississippi River.
38	Lemay	January, 1985	This control provides for the upgrading of an existing primary facility discharging to the Mississippi River to secondary treatment facility.
39	Bissell Point	January, 1985	This control provides for the upgrading of an existing primary facility discharging to the Mississippi River to a secondary treatment facility.
40	St. Charles-Missouri River	July, 1981	This control provides for the upgrading of an existing primary treatment system discharging to the Missouri River to a secondary treatment facility.

TABLE 25
(Continued)

Regional Priority	Point Source Control	Beginning Date of Operation	Selection Criteria
41	Washington	January, 1979	Construction to be completed in late 1978.

TABLE 26
SCHEDULE FOR POINT SOURCE IMPROVEMENTS

			1978	1979	1980	1981	1982	1983	1984
1. FRANKLIN COUNTY									
PACIFIC/GRAY SUMMIT									
Organize Gray Summit Sewer District	January	1979		☆					
Intergovernmental Agreement	October	1979							
Initiate 201 Facility Planning	June	1980			▲				
Begin Construction	January	1982					○		
BEAUFORT									
Organize Sewer District or Incorporate	January	1981				☆			
Initiate 201 Facility Planning	January	1982					▲		
Begin Construction	January	1984							○
BERGER									
Initiate 201 Facility Planning	January	1982					▲		
Begin Construction	January	1984							○
GERALD									
Formalize projected service area									
Initiate 201 Facilities Planning	January	1978	▲						
Begin Construction	January	1981				○			
LABADIE									
Organize Sewer District or Incorporate	January	1981				☆			
Initiate 201 Facility Planning	January	1982					▲		
									○

TABLE 26
(Continued)

		1978	1979	1980	1981	1982	1983	1984
1. FRANKLIN COUNTY (Continued)								
LESLIE								
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
NEW HAVEN								
Initiate 201 Facility Planning	January 1981				▲			
Begin Construction	January 1984							○
PIN OAK								
Organize Sewer District or Incorporate	January 1981				☆			
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
ROBERTSVILLE/LAKE SERENE								
Organize Sewer District or Incorporate	January 1981				☆			
Begin 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
STANTON								
Organize Sewer District or Incorporate	January 1981				☆			
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○

TABLE 26
(Continued)

			1978	1979	1980	1981	1982	1983	1984
1. FRANKLIN COUNTY (Continued)									
SULLIVAN/OAK GROVE VILLAGE									
201 Facility Planning has Started	June	1977	●						
Formal Intercity Agreement	January	1979		□					
Begin Construction	January	1980			○				
ST. CLAIR									
Construction (Step 3) to begin	June	1978	○						
Develop Intercity Agreement with Parkway	June	1979		□					
UNION									
201 Facility Plan (Step 1) Completed	March	1978	●						
Formalize Projected Service Area	January	1979		□					
Begin Construction	January	1981				○			
WASHINGTON									
Construction to be completed	November	1978							
Expanded Service Area	January	1979		□					

TABLE 26
(Continued)

			1978	1979	1980	1981	1982	1983	1984
2. JEFFERSON COUNTY (Continued)									
FESTUS/CRYSTAL CITY									
Complete 201 Facility Planning	October	1978	●						
Begin Construction	October	1979		○					
GLAIZE CREEK WATERSHED									
Expand Service Area	January	1980			□				
Initiate 201 Facility Planning	January	1982					▲		
Begin Construction	January	1984							○
SELMA									
Organize Sewer District or Incorporate	January	1981				☆			
Initiate 201 Facility Planning	January	1982					▲		
Begin Construction	January	1984							○
HERCULANEUM/PEVELY									
Facility Plan Completed	May	1978	●						
Start Construction	January	1980			○				

TABLE 26
(Continued)

		1978	1979	1980	1981	1982	1983	1984
2. JEFFERSON COUNTY (Continued)								
DESOTO								
Initiate 201 Facility Planning	January 1980			▲				
Start construction	January 1982					○		
OLYMPIAN VILLAGE								
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
LOWER BIG RIVER/HEADS CREEK								
Expand Sewer District	January 1979							
Initiate 201 Facility Planning	January 1981				▲			
Begin Construction	January, 1983						○	
CEDAR HILLS								
Organize Sewer District	January 1979		☆					
Initiate 201 Facility Planning	January 1981				▲			
Begin Construction	January 1983						○	
4. ST. CHARLES CO. CONSOLIDATED SYSTEM								
Organize Sewer District	October 1979		☆					
Initiate 201 Facility Planning	July 1980			▲				
Start Construction	July 1982					○		

TABLE 26
(Continued)

		1978	1979	1980	1981	1982	1983	1984
3. ST. CHARLES COUNTY (Continued)								
AUGUSTA								
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
DUCKETT CREEK WATERSHED								
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
MATSON/DEFIANCE								
Organize Sewer District	January 1981				☆			
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
NEW MELLE								
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
ORCHARD FARM								
Organize Sewer District or Incorporate	January 1981				☆			
Initiate 201 Facility Planning	January 1982					▲		
Begin Construction	January 1984							○
PORTAGE DES SIOUX								
Initiate 201 Facility Planning	January 1978	▲						
Begin Construction	January 1981				○			

TABLE 26
(Continued)

			1978	1979	1980	1981	1982	1983	1984
3. ST. CHARLES COUNTY (Continued)									
ST. CHARLES-MISSOURI RIVER									
Complete 201 Facility Planning	July	1978	◐						
Begin Construction	July	1979		○					
WEST ALTON									
Organize Sewer District or Incorporate	January	1981				☆			
Initiate 201 Facility Planning	January	1982					▲		
Begin Construction	January	1984							○
WENTZVILLE									
Complete Construction	January	1979		●					
4. ST. LOUIS CITY/COUNTY									
LOWER MERAMEC									
Facility Plan Completed	May	1978	◐						
Start Construction	January	1979		○					
EUREKA/TIMES BEACH									
Complete 201 Facility Planning	June	1978	●						
Expand Service Area	October	1978	□						
Start Construction	January	1980			○				
MARTIGNEY CREEK WATERSHED									
Initiate 201 Facility Planning	January	1982					▲		
[illegible]	[illegible]								○

TABLE 26
(Continued)

			1978	1979	1980	1981	1982	1983	1984
4. ST. LOUIS CITY/COUNTY (Continued)									
SUGAR CREEK WATERSHED									
Initiate 201 Facility Planning	January	1982					▲		
Begin Construction	January	1984							○
BISSELL POINT									
Design (Step 2) to be Completed	September	1978	●						
Begin Construction	January	1979		○					
LEMAY									
Construction (Step 3) Started	January	1977	○						
CAULKS CREEK, CREVE COEUR, COWMIRE CREEK (MSD NORTHWEST)									
Initiate 201 Facility Planning	June	1978	▲						
Begin Construction	January	1980			○				
SPANISH LAKE									
Initiate 201 Facility Planning	June	1978	▲						
Begin Construction	July	1980			○				
COLDWATER CREEK WATERSHED									
Initiate 201 Facility Planning	May	1978	▲						
Begin Construction	July	1979			○				

TABLE 27

MAJOR MANAGEMENT FUNCTIONS: LONG-RANGE SCHEDULING AND ALLOCATION

	Responsible Agencies	1978-1979	1979-1984	1984-1994
I. PROGRAM PLANNING, SUPERVISION AND COORDINATION				
1. Develop Continuing Funding	EPA/DNR/Gateway/Counties	←	CONTINUING	→
2. Conduct First-Year Program	Gateway	•		
(2.1) Establish Regional and County Water Quality Boards	Gateway	•		
(2.2) Initiate Update Mechanism	Gateway	•		
3. Provide Annual Plan for Certification	Gateway	←	CONTINUING	→
4. Conduct A-95 Review	Gateway	←	CONTINUING	→
5. Update Data Base and Projections	Gateway	←	CONTINUING	→
6. Review Nonpoint Source Needs	Gateway	←	↗	
7. Conduct Public Participation	Gateway	←	CONTINUING	→
II. TREATMENT PLANT DEVELOPMENT, FINANCING, OPERATION AND MAINTENANCE				
1. Facility Development and Financing				
(1.1) Review Facility Plans for conformance with 208 Plan (A-95)	Gateway	←	CONTINUING	→

TABLE 27

MAJOR MANAGEMENT FUNCTIONS: LONG-RANGE SCHEDULING AND ALLOCATION
(Continued)

	Responsible Agencies	1978-1979	1979-1984	1984-1994
II. (Continued)				
1. (Continued)				
(1.2) Explore Innovative Approaches to Facility Planning for Cost Reduction	Gateway			
(1.3) Continue Facility Planning	Gateway/MSD/Counties		CONTINUING	
(1.4) Construct and Update Facilities	MSD/Counties/Designated Agencies/Gateway		CONTINUING	
1978-1979 1979-1984 1984-1994				
(1.5) Fund Facility Construction	Clean Water Commission/ EPA/DNR/Counties		CONTINUING	
(1.6) Continue Priority list and Federal Funding Process	DNR/EPA		CONTINUING	
(1.7) Assist in Upgrading Local Agency Priority	Gateway			
(1.8) Local Evaluation of Priority Mechanisms/ Execution	Gateway			

TABLE 27

MAJOR MANAGEMENT FUNCTIONS: LONG-RANGE SCHEDULING AND ALLOCATION
(Continued)

	Responsible Agencies	1978-1979	1979-1984	1984-1994
II. (Continued)				
2. Operation and Maintenance				
(2.1) Operate and maintain facilities	Counties/Designated Agencies	←	CONTINUING	→
(2.2) Examine Alternative Approaches to operation and maintenance to achieve cost reduction	Gateway/Water Quality Boards/Counties/Designated Agencies	•	—	→
III. POINT SOURCE REGULATORY AND COMPLIANCE FUNCTIONS				
1. Permitting				
(1.1) Issue NPDES Permits in accordance with Plan	DNR/EPA	←	CONTINUING	→
(1.2) Review NPDES Permits for Compliance with Plan	Gateway	←	CONTINUING	→
(1.3) Evaluate New NPDES Permit Parameters	DNR	←	•	
(1.4) Local Evaluation of New NPDES Permit Parameters	Gateway	←	•	
2. Standard Setting				
(2.1) Continue Standards Evaluation	DNR	←	CONTINUING	→
(2.2) Local input to Standard Setting	Gateway		•	→

TABLE 27

MAJOR MANAGEMENT FUNCTIONS: LONG-RANGE SCHEDULING AND ALLOCATION
(Continued)

	Responsible Agencies	1978-1979	1979-1984	1984-1994
III. (Continued)				
2. (Continued)				
(2.3) Continue Wasteload Allocations in Accordance with 208 Plan	DNR	CONTINUING		
(2.4) Special Studies to Confirm/Modify Allocations	Shared			
(2.5) Local Evaluation of Allocations	Gateway			
3. Monitoring and Enforcement				
(3.1) Continue Existing Primary Monitoring System	DNR			
(3.2) Conduct Joint Monitoring Program	DNR/Gateway/MSD/Counties		CONTINUING	
(3.3) Establish Mechanism for Coordinating Monitoring	DNR/Gateway/MSD/Counties			
(3.4) Conduct Special Monitoring Programs	Gateway/MSD/Counties			
(3.5) Strengthen Enforcement Activities	EPA/DNR/Gateway/Counties/ Attorney General		CONTINUING	
(3.6) Coordinate Local Enforcement Activities	Gateway			
(3.7) Develop Enforcement Procedures for Nonpoint Source Program	DNR/Missouri Attorney General			

TABLE 27

MAJOR MANAGEMENT FUNCTIONS: LONG-RANGE SCHEDULING AND ALLOCATION
(Continued)

	Responsible Agencies	1978-1979	1979-1984	1984-1994
IV. MANAGEMENT OF NONPOINT SOURCE CONTROLS				
1. Develop New or Modified Individual Home Treatment System (IHTS) Ordinances and Programming				
(1.1) Prepare model ordinance and criteria	Gateway/Water Quality Boards	●		
(1.2) Implement new or modify existing ordinances	County and Local Governments	●———	———●	
(1.3) Enforce new or modified ordinance	County and Local Governments/DNR/Attorney General	●———	———	———→
2. Develop New or Modified Urban Runoff Ordinances and Programming				
(2.1) On-site Detention and Erosion Control				
a. Prepare model ordinances & criteria	Gateway/Water Quality Boards	●		
b. Implement new or modify existing ordinances	County and Local Governments	●———	———●	
c. Enforce new or modified ordinance	County and Local Governments/DNR/Attorney General	●———	———	———→

TABLE 27

MAJOR MANAGEMENT FUNCTIONS: LONG-RANGE SCHEDULING AND ALLOCATION
(Continued)

	Responsible Agencies	1978-1979	1979-1984	1984-1994
IV. (Continued)				
2. (Continued)				
(2.2) Urban Cleanliness (Street-sweeping, leaf collection, private parking lot maintenance)				
a. Prepare model ordinance and criteria	Gateway/Water Quality Boards			
b. Implement new or modify existing ordinances	County and Local Governments			
c. Enforce new or modified ordinance	County and Local Governments/DNR/Attorney General			

such controls be allocated to county governments since they are the only local governmental body with any authority over unincorporated areas.

A number of county court judges have expressed the opinion that existing legislation does not allow second class counties to adopt many of the program elements outlined in the attached inquiry. If the Attorney General's Office confirms this opinion, it will be critical to look to the Missouri legislature to specifically amend second class county legislation to authorize the practices recommended in this Final Plan.

2. Clarification/Revision of Sewer District Legislation. A second major area for statutory analysis and change involves sewer districts. A fairly recent Jefferson County Circuit Court decision found unconstitutional the annexation provisions of legislation governing "second class county sewer districts." Because of its emphasis on local control, this type of district has been and will continue to be an attractive management option in newly sewered areas throughout the more rural areas of the region. Yet this judicial decision has cast a cloud upon the applicable legislation. While the decision has not questioned the more important process of district incorporation, it may well encourage future attacks on second class county sewer district legislation. Moreover, this lawsuit has simply highlighted a fact which has become apparent as a result of this 208 study--all of Missouri's sewer district legislation is in need of clarification and substantial reworking. Existing sewer district laws are simply too dated and unresponsive to handle the water quality management demands of 208. It is particularly critical that sewer districts gain the added authority needed to deal adequately with nonpoint source control, nonsewered point source control alternatives and major new funding needs.

3. Additional State Pollution Control Funding. As has been previously suggested in this Final Plan, local governments should immediately initiate the process of gaining from Missouri voters an authorization for supplementing the existing Water Pollution Control Fund. This critical State revenue source, funded through proceeds arising from State bond sales, has been used to match federal grants and local contributions in the development of new and/or expanded treatment facilities. Many of the point source alternatives proposed in this Plan will depend upon the replenishment of the Water Pollution Control Fund. This effort needs to be initiated before the current resources of the Fund have been fully committed. Thus, as was done in 1971, State voters must amend Article III, Section 37(b) of the Missouri Constitution to authorize further State indebtedness for the purpose of water pollution control.

On a separate funding front, the General Assembly needs to make available sufficient funds to meet the request of the Clean Water Commission for additional legal staff in the Attorney General's Office to assist the Commission in its improvement activities.

4. Strengthened State Nonpoint Source Control Legislation. This Final 208 Plan has placed the major responsibilities for nonpoint source control programming and enforcement at the local governmental level. This decision reflects the desire of local counties and municipalities to deal directly with nonpoint control. Major new State involvement in this area was proposed and reflected at a number of points in the study process. Not only did local governments wish to retain autonomy, but also state government itself was not interested in expanding its existing limited role in nonpoint matters. With the assistance of Gateway and the two-tiered Water Quality Board system, local governments in the St. Louis 208 region should be able to adequately implement and enforce proposed nonpoint programs. Should this not occur, however, State government needs the legislative capacity to deal directly with local nonpoint problems. Although this is a lesser priority item than those statutory changes proposed above, a strengthening of Chapter 204 (Water Pollution) of Missouri Statutes is highly recommended.

In particular, this Statutory Section needs to be amended to recognize one concept of "nonpoint" pollution and to at least authorize a potential State role in dealing with construction site runoff and stormwater control, particularly in environmentally sensitive areas. While State involvement of nonpoint source should be viewed primarily as a back-up system, DNR needs to have adequate authority to enforce nonpoint programs when other local efforts have clearly failed.

The 208 studies being done in various parts of the State of Missouri are likely to come to many of the same conclusions regarding legislative priorities. Thus, it is hoped that Statewide support for legislative changes in these areas can be mustered. Gateway, as St. Louis' 208 Coordinator, must, therefore, work not only with the State (the DNR and the Attorney General), but also with other designated 208 coordinators throughout Missouri to achieve these legislative objectives. This effort should begin immediately so that proposed new legislation can be drafted prior to the Fall session of the legislature.

APPENDICES

A. 208 PLAN COMMITTEES

BOARD OF DIRECTORS

The East-West Gateway Coordinating Council is governed by a Board of Directors whose function is to set policy, approve or reject plans, and make all final decisions on plans and policies affecting the Council as well as the region.

The Board of Directors is comprised of 21 members, ten from the State of Illinois and ten from the State of Missouri, plus the Chairman of the Bi-State Development Agency. Two members from each state serve as ex-official members without voting privileges. Along with the elected officials who sit on the Gateway Board, six regional citizens also review and vote on proposed projects.

Plans formulated by East-West Gateway's professional planning staff are reviewed by the Council's Board of Directors before they are recommended for implementation.

Gene McNary, Chairman
Supervisor, St. Louis County

Victor P. Canty, Chairman
St. Clair County Board

Walter Steinburk, Treasurer
Presiding Judge, Jefferson County

Nelson Hagnauer
Chairman, Madison County Board

Hugh McCane
Presiding Judge, Franklin County

James F. Conway
Mayor, City of St. Louis

William Mason
Mayor, City of East St. Louis

William A. Magurany
Mayor, City of Wood River

Mrs. Wilda Worley
Citizen

John Fedrick
Citizen

Leo Konzen
Citizen

Robert Crawley
Citizen

Fred Teer
Citizen

Ms. Lois Bliss
Citizen

Charles Schwendemann
Presiding Judge, St. Charles County

Donald R. Melhorn
Village President of Swansea

Robert A. Heimsch
Mayor, City of Des Peres

Paul J. Simon
President, Board of Alderman,
City of St. Louis

Chester Schmidt, Chairman
Board of Commissioners
Monroe County

John Bellcoff
President of Southwestern Illinois
Metropolitan and Regional Planning
Commission

John Brawley
Bi-State Development Agency

NONVOTING MEMBERS

Stephen C. Bradford
Commissioner
State of Missouri

Dan C. Dees, Chief
Bureau of Planning
Illinois Department of
Transportation

Robert Hunter
Missouri State Highway
Commission

John W. Castle
Department of Local
Government Affairs,
Illinois

Jack Kirkland
Missouri Department of
Transportation

WATER QUALITY POLICY ADVISORY COMMITTEE

This Committee had the responsibility for formulating policy relating to the 208 Plan and for making a recommendation to Gateway's Board of Directors on whether they should approve the Plan. The Committee accomplished these tasks by helping Gateway's Water Quality staff and consultants identify water quality problems in the region and develop solutions to these problems.

The Committee had thirty-six members, including elected officials, operators of wastewater treatment facilities, representatives from industries, and members of the Water Quality Citizens Task Force. In addition, state and federal agency representatives served in an ex-officio capacity to ensure consistent policy orientation between the Plan and other federal and state programs.

MEMBERS

James Beckman
Representing Agriculture

Albert Beyer
Representing Jefferson County
Water Quality Citizen Task Force

Ulrich W. Busch
Representing Franklin County
Planning Department

*Robert Chandler
Representing National Park Service

Elmer Cowan
Representing Franklin County
Municipal League

*Lee Duvall
Representing U.S. Environmental
Protection Agency

Roberta Fishman
Representing City of St. Louis
Water Quality Citizen Task Force

Tim Hennessy
Representing the Plumbing Industry

Earl Holtgraewe
Representing Missouri Department
of Natural Resources

R. R. Imsande
Representing Metropolitan Sewer
District

Frank Janson
Representing Metropolitan Sewer
District

*Cloyd Johnston
Representing Federal Land Bank
of St. Louis

*Indicates Non-Voting Members

Larry Keith
Representing Water Quality
Citizen Task Force

*Edwin Knight
Division of Environmental
Quality
Representing Department
of Natural Resources

James Love
Representing Kimmswick

Judge Hugh McCane
Chairman
Representing Franklin
County

*Robert S. Miller
Representing State of
Missouri

Robert S. Nelson
Representing Associated
Industries of Missouri

*Carl Noren
Representing Missouri
Department of Conservation

Suzanne Pogell
Representing Water Quality
Citizens Task Force
League of Women Voters

Dave Rahubka
Representing U.S. Corps
of Engineers

Boston Richards
Representing Crystal City

Sandy Rothschild
Representing Home Builders
Association

Judge Charles Schwendemann
Representing St. Charles County

*Don Spencer
Representing U.S. Department of the Interior

Judge Walter Steinburk
Representing Jefferson County

*Rick Sterling
Representing Missouri Office of Administration

Michael E. Swoboda
Representing St. Louis County Municipal League

Virginia Van den Broek
Representing St. Charles Water Quality Citizen Task Force

Michael Whitaker
Representing Lake Saint Louis

*Betty Wilson
Representing Missouri Clean Water Commission

Luis Zambrana
Representing St. Louis County

Walter Zollmann
Representing City of St. Louis Water Division

Walter Johanpeter
Representing City of St. Louis Water Division

Joe Frank
Representing St. Louis Community Development Agency

Steve Donatiello
Representing City of St. Louis Water Quality Task Force

*Indicates Non-Voting Member

208 WATER QUALITY CITIZEN TASK FORCE

The Task Force was responsible for representing citizens' interest during the 208 Water Quality planning process. The Task Force made reviews on various solutions, approaches and plans developed by Gateway's 208 Water Quality staff and consultants. The Task Force had 42 members, including representatives from each county, real estate brokers, farmers, lawyers, chemists and environmentalists. Unaffiliated citizens, as well as citizens representing organizations, served on the Task Force in a voluntary capacity for the duration of the program.

MEMBERS

Stephen C. Banton

Ted Stude

Jean Barton

Albert Beyer

Cecelia Beyer

Gerry Bratsch

Steve Donatiello

Vince R. Ellwood

George R. Englebach

Roberta Fishman

Jo Gallo

Dorothy Heinze

Gloria Hinch

Marjorie Huenneke

Claude E. Jones, Jr.

Larry W. Keith

Hildegarde Kramer

Susan Lammert

Ernestine Magner

Tony Nenninger

Donald W. Pettigrew

Gilbert G. Pfaff

Suzanne Pogell

Ted Pruess

Virginia Van den Broek

Albert Weiss

Betty Wilson

John H. Wright

Jane McKenna

Mary Reilly

EX-OFFICIO MEMBERS

Mr. Lee Duvall
208 Project Officer
U.S. Environmental Protection Agency

Mr. Earl Holtgraewe
Regional Engineer
Department of Natural Resources

Mr. Edwin Knight
Division of Environmental
Quality
Department of Natural Resources

Mr. Jerome Pratter
Team Four Inc.

Mr. Alan C. Richter
Executive Director
East-West Gateway Coordinating
Council

Mr. Einar M. Syvertsen
CH2M-Hill, Inc.

B. MONITORING SYSTEM

I. INTRODUCTION

Water quality monitoring in St. Louis will be used for several different functions, including enforcement and the establishment of water quality standards as well as continous planning. Each of these functions has its own unique requirements and much of the information generated for one monitoring function may not be entirely interchangeable among the other functions.

Water quality monitoring for the enforcement of regulations and discharge permits requires very careful documentation of cause and effect in a manner acceptable to the courts and enforcement agencies. Presently, enforcement is being jointly carried out by EPA on the federal level and on the state level by the Division of Environmental Quality (DEQ), Missouri Department of Natural Resources. The present enforcement roles of EPA and DEQ are proposed to be unchanged.

Water quality monitoring for the establishment of water quality standards is directed at defining the needs of various water uses such as domestic water supply and fish propagation. Monitoring for the establishment of standards often involves basic research into the effect of pollutant discharges on various water uses with sophisticated analytical techniques not in common practice. Presently, most monitoring for the establishment of standards is being conducted by various research organizations such as universities and federal agencies. State agencies such as the DEQ are also involved with monitoring in order to document unique problems. The present role of federal agencies, state agencies and universities in the development of water quality standards will continue unchanged.

Water quality monitoring as a component of the continuous planning process requires a broad data base taken over a long period of time for a specific area that can be used by various planning agencies, such as East-West Gateway, local municipalities and the State of Missouri. The primary focus of

this work is in developing future wastewater control strategies. Data for planning also must be carefully obtained by using acceptable sampling and analytical techniques but its primary objective is to document long-term trends. Thus, data used for planning purposes often is not acceptable for water quality standards enforcement or the establishment of water quality standards. However, the reverse is not necessarily true. Data used for enforcement and establishment of standards may be useful for continous planning. The water quality monitoring presented in the report is designed to satisfy the region's continous planning needs.

II. REPOSITORY FOR WATER QUALITY DATA

Regardless of the monitoring goal, one of the most important functions of the entire water quality monitoring program is to produce a set of usable data which is easily accessible for all the monitoring purposes. Data supplied from the various elements of a water quality monitoring program must be continuously analyzed and catalogued in an orderly manner to allow easy access by the various planners, agencies and the public. Often a significant delay is experienced between the collection of water quality data and its publication. Some federal agencies require between one and two years for publication of field data. This program should view delays beyond two and three months as unacceptable and work to eliminate such impediments to future water quality planning.

III. EXISTING WATER QUALITY MONITORING PROGRAM

Within the study area, a large number of organizations are presently obtaining water quality data. There appears to be no coordination of the data acquisition efforts of these various organizations. This is true nationwide. As a result, the water quality data presently available to local planners and the public may be repetitious in some cases and inadequate in others. The following list of organizations is provided as a partial accounting of the sources of water quality data that have been identified during the course of the St. Louis 208 study. Other organizations probably collect water quality data and could be identified as contributing to this overall effort. The extent of water quality monitoring carried on by these organizations may vary depending upon budget sources available to them. Organizations now identified as major contributors to the area's water quality data include:

1. U.S. Environmental Protection Agency.

2. U.S. Geological Survey

3. U.S. Army Corps of Engineers

4. Metropolitan Sewer District of St. Louis

5. State of Missouri

   a. Department of Natural Resources
   b. Department of Conservation
   c. Geological Survey and Water Resources

6. State and Private Universities include:

   a. University of Missouri at St. Louis
   b. University of Missouri at Rolla
   c. Washington University
   d. Southern Illinois University at Edwardsville

7. Private Analytical Laboratories and Services

8. Private and Public Treatment Systems include:

   a. Water Treatment and Sewer Treatment

9. Illinois Environmental Protection Agency and Water Survey

IV. OBJECTIVES

Because of the high costs of monitoring, it is necessary to establish priorities for the St. Louis Water Quality Monitoring Program. Certain data requirements of the planning and enforcement process are more urgent and/or required by law. Therefore, the major functions for water quality data collection which are presented below have been ranked according to their importance and fundability.

The priorities established below further the distinction between monitoring for enforcement and monitoring for planning.

Functional Group A is considered the most important monitoring. It is essential to the water quality plnning process that the elements of Function A, which include 1) point source effluent monitoring, 2) major stream water effluent monitoring, and 3) biota sampling of major streams, be implemented for the purpose of defining water quality problems and changes.

The other functions detailed below are less critical to the water quality planning process. Nevertheless, they are important to presenting a complete picture of water quality conditions and so should not be eliminated from the monitoring program. Funding, however, for some of these elements may prove difficult.

Function Group B involves urban stream water quality monitoring for the purpose of updating and modifying water quality models.

Function Group C involves 1) detailed urban runoff water quality monitoring, 2) individual home treatment systems monitoring, and 3) water quality monitoring of streams with significant discharges from individual home treatment systems, for the purpose of evaluating the effectiveness of certain nonpoint source controls.

It is important to restate that the proposed monitoring program is not designed to be used strictly for enforcement purposes. Although water quality problems may be documented or defined by this monitoring program, the data produced should not be solely used for enforcement actions. In addition, the restrictions required for monitoring of enforcement quality will significantly increase the monitoring program cost and will certainly limit the planning agencies' ability to obtain the data needed for planning and evaluation purposes.

A. Funding

Funding the monitoring program will present some special problems.

Among the "A" group of monitoring elements point source effluent monitoring will not be a new cost item. This work will be conducted by EPA and DNR and is to be funded through their existing permit programs. In contrast, the monitoring of major streams will occasion an increase in public expenditures. It is most likely that either the state or the regional planning and management agency, EWGCC, will be expected to assume the operating and capital costs of this

monitoring element. Unfortunately, local funding will be difficult to secure which will negate not only local responsibility for this element but probably EWGCC's too. Thus, state action is the preferred route. Biota sampling is the third "A" group element. It is extremely expensive, therefore, this monitoring facet is limited in scope. Nevertheless, a yearly operating cost of $60,000 must be absorbed. This expense, as in the previous case, will be considered a regional cost and this faces an uphill battle for state appropriations.

Group "B" monitoring covers only one element--urban stream water quality which is related to stormwater. The sampling points for this element are located solely within St. Louis County. Regardless of the fact that one county is the initial focus of this activity, the funding again should be from a larger base.

The rationale for this cost allocation formula is the interrelationships among the region's streams. Simply put, county and municipal lines do not insulate areas from adjacent pollution sources. Thus, this monitoring function should be "regionalized" and the cost made part of either the EWGCC or state program.

The Group "C" elements of the water quality monitoring program are not essential to the overall monitoring effort. However, if funding can be developed for these elements, the data base for regional plan evaluation especially of techniques for continuing IHTS and urban runoff would be vastly improved. However, at this time, there is no assured source of funding for this group of activities. The cost of the detailed urban runoff monitoring ($40,000/year capital and $492,000/year operating cost) is particularly high. It appears that absent special funding such as an EPA demonstration grant, these regional aspects of monitoring cannot be funded by Gateway alone.

V. WATER QUALITY MONITORING PROGRAM ELEMENTS

The water quality monitoring program for the St. Louis 208 study area will consist of eight major elements each designed to accomplish a specific objective. The objective of each element along with the type of monitoring, location of sampling points, and a cost estimate is presented below. A list along with a summary of monitoring cost is presented in Table B-1.

It should be noted that the sampling required by one element must be coordinated with the monitoring and sampling of the other elements in order to acheive the greatest overall efficiency. Other information such as land use changes, topography changes, and climatological data must also be collected in order to provide the planner with sufficient data to analyze the effectiveness of the 208 Plan and modify its implementation.

The sampling locations presented in Figure 30 (p. 193) and the following discussion are to be used only as a general guide for the location of the actual sampling site. The precise location of the monitoring sites will require a detailed field reconnaissance. Some of the suggested monitoring sites correspond to existing or past sampling sites. It is possible and indeed preferable to coordinate the suggested sites with existing sampling sites.

A. Point Source Effluent Monitoring

1. Objective. The primary objective of point source effluent monitoring is to document a historical record of pollution loads discharged to the area's waters by municipal and industrial point sources. The point source effluent data will be used to update the instream water quality model and to correlate instream water quality changes with discharges from point sources.

2. Type of Monitoring. Point source effluent monitoring will be supplied through the existing NPDES Discharge Permit compliance monitoring currently administered by Missouri DEQ and Federal EPA. Sampling methods and frequencies along with the required analytical procedures will continue to be specified by the NPDES Discharge Permit. Consideration should be given to expanding the list of commonly monitored constituents to include nitrogen, both in the form of total and ammonia, along with phosphates. Consideration should also be given to increasing the sampling frequency to provide a minimum of monthly effluent samples.

3. Priority Level: A.

4. Locations. Currently EPA and DEQ require all point sources with discharges to the area's water to obtain an NPDES discharge permit. Specific locations of effluent sampling is also specified in the NPDES discharge permit.

5. Cost. No additional cost is anticipated since the current cost of effluent monitoring is borne by each individual discharger.

6. Monitoring Agencies. The monitoring agencies are EPA and DNR.

TABLE B-1
WATER QUALITY MONITORING COST SUMMARY

ELEMENT	PRIORITY	FRANKLIN COUNTY	JEFFERSON COUNTY	ST. CHARLES COUNTY	ST. LOUIS COUNTY	TOTAL
CAPITAL COST						
Point Source Effluent Monitoring	A	--	--	--	--	--
Major Stream Water Quality Monitoring	A	12,000	22,000	12,000	10,000	56,000
Biota Sampling of Major Streams	A	--	--	--	--	--
Urban Stream Water Quality Monitoring	B	--	--	--	6,000	6,000
Detailed Urban Runoff Water Quality Monitoring	C	--	4,000	--	36,000	40,000
Individual Home Treatment Systems Effluent Monitoring	C	5,000	5,000	7,500	7,500	25,000
Water Quality Monitoring of Streams with Significant Discharges from IHTS	C	8,000	10,000	8,000	26,000	26,000
Groundwater Sampling	C	--	--	--	--	--
TOTAL CAPITAL COST		25,000	41,000	27,500	59,500	153,000
ANNUAL OPERATING COST						
Point Source Effluent Monitoring	A	--	--	--	--	--
Major Stream Water Quality Monitoring	A	19,000	59,700	18,700	23,500	120,900
Biota Sampling of Major Streams	A	--	15,000	30,000	15,000	60,000
Urban Stream Water Quality Monitoring	B	--	--	--	10,300	10,300
Detailed Urban Runoff Water Quality Monitoring	C	--	49,000	--	443,000	492,000
Individual Home Treatment Systems Effluent Monitoring	C	1,700	1,700	2,550	2,550	8,500
Water Quality Monitoring of Streams with Significant Discharges from IHTS	C	6,300	8,700	6,300	--	21,300
Groundwater Sampling	C	400	400	400	400	1,600
TOTAL ANNUAL OPERATING COST		27,400	134,500	57,950	494,750	714,600

B. Major Stream Water Quality Monitoring

1. Objective. Instream water quality data will be collected to: 1) determine the aggregate impact on water quality of all of the various discharges including point and nonpoint sources; 2) detect long-term water quality trends; 3) provide a long-term data base for future water quality modeling and planning; and 4) measure the water quality improvements associated with plan implementation.

2. Type of Monitoring. Monthly grab samples will be analyzed for bacteria, nutrients such as ammonia and phosphate, oil and grease, phenols, TDS, heavy metals, organics, and suspended solids. All sampling must include an estimate of flows to allow measurement of total pollutant loads. Sampling should be accomplished on a minimum of once monthly but periodic intensive sampling associated with individual storm events will also be necessary.

One sampling station located on the Lower Meramec will be sampled at least once per week in order to define more precisely relatively short-term instream water quality changes due to storm events in other transitory phenomena.

3. Priority Level: A.

4. Location. Table B-2 presents a list of all the major stream water quality monitoring stations along with a short definition of the reason for monitoring.

5. Cost. The costs of constructing and operating the Major Stream Water Quality Monitoring Stations will be borne jointly by the State and Gateway, assuming that continuing 208 funding may be used for this purpose. The costs of this program are summarized below.

County	Number of Sites	Capital Cost	Total Annual Cost
Franklin	6	$12,000	$ 19,000
Jefferson	11	22,000	59,700
St. Charles	6	12,000	18,700
St. Louis	5	10,000	23,500
TOTAL	28	$56,000	$120,900

6. Monitoring Agency. The monitoring agencies for this program would be Gateway and DNR.

TABLE B-2
MAJOR STREAM WATER
QUALITY MONITORING SITES

Name/Location	Site Location Number	Type
FRANKLIN COUNTY		
Upper Bourbeuse @ Hwy. H	1	Instream: Boundary Inflow
Bourbeuse @ I-44	2	Instream: Impact of Development and Growth
*Upper Meramec Near Sullivan (Hwy. 185)	3	Instream: Boundary Inflow
Meramec Above Bourbeuse Near Hwy. AM (no bridge)	4	Instream: Quality above impact of Bourbeuse
Meramec Near Robertsville @ Hwy. N	5	Instream: Impact of Bourbeuse, before Pacific
St. John's Creek @ Hwy. 100	6	Instream: Rural Nonpoint and IHTS
JEFFERSON COUNTY		
*Meramec @ Eureka @ Hwy. W	11	Instream: Impact of Pacific
Big River near DeSoto @ Mammoth Bridge	12	Instream: Boundary Inflow
Belew Creek @ mouth near Hwy. BB	14	Instream: Point source impact (208 alternative has discharge to creek)
Joachim Creek @ Victoria	15	Instream: Point Source
Plattin Creek	16	Instream: Point Source
Joachim Creek near mouth @ Hwy. 61-67	17	Instream: Urban Impact & growth
Rock Creek @ Hwy. K	18	Instream: Impact of growth, removal of point sources
Saline Creek @ Hwy. 141	19	Instream: Impact of growth, removal of IHTS
Meramec River at Paulina Hills	21	Instream, Biota (weekly sampling for instream)

TABLE B-2
(Continued)

Name/Location	Site Location Number	Type
JEFFERSON CO. (Cont.)		
Duckett Creek near mile 1.0	27	Instream: Urban development
ST. CHARLES COUNTY		
Dardenne Creek @ Hwy. 40-61	28	Instream: Upstream of developed area
Dardenne Creek @ I-70	29	Instream: Impact of development
Peruque Creek above Lake St. Louis @ Hwy. 40-61	30	Instream: Upstream of developed area
Peruque Creek below Lake St. Louis @ I-70	31	Instream: Impact of development
Peruque Creek @ Hwy. P	32	Instream: Removal of Point Source Biota: Impact of development
Cuivre River @ Hwy. 79	34	Instream: Rural non-point impact
ST. LOUIS COUNTY		
Wildhorse Creek @ Wildhorse Creek Rd.	40	Instream: Rural Non-point
Bonhomme Creek @ Hwy. 40	41	Instream: Development
Creve Coeur Creek @ Olive Street Road	42	Instream: Urban and Rural Impact on Lake
Creve Coeur Creek @ I-70	43	Instream: Impact of development
*Mississippi River @ Eads Bridge	44	Instream: Long-Term Quality Change

*These monitoring sites are existing NASQUAN stations which should be continued.

C. Urban Stream Water Quality Monitoring

1. Objective. Urban stream water quality monitoring will: 1) document instream impacts of stormwater runoff for streams which are located in urbanized areas; and 2) establish long-term water quality trends associated with stormwater runoff from different levels of development and land uses.

2. Type of Monitoring. Grab samples will be taken on a minimum frequency of once per month and analyzed for bacteria; nutrients, such as ammonia and phosphate; oil and brease; phenols; total dissolved solids; selected heavy metals; BOD; and suspended solids. All sampling must include estimates of flow to allow an estimate total pllution load. Periodically more frequent sampling associated with a particular storm event or problem may be required.

3. Priority: B.

4. Location. The location of Urban Streams Water Quality Monitoring sites are in St. Louis County and are outlined in Table B-2. As developed patterns change, location of these monitoring sites is also expected to change.

TABLE B-3
URBAN STREAM
WATER QUALITY MONITORING SITES

Name/Location	Site Location Number	Type
ST. LOUIS COUNTY		
Coldwater Creek @ Old Halls Ferry Road	48	Urban: Urban Instream Impact
Coldwater Creek @ Hwy. 67	49	Urban: Urban instream impact, point source
Maline Creek @ Goodfellow Road	50	Urban: Urban instream impact

5. Cost. The cost of Urban Stream Water Quality Monitoring is summarized below. It should be noted that increased sampling frequency will increase the total annual cost. MSD and Gateway should share the costs of this program.

ST. LOUIS COUNTY: $ 6,000--Capital Cost
10,300--Total Annual Cost

6. Monitoring Agency. MSD would be the monitoring agency for this program.

D. Detailed Urban Runoff Water Quality Monitoring

1. Objective. Detailed urban runoff water quality monitoring will develop detailed site specific, reliable data of urban runoff and define the temporal relationship between precipitation and runoff quantity and quality. Data from the detailed urban runoff water quality monitoring will be used to provide the planners with a more precise estimate of the pollution from urbanized areas. This data will be used to confirm the pollution runoff parameters used in the existing water quality model taken primarily from literature and to provide for further calibration of the water quality models by utilizing local data.

2. Type of Monitoring. Automatic sampling stations will be established in order to monitor the rapid fluctuations in urban runoff flow and quality. Sampling should be flow actuated to provide sampling only during runoff events with a minimum ten minute interval on quality samplings and a five minute interval on flow measurements.

Samples collected from the automatic stations should be analyzed for nutrients, oil and grease, phenols, dissolved oxygen, selected heavy metals, and BOD. BOD analysis should be attempted only on a periodic basis when adequate sample preservation and refrigeration can be supplied.

Automatic sampling of selected basins should continue until a statistically valid set of runoff quantity/quality parameters have been established for the basin. Ideally, between 30 and 40 storms should be analyzed over a period of one to five years. Particular emphasis should be placed on obtaining statistically valid samples for independent seasonal (spring, fall, summer, and winter) runoff events.

3. Priority: C.

4. Location. Due to the high cost of automatic sampling, both in terms of equipment, manpower and analytical cost, the number of stations has been limited to those shown in Table B-4. Location has been limited to those stations could vary as development patterns change and statistically valid samples are obtained for various basins.

TABLE B-4
DETAILED URBAN RUNOFF
WATER QUALITY MONITORING SITES

Name/Location	Site Location Number	Type
JEFFERSON COUNTY		
Sugar Creek (Tributary of Saline) north of Rock Creek	20	Instream: Urban, IHTS
ST. LOUIS COUNTY		
Coldwater Creek Tributary, south of St. Charles Rock Road, St. Ann	45	Urban, urban runoff: high density, single family residential
Coldwater Creek Tributary, Hazelwood north of Lambert Airport	46	Urban, urban runoff: commercial, light industrial
Coldwater Creek Tributary, northwest of Coldwater School, St. Ferdinand	47	Urban, urban runoff: developing area
Deer Creek in Warson Woods	51	Urban: urban runoff: residential
Gravois Creek above confluence with River Des Peres	52	Urban, urban runoff: developed area
River Des Peres @ Broadway	53	Urban, urban runoff: Impact of MSD combined sewer overflow
Mattese Creek @ I-55	54	Urban, urban runoff: Residential and Commercial
Grand Glaize Creek @ Manchester Road	55	Urban, urban runoff: single family residential
Fishpot Creek @ Ballwin Road	56	Urban, urban runoff: Impact of change from urban undeveloped to residential

5. Cost. The cost of detailed urban runoff water quality monitoring is summarized below.

County	Number of Sites	Capital Cost	Total Annual Cost
St. Louis	9	$36,000	$443,000
Jefferson	1	4,000	49,000
TOTAL	10	$40,000	$492,000

These costs are proposed to be borne by 208 continued funding and special demonstration grants through Gateway.

6. Monitoring Agency. The monitoring agencies for this program will be Gateway in cooperation with MSD and DEQ.

E. Biota Sampling of Major Streams

1. Objective. The objective of biota sampling is to document the effects of water quality changes on the aquatic biota. Changes in the aquatic biota can serve as an early warning to changes in water quality which may not be detectable by conventional means.

2. Types of Monitoring. Measurement of the biota involves an inventory of the aquatic species found at the sampling site. This inventory which should be conducted at least twice a year involves species counts, species diversity indexes, measurement of fish size and toxin in fish, etc. The results from any single inventory are of limited value but changes from one inventory to the next should be carefully analyzed and studied. Part of the biota measurements or inventory could include such procedures as algal assays to establish a phosphate standard to adequately protect the stream from excessive aquatic growths. Other bioassays could be performed to determine the toxicity of various pollutants to local aquatic species.

3. Priority: A.

4. Location. Due to the high cost and the complexity associated with biota sampling, a limtied number of locations have been recommended and are listed in Table B-5.

TABLE B-5
SITES FOR BIOTA SAMPLING OF MAJOR STREAMS

Name/Location	Site Location Number	Type
JEFFERSON COUNTY		
Meramec River at Paulina Hills	21	Instream, Biota (weekly sampling for instream
ST. CHARLES COUNTY		
Peruque Creek @ Hwy. P	32	Instream: Removal of point source
Peruque Creek Downstream of O'Fallon T.P.	33	Instream: STP Impact
ST. LOUIS COUNTY		
Fox Creek @ Old Hwy. 66	39	Instream: Rural nonpoint, future development

5. Cost. The cost of biota sampling will vary depending upon the procedures used in sampling. The estimated cost for biota sampling is approximately $5,000 to $10,000 per sample with an annual cost for two analyses of $10,000 to $20,000 per sampling station. The cost of biota sampling is summarized below.

County	Number of Sites	Capital Cost	Total Annual Cost
Jefferson	1	--	$15,000
St. Charles	2	--	30,000
St. Louis	1	--	15,000
TOTAL	4	--	$60,000

The cost of this program is proposed to be borne by Gateway using continuing 208 funding.

6. Monitoring Agency. The monitoring agency would be Gateway.

F. Individual Home Treatment Systems Effluent Monitoring

1. Objective. The primary objective is to define the performance of various types of properly designed, installed, and operated individual home treatment systems (IHTS) under actual field conditions. Information will allow: 1) the development of actual loads to the area streams and groundwater system from IHTS; and 2) the definition of specific performance criteria for properly operated, designed, and installed IHTS. It is not the objective of this monitoring to provide an endorsement for a given or specific manufacturer but to provide the planner with a reasonable estimate of IHTS capabilities.

2. Type of Monitoring. Monitoring wells and drain systems specifically designed to sample the effluent from a soil absorption field will be sampled a minimum of four times per year over a five to ten year period. The actual sampling wells and collected systems must be individually designed for each location in order to provide the best sample of actual effluent leaving the soil absorption field. Water quality monitoring of the effluent from soil absorption systems will include analysis for bacteria, BOD, ammonia, nitrate-nitrogen, phosphate, and selected heavy metals. In order to estimate the total pollution load from IHTS, some form of flow measurement of the wastewater must be installed.

3. Priority: C.

4. Location. Approximately ten sites should be identified and monitored with permission from the individual homeowners. Specific locations in all counties would be defined at a later date once the monitoring program is implemented.

5. Cost. The cost of the sampling wells and collection system will vary depending on the characteristics of the individual home treatment system and its particular site. It is anticipated that the monitoring well and collection system would cost between $1,000 and $2,000 and a wastewater or water meter approximately $500. The annual sample collection and analytical cost would be approximately $850 per site. Total estimate program cost for monitoring individual home treatment system effluents is shown below:

Number of Location	10
Capital Cost	$25,000
Total Annual Cost	$ 8,500

The costs of this program are expected to be borne by the 208 continued planning funds.

6. Monitoring Agency. EWGCC and Washington University would monitor this program.

G. Water Quality Monitoring of Streams with Significant Discharges from Individual Home Treatment Systems

1. Objective. The primary objective is to document instream changes of water quality as a result of improved operation and maintenance of IHTS. Additionally, changes in water quality as a result of the construction and operation of new IHTS will be monitored along with a documentation of the total pollution from IHTS.

2. Type of Monitoring. Grab samples sets taken at least twice per year, once during the wet weather and once during the dry season, shall be analyzed for bacteria, BOD, phosphate, nitrate-nitrogen, ammonia-nitrogen, and selected heavy metals. Each sample set shall consist of four samples taken at six hour intervals over 24 hours. Sampling of streams impacted by IHTS should proceed for a minimum of five years.

3. Priority: C.

4. Location. The location of sampling stations to document the impacts of individual home treamtent systems on small streams found in the area is shown in Table B-6. Again as development patterns change and new areas with significant concentrations of IHTS develop, changes in the location of the sampling stations should be expected.

5. Costs. The cost to monitor stream with significant discharge from IHTS is summarized below.

County	Number of Sites	Capital Cost	Total Annual Cost
Franklin	4	$ 8,000	$ 6,300
Jefferson	6	10,000	8,700
St. Charles	4	8,000	6,300
TOTAL	14	$26,000	$21,300

Funding for this monitoring element will be through continuing 208 planning funds.

6. Monitoring Agency. Gateway will monitor in cooperation with existing monitoring agencies.

TABLE B-6
SITES FOR WATER QUALITY MONITORING
OF STREAMS WITH SIGNIFICANT DISCHARGES
FOR INDIVIDUAL HOME TREATMENT SYSTEMS

Name/Location	Site Location Number	Type
FRANKLIN COUNTY		
IHTS: Robertsville	7	IHTS receiving water
IHTS: Villa Ridge	8	IHTS receiving water
IHTS: Krakow	9	IHTS receiving water
IHTS: South of Union	10	IHTS receiving water
JEFFERSON COUNTY		
Sugar Creek (Tributary of Saline) north of Rock Creek	20	Instream: Urban, IHTS
IHTS: Meramec Meadows Lake (near Dutch Bottom Road & Hwy. 141)	22	IHTS receiving water
IHTS: Lonedell Terrace, Lonedell Road west of Hwy. 141	23	IHTS receiving water
IHTS: Murphy	24	IHTS receiving water
IHTS: Upper Antire	25	IHTS receiving water
IHTS: Cedar Hill Lakes	26	IHTS receiving water
ST. CHARLES COUNTY		
IHTS: O'Fallon Hills--drainage ditch	35	IHTS receiving water
IHTS: Cedar Lake Estates--receiving stream	36	IHTS receiving water
IHTS: St. Peters Road receiving stream	37	IHTS receiving water
IHTS: Koch Subdivision--Drainage ditch	38	IHTS receiving water

H. Groundwater Monitoring

1. Objective. Monitoring groundwater will document long-term changes in the quality of groundwater which may be associated with urban development.

2. Type of Monitoring. Existing municipal and industrial water wells should be sampled on an annual basis and analyzed for bacteria and nitrate nitrogen. Wells should be pumped prior to sampling in order to insure the collection of a representative sample.

3. Priority: C.

4. Location. The actual location of existing private wells to be sampled should be determined after a study is completed which defines the depth of wells, well and aquifer condition supplying the water. Additionally, the permission of the owner for the well water analyses must be obtained. It is assumed ten existing wells will be sampled once per year in each county. Data routinely collected by the state from the various wells in the area should also be included.

5. Cost. The cost for sampling existing private well is summarized below.

County	Number of Sites	Capital Cost	Total Annual Cost
Franklin	10	--	$ 400
Jefferson	10	--	400
St. Charles	10	--	400
St. Louis	10	--	400
TOTAL	40	--	$1,600

Funds for this program are expected to come from 208 continued planning funds.

6. Monitoring Agency. Gateway, in cooperation with existing monitoring agencies, should monitor this program.

VI. OTHER INFORMATION

The accomplishment of the objectives outlined earlier will require the collection of additional information simultaneously to the water quality monitoring. In order to provide a complete data base needed for continuous planning, three additional categories of information must also be supplied. They are: 1) population and land use development patterns; 2) descriptions of the physical characteristics of the watershed which will affect hydrology; and 3) climate and weather data.

Updates of land use and population data should be obtained whenever possible. Close monitoring of both population and land use in an urbanizing area will be necessary in order to maintain a comprehensive network of sampling sites for urban runoff and to aid in evaluation change in water quality. The following land use categories wree used during the initial 208 planning program and should be monitored on a continuing basis:

1. Low density single family residential
2. High density single family residential
3. Multi-family residential
4. Commercial
5. Industrial
6. Recreational
7. Urban undeveloped
8. Pasture
9. Row Crops
10. Forest

The watershed characteristics generally needed for input into a water quality model include land surface characteristics such as slope, land use, vegetation cover, impervious area, soil types, major aquifer locations, and channel characteristics such as width, depth, slope and roughness. Periodically these characteristics should be reviewed and changed as needed. Stream characteristics such as channel depth, width, vegetation cover should be monitored after each major flood event.

The most important input into a dynamic water quality model is precipitation. Hourly precipitation data are available from NOAA Environmental Data Service for eight sites within the boundaries of the 208 area. Additional rain gages may be established in the urban area as a result of other studies and these should also be monitored. In order to adequately estimate urban runoff, a greater density of rain gages is required and this network should be able to produce precipitation measurements on five or ten minute frequencies.

C. REQUIRED SECTION 208 OUTPUTS

Plan Element Requirement (40 CFR 131.11)	Reference Document
(a) Planning Boundaries	
(1) Approved state planning areas.	Work Element 14: Figure 1, p. 3 Final Report: Figure 1
(2) Areas in which facility planning has been deemed.	Work Element 24: Section 4 Final Plan: Figure 4
(3) Location of each water quality and effluent limited segment.	Task Memo 28m
(4) Location of Significant discharges.	Work Element 10: Figures 10.7 thru 10.11 Final Plan: Figure 12
(5) Location of fixed monitoring stations.	Work Element 8: Pages 109, 120, 149, 151, 161, and 164 Final Plan: Figure 30 and Appendix B
(b) Water Quality Assessment and Segment Classifications	
(1) Assessment of existing problems.	Work Element 8: Chapter 2, pgs. 55-73, Chapter 4, pg. 200, Appendix A, pgs. 2-140 Work Element 10: Chapters 2-4 Work Element 11: Chapter 2, pgs. 2-14 thru 2-18, Appendix B, pgs. B-1 Work Element 14: Appendices C, D, and E

(2) Segment Classification	Task Memo 28m
(c) Inventories and Projections	
(1) Inventrory and ranking of Municipal Sources.	Final Plan: Section 6
**Inventory of "significant industrial discharges."	Task Memo 28k
(2) Existing land use patterns	Work Element 14: Pages 12-17 Task Memo 28o Final Plan: Figure 7
(3) Demographic and economic projections	Work Element 14: Chapter 2, pgs. 5-17 & Appendices A & B
(4) Projected municipal and industrial wasteloads.	Work Element 10: Chapter 3, pp. 84 and Chapter 4, pg. 69
(5) Projected land use patterns	Work Element 14: Chapter 2, pgs. 5-17 & Appendices A & B
(d) Nonpoint Source Assessment	
(1) Problem and identification of waters affected.	Work Element 8: Chapter 2, pps. 55-73, Appendix A, pgs. 1-140 Work Element 11: Chapter 2, pgs. 2-14 thru 2-18, Appendix B, pg. B-1
(2) Identification of nonpoint pollutants outside segment.	Work Element 8: Chapters 2-4 Work Element 11: Appendix B
(e) Water Quality Standards**	Work Element 23: Pgs. 2.1 2.22 for each county Task Memo 28q
(f) Total Maximum Daily Loads	Task Memo 28q

*The 303(e) Basin Plans prepared by the Mo. Dept. of Natural Resources contains detailed listing of industrial discharges and their respective effluent characteristics.

**The recently adopted State water quality standards may differ from the Element 23 proposed standards (see 10 CSR 20-7-031).

(g) Point Source Load Allocations	Work Element 10 Work Element 20 Work Element 24: Chapter 4 Final Plan: Section 2
(h) Municipal Waste Treatment System Needs	
(i) Industrial Waste Treatment Systems	Draft Plan: Appendix 5 Task Memo 28k
(j) Nonpoint Source Control Needs	
(1) Identification of measures necessary to reach recommended level.	Work Element 21: Chapter 2 for each county Final Plan: Section 3
(2) NPS time limitation.	Work Element 24: Section 5 for each county Final Plan: Section 3
(3) NPS categories.	Work Element 11: Chapter 2 Work Element 21: Chapter 2 Work Element 24: Chapter 5
(k) Residual Waste Control Needs	
(1) Necessary controls for water quality.	Work Element 22: Chapters 4, 5, 6, 7 Final Plan: Section 4
(2) Necessary controls on land.	Work Element 22, Chapter 3, pgs. 3 - 1 thru 3 - 24 An Interstate Approach to Sludge Management in the St. Louis Metropolitan Area. (see bibliography)
(l) Urban and Industrial Stormwater	
(1) Required improvements.	Work Element 11 Work Element 21: Chapter 2 for each county Work Element 24: Section 5 for each county

	Final Plan: Section 4
(2) Needed urban and industrial stormwater systems.	Work Element 11 Work Element 21: Chapter 2 for each county Work Element 24: Section 5 for each county Final Plan: Section 4
(3) Cost estimates.	Work Element 11 Work Element 21: Chapter 2 for each county Work Element 24: Section 5 for each county Final Plan: Section 4
(m) Target Abatement Dates	Final Plan: Section 6
(n) Regulatory Programs	
(1) Description of existing regulatory programs.	Work Element 9: Pages 26-42 Work Element 13: Pages 3-7 and 64-106 Work Element 23 Final Plan: Section 6
(2) Description of necessary additional regulatory programs.	Final Plan: Section 6
(3) Regulatory programs (existing legislation).	Work Element 9: Pages 9-11 Work Element 13: Pages 64-82 Work Element 23 Work Element 24: Section 4 Task Memo 28k Final Plan: Section 6

(o) Management Agencies	Work Element 9: Pages 19-25, pgs. 45-97 Work Element 13: Pages 8-82 Work Element 23: Section 6 Final Plan: Section 6
(p) Environmental, Social and Economic Impact	Work Element 24 Work Element 29

D. BIBLIOGRAPHY OF 208 PLAN OUTPUTS

Preface -- The purpose of the 208 program at East-West Gateway Coordinating Council (EWGCC) is to develop guidelines and recommend actions for local, state and federal cooperation in improving water quality in the St. Louis area. The EWGCC study area incorporates St. Louis City, St. Louis County, St. Charles County, Franklin County and Jefferson County, in Missouri. The program is being conducted under the authorization, and is intended to fulfill the requirements of section 208 of Public Law 92-500, the Federal Water Pollution Control Act as amended, in 1972. The program is fully funded by a grant from the U.S. Environmental Protection Agency.

The EWGCC 208 study is divided into four phases and will result in a Water Quality Management Plan for the above-mentioned counties. Basically, the first two phases are for gathering technical and management/institutional data. This data is analyzed, and the preliminary 208 plan recommendations are developed in the third phase. The final 208 plan, along with an environmental impact assessment, is produced in the final study phase. Outputs from each phase include reports which address technical and management problems and advanced solutions to them, and public information and local guidance publications. All reports are researched and organized by the EWGCC staff, as well as their consultants: CH2M-Hill and Associates; Team Four; Zurheide-Herrmann, Inc.; and Ernest Brown and Associates. Presently, staff and consultants are working in Phase III.

Work plan outputs of the 208 study to date, including element reports, and current task reports and memos to be incorporated in future elements are: (NOTE: Elements 1 and 4 were 208 contracts). The outputs are arranged by date of completion.

Element 2 - Scope of Work Element Cost Summary (April, 1976)

Describes in detail the step-by-step approach that will be required in all phases, to complete the 208 wastewater management study. Indicates whether a task is to

be performed by one or more of the consultants and/or EWGCC, scheduled completion dates, and estimated costs. Elements 3 through 16 are described here.

Element 5 - Phase I Workshop Materials (May, 1976)

1. Regional Water Quality Profile - 208

   This pamphlet contains a brief review of current and estimated future water pollution problems for the 208 study area. For each county, structural and nonstructural controls for these problems are discussed.

2. Water Uses in the St. Louis Region

   A brief description of the water quality required to meet each type of water use, i.e. industrial, domestic, recreational, aesthetic, fishing and transportation water needs, are discussed.

Element 6 - Phase I Workshop Report (July, 1976)

The first St. Louis area 208 workshop, designed to give participants an active role in the 208 process, is described in this report. The process, format, arrangement, an analysis, and an evaluation of the workshop is given. Included in the appendices are the workshop invitation and attendance list, a copy of questionnaires and evaluation forms, and the responses to these also. Information given out at the workshop is included.

Element 3 - Background Material, 208 Quality Management Plan (September, 1976)

Discusses background information that was generated to describe the 208 study area, and the phase I steps necessary to undertake subsequent tasks in the water quality management project. Maps and mapping systems are included for information on land use, population, precipitation, and gauging and stream quality stations. Profiles on issues such as legal authority and public interest groups in the area are provided.

Element 7 - Phase II Work Plan (October, 1976)

Specifies the work to be undertaken during the second phase of the 208 work plan. Phase II consists of two principal activities, data collection and the development of the first round of alternatives. Therefore, Element 7 involves identification of data sources and needs, and design of methodology for data collection. It details work tasks, staff assignments, schedules, and budget estimates.

Element 8 - Water Quality Modeling - Development and Background of the St. Louis 208 Region Water Quality Computer Model (November, 1976)

A complete survey of work, background, and constraints that went into the development of the St. Louis area water quality computer model. This model takes projected land use and population data and simulates future water quality. The model can then be used to test alternatives, and thus helps develop effective control strategies. Technical aspects of the model and general philosophy, special problems and limitations are discussed in this report.

Element 9 - Interim Management/Institutional Report (November, 1976)

Assesses the problems and potentials of the existing framework in the 208 region, and develops the mechanisms to guide EWGCC's research and analysis of alternative management systems. Objectives and criteria are developed for the assessment of existing agencies and management alternatives that will be suggested in the future. Local management agency profiles and jurisdictional issues are also addressed.

Element 13 - Phase II Management/Institutional Report January, 1977

Provides a strong framework for evaluating management/institutional alternatives. Preliminary procedures for evaluating financial impact and distribution of costs are outlined. Physical/engineering concerns are considered in anticipation of a match of these and management/institutional issues, with particular emphasis placed in

the area of nonstructural control measures. Six major management/institutional alternatives are developed and evaluated.

Element 14 - Phase II Interim Report and Recommendations (February, 1977)

A comprehensive summary of all major alternatives and recommendations developed under Phase II of the St. Louis area 208 areawide wastewater management study. Includes abridged excerpts from Elements 8, 9, 10 and 11, 12, and 13 reports.

Appendices to this study contain the final population and land use projections in 5-year increments through the year 2000, to be used with the population and land use sections. Tabular outputs for wastewater flow projections, projected raw wastewater loads, treatment plant stream loadings for each structural alternative and a detailed presentation of preliminary point source structural control costs are given to aid in dealing with the report's municipal and industrial point source discussion.

Element 15 - Water Quality Profiles (February, 1977)

Assembled to assist 208 regional workshop participants in understanding and evaluating the 208 program. One profile for each county was developed (St. Louis City and County combined). Gives a physical description, problem analysis and discussion of point and nonpoint issues, regulatory practices and existing treatment agencies for the counties.

Element 16 - Workshop II Report (February, 1977)

Describes and discusses the second series of workshops held in February, 1977, which provided opportunity for public involvement in the 208 planning process. Information on workshop organization, format and workshop evaluation are included. Appendices indicate workshop participants, discussion points, and tabulated results on the evaluation of the alternatives and on results and comments concerning the workshop.

Element 10 - Phase II Municipal and Industrial Point Source Report (March, 1977)

All municipal, institutional, commercial, private and industrial facility discharges are located. Point source wastewater and treated effluent loadings are developed to determine the effect of existing point sources on receiving waters. Land use and population projections are used for analyzing anticipated future point source discharges. Preliminary alternative point source control plans are developed.

Element 11 -Phase II Nonpoint Source Report (March, 1977)

Deals with the identification of and solutions to nonpoint source problems in the St. Louis 208 area. Problem constituents are identified, anticipated sources are estimated and pollution control strategies are developed. Discussion is on a region-wide and county-wide basis.

Element 12 - Phase II Residual Waste Report (March, 1977)

Results of a survey on residual waste conditioning disposal practices are described. Future residual waste quantities are estimated for various point source alternatives, and a preliminary evaluation is made to determine the practical feasibility of selecting sludge processing techniques for each county within the study area. Residual waste alternatives are examined.

Element 13 - Management/Institutional Report Technical Supplment

This appendix consists of a number of summary reports on water quality management agencies and regional governmental systems in other parts of the country. It is used to provide background materials for the development of the initial management alternatives and assists in selecting the preferred institutional arrangements.

Element 17 - Phase III Work Plan (April, 1977)

Describes the revised work order of what elements are to be done in Phase III, where the final alternatives will be developed. The purpose and outputs of each step in this phase are reported. Responsibilities are assigned,

methodology is discussed and completion dates are indicated. A new PERT chart format is used.

Element 18 - Phase II Alternative Selection Report (April, 1977)

Serves as a status report on the program to date; it enables review and comment by agencies and jurisdictions participating in the planning process. It it a summary of all work done by project staff and consultants, including problem identification, development of alternative solutions, and utilizing comments received form workshops. The report presents recommendations for further in-depth study in Phase III of the 208 planning process in the areas of point source, nonpoint source and management/institutional water quality problems.

Element 19: Task Memo f - Updated Future Land Use for Computer Model (May, 1977)

Describes the final land use data and the proper format for its inclusion in the computer models. The methodology used in analyzing total and segmented pollution loads is reported. Tables of input and output land use data and pollution build up rates are included.

Element 19: Task Memo h - Water Quality Sampling (Nonpoint and Environmental (May, 1977)

To augment the nonpoint and environmental water quality data base, additional samples were analyzed. This memo describes the new data. Sample locations, methodology of collection, conditions, and an interpretation of results is included.

Element 20, 21: Task Report a - Final Water Quality Evaluation Criteria (May, 1977)

Indicates the definition of and need for water quality objectives, criteria, and standards, and the roles and limitations of the Environmental Protection Agency, the State, and EWGCC in establishing each of these. EWGCC's approach to establishing criteria is explained, with three classes of alternatives outlined. Stream classifications for the EWGCC 208 study area, taken from the proposed Missouri Water Quality standards publication, are included.

Element 20, 21, 22: Task Report c - Water Quality Problems and Management/Institutional Issues (May, 1977)

Defines issues and problems which must be addressed in the final phases of the St. Louis 208 study, developed through prior research, workshops, committees, and meetings with local officials. Provides a basis for directing the development of alternative managment systems and forms the foundation for evaluation of the various alternatives developed by the 208 program. Problem statements are developed for point sources, individual treatment systems, urban runoff, construction site runoff, residual waste, and management/institutional issues.

Element 20,21: Task Memo b - Preliminary Problem Analysis (June, 1977)

Explains the purpose, methodology, and results of testing the impact of future conditions on water quality within the St. Louis 208 area. Pollution sources are quantified in computer format through the year 2000. Impacts of point and nonpoint sources of pollution upon stream quality are evaluated.

Element 20: Task Memo d - Municipal and Industrial Controls Measures (June, 1977)

Structural Control Measures for dealing with point source pollution are presented. Each of the systems remaining for further study and analysis are identified and explained. Advantages and disadvantages of the alternative systems are presented.

Element 20: Task Memo e - Municipal and Industrial Nonstructural Control Measures (June, 1977)

Nonstructural control measures related to municipal and industrial point sources to be studied in greater detail are identified. Topics covered include rural wastewater treatment systems, industrial pretreatment standards rate structures, phosphates, water conservation, garbage grinders and public information.

Element 21: Task Memo d - Nonpoint Source Structural Control Measures (June, 1977)

A discussion of the control of urban runoff from combined sewer areas and the levels of treatment required are presented: Diagrams of the three levels of effectiveness are also included.

Element 21: Task Memo e - Nonpoint Source Nonstructural Control Measures (June, 1977)

Details those nonpoint problems and accompanying nonstructural control measures that must be substantively addressed as part of the final planning effort. Nonpoint sources are classified and specific controls are recommended.

Element 21: Task Report f - Nonpoint Source Subplans (June, 1977)

Based on the contents of technical memos 21d and 21e, this report integrates the structural and nonstructural controls for nonpoint source pollution in the St. Louis area. A description of the control program; tables on how the controls would be effectuated; information on who would enforce them; and maps of the areas are included.

Element 22: Taks Memo d - Residual Waste Nonstructural Control Measures (June, 1977)

The large quantity and variety of residual wastes generated in the study area requires that various methods of disposal of the wastes be considered. To develop an adequate plan, this memorandum identifies possible methods which would enable economic and nonstructural feasibility studies to be made.

Element 20, 21: Task Report g - Pollution Control Systems Report (July, 1977)

A description of public and private service areas and the needed sewer service actions are detailed. Point and nonpoint source control strategies, representing best management practices, are defined.

Element 21 - Phase III Final Alternative Analysis Report: Nonpoint Source Report (October, 1977)

Based on the contents of Task Memo 20A, 21A, Water Quality Evaluation Technical Supplement, this report details nonpoint source controls for three levels of water quality in the St. Louis area. Design criteria and costs are presented for each control measure. (4 volumes)

Element 23 - Phase III Final Alternative Analysis Report (October, 1977)

This is a summary of the stream quality based on computer modeling of point sources and nonpoint sources. Detailed charts on stream quality by varying levels, future water quality of stream segments with significant pollution sources based upon water quality simulation and analysis of pollution loads, and annual pollutant load by constituent table are also included.

Element 22 - Phase III Final Alternative Analysis Report: Residual Waste Report (November, 1977)

This report identifies regional sludge processing centers for each county. A cost effective analysis determined the processing center's location and size. Diagrams on the different levels of sludge treatment and disposal systems and tables on the capital cost, operation, and maintenance of the plants are also included.

Element 24 - Phase III Summary Report (November, 1977)

This report was used, as a workshop material for the Phase III Workshop held in November, 1977, to explain designated management agencies, point source alternatives, nonpoint source alternatives, and management/institutional issues. etailed maps of the watersheds, costs, and preliminary environmental assessments of the alternatives are listed.

Element 25 - Workshop III Report (December, 1977)

The third St. Louis area 208 workshops were designed to receive participants' comments on costs of alternatives nonpoint source alternatives and designated management agencies and their responsibilities. These comments

will be incorporated into the final 208 plan. Included in the appendices is a list of participants by county, general discussion points by county, and tabulated results of preference and evaluation forms.

Element 20 - Final Point Source Alternative (December, 1977)

The final point source alternatives have been defined by cost and effectiveness analysis in this report. The alternative description, engineering specifications, source areas, and cost for point source controls are listed. (4 volumes)

Element 28: Monitoring Implementation (January, 1978)

These memos describe monitoring programs and techniques which should be used in the areas of water quality, land use, population change and distribution, and relevant institutional changes. Also included are recommendations for plan implementation including capital improvement programs and financing plans for structural control measures.

Element 29: Report - Environmental Assessment (April, 1978)

Will describe the future environment without the proposed project and environmental factors involved in each alternative. Also, the environmental effects of the proposed plan and the steps necessary to minimize adverse effects will be presented.

Programs directives, public information publications and other non-work plan outputs of the 208 study to date are:

EWGCC Designating Application (December, 1974)

Application to the Governor of Missouri describing, proposing and giving reasons for establishing the Missouri portion of the St. Louis area as a 208 region, and for designating EWGCC as the designated 208 agency.

Statement of Coordination prepared by EWGCC and Southwestern Illinois Regional and Metropolitan Planning Commission (SIMAPC) (December, 1974)

This document defines the differing roles of EWGCC and SIMAPC; where EWGCC was designated as the 208 agency for the Missouri portion of its region, SIMAPC took over the 208 process for the Illinois side of the St. Louis region (Madison, Monroe and St. Clair Counties). Coordination relationships and those activities which are to be jointly addressed are described.

Public Hearing Record (January, 1975)

Details the hearing conducted by the Missouri Department of Natural Resources to decide whether or not to designate the St. Louis area counties located in Missouri as a 208 region, and EWGCC as the responsible 208 planning agency.

Public Law 92-500 and EWGCC Activities (March, 1975)

This synthesis of general information summarizes the results of an EWGCC preliminary study of the St. Louis 208 area, determines the degree of urbanization and industrial concentration, as well as the water quality problems that exist. Statements detailing EWGCC's Qualifications in assessing the water quality problems as a 208 agency are included. Information on the 208 program in general is also given.

Grant Application (May, 1975)

Application to U.S. EPA requesting funds for a 2-year water quality planning program for the Missouri portion of the St. Louis area under section 208 of P.L. 92-500, the federal water Pollution Control Act as amended.

Staff Notes on the Coalition's Proposal for Citizen Participation in 208 Planning (July, 1975)

EWGCC staff ideas on involving St. Louis area citizens in the 208 process are described. Functions of each committee, method of selection and organizational structure are provided.

EWGCC 208 Request for Proposal (August, 1975)

Indicates what is to be required from consultants working with EWGCC on the 208 waste water treatment managment study. The prject scope, work program, budget, and time factors are estimated. Proposal content requiring qualified environmental planning and engineering firms and EWGCC evaluation criteria are presented. EPA regulations, the 208 organizational structure, and cost summary sheets are contained in the appendix.

Intergovernmental Coordination (October, 1975)

The coordination of activities between EWGCC, in carrying out the 208 program, and various governmental organizations is identified. Formal and indirect EWGCC relationships with SIMAPC and other agencies are described and centralized as a staff function.

Citizen Participation in Water Quality Planning (December, 1975)

Describes the citizen participation function in 208 planning: objectives of the citizen participation aspect of the prgram, how the citizen committee will be formed, what the committee's role will be in the water quality planning process at EWGCC. An EWGCC 208 committee organization diagram is provided.

208 Water Quality Glossary (January, 1976)

A list of key words in the area of water quality, prepared by the Water Quality public information specialists at EWGCC.

The Challenge and Opportunity of Water Quality Management Planning (January, 1976)

Poses questons and gives answers concerning section 208 of the Federal Water Pollution Control Act as amended. The 208 program's purpose, its importance, and requirements are discussed. The program's relationship to EPA and various federal, state and local governments is included. A glossary of useful terms is also contained within this booklet.

Organizational Policies for 208 Areawide Citizens Committee and Organizationa Policies for 208 areawide Policy Committee (February, 1976)

These three page papers discuss both committees, each established in January 1976. The responsibilities, organizational relationships, powers, and membership on each committee are described.

208 Fact Sheet (February, 1976)

General information on the goals, cost, and proposed outputs of the water quality management plan is given. Financial data on all analysis to be undertaken, and of other 208 tasks are included.

208 People Participation Planning (March, 1976)

Directed towards the public who have little familiarity with 208 planning, this booklet explains the water quality problems that presently exist and can increase in the future if no planning is done. It explains the Federal Water Pollution Control Act (P.L. 92-500) and how EWGCC was granted funds by EPA to do a St. Louis region 208 study. EWGCC's active 208 public information and involve-programs are described. A form is provided for those who desire to take an active interest in the program.

Slide Show and Script (April, 1976)

An in-house project which was presented at meetings, schools, clubs and a national 208 conference, this 12-minute slide show uses approximately 90 slides and is accompanied by a script of a dialogue between two people. The script's content is a discussion of the problems with the water quality in the St. Louis area, the 208 program, and EWGCC's role in trying to solve the water problems through an areawide water quality study. The script is on tape and in written form. The slides for the show are a mixture of cartoons and photos obtianed from various sources.

EWGCC 208 Planning Agency Program Profile (October, 1976)

Gives a brief description, study overview and schedule dates for reports on priority water quality problems. The water quality problems are broken up and discussed under three headings: point source discharges, septic tanks, and storm runoff. Information on the grant award from the Environmental Protection Agency for EWGCC to study these problems is also given.

208 Water Quality Program Moves Ahead (October, 1976)

A one-page sheet briefly describing the methodology to be used in carrying out the 208 water quality project. Citizen participation activities to be accomplished are indicated. Citizen committees to be set up to work with the 208 staff are listed and described.

Brush Creek Technical Report (December, 1976)

This report, researched on request, deals with alternative sewage management arrangements for the Gray Summit area. This community consulted EWGCC for advice concerning the formation of a sewage management structure. Present sewage practices are identified and five alternatives are examined and recommendations made.

Dirty Words

Developed by EWGCC in coordination with the Southwestern Illinois Metropolitan and Regional Planning Commission (the designated 208 agency for the Illinois side of the St. Louis metropolitan region), these are a series of one-page mailings designed to acquaint citizens with terms and concepts dealing with water quality problems. Mailings were published once a month from January 1976 through March 1977, thus there were 15 volumes. Each volume contains illustrations and definitions of several key words in water quality.

Water Quality Criteria and Wastewater Management Planning (March, 1977)

This graphically designed report briefly describes a water quality standard, the 5-step establishment process, and two major indicators of pollutions that require standards, fecal coliform and phosphates. The differences between EWGCC 208 criteria and state and federal standards revolve around these two parameters, and this report indicates how and why EWGCC 208 criteria differ from state standards.

208 Quarterly Reports

Each of these reports is a general description of work completed, problems, changes, and accomplishments of EWGCC's wastewater management study during each quarter of a year. Administration, coordination and public partici-

pation occurrences are also discussed.

Manual for 208 Citizen Survey Interviewers (April, 1977)

Developed as a guide for interviewers participating in EWGCC's 208 citizen survey, this manual explains how EWGCC will evaluate its success in making the public more aware of the 208 program and in discovering needs and wants of citizens in regard to water pollution through the survey. The manual discusses background to the survey, in addition to the approach, potential problems and procedures to be followed when carrying out the interview. The survey format is included.

Detailed Work Plan - Executive Summary -- 208 Wastewater Management

Outlines the specific work to be done in each phase of the program. Provides background and indicates the overall organization of the phases in the 208 study.

Specific output reports and cost estimates are discussed. Element 2, scope of work, is an elaboration of this work plan.

Bridge Building (September, 1977)

A brief description of the meetings conducted with local officials concerning point source alternatives, nonpoint source control measures and designated management agencies. These meetings were part of Phase III of the 208 plan.

An Interstate Approach to Sludge Management in the St. Louis Metropolitan Area (November, 1977)

The report determines the feasibility of incineration and energy recovery of sludge generated in the metropolitan area. Further, the study determined the feasibility of regional sludge disposal with regard to landfills, strip mine reclamation and agricultural land application. This is an element of interstate 208 plan coordination.

An Interstate Approach to Wastewater Treatment in the St. Louis Metropolitan Area (December, 1977)

This report presents institutional and cost-effective analysis of Bissell Point, Lemay primary treatment plants in the St. Louis Metropolitan Sewer District (MSD) and the proposed secondary Sauget regional facility in Illinois. A three plant system versus a one plant system is analyzed, and conclusions, recommendations and costs to implement the recommendations are included.

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These reports and task memos were prepared bv East-West Gateway Coordinating Council, CH2M-Hill, Zurheide-Herrmann and Team Four Inc.

E. FRANKLIN AND JEFFERSON COUNTY COMMENTS

Jefferson County requests that the following comments on the 208 Water Quality Plan become part of the written record of the vote regarding it before the Board of Directors of the East-West Gateway Coordinating Council.

In the absence of State regulations, expansion of the minimum lot size beyond 20,000 square feet is politically impractical. The County does now require perculation tests and we do not feel laboratory permability test would be any more indicative of a plot of ground over a length of time.

The formation of a Water Quality Board without any basis either for formation or authority would be an effort in futility at best.

On site run-offs recommendation call for going back to 1975 as new developments do not feel this is as obtainable recommendation for grandfather regulation.

Funding for implementation of the plan will be required from Federal or State Agencies. The County could furnish limited services in kind as their contribution toward implementation of the plan.

Stream Monitoring should be done by State Agencies.

Point Sources of Pollution should remain under the jurisdiction of the Missouri Clean Water Commission.

Non-Point Sources of Pollution from septic tanks and similar individual Waste Water Treatment Systems could be controlled under the provisions and procedures of the County Building Code, the establishment of a County Public Works Department and Public Health Department.

The County Administrative Court does not have jurisdiction over any incorporated towns in Jefferson County. The acceptance and implementation of the 208 Waste Water Management Plan for the incorporated towns will be the sole responsibility of these jurisdictions.

Any vote by county not contrued to be a vote for point sources since County Administrative body has not received a positive reaction from any incorporated cities as Mr. Sporn indicated, and all responses have been negative.

Acceptance and implementation of a Comprehensive Planning Program can be accomplished best by voluntary compliance, through educational procedures, and public participation in the program. Mandatory compliance with unrealistice Federal, State and Local programs will be resisted and fail in Jefferson County.

These recommendations are for the unincorporated areas in Jefferson County, and do not take into consideration the problems from Industrial wastes, and incorporated areas.

The bottom line for Jefferson County is that the recommended 208 Water Quality Plan remain recommended and not become mandatory. If implemented, recommendation must prove cost feasible and legal authority presence to enforce it.

TO: Hugh McCane, Chairman
208 Water Quality Policy Advisory Committee

April 26, 1978

As a member of the above named committee, I have attended and actively participated in all but two of the regular meetings, attended one special meeting of the Technical Committee, participated in two bridge building meetings with local city officials, attended two workshops in Franklin County and the public hearing held in St. Louis.

During the development of the proposed 208 Waste Water Management Plan, all materials and data submitted was studied, evaluated and commented upon in writing. The latest recommendations were made on March 15, 1978 and presented to Alan Richter, East-West Gateway Staff and the consultants.

Taking the above outline of participation in the development of the 208 Plan into consideration, I want to compliment the East-West Gateway Staff on their efforts and dedication in conducting workshops, data collection and in assembling the various materials.

Without having the final document in hand for review, it is very difficult to form any conclusions in regard to approval or disapproval of the final report.

Throughout the entire study period, the point was continously made that "Franklin County would not approve any plans that could not be implemented".

On the basis of the above premise, the proposed 208 Plan is lacking in the following regard:

a) Excessive cost to rural areas that have no bonding capacity, taxing authority, or hope of receiving federal or state funding based upon the priority system for available funds.

b) The limited legal authority for Class II Counties, under present State Statutes, would not permit implementation of many of the recommendations for management of non-point sources of pollution.

c) The cost/EFFECTIVE benefit ratio to achieve only fair improvement in water quality, as indicated in Table 2-5 is not acceptable.

Therefore, unless the plan can be implemented, and the recommendations made by me and the Franklin County Planning Department are made part of the final document, I hereby recommend that the plan in its present form not be recommended for approval to the Board of Directors of the East-West Gateway Coordinating Council.

Ulrich W. Busch

ULRICH W. BUSCH
Planning Consultant

F. LETTER TO ATTORNEY GENERAL

MEMORANDUM

TO: Office of the Attorney General

FROM: Department of Natural Resources

RE: Powers of Second Class Counties to Control Nonpoint Pollution Sources

DATE: March 7, 1978

Dear Sir:

Under the mandate of Section 208 of the Federal Water Pollution Control Act Amendments of 1972, the East-West Gateway Coordinating Council has prepared an Areawide Waste Water Treatment Study for the St. Louis area.

The waste water improvement program developed for the region (which includes Franklin, Jefferson, St. Charles, and St. Louis Counties, and the City of St. Louis) includes the adoption and enforcement of a variety of nonpoint source pollution controls. Our question concerns the powers of second class counties to adopt and enforce such controls.

Specifically, before the recommended program can be moved toward implementation we need answers to the following questions regarding second class counties:

> Is the county court of a second class country authorized to pass an ordinance requiring the construction of on-site facilities for the detention of storm water?
>
> Can the county court pass an ordinance regulating construction sites and new development sites for the purpose of reducing erosion?
>
> If the county court cannot pass such ordinances, does the building commission have the authority to enact such controls through the building code?
>
> Is the county court authorized to require that all site plans prepared by developers shall be reviewed by the county planning commission for compliance with the erosion control program?
>
> Is the county court authorized to pass an ordinance requiring inspections of and permits for septic tanks and other individual home treatment systems?
>
> If the county court cannot pass such an ordinance, does the building commission have authority to enact such controls through the building code?
>
> Does the county court have the authority to pass an ordinance requiring that septage haulers be licensed by the county?

If the county court cannot pass such an ordinance, does the building commission have the authority to require licensing of septage haulers?

Does the county court have the authority to implement street sweeping and leaf collection programs in urbanized areas of its jurisdiction?

Does the county court have the authority to require owners of private parking lots to improve maintenance of the lots (for example, by sweeping and collecting leaves and litter)?

If the county court cannot enact such a requirement, can the building commission enact this requirement through the building code?

Do the county court and the building commission have the authority to levy fines or request the prosecuting attorney to levy fines against violators of the above ordinances or regulations or any other nonpoint source water pollution controls?

The East-West Gateway Coordinating Council's research in Sections 64.170 and 64.620 to 64.640 of the Missouri Revised Statutes has failed to produce the definitive answers which are necessary for the implementation of the 208 plan to proceed. For that reason we have requested your opinion on this matter which has proven to be of great concern to many second class counties throughout the State.

We understand that the work load of your office does not always permit you to reply immediately to inquiries. Nevertheless, we are sure that you understand the urgency of the situation, and our need to move quickly into the implementation phase of the project. We will greatly appreciate your speedy reply.

Respectfully yours,

Edwin Knight

EK:cj