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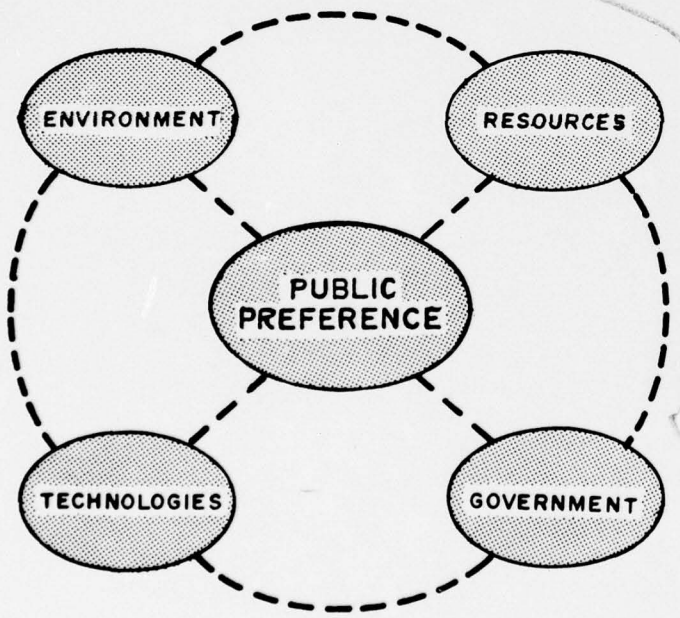

APPENDIX F.

INSTITUTIONAL CONSIDERATIONS.

DEPARTMENT OF THE ARMY
CHICAGO DISTRICT CORPS OF ENGINEERS
219 SOUTH DEARBORN STREET
CHICAGO, ILLINOIS 60604

JULY 1973

REPORT COMPOSITION

The survey report is divided into a Summary, and 9 Appendices. A charge for each appendix and summary report to cover the cost of printing will be required, should purchase be desired. The appendices each contain a different category of information. Alphabetically identified, the appendices are:

A. Background Information - This appendix includes the population and industrial projections, wastewater flows and the engineering data used as a basis for planning.

B. Basis of Design and Cost - This appendix contains the criteria and rationale used to design and cost the final alternative wastewater treatment system components.

C. Plan Formulation - The appendix presents the planning concepts and procedures used in developing the alternative wastewater management plans that were examined during the study.

D. Description and Cost of Alternatives - This appendix contains a cost description and construction phasing analysis for each of the final five regional wastewater management alternatives. Components of these alternatives are described in detail in Appendix B.

E. Social - Environmental Evaluation - This report provides an assessment of the social and environmental impacts likely to arise from the implementation of the final five alternatives.

F. Institutional Considerations - This report presents an assessment of the institutional impacts likely to arise from implementation of the final five alternatives.

G. Valuation - This appendix presents a broad evaluation of the implications and use potential inherent in the final five alternatives.

H. Public Involvement/Participation Program - This appendix documents the program used to involve the public in the planning process.

I. Comments - This appendix contains all of the formal comments from local, State and Federal entities as the result of their review of the other appendices and the Summary Report. Also capsulized are the views of citizens presented at public meetings.

The Summary document presents an overview of the entire study.

CHICAGO-SOUTH END OF LAKE MICHIGAN AREA

WASTEWATER MANAGEMENT STUDY

APPENDIX F

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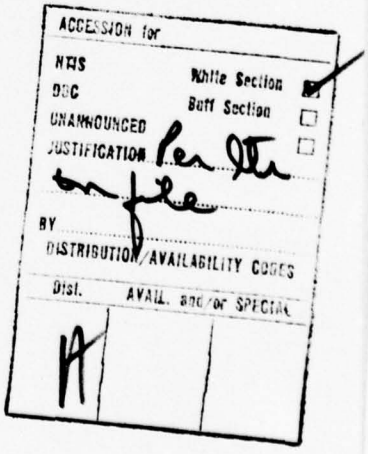

FINAL REPORT

Institutional Evaluation of Five Technical Wastewater Management Alternatives for the Chicago-South End Lake Michigan Study Area

PREPARED FOR

The Army Corps of Engineers
Chicago District Office

BY

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JULY 1973

PREFACE

The Chicago District has developed five final alternatives for regional wastewater management in the Chicago-South End Lake Michigan area. This report presents an evaluation and analysis of the institutional impacts that would result from the implementation of any of these alternatives (or parts thereof). The intent is not only to provide an understanding of the institutional impacts of the final alternatives, but also to highlight the implications that these impacts would have on present institutional arrangements for wastewater management.

Much of the analysis has resulted from earlier institutional reports. (Appropriate portions of two prior institutional reports are reproduced in the addendums at the end of this report.) In general, this report presents a summary of institutional arrangements which should be considered for modifying existing institutions and/or establishing new ones. These arrangements would be a prerequisite to the actual implementation of any technical (engineering) solution to the wastewater management problems of the area. It was also recognized that the development of institutional arrangements capable of implementing the technical solution (i.e., alternative) was necessary to further the process by which institutional arrangements can be formulated. Thus, the objectives of this report are as follows:

1. To identify the institutional (including financial) impacts of the five technical alternatives upon a cross-section of existing institutions and to identify the types of changes to existing institutions which would be necessary to implement the alternatives. The cross-section includes those institutions discussed in the previous LM&C report, "Evaluation of Institutional, Financial and Manpower Factors - Chicago-South End Lake Michigan."

2. To compare the five alternatives to each other to determine impacts on selected institutional impacts.

3. To identify alternative institutional arrangements which could be considered if any or parts of five alternatives would be selected for implementation.

4. To serve, as one of several evaluation studies, as a basis for local decision makers to assess and select the alternative(s) which, from a total resource management viewpoint, would provide the best solution to the wastewater management problems of the C-SELM area.

5. Thus, to serve, together with other evaluation reports, as the basis for further planning efforts and subsequent design considerations.

APPENDIX F - INSTITUTIONAL CONSIDERATIONS

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SECTION I - SUMMARY OF FINDINGS

The summary of findings presented below is the result of contractual work conducted by Linton, Mields and Coston, Inc. for the Chicago District Office of the U. S. Army Corps of Engineers. The major input of this work has been to provide a framework for understanding the major implications for institutional arrangements in the Chicago-South End Lake Michigan Study area vis-a-vis five technical wastewater management alternatives proposed by the Corps of Engineers. The findings of this report with respect to institutional modifications and changes necessitated by the technical alternatives are presented below:

I. Current Federal policies point the way increasingly toward regional solutions to wastewater management problems.

II. Regardless of which of the five technical alternatives is considered they all have significant and similar implications for existing institutional arrangements.

III. The major difference in institutional impacts result from the fact that two of the technical alternatives require the use of large amounts of land for spray irrigation sites to renovate wastewater.

IV. Three institutional approaches have been selected for consideration: a local approach, a regional approach and an areawide approach.

V. Several mechanisms are suggested in the discussions to implement the three institutional approaches. These are:

(a) increased use of contractual agreements

(b) expansion of certain institutions geographical authorities.

(c) the creation of new or expanded service areas using existing legislative authorities.

(d) the creation of one or more new institutions to manage and oversee areawide districts. This will require new state enabling legislation.

VI. A major new institutional arrangement to implement any of the alternatives is not recommended at this time.

VII. The analysis indicates there would be major economic and administrative advantages from increased regionalization; however, consolidation will require local citizenry and governmental approval.

VIII. All of the institutional alternatives are consistent with the trend towards regionalism and consolidation in the provision of wastewater management services.

IX. Regardless of which institutional approach is ultimately chosen or implemented, existing institutions should be utilized and incorporated to the greatest extent practicable.

BACKGROUND FACTORS INFLUENCING WASTEWATER MANAGEMENT

RECENT FEDERAL INITIATIVES IN WATER QUALITY LEGISLATION

Federal initiatives in water pollution control date back more than two decades to 1948 when the first comprehensive Water Pollution Control Act was passed to support and assist the states to control and prevent water pollution. This and subsequent legislation up to the recently passed Federal Water Pollution Control Act Amendments of 1972, discussed below, adhered to a policy of keying Federal water pollution control efforts to the principle that the states should lead in the national effort to control pollution. In these early legislative attempts enforcement responsibilities and the setting of standards were assigned to the states. In 1956, major changes were instituted and the National Water Pollution Control program was permanently established by providing $500 million for grants to local communities to build sewage treatment plants. In 1965, in response to increasing pollution problems, Congress passed legislation establishing a permanent agency to administer Federal water legislation and at the same time required the states to develop standards for water quality within its boundaries. In 1966, Congress again increased the allocations for Federal support for state pollution control efforts authorizing $3.4 billion for FY67-71. Despite continued Federal legislation efforts, the problems continued to grow worse, particularly the problem of municipal sewage. Congressional hearings in 1970 and 1971 revealed that the enforcement process was not working, state and local needs for improved treatment facilities were growing more acute, and the discharge permit system was cumbersome and unworkable.

To help correct these deficiencies, Congress passed the Water Quality Act of 1970 and the National Environmental Policy Act of 1969. The United States Environmental Protection Agency was created under the provisions of Section One of the Reorganization Plan Number Three of 1970 (transmitted to Congress by the President on July 9, 1970). Sections Two, Three and Four of this Reorganization Plan transferred the vast majority of all Federal environmental and pollution control activities (including water pollution control to the United States Environmental Protection Agency.

Federal Water Pollution Control Act Amendments of 1972

In 1972, Federal policy underwent a major philosophical and substantive change with the passage of the Federal Water Pollution Control Act Amendments

of 1972 (FWPCAA). This legislation mandates a major change in emphasis in the enforcement mechanism of the Federal Water Pollution Control program from water quality standards of water bodies to effluent discharge limits. Under the new law, the basis for pollution abatement is the setting of treatment discharge effluent limitations.

Under the earlier 1965 Act, water quality standards became the major control mechanism; States decided how water was to be used, the levels of pollutants permitted by use category, types of abatement required and a time frame for abatement. This system, however, did not achieve the success expected. Many states, for example, were slow to adopt the required standards and had difficulty establishing relationships between a tolerable level of pollutants and water uses. The 1972 FWPCAA adopted the change from these water quality standards to effluent limits because of the great difficulty in establishing reliable and enforceable effluent limitations on the basis of a given stream quality. In addition, water quality standards often could not be translated into effluent limitations defendable in court tests because of the imprecision of water quality technology.

The result is that water quality will not be the measure of program effectiveness and performance and not a means for elimination or enforcement. The central goal of the new water pollution control law is contained in Section 101. Section 101 charges the Environmental Protection Agency with the responsibility of setting effluent standards to achieve the national goal of eliminating the discharge of pollutants into navigable waters by 1985 and of achieving wherever attainable, an interim water quality which provides for the protection of wildlife and fish as well as recreation by 1983. Section 101 also directs EPA to provide major research and demonstration grant financial assistance to agencies and institutions who request it.

Section 208

The Act also recognizes the piece-meal approach of past policies and their implicit failure. Section 208 notes the interdependence of pollution control efforts by encouraging areawide solutions to water pollution control and abatement. Section 208 provides a program mechanism whereby populated areas with diverse and complex waste disposal and treatment problems may plan and manage waste treatment programs on an areawide basis. Section 208 recognizes the interdependence of waste treatment management systems and seeks to take advantage of the economies of scale inherent in large scale provision of services. An earlier HUD-EPA administrative agreement also sought to coordinate HUD water and sewer grants and EPA construction grants; however, now for the first time in 25 years of Federal Water Policy, a mechanism is clearly defined whereby areas may plan and coordinate a variety of related water resources developments to assist in achieving the goal of clean water by 1985.

Sections 306 and 307

Section 306 directs EPA to develop national standards of performance for new sources of pollution from specified manufacturing processes. The States are required to submit procedures for applying and enforcing such standards. Section 307 directs EPA to develop effluent standards for toxic substances and national pretreatment standards for pollutants which could interfere with the operation of publicly owned treatment facilities. The intent of these sections is to insure that stationary sources of pollution are designed, built and operated to minimize the discharge of pollutants. Also, they reflect the intent of Congress to expand Federal guidance to the states.

Other Significant Federal Policies Affecting Wastewater

Several other Federal policies also have a significant bearing on the national wastewater management programs and policies. One is the Federal requirement for regional clearinghouse agencies to coordinate and improve planning and programming at the local level. The A-95 agencies established by the President's Office of Management and Budget in 1969 require that all Federal programs and policies be reviewed to insure that they are consistent with regional service needs and that they encourage the most efficient use of Federal and local resources. The practical effect of this requirement has been to broaden the range of effects and consequences to be considered before approving any Federally supported project or proposal.

Under the FWPCAA of 1972 both the Corps of Engineers and the Environmental Protection Agency will play increasingly active roles in wastewater management. The Corps possesses an extensive engineering and planning capability which is recognized in Section 208 of the new law. Section 208 authorizes the Corps to provide technical planning assistance upon request from designated areawide planning and management agencies and provides an authorization of up to $50 million for FY 73 and again for FY 74. At the same time, Federal funding for the Housing and Urban Development's water and sewer grants program has been eliminated in the Administration's proposed FY 74 budget, thereby placing all of the present Federal construction program activities in EPA.

Other Significant State and County Factors Influencing Wastewater Management

Bi-State Area. Along with Federal policies and actions shaping wastewater management policies and programs, several significant local factors stand out. The C-SELM area is a bi-state area and includes, in addition to most of the Chicago Metropolitan Area, a significant portion of the highly urbanized and industrialized northwestern corner of Indiana.

As a result, the study area is affected and complicated by two distinct sets of institutions.* At the present, Indiana does not have the authority to assume general obligation bond indebtedness as does Illinois. On the other hand, the Illinois Constitution, recently revised and simplified, provides new support for the concept of local community rule. Three types of institutions currently provide wastewater management and/or treatment services within the C-SEIM area, municipalities, counties, and special districts. Illinois counties may provide these services only if they are not already provided by an entity organized for similar services. In Indiana, on the other hand, there is now authority to establish regional water and sewage districts, however, no significant public demand for such a district has been heard.

While there are attempts in Indiana to widen the institutional authority to provide wastewater management services, there are other attempts to limit this authority. For example, Indiana law (House Enrolled Act No. 1001) now requires any plan which involves the interstate transfer of sewage for land disposal to be approved by both the state legislature and the county commissioners of the affected counties. In a related law (House Enrolled Act No. 1002), also passed in 1973, planning commissions in Indiana are prohibited from assisting in the implementation of any land disposal provisions of any study that would create a multi-state waste disposal system. This law did not, however, prevent the commissions in assisting in an exchange of information concerning wastewater management studies.

Finally, no regional institution exists in either state with the authority or jurisdiction to implement and/or operate wastewater management programs and proposals. Planning commissions are universally recommending agencies; not building or regulatory agencies. Similarly, at the interstate level, the Interstate Planning Committee makes recommendations but it has no authority to implement, regulate or enforce its recommendations. At the regional level, the Northeastern Illinois Planning Commission in Illinois and the Lake-Porter County Regional Transportation Commission in Indiana both have comprehensive planning authority but no power to implement plans. At the state level, both states have their own regulatory and enforcement agencies.

Home Rule

Increasingly, public attention and concern is being focused on the need to maintain the integrity of home rule for local communities. The emphasis on protecting this concept is nowhere more evident than in the recently revised Illinois Constitution. While the concern for protecting local community's autonomy and integrity is being taken more seriously by policy and decision makers at all levels of government in the two affected states, it is also becoming more apparent that increased regional coordination of technical systems, financing and institutional capabilities is the only solution to growing problems

*See Addendum.

attendant to efficient and economical wastewater management and treatment services. This sets up a basic conflict. In short, the technological trend is toward greater consolidation of wastewater management services because of greater economies of scale. At the same time, there is concern for the mounting costs associated with these services. The "taxpayer revolt", as it has come to be known, is a clear sign that costs cannot continue to rise without some dramatic protest from the taxpayers of the affected areas. Although these realities are, on the surface, in conflict, this does not necessarily mean a solution is not possible. On the contrary, it means these issues demand close attention and a realistic evaluation of the interests involved.

1909 Treaty Between the United States and Great Britain and the Great Lakes Water Quality Agreement of April 15, 1972

Another background institutional factor to be considered in the Boundary Waters Treaty of 1909 entered into by the United States and Great Britain. The purpose of the treaty was the desire of the parties "to prevent disputes regarding the use of boundary waters of the United States and Canada and to settle all questions... involving the rights, obligations, or interests of either in relation to the other..., along their common frontier, and to make provision for the adjustment and settlement of all such questions as may hereinafter arise."

Article IV of the treaty in part provides that "it is further agreed that the waters herein defined as boundary waters and waters flowing across the boundary shall not be polluted on either side to the injury of health or property on the other." This provision is applicable to the waters of Lake Michigan because these waters flow across the international boundary. In those instances where pollution emanating from the C-SELM area would be sufficient grounds for initiating proceedings under the treaty, it is more likely that legal proceedings would be instituted to abate this pollution under U.S. law (i.e., 1972 FWPCAA) and/or State law (i.e., Illinois Environmental Protection Act or Indiana Environmental Management Act).

On April 15, 1972, the two countries entered into the Great Lakes Water Quality Agreement. This agreement established a number of general objectives for pollution abatement such as ecological freedom from toxic substances and set a number of water quality standards such as total coliform, dissolved oxygen, and dissolved solids. The agreement called for the construction and operation of municipal waste treatment plants discharging into the lakes and the establishment of treatment requirements for all industrial plants. The agreement provided that the International Joint Commission should examine the actions taken by the two Governments to carry out the agreement. In addition, a water quality and advisory board and a research board are to be created under the authority of the International Joint Commission.

Summary

The present state of affairs in wastewater management services provision in the C-SELM area is characterized by several factors at the state and Federal levels. At the Federal level, a change in philosophy from assisting local efforts in setting water quality standards to now establishing a national framework for effluent standards and implementation of areawide plans is beginning to take effect. Strict new limits on effluent discharges by class and category (in some cases amounting to a total prohibition of toxic pollutant discharges) will be set by the Environmental Protection Agency while areawide solutions to pollution control are to be emphasized and regional approaches in all federal programming efforts are also encouraged by the A-95 regional review agencies. The Corps of Engineers can be expected to play a larger role in planning and emphasizing consolidated technical approaches while the bulk of the Federal construction review and enforcement progress will be conducted through EPA.

On the state and local level, the situation is strongly influenced by local concerns over protecting and maintaining local autonomy while at the same time reducing costs. The two states possess different institutional arrangements, different financing authorities and distinct laws. It is against this background that the following reviews and analysis is presented.

SECTION II - ANALYSIS OF MAJOR INSTITUTIONAL SIMILARITIES AND DISTINCTIONS AMONG THE FIVE FINAL ALTERNATIVES

The five alternatives under consideration offer a broad range of solutions to the area's wastewater management problems. As has been pointed out in the preceeding Section, there are major institutional impacts which are common and identical to all of the technical alternatives; however, there are numerous differences as well. In terms of developing institutional arrangements for the C-SELM area, the similarities appear significantly more important than the differences.

This Section considers the various institutional impacts under six headings:

1. Impacts of regionalization requirements of the alternatives.
2. Impacts of financial requirements of the alternatives.
3. Impacts of reuse requirements of the alternatives.
4. Impacts of land use requirements of the alternatives.
5. Impacts of home rule requirements of the alternatives.
6. Impacts of manpower requirements of the alternatives.

Under each heading there is a short discussion of the similarities and differences between the institutional impacts resulting from each of the alternatives. Included is a discussion of whether new legislation is needed, or if expanded implementation of existing laws will suffice. The matrix on the following pages describes the five alternatives and indicates major differences and similarities of components.

All alternatives encourage the trend toward regionalism in wastewater treatment and management services and would require some regional integration of similar existing and new wastewater functions.

All of the alternatives, including Alternative I, would regionalize or consolidate services beyond the existing system. The basis of Alternative I, for example, is really a compilation of planning efforts presently advocated by existing local and regional planning agencies using current standards (now superceded by no discharge of critical pollutants criteria contained in the FWPCAA of 1972). These existing plans upon which Alternative I is predicated, would place various controls on land use and development practices. In addition, the system

CORPS TECHNICAL ALTERNATIVES AND INSTITUTIONAL IMPACTS IN THE C-SELM AREA

Present "system" 135 Plants	Regionalization of Planning Management Operations	Financial Impacts 1990	Reuse Impacts	Land Use Impacts*	Home Rule Impacts	Manpower Impacts
Alternative I						
64 plant system reference plan meets existing wastewater regional plans of C-SELM area planning agencies and complies with existing Ill. & Ind. stream quality standards.	Would require intrastate agreements. increased coordination for planning, operation and management over present existing method. Increased regional requirement over present system.	For ww/treatment: (present worth basis) $1.04 billion total capital cost. $27 million annual O+M. $88 million annual total cost. For the total system: $2.68 billion total capital cost.	None provided for.	Some relocation of people. New authority to preserve open space and to control development. Requires the purchase of 1,500 additional acres beyond present system and leasing of 57,000 acres (sludge management). Displaces 3,400 people.	Would have greater affect on home rule than present system because it represents increased consolidation.	Requires 2900 manpower units.

CORPS TECHNICAL ALTERNATIVES AND INSTITUTIONAL IMPACTS IN THE C-SELM AREA

Present "system" 135 Plants	Regionalization of Planning Management Operations	Financial Impacts 1990	Reuse Impacts	Land Use Impacts*	Home Rule Impacts	Manpower Impacts
Alternative II						
33 Plant system using advanced physical chemical technology meets NDCP requirements.	Increased coordination and regionalism than required in Alternative I above-system. More technically complex than Alternative I. Increased regional requirement over I.	For ww/treatment: (present worth basis) $3.24 billion total capital cost. $230 million annual O+M. $421 million annual total cost. For the total system: $7.41 billion total capital cost.	Requires new authority to operate recreational facilities, in Ind. Also requires new regional land use and state regulatory authorities over Alt. I and present system. Options 1 and 2 same in Alt. II-V.	Greater land use impacts than Alt. I. Displaces 18,800 people for treatment plants and storm water management programs. Sludge management requires 649,000 acres for agriculture utilization.	Affects home rule more than Alternative I. Greater impact on home rule since this system proposes a greater degree of regionalization and implies greater dependency on outside *agency/agencies*. System more technically complex than Alt. 1.	Requires 11,200 manpower units more than present system and 8,300 units more than Alternative I above.

CORPS TECHNICAL ALTERNATIVES AND INSTITUTIONAL IMPACTS IN THE C-SELM AREA

Present "system" 135 Plants	Regionalization of Planning Management Operations	Financial Impacts 1990	Reuse Impacts	Land Use Impacts*	Home Rule Impacts	Manpower Impacts
Alternative III						
17 plant system using advanced biological treatment-meets NDCP requirements.	Increased coordination and regionalism than required in Alternative I above and greater than II. The above-system more technically complex than Alternative II.	For ww/treatment: (present worth basis) $4.46 billion total capital cost. $235 million annual O+M. $499 million annual total cost. For the total system: $7.97 billion total capital cost.	Same as above with institutional impacts on crop production, recreation land reclamation, and water supply.	Smaller land use impacts than Alternative II but greater than Alternative I. Displaces 29,600 people.	Affects home rule more than Alternatives I and II. Implies greater dependency on outside agency/ agencies than both Alternatives I & II above. The system is more technically complex than Alternative II.	Requires 11,600 manpower units or 8700 manpower units more than Alternative I. Largest manpower increase of all alternatives.

CORPS TECHNICAL ALTERNATIVES AND INSTITUTIONAL IMPACTS IN THE C-SELM AREA

Present "system" 135 Plants	Regionalization of Planning Management Operations	Financial Impacts 1990	Reuse Impacts	Land Use Impacts*	Home Rule Impacts	Manpower Impacts
Alternative IV						
Land treatment system using 5 land disposal sites. Meets NDCP requirements. Uses leasing for most land sites.	Greater coordination and regionalization required than for Alts. III, II, or I but system less technically complex than Alts. I, II & III because there are fewer components Most regional of all alternatives.	For ww/treatment: (present worth basis) $1.99 billion total capital cost. $98 million annual O+M. $216 million annual total cost. For the total system: $7.06 billion total capital cost.	Generally the same as above. with institutional impact on power production.	Much greater land use impact/ requirements than Alts. I & II or III with 126,600 acres purchased both inside and outside study area and 416,300 acres leased for irrigation and sludge management. Displaces 20,200 people.	Implies even greater dependency on outside agencies than Alts. III, II & I. Affects home rule more than I, II or III.	Requires 5,500 manpower units or 2,600 more than Alt. I.

CORPS TECHNICAL ALTERNATIVES AND INSTITUTIONAL IMPACTS IN THE C-SELM AREA

Present "system" 135 Plants	Regionalization of Planning Management Operations	Financial Impacts 1990	Reuse Impacts	Land Use Impacts*	Home Rule Impacts	Manpower Impacts
Alternative V						
Combination land and advanced biological treatment (5 plants). Meets NDCP requirements. Has 5 land sites as in Alt. IV above.	About same impacts as as Alt. IV above.	For ww/treatment: (present worth basis). $3.48 billion total capital cost. $197 million annual O+M. $403 million annual total cost. For the total system: $7.94 billion total capital cost.	Generally the same as above.	Greater land use impact/ requirements than Alt. I and II but less than Alts. III and IV.	The same impact as Alt. IV above.	Requires 9,900 manpower units or 7,000 more than Alternative I.

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* uses 1990 figures because they reflect major effects incurred to 2020.

would benefit from increasing economies of scale due to the elimination of as many as 68 existing treatment facilities. Alternative I as well as Alternatives II through V would carry these effects even further and would, in increasing degrees, require the coordination of planning, operations and management activities. As the proposed technical alternatives become more consolidated, i.e., use fewer but larger components, the cooperation, interdependence and coordination necessary to implement the alternative also become technically more complex. Alternative I would reduce the existing number of facilities and plants from approximately 132 to 64, while Alternatives II through V would generally consolidate facilities to an even greater degree. Thus, Alternative II would utilize 33 plants, Alternative III would employ 17 plants, and Alternatives IV and V would utilize a mix of land sites and treatment plants. The differences between these alternatives in terms of consolidation are in degree but not in kind. All alternatives reflect the trend toward greater efficiencies obtained in operating larger coordinated systems.

IMPACT OF REGIONALIZATION REQUIREMENTS

As indicated on the matrices at the end of this Section, all the alternatives require a greater degree of regionalization than presently exists within the study area. Alternative I, which would require the least amount of regionalization, would reduce the number of treatment plants within the study area from approximately 132 to 64, ten of which would be new facilities. The fact that Alternative I requires the elimination of 68 existing plants indicates that even the minimum level or regionalization required by the alternatives would significantly change existing institutional arrangements. In the other alternatives, many more existing plants would be abandoned. Alternative V retains only five of the 132 existing plants and Alternative IV would eliminate treatment facilities altogether.

Although all of the alternatives require a level of regionalization which is substantially greater than the existing level, there are also differences in the levels of regionalization required by different technical alternatives. However, as noted above, these differences are not as significant as the fact that all alternatives share a need for a higher level of regionalization with one major exception. Both of the land alternatives (IV and V) would require a level of regionalization substantially greater than the remaining three alternatives. From an institutional perspective, this presents significantly greater problems.

As the discussion which follows will show, the main impact of regionalization falls upon local institutions which have responsibility for the actual construction, operation and maintenance of treatment plants.

One of the more significant differences among alternatives is that the land treatment alternatives require a greater degree of regionalization than do the treatment plant alternatives. If the treatment plant alternative requiring maximum regionalization (Alternative III) were implemented, the study area could be divided into seventeen separate service areas. On the other hand, the maximum number of separate service areas permissible under land treatment alternatives would be only five. (Alternatives IV and V). Furthermore, none of the treatment plant alternatives utilize components which cross the Illinois-Indiana boundary (an exception is a single existing storm water management conveyance line which is part of the basic suburban storm water management system). On the other hand, Alternative IV, the pure land treatment alternative, utilizes components which cross state lines. This means that the plant disposal systems in each state could be operated independently under an overall regional scheme, whereas the land treatment system could not be unless so designed and costs increased. Assuming that operation of the land treatment alternatives would require some type of agreement between Illinois and Indiana because of the interstate nature of the alternatives, Congressional approval of the agreement would be required by Title 33 USC Section 1154(b). This does not necessarily raise a serious institutional problem, however, because under the provision of the Section 1154(a), Congress has directed the Administrator of the Environmental Protection Agency to "encourage compacts between States for the prevention and control of water pollution."

NUMBER OF TREATMENT PLANTS

The number of treatment plants utilized by a particular alternative is another technical factor affecting regionalism and having an institutional impact. First, the number of plants used determines the number of institutions which will have a facility located within their jurisdiction. For example, if 64 plants are used, all of the major institutions within the study area involved in the operation of existing treatment plants would have treatment plants within their jurisdictions whereas if five plants (Alternative V) are used, only five major institutions would have plants within their boundaries. Accordingly, as the number of plants is reduced, the opportunity for consolidating existing institutions increases. Second, the number of plants utilized determines the number of institutions affected by the abandonment of existing plants. As the number of institutions affected by the abandonment increases, so do the institutional problems associated with assuming the outstanding debts and compensating the owners of abandoned plants. Third, the number of plants utilized affects interrelationships among existing institutions. As the number of plants is reduced, the geographic area and number of political subdivisions served by each plant increases. This creates an increased need for consolidation and/or contractual arrangements between the institutions without treatment plants and those

with plants. Furthermore, if the geographic area served by a plant becomes regional rather than local, the enabling legislation of the institution operating the plant may have to be changed to allow it to serve the additional area(s).

SPRAY IRRIGATION SITES

The utilization of the spray irrigation sites required by Alternatives IV and V will have significant institutional impacts outside, as well as inside, the study area. Within the study area, Alternatives IV and V would have a similar impact because of the common need for a cooperative arrangement among wastewater management institutions to regulate the use of shared facilities such as conveyance systems and the irrigation sites themselves.

Outside of the study area, the institutional impacts of the alternatives would be similar in that both use essentially the same irrigation sites. However, Alternative IV would have a greater impact because it requires more acreage. Institutions outside the study area which would be affected include agencies responsible for the relocation of people, agencies responsible for land use planning and control, and agencies with the potential for being assigned responsibility for the acquisition and operation of the spray irrigation sites.

The major impact of the irrigation sites, however, would stem from the need to incorporate citizens living outside of the C-SELM area in the wastewater management decision-making process. In order for these citizens to be assured that their own self-interests and values are protected it is imperative for them to have administrative responsibility over their lands. A good technique for incorporating such citizens in the decision-making process would be to establish locally controlled agencies which would be responsible for acquisition and operation of the spray irrigation sites. The local agency would contract with existing wastewater agencies within the C-SELM area for the disposal of wastewater. A second alternative would be to coordinate operation of the locally operated irrigation sites and the existing collection systems through a regional body composed of representatives from within and outside of the C-SELM area. However, if this regional approach was adopted steps would have to be taken to avoid potential conflict with the one man, one vote principle while providing the citizens in the outlying area an influential voice.

STORM WATER SYSTEMS

Two basic types of storm water collection and treatment systems are utilized by the technical alternatives. Alternative I would treat the storm water of the Metropolitan Chicago and Gary areas which would be

collected through combined sewers. The impact of this storm water system would be minimal as a similar system presently exists. Alternatives II through V would utilize a more complex and regionalized storm water treatment system. The storm water of suburban and rural areas would be collected separately and stored before being treated at a controlled rate. This system will have several institutional impacts. First, it will be necessary to acquire the storage sites. Second, institutional adjustments will be necessary if storage sites are utilized for recreation. Third, a cooperative mechanism will be required to control the release of water from storage sites to treatment plants or spray irrigation sites.

SLUDGE DISPOSAL

Two sludge disposal options have been proposed as part of the regional wastewater systems. Option 1 would utilize sludge for agricultural fertilizing, while Option 2 would use sludge for land reclamation. These options raise several institutional problems. The problems associated with Option 1 are similar to the problems connected with the acquisition of spray irrigation sites in that legal rights to use farm land for sludge disposal will have to be acquired. Option 2 will require contractual arrangements with the coal companies or other owners of the land to be reclaimed. Furthermore, land reclamation projects will have to be coordinated with applicable regional and local land-use plans. This would be accomplished by involving representatives of local governments located in the disposal areas in the decision making process. Both Options 1 and 2 will also require regional cooperative arrangements to regulate the use of shared facilities such as conveyance systems and disposal sites.

ABILITY TO RESPOND TO REGIONAL REQUIREMENTS

The ability of existing institutions to adapt to the regional requirements of the technical alternatives depends largely upon the institutions' geographic flexibility. The different types of agencies involved in the operation of treatment plants (municipalities, counties and special districts) have different levels of geographic flexibility. Municipalities in Indiana and Illinois serve the areas within their boundaries but are permitted to treat the sewage of other political subdivisions on a contractual basis. Counties, which are involved in treatment plant operation only in Illinois, are more restricted because they are authorized to act only in areas not served by another entity organized for similar purposes. Special districts generally provide the greatest opportunity for adaptation to an increased level of regionalization. Special districts organized under general enabling legislation in Illinois and Indiana are authorized to incorporate additional areas in a variety of ways. However, under special Sections of the Illinois Code, there are two districts that are more restricted; Metropolitan

Sanitary District of Greater Chicago's jurisdiction can be enlarged only by an act of the State legislature; and North Shore Sanitary District's jurisdiction is restricted to municipal corporations and the area within three miles of a municipal corporation. Thus, of the existing institutions, the functional requirements of the five alternatives can be met most readily by the special districts within the study area, although municipalities appear to have considerable flexibility also.* Other institutional reforms would also be required by the need to regionalize. The need to establish agreements among the institutions and in particular the interstate agreement required by the on land treatment alternatives have been discussed above. Cooperative agreements for all alternatives would be needed to regulate the use of shared facilities, such as conveyance systems and storage facilities, and to provide for assumption of the debts of abandoned facilities.

Furthermore, because of the regional nature of the technical alternatives, some type of agencies or agency with areawide authority and jurisdiction would be needed in order for the system to function effectively. Such an agency should have responsibility for the overall planning of the systems and authority to regulate operation of the regional system. Service area jurisdictions would ultimately have to be determined by local institutions and authorities.

Although there are several regional institutions in the C-SELM area, none has sufficient authority and jurisdiction to effectively control the operation of a wastewater management system for the entire area.** At the interstate level, the Interstate Planning Committee is authorized to consider all planning and development problems affecting the Chicago-Gary area but has no regulatory or enforcement authority. At the regional level, the Northeastern Illinois Planning Commission and the Lake Porter County Regional Transportation and Planning Commission have comprehensive planning authority but no power to implement plans. Both Illinois and Indiana have regulatory agencies at the state level. In Illinois, the Illinois Pollution Control Board and the Environmental Protection Agency regulate treatment facilities and promulgate water quality standards. The Indiana Stream Pollution Control Board and Environmental Management Board perform similar functions in that state.

In order for these regional planning institutions to fulfill the requirements of regionalization, several modifications would be necessary. First, in the case of Alternative IV, there is a need to develop uniform objectives for wastewater management in the Illinois

*See Addendum.
**Addendum A - Interrelationships Among Existing Wastewater Management Institutional Systems.

and Indiana portions of the C-SELM area and to coordinate enforcement of standards. This concept could also be investigated in the cases of the other four alternatives. This could be accomplished by an interstate agreement between state regulatory agencies. Second, regional planning agencies need authority to implement regional water and land resource plans or to coordinate the implementation of plans by local institutions. If local agencies cannot be required to coordinate the planning, construction and operation of their facilities at the regional level, then implementation of any regional alternative will be difficult.

IMPACTS OF THE FINANCIAL REQUIREMENTS OF THE ALTERNATIVES

Under present arrangements, wastewater financing is obtained from three sources: Federal cost sharing, State bonding (Illinois only) and local contributions.* Since costs of attaining new standards may increase as much as ten times the current annual level of expenditures, regardless of which alternative is used, ways of minimizing the financial strain should be examined. This could include: (a) increasing the debt ceiling, (b) increasing the tax base by expansion or reassessment, (c) assessing costs to users in a more equitable manner, (d) contributing greater amounts from local, state, and Federal treasuries, (e) expanding or creating new institutions to permit the spreading and leveling of costs over a greater area.

AMORTIZATION COSTS

Level of Treatment

The basic financial difference between Alternative I, which treats wastewater to current state standards and the remaining alternatives, which meet the NDCP criteria, is the amortized annual total costs. (Amortized annual cost is defined as the annual payment of principal and interest, based upon the current Federal interest rate of 5 1/2 percent over 50 years for capital, O&M and replacement costs). The total annual amortized cost of Alternative I is $202 million(1990, present worth basis). This contrasts with the remaining alternatives which fall within the range of $593 million (Alternative IV) to $775 million (Alternative III) for 1990.

*See Addendum.

Method of Treatment

Of the four NDCP alternatives, the pure Physical Chemical Alternative II is less costly in terms of total annual cost than Advanced Biological Treatment Alternative III. However, it is important to note that Land Treatment Alternative IV is the least costly of all of the NDCP alternatives. In addition, Alternative V, (Advanced Biological combined with Land) is equal to a less costly than the pure Physical-Chemical and Advanced-Biological systems respectively. Thus, the land treatment system, in terms of annual amortization costs, will place a significantly smaller burden on the institutional financial structure than any other alternatives. However, even this burden will be considerably greater than wastewater expenditures to date in the C-SELM region.

CAPITAL, OPERATIONS AND MAINTENANCE (O&M) AND REPLACEMENT COSTS

While two or more alternatives may have a similar total amortization (annual cost) requirement, it is useful to examine the individual components of this yearly total cost. While the total annual cost requirements of two systems may be roughly equivalent, different institutional arrangements may be required in order to finance the alternatives. There are several reasons for this. First, while capital cost repayments are usually spread over a number of years the total capital cost of the system must be raised before the system can be built. If the institutions within the study area are to accomplish this, then the legal authority and capacity to undertake such financing must be present. The second component of total annual costs is operation and maintenance. Unlike capital costs, sufficient funds to cover these requirements have to be raised each year, not at the beginning of the project. The third component of total costs is replacement costs. If these are substantial, then the institution will likely be required to undertake bond financing or raise annual funds to meet these requirements.

Of the five alternatives, Alternative I has the lowest total capital cost, annual O&M cost and annual replacement cost (1990 present worth basis). However, a number of differences are evident among the four NDCP alternatives. These are:

1. The land treatment alternative has a significantly lower total capital cost ($7.06 billion, present worth basis for 1990) than any of the remaining systems. The next least costly (Alternative II, Physical-Chemical) is $7.41 billion for 1990.

2. Annual operation and maintenance costs of non-land alternatives fall within the range of $226 million (Alternative V) to $258 million (present worth basis, Alternative II) for 1990. This contrasts to a significantly lower $156 million for the land option (Alternative IV).

3. Annual replacement cost, which, if large, can significantly tax the managing institution's financial capacities, is greatest for the pure Physical-Chemical and Advanced-Biological options. It is slightly less for the Advanced Biological and land combination and significantly less for the pure land alternative. These annual costs for 1990 range from $19 million (present worth basis, land) to $60 million (advanced biological treatment) and will very probably place a major burden on the existing financial structure in the C-SELM region.

IMPACT UPON INSTITUTIONS

The impacts of the five alternatives upon the institutions in the C-SELM area is discussed below. These are classified as local institutions, which include municipal corporations, counties and special sanitary districts; and state institutions. The focus of the analysis will be upon the ability of such state and local institutions to finance the capital, O&M, replacement and associated costs of the systems.

Local Institutions

Counties, municipal corporations and special districts in Indiana and Illinois are characterized as operational agencies because in addition to financing all or part of the wastewater management costs, they frequently operate the facility as well. These operating agencies will be confronted with costs under the alternative proposals that are significantly higher than those currently in effect. The total capital cost, for example of Alternative I is $2.68 billion for 1990 (present worth basis). This contrasts with the least costly NDCP system (Alternative IV, land treatment) which has a total cost of $7.06billion for 1990.

On an annual basis, the total cost requirement of the least costly NDCP system is $593 million (Alternative IV) for 1990 (present worth basis). This exceeds the $202 million(1990) for Alternative I, which treats wastewater only to current state standards.

The above costs can be compared with those which the States of Illinois and Indiana are currently spending on wastewater management. It is important to note, however, that the C-SELM area includes only segments of each state and that the following data represents total state and local expenditures for both states in their entirety. In 1971, Indiana spent a total of approximately $69 million and Illinois $140 million on wastewater management in capital, O&M and replacement costs. These figures are exceeded by the lowest annual amortization cost of the four NDCP systems (Alternative IV) which is $593 million (present worth basis) for 1990.

Of the total annual expenditure for wastewater by the states in 1971, $71 million (Illinois) and $36 million (Indiana) was used for capital facilities. This contrasts to the estimated annual amortization of capital cost of $157 million (present worth basis) in 1990 for Alternative I. Considering the NDCP systems, Alternative IV (land treatment) is the least costly in terms of annual capital costs: $416 million for 1990. The most expensive system, Alternative III, (advanced biological treatment) has comparable annual costs of $593 million (present worth basis) for 1990.

From the above comparisons, it is apparent that current expenditures in the states are far lower than the costs of the various alternatives, especially those which treat wastewater to NDCP standards. This suggests that existing institutions may not be able to accommodate such a financial burden without radically affecting the tax structure and without reallocating resources from other public services.

There are additional factors which support this hypothesis. First, the requirements of the most costly system in terms of annual total amortization expense (Alternative III, advanced biological) are likely to exceed the borrowing ceilings of many municipal corporations and special districts within the C-SEIM area. The remaining systems, to a lesser degree, will encounter this problem also. Voter resistance to increase debt is a problem which will be encountered in any effort to alter the restrictions on the amount of indebtedness. The extent to which the much publicized taxpayer revolt is a reality may significantly effect the likelihood of new local bond issues for wastewater financing.

Additionally, many of the smaller municipalities in both Indiana and Illinois have little remaining borrowing margin and consequently have poor bond ratings. This factor often makes it difficult, if not impossible to sell a sizeable bond issue of the dimension that will be required for the NDCP alternatives.

While the special district often offers greater financing flexibility than is usually available to the municipal corporation, it is highly unlikely that a bi-state special district can or will be created which covers the entire study area. Even if it were, a massive bond issue would require a substantial increase in taxes and/or user fees. Furthermore, high interest rates and bond market conditions at any given time can make it difficult to sell a large bond offering at an economic price (to the borrower).

State Institutions

Based upon past experience, the state would seem to be the institution with the greatest capability of assisting local institutions in the

financing of wastewater programs. Bond issues have generally had high credit ratings. Illinois, for example, has recently issued a $750 million general obligation wastewater bond and could be expected to further contribute in the future. It is important to note, however, that all of the NDCP alternatives (without storm water) require a capital expenditure in excess of $5.0 billion (1990 present worth basis) as well as operation, maintenance, replacement and amortization costs. A bond issue several times the size of the substantial Illinois issue would therefore be necessary. Indiana, on the other hand, is prohibited from issuing a general obligation bond and therefore currently has neither the experience nor capacity to finance wastewater debt costs through this procedure.

Revenue bonds are more costly than general obligation bonds at this level of expenditure because higher interest rates must be paid to bondholders. However, they could be used to finance a portion of capital and/or replacement costs.

A major institutional impact of either type of bond is the payment of the bond debt. This factor is as important as the ability to issue a bond(s) of sufficient size to meet capital and/or other costs. Bonds are repaid through taxes and/or user fees. Implementation and administrative considerations are critical as well as the population's response to the fees that would result under any alternative.

Modifying the Financial Capacity of Existing Institutions

In order to implement any of the wastewater management alternatives, a number of changes in existing institutions would be required. These anticipated changes would apply to local institutions and to state institutions which could either be modified or supplemented with new institutional arrangements.

The most basic changes would be legislative. If the states are to take a more viable role, Indiana would have to pass a Constitutional amendment that would enable it to assume general obligation bonds indebtedness.

On the local level, the bonding authority (ceiling on indebtedness) that is expressed as a percentage of assessed property value would have to be raised to accommodate the capital requirements of the majority of the alternatives. One way that this can be accomplished is by having the legislature raise the statutory debt limits that apply to the selected local institutions. This could most practically be accomplished for special districts which generally have debt limits which are determined separate and apart from other units of local government thereby permitting

greater flexibility in financing. In addition, Indiana would need to amend the Constitutional debt ceiling of 2 percent that applies to all local institutions. The revised Illinois Constitution of 1970 sets no debt ceiling. Another method would be to have the property tax board raise the assessed value of property. Either course of action, often associated with increased property taxes, can be politically undesirable.

Several other legislative changes, relating to the ability of local institutions to levy selected types of charges would also be necessary. Specifically, in Indiana special districts may have to be permitted to levy special assessments to meet a portion of the costs to the various alternatives and should also be permitted to issue revenue bonds. In Illinois, the enabling legislation of special districts may have to be amended to authorize charging user fees for treatment of domestic sewage. They are currently prohibited to all but industrial users in these institutions.

Changes other than those by the legislature would relate to the relative contributions of local, State and Federal governments. As discussed in an earlier report* and in this report, local institutions will be unable to finance any of the alternatives that have been presented even if they have sufficient legal bonding capacity remaining (they generally do not). Poor bond ratings and the unwillingness of the public to support this debt are the main reasons. Therefore, the State and Federal government will likely be required to ease the local financing burden. In Illinois, the state has demonstrated the ability to finance local wastewater projects. Such potential could be expanded in both Illinois and Indiana. A necessary measure for meeting the costs of any of the five technical alternatives will be an increased Federal role in financing. Some commitment to this increased role is evident from new Congressional wastewater financing provisions contained in the Federal Water Pollution Control Act Amendments of 1972. In particular the Environmental Financing Authority contained in this Act creates a $100 million fund to assist local governments in borrowing funds on reasonable terms to construct waste treatment works.

FEDERAL LEVEL

It is important to note that certain provisions of the recently-enacted Federal Water Pollution Control Act Amendments of 1972 require that a system of user fees be established to meet operation, maintenance and replacement costs attributable to all users of the facility. However, the local share of capital costs may be financed through revenue bonds which are serviced with user fees or general obligation bonds which are paid off from general taxation.

*See Addendum.

Current legislation authorizes the Federal government to provide 75 percent of the capital costs for wastewater projects. However, the constantly-changing order of Federal priorities and the relatively low level of funding envisioned in the environmental area will not assure that Indiana and Illinois will receive a Federal contribution that is of the magnitude required under each of the plans.

Industrial users and municipal facilities are required to pay back to the Federal sector the proportionate cost of treating their wastes. Additionally, local recipients of Federal assistance could implement a system of user fees that results in a similar contribution toward the local share. In the absence of an engineering estimate of the percentage of capacity of costs attributable to industry, it is not possible to determine the percentage of the local share which may be recouped from industrial users. Thus, the local capital cost requirement may be 25 percent (or less if industry is required to pay a share of local costs) if the Federal government contributes funds freely. However, the scarcity of resources in this area makes such assumptions tenuous at best.

Ultimately, because of the magnitude of the costs of the proposed systems, the issue to be resolved is whether the public will be willing, through sharply increased taxes and/or user fees, to pay the higher costs associated with NDCP standards. Furthermore, the public will have to absorb the costs of retiring outstanding indebtedness on facilities which are to be abandoned. If the federal level emphasizes an areawide approach to wastewater, abandonment could be accentuated, thereby increasing this burden.

IMPACTS OF RE-USE REQUIREMENTS OF THE FIVE ALTERNATIVES

All alternatives would employ water reuse schemes. All of the alternatives, except Alternative I, consider comparable reuse capability of the treated water and sludge by-products. The four NDCP alternatives accomplish this integration by planning the reuse of wastewater and wastewater treatment by-products with related proposals which, in turn, create institutional impacts. Although there are distinctions among the alternatives, they are not critical from a broad institutional perspective. All four alternatives consider to some degree, reuse alternatives such as crop production, recreation, land reclamation, power production, stream flow augmentation and water supply. To cope with these resource management alternatives, existing institutions must either be granted new authorities, or cooperative arrangements developed with those agencies that have the authority. At the same time all treatment and reuse options must be integrated with land use planning. This will be required regardless of which technical alternative is adopted.

As noted above four of the five wastewater management alternatives being considered for the C-SELM integrate wastewater management with natural resources management in general. The technical alternatives accomplish this integration by planning for the re-use of wastewater and wastewater treatment by-products with related land proposals which in turn creates a series of institutional impacts. The alternatives provide for the re-use of wastewater in several different ways, as follows:

CROP PRODUCTION

Some significant institutional impacts within and outside the study area would be caused by the utilization of spray irrigation sites for crop production. The institutional impacts of using wastewater to grow crops would vary depending upon whether the public or private sector is involved in producing crops. If a public agency is to grow the crops, then either a new agency would have to be created or the enabling legislation of an existing agency (wastewater or other) would have to be amended to authorize such activity. For example, this problem could arise in Alternatives IV and V. Both of these land treatment alternatives propose that contractual arrangements be adopted with the present owners who would retain title to the lands. The only lands actually purchased in these alternatives would be in areas where lagoons or sludge disposal facilities (optional) are to be located. In return, the farmers would be paid a yearly fee which would include both initial and annual cash payments to offset damages incurred for installation of irrigation and drainage systems and to offset the annual capital gains foregone. Such an arrangement would require the creation or modification of a public or private agency to administer the leasing, growing, and selling of crops that could involve hundreds of thousands of acres. Another possible problem created by the use of wastewater for agriculture would be conflict with the agriculture crop support programs. Operation of spray irrigation sites would have to be coordinated with the appropriate Federal and State agencies to avoid possible conflicts with programs or regulations.

RECREATION

The five technical alternatives also use wastewater for recreation. For example, the storm water detention ponds and buffer zones could be used for hiking, fishing and sailing in the suburban areas. Alternatives II through V would utilize open space lands in the rural areas as treatment sites for rural storm water, and all alternatives would provide treated water for stream flow augmentation and as a resource base for land related programs. One of several alternative institutional modifications would be necessary in order for wastewater to be used for recreation. Either the enabling legislation of existing wastewater management agencies could be

modified to authorize them to provide recreational services or the existing wastewater management agencies would have to establish cooperative agreements with other agencies responsible for recreational development and operation.

LAND RECLAMATION

The optional use of sludge for land reclamation is another way in which the alternatives integrate wastewater management with overall resource management. Although, the Metropolitan Sanitary District of Greater Chicago has already initiated a program to reclaim strip-mined land in Fulton County, Illinois, the use of sludge for land reclamation could present serious institutional problems because the technical alternatives would require land reclamation on a much larger scale. There is a potential, however, to reduce at least some of the institutional problems associated with large scale reclamation activities in that coal companies presently engaged in surface mining outside the study area have expressed some interest in integrating land reclamation activities utilizing sludge into surface coal mining activities. The institutional problems would be similar to those discussed above in relation to the acquisition of spray irrigation sites and sludge disposal sites. Also, the restoration of land should be coordinated with public agencies involved in land use planning to insure that the restoration programs serve public needs to the fullest extent possible.

POWER PRODUCTION

Alternatives IV and V would also provide storage of wastewater in lagoons at spray irrigation sites which could be used as heat sinks for industrial and/or electric utility installations. Certain institutional modifications would be necessary if such synergisms are to be realized. The institution responsible for operation of the spray irrigation site would need authority to provide wastewater for such purposes. If the water is to be leased to private users, a system of equitable user fees would have to be established. Similar arrangements would also be necessary if land treatment sites are used for pumped storage electrical generation.

WATER SUPPLY

One of the primary re-users of wastewater would be as a source of potable water. The impact of reusing wastewater in this manner would vary depending upon whether existing institutions are authorized to provide a water supply. Special districts in Illinois are authorized

to provide a water supply but the major districts (Bloom Township, Sanitary District, NSSD and MSDGC) have not exercised their authority. In Indiana, special districts are not authorized to provide a water supply; however, a recently enacted section of the Indiana Code provides for the creation of regional water, solid waste, and sewer districts. In both states, municipalities may engage in sewage disposal and water supply.

Institutional modifications are necessary if existing wastewater management agencies are to integrate wastewater management with total resource management. Existing institutions must be granted new authorities or cooperative arrangements with other resource management agencies must be developed if they are to capitalize upon the potential for the reuse of water and its waste constituents for such beneficial uses as crop production, recreation, land reclamation, power production and water supply.

An important legal restriction affecting the design of water re-use systems is the case of Wisconsin et al v Illinois et al 388US 426, which limits Illinois and its political subdivisions to withdrawing water from Lake Michigan at a rate of 3200 cfs. Illinois may apply for a revision of this limitation; however, the State must demonstrate that the reasonable needs of the Chicago area cannot be met by other supply sources and that "all feasible means reasonably available...have been employed to improve the water quality of the Sanitary and Ship Channel and to conserve and manage the resources of the region...in accordance with the best modern scientific knowledge and the engineer practice."

Another factor to be considered in planning for water re-use is the water quality standards regulating the level of dissolved solids which can flow into Lake Michigan. Both Illinois and Indiana have adopted water quality standards which contain non-degradation provisions. Such standards require a level of treatment substantially higher than that which can be provided by proposed treatment technologies. If existing standards are enforced, Illinois, which presently does not discharge effluent into the lake, would be prevented from using proposed technology to return treated effluent to the lake and thereby establish a basis for withdrawing additional water supplies from the lake. The Region V Office of the U.S. Environmental Protection Agency has indicated that based upon existing water quality standards, a return flow of 1,500 mgd would not be acceptable. Enforcement of existing standards would also require Indiana, which currently does discharge treated effluent to Lake Michigan, to adopt new treatment techniques.

IMPACT OF LAND REQUIREMENTS

All five of the proposed technical alternatives will have greatly increased land use impacts because they all require increased acreage for the system components and increased land use regulation. While this institutional impact is present in all alternatives, the impact varies

with the technology involved, with the physical/chemical and the land treatment systems requiring the greatest amounts of land. As a result all alternatives will have institutional implications differing in degree but not in substance. New land use regulations will be required to govern the use of flood plains, recreational development, population density and displacement, sludge disposal areas, and commercial development and should include zoning and other forms of ordinance controls. All the technical alternatives will require these similar institutional authorities to regulate these land use impacts. The institutional impacts stem either from the acreage requirements of the alternatives' individual components or from a general need shared by all alternatives for increased land-use regulation to preserve and protect the integrity of the technical system as well as the other values attached to the surrounding lands.

The use of treatment plants does not raise major institutional problems for several reasons. Local wastewater management institutions are presently authorized to acquire and sell real estate. Accordingly, these institutions should have few legal problems in acquiring additional acreage needed for new facilities or disposing of excess real estate created by the abandonment of existing facilities. However, the disposal of surplus land should be coordinated with the plans of other public agencies.

On the other hand, the use of spray irrigation sites and the sludge management options do present major institutional problems because of their large acreage requirements. First, wastewater management agencies within the C-SELM area may have difficulty in securing the use of the large tracts of land. The Metropolitan Sanitary District of Greater Chicago lost its authority to exercise the power of eminent domain outside of its jurisdiction because of opposition to such authority. Consequently, MSDGC and other agencies can now be forced to pay a premium price for land located outside their jurisdiction. Furthermore, a legal question may arise as to whether the authority of existing institutions to acquire real estate can be interpreted as authorizing contractual arrangements for the use of large tracts of land required for land treatment sites. Acquisition of the land also presents other institutional problems. If the land is acquired in fee, implementation of the system could be delayed should it become necessary to institute condemnation proceedings. Furthermore, if the land is bought outright, there could be a major impact on the tax rolls of the political subdivisions in which the land is located as ownership changes from the private to the public sector.

This impact could necessitate an arrangement whereby agencies within the C-SELM area compensate political subdivisions outside the area for lost tax revenues. If the land is to remain in private ownership, there will be substantial legal problems in working out contractual arrangements for disposal of sewage and sludge on the land. For example, there must be sufficient incentive to the landowners to keep the land in compatible use. Another problem which arises, whether the land is publicly or privately owned, is the need to relocate displaced people. This requirement could place a large burden on any agency within the C-SELM area which would be involved in relocation efforts.

As noted above, a second set of institutional impacts arises because all of the alternatives require a level of land-use regulation which substantially exceeds that currently in effect within the study area. In order for any regional wastewater management system to operate effectively, increased land use regulation is necessary. First, land-use controls are necessary in order to allow wastewater management systems to function at their designed capacity. Second, regulation is needed to preserve the sites actually required for wastewater treatment, storage sites, and other related facilities. For example, all advanced alternatives require existing open spaces for storm water management. Development of these areas must be controlled if the system is to operate as planned.

To prevent wastewater systems from being overloaded, enactment and enforcement of non-structural constraints such as zoning regulations, erosion control regulations, and health codes are necessary. The basis for these constraints already exists in regulatory powers available to local governments. In many cases these powers are not exercised especially in terms of common regional objectives. What is needed in order to promote effective wastewater management is cooperation between those agencies responsible for wastewater management and those responsible for exercise of the regulatory powers and an effective program which actually achieves control.

In addition, preservation of areas required for treatment facilities requires cooperation between wastewater agencies and other public institutions which own land. Wastewater disposal systems must be designed in coordination with other types of public and/or private land use and vice versa.

IMPACTS OF HOME RULE REQUIREMENTS

All Alternatives would have a direct affect on home rule interests. Since all the alternatives imply consolidation of existing and new wastewater services, they all will affect the home rule authority and control over what are now local decisions. The more consolidation a technical alternative proposes, the fewer functional components are

involved and the smaller the influence of an individual community or agency. In effect, Alternatives IV and V are more complex in that they require more technical coordination of functions and activities as well as institutional coordination and agreement. In the same manner, the larger and less flexible the proposed technical system is, the more removed the local service providers and agencies are from the regional decision making. As a consequence, all of the technical alternatives face the same difficult home rule issues, particularly as the systems become more integrated (from Alternative I to V).

The home rule concept is a powerful and important political and hence institutional factor which all of the technical alternatives must contend with not only in Illinois, where the passage of a new constitution placed emphasis on the concept, but in Indiana as well. In both States, proposals to increase the authority or jurisdiction of agencies regardless of their functional authority or the alleged need have met with a storm of public discussion and controversy. Planning agencies in both States and at the interstate level as well, have been consistently unsuccessful in implementing plans developed on a regionwide basis because of a perceived threat to local home rule interests. Nowhere is this threat more implicit than with regard to regionwide or areawide wastewater management planning. The matrices on pages __ through __ along with the foregoing discussion indicate clearly that all of the technical alternatives have important impacts on the degree of requirements for regionalization. From the matrix on page __ which compares the alternatives to the reference plan (Alternative I) and to one another, it can also be seen that the impact on home rule is likely to increase as the number of facilities decreases and hence the degree of regionalism increases. As was pointed out earlier, it is likely that the more regional in scope a proposed alternative is the less direct decision making control a local community may feel it has over regional wastewater management system decisions affecting its own local interests. As a result, technical alternatives will receive greater public scrutiny the more they affect local rule interests or the more regionalization they imply or require. In particular the home rule issue becomes important in Alternatives IV and V both of which require large amounts of land for land disposal systems. In these two alternatives, and to a lesser but still significant extent in the other alternatives, large amounts of land are required for wastewater treatment. All of these land use impacts, (discussed earlier in some detail) indicate the need for large scale land use development policies and regulations. In the rural areas where much of the required land is to be provided, no institution presently exists with the authority or jurisdiction to undertake such large scale planning and regulation. In order for any of these alternatives, and in particular Alternatives IV and V, to work, an existing agency or institution must be granted the additional legal authority required or a new institution with the requisite authority must be created.

With an institutional mechanism which encourages local participation in regionwide decisions, greater local public support can be expected for any of the technical proposals.

IMPACT ON MANPOWER RESOURCES

All alternatives would require increased manpower resources over present levels. All of the proposed technical alternatives would require substantial increases in skilled and unskilled manpower resources. This is because all the alternatives will serve a larger need than is presently the case and in addition, the technologies to be employed require new and different skills not presently in use. Therefore, these new advanced technologies will require a shift to higher and more technical skills not presently required. Physical-Chemical treatment technologies require specific skills as do advanced biological and land treatment technologies. These manpower needs will be satisfied in part by the addition of new people while a substantial number will require retraining. While there are substantial differences in manpower needs among the alternatives (from 3200 manpower units in Alternative I to 11,600 for Alternative III), the important factor to note is that all of the alternatives have manpower needs significantly higher than the present requirements.

SUMMARY

The matrices which follow are provided to summarize visually the above impacts. One matrix for each technical alternative is provided which displays the different institutions in the C-SELM area and the institutional impacts. An "X" indicates there is an impact while a blank indicates there is no significant impact. A review of these five matrices quickly shows that while the five technical alternatives vary somewhat in their impacts on existing institutions, the substance of their impacts is very similar regardless of which technical alternative is discussed. With these similarities and the differences previously discussed, the following Section presents a discussion of institutional considerations for the C-SELM area based on maximizing efficient and viable institutional criteria.

TECHNICAL ALTERNATIVE NO. I.

Possible Institutional Modifications	Regionalization Impacts	Financial Impacts	Reuse Impacts	Land Use Impacts	Home Rule Impacts	Manpower Impacts
Type of Institution						
A. Institutions with Wastewater Management Responsibility						
.municipalities	X	X	X	X	X	X
.county departments of public works	X	X	X	X	X	X
.special sanitary districts	X	X	X	X	X	X
.regional planning agencies	X			X	X	X
.state regulatory agencies			X			
.state financing agencies	X	X		X		
.interstate planning agencies	X			X	X	X
B. Other Agencies						
.recreation (local regional-state)			X	X	X	X
.land use (local regional-state)			X	X	X	
.relocation agencies				X		X
.federal agencies	X		X	X		

TECHNICAL ALTERNATIVE NO. II.

Possible Institutional Modifications	Regionalization Impacts	Financial Impacts	Reuse Impacts	Land Use Impacts	Home Rule Impacts	Manpower Impacts
Type of Institution						
A. Institutions with Wastewater Management Responsibility						
.municipalities	X	X	X	X	X	X
.county departments of public works	X	X	X	X	X	X
.special sanitary districts	X	X	X	X	X	X
.regional planning agencies	X			X	X	X
.state regulatory agencies	X		X			
.state financing agencies	X	X		X		
.interstate planning agencies	X			X	X	X
B. Other Agencies						
.recreation (local regional-state)	X	X	X	X	X	X
.land use (local regional-state)	X	X	X	X	X	X
.relocation agencies	X	X	X	X	X	X
.federal agencies	X		X	X		

TECHNICAL ALTERNATIVE NO. III.

Possible Institutional Modifications	Regionalization Impacts	Financial Impacts	Reuse Impacts	Land Use Impacts	Home Rule Impacts	Manpower Impacts
Type of Institution						
A. Institutions with Wastewater Management Responsibility						
.municipalities	X	X	X	X	X	X
.county departments of public works	X	X	X	X	X	X
.special sanitary districts	X	X	X	X	X	X
.regional planning agencies	X			X	X	X
.state regulatory agencies	X	X				
.state financing agencies	X	X		X		
.interstate planning agencies	X				X	X
B. Other Agencies						
.recreation (local regional-state)	X	X	X	X	X	X
.land use (local regional-state)	X	X	X	X	X	X
.relocation agencies	X	X	X	X	X	X
.federal agencies	X		X	X		

TECHNICAL ALTERNATIVE NO. IV.

Possible Institutional Modifications	Regionalization Impacts	Financial Impacts	Reuse Impacts	Land Use Impacts	Home Rule Impacts	Manpower Impacts
Type of Institution						
A. Institutions with Wastewater Management Responsibility						
.municipalities	X	X	X	X	X	X
.county departments of public works	X	X	X	X	X	X
.special sanitary districts	X	X	X	X	X	X
.regional planning agencies	X			X	X	X
.state regulatory agencies	X		X			
.state financing agencies	X	X				
.interstate planning agencies	X			X	X	X
B. Other Agencies						
.recreation (local regional-state)	X	X	X	X	X	X
.land use (local regional-state)	X	X	X	X	X	X
.relocation agencies	X	X	X	X	X	X
.federal agencies	X		X	X		

TECHNICAL ALTERNATIVE NO. V.

Possible Institutional Modifications	Regionalization Impacts	Financial Impacts	Reuse Impacts	Land Use Impacts	Home Rule Impacts	Manpower Impacts
Type of Institution						
A. Institutions with Wastewater Management Responsibility						
.municipalities	X	X	X	X	X	X
.county departments of public works	X	X	X	X	X	X
.special sanitary districts	X	X	X	X	X	X
.regional planning agencies		X	X	X		
.state regulatory agencies		X	X			X
.state financing agencies	X	X	X			X
.interstate planning agencies		X	X	X		
B. Other Agencies						
.recreation (local regional-state)		X	X	X	X	
.land use (local regional-state)		X	X	X	X	
.relocation agencies		X	X	X	X	
.federal agencies					X	

SECTION III - ALTERNATIVE INSTITUTIONAL ARRANGEMENTS FOR IMPLEMENTING THE FIVE TECHNICAL ALTERNATIVES IN THE C-SELM STUDY AREA

INTRODUCTION

Earlier Sections in this report established that, in comparison to the present "system", all of the five technical alternatives would require dramatic and substantive changes in the existing institutional system for providing wastewater and related water resources services in the C-SELM area. The previous Section further discussed some of the differences among the technical alternatives in terms of the implications for existing institutions; and it has been demonstrated that each alternative has its own institutional impacts and requirements. On the basis of this information this concluding Section discusses possible institutional arrangements for wastewater management, in the C-SELM study area and analyzes the political, economic, and administrative feasibility of implementing each of the institutional arrangements discussed. A discussion of specific institutional modifications, including financial provisions is presented. This information is displayed in matrix form on page F-III-2 for easy reference. Implicit in this discussion is the assumption that to the greatest extent possible the existing institutions and structure should be maintained and utilized and that new structures, institutions or concepts should be introduced only when existing institutions or modifications thereto would be unable to implement the technical alternative.

The criteria discussed below have been developed as indicators of an institution's ability to deal effectively with problems which confront it. As such these criteria could be analyzed in terms of any institution, not just those concerned with wastewater management. The assumption is that the more an institution or institutional arrangement is capable of maximizing a particular component, the better are the chances of implementing that particular arrangement and its attendant modifications.

INSTITUTIONAL REQUIREMENTS

ECONOMIC QUALITIES

Ability to Accommodate Peripheral Factors

There should be control over the sources of wastes discharged into the treatment system such that there are no unaccounted program costs.

Ability to Achieve Economies of Scale

Given a population density of sufficient size, it usually follows that the larger the area serviced by the institution, the lower the unit costs will be. A regional institution would meet this criteria.

EVALUATION OF INSTITUTIONAL IMPLICATIONS
C SELM STUDY

	ALT NO. I			ALT NO. II			ALT NO. III			ALT NO. IV.			ALT NO. V		
	Collection	Conveyance/ Treatment	Sludge	Collection	Conveyance/ Treatment	Sludge	Collection	Conveyance/ Treatment	Sludge	Collection	Conveyance/ Treatment	Sludge	Collection	Conveyance/ Treatment	Sludge
Economic Qualities															
Peripheral Factors Inside C-SELM Outside C-SELM	L or R	L or R	L or R	R	R	R	R	R	R	R or A	R or A	R or A	R or A	R or A	R or A
Economics of Scale	L or R	L or R	L or R	R	R	R	R	R	R	R or A	R or A	R or A	R or A	R or A	R or A
Administrative Qualities															
Control of Casual/affected areas	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Changing Needs/Conditions	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Authority to Implement Decisions	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Adequate Financial Resources	R or A	R or A	R or A	R or A	R or A	R or A	R or A	R or A	R or A	L	L	L	L	L	L
Consider Alternatives	L	L	L	L	L	L	L	L	L	R or A	R or A	R or A	R or A	R or A	R or A
Exist Govern Compatibility	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Regional Visibility	L	L	L	L	L	L	L	L	L						
Political Qualities												L	L	L	L
Public Participation	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Political Acot/Respon	L	L	L	L	L	L	R	R	R	R or A	R or A	R or A	R or A	R or A	R or A
Respon for Spectrum of Services	L	L	L	L	L	L	L	L	L	R or A	R or A	R or A	R or A	R or A	R or A
Attract Qual Personnel	R	R	R	R	R	R									
Obtain Consensus	L	L	L	L	L	L									

L - Local Approach, R - Regional Approach A - Areawide Approach

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ADMINISTRATIVE QUALITIES

Control of Casual and Affected Areas

The institution should have sufficient geographical jurisdiction to effect regulatory control over areas which cause wastewater problems and which are affected by treatment programs. This differs from institutional criterion (ability to accommodate peripheral factors) in that the focus is on including the governmental unit which produces, or is affected by, those peripheral or external factors.

Ability to Respond to Changing Needs and Conditions

The institution should have sufficient service, functional, temporal (time) and areal flexibility to adapt to changing circumstances. Wastewater management institutions should also have sufficient authority to integrate wastewater management with total resource management. Without such authority, the synergistic benefits of wastewater management cannot be fully captured.

Adequate Authority to Implement Decisions

The institution should have the authorities required of a wastewater management agency as specified by Section 208 of the FWPCAA of 1972. These authorities include the power to:

(a) construct, operate and maintain the treatment works and related facilities required by the areawide waste treatment management plan.

(b) accept grants or other funds; raise revenues; incur short- and long- term indebtedness.

Adequate Financial Resources

Adequate revenue is necessary in order for an institution to exercise its legal authority. Bonds, user charges, taxes and revenue sharing are ways of raising revenue which will probably be considered. In order to insure that the institution will have an adequate financial base, it should meet certain requirements such as a minimum geographic area, population or assessed property value.

Ability to Consider Alternatives

The institution should be able to consider and implement alternatives and necessary changes thereto.

Compatability with Existing Governments

The institution should not duplicate services currently being adequately performed by existing governmental units. It should also fit into the local, State and Federal institutional structure.

Ability to Establish Regional Visibility

Regional visibility is necessary in order for the institution to cultivate political and legislative support for its programs and budgets.

POLITICAL QUALITIES

Ability to Promote Meaningful Public Participation in Planning and Decision-Making

By involving citizens in the decision-making process, the institution will educate the public and thereby develop plans which are both in the public interest and publicly supported.

Political Accountability and Responsiveness

The most important political criterion for any democratic government is that those whom it purports to govern have access to and ultimate control over it.

Responsibility for a Spectrum of Services

The more varied the functional scope of an institution, the more the opportunity to make trade-offs and compromises necessary to accomplish the major objectives of the institution.

Ability to Attract Qualified Personnel

The institution should have enough power, prestige, exposure, and pecuniary incentives to attract qualified personnel.

Ability to Promote a Consensus Among Decision-Makers

The institution should strive to create a regional consensus on objectives and approaches among members of the agency's decision-making body.

GENERAL DISCUSSION OF INSTITUTIONAL APPROACHES

This analysis presents three basic institutional arrangements for consideration in the C-SEIM study area. The first is referred to as the local approach and emphasizes the maximum use of existing institutions.

It would be implemented primarily through the use of bilateral and multilateral contractual agreements. The second approach goes beyond this and is referred to as the intermediate regional approach and would involve a greater restructuring of service districts. This approach could require special state enabling legislation to create the required service districts and would conflict with home rule advocates. The third approach goes further still and would create one or a few multi-county service areas. This approach would very likely require new state enabling legislation. This approach is referred to as the areawide approach and would be the most far reaching in terms of institutional, political, economic and administrative repercussions. In light of the institutional impacts identified earlier, it is clear that existing institutions will not be able to implement any of the technical proposals without substantial modifications. Under the local approach discussed below these modifications would be kept to a minimum.

THE LOCAL APPROACH

All five of the technical alternatives propose the elimination of from 68 to 132 treatment facilities. Thus, even the reference plan (Alternative I) which is based on already existing local and regional plans, would eliminate 68 facilities. As a result, the service areas of the remaining existing institutions will have to expand to fill the void left by abandoned plants and their administering institutions. This expansion means the remaining facilities and their administering institutions will have larger geographic areas to service which in turn will include a larger number of political subdivisions and institutions.

Under the local approach there are two basic ways in which the remaining existing institutions could respond to the elimination of treatment facilities and/or institutions. They could either enter into contractual agreements with these institutions, thus retaining a strong degree of control over local affairs, or the remaining existing institutions could expand their service areas and boundaries to include areas which no longer have treatment facilities. In either case the reconstructed entity would still be responsive to local control. From a regional perspective, expanding service areas is probably more desirable; but from a political perspective less desirable. The viability of increasing geographic jurisdiction is largely dependent on the present existing legal authority which grants institutions geographic flexibility. In Illinois the special sanitary districts are granted the greatest geographical flexibility by their enabling legislation. In the absence of a contractual agreement, municipal wastewater treatment facilities are restricted to providing services only within the municipal boundaries. County Departments of public works are similarly statutorily restricted to providing services to areas within the county not already served by an existing agency or

facility. Thus both municipalities and counties have limited geographical flexibility in Illinois. As a result only the special sanitary districts would provide an available option to use an existing agency. There also exists enabling legislation in the Illinois Code authorizing river conservancy districts to engage in a variety of water resource program however, the authority remains basically unused.

In Indiana a somewhat similar situation prevails. Sanitation departments are limited in their geographic flexibility and special sanitary districts possess the most geographical flexibility for expansion of service areas. A recently enacted section of the Indiana Code provides for the creation of regional water and sewage districts, however, to date, no such districts have been organized.

Regional institutions do exist in the two state area. However, they are planning agencies with no authority to require their membership to accept regional plans for wastewater management.

In order for these regional planning institutions to fulfill the requirements of regionalization, several modifications would be necessary. First, there is a need to develop uniform objectives for wastewater management in the C-SELM Area and to coordinate enforcement of these objectives. Second, regional planning agencies need authority to implement regional water and land resource plans or to coordinate the implementation of plans by local institutions. If local agencies cannot be required to coordinate the planning, construction and operation of their facilities at the regional level, then implementation of any technical alternative will be difficult.

From a financing perspective, both contractual arrangements and expansion of service areas would place the burden for raising the necessary financial resources on a combination of municipalities, counties, special districts and the state. In essence, this is the financing arrangement that currently exists. In either case each remaining unit of government would be responsible for modifying local restrictions to incur indebtedness as necessary and would also have responsibility for administration. As localities were found to be unable to meet the financial requirements, the federal government would have to expand its role. Of the two local approaches, contractual agreements and expansion of geographic jurisdictions, contractual agreement is the most feasible and practicable from a political standpoint and perhaps from an administrative standpoint. For the most part, contractual agreements should not require new state or county enabling legislation, should minimize local opposition, and should maintain the integrity of more existing institutions. As was noted above, however, the local approach is probably less desirable from an economic or financing view since it would depend on an already over-burdened patchwork financing system at the local level.

The location of an "L" an "R" or an "A" in each of the boxes in the matrix on page F-III-2 indicates which of the institutional approaches are thought to be most likely to fulfill the economic, administrative and political criteria established. On the matrix it can be seen from the frequency of the letter "L" that the local approach, implemented primarily through the use of contractual agreements, appears in some ways to be a practicable answer to at least some aspects of the total wastewater management problem. In addition to being politically feasible this approach would still be compatible with forthcoming Federally supported areawide wastewater management planning programs and activities (Section 208 requirements referred to earlier).

THE INTERMEDIATE REGIONAL APPROACH

The regional approach departs significantly from the local approach just discussed in that more substantial modifications would be required of the existing institutional structure. Basically the regional approach would involve a significant restructuring of present institutions and service areas which would very likely eliminate or consolidate many of the smaller municipal and county public works departments within the C-SELM area in both Indiana and Illinois. The significant difference between this regional approach and the local approach discussed above is that many more existing wastewater management institutions would either be eliminated entirely and their services absorbed by other jurisdictional expansions, or consolidated into larger service areas. A substantial amount of expansion of existing service areas and/or boundaries to include areas which no longer have treatment facilities would be required.

To accomplish this regional goal, many of the same institutional problems encountered in the local approach would still remain but would probably be even more complex from a political and administrative standpoint. Thus new state enabling legislation would undoubtedly be required to expand the geographical jurisdictions of existing institutions to include new areas. As in the local approach special sanitary districts in both states appear to provide the most opportunity from a purely administrative and institutional perspective. This regional approach could be based on service areas each of which contained at least one and probably several treatment facilities. In the case of Alternative III, for example, as many as 17 service areas might be created, one for each treatment facility, with either contractual agreements among the service areas to facilitate collection and disposal of sludge, or a planning or enforcement authority to guide and coordinate the overall objective of each of the 17 districts. In actuality, the exact number of districts in the regional approach should be determined by the way in which the C-SELM area could most logically be subdivided into service districts. In the case of Alternative IV, a regional approach such as the one described would also require some sort of interstate compact since this technical alternative proposes to transfer sewage from one state to another.

In this intermediate regional approach, cooperative and other contractual agreements would also be frequently employed to coordinate policies concerning land uses, shared facilities, resources and planning, and construction and management activities. As in the local approach there is presently no institution in the C-SELM area with this authority and thus either an existing institution would have to be given the authority or a new one(s) created through legislation with the necessary authority. The River conservancy districts now permitted under Illinois law provide another institutional option available for consideration. The same is true of the regional water and sewage districts authorized in Indiana. These districts have not yet been organized but do possess the geographic jurisdictional authority which could provide the basis for restructuring existing institutions into expanded service areas. The regional approach does, however, involve a greater degree of consolidation; it does affect a greater number of political subdivisions; and it therefore could be expected to meet greater public and institutional opposition.

The intermediate regional approach, like the local approach, would operate most effectively if regional planning agencies were authorized to require those agencies responsible for the construction and operation of treatment facilities to adhere to regional plans. If such agencies cannot be required to coordinate the planning, construction and operation of facilities, then implementation of any technical alternative will be difficult.

From an economic point of view, the intermediate regional approach offers significant advantages over the local approach in that the local financing and resources would be substantially consolidated and likely increased. These special districts would have to have the responsibility for establishing a comprehensive system of user fees to raise revenues to cover operation, maintenance and replacement costs. Additionally, these districts then could back bond issues while taxing authority or a system of user charges. This would be accomplished on a broader scale than the local approach thus allowing for a more efficient and equitable distribution of costs. By being able to draw from the resources of a large number of jurisdictions within its boundary, the district would very likely be able to obtain a favorable credit rating, thereby reducing the cost of borrowing money.

These actions would, however, have the effect of reducing local decision making control (and constraints), would centralize administration to a greater degree and would solidify the local financing base. Again, as noted above, these economic advantages are probably balanced by trade-offs in the loss of local decision making authority resulting from centralization and consolidation. This is shown graphically in the matrix which appears on page F-III-2.

THE AREAWIDE APPROACH

This approach is similar in most respects to the regional approach just discussed except that it would go further and establish one or perhaps a few multi-county service areas. Major institutional alignments and changes would be required under this proposal and in particular some mechanism, probably an interstate compact, would be required to resolve the interstate transfer of sewage which would be involved. Specially, technical Alternative IV would require an interstate agreement because it would transfer waste from Illinois to a land disposal site in Indiana. There have also been recent actions in Indiana to prohibit such a transfer through state legislation. These actions no doubt represent some public thinking in Indiana. A second example of public sentiment in Indiana is also indicated by legislation introduced recently in the Indiana legislature which would require local public approval and representation in any areawide waste disposal system in all affected areas. Again, an areawide system with only one or a few large service areas would face most of the same political and administrative problems which the previously discussed regional approach would face except that they would be exacerbated.

Under the areawide approach, the successful implementation of any of the technical plan would not be as dependent upon the existence of a regional planning body as is the case with the local or regional institutional approaches. Where only a few agencies are involved in the construction and operation of facilities, there is less need for a separate agency with enforcement authority to coordinate construction, operation and planning.

In the case of financial resources development, an areawide service district(s) would have the greatest advantage of all three of the institutional approaches discussed. It could draw on the resources of a large area, taking advantage of the resulting economies of scale and could eliminate much of the existing duplication in both administrative and financing expenses. Its bonding authority would be substantially greater due to its larger service area and it could be assumed that its credit rating would be improved. This could in turn reduce the cost of borrowing money.

In the light of present federal policies, particularly areawide management planning required by Section 208 of the FWPCAA of 1972 (see page F-I-3), the intermediate regional or areawide approach would be the more consistent and far reaching than the local approach. The matrix on page F-III-2 displays this analysis.

ADDENDUM A

TYPES OF EXISTING INSTITUTIONS

ILLINOIS

Within the Illinois portion of the C-SELM area, there are three significant types of institutions involved in wastewater treatment; municipalities, county departments of public works (DPW's), and special sanitary districts.

Municipalities

It is important to note that no single municipality plays an important role in wastewater treatment within the study area. However, there are many municipalities which own and operate their own treatment facilities. Illinois municipalities are authorized to plan, construct, and maintain sewage facilities. Of significance is the fact that municipalities may contract to treat the sewage of other municipalities, counties, sanitary districts, individuals and industries. Municipalities have the power of eminent domain within the corporate limits. If the municipality has a population of not less than 100,000, it may condemn land and build facilities outside of the corporate limits. They may also collect and dispose of solid waste.

County DPW's

Within the C-SELM area, the Lake and DuPage County DPW's are involved in wastewater management. A critical factor in determining the ability of county DPW's to assimilate all or portions of new wastewater systems is the fact that DPW's are restricted by statutorily imposed geographic limitations. DPW's are authorized to act only in areas without similar services provided by another entity organized for similar purposes. For example, the Lake County DPW's is restricted in the western part of the county because the North Shore Sanitary District provides service for the eastern lakefront communities. However, DPW's may treat effluent from incorporated areas if such service is requested by a municipal corporation. In addition, counties may contract to treat the sewage of any sanitary district which has a population of less than 500,000.

Another critical factor is the scope of the DPW's authority. In addition to planning, constructing and operating sewage treatment facilities, the Lake and DuPage County DPW's provide water supply and are engaged in flood control activity. Although county DPW's themselves do not have comprehensive planning authority, the Illinois Code does authorize regional

planning commissions to be established by counties. Plans developed by such Commissions are advisory only. County DPW's are also authorized to order parties, individuals and firms to cease the pollution of streams, but such authority does not supercede that of the Illinois Pollution Control Board.

Special Sanitary Districts

There are a large number of special sanitary districts within the Illinois portion of the C-SELM area. Some districts are formed under general enabling legislation while others are authorized by specific sections of the Illinois Code. Three districts, the Metropolitan Sanitary District of Greater Chicago (MSDGC), the North Shore Sanitary District (NSSD), and the Bloom Township Sanitary District (BTSD) are of special significance because of the scale of their operations and will be discussed below.

MSDGC. MSDGC was organized under Chapter 42 section 320 et seq. of the Illinois Code. One critical factor is flexibility of MSDGC's geographic jurisdiction. By statute, the corporate limits of MSDGC may be extended to any contiguous area of Cook County where the operation of treatment plants will be conducive to the preservation of public health. The district's boundaries, which may be extended by act of the state legislature, have frequently been extended so that the district now includes almost all of the county. The district is also authorized to treat the sewage of any municipal corporation which is wholly or partially within its jurisdiction.

The scope of the district's functional authority is also important in evaluating the district's ability to implement new wastewater treatment proposals. MSDGC's major function is the planning, construction, and operation of sewers and sewage treatment facilities. As authorized by law, the district is also involved in flood control and electrical generation. One of the district's most significant programs involves the reclamation of strip-mined land in Fulton County through the application of sludge produced by the district's treatment plants. The district is authorized to purchase and lease real and personal property both within and outside of its jurisdiction and to take property by condemnation but only within its boundaries. MSGDC also plays a limited regulatory role in that it has the power to approve plans for all sewers connecting with the district and to issue permits for any discharge which may pollute the waters of the District (this provision does not apply to a municipal corporation of less than 500,000).

NSSD. NSSD was created under the provision of Chapter 42 section 298 et seq. of the Illinois Code. One critical factor with respect to NSSD is the limitations which are placed upon the agency's geographic jurisdiction.

NSSD provides sewage treatment for the eastern section of Lake County. By statute, the district's jurisdiction is restricted to municipal corporations and the area within three miles of a municipal corporation. Within these limits, however, NSSD has some geographic flexibility in that its jurisdiction may be expanded by an act of the State Legislature, by petition of the residents of a proposed addition, or by act of the District's Board of Trustees.

NSSD is authorized to plan, construct, operate and maintain sewers and treatment plants. Although the district is also authorized to provide a water supply, it has not exercised this authority. NSSD has the power to condemn public and private property both inside and outside its corporate boundaries in order to construct sewage facilities. It also has limited regulatory authority as it can control public and private tributary connections, set standards for the construction of connecting sewers, and control the discharge into sewers of wastes which are toxic to biological treatment processes.

BTSD. BTSD was formed under general enabling legislation (Chapter 42 section 299 et seq.) which restricts the geographic jurisdiction of sanitary districts to any area within a municipal corporation or within six miles of the boundary of a municipal corporation. It is important to note that within the above limitation, the BTSD has flexibility in expanding its jurisdiction. The district's jurisdiction may be expanded by petition of the residents of the areas to be annexed or by act of the Board of Trustees. The district may annex any territory which is contiguous thereto and which is served by the district.

BTSD is authorized to plan, construct, operate and maintain sewers and sewage treatment facilities. It may also acquire and operate waterworks if authorized to do so by referendum. The district has not exercised this authority. BTSD may acquire real and personal property by purchase or condemnation inside and outside its jurisdiction, regulate connections to its sewers, and promulgate standards for the construction of sewers and treatment facilities which connect with the district's system. The district also has authority to prevent the pollution of water supplies which may be used by a municipal corporation within the district and to police the area within fifteen miles of the intake of any such water supply. Furthermore, BTSD may prohibit the discharge into sewers of certain substances which are toxic to biological treatment processes.

INDIANA

Within the Indiana portion of the C-SELM area, two fundamental types of institutions are involved in wastewater treatment; special sanitary districts and the sanitation departments of municipal corporations. The East Chicago, Gary, Hammond, and Michigan City Sanitary Districts are

examples of special districts. The Valpariso Sanitation and Sewer Department (VSSD), the Portage Sanitary Board (PSB), and the Chesterton Sewage Utility (CSU) are the principal municipal departments within the area involved in wastewater management.

Municipal Sanitation Departments

The first critical factor in determining the ability of sanitation departments to adapt to a regional sewage system is the geographic flexibility of the departments.

The jurisdiction of sanitation departments in Indiana is generally limited to the boundaries of the municipal corporation. However, any city or town may contract to treat the sewage of any other city or town subject to the approval by the State Board of Health and the Indiana Stream Pollution Control Board.

The second critical factor is the scope of authority granted to municipalities. Municipalities are authorized to plan, construct, operate, maintain sewers and treatment facilities. They also provide facilities for sludge and solid waste disposal. Municipalities provide water supply and are authorized to acquire by condemnation real and personal property within and outside of the corporate limits necessary for treatment facilities.

Special Districts

Special sanitary districts are created by city ordinance under state enabling legislation. The jurisdiction of the districts includes the corporate limits of the city and an additional area which may be included in a variety of ways. Additional cities, towns, platted subdivisions and unplatted lands located in the same county as the city which formed the district may be included. In addition, the Board of Sanitary Commissioners (the governing body of a district) may incorporate any territory which drains sewage into the district's sanitary system. Sanitary districts are also authorized to treat sewage from sources outside of the district on a contractual basis.

The scope of the districts' functional authority is another factor which is of importance in assessing the ability of the districts to adapt to new technical proposals. In addition to planning, constructing, and operating sewers and treatment facilities, sanitary districts have authority to engage in solid waste disposal. However, only the Gary and Michigan City Sanitary Districts provide this service. The districts are authorized to sell by-products of sewage disposal or to provide such material for a public use without cost. In order to perform its authorized functions, a special sanitary district may purchase, lease, or condemn real or personal property within the district or within five miles of its boundaries.

It is also important to note that sanitary districts are to a limited extent involved in regulatory activity. They are authorized to review and approve plans for private treatment facilities which connect with the district's facilities and they can require the elimination of elements which would interfere with sewage treatment.

INTERRELATIONSHIPS AMONG EXISTING WASTEWATER MANAGEMENT INSTITUTIONAL SYSTEMS

This section of the report will examine the extent to which wastewater management institutions in the C-SELM area function together as a regional system. This section will discuss current efforts at the local, regional state and interstate levels to regionalize wastewater treatment and identify those factors which are critical to the success or failure of regionalization.

LOCAL LEVEL

A critical factor in determining the strengths and weaknesses of the existing areawide wastewater management systems is the level of coordination between local wastewater institutions. At the present, there is a general absence of coordination between local wastewater institutions in either the Illinois or Indiana portions of the C-SELM area. However, there are limited exceptions to this rule. For example, in Illinois, the Lake County DPW operates some municipal treatment plants on a contractual basis. It is important to note that there is potential for some regional effort by Illinois County DPW's and municipalities and by Indiana municipal sanitation departments as these agencies may treat the sewage of other political subdivisions on a contractual basis. Indiana municipalities also may require any property owner to connect his property with the municipal system.

Sanitary districts in Illinois and Indiana provide a greater opportunity for regionalization for several reasons. First, in both states the districts have a certain degree of geographic flexibility because they are authorized to annex additional areas either on their own initiative, by an act of the state legislature or by petition of the residents of the area to be annexed. The districts can also treat sewage from outside their boundaries on a contractual basis. Another reason for the ability of the districts to operate on a regional basis is their limited regulating authority. In Illinois and Indiana the special districts can regulate the content of the effluent which enters their facilities and can also review plans for connecting sewer lines.

INTRASTATE REGIONAL LEVEL

Illinois

The principal regional agency within the Illinois portion of the C-SELM area is the Northeastern Illinois Planning Commission (NIPC). NIPC was created in 1957 by the Illinois legislature and directed to develop a comprehensive plan for Cook, Will, DuPage, Kane, Lake, and McHenry Counties. The agency has planning responsibility in a variety of areas including wastewater, open space, housing and transportation. Of critical importance is the comprehensive plan which was adopted by NIPC in 1968. The plan calls for development corridors reaching outward from Chicago. Since 1968, NIPC has developed a Regional Open Space Plan and a Regional Wastewater Plan which serve as implementing elements of the comprehensive plan. The Regional Open Space Plan recommends that 220,000 additional areas of regional open space should be acquired in Northeastern Illinois before 1995. A land acquisitions plan involving parcels of this size would exert a strong influence on the land use pattern within the C-SELM study area. NIPC is now developing an implementation schedule for its wastewater management plan.

Although NIPC has regional comprehensive planning authority and serves as an A-95 agency, of critical importance is the fact that the agency's effectiveness is weakened in several ways. NIPC can advise local units of government concerning the interrelationship of their plans and projects, but the commission may act only as an advisory body and its recommendations have no binding effect. Also, NIPC has no independent source of revenue and must rely upon the member counties and federal grants for its income.

Indiana

Within the Indiana portion of the C-SELM area, the principal regional agency is the Lake-Porter County Regional Transportation and Planning Commission (LPCRTPC). LPCRTPC was created in 1967, under authority of the Indiana Regional Planning Act. The act authorizes regional planning commissions to develop a comprehensive plan including transportation for the region the agencies encompass. LPCRTPC also serves as a Metropolitan A-95 Clearinghouse and as such, it comments upon local applications for federal aid. Although LPCRTPC's present jurisdiction includes only Lake and Porter Counties, its jurisdiction will probably be expanded to include at least LaPorte County and perhaps Newton, Jasper, Pulaski and Starke Counties. A provision of the Regional Planning Act authorizes LPCRTPC to admit political subdivisions of another state as members when a logical planning area extends beyond Indiana.

LPCRTPC has not yet played a major role in regional wastewater treatment system planning. To date, the commission's only involvement in wastewater planning has been the development of the "Master Plan Reports - Sanitary Sewer and Water Facilities for Lake and Porter Counties". In other areas such as transportation, public health and urban planning, LPCRTPC has been active in coordinating area efforts and in reviewing applications for Federal and state funds. The Commission has not developed a plan comparable to NIPC's Regional Open Space Plan.

LPCRTPC is restricted because it can act only in an advisory capacity and has no independent source of revenue. However, a 1971 amendment to the Indiana Regional Planning Act directed participating counties to levy a tax in order to finance their pro-rata share of the Commission's operating expenses.

STATE LEVEL

In both Illinois and Indiana, there are several state agencies which will affect a regionalized approach to wastewater treatment.

Illinois

In Illinois, two agencies, the State A-95 Clearinghouse and the Bureau of the Budget, are of critical importance because they have the capacity to affect regionalism through their influence in the area of finance. The State A-95 Clearinghouse reviews local applications for federal financial assistance to determine whether there are duplicate or conflicting programs planned by other local units of government. The Bureau of the Budget is an influential state agency which prepares the governor's budget and therefore, plays an important part in determining the dollar amount allocated to state agencies.

The Illinois Natural Resources Development Board serves in an advisory and coordinating capacity. The Board is composed of the directors of ten state agencies involved with natural resources. In the area of wastewater, the Board has several specific responsibilities including recommending legislation and programs to insure that state water requirements will be met.

Three other Illinois agencies created by the Illinois Environmental Protection Act are also significant. The Illinois Institute for Environmental Quality is a research and advisory agency which coordinates research on waste disposal in northeastern Illinois. The institute is authorized to investigate practical problems relating to the technology and administration of environmental protection but may not engage in abstract research. The Illinois Pollution Control Board (IPCB) is responsible for

promulgating standards for water quality, effluents, treatment facilities, and treatment plant operators. The Board also conducts pollution abatement hearings. Although the Board activities do not directly promote a regionalized solution to sewage treatment problems, they can indirectly in that the promulgation of water quality standards may call for more sophisticated treatment processes which in turn result in economic attractiveness of large-scale treatment facilities. The Illinois Environmental Protection Agency is responsible for enforcing the IPCB regulations and administers the State's Anti-Pollution Board Program. Local requests for financial aid for the construction of treatment facilities are presented to the agency.

There is presently no concentrated effort on the part of Illinois State agencies to promote regional sewage treatment. However, the State A-95 Clearinghouse and the Illinois EPA review applications for financial aid to insure that local government units do not pursue conflicting programs and the Illinois Pollution Control Board has ordered DuPage County to regionalize its sewer system.

Indiana

There are also several Indiana state agencies which do or potentially could have an influence upon a regional approach to sewage treatment. The Indiana Stream Pollution Control Board is staffed and funded by the State Board of Health and is the state's principal wastewater treatment regulatory agency. The Board inspects all municipal and industrial treatment operations, reviews plans for new facilities, establishes water quality standards, conducts enforcement procedures, and reviews all applications for state and federal financial assistance (the Board is not an A-95 agency, but works closely with the statewide clearinghouse). The Board can order municipalities and sanitary districts to build facilities in order to abate violations.

The Division of Planning within the State Department of Commerce is an agency actively involved in promoting regionalism. The division encourages inter-governmental planning, and is responsible for drafting legislation dealing with regional institutions. The Division of Planning has divided the state into fourteen planning and development regions.

The Indiana Department of Natural Resources is responsible for flood control, water resource conservation, recreation and reservoir development. The department's only involvement with wastewater is approving conservancy districts and supervising deep-well disposal systems.

The statewide A-95 review process is performed by the State Budget Agency. The Budget Agency relies heavily on the Indiana Stream Pollution Control Board in reviewing local applications for federal financial

assistance. The purpose of the review process is to insure that federal money is not used to finance competing or duplicate programs at the local or regional levels.

The Indiana Environmental Management Board, which was created in February 1972, has wide authority to affect regional wastewater treatment planning and development. The Board may, for example, develop a comprehensive plan for control of the environment, develop regulations to protect the environment, inspect disposal sites and encourage and assist local units of government in developing programs and facilities for the control of air, water, radiation, odor and noise pollution. More significantly, however, the Board may, if it is in the interest of health, safety or welfare, order any person to connect or receive and treat sewage from any other person or from an industry or housing development. If the Board finds that local governmental units have not developed plans to provide for adequate wastewater treatment, it may hold a public hearing, and if the facts support the conclusion, it may order the affected local government units to form regional water, and/or sewage districts.

INTERSTATE LEVEL

Two different coordinating bodies have been created to facilitate the integration and coordination of planning efforts in the C-SELM area. These agencies are critical factors in the operation of a regional sewage system. The Regional Transportation Planning Board (RTPB) is a coordinating committee composed of the executive directors of NIPC, LPCRTPC and the Chicago Area Transportation Study (CATS). Although RTPB was created principally in response to pressure from the Federal Department of Transportation and is involved in transportation planning, the fact that the agency exists shows a willingness on the part of Illinois and Indiana to cooperate in solving interstate problems.

The Interstate Planning Committee (IPC) is a response to federal pressure through HUD for interstate coordination of comprehensive planning. IPC was created in 1969, by agreement between NIPC and LPCRTPC to "consider all planning and development problems affecting the entire 'Metropolitan Region'." It is unclear as to whether IPC is subordinate to NIPC and LPCRTPC or vice versa. This uncertainty has created confusion regarding IPC objectives and produced various assessments of its efficiency. With respect to planning for water supply, sanitary sewers, and solid waste management, there has been little cooperative effort and little is anticipated at this time. However, there has been some exchange of technical information in these areas.

ADDENDUM B
FINANCIAL FACTORS

This part of the report will identify those financial considerations that will determine the extent to which state and local institutions within the C-SELM area will be able to finance wastewater management activities. The report is organized into five sections.

I. Financing: legal constraints and allowances.
II. The state budget cycles.
III. State finances.
IV. Local wastewater financing - Indiana
V. Local wastewater financing - Illinois

Since the C-SELM area contains parts of Illinois and Indiana, the analysis for ease of understanding is separated along state lines whenever necessary. A number of tables have been included as well as a glossary of terms.

SUMMARY

SECTION I - FINANCING: LEGAL CONSTRAINTS AND ALLOWANCES

In terms of constitutional and other state-imposed legal constraints pertaining to wastewater financing, *Illinois is less constrained than* Indiana for nearly every generic type of institution.

Indiana

The State of Indiana is precluded by the constitution from issuing any general obligation bonds, thereby effectively shifting the financing burden to state created but locally-administered special districts and to municipal corporations. In turn, these institutions operate under a variety of constraints and allowances relating to permissible indebtedness, debt service, taxation powers, user charges and special assessments. The maximum debt ceiling for any institution is 2% of assessed property valuation.

Illinois

The State of Illinois is enabled by its 1970 Constitution and the State Code to take an active role in financing at the state level. Currently it has outstanding a sizeable general obligation bond issue to assist local governments in wastewater financing. Local institutions in Illinois operate under constraints and allowances very similar, but less constrained than local entities in Indiana. However, the maximum debt ceiling permissible for any institution is 5% of assessed property value.

SECTION II - THE STATE BUDGET CYCLES

Both states have relatively short budget cycles and this does not encourage long-term planning. In Illinois, the National Resources Section of the Bureau of the Budget has primary responsibility for developing wastewater expenditures, in Indiana, the budget formulation process for wastewater involves the Budget Agency and the legislature.

SECTION III - STATE FINANCES

In terms of direct state financing and in transfers to local governments Illinois has taken an active role both generally and in wastewater. The most significant example is the current $750 million Anti-Pollution Bond Act of 1970 which transfers state general fund revenues to local governments as part of an expanded state contribution in joint federal, state and local wastewater projects. Indiana has participated, in a limited manner, by providing several small transfers to local and regional institutions.

Contained within this section are a number of graphic state-local comparisons of a categorical expenditures for wastewater and other purposes. While these reveal that per-capita expenditures for the total of all local and state institutions are nearly identical for Indiana and Illinois, there is evidence of a stronger financial capability in Illinois in terms of long-term general obligation bonding capacity.

SECTION IV AND V - LOCAL WASTEWATER FINANCING

There are two distinct local wastewater financing approaches in Indiana: the sanitary district and the municipal department of sanitation. The sanitary districts rely primarily upon the issuance of general obligation bonds for financing and, as indicated by recent data, generally have considerable borrowing capacity remaining. Municipalities, however, rely heavily upon revenue bonds, an approach generally considered less desirable because of higher bond interest cost and variability of the bond market. Additionally, the low rating or absence of a rating by Moodys Investors Service of many of these revenue bonds may severely limit the utility of this financing approach.

The major wastewater financing distinction in Illinois is also between sanitary districts and municipalities. Data indicates that these sanitary districts are increasingly likely to be supplementing an overburdened municipal taxing structure, especially in Cook County. There is one indication of an expanded financing role for special districts. For example, the Metropolitan Sanitary District has a number of significant cash funds and other financing tools at its disposal that are not available to many other Illinois sanitary districts. There is little evidence of such a trend in Indiana.

GLOSSARY OF TERMS

Assessed Valuation: The valuation placed on property for purposes of taxation.

Bond: An interest-bearing security with a promise to pay back at a specific date.

Coverage: This is a term connected with Revenue bonds. It indicates the number of times that the debt service for one year can be paid after operating and maintenance charges have been subtracted from revenues.

Debt Limit: The statutory or constitutional maximum debt-incurring power of a unit of government.

General Obligation Bond: A bond secured by pledge of the issuer's full faith, credit and taxing power.

Revenue Bond: A bond payable from revenues derived from charges, rents or tolls paid by those who use the facility constructed with the proceeds of the sale of the bonds. Such bonds are secured only by the project's revenues.

The Bonding Process: Bonds are a means of financing major capital and other expenditures by providing large amounts of money which can be paid back over an extended period of time (Usually 50 years or less). When municipal bonds are sold, the city receives the amount of the issue, say $20 million. The city is then obligated to pay back this money plus interest over a period of years. If the bond is a revenue bond, then the paycheck will be from revenues of the project. If the bond is a general obligation bond, payment will come from any/or all sources of tax revenue for the city.

SECTION I - FINANCING: LEGAL CONSTRAINTS AND ALLOWANCES

INDIANA

Indiana would be permitted to issue general obligation bonds of the state only if a constitutional amendment is passed by the legislature and ratified by the voters, a process which has never been attempted. State created institutions are permitted to issue revenue bonds and several, such as the Indiana Toll Road Commission and several colleges and universities, have done so. With the exception of special districts, (considered local institutions), no state-level institutions have outstanding indebtedness for the purpose of wastewater financing.

The wastewater financing legislation that is contained in the Indiana Code is lengthy, detailed and complex. The institutional focus of the code statutes is extremely specific and what exists, is in essence a series of laws, each of which applies to a single city or a single special district. Table 10 contains a summary matrix of relevant Indiana constraints and allowances that will be discussed in the following paragraphs.

The constitutional limitation on indebtedness of 2% of total assessed property valuation applies to political and municipal corporations. This limit does not apply to special districts which are not municipal corporations but rather special state functional units. A limit on total indebtedness of 12% for these districts has been established by the legislature and this is periodically raised.

Both special districts and municipal corporations can issue general obligation bonds that are backed by the full faith and credit of the institution and the proliferation of such issues on the market attests to the usefulness of this approach. However, municipal corporations are also enabled to issue revenue bonds (called revenue warrants) and they generally rely heavily upon this type of bond.

Special assessments can be levied by cities of the third and fourth class and in some instances by cities of the first and second class; however, special districts cannot levy special assessments. Both municipal corporations and special districts are permitted to levy user fees adequate to cover capital and operational costs. These are used by municipal corporations to cover the plant operation costs and to meet revenue bond debt service requirements. Special districts, if they levy user charges, place the proceeds in a revolving fund with special taxes that are levied, and the fund is used to pay the general obligation bond debt service.

Counties are also limited by the 2% Constitutional debt limit which is in addition to the limit on all cities and sanitary districts within the county. Although they are permitted to issue general obligation bonds, no counties in the Indiana study area have yet done so for the purpose of wastewater financing. This is due to the fact that in Indiana, municipalities and special districts have traditionally undertaken the major wastewater management financing function.

ILLINOIS

Illinois is permitted to issue general obligation bonds for any purpose, after approval by both houses of the legislature or by the majority of voters in a general election. The most significant recent example is the 1970 Anti-Pollution Bond Act which provides up to $750 million to assist localities in the development of municipal sewage treatment works.

The Constitutional and Code provisions that apply to counties and municipal corporations are flexible. These provisions are outlined in the matrix in data Table 11. The overall debt limit for all types of institutions is 5% of assessed property valuation (2 1/2% in counties with more than 500,000). If home rule units of a specific size exceed more restrictive limits, then the legislature may limit their debt to less than the 5% Constitutional ceiling.

Counties are enabled to issue both general obligation and revenue bonds. User fees are permitted but they must be equitable and may be higher for users geographically outside the boundaries of the county.

The same general provisions that apply to counties also apply to municipal corporations, with a number of minor differences, such as bond interest rates and referendum requirements. User fees can be levied and special assessments are permitted in home rule municipalities. Taxes may be levied to pay off general obligation bonds and to meet expenses. Tax warrants, another name for tax anticipation bonds, may also be issued. In addition, a special annual tax of 5% of assessed value of property may be levied to establish and maintain a capital improvement fund. The restrictions and allowances specified in the code apply generally to all municipal corporations.

The Illinois code deals with special sanitary districts in general, as well as specifically in terms of Chicago's Metropolitan Sanitary District. Special sanitary districts incur indebtedness through the issuance of general obligation bonds, although districts with less than 500,000

population may also issue revenue bonds. Special assessments are permitted, although user fees are limited to industrial users of the system. A general tax is permitted to cover costs and to pay off general obligation bonds. An additional tax of .083% can be levied annually (or a greater amount with a referendum). As in Indiana, the special sanitary district's debt limit is independent of the municipality's debt limit and is therefore a major financing vehicle for wastewater.

The Metropolitan Sanitary District of Chicago has a number of additional financing mechanisms not available to other special districts. It may levy a tax in addition to that necessary to meet expenses and debt service of .28% of assessed value of property if approved by a public referendum. Also, it is permitted to establish a $17.5 million corporate working cash fund, a $12.5 million construction working cash fund, a $380 million replacement and remodeling cash fund (all through the issuance of bonds). Although MSDGC is permitted to issue revenue bonds, the great bulk of debt financing is accomplished with general obligation issues.

REFERENDUM REQUIREMENTS

Referendum requirements in Illinois and Indiana apply to general obligation bonds, except those of sanitary districts. The referendum requirement is not generally applicable to revenue bonds which are constrained by bond market considerations which in turn are closely related to the general economic climate. In both states, the legally designated procedures for referendum are not burdensome and the time lags not significant (90 days or the next general election). Fifty percent plus one vote is usually needed for passage. When a jurisdiction is under an order of a court of law these referenda restrictions are not applicable.

State officials in Illinois' Bureau of the Budget feel that increasing tax pressures have caused referenda for all purposes to be defeated in increasing numbers since 1966. However, Illinois' $750 million bond Act passed by a margin of two to one. Because this Act can effectively decrease the local matching requirement for wastewater to 25% in a joint federal EPA-state-local sharing program, it is possible that lower local matching bonding requirements encourage prospects of local referenda. The same cannot be said, however, for Indiana since the State has not been able to lower the local share to date.

SECTION II - THE STATE BUDGET CYCLES

INDIANA

The State budgetary process in Indiana is keyed toward local participation and toward longer-range planning. Illinois operates on a shorter budget-making authority with one executive agency.

Indiana operates on a biennial budget cycle with state and local agencies submitting past expenditure data and appropriation requests to the State Budget Agency at the beginning of each cycle. A committee composed of this agency's staff and Indiana House and Senate members then formalizes the budget recommendation before they are sent to the legislature for action. After the first year of the cycle, the legislature may modify the budget as necessary. While this two-year cycle may encourage longer-range planning, it can restrict operations of state agencies and affect state grants to local government to the extent that the allocation for the two year period has been rendered inflexible by administrative and legislative processes.

ILLINOIS

Budget formulation in Illinois is vested in the Governor's Bureau of the Budget office. The budget document is presented to the legislature for approval and modification. The legislative branch may have no prior input in the process. In effect, the Natural Resources Unit of the BOB develops the dollar allocations for wastewater during the one-year budget cycle without extensive outside participation. The legislature feels that the Natural Resources Unit has the expertise to develop the budget for wastewater.

While this short budget cycle discourages longer-range planning, it does permit budget modifications on an annual basis.

SECTION III - STATE FINANCES - INDIANA AND ILLINOIS

Indiana data present a picture of a state that has undertaken limited state financing of wastewater activities. It has been able to transfer little in recent years beyond funds for study and planning purposes and this has been to state agencies rather than to local governments. In the past, federal grants for various purposes have been lost due to the state's inability to match. Recent significant state grants for wastewater have been:

$1,905,000 to Hammond S.D.
$ 600,000 to Portage S.D.
$ 412,000 to Valparaiso S.D.

Indiana and its various state agencies have no significant wastewater debt outstanding. As mentioned previously, the state and its agencies are prohibited from issuing general obligation bonds. Although it has issued revenue bonds, these have been for purposes other than wastewater.

In terms of general financing for all functions and in relation to wastewater, Illinois has taken a significant and active role. On June 30, 1971 the state had the following general obligations outstanding:

Armed Services Recognition	$ 12,500,000
Mental Health and Welfare	$100,000,000
Educational Institutions	$128,800,000
Anti-Pollution	$100,000,000

These represent general obligations of the state and are payable from various taxes, while being backed by Illinois' full-faith and credit. The bonds have received Moody's highest rating - AAA. This indicates that additional debt can probably be undertaken with little difficulty.

The Illinois Anti-Pollution Bonds outstanding (sold) represent only a fraction of the $750 million authorized in 1970. The interest and principal on these bonds is paid from the state's general fund. These general fund revenues finance approximately two-thirds of Illinois' expenditures.

Excluded is $1.434 billion in 1972 revenues ($573 million of federal aid) which is restricted by law to special fund categories. During 1971, these funds did not account for any significant wastewater expenditures. For 1973, a total of $2.5 billion in state transfers to local governments is projected. Of this, $1.4 billion (60% down from 67% in fiscal 1972) is free of restrictions, part of which can be used for wastewater financing. Table 1 itemizes aid to local institutions (Illinois) by category. Environmental protection and general aid represent potential wastewater expenditures, however, general aid tends to be used for other purposes.

TABLE 1 - Aid to Locals-Categorical Comparisons - Illinois
(Millions of Dollars)

	Actual 1971	Estimated 1972	Estimated 1973
General (Sales tax share & state income tax share)	300.0	344.8	368.3
Education			
elementary & 2nd	931.3	988.1	1,131.1
J.C.	109.7	136.9	204.0
Health	16.5	25.8	31.4
Econ. Growth	6.3	6.4	6.6
Enviro. Protection (wastewater management)		200.0	300.0
Transportation	202.1	313.3	336.8
Total Monetary Assistance	1,708.1	2,143.0	2,517.3

One-twelth of state income-tax receipts from individuals+ corporations is paid monthly to local general revenue funds.

Tables 2 through 4 detail expenditures of the Illinois and Indiana state and local institutions providing categorical and percapita comparisons.

Table 2 State Institution Per Capita Debt: 1970

State Institution Per Capita (Millions of Dollars)

	G.O. Bonds	Revenue Bonds	Total
Indiana	None	103.35	103.35
Illinois	23.90	90.66	114.56

General expenditures by category for all state and local institutions during 1970 are depicted in Table 3 below:

Table 3 General Expenditures by Category
State and Local Governments
In Millions of Dollars
By Capital Outlay

	Total	Education	Highways	Sewerage	Other
Illinois	1,395	419	441	71	464
Indiana	615	229	203	36	147

In terms of total capital outlay expenditures, sewerage amounts to 5.1% in Illinois compared to a slightly higher 5.8% in Indiana.

Table 4 below depicts per capita general expenditures for sewerage.

Table 4 Per Capita Sewerare Expenditures
In Dollars

	Total	Capital-Outlay	Other Than Capital-Outlay
Illinois	12.59	6.38	6.21
Indiana	12.14	6.91	5.23

Per-capita expenditures for sewerage are nearly the same in the two states, although Indiana is spending more on a per-capita basis than Illinois for capital outlay, while spending less for purposes other than capital outlay (operation + maintenance, for example).

Illinois has more special financing districts (2,313) than any other state, while Indiana (619) ranks in the top third. An important reason for the creation of special taxing districts is the fact that they can incur debt which does not come under the limit of the county or city in which they are located. There is a specific limit that applies to special districts and which is depicted in Tables 10 and 11. An individual may, therefore, pay taxes and fees to both the city and a special district in Illinois. This is one of the reasons that the state has undertaken assistance by decreasing the local share required through the Anti-Pollution Bond Act.

SECTION IV - LOCAL WASTEWATER FINANCING - INDIANA

INDIANA MUNICIPAL CORPORATIONS

Municipal corporations in Indiana rely upon revenue bonds as the primary financing tool for wastewater. Forty-six cities issued sewer revenue bonds, while only five issued sewer general obligation bonds during 1969. Revenue bonds are not backed by the full faith and credit of a municipality, but are payable exclusively from the revenues of the sewage plant. Because of this risk factor, revenue bonds command a higher interest rate, making the project most costly (in terms of bond interest paid) to the municipality. This higher cost is, in turn, paid for by the user of the sewage facilities in the form of user fees. These characteristics make the revenue bond financing approach less desirable.

Generally, the revenue bonds are under $2 million each, a relatively small sized issue. Tables 6 through 8 provide additional financial information for sanitary districts and municipalities within the Indiana portion of the C-SELM study region.

One important indicator of a municipality's need for future rate increases is the revenue bond coverage statistic (Table 5), which represents the number of times that one year's debt service can be paid after operating expenses have been subtracted from revenues. For example, if the revenues collected amount to $3,000, then $2,000 would be left after operating expenses have been subtracted from revenues. Since this is two times the debt service, then the bond coverage statistic is 2.00. A figure of 2.00 will cover twice the annual debt service. The excess will go into a revenue bond fund.

The average coverage is a statistic indicating the number of times that the average annual debt service can be paid. Several municipalities, notably Griffith, Kingsford Heights and Highland will not be generating sufficient revenue to cover debt service after paying operating expenses for each year over the life of the bond. Other municipalities are in a marginally better position. Most of these municipalities have a relatively low (BBB), Moody's Bond Rating, which will make it difficult to sell future bond issues.

TABLE 5. Municipal Revenue Bond Coverage

County	Average Bond Coverage
Lake County	
Crown Point	1.81
Dyer	1.33
Griffith	.86
Highland	.63
Hobart	1.21
Lowell	1.28
Schererville	1.39
Porter County	
Chesterton	1.37
Kouts	1.17
LaPort Count	
Kingsford Heights	.62
LaPorte	1.19
Michigan City	N.A.
Westville	1.06

Indiana Sanitary District Financing

Two of the sanitary districts (Hammond and East Chicago) are in debt very close to the legislatively imposed ceiling of 10 percent (recently raised to 12 percent) of assessed valuation of property. Districts with little borrowing margin remaining are not able to take an active role in financing unless the legislature raises the ceiling on indebtedness. Table 6 below depicts the borrowing margin for sanitary districts within the study area.

Table 6. Borrowing Margin 1971
(In Dollars)

District	Assessed Valuation	Current Debt	Maximum Ceiling	Margin
Gary S.D.	388,000,000	18,000,000	38,800,000	20,000,000
Hammond S.D.	216,000,000	19,000,000	21,600,000	2,600,000
E. Chicago S.D.	275,000,000	23,250,000	27,500,000	4,250,000

The general obligation bonds of each of the above sanitary districts have been rated A by Moody's. This is an indication of a favorable debt and taxing structure and the ability of the district to incur and pay off additional debt within limits specified by the legislature.

NOTE: Michigan City Sanitary District created by special law is a hybrid sanitary district which has issued only storm sewer revenue bonds.

Indiana County Financing

Data for Indiana counties within the C-SELM area indicates that all have considerable borrowing margin available (see Table 7 below).

Table 7. County Borrowing Margin 1971
(In Dollars)

County	Assessed Valuation	Maximum Debt Allowable	Current Debt	Borrowing Margin
Lake	1,172,152,645	23,443,040	16,403,000	7,040,040
Porter	347,103,950	6,942,080	3,565,000	3,377,080
LaPorte	253,308,080	5,066,160	None	5,066,160

At the present time these counties are not playing a major role in wastewater management within the study area. However, special districts located within these counties have assumed the important role.

SECTION V. LOCAL WASTEWATER FINANCING - ILLINOIS

ILLINOIS SPECIAL SANITARY DISTRICTS

Special sanitary districts in Illinois rely primarily upon general obligation bonds as a debt financing mechanism. The Illinois portion of the C-SELM area has a number of sanitary districts, many of which are very small and could be annexed by a larger district. Such has been the case in Cook County where the Metropolitan Sanitary District of Greater Chicago has absorbed smaller districts. Presently, MSDGC includes all of Cook County.

The smaller sanitary districts have not been major factors in wastewater financing in the past, although a number of districts seem to have considerable borrowing margin remaining under the constitutional debt limit of 5 percent of assessed value of property. Table 8 below presents data compiled by the Illinois Bureau of the Budget for a sampling of sanitary districts within the study area.

Table 8. Borrowing Margin 1971
(In Dollars)

District	Assessed Valuation	Current Debt	Maximum Ceiling	Margin
MSDGC	22,500,000,000	282,000,000	1,125,000,000	843,000,000
Island Lake	3,516,000	*N.A.	1,758,000	N.A.
Roger Lake	13,627,000	445,000	681,350	236,350
North Shore	818,451,000	8,905,000	40,922,000	32,017,000
Round Lake	28,547,000	760,000	1,427,000	667,000
Downers Grove	154,206,000	1,260,000	7,710,300	6,450,300
Salt Creek	86,528,000	25,000	4,327,000	4,302,000
Wheaton	163,208,000	2,393,383	8,160,400	5,767,017

*Not Available

ILLINOIS COUNTIES

Because the Metropolitan Sanitary District of Greater Chicago finances, owns and operates most of the wastewater facilities within Cook County, the county itself does not finance wastewater activities. The indebtedness which the county incurs is for other purposes. DuPage County has not financed substantial wastewater expenditures. In 1970, voters of the county turned down by a seven to one margin a $105 million bond issue which would have consolidated 87 municipal plants into a regional system of 8 plants. Officials of the county believe that the bond issue was turned down because of a controversy over who would be the governing body and not for financial reasons. Will County does not currently perform a wastewater function, although it expects to establish a Department of Public Works within two years.

Table 9 below itemizes the current indebtedness for all purposes within the four counties in the study area. Remaining borrowing margin has been calculated for each county. (In some cases, the figures for current indebtedness may include some debt which does not count toward the indebtedness limit specified in the state code).

Table 9. County Borrowing Margin 1971
(In Dollars)

County	Assessed Property Valuation	Maximum Debt Allowable	Current Debt	Borrowing Margin
Cook	21,017,835,000	1,020,000,000	251,921,629	768,078,371
DuPage	2,015,901,482	50,000,000	No county debt	50,000,000
Lake	1,598,413,764	40,000,000	No county debt	40,000,000
Will	997,856,124	20,000,000	N.A.	N.A.

ILLINOIS MUNICIPAL CORPORATIONS

In terms of the number of bond issues, the outstanding bonded indebtedness of Illinois municipalities is evenly divided between revenue and general obligation bonds (according to a 1969 Department

of the Interior Survey). Because many of these issues are relatively small in dollar amount, they are not ranked by Moody's Investors Service and complete data is difficult to obtain. The recent $750 million state bond issue will further reduce local bonding requirements by reducing the local share required for federally financed wastewater facilities.

INDIANA

TABLE 10 FINANCING RESTRICTIONS AND ALLOWANCES

	STATE	COUNTIES	CITIES & TOWNS	DISTRICTS
LIMIT ON INDEBTEDNESS	Cannot incur debt directly at present	2 Percent Av.	2 Percent Av.	2 Percent Av.
Can G. O. Bonds be Issued	With constitution amendment	Yes	Yes	Yes
Limit on amount	-	Not specified	Not specified	
Limit on debt service	Not specified	Not specified	None	2 Percent
Limit on interest paid	Not specified	Not specified	Not specified	Not specified
Referendum	Yes	Not specified	Not specified	Not specified
Can Revenue Bond be Issued	Not specified	Not specified	Yes	No
Limit on amount	None	None	None	-
Limit on interest paid	-	-	6 percent	-
Limit on debt service	None	None	None	-
Referendum	No	No	No	-
Special Assessments	No	Not specified	Most can	No
Limit	-	-	-	-
Anticipation Bonds	-	-	Yes	-
User Fees	Not specified	Not specified	Yes	Yes
Adequacy Provision	-	-	Yes	Yes
Geographic Flexibility	-	-	Yes	Yes
Taxes	Yes	Yes, for bonds	Yes	Yes

ILLINOIS

TABLE 11 FINANCING RESTRICTIONS AND ALLOWANCES

	STATE	COUNTIES	MUNICIPALITIES	DISTRICTS	MSDGC
LIMIT OF INDEBTEDNESS	5 Percent Av.	5 Percent Av.	5 Percent Av.	5 Percent Av.	5 Percent Av.
Can G.O. Bonds be Issued	Yes	Yes	Yes	Yes	Yes
Limit on amount	5 Percent Av.	5 Percent Av.	75 Percent taxes	5 Percent Av.	5 Percent Av.
Limit on debt service	None specified	None specified	None specified	None specified	None specified
Limit on interest paid	None specified	8 percent	None specified	6 percent	Limit was suspended
Referendum	Yes	Yes	Except where pop. exceeds 500,000	Except when under court order	When payable from taxes
Can Revenue Bonds be Issued	Agencies of the state can	Yes	Yes	Yes, S.D. of less 500,000	Under certain circumstances
Limit on amount	None	None	None	None	None specified
Limit on debt service	None	None	None	None	None
Limit on interest paid	None specified	6 percent	Limit suspended	6 Percent	None
Referendum	None	None	None	None	None
Special Assessments	HOME RULE LEGISLATION CANNOT LIMIT THESE IN HOME RULE UNITS				
Limit	-	If home rule unit	If home rule unit	Must be equitable	Must be equitable
Anticipation Bonds	-	-	-	Yes	Yes
User Fees	Yes	Yes	Yes	Limited to industrial users	Limited to industrial users
Adequacy Provision	No	Yes	Yes	Yes	Yes
Geographic Flexibility	No	Yes	Yes	No	No
Taxes		None specified	75 percent of taxes to meet expenses	Yes	Yes