

VOLUME I OF II
REPORT SECTION

ANNUAL

REPORT

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GEORGE W. KUHN
DRAIN COMMISSIONER

OAKLAND COUNTY , MICHIGAN

VOLUME I

ANNUAL REPORT

OAKLAND COUNTY

MAY 30 1980

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April 1, 1980

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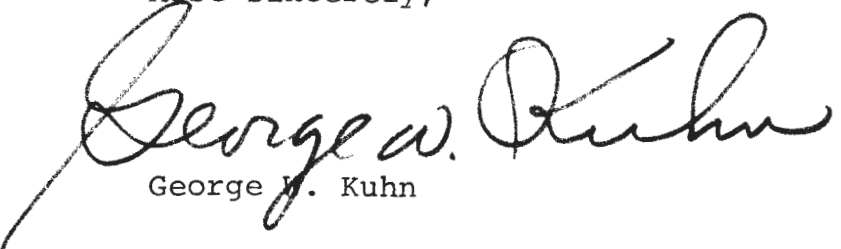
Ladies and Gentlemen:

As required by Section 31 of the Michigan Drain Code, as amended, we here present our Annual Report covering operations of the Drain Commissioner's office during the period between January 1, 1979 and December 31, 1979.

Again, this year there is a brief summary of the more "Significant Events and Accomplishments" of the past year for your convenience. The most noteworthy is the administration of construction contracts on the several major sanitary sewer projects delegated to this office by the Board of Commissioners. Progress payments for construction during 1979 were in excess of \$59 million dollars.

At this time, I wish to again extend my sincere thanks and appreciation to all members of the Board of Commissioners and members of the various standing committees for your excellent cooperation and assistance during the past year.

Most sincerely,


George W. Kuhn

GWK:sjj

SIGNIFICANT EVENTS AND ACCOMPLISHMENTS - 1979

1. Administration of 64 Active Construction Contracts

During 1979, the Drain Commissioner as County Agency provided administration and management of 64 active contracts for construction of sanitary sewers and water supply systems representing 95 million dollars in construction costs. The total length of sewer and water lines under construction was approximately 350 miles, and also included one complete sewage treatment plant and 39 sanitary sewer pumping stations.

2. New Computer Program for Processing Construction Estimates

Construction Estimates detail construction work completed on a particular contract and authorize payment to the contractor for such work. During the year more than 800 of these monthly construction estimates were approved for payment of approximately 60 million dollars. This large number of construction estimates, a direct result of the volume of construction during 1979, made manual preparation of the estimates an impossibility. Accordingly a new program was written to permit a small in-house computer to calculate and prepare the estimates needed. Utilizing this new system, we now direct the computer to calculate, print and store the necessary information, and print the entire estimate form ready for signatures all in slightly more than one day. This method is superior to manual preparation of the estimates and assures prompt payment to contractors.

3. Southeastern Oakland County Sewage Disposal System

In March the Drain Commissioner credited Southeastern Oakland County communities with almost \$1 million (\$940,162.50) from the Construction Surplus to pay the 1979 capital and interest costs for the Pollution Control Facility.

In July, 1979 an additional \$1,500,000 was rebated to S.O.C.S.D.S. communities from surplus operating and maintenance funds, partially offsetting the July 1, 1979 sewage rate increase imposed by the Detroit Water Board.

4. Initiative Petition to Restructure the Detroit Board of Water Commissioners

In December, 1979 the Drain Commissioner initiated a statewide petition drive to restructure the Detroit Board of Water Commissioners by creating a Regional Water & Sewer Commission. The initiative petition seeks to amend Public Act 279 of 1909 to require fairer representation for all the user customers served by the metropolitan Detroit Sewer System. Approximately 239,000 petition signatures are necessary to place this question on the ballot in November 1980 or 1982.

5. Establishment of Public Works Advisory Council

The Drain Commissioner in September, 1979 established a Public Works Advisory Council to keep all Oakland County communities informed as to various key issues including water and sewage rates, future public works projects, and other matters of common concern.

6. Completion of Facilities Plan for Evergreen-Farmington S.D.S. - Pollution Control Facilities

The Draft Facilities Plan for the Evergreen-Farmington Sewage Disposal System - Pollution Control Facilities was completed in July, 1979. The Plan indicates that a Sewer System Evaluation Survey is necessary. The Plan also identifies the need for approximately 44 million dollars for interceptor sewers, 40 million dollars for combined sewer overflow controls and 8 million dollars for possible sewer system rehabilitation for a total estimated project cost of 92 million dollars.

7. Soil Erosion Control

The Soil Erosion Control Division received 567 applications for Soil Erosion Permits. The amount of revenue generated from these permits totaled \$73,851.00. The cost of operations (wages, etc.) was \$60,736.00, leaving an excess of revenues over costs of approximately \$13,000 which was deposited in the County's General Fund.

The Division continued its on-going instructional meetings. Most recently, the Division responded to a request by the Department of Natural Resources to assist in the Soil Erosion and Sedimentation Control Phase I Training Program held on the Orchard Ridge Campus of Oakland Community College.

The Soil Erosion Control Division is also actively assisting the Southeastern Council of Governments with the Environmental Protection Agency's Nationwide Urban Run-off Program.

8. New Lake Boards Formed

Lake Improvement Boards were formed for Lakeville Lake and Big Lake during 1979. The Drain office provides technical and policy guidance to these new lake boards which are addressing the improvement of their lakes, one of the most valuable resources of the County.

T A B L E O F C O N T E N T S

VOLUME I

TRANSMITTAL LETTER

SIGNIFICANT EVENTS AND ACCOMPLISHMENTS

DRAIN ENGINEERING 1

WATER AND SEWER ENGINEERING 6

EASEMENT ACQUISITION 8

CONSTRUCTION INSPECTION 9

MAINTENANCE UNIT 10

DRAIN CONSTRUCTION 13

Kasper Drain	13
McDonald Drain	14
McDonnell Drain	14
Randolph Street Inter-County Drain	15
Elliott Drain	19
Gorsline Drain	19
Lanni Drain	19
McConnell Drain	20
Moxley Drain	20
Olson Drain	21
Roth Drain	22
Ten Mile-Rouge Sanitary Drain	22

SEWER CONSTRUCTION 26

Avon Township Extensions No. 2	26
Bingham Farms Water & Sewer	31
Holly Sewage Disposal System	35
Waterford Extensions - Phase III (2nd Section)	36
Waterford Extensions - Phase IV	36
Waterford Extensions - Phase V	41
West Bloomfield Extensions No. 2	42

WATER MAIN CONSTRUCTION	56
Waterford Water Supply System - Ext. 4	56
West Bloomfield Township Water - Sections IV & V	56
COMPLETED PROJECTS - OPEN CONSTRUCTION ACCOUNTS	57
SOUTHEASTERN OAKLAND COUNTY SEWAGE DISPOSAL SYSTEM	59
Pollution Control Facility	59
1979 Maintenance Program	63
Laboratory Report	64
PROJECTS UNDER DEVELOPMENT	67
Avon Township Extensions No. 2 (Water)	67
Evergreen-Farmington Pollution Control Facilities	67
Huron Gardens Extension	69
PLANNED DRAINS	71
Aaron Drain	71
Ball Drain	71
DiGiovanni Drain	72
Doyon Drain	72
Independence M-15 Drain	72
Kelly Drain	73
Larsen Drain	74
Maplehurst Drain	74
Patnales Drain	75
Patterson Drain	75
Simson Drain	76
Thornton Drain	76
PROPOSED DRAINS	76
Atchison Drain	76
Claire Drain	77
Fortino Drain	78
Hayes Drain	78
Joachim Relief Drains	78
Mainland Drain	79
Moffitt Drain	80
Nowak Drain	80
Pernick Drain	81
Price Drain	81
Richards Drain	82

VOLUME II

ENGINEERING RESPONSIBILITIES OF THE DRAIN COMMISSIONER

The Drain Commissioner has broad and varied engineering responsibilities.

The staff of Engineers and other technical personnel of the Drain Commissioner are principally engaged in the following two areas of responsibility:

1. Drain Engineering

Those activities related to the Drain Code (Chapters 8, 20 and 21 of Act 40 of 1956), the Subdivision Control Act (Act 288 of 1967), the Soil Erosion and Sedimentation Control Act (Act 347 of 1972), and the Inland Lake Level Control Act (Act 146 of 1961).

2. Water and Sewer Engineering

Those activities and projects related to sanitary sewers and water supply systems carried out under the provisions of Act 185 of 1957 and Act 342 of 1939.

DRAIN ENGINEERING

This unit advises the Drain Commissioner, as well as furnishes the personnel to coordinate the construction of new storm drains required to service Oakland County's expanding population. In addition, the following related activities are carried out:

CONSTRUCTION PERMITS

During this past year, a total of 83 permits for taps into County and Inter-County Drains were issued, which represents a 15% increase over 1978.

Prior to the issuance of any permit, a thorough examination of the application and related engineering drawings is made to assure the connection conforms to our construction specifications.

At the time any of these connections is made, an inspection is made to assure that the work is done properly and in accordance with the approved engineering plan. A fee is charged to offset the cost of this inspection.

EASEMENT ACQUISITION

Prior to building any project, it is necessary to secure easements. Easements consist of permanent (land upon which the structure is placed) and temporary or construction easements (lands required to construct the Drain). On completion of the project, the temporary easements revert back to the owner, while permanent easements remain under the control of the Drain Board.

As a right in land is being transferred from a landowner to the Drain Board, compensation is paid. Fair compensation is based upon an appraisal performed by an experienced land appraiser. He can determine if a loss of property value will occur and, if so, suggest a dollar amount to offer the owner.

If no agreement can be reached, condemnation is brought under Act 188 of 1978 in the Circuit Court. The Court can provide a jury who, with the assistance of expert appraisers, will determine fair value for the easement.

Drain Engineering works in close conjunction with the Design Consultants to determine the minimum requirements for construction and maintenance easements.

REVIEW OF LATERALS TRIBUTARY TO THE S.O.C.S.D.S.

All connections into any sewer that is tributary to the Southeastern Oakland County Sewage Disposal System are required to be first reviewed by this office prior to being submitted to the Michigan Department of Health.

This review helps protect established Drainage Districts and allows a record to be kept of all facilities outletting into County trunk lines, as well as assuring this office that proper and approved construction standards are used.

The Drain Commissioner works closely with local governments. All plans sent to us for review are transmitted through the municipalities' engineer or Engineering Department. We do this to assure that sewer lines conform to the local community master plan for sewerage development.

The Engineering Department, between January 1, 1979 and December 31, 1979, received and reviewed 42 sets of sanitary and combined sewer plans for facilities that will outlet into the Southeastern Oakland County Sewage Disposal System.

Upon our completion of review, these plans were then forwarded to the Michigan Department of Health with our recommendation that a construction permit be issued.

LAKE LEVEL PROGRAM

Under the provisions of Act 146 of 1961, the Drain Commissioner's Office has participated in legal proceedings to establish and build lake level controls for many Oakland County lakes.

There are 27 lakes in the County where levels have been established and assigned to the Drain Commissioner for control and maintenance.

The Drain Engineering Unit has prepared the Special Assessment Districts for these projects and has also prepared, as necessary, yearly assessment rolls to cover needed maintenance of these projects.

Regular inspection of control structures on a weekly basis, or more often as weather conditions dictate, is maintained throughout the year under the supervision of an engineer thoroughly familiar with all of the structures. At least weekly the levels of these lakes are read and the level control structures are adjusted to maintain the established legal level. Regular inspection also assures that the structures are in good operating condition, and permits scheduled maintenance and repairs when needed.

PLAT REVIEW

Under the provisions of the Subdivision Control Act (Act 288 of 1967), the Drain Commissioner reviews and approves all proposed plats to determine if adequate storm drainage provisions have been included.

In addition, the Oakland County Drain Commissioner has entered into contracts with outside consulting engineering firms for the review of the drainage facilities for new plats for those developers electing to pay an additional review fee. Sixteen subdivisions were reviewed in this manner.

From January 1, 1979 through December 31, 1979, this office approved 94 preliminary plats, 144 sets of construction plans and the Drain Commissioner signed 134 final plats.

Twenty-six separate communities were represented by these 134 final plats with 20 containing 1,436 lots being located in Avon Township, with Farmington Hills having 18 plats containing 1,060 lots, and Troy with 15 plats containing 1,006 lots.

The 134 final plats signed by the Drain Commissioner contained a total of 6,009 lots and according to local assessors, when constructed upon will have a value in excess of \$632,000,000, creating approximately \$17,300,000 in additional property taxes.

DRAIN AND LAKE LEVEL ASSESSMENT ROLLS

Drains constructed prior to 1956 were built by special assessment. Construction costs, along with future maintenance charges, are the obligation of those living within the special assessment district.

During this last year, maintenance work was performed on 75 of the special assessment (Chapter 8) drains and 19 of the special assessed Lake Level Projects.

The Board of Commissioners on November 1, 1979, approved Drain Warrants in the amount of \$156,516.90 to offset costs of Chapter 8 and Lake Level Control Projects.

Costs of preparing such assessment rolls were reduced as a result of a joint program with the County Computer Services. Computerization has helped keep our property descriptions current.

SOIL EROSION AND SEDIMENTATION CONTROL - ACT NO. 347

The Drain Office is the Enforcing Agency for the Soil Erosion and Sedimentation Act in Oakland County. The program in its fifth year continued to operate with a minimum of problems and maximum effectiveness in protecting the environment.

567 applications were received in 1979 for soil erosion permits. While the total number of projects remained about the same, there was a noticeable increase in Government Public Service Facilities, Multiple Housing, and Industrial construction over 1978. Single Family Residence construction decreased from 285 permits in 1978 to 242 permits in 1979.

The amount of revenue generated from permit fees in 1979 was \$73,851.47. In 1978, the total amount due for 564 permits was \$86,622.33. Therefore, the 1978 permit fee revenue exceeded the 1979 permit revenue by \$12,770.86. The total amount paid by Oakland County in wages to those employees who worked on Soil Erosion and Sedimentation Control was \$60,736.34. By comparison, in 1978 the total amount paid for wages was \$52,129.35. As these figures indicate, the 1979 permit fee revenues exceeded 1979 wages paid leaving a positive balance of \$13,115.13. It should be noted that the foregoing comparison does not include the miscellaneous and fixed costs associated with running the program, such as employee fringe benefits, electricity, phones, office space, copying costs, gasoline, and office supplies, etc.

INSTRUCTIONAL MEETINGS

As in the past, the Drain Office continued its ongoing instructional meetings with public agencies, builders, developers, engineers, architects, etc. Most recently, we responded to a request by the Department of Natural Resources to assist in the Soil Erosion and Sedimentation Control Phase I Training Program held on the Orchard Ridge Campus of Oakland Community College.

NATIONWIDE URBAN RUNOFF PROGRAM INVOLVEMENT

Spurred by the public concern of possible water quality degradation originating in small urban drains and creeksheds, the Oakland County Drain Commissioner is actively cooperating with the South-eastern Council of Governments (SEMCOG) and combining resources to assist in the Environmental Protection Agency's Nationwide Urban Runoff Program. The result of this participation will be to reduce storm water quality degradation from developing areas. This program will incorporate the experience and success of the Drain Office's programs associated with the administration and enforcement of the Soil Erosion and Sedimentation Control Act within Oakland County.

Based upon the results of this study, the Drain Office and SEMCOG will be able to set forth design criteria and guidelines for use by engineers, local agencies and site planners to select the most

effective state-of-the-art control of urban nonpoint pollution. These criteria guidelines, once established, will be of use to the State of Michigan, SEMCOG, counties, and others throughout the country.

WATER AND SEWER ENGINEERING

Calendar year 1979 was an exceptional year in volume of construction for the Water and Sewer Engineering Unit. The paramount activity has been the administration and management of 64 active contracts for construction of sanitary sewer and water supply systems worth nearly 95 million in construction dollars. The total of all project costs was in excess of 128 million dollars. If all pipe line footage of water and sewer was laid in one continuous run, the length would total nearly 350 miles and include one, complete sewage treatment plant and 39 sanitary sewer pumping stations.

The intensity of construction activity in 1979 is demonstrated by the level of construction dollars paid to contractors. Staff Project Engineers prepared more than 800 monthly construction estimates which the Drain Commissioner approved for payments worth nearly 60 million dollars. That level of spending accounted for almost 63 percent of the total expenditures for the active construction program, and approximately 200 miles of pipe in the ground.

Estimates for payments to contractors are prepared monthly within a ten-day period following the twentieth of each month. The number of monthly estimates for the year ranged from a monthly low of 36 to a high of 90. Manual preparation of this volume of estimates would have been impossible. An in-house printing computer was programmed to handle this increased volume of estimate preparation. Computer programs now calculate, print and store information and also print the entire form ready for signatures all in slightly more than one day. Development of this innovative function has saved untold hours of manual preparation and assured prompt payments to contractors.

Oakland County residents in the areas served by these six sanitary sewer projects have a heavy financial interest in these systems. Applications filed by the Drain Commissioner several years ago and approved for funding by E.P.A. and D.N.R. under the water pollution control grant program of Public Law 92-500 have reduced the total cost in varying degrees. Federal and State grant funds will account for more than 47 million dollars of project costs.

Table 1 - Distribution of Grant Funds

<u>Project</u>	<u>Grants</u>	<u>Local Funding</u>	<u>Project Cost</u>
Avon Twp. Ext. No. 2	\$10,406,865	\$26,725,000	\$ 37,131,865
Holly S.D.S.	7,110,301	3,500,000	10,610,301
Waterford Ext., Phase III	3,832,907	10,342,000	14,174,907
Waterford Ext., Phase IV	6,773,407	12,350,000	19,123,407
Waterford Est., Phase V	13,454,183	13,475,000	26,929,183
West Bloomfield Ext.No.2	5,787,940	14,794,984	20,582,924
	<u>\$47,365,603</u>	<u>\$81,186,984</u>	<u>\$128,552,587</u>

The intense activity of the past year may slow to more normal proportions during 1980. However, potential projects, some large and some small, continue to surface.

Efforts of the staff of the Water and Sewer Engineering Unit continue to be directed toward the final completion of projects, large and small, from prior year starts. Construction accounts will be closed for several projects during the first half of 1980. Others will remain open until such time as court proceedings are complete.

Several established projects in various stages of development require the attention of the Staff Project Engineers. One of these projects, the Evergreen-Farmington Pollution Control Facilities, could generate upwards of 140 million dollars worth of work over the next several years.

EASEMENT ACQUISITION

During 1979 approximately 3,000 individual easements and several miles of private road easements (consisting of approximately 12,000 parcels) were acquired for sewer and water main construction. In order to obtain easement rights in certain individually owned parcels and private road easements, it was necessary to file condemnation proceedings on several thousand parcels of property in nine separate condemnation cases. During 1979 work proceeded on the settlement of costs for easements in open cases. Five of the nine court condemnation cases have been closed involving several hundred parcels. Court, pre-trial proceedings and negotiations with attorneys continue on the remaining easements in the four remaining court cases.

In addition, Right of Way employees have been utilized to assist in resolving a large number of trespass, tree removal and general complaints from property owners during sewer line construction. This assistance included negotiations of various kinds and appraisals to satisfactorily resolve the individual complaint.

During construction of several sewer lines, it was necessary to relocate portions of some lines. In such cases it was necessary to rewrite, reappraise and renegotiate many easements. Similar procedures were used in acquiring new easements to accommodate route changes or other field changes.

Approximately 3,000 title searches were completed in 1979. The capacity to perform title searches internally means a substantial saving to our projects, both in time and in cost.

A special project during 1979 was obtaining easements for a water quality enhancement program funded by SEMCOG. It was necessary to search ownership, prepare the proper documents and acquire the easements over existing retention basins for the project.

CONSTRUCTION INSPECTION

During the past year the Oakland County Drain Commissioner's Inspection staff was responsible for the inspection of over 150 miles of new drain, sewer and water main facilities throughout Oakland County.

The inspector's principal duties are to maintain accurate and complete records of the construction progress, insure that all materials are in accordance with the specifications, that the contractors' workmanship be consistent with industry standards and that the citizens are inconvenienced as little as possible by the contractors' operations.

There were 76 active contracts with 36 different contractors installing everything from 6" house leads, to 114" storm drains, to large sewage lift stations for 8 different municipalities.

With so much work going on in so many different areas some problems were bound to arise. Most of them were anticipated though and were handled without incident. For example, the Drain Commissioner provided temporary emergency water service to those citizens whose regular private source was affected by the contractors' efforts to stabilize the sub-soil by dewatering the ground adjacent to his pipe laying operations.

Our staff has spent much of the winter going over inspector's daily records in order to produce what is called an "as-built" plan. As-builts are an updated set of construction plans showing all additions, deletions, changes and exact locations of house leads, casing pipe, fittings, manholes, etc. These plans are then reproduced and become the plans of record and are given to the interested municipality for their use in maintaining their new system.

Clean up and restoration of those areas disturbed by construction was completed in many areas last fall, but there is much left to do in the upcoming growing season on work done during the past winter. Video tapes taken by inspection personnel prior to construction and the inspector's daily records are valuable tools in restoring those areas disrupted, by the contractor, to their former condition.

MAINTENANCE UNIT

The Oakland County Drain Commissioner is responsible for the regular maintenance of established storm drains located throughout Oakland County. For this purpose a permanent force of Maintenance personnel is employed capable of providing the wide variety of maintenance and repair services necessary. These services are, primarily, the inspection and maintenance of approximately 600 miles of established county drainage and combined storm and sanitary systems. In addition, flood control structures used in the regulation, operation and control of the legal levels of 27 Oakland County lakes are maintained by the Drain Commissioner.

In the performance of these functions, the Drain Commissioner's Maintenance personnel utilize various types of vehicles and construction equipment, which include basic and specialized hand and power tools as well as certain necessary safety equipment. Inventory, repair, operation and proper care of these tools and equipment is a function of the Maintenance Unit.

Specific operations performed by the Maintenance Unit include the following:

GENERAL DRAIN MAINTENANCE

Periodic maintenance activities that insure the proper functioning of various drainage systems in Oakland County include removing roots, silt and other debris from enclosed drains; repairing structures that have failed or have been damaged; rehabilitating open drains by removing brush, debris, shoals and silt; cleaning and maintaining manholes and catch basins; and inspection and cleaning of diversion gates, meter chambers and outfall structures.

General drain maintenance was performed on 54 Chapter 20 drains, 1 Chapter 21 drain, 75 Chapter 8 drains and 1 Act 342 project.

EQUIPMENT

In order to increase efficiency while maintaining personnel at a constant level, the Maintenance Unit employs specialized power equipment.

The most important piece of equipment is the Vactor Jet. The Vactor works with water pressure and vacuum to clean out storm and sanitary sewers. It is especially efficient in cleaning of catch basins, manholes and sewer lines of 30 inch and lesser diameter pipe. By using the Vactor, more work can be done with a two-man crew than formerly could be done with hand equipment and substantially more manpower. It has enabled the Maintenance Unit to clean drains and sewers on an orderly and routine schedule. The result is decreased costs per job, and increased service to the public.

The Drain Commissioner employs the necessary safety equipment needed to meet OSHA and MIOSHA standards as well as the hazards of the particular drain Maintenance work.

DRAIN INSPECTIONS

Routine inspections are made, periodically, on all drainage systems. Once inspected the necessary repairs are performed by the Maintenance Unit. This preventive maintenance system assures reliable drainage to the residents of Oakland County and avoids costly drain failures.

During 1979 the following drains were inspected by the Oakland County Drain Commissioner's Maintenance Unit: 42 Chapter 20 drains, 1 Chapter 21 drain and 33 Chapter 8 drains.

MAINTENANCE OF LAKE LEVEL CONTROLS

In addition to the maintenance of drainage systems, the Drain Maintenance Unit also maintains lake level structures. Such maintenance includes dike repair, painting and repair of structures, and repair of gates and landscaping.

Maintenance was performed at 19 Lake Level Control locations.

RAIN GAUGE OPERATIONS

There are 23 Rain Gauges located throughout Oakland County. Oakland County Drain Maintenance personnel install, maintain and repair Rain Gauges in cooperation with the U. S. Government Department of Agriculture, Weather Service Office. Distribution of supplies to the various stations and the collection and processing of recorded data is also a part of this service.

WORK SPONSORSHIP PROGRAMS

In addition to maintenance labor provided by full time County employees, the Drain Commissioner has consistently either developed or taken advantage of programs that permit governmental units to employ workers at little or no cost to the taxpayer at the local level. Federal CETA and County Welfare recipient programs supplied laborers for this program during 1979.

The Maintenance Unit used these additional personnel primarily to remove brush and debris from open drainage channels on older drains in rural areas of the County. With the minimal costs of supervisory personnel and equipment, these maintenance crews were available to effectively assist permanent County employees in the maintenance work at substantial cost savings.

INTER-DEPARTMENTAL SERVICES

The Drain Commissioner also cooperates with other County departments to provide specialized personnel and equipment as required. By lending personnel and equipment at minimal rates, other County departments were able to reduce their costs to complete specific maintenance assignments.

The Departments of Facilities and Operations, Public Works, Animal Control and the Oakland-Pontiac Airport utilized these available maintenance services during 1979.

CONSTRUCTION ACTIVITY

DRAIN CONSTRUCTION

The Drain Commissioner, under Act 40 of the Public Acts of 1956, as amended, is authorized to construct, operate and maintain county drains.

Construction of a county drain is undertaken only after a petition has been filed with the Drain Commissioner. Petitions are normally filed by one or more governmental units, however, a petition may be filed by a property owner or group of property owners.

During the time period covered by this report, a total of four drainage projects were completed, twenty-three drains are in various stages of planning and development, and eight drains are presently under construction.

DRAIN CONSTRUCTION PROJECTS COMPLETED BETWEEN JANUARY 1, 1979 AND DECEMBER 31, 1979

KASPER DRAIN

The Kasper Drain is located in Sections 14 and 23 of Pontiac Township and serves a commercial area along Opdyke Road and a large residential area east of Interstate 75.

The Township of Pontiac petitioned the Oakland County Drain Commissioner to locate, establish and construct a storm drain because of periodic flooding and poor drainage in this area.

The engineering firm of Orchard, Papke, Hiltz & McCliment, Inc., was employed by the Drainage Board to prepare plans and specifications for the Drain.

As designed, the outlet of the drain is 96 inch diameter reinforced concrete pipe and is enclosed by various sizes of pipe to its upper terminus. Also at the request of the Township of Pontiac, road ditching was designed into the project to relieve road flooding in the Hawthorne Acres and the Chandler Estates Subdivisions.

The Board accepted construction bids for the Kasper Drain on February 17, 1978, and the contract for construction was awarded to A & P Construction Company, the low bidder, in the amount of \$1,678,002.00.

Construction of the drain has been completed and is presently in use. Storm water from the Kasper Drain outlets into the Clinton River by way of the Galloway Creek.

MCDONALD DRAIN

One of the areas that has developed intensely in the City of Troy in recent years is the area between 14 and 15 Mile Roads along the Stephenson Highway and I-75 corridors. The development of the Oakland Mall shopping center and the Robbins Executive Park West Industrial Subdivision, together with necessary improvement of highways to serve the area, has caused existing drainage facilities in the vicinity to become inadequate.

Because of the need for improved drainage facilities in this area, the City of Troy petitioned the Oakland County Drain Commissioner to locate, establish and construct a county drain to serve this portion of the City in Section 26.

After necessary hearings and legal proceedings, the Drainage Board employed the engineering firm of Hubbell, Roth & Clark, Inc., to prepare plans and specifications for the McDonald Drain.

Plans that were designed by Hubbell, Roth & Clark, Inc., provided for an outlet of the McDonald Drain into a branch of the Henry-Graham Drain on the east side of John R. Road north of 14 Mile Road. The drain then goes north on the east side of John R. for 2,100 linear feet, then crosses John R. and continues westerly to the west side of Interstate 75 to its upper terminus. Pipe sizes vary from 8 foot to 6 foot diameter.

The Board accepted construction bids for the McDonald Drain on July 26, 1978, and the contract for construction was awarded to the Frank V. Louis Equipment Company, Inc., the low bidder, in the amount of \$1,171,183.30.

Construction of the McDonald Drain has been completed and the facility is now in use.

MCDONNELL DRAIN

A study conducted by the engineering firm of Hubbell, Roth & Clark, Inc., in conjunction with the Planning Department of the City of Southfield, revealed that a major storm sewer was needed in Section 32 of the City of Southfield.

As a result of this study, the City of Southfield petitioned the Oakland County Drain Commissioner to locate, establish and construct a county drain to alleviate the drainage problems in the area.

After determining that the proposed project was practical, the Board employed the engineering firm of Hubbell, Roth & Clark, Inc., to prepare plans and specifications for the McDonnell Drain.

Plans that were designed by Hubbell, Roth & Clark, Inc., provided for a storm drain beginning approximately 1,000 linear feet north of Eight Mile Road and 1,250 linear feet west of Telegraph Road on a tributary to the main stream of the Rouge River, and proceeding

McDONNELL DRAIN - Cont'd.

northeasterly to Sargent Street, which point of ending is approximately 530 feet west of Telegraph Road and approximately 600 feet south of Nine Mile Road.

The plans and specifications as prepared by Hubbell, Roth & Clark, Inc., were accepted and approved by the Board.

The Board accepted construction bids for the McDonnell Drain and the contract for construction was awarded to the M & B Contracting Corporation, the low bidder, in the amount of \$651,721.00.

Construction of the McDonnell Drain has been completed and the facility is now in use.

RANDOLPH STREET INTER-COUNTY DRAIN

Drainage problems in the Cities of Northville and Novi prompted petitions received in February, 1970, for construction of corrective storm drainage facilities. These were located on a tributary of the Rouge River running westerly from the Walled Lake Branch generally paralleling Randolph Street in the City of Northville, and then across Eight Mile Road to Beck Road in the southern part of the City of Novi. Since the project involved both Wayne and Oakland Counties, proceedings under Chapter 21 of Act 40, P.A. 1956, as amended, were followed. The Director of the Michigan Department of Agriculture is Chairman of the Drainage Board, the Wayne County Drain Commissioner was selected as Secretary, and the Oakland County Drain Commissioner serves as a member of the Drainage Board.

Citizen objections to the preliminary concept of the project resulted in revisions which extensively reduced the amount of enclosed drain and preserved much of the open drain in its natural state. This was accomplished by purchasing flood easements over portions of the drain. The overall cost of the project was materially reduced.

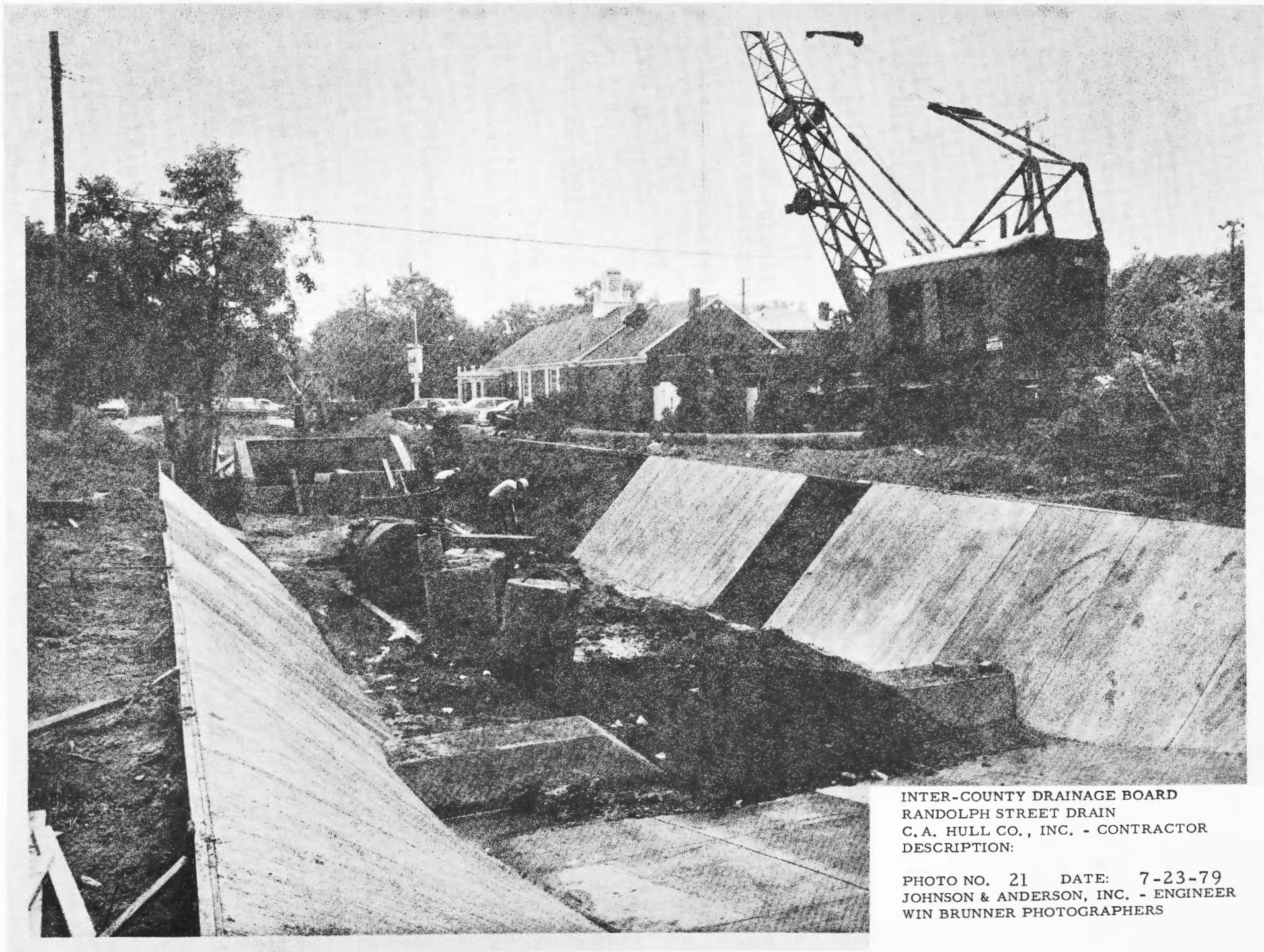
The expense of right-of-way acquisition which included condemnation proceedings and other costs required the sale of three issues of drain notes.

Plans and specifications were prepared by Johnson & Anderson, Inc., Consulting Engineers, and approved by the Inter-County Drainage Board.

In April, 1978, the Oakland County Drain Commissioner was named Secretary and the Oakland County Treasurer was named Treasurer of the Randolph Street Drainage District.

The C. A. Hull Co., Inc., was low bidder and awarded the construction contract for \$1,015,679.50. Bonds in the amount of \$1,660,000 were sold and the actual construction was started in December, 1978.

Construction of the Randolph Street Drain has been completed, and the drain is presently in service. Final clean up and restoration will be completed in the Spring of 1980.



INTER-COUNTY DRAINAGE BOARD
RANDOLPH STREET DRAIN
C. A. HULL CO., INC. - CONTRACTOR
DESCRIPTION:

PHOTO NO. 21 DATE: 7-23-79
JOHNSON & ANDERSON, INC. - ENGINEER
WIN BRUNNER PHOTOGRAPHERS

DRAINS UNDER CONSTRUCTION

ELLIOTT DRAIN

The City of Troy requested the Michigan Department of State Highways and Transportation to improve M-150 (Rochester Road) through the City. The Department of State Highways and Transportation agreed that M-150 should be widened and improved and prepared plans and specifications for the project. One of the requirements of the project was the improving of storm water facilities in several areas.

In order to supply such needed drainage, the City of Troy petitioned the Oakland County Drain Commissioner to construct several drainage projects. One of the projects petitioned for was the Elliott Drain.

The Elliott Drain would replace a section of the Renshaw Drain located in the east half of Section 3 and the northeast quarter of Section 10 of the City.

The firm of Hubbell, Roth & Clark, Inc., was employed to prepare plans and specifications for the project.

Plans and specifications have been prepared, bonds to finance the project have been sold and the Elliott Drain is under construction by the M & B Construction Company. The project is approximately 1% completed.

GORSLINE DRAIN

The Gorsline Drain is another of the drains that was petitioned for by the City of Troy to enable the Michigan Department of State Highways and Transportation to widen Rochester Road (M-150) to five lanes.

After determining that the proposed project was practical, the Drainage Board designated the project as the Gorsline Drain.

Construction plans and specifications were prepared by Hubbell, Roth & Clark, Inc. Plans call for the Gorsline Drain to include 1,750 linear feet of drain in Rochester Road between Big Beaver Road and Wattles Road and outlet 140 linear feet east into the existing Shanahan Drain.

Bonds to finance the Gorsline Drain have been sold and construction is presently 69% complete. Contractor is M & B Contracting Corporation.

LANNI DRAIN

The Lanni Drain is another of the six storm drains that were petitioned for by the City of Troy primarily to provide storm drainage for the Rochester Road (M-150) improvement project.

LANNI DRAIN - Cont'd.

In addition to providing an outlet for drainage from Rochester Road, the Lanni Drain will replace a section of the Houghten Drain for a distance of 2,755 linear feet easterly from Rochester Road.

After receiving the petition and determining that the project was practical, the Drainage Board employed the engineering firm of Hubbell, Roth & Clark, Inc. to prepare plans and specifications for the project.

Plans and specifications have been completed, bonds to finance the project have been sold and bids for construction were received by the Michigan Department of State Highways and Transportation.

The firm of M & B Contracting Corporation was the successful bidder for construction of the project.

Construction is now underway with approximately 74% completed.

McCONNELL DRAIN

The City of Troy filed a petition with the Oakland County Drain Commissioner to locate, establish and construct an intra-county storm drain. The drain would serve primarily as drainage for the Michigan Department of State Highways and Transportation improvement project of Rochester Road (M-150) between Big Beaver Road and Wattles Road.

After receiving the petition, the Drainage Board determined that the proposed project was practical and designated the project as the McConnell Drain.

The engineering department of the City of Troy and the firm of Hubbell, Roth & Clark., Inc., were employed by the Drainage Board to prepare plans and specifications for construction of the McConnell Drain.

Construction plans and specifications have been prepared, bonds to finance the project were sold and bids for construction were received.

The firm of M & B Contracting Corporation was the successful bidder for construction of the project.

Construction is presently underway with approximately 94% completed.

MOXLEY DRAIN

The City of Troy petitioned the Oakland County Drain Commissioner to locate and establish an intra-county drain to improve drainage along Wattles Road east of Rochester Road.

MOXLEY DRAIN - Cont'd.

The drainage facility would have its point of beginning at the intersection of the Henry-Graham Drain and Wattles Road and would extend west approximately one and one-half miles to Rochester Road, with branches north of Wattles Road on John R. Road and north and south on Rochester Road. The branches on Rochester Road are necessary to accommodate the widening and improvement of Rochester Road.

The Drainage Board, after necessary hearings, determined that the proposed project was practical and designated the project as the Moxley Drain.

The Board employed Hubbell, Roth & Clark, Inc. to prepare construction plans and specifications for the project.

Plans and specifications have been prepared, bonds to finance the project have been sold and bids were received for the portion of the Moxley Drain that directly affected the M-150 improvement. That portion of the drain has been completed by M & B Contracting Corporation.

The remaining portion of the Moxley Drain will be bid when right of way procurement has been completed.

OLSON DRAIN

A petition was filed with the Oakland County Drain Commissioner by the City of Troy to locate, establish and construct an intra-county drain in the City.

The proposed drain would replace a portion of the Renshaw Drain. The drain would have as its point of beginning a location in the centerline of the existing Renshaw Drain approximately 100 feet east of Rochester Road and approximately 2,600 feet south of Square Lake Road, and proceed westerly crossing Rochester Road; thence northerly following the route of the Renshaw Drain to the upper terminus at Square Lake Road approximately 550 feet east of Rochester Road.

After considering the petition, the Drainage Board determined that the proposed project was practical and designated the project as the Olson Drain.

The Drainage Board employed the engineering firm of Hubbell, Roth & Clark, Inc. to prepare construction plans and specifications for the project.

Plans and specifications have been completed, bonds to finance the project have been sold and bids for construction were received by the Michigan Department of State Highways and Transportation.

The firm of M & B Contracting Corporation was the successful bidder for construction of the project.

Construction is presently in progress with approximately 64% completed.

OLSON DRAIN - Cont'd.

The Olson Drain will serve as an outlet for drainage for a portion of the M-150 improvement project in the City of Troy.

ROTH DRAIN

The City of Troy petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county drain. The proposed facility would replace a major portion of an existing county drain known as the Hawthorne Drain. Continuing development in the City of Troy in recent years has caused the Hawthorne Drain to become overburdened because of the increased runoff of storm water that results from such development.

The proposed drain would begin at the intersection of the Henry-Graham Drain and Vermont Street and continue along the route of the Hawthorne Drain to its upper terminus north of Interstate 75 and approximately 800 feet west of Rochester Road.

The Drainage Board determined that the proposed project was practical and designated the project as the Roth Drain.

The engineering firm of Hubbell, Roth & Clark, Inc. was employed to prepare construction plans and specifications for the Roth Drain.

Plans and specifications for construction of the Roth Drain were delivered to the Board. Bonds to finance construction were sold and construction bids were received by the Board on June 6, 1979.

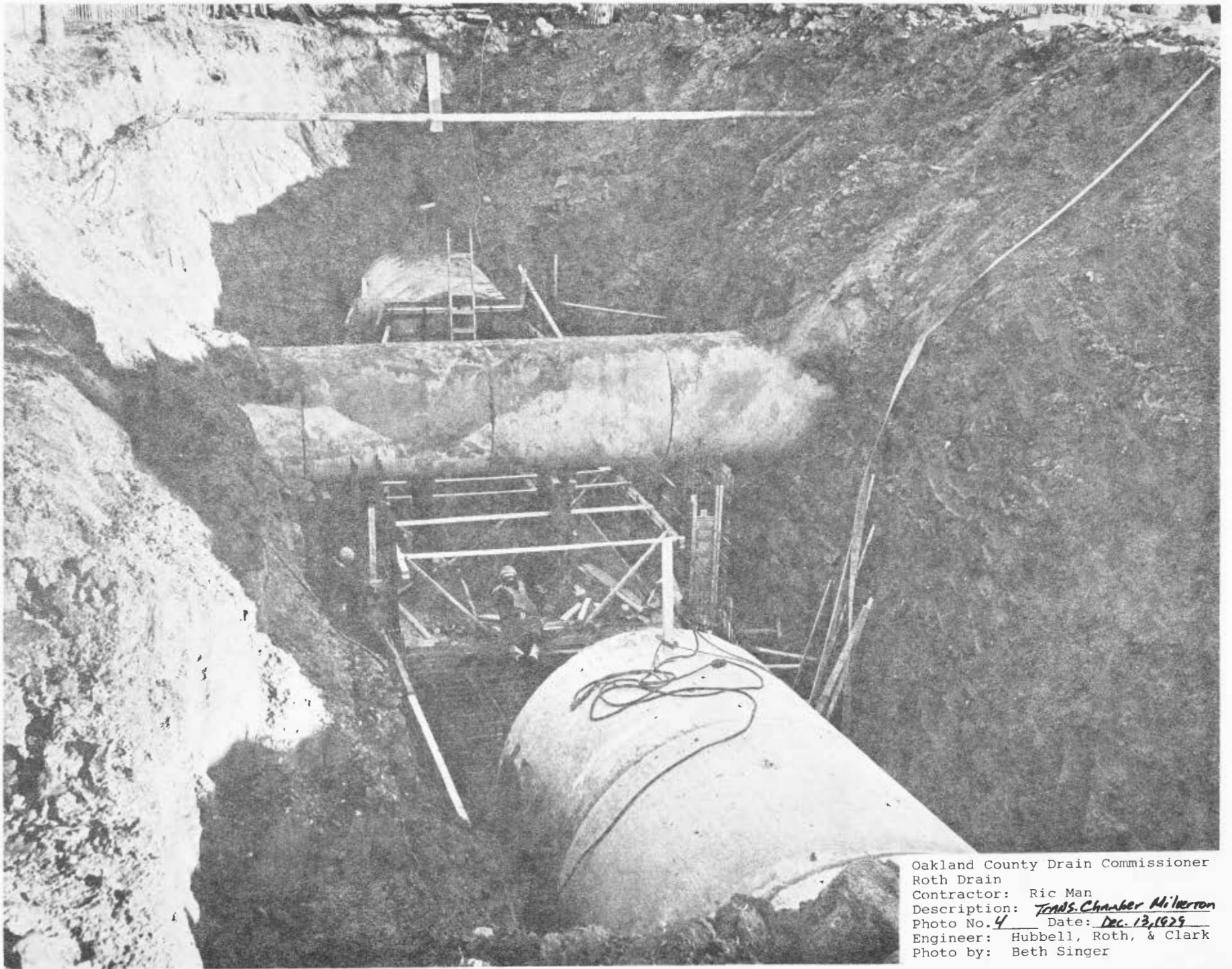
The contract for construction of the Roth Drain was awarded to Ric-Man Construction Co., the low bidder, in the amount of \$2,918,754.70.

Construction is presently in progress with approximately 12% completed.

TEN MILE-ROUGE SANITARY DRAIN

Petition to locate, establish and construct an intra-county drain was filed in the office of the Oakland County Drain Commissioner by the City of Farmington Hills. The project proposed by the petition consisted of sanitary sewers and branches with appurtenance structures including four pumping stations.

Previous to the petition being submitted to the Drain Commissioner, this project had proceeded under Act 185 and was under the direction of the Oakland County Department of Public Works. However, because of difficulty in financing the project under Act 185, it was necessary to proceed under Chapter 20 of Act 40 of the Public Acts of 1956, as amended.



Oakland County Drain Commissioner
Roth Drain
Contractor: Ric Man
Description: *Trads. Chamber Millerton*
Photo No. 4 Date: Dec. 13, 1929
Engineer: Hubbell, Roth, & Clark
Photo by: Beth Singer

TEN MILE-ROUGE SANITARY DRAIN - Cont'd.

After necessary legal procedures and hearings, the Drainage Board determined that the proposed project was necessary for the public health and that the petition was of sufficiency and that the project was practical. The Board designated the project as the Ten Mile-Rouge Sanitary Drain.

The engineering firm of Pate, Hirn & Bogue, Inc. was employed by the Board to prepare plans, specifications and an estimate of cost of the Ten Mile-Rouge Sanitary Drain.

Plans and specifications were prepared by Pate, Hirn & Bogue, Inc. and bids for construction were received by the Drainage Board. Upon recommendation of the engineers, the Board awarded the following contracts:

<u>Contract Section No.</u>	<u>Contractor</u>	<u>Amount</u>
I	Joseph J. Sinacola	\$ 855,670.10
II	Mole Construction Co., Inc.	786,681.45
III	O'Laughlin Construction Co.	387,450.00
IV	O'Laughlin Construction Co.	553,400.00
V	Rocco Ferrera Company	339,000.00
VI	Rotor Electric Company	17,600.00
	Total	<u>\$2,939,801.55</u>

The Ten Mile-Rouge Sanitary Drain, with the exception of one mile of deleted sewer, is now in service, handling sewage flows generated from its district. Although some work still remains to be done to the pumping stations, all four are being used to handle the sewage flows. Presently telemetering is being installed in these stations. The one mile of deleted sewer is located between 12 and 13 Mile Roads, 1/2 mile east of Haggerty Road. This sewer was deleted from Contract II because of the sub-surface soils encountered.

These sub-surface soils were not suitable to support the sewer pipe and, therefore, the design had to be modified or the sewer rerouted. After exploring the soils more thoroughly it was determined that a cost effective installation would entail rerouting the sewer. New easements were secured and engineering plans prepared so the one mile project could be rebid.

SEWER CONSTRUCTION

AVON TOWNSHIP EXTENSIONS NO. 2

This project is known formally as the "Oakland County Water Supply and Sewage Disposal Systems for Avon Township, Extensions No. 2 (Sewer)". The title indicates that construction of water systems were to be included in the project, and in the original proposal, they were included. However, as the project developed, and it became known that Federal and State Water Pollution Control funding was available for sewer construction, the water portion of the project was deleted from immediate consideration to avoid difficult grant administration problems.

The system consists of 107.6 miles of sanitary sewers, 6-inch through 30-inch in size, and two pumping stations. Residents and businesses located in the southern one-half of Avon Township will receive sanitary sewerage service when construction is finished.

Of all the systems presently under construction, this is the largest in terms of construction dollars and in terms of sphere of influence. Lateral sewers to provide service to individual users constitute the principal portion of the constructed system. However, a great deal of trunk sewer footage up to 30-inch in size is being constructed to provide outlets for the lateral systems. A variety of different kinds of construction operations include tunnel crossings of the Grand Trunk Railroad at two locations, tunnel crossings of the M-59 Freeway at two locations, and construction through several environmentally sensitive areas.

Construction through areas identified as waterfowl nesting areas received special attention. Provisions were included in the construction contracts which prohibited construction activity during the spring and early summer nesting period, and established special surface restoration requirements.

Approximately 35 percent of the system was ready to be used for the intended purpose during 1979. The remaining portions will be ready by early fall of 1980, two to three months ahead of scheduled contract completion dates.

The firm of Johnson and Anderson, Inc. designed the system, prepared construction plans and specifications, and assisted the Drain Commissioner's staff to obtain federal and state funding under the Public Law 92-500 grant program.

This project had a grant eligibility of 47 percent for the system to be constructed. Federal and state funds for 80 percent of the grant eligible portions constructed in an amount in excess of 10.4 million dollars will be received when all project work is complete.



OAKLAND COUNTY DRAIN COMMISSIONER
O.C.W.S. & S.D.S.
Avon Twp. Ext. #2 Sewer Cont. #7
Contractor: Ric Man
Location: M.H. 24A
Photo No: 1 Date: 2/14/80
Photo by: Beth Singer



OAKLAND COUNTY DRAIN COMMISSIONER
O.C.W.S. & S.D.S.
Avon Twp. Ext. #2 Sewer Cont. #7
Contractor: Ric Man
Location: M.H. 24A
Photo No: 2 Date: 2/14/80
Photo by: Beth Singer

AVON TOWNSHIP EXTENSIONS NO. 2 - Cont'd.

Thirteen construction contracts were awarded in mid-September and mid-November 1978 to eight construction contractors; Ric-Man Construction, Inc., Guymann Construction, Inc., Mancinelli Contracting Corporation, Dan's Excavating, Inc., John Carlo, Inc., DiPonio & Morelli Construction Co., Lanzo Construction Co., Inc., and O'Laughlin Construction Co. The total cost of construction contracts was \$26,099,861.08.

BINGHAM FARMS WATER AND SEWER

Two separate systems, one for water supply and the other for sanitary sewerage service were combined into one project to be financed and constructed jointly. The two systems are known, formally, as the "Evergreen S.D.S., Bingham Farms Extension No. 2 (Sewer)" and the "Bingham Farms Water Supply System". Both systems follow construction of initial segments of both utilities in prior years, and are intended to be the final stage necessary to provide service to the entire Village of Bingham Farms.

The project consists of 7.8 miles of sanitary sewers, 6-inch through 18-inch in size and one lift station, and 6.2 miles of water mains 8-inch through 16-inch in size. The sanitary sewer system includes a trunk line located in the flood plain of the Franklin Branch of the Rouge River. This trunk line runs from the south limit of Bingham Farms northwesterly and just into the Village of Franklin at a point north of Thirteen Mile Road where the river crosses Telegraph Road. This outlet and one constructed in prior years near Telegraph Road one-half mile south of Thirteen Mile Road provide for the future needs of the Village of Franklin.

Nearly all of the systems were ready to be used for the purpose intended during the latter part of 1979. The remaining portions will be ready during the early part of 1980.

The Village of Bingham Farms is a community of large homes built on large parcels in a semi-rural setting full of large beautiful, old trees. A great deal of effort went into the study necessary to preserve and protect that community asset. The recommendations of an environmental consultant retained by the Village led to satisfactory solutions to potential problems. For example, much of the sanitary sewer system and portions of the water system were built under or immediately adjacent to the traveled portions of roads to avoid destruction of large numbers of specimen trees.

The firm of Giffels-Webster Engineers, Inc. designed the system, prepared construction plans and specifications and worked in close harmony with the Drain Commissioner's staff to provide protective requirements for the Village environment.

Two construction contracts, both of which included construction of sanitary sewer and water main, were awarded to Troelsen Excavating Co. on May 4, 1978. The total cost of construction contracts was \$2,081,569.25.



OAKLAND COUNTY DRAIN COMMISSIONER
Evergreen S.D.S. Bingham Farms Ext. #2
Contract B
Contractor: Troelsen Excavating Co.
Location: Pump Station at Brooklane
Photo No: 3 Date: 3/7/80
Photo by: Beth Singer

HOLLY SEWAGE DISPOSAL SYSTEM

The Village of Holly is located in the far northwest corner of Oakland County. Holly lies in the drainage basin of the Shiawassee River which flows in a westerly and northerly direction to the Saginaw River. Regional sanitary sewer interceptors, such as those which serve much of the remainder of Oakland County, do not reach Holly, and therefore, Holly has had to provide its own sanitary sewerage collection, treatment and disposal.

Like other communities elsewhere, Holly, years ago, constructed a treatment plant and collection system to comply with water quality standards current at the time. With the advent of the more stringent standards and greater environmental awareness, Holly's system became obsolete. The State of Michigan cited Holly for pollution of public waters and it became necessary to provide major improvements.

A determination was made to apply for Federal and State funding under the Public Law 92-500 grant program since the project appeared to be eligible for a high degree of grant participation, not only for the treatment plant improvement, but also for major improvements and repairs to the collection system. The scope of the project was, therefore, enlarged to include the latter.

The system consists of 4.7 miles of sanitary sewers, 8-inch through 18-inch in size, eight pumping stations, and the treatment plant expansion and improvement. The principal feature of the treatment process is the "bio-disk" process, a rather recent and advanced development of proven worth, somewhat comparable to the conventional trickling filter. The quality of the final discharge from the plant should be the equivalent of that produced by a tertiary treatment system with nutrient removal as an added feature.

The collector system was ready to be used for the intended purpose during 1979, although rehabilitation of a small segment of collector remains to be done. The treatment plant is expected to be ready for service by the early part of 1981. In the interim, the existing plant continues to provide treatment.

The firm of Capital Consultants, Inc. of Lansing, Michigan designed the entire project, prepared construction plans and specifications, and assisted in obtaining federal and state funding under the Public Law 92-500 grant program, and provides resident engineer inspection services at the treatment plant.

This project has a grant eligibility of 81 percent of total construction and associated project costs. Federal and State funds for 80 percent of the grant eligible portions in an amount in excess of 7 million dollars will be received when all project work is complete.

Four construction contracts were awarded in October 1978 to four contractors; Lerner-Linden, Inc., V.I.L. Construction, Inc., Iacobelli Construction, Inc., and A & B Sewer Cleaning, Inc. The total cost of construction contracts was \$8,014,355.00.

WATERFORD EXTENSIONS - PHASE III (2nd Section)

This project is known formally as the "Clinton-Oakland S.D.S., Waterford Extensions - Phase III, Contracts 24A, 24B, 26A, 26B, 27, 27A and 28B". It is the second and final section to be constructed of a much larger Phase III, Waterford Township sanitary sewer program.

The system consists of 26.5 miles of sanitary sewers, 6-inch through 18-inch in size, and five pumping stations. Residents and businesses located in the northeasterly part of Waterford Township will receive sanitary sewerage service when construction is finished.

Much of the construction was located in the vicinity of lake country adjacent to the Eagle, Woodhull and Oakland lake chain. Many sewers were constructed through narrow strips of land between permanent lake-front homes and the waters edge, and in one instance across open water to serve an island at the east end of Island Park Drive. Nearly all of the system was ready to be used for the intended purpose during 1979. The remaining portions will be ready during the early part of 1980.

Residents of the lakes area should notice a substantial improvement in the water quality of their lakes within a short period of time after their homes and businesses are connected to the sanitary sewerage system.

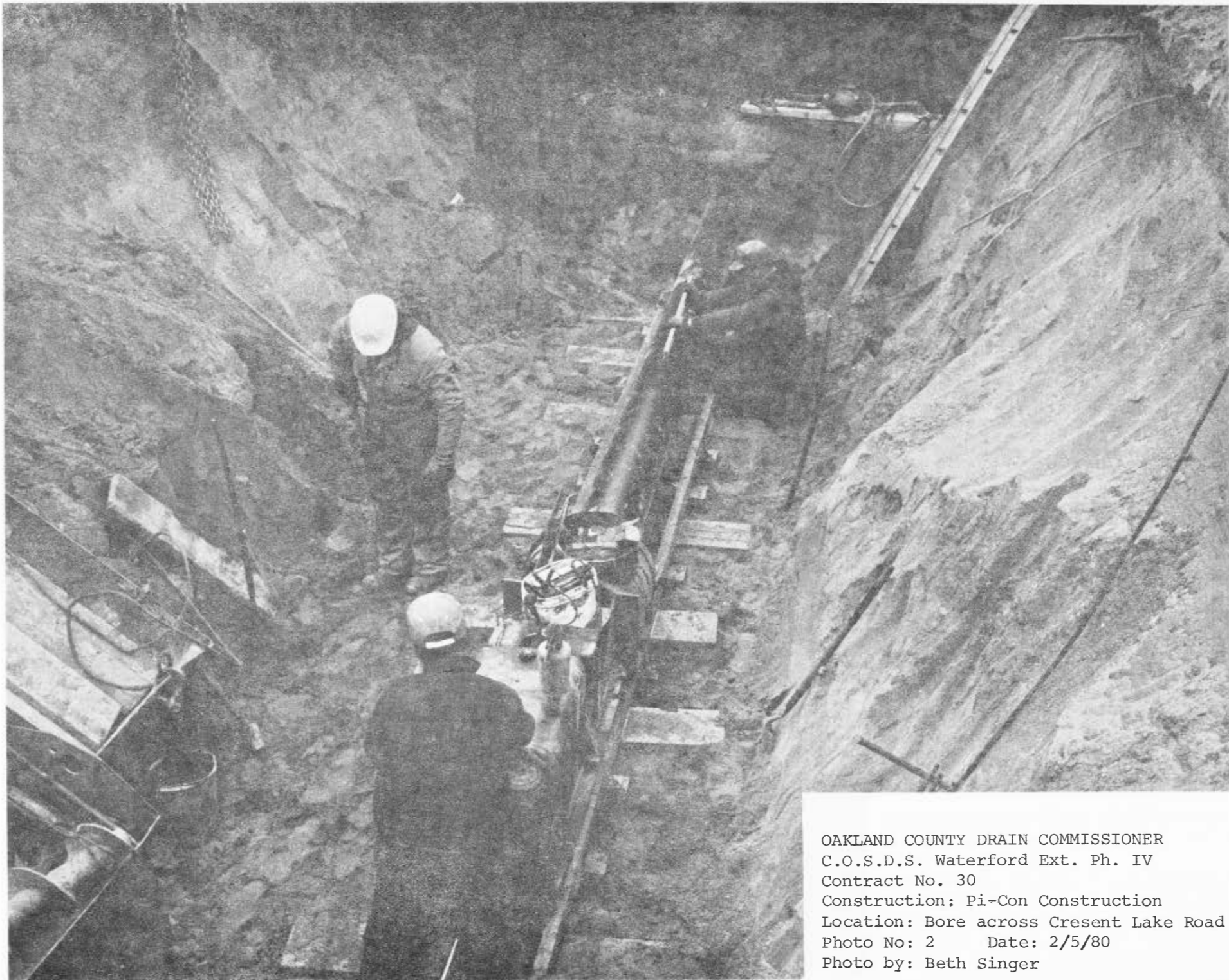
The firm of Johnson and Anderson, Inc. designed the system and prepared construction plans and specifications. Johnson and Anderson, Inc. also assisted in obtaining federal and state funding under the Public Law 92-500 grant program.

This project had a grant eligibility of 72 percent for the system to be constructed. Federal and state funds for 80 percent of the grant eligible portions constructed in an amount in excess of 3.8 million dollars will be received when all project work is complete.

Six construction contracts were awarded in mid-1978 to four construction contractors; John Cavaliere Cement Contractors, Inc., Sterling Garrett Contracting Co., Inc., Ric-Man Construction, Inc., and Giannetti Brothers Construction Co., Inc. The total cost of construction contracts was \$5,660,862.34.

WATERFORD EXTENSIONS - PHASE IV

This project is known formally as the "Clinton-Oakland S.D.S., Waterford Extensions - Phase IV". It was intended to follow the completed construction of Phase III in the master development plan of capital improvements adopted by Waterford Township. However, project development schedules were accelerated to take advantage of federal and state funding under Public Law 92-500.



OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. Waterford Ext. Ph. IV
Contract No. 30
Construction; Pi-Con Construction
Location: Bore across Cresent Lake Road
Photo No: 2 Date: 2/5/80
Photo by: Beth Singer



OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. Waterford Ext. Ph. IV
Contract No. 36
Contractor: Ric-Man Construction
Location: M.H. #42
Photo No: 1 Date: 2/5/80
Photo by: Beth Singer

WATERFORD EXTENSIONS - PHASE IV - Cont'd.

The system consists of 47.6 miles of sanitary sewers, 6-inch through 30-inch in size, and four small submersible-pump, pumping stations. Residents and businesses located in the west-central portion of Waterford Township will receive sanitary sewerage service when construction is finished.

Lateral sewers to provide service to individual users constitute the principal portion of the constructed system. However, the 30-inch trunk sewer which acts as the outlet for a large part of the system, passes through several environmentally sensitive areas near the Clinton River. Design and construction provided a challenge to the Engineer and the Contractor. Nearly all of the system was ready to be used for the purpose intended during the latter part of 1979. The remaining portions will be ready during the early part of 1980.

There should be a noticeable improvement in the water quality in the upper reaches of this branch of the Clinton River, and also in Crescent Lake within a short period of time after homes and businesses are connected to the sanitary sewerage system.

The firm of Johnson and Anderson, Inc. designed the system, prepared construction plans and specifications, and assisted in obtaining federal and state funding under the Public Law 92-500 grant program. All of this activity took place under a substantially accelerated schedule to permit the project to qualify for funding.

This project had a grant eligibility of 50 percent for the system to be constructed. Federal and state funds for 80 percent of the grant eligible portions constructed in an amount in excess of 6.7 million dollars will be received when all project work is complete.

Ten construction contracts were awarded in mid-September 1978 to nine construction contractors; M.C.S. & J. P. Harte (joint venture), Pi-Con, Inc., Guymann Construction, Inc., Warren Contractors, Inc., Triangle Excavating Company, Rocco Ferrera & Co., Inc., DiPonio & Morelli Construction Co., Ric-Man Construction, Inc., and Union Construction Co. & Schaefer Lumber Co. (joint venture). The total cost of construction contracts was \$15,005,170.78.

WATERFORD EXTENSIONS - PHASE V

This project is known formally as the "Clinton-Oakland S.D.S., Waterford Extensions - Phase V". It was intended to follow the completed construction of Phases III and IV in the master development plan of capital improvements adopted by Waterford Township. As a result, the Phase V project was considered to be a master plan concept and, hence, a future project, as late as the early part of 1977.

WATERFORD EXTENSIONS - PHASE V - Cont'd.

That project status changed dramatically when it was learned that a substantial portion of the proposed system had a high degree of eligibility for participation by federal and state agencies for funding under Public Law 92-500. The target date for qualification was late 1977, only four to five months in the future.

This triggered a massive cooperative effort by the Drain Commissioner's staff and the consulting engineer, Johnson and Anderson, to complete plans, specifications and all related project documents within a four-month period, a task of near impossible proportions. The proofs of the success of that effort were the receipt of federal and state grant funds and the construction of the system.

The system consists of 75.4 miles of sanitary sewers, 6-inch through 21-inch in size, and fourteen submersible-pump, pumping stations. Residents and businesses located in the northwest corner of Waterford Township will receive sanitary sewerage service when construction is finished.

A substantial portion of the construction is located in the populated areas adjacent to the Van Norman, Lester, Lotus, Maceday and Williams Lake chain, and surrounding Huntoon Lake. Approximately 20 percent of the system was ready to be used for the intended purpose during 1979. The remaining portions will be ready during the first half of 1980, six to nine months ahead of scheduled contract completion dates.

The firm of Johnson and Anderson, Inc. designed the system, prepared construction plans and specifications, and assisted in obtaining federal and state funding under the Public Law 92-500 grant program.

This project has a grant eligibility of 71 percent for the system to be constructed. Federal and state funds for 80 percent of the grant eligible portions constructed in an amount in excess of 13.4 million dollars will be received when all project work is complete.

Fourteen construction contracts were awarded to six contractors in the latter part of 1978, three in August and eleven in December. The contractors were; Giannetti Brothers Construction Co., Inc., Rocco-Ferrera & Co., Inc., Douglas H. Higgins, Inc., Ric-Man Construction, Inc., Sterling Construction Co., Inc., and Guymann Construction, Inc. The total cost of construction contracts was \$21,522,392.52.

WEST BLOOMFIELD EXTENSIONS NO. 2

The formal title of this project is the "Clinton-Oakland S.D.S., West Bloomfield Extensions No. 2". It has followed the construction several years ago of the initial system of trunk sewers within the Clinton-Oakland interceptor district of West Bloomfield Township.

WEST BLOOMFIELD EXTENSIONS NO. 2 - Cont'd.

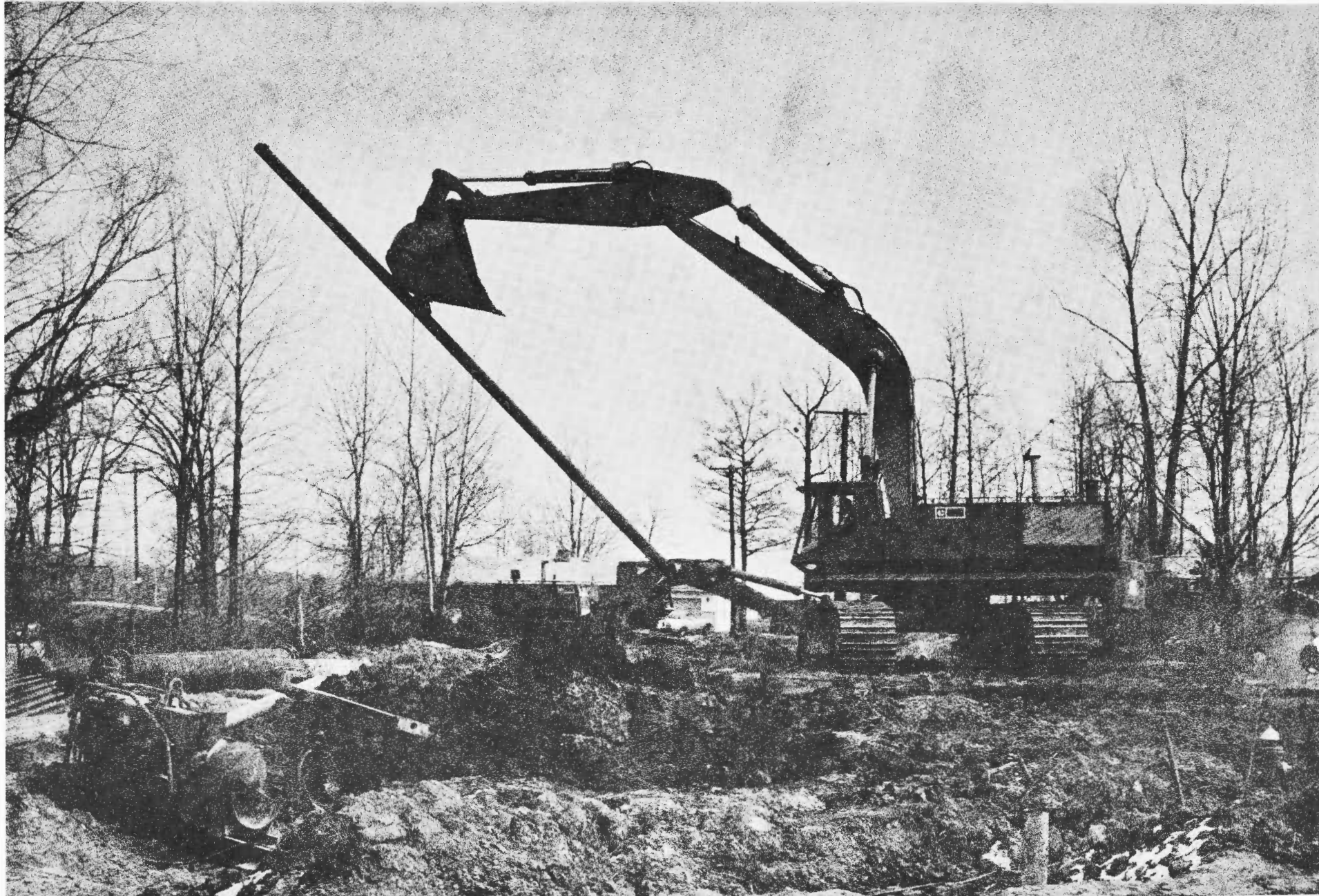
This system consists of 67.1 miles of sanitary sewer, 6-inch through 16-inch in size, and five lift stations. Residents and businesses located in the northwesterly one-third of West Bloomfield Township will receive sanitary sewerage service when construction is finished.

The substantial portion of the constructed system will provide lateral sewer service to individual users in the high density developments of both old and new homes next to the shores of Cass, Green, Upper Straits, Middle Straits, Union and Pleasant Lakes. Many of these homes were once summer cottages that have since been converted to permanent residences often with much less than adequate on-site sewage disposal systems, and little or no potential for improvement.

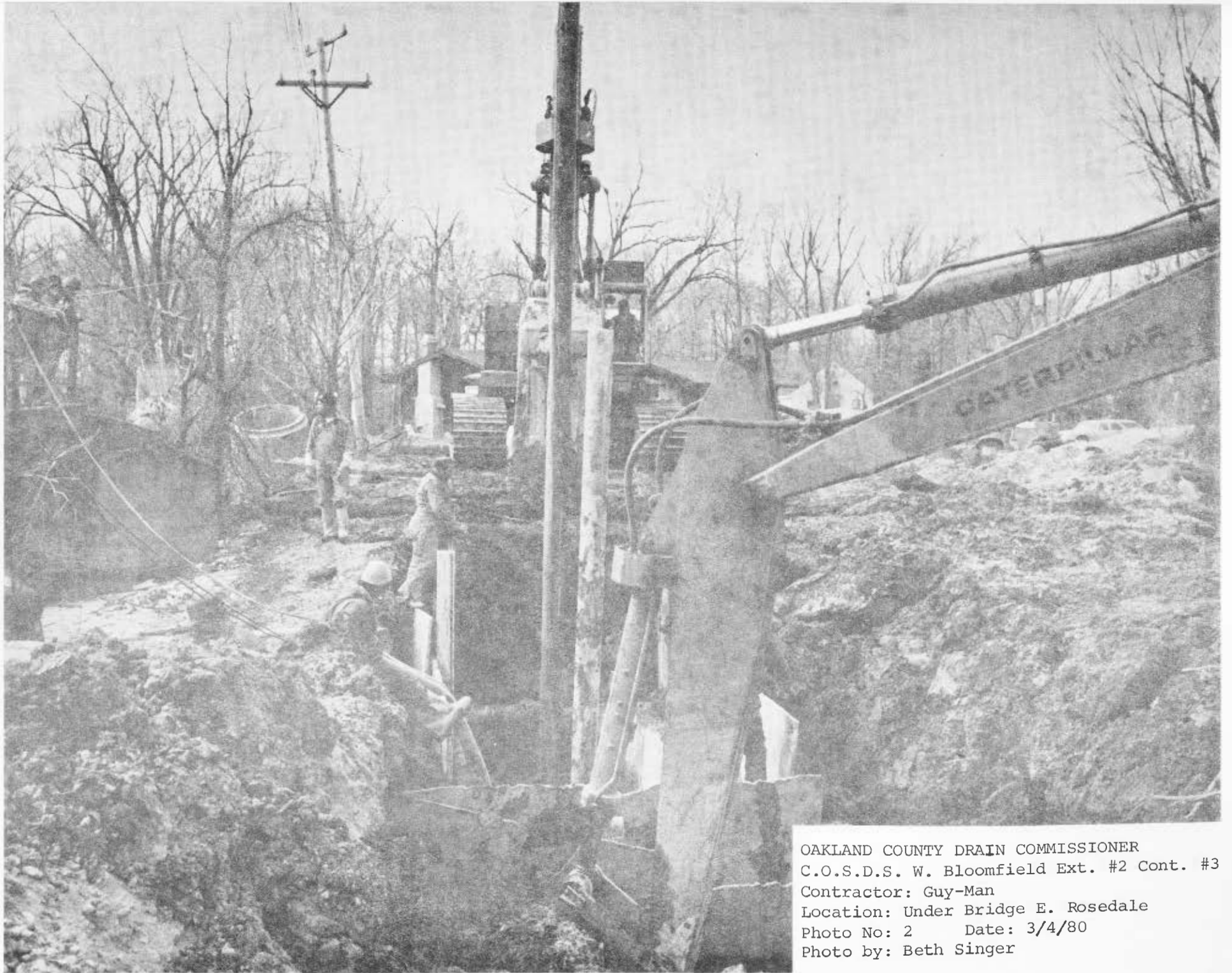
A portion of this system presented a significant challenge to both the engineer-designer and the contractor. "Zox Lakeside Park" and the "Lagoon Addition" is a private subdivision of platted lots located on the northwesterly shore of Cass Lake and Gerundegut Bay. Much of the land within the plat is marsh-land with deep pockets of muck, marl, silt, and peat soils with unstable qualities and a high ground water level. Many of the lots have direct access to the lakeshore or to a system of canals which exit to the lake; and as a result, the area is highly attractive to people who seek and enjoy water-related sporting and recreational activities. Nearly fifty homes have been built over the years, some rather recently, on soils which have not provided adequate foundation support. Evidences of severe settlements are visible even by casual observation.

The challenge in the "Zox" area was to construct sanitary sewers on a stable foundation system to provide reliable service, and not damage existing homes or the old, one-lane bridges which span the canal system. The combined efforts of the Drain Commissioner's staff, the engineering firm of Hubbell, Roth and Clark, and the contractor, Guymann Construction Company, developed a pile support system to be installed without the use of enormous equipment or conventional pile driving hammers. Steel pipe piles were pushed and vibrated into the ground with calibrated machinery which produced no damaging effects on homes or bridges. That machinery was of the type used routinely for construction of sanitary sewers. Approximately 28,000 feet of steel pipe piles, more than five miles, have been constructed so far, in some cases to depths of 85 feet below ground surface.

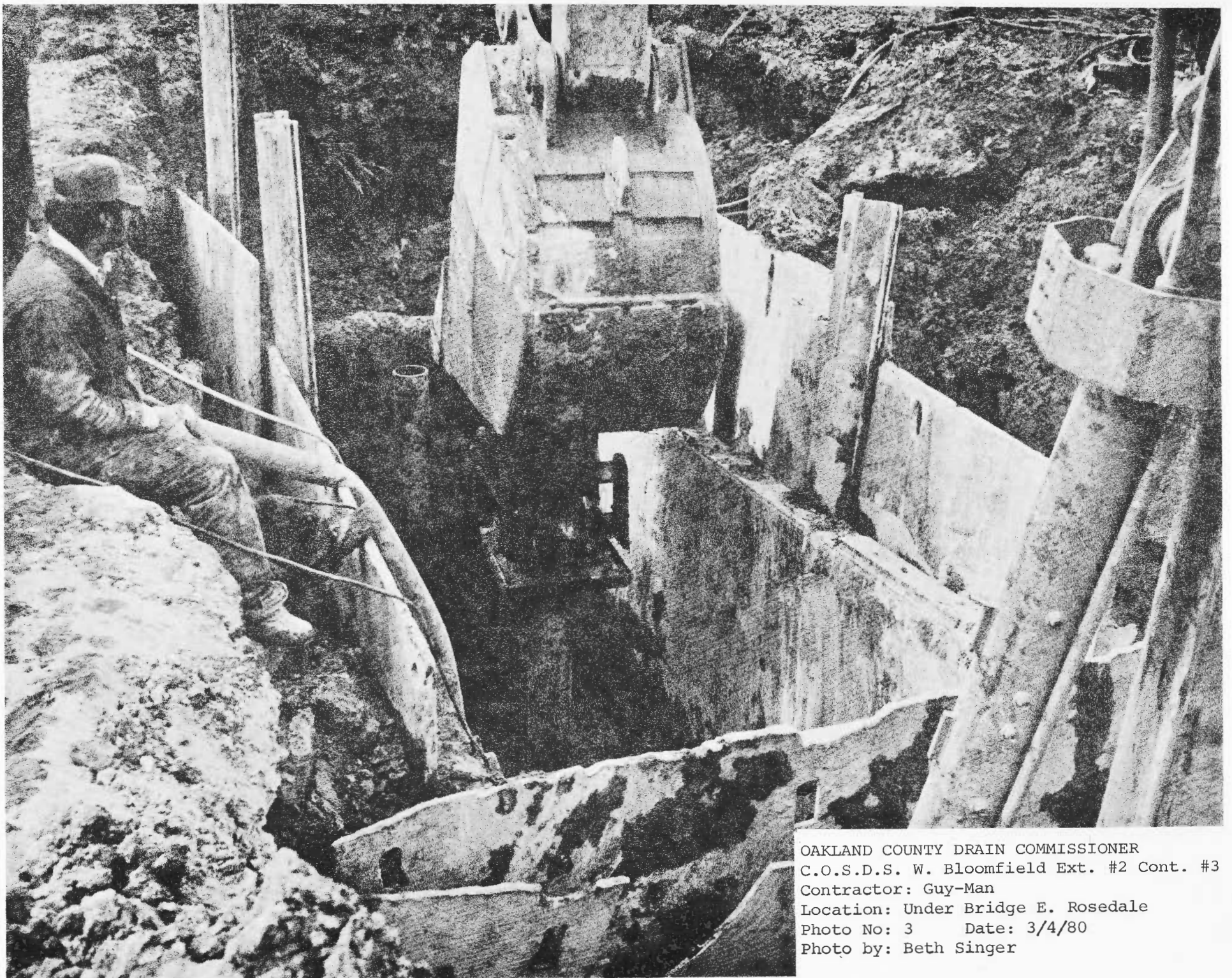
Nearly all of the system was ready to be used for the purpose intended from mid to late 1979. The remaining portions will be ready during the early part of 1980. Residents of the lakes area should notice a substantial improvement in the water quality of their lakes within a short period of time after their homes and businesses are connected to the sanitary sewerage system.



OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. W. Bloomfield Ext. #2 Cont.#3
Contractor: Guy-Man
Location: Under Bridge E. Rosedale
Photo No: 1 Date: 3/4/80
Photo by: Beth Singer



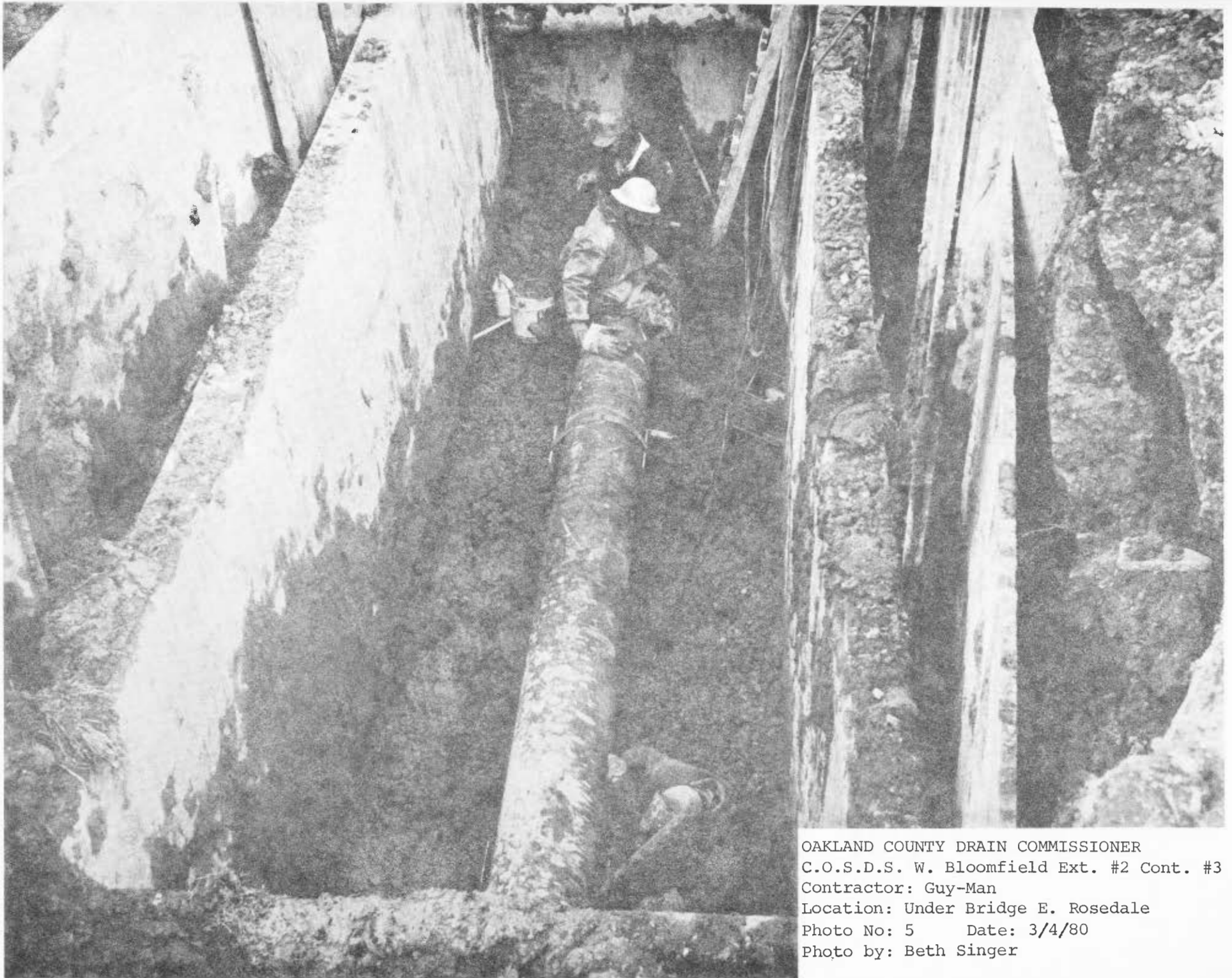
OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. W. Bloomfield Ext. #2 Cont. #3
Contractor: Guy-Man
Location: Under Bridge E. Rosedale
Photo No: 2 Date: 3/4/80
Photo by: Beth Singer



OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. W. Bloomfield Ext. #2 Cont. #3
Contractor: Guy-Man
Location: Under Bridge E. Rosedale
Photo No: 3 Date: 3/4/80
Photo by: Beth Singer



OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. W. Bloomfield Ext. #2 Cont. #3
Contractor: Guy-Man
Location: Under Bridge E. Rosedale
Photo No: 4 Date: 3/4/80
Photo by: Beth Singer



OAKLAND COUNTY DRAIN COMMISSIONER
C.O.S.D.S. W. Bloomfield Ext. #2 Cont. #3
Contractor: Guy-Man
Location: Under Bridge E. Rosedale
Photo No: 5 Date: 3/4/80
Photo by: Beth Singer

WEST BLOOMFIELD EXTENSIONS NO. 2 - Cont'd.

The firm of Hubbell, Roth and Clark designed the system and prepared construction plans and specifications. Hubbell, Roth and Clark also assisted in obtaining federal and state funding under the Public Law 92-500 grant program.

This project had a grant eligibility of 41 percent of the system to be constructed. Federal and state funds for 80 percent of the grant eligible portions constructed in an amount in excess of 5.7 million dollars will be received when all project work is complete.

Thirteen construction contracts were awarded in mid-June and mid-September 1978 to nine construction contractors; Guymann Construction, Inc., J. P. Capello, Inc., Warren Contractors, Inc., Ric-Man Construction, Inc., Iannucci Contracting Co., Inc., Triangle Excavating Company, Ben P. Fyke & Sons, Inc., Imperial Construction Co., Inc. and S.B.G. Construction, Inc. (joint venture), and Union Co. and Schaefer Lumber Co. (joint venture). The total cost of construction contracts was \$15,555,418.81.

WATER MAIN CONSTRUCTION

WATERFORD WATER SUPPLY SYSTEM - EXT. 4

This water distribution system consists of 4.45 miles of water mains, 8-inch and 12-inch in size. Residents and businesses located in the south - central segment of Waterford Township near the shores of Cass Lake will receive water service when construction is finished.

The entire system was placed into service for the intended purpose in November of 1979. Final restoration following construction will be completed during the early part of 1980, and the contractor should receive final payment by mid-year.

The firm of Johnson and Anderson, Inc., designed the system and prepared construction plans and specifications.

One construction contract was awarded to the Angelo Iafrate Company on April 5, 1979, in the amount of \$562,951.95.

WEST BLOOMFIELD TOWNSHIP WATER - SECTION IV & V

In two separate actions, February 2, 1978 and May 3, 1979, the Board of Commissioners responded to requests from West Bloomfield Township and established two, separate projects for construction of water transmission mains in the Township. Both actions assigned project development and construction to the Drain Commissioner's office, as the County Agency, and transferred surplus funds from projects completed in prior years to provide financing.

The Section IV project consists of 2,000 lineal feet of 16-inch water transmission main located in Drake Road from Maple Road, south, and a pressure-reducing valve chamber located near the intersection of 14 Mile and Farmington Roads.

The Section V project consists of 4,800 lineal feet of 16-inch water transmission main located in Maple Road from Halstead Road, west, to Haggerty Road.

The Section IV project would have been constructed during calendar year 1978 if project development procedures had progressed normally. However, right of way acquisition for the pressure-reducing valve chamber delayed the construction start for more than a year. In the interim, the Section V project development reached the construction bidding stage, and the two projects were combined into one construction contract.

Both systems will be placed into service for the intended purpose by July 1, 1980. The construction contract was awarded to Pacentro Construction Company, Inc. on October 31, 1979, in the amount of \$232,252.40.

The firm of Hubbell, Roth and Clark, Inc. designed the systems and prepared construction plans and specifications.

COMPLETED PROJECTS - OPEN CONSTRUCTION ACCOUNTS

TROY WATER SUPPLY SYSTEM

This project provides water transmission service to almost all of the City of Troy. The water supply is drawn from the City of Detroit system some of which was under construction at the same time.

Final payments for construction of contract sections 4, 5, and 6 were made during calendar year 1979. Final payments have now been made on all ten contract sections.

The original design for the Troy system included several supply connections to Detroit's main lines. Two of these connections were not constructed because of delays in construction of the Detroit mains. The two connections to the 84-inch Detroit main will be constructed by mid-1980; a 30-inch at South Blvd. and Rochester Road, and a 24-inch at South Blvd. and Crooks Road.

CLINTON-OAKLAND SEWAGE DISPOSAL SYSTEMS

This sanitary sewer interceptor is intended to serve approximately 290 square miles of northeastern Oakland County in the Clinton River basin. Construction was completed several years ago and the system is completely in service. Final payment for construction of contract section 3 continues to be delayed because of litigation initiated by the contractor.

CLARKSTON-INDEPENDENCE EXTENSIONS

The official title of this project is the "Clinton-Oakland S.D.S., Clarkston-Independence Extensions". The system provides sanitary sewer service to the entire Village of Clarkston and the southwesternly portion of Independence Township south of the I-75 freeway. Construction was completed several years ago and the system is completely in service. Construction accounts remain open because of a lawsuit and counter-suit filed by the contractor and the County, respectively, over the contractor's default in contracts T-3 and T-6.

BLOOMFIELD TOWNSHIP TRUNK ARMS, STAGES II & III

Construction of 4.6 miles of 6-inch through 15-inch sanitary trunk sewers and one pumping station is complete and the entire system is in service. Final payment to the contractor is expected to be processed by early 1980.

WATERFORD EXTENSIONS - PHASE II

This project is known formally as the "Clinton-Oakland S.D.S., Waterford Extensions - Phase II". Construction of sanitary lateral sewers to serve the east-central portion of Waterford Township was completed and the system placed in service. Claims for extra payments by two contractors under contracts 11, 18, 19 and 20B should be resolved soon and final payments should be made in early 1980. A lawsuit filed by the contract 19 contractor continues.

OXFORD VILLAGE EXTENSIONS

The official title of this project is the "Clinton-Oakland S.D.S., Oxford Village Extensions". The system provides sanitary sewer service to the entire Village of Oxford. Construction was completed several years ago and the system is completely in service. Final payments have been made for all but contract 1. Resolution of a lawsuit filed by the contractor against Oakland County, and receipt of the Michigan Department of State Highways and Transportation permit release are necessary to close construction accounts.

SOUTHEASTERN OAKLAND COUNTY

SEWAGE DISPOSAL SYSTEM

SOUTHEASTERN OAKLAND COUNTY SEWAGE DISPOSAL SYSTEM

POLLUTION CONTROL FACILITIES

The County of Oakland was ordered and directed by a Final Order of Determination of the Michigan Water Resources Commission adopted December 10, 1969, to abate pollution of the Red Run Drain and the Clinton River on or before December 1, 1972. The Order set forth a time schedule that included a requirement that the facilities had to be placed under construction on or before October 1, 1970.

The Oakland County Drain Commissioner, acting for the Southeastern Oakland County Sewage Disposal System, employed the firm of Hubbell, Roth and Clark, Inc., of Bloomfield Hills, to prepare plans and specifications for a proposed Pollution Control Facilities Project.

The area served includes all or part of fourteen communities encompassing a drainage district of 24,500 acres and a population exceeding 350,000 people.

Construction involved the use of existing easements occupied by the Red Run Drain, a large and deep open drainage course, to create an enclosed structure 11,000 feet long, with an in-line retention of 62.2 million gallons. Accessory structures include a complete garage to house service vehicles, a laboratory addition to the existing control building, and a dewatering pump station. The retention structure with its accessory facilities was designed to reduce overflows of storm drainage from the existing combined wastewater systems to meet acceptable limits of governing authorities. The design provided that storm discharge would be less than if the area served had separate sanitary and storm systems. In addition, provision was made so that extreme storm runoffs will now be chlorinated with adequate detention prior to discharge downstream.

During rainstorms or snow melt periods, a high weir and skimming structure at the inlet (formerly the outlet for the Twelve Towns Drainage District) skims floating debris and high storm water flow into the retention basin. The main retention facility consists of an enclosed reinforced concrete structure with a cross section 65 feet wide, 20 feet deep and approximately two miles in length providing 190 acre feet of retention. The 11,000 feet length of retention structure was constructed within the drainage course of the Red Run Drain. The outlet structure has a 950 feet long weir and baffle adequate to handle the full design flow, eliminating the need for relief gates. Provision was also made so that maintenance vehicles could enter the structure from the outlet end.

When an overflow from the upstream Twelve Towns Drainage System enters the main retention structure, it is chlorinated and retained in the structure until such time as it can be pumped from the downstream pump station into an interceptor for further treatment in the Detroit system. If the capacity of the main retention structure is exceeded, overflow will occur over the weir at the outlet into the

downstream open drainage course, the Red Run Drain, east of Dequindre Road. After the retention structure has been dewatered (pumped out), the cleaning or flushing of the system can begin.

The negative aspect of a two mile long structure was converted to a positive factor by using the length to provide required detention time for the automatic injection of sodium hypochlorite solution which is controlled by the wastewater crest above the inlet weir, and also to provide for automatic sequence flushing of the structure. Periodic flushing of the structure is required to remove solids deposited by retained storms and to flush these solids to an interceptor for subsequent treatment at the Detroit Wastewater Treatment Plant. Sequence flushing was incorporated to make use of an available water supply as dictated by the quantities and pressure required.

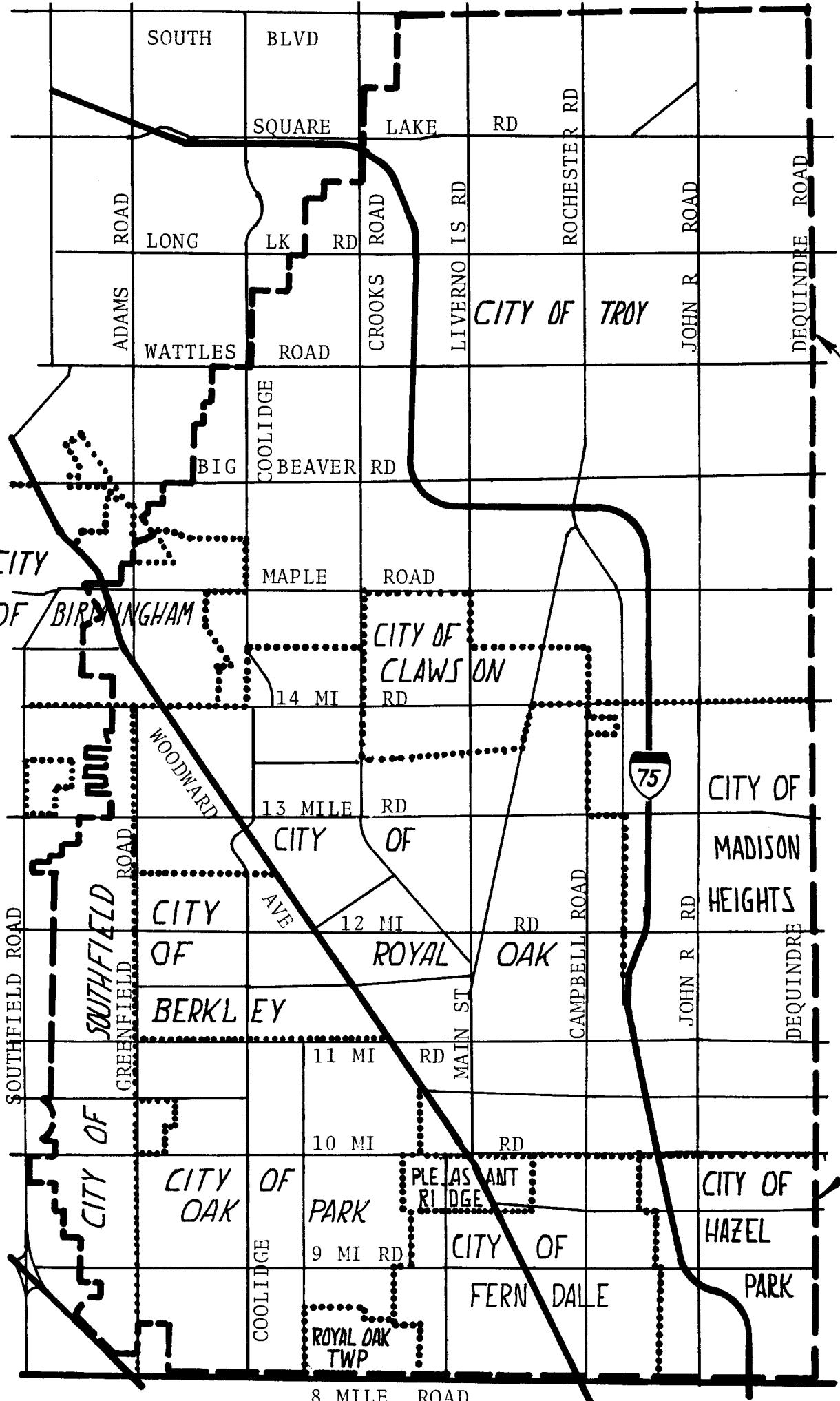
The flushing system is activated at the laboratory building after dewatering the main retention structure, using water from the Detroit Metropolitan Water System, protected by a barometric loop, through a 20 inch water main in banks of fifteen nozzles. Once actuated the flushing sequence proceeds automatically throughout the full length of the structure. Control may be varied at the laboratory building depending upon available water for flushing and available flow in the receiving interceptor. In all, there are over 3,200 individual nozzles.

The chlorination system includes three 30,000 gallon underground concrete sodium hypochlorite storage tanks, provisions for dilution pumps, constant head tank, distribution system within the retention structure, and control valves located within the laboratory building. Exhaust fans for the main retention structure are interlocked with an ozone generator, also located at the laboratory building, to eliminate odor conditions that may possibly occur. The on-site laboratory is equipped, including the provision of an emergency electrical power system, to permit continuous laboratory testing of dry weather and storm flows.

Bids for the Project were taken on September 23, 1970. R. E. Dailey and Co. was low bidder and awarded the contract in the amount of \$19,440,000 on September 28, 1970. The facility became functional in June, 1973. Final construction payment was made in March, 1976. Total Project Cost was \$24,618,172.80. Project financing was by sale of bonds in the amount of \$13,275,000 along with a Federal Grant of \$11,739,566 and a State Grant of \$5,336,116.

Subsequent to the construction of the Pollution Control Facility, the Oakland County Department of Parks and Recreation requested authorization to construct a 9 hole golf course and driving range on the property over the buried retention basin. After obtaining consent from the United States Army Corps of Engineers and the various communities within the Southeastern Oakland County Sewage Disposal System which would be affected by this proposal, the Drain Commissioner authorized use of approximately 140 acres for recreational use. The Red Oaks Golf Course located on this site opened in June, 1978 and now provides additional recreational space for the highly developed Southeastern Oakland County area.

NORTH



S.O.C.S.D.S. Sanitary Drainage District Limits

1979 MAINTENANCE PROGRAM

The Red Run Drain is an inter-county drain originally 11 miles in length. Since construction of the Southeastern Oakland County Sewage Disposal System Pollution Control Project has now taken place upstream from Dequindre Road, maintenance responsibility for the Red Run Drain originates at Dequindre Road in the City of Warren and terminates at the south branch of the Clinton River, east of Utica Road, north of Metropolitan Parkway. Its invert width varies from 40 feet at the Pollution Control Facilities outlet structure to 120 feet at the Clinton River. The top of the channel varies from 90 to 200 feet in width. This drainage channel accepts most of the flow of storm waters of Southeastern Oakland County, as well as a large area of Southern Macomb County.

Rapid property development has occurred in the past few years along this drain. New residential subdivisions, parks and industrial development have intensified the importance of proper drain maintenance, both to insure that the maximum section is available for flood protection and also to improve the general appearance of the area.

Along with periodic inspection of the Red Run right of way after rain storms or other severe weather conditions, an annual inspection was performed during the month of May, 1979, and a formal report was prepared.

Weed spraying was undertaken during the Spring and again in the Fall to control growth of unwanted weeds. Mowing of some sections of the right of way was necessary.

Control of rats was carried out by means of placing rat bait at indicated locations along the right of way. Success was evident by lack of tracks after fresh snowfall.

It was necessary to remove sections of concrete pipe being stored on right of way at Ryan Road to eliminate vandals from rolling section into the Red Run Invert.

Due to an accident involving a train carrying parts racks over the railroad bridge west of Van Dyke and east of Mound Roads, it was necessary to remove racks and other debris from the Red Run right of way and invert. At the same time, logs and miscellaneous trash build-up on the bridge supports were also removed.

The removal of abandoned car parts and dumped trash along the entire length of right of way was necessary throughout the year.

Roadways along the right of way were kept in repair by filling of ruts and washouts.

Laboratory Report

SAMPLING AND ANALYSIS

During calendar year 1979, approximately 25,000 analyses were performed on more than 5,000 samples collected in the Twelve Towns drainage area which includes all of the Cities of Royal Oak, Ferndale, Berkley, Clawson, Hazel Park, Madison Heights, Pleasant Ridge, Huntington Woods, Oak Park, and Royal Oak Township, and part of the Cities of Troy, Birmingham, and Southfield, and the Village of Beverly Hills.

Monthly reports are compiled from the thousands of samples analyzed and are submitted to the office of the Michigan Water Resources Commission in Lansing, the Oakland County Drain Commissioner in Pontiac, and the Detroit Water Board.

OVERFLOWS

The Twelve Towns Relief Drains retention system, which has a holding capacity of 100 acre feet of combined storm water and sewage, experienced 17 spills to the Pollution Control Retention Basin. Of these, 7 were retained, thus, experiencing 10 overflows to the Red Run Drain, for a total of 125 hours.

During an overflow, the quality of water now entering the Red Run Drain at the Dequindre outlet is greatly improved due to the chlorination of overflows entering the Retention Basin. Sampling is performed continuously on all waters entering the Red Run Drain and standard analyses are performed in accordance with National Pollution Discharge Elimination System, Permit Number MI 0026115.

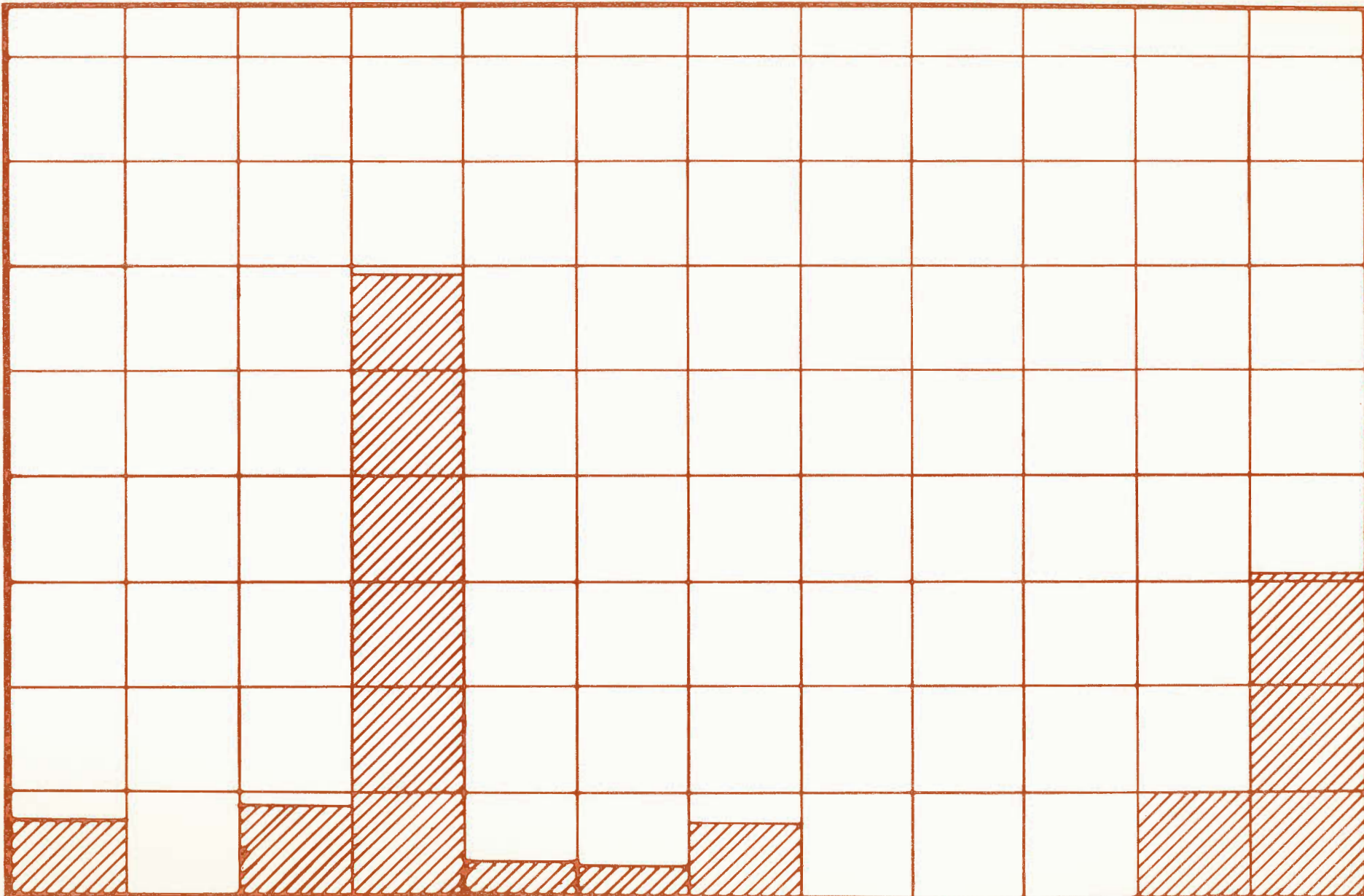
COOPERATION AND VIGILANCE TO CONTROL POLLUTION

The Southeastern Oakland County Sewage Disposal System's Laboratory staff has worked closely with and wishes to acknowledge the assistance and cooperation received from the Michigan Water Resources Commission, the City of Detroit, and the City of Warren, in the effort to clean up County and Inter-County Drains discharging industrial and domestic waste into waters controlled by their respective offices. The Laboratory also works with other members of the Clinton River Watershed Council-Stream Monitoring Committee aiding in analyzing monthly samples of the river.

A constant and continuing program of sampling and testing will continue to prevent destructive effluents from entering the Southeastern Oakland County Sewage Disposal System and to control pollution of County and Inter-County Drains, as well as the receiving waters of the State of Michigan.

HOURS OF OVERFLOW

80
70
60
50
40
30
20
10
0



OVERFLOW DATES

1
4
5 8-9
13-14 25
25-26 28
9
24-26 24-25

MONTH

JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

TOTAL HOURS

7H 15M 0H 0M 8H 30M 59H 0M 3H 15M 3H 0M 7H 0M 0H 0M 0H 0M 0H 0M 10H 0M 30H 40M

SOUTHEASTERN OAKLAND COUNTY SEWAGE DISPOSAL SYSTEM

JANUARY 1, 1979 TO DECEMBER 31, 1979

PROPOSED PROJECTS

PROJECTS UNDER DEVELOPMENT

AVON TOWNSHIP EXTENSIONS NO. 2 (WATER)

The formal title of this project is "Oakland County Water Supply and Sewage Disposal Systems for Avon Township, Extensions No. 2 (Water)". The title indicates that construction of sewer systems were to be a part of the project, and in the original proposal, they were included. The water portion, the scope of this project, was deleted from immediate consideration when sewer construction received grant funding assistance.

The system consists of approximately 13.6 miles of water transmission and distribution mains, 8-inch and 12-inch in size. Residents and businesses located in the southeast corner of Avon Township are the intended recipients of this water supply service.

Avon Township officials are considering administering this project with their own staff and financing the program with funds which they have available from sources other than a county bond sale. If these considerations mature, the Drain Commissioner's office will have no further involvement. As a result, all work on this project has ceased.

EVERGREEN-FARMINGTON POLLUTION CONTROL FACILITIES

Two, independent, sanitary sewer, interceptor systems known as the "Farmington" and the "Evergreen" were planned and designed in the mid 50's, and constructed in the late 50's and early 60's. The districts they serve are located in the south-central portion of Oakland County, from the City of Pontiac, south to Eight Mile Road. They have a common north-south boundary along the extended alignment of Inkster Road, the Evergreen to the east and the Farmington to the west.

Discharges from these two interceptors flow by a common connection to a City of Detroit Interceptor located at Eight Mile and Southfield Roads, and thence to the Detroit Sewage Treatment Plant. The Detroit Interceptor sewer carries both storm water and sanitary sewage, or combined sewage. The Evergreen Interceptor also carries some combined sewage which was designed to spill only periodically into the Rouge River at control structures along its route during times of intense rainfall and limitations of downstream capacity.

Substantial growth has taken place in south Oakland County since the two interceptor systems were completed in the early 60's. The density and character of the growth in both districts have exceeded, substantially, that which was or could have been anticipated during the design phases. Consequently, physical capacities began to show severe strain and only periodic spills to the Rouge River became frequent spills. Growth and development in the districts continue today although the pace is much slower, but each increase adds to that strain.

EVERGREEN-FARMINGTON POLLUTION CONTROL FACILITIES - Cont'd.

Many new public regulations dealing with pollution of the waters of the state have been enacted within the decade of the 70's. As a result, stream water quality standards have been upgraded to a degree that requires much stricter control of pollutant discharges from all sources.

Much developed area within these districts is still served by on-site disposal through septic tanks and tile fields which for a variety of reasons do not function in their modern environment. Collector sewers must be constructed in such areas. New regulations also call for much stricter control over the discharge of combined sewer overflows. Such controls result in an increased demand for capacity to transport and treat sewage. Several sewage collector systems in the district constructed in earlier years contribute excessive non-sanitary flows of ground water or surface water origin. Such flows have increased the intensity of the problem.

Approximately sixteen years ago, the National Sewage Foundation engaged in a study of the future needs for sanitary sewer in the Detroit Metropolitan Area. The resulting report recommended that sewage collection and treatment should be developed as a region-wide effort and that sewage should be transported via interceptor sewers directly to the Detroit Sewage Treatment Plant. The plan which developed included a requirement for a sanitary interceptor to provide capacity for, at least, the flows from these two districts. The construction of that interceptor has become the basis for the solution to the problem.

On-going studies for project development address many major considerations. Three of these have a considerable impact. Cost to construct the necessary facilities continues to escalate rapidly. Available capacities within the districts' interceptors and the Detroit outlet continue to dwindle. The cost of transportation and treatment of storm and other non-sanitary water inflows continues to grow to rather high proportions. This latter indicates that there is an increasing cost-effectiveness to reducing or eliminating non-sanitary flows.

The enactment of Public Law 92-500 and Public Law 95-217 offer strong incentives in the form of federal and state grant funding to conduct the intensive studies necessary to identify and provide solutions to problems of this nature. They also make grant funding available for design, preparation of construction plans and, ultimately, for construction of facilities judged to be eligible for participation. The current level of participation is eighty percent.

Early in 1976, sixteen communities located in the districts requested Oakland County to apply for a Facilities Planning Grant (Step 1) and provided the twenty percent local share as an advance to finance studies. The Board of Commissioners approved that request and assigned the work to the Drain Commissioner's office,

EVERGREEN-FARMINGTON POLLUTION CONTROL FACILITIES - Cont'd.

as County Agency under Act 342, Public Acts of 1939, as amended. A subsequent Step 1 grant application was filed and approved by the D.N.R. and E.P.A.

Hubbell, Roth and Clark, Inc. was selected as the consulting engineer to perform the study. The Drain Commissioner's staff continues to provide assistance in certain phases of the work.

The draft Facility Plan was completed in July 1979. The findings indicated that further Step 1 studies are necessary concurrent with Phase I of a sewer system evaluation survey. This requires additional local share funding which is presently being requested from the sixteen communities. The findings further indicated that the program needs approach 44 million dollars for interceptors, 40 million dollars for combined sewer overflow controls, and 8 million dollars for sewer systems rehabilitation. Design and construction grant funding are expected to remain at the 80 percent level.

Detroit Facility Planning is also in progress. The plan includes the sanitary interceptor outlet for the Evergreen-Farmington plan. Grant funding for the interceptor is also expected to remain at the 80 percent level.

Eight of the sixteen communities within the districts have initiated Facility Planning for local needs. These efforts are expected to provide master plans for collector sewers within both developed and undeveloped areas. Construction for these needs could reach a level in excess of 50 million dollars for which grant funding should remain at an 80 percent level for the eligible portions.

This entire program is one of ambitious proportions. Cooperation of all interested agencies is necessary to produce satisfactory results.

HURON GARDENS EXTENSION

The formal title of this project is the "Clinton-Oakland S.D.S., Huron Gardens Extension". It became an established project as the result of a request from Waterford Township in January 1977 and the approval of the Oakland County Board of Commissioners on March 3, 1977. Project development and construction was assigned to the Drain Commissioner's office, as County Agency under Act 342, Public Acts of 1939, as amended.

The system consists of approximately 2.7 miles of interceptor sewers and five submersible pumping stations. Residents and businesses located in the southeast portion of Waterford Township north of Sylvan Lake and west of Telegraph Road lie within the service district, which is presently receiving sewage disposal services from the City of Pontiac.

The basic purpose for this project is to disconnect the sanitary sewer service from the City of Pontiac and re-direct sewage flow to

HURON GARDENS EXTENSION - Cont'd.

the Clinton-Oakland Interceptor System. This became necessary when the City of Pontiac notified Waterford Township that it intended to terminate that service, as permitted under the terms of their existing agreement. The issue which prompted the termination is the disagreement between Waterford and Pontiac over storm drainage problems not related to sanitary sewerage service.

At an early stage of project development, the decision was made to apply for Federal and State funding under the Public Law 92-500 grant program. An application for assistance to design the system (Step 2) was denied. A grant amendment to the facilities planning grant (Step 1) for assistance to conduct a sewer system evaluation survey for the existing sewer system did receive approval and that work is partially complete.

The firm of Johnson and Anderson, Inc. was selected to provide engineering services and to assist in obtaining federal and state funding under the Public Law 92-500 grant program.

The City of Pontiac and Waterford Township have met over a several-month period to attempt to resolve certain issues involving responsibility for storm drainage costs. Those discussions led to a petition by Waterford Township to the Drain Commissioner in November to establish the Lewand Drain, a storm drain. In response, the City of Pontiac has granted a two-year extension to the sanitary sewer service contract. Further successful efforts by Waterford and Pontiac may lead to a permanent sanitary sewer service contract.

PLANNED DRAINS

AARON DRAIN

At the time of construction of the Owens Drain in the City of Southfield, the policy of the City was to only build trunk sewers and to let future development take care of the construction of laterals to the trunk line.

The Owens Drain replaced two open ditch county drains known as the Morgan and Griffin Drains. Portions of the open drains were used as laterals to the Owens Drain. Although the flows in the open ditches were greatly reduced, the cross-section dimensions of the ditches remained the same. Consequently, the flows in the ditches were not of sufficient volume and velocity to effect a cleansing action and allowed water to become stagnant and cause a nuisance for citizens residing in the area.

Because of the above-described nuisance and because development in the area has not resolved the problem, the City of Southfield petitioned the Oakland County Drain Commissioner to locate, establish and construct a county drain to serve these problem areas in Sections 26, 34 and 35. Such drain would serve as laterals to the Owens Drain and would replace sections of the Morgan and Griffin Drains.

After necessary hearings and determining that the proposed project was practical, the Drainage Board designated the project as the Aaron Drain and employed the engineering firm of Hubbell, Roth & Clark, Inc., to prepare plans and specifications for the drainage facility.

After the plans and specifications were prepared, the Board advertised for and received construction bids for the Aaron Drain on July 26, 1978. All bids were rejected by the Board because the bids far exceeded the estimated cost of the project.

The Drainage Board decided that construction bids would be solicited again at a future date with the hope of attracting a more reasonable bid.

BALL DRAIN

Periodic flooding has occurred in Bloomfield Township in Sections 12 and 24. As a result of this localized drainage problem, the Township of Bloomfield petitioned the Oakland County Drain Commissioner to locate, establish and construct drainage facilities to alleviate the flooding. The petition described three separate drains.

After consideration of the petition, and after necessary determinations and legal hearings, the Drainage Board determined that

BALL DRAIN - Cont'd.

the project was practical and, since all three drains were included in the same petition, the three drains would be considered as one project. The Board designated the proposed project as the Ball Drain.

The engineering firm of Hubbell, Roth & Clark, Inc., was employed to prepare plans and specifications for the proposed drain.

DiGIOVANNI DRAIN

The Township of West Bloomfield petitioned the Oakland County Drain Commissioner to locate, establish and construct a county drain under the provisions of Chapter 20 of Act 40 of the Public Acts of 1956, as amended. The petition was filed on July 18, 1979. At the first meeting of the Drainage Board held on July 25, 1979, the Board determined that the proposed project was practical and designated the project as the DiGiovanni Drain.

The DiGiovanni Drain, as proposed, would serve an area east of Union Lake in Section 5 of West Bloomfield Township.

At a meeting held on September 12, 1979, several objections to the project were heard by the Board from residents with property on Union Lake.

DOYON DRAIN

The Township of West Bloomfield petitioned the Oakland County Drain Commissioner to construct a Chapter 20 storm drain in Section 17 of the Township.

Purpose of the proposed drain is to provide drainage for the Riding Club Addition to Twin Beach Country Club Subdivision.

At the first meeting of the Drainage Board it was determined that the petition was of sufficiency and that the entire cost of the proposed project would be borne by the petitioner except for possible assessments against the State of Michigan and the County of Oakland on account of drainage to highways. The Board named the proposed facility the Doyon Drain.

The firm of Giffels-Webster Engineers, Inc., Registered Professional Engineers, were employed to prepare plans and specifications for the Doyon Drain.

INDEPENDENCE M-15 DRAIN

A public hearing was held in the Independence Township Hall in the matter of the application for the locating, establishing and constructing of a storm drain in Independence Township. The primary

INDEPENDENCE M-15 DRAIN - Cont'd.

purpose of the drain would be to provide storm drainage for improvement and widening highway M-15 north of Dixie Highway.

Mr. Stanley R. Quackenbush, Deputy Director of the Michigan Department of Agriculture, explained that these proceedings were initiated by an application filed by the Michigan Department of State Highways and Transportation pursuant to the provisions of Section 327, Act 40, Public Acts of 1956, as amended.

Several persons at the hearing expressed comments regarding the proposed project. All were in favor of the drain.

Mr. Quackenbush determined that the proposed drain was practical and necessary.

On June 28, 1978, the Oakland County Drain Commissioner determined that the application for the laying out and designating a drainage district for said drain should be granted and that the said drain is practical, in accordance with the survey. The Drain Commissioner also determined that the name of the drain shall be the Independence M-15 Drain.

The Michigan Department of State Highways and Transportation indicates that they propose to seek bids during the construction season of 1979, provided the financing of Independence Township's share is available.

KELLY DRAIN

The Township of Independence petitioned the Oakland County Drain Commissioner to locate, establish and construct a county drain under the provisions of Chapter 20 of Act 40 of the Public Acts of 1956, as amended, on October 1, 1979. The proposed drainage facility would serve an area of Independence Township in Sections 28 and 29, north of Maybee Road and east of M-15 and Dixie Highway.

The purpose of the Drain would be to relieve an existing drainage problem in the Highwood Subdivision and to provide an outlet for drainage facilities from the Chestnut Hills Subdivision, presently being developed. The developer of the Chestnut Hills Subdivision would be responsible for any and all costs for the proposed Chapter 20 Drain, except for assessment against the County of Oakland on account of drainage of county roads.

At a meeting of the Drainage Board held on November 29, 1979, there were objections raised by residents of Independence Township toward the proposed project and the Board decided that further consideration of the Kelly Drain would be deferred until an investigation of the matters raised could be made.

LARSEN DRAIN

A petition was filed by the Township of Avon with the Oakland County Drain Commissioner requesting that a drainage district be established in Section 2 of the Township.

Upon receipt of the petition, the Drainage Board determined that the project was practical and that the drainage system would be designated as the Larsen Drain.

The Larsen Drain is designed to provide storm drainage for the Whispering Heights Subdivision. The developer of the Subdivision would be responsible for all costs associated with establishing the Chapter 20 Drain by means of a separate agreement with Avon Township.

The engineering staff of the Oakland County Drain Commissioner was employed by the Board to prepare plans and specifications for the project.

MAPLEHURST DRAIN

A petition was filed with the Oakland County Drain Commissioner by the Township of Pontiac under provisions of Chapter 8 of Act 40 of the Public Acts of 1956, as amended. Purpose of the petition was to institute proceedings for enclosing a section of the existing Maplehurst Drain.

Upon receipt of the petition, the Drain Commissioner appointed Michael J. Warren, James L. Reid and Arthur W. VanBrook as a Board of Determination.

The Board of Determination held a meeting at the proposed project site and, after hearing comments from a number of residents and officials present, the Board rendered the following decision:

"It is hereby Ordered and Determined that the drain prayed for in the petition is necessary for the protection of the Public Health in the municipalities of Avon and Pontiac Townships and that the whole cost thereof, except that which may be apportioned for benefits to highways, shall be apportioned to said municipalities at large."

A contract by and between the Oakland County Drain Commissioner and the firm of Orchard, Papke, Hiltz & McCliment, Inc., was signed. The engineering firm, under authority of the provisions of said contract, will supply plans, specifications, estimate of cost and certain other engineering services for the proposed project.

PATNALES DRAIN

A petition to locate, establish and construct an intra-county drain was filed with the Oakland County Drain Commissioner by the City of Novi and the Township of Farmington.

The proposed drain would have at its point of beginning a location on the west line of Section 35 in the City of Novi in the Walled Lake Branch of the Middle River Rouge and continue northeasterly to Meadowbrook Lake; thence continuing northeasterly across Meadowbrook Lake to the Ingersall Creek; thence continuing northeasterly in Ingersall Creek to the Francis Drain and then continuing along the route of the Francis Drain across the Interstate 96 to its upper terminus in Section 18.

The Drainage Board, after necessary hearings and legal proceedings, determined that the proposed project was practical and designated the project as the Patnales Drain.

The engineering firm of Johnson & Anderson, Inc., was employed by the Board to prepare construction plans and specifications for the Patnales Drain.

Construction plans and specifications have been delivered to the Drainage Board.

PATTERSON DRAIN

A petition to locate, establish and construct an intra-county drain was filed with the Oakland County Drain Commissioner by the Townships of Commerce and West Bloomfield.

The proposed drain would receive excess water from Lower Straits Lake and transport the water to the Huron River. Periodic flooding has occurred along the route of the present outlet channel.

Upon receipt of the petition, the Drainage Board determined that the project proposed therein was practical and the Board designated the project as the Patterson Drain.

The engineering firm of Johnson & Anderson, Inc., was employed by the Board to prepare construction plans and specifications for the project.

Plans and specifications for construction of the Patterson Drain have been delivered to the Board by Johnson & Anderson, Inc.

Further proceedings in construction of the drain have been delayed because of difficulty in the procurement of rights-of-way.

SIMSON DRAIN

Because of an existing drainage problem in the southwest quarter of Section 35 of the City of Southfield, the City petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county drain. The drain would have as its outlet the existing Eight Mile Road Drain and would serve an area north of Eight Mile Road, roughly bound by Eight Mile Road, Boening, Melrose and Stahelin Streets.

After determining that the proposed project was practical, the Drainage Board designated the project as the Simson Drain and employed the engineering firm of Hubbell, Roth & Clark, Inc., to prepare construction plans and specifications for the Drain.

THORNTON DRAIN

The City of Troy petitioned the Drain Commissioner to locate, establish and construct an intra-county drain to serve an area in Section 2 of the City. The proposed drain would replace a portion of the Renshaw and Ferry Drains north of Square Lake Road and east of Rochester Road. It would also serve as an overflow from Emerald Lakes.

Several large housing developments in the area of the proposed improvement have overloaded existing storm drainage facilities and have caused some flooding and severe erosion to the existing drains.

After the necessary hearings and legal proceedings, the Drainage Board determined that the project was practical and necessary. The Board designated the proposed project as the Thornton Drain.

The engineering firm of Hubbell, Roth & Clark, Inc., was employed to prepare plans and specifications for construction of the Thornton Drain.

PROPOSED DRAINS

ATCHISON DRAIN

The City of Birmingham and the Village of Beverly Hills petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county relief drain in the two municipalities located in Sections 35 and 36. The relief drain would be designed to intercept existing storm sewers in the two political subdivisions. Primarily the facility would supplement and relieve the Acacia Park Drain that presently serves the area.

ATCHISON DRAIN - Cont'd.

After necessary determinations and legal proceedings, the Drainage Board employed Johnson & Anderson, Inc., Registered Professional Engineers of Pontiac, Michigan, to prepare plans and specifications for the proposed project.

The Atchison Drain has been delayed because it is a combined sewer and discharges to the Rouge River. The Department of Natural Resources has withheld approval of a permit pending further study.

CLAIRE DRAIN

The City of Southfield, under provisions of Chapter 20 of the Drain Code, petitioned the Oakland County Drain Commissioner to locate, establish and construct a drain in Sections 22, 27 and 28 of the City. The purpose of the drainage project would be to relieve flooding in the Rouge River between the 696 Freeway downstream to a point several hundred feet west of Lahser Road. The Drainage Board designated the proposed project as the Claire Drain.

Early in the legal proceedings by the Board, it was learned that there were many citizens living in the area affected by the drain that were very concerned about the environmental damage that could occur because of construction of the drain as conceived in the petition.

The Drainage Board ordered that an Environmental Impact Statement be prepared before proceeding with construction. The Board employed the firm of Hubbell, Roth & Clark, Inc., to prepare plans, specifications and an Environmental Impact Statement for the project.

Plans, specifications and the EIS were completed and delivered to the Board by Hubbell, Roth & Clark, Inc. All were accepted and approved by the Board.

At the request of the City of Southfield, the Board accepted bids for construction of a portion of the Claire Drain immediately west of Lahser Road. The City required the project to be completed in this area because of construction of their headquarter's fire station immediately adjacent to the Claire Drain. This was an area where extensive erosion had occurred and, in order to protect the integrity of the stream banks, it was necessary to construct a Gabion Retaining Wall as part of the construction.

Construction of the Gabion Retaining Wall has been completed.

Construction of the remaining portions of the Claire Drain has been delayed because of difficulty in easement acquisition.

FORTINO DRAIN

Due to very poor drainage facilities in the Sylvan Manor area of West Bloomfield Township in Sections 1 and 12, the City of Sylvan Lake and the Township of West Bloomfield petitioned the Oakland County Drain Commissioner to locate, establish and construct a storm drain to relieve the problem.

The proposed drain would originate in the vicinity of the intersection of Woodrow Wilson Boulevard and Empire and proceed southerly to its lower terminus in an existing channel located at the rear of Lots 109 and 112 of the Pine Lake Manor Subdivision. The effluent from the drain would enter Pine Lake through the channel.

The firm of Giffels-Webster Engineers, Inc., was employed by the Drainage Board to prepare plans and specifications for the project.

Residents of Pine Lake have vigorously objected to the drain outletting to Pine Lake and because of environmental concerns have instituted legal action. Their allegation is that pollution carried by storm waters from the drain will have a deleterious effect on Pine Lake.

HAYES DRAIN

The Hayes Drain was petitioned for by the Townships of Commerce and West Bloomfield. Location of the proposed drain is along the route of the Hayes Creek approximately 80 feet south of the intersection of Wise Road and Union Lake Road. The drain would extend to 320 feet west of Union Lake Road. Obstructions in the Hayes Creek at this location has resulted in much difficulty in the regulation of the level of Union Lake.

The Drainage Board determined that the proposed project was practical and employed the engineering firm of Johnson & Anderson, Inc. to prepare plans and specifications.

Plans and specifications have been furnished and have been approved by the Board.

Refusal of Morey's Golf and Country Club to grant an easement through their property has caused delay in the project. The property has been placed under condemnation.

JOACHIM RELIEF DRAINS

The City of Pontiac petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county drain in the northeastern section of the City, south and west of Galloway Lake. The proposed drainage facility would outlet into the Clinton River by way of the Galloway Creek.

JOACHIM RELIEF DRAINS - Cont'd.

After receiving the petition from the City of Pontiac, the Drainage Board, after necessary hearings and legal proceedings, employed Jones & Henry Engineers Ltd., Registered Professional Engineers, of Toledo, Ohio, to prepare construction plans and specifications for the proposed project. Because of environmental concerns, the Board arranged to have an Environmental Impact Statement prepared.

Construction plans and specifications were delivered to the Drainage Board by Jones & Henry and bids for construction of the Joachim Relief Drains were received by the Board. The contract for construction was awarded to Rocco Ferrera Co., Inc., subject to the sale of bonds.

Environmental concerns and difficulty in obtaining necessary construction permits delayed financing of the project. The period of time during which the bid was held firm by the Rocco Ferrera Co., has expired; hence, the project must be rebid.

Subsequently, the Corps of Engineers informed the Drain Office that, before the project could go out for rebid, a 404 Permit had to be acquired from their office. Plans were then sent to the Corps of Engineers for their review. The U. S. Department of the Interior (Fish and Wildlife Service) rejected the design outlet for the proposed project for ecological reasons and suggested an alternate location. The Consulting Engineers, the City of Pontiac, and the Drain Office Staff contend the original design route is the more viable with all factors considered.

MAINLAND DRAIN

The Mainland Drain was petitioned for by the Charter Township of Waterford and the County of Oakland.

The purpose of the drain is to improve drainage in the Oakland County Service Center located in Waterford Township and the City of Pontiac. It would also serve as an outlet for drainage for an area north of the Pontiac Mall shopping center and south of Pontiac Lake Road which is presently being developed. The proposed drain would have as its point of beginning a point located in the Augusta Drain approximately 150 feet south and 250 feet west from the northeast corner of Section 30, Pontiac Township, and would proceed northwesterly through the Oakland County Service Center to its point of ending at Pontiac Lake Road approximately 270 feet west of the centerline of Telegraph Road.

The Drainage Board determined that the proposed project was practical and designated the project as the Mainland Drain. The City of Pontiac indicated that it would not object to the project if they would be removed from any financial obligations for the project, and if retention was used to limit the flow to the Augusta Drain.

MAINLAND DRAIN - Cont'd.

The engineering firm of Johnson & Anderson, Inc., was employed to prepare construction plans and specifications for the proposed project.

This project has been delayed because of problems with right-of-way and the resolution of a dispute between the City of Pontiac and the Township of Waterford over flowage rights in the Augusta Drain.

MOFFITT DRAIN

Petition to locate, establish and construct an intra-county drain was filed in the office of the Oakland County Drain Commissioner by the Charter Township of Waterford.

After necessary legal proceedings and hearings, the Drainage Board determined that the proposed project was practical and designated the project as the Moffitt Drain.

Primarily the Moffitt Drain would replace an existing county drain known as the Pontiac Creek Extension Drain. The drain would extend from Telegraph Road at a point approximately 1,320 feet southwest of the intersection of Dixie Highway and Telegraph Road and proceed westerly to Alhi Street in Waterford Township. Improvement of drainage facilities is necessary because of intense development in the Pontiac Creek Extension drainage area. Severe flooding is occurring in the westerly portion of the district.

The engineering firm of Johnson & Anderson, Inc., was employed to prepare plans and specifications for construction of the project.

This project has been delayed because of a dispute between the City of Pontiac and the Township of Waterford over flowage rights in the Augusta Drain.

NOWAK DRAIN

The City of Southfield petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county drain in Section 17 of the City.

The drain would begin at the Pernick Drain where it crosses the Northwestern Service Drive, at a point 400 feet northwesterly of Case Avenue, and proceeding thence southeasterly in the Northwestern Service Drive to its intersection with Lockdale Road; thence northerly in Lockdale Road to its intersection with 12 Mile Road.

After receiving the petition, the Drainage Board determined that the proposed project was practical and designated the project as the Nowak Drain.

NOWAK DRAIN - Cont'd.

The Board employed the engineering firm of Hubbell, Roth & Clark, Inc., to prepare construction plans and specifications for the project.

The Nowak Drain has been delayed pending construction of the Pernick Drain.

PERNICK DRAIN

Because of continuing intense development in portions of the City of Southfield, flows in existing drainage structures and water-courses have been overburdened and flooding has occurred in periods of heavy precipitation.

In order to relieve one such problem area, the City of Southfield petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county storm drain. The drain would follow a tributary of the Rouge River from a point approximately 600 feet west of the east property line of the Holy Sepulchre Cemetery property in the northwest quarter of Section 20 and proceed northerly along the Pebble Creek Branch to approximately one-half mile north of Twelve Mile Road.

The Drainage Board determined that the proposed project was practical and designated the project as the Pernick Drain.

The engineering firm of Hubbell, Roth & Clark, Inc., was employed to prepare construction plans and specifications for the drain.

Further proceedings on the Pernick Drain have been delayed because of environmental concerns.

PRICE DRAIN

Severe flooding has occurred to properties adjoining Sylvan Lake, Otter Lake and Cass Lake in recent years. During periods of intensive precipitation and heavy spring runoff, damage has been sustained by low lying properties in the vicinity of these lakes due to inadequate facilities to control the levels. The area most affected is west of Telegraph Road in West Bloomfield and Waterford Townships. The lakes are a part of the Clinton River system. Recent intensive development upstream from the lakes has increased the velocity and volume of runoff and has caused present control facilities to become inadequate. Present control of the levels of these lakes requires regulation of the Dawson Mill Pond dam, controlled by the City of Pontiac, and operation and control of dams on Cass Lake, controlled by the Oakland County Drain Commissioner. Coordination of these two efforts in the past has occasionally been difficult.

PRICE DRAIN - Cont'd.

Because of the difficulty of maintaining constant levels in the Clinton River and the subject lakes, the Charter Township of Waterford and the City of Sylvan Lake petitioned the Oakland County Drain Commissioner to locate, establish and construct an intra-county drain under provisions of Act 40 of the Public Acts of 1956, as amended.

The Drainage Board determined that the proposed project was necessary for the public health and was practical and designated the project as the Price Drain. At the hearing held on September 8, 1976, there were several objections registered to the project and the hearing was adjourned.

Because the original petition did not include the Dawson Mill Pond dam, an amended petition was submitted by the City of Keego Harbor, the Township of West Bloomfield, the Township of Waterford and the City of Sylvan Lake. The amended petition includes the Dawson Mill Pond dam.

The engineering firm of Hubbell, Roth & Clark, Inc., was employed by the Drainage Board to prepare a study with regard to proposed Clinton River Improvements from and including the Dawson Mill Pond dam and the Clinton River system upstream through Cass Lake. The report has been completed and has been delivered to the Drainage Board.

The United States Army Corps of Engineers, under the direction of Project Engineer Dennis Oakes, is also making a study of improvements to relieve flooding problems in this area.

On December 20, 1979, the Drainage Board tentatively determined that the project proposed in revised petitions submitted by the City of Keego Harbor, City of Sylvan Lake, Township of West Bloomfield and the Charter Township of Waterford were of sufficiency and that the project proposed therein was practical.

RICHARDS DRAIN

A petition was filed in the office of the Oakland County Drain Commissioner to locate, establish and construct an intra-county drain by the Charter Township of Waterford.

The Township petitioned for a new drain to replace the existing Drayton Plains Drain and Drayton Plains Extension Drain and also included some areas that were not serviced by the present facility.

Relief of the present drains is necessary because the area served by the Drayton Plains Drain has experienced intense development. The area served by the proposed facility includes industrial, as well as extensive commercial and residential development.

RICHARDS DRAIN - Cont'd.

The Drainage Board determined that the project was practical and designated the proposed drainage project as the Richards Drain.

The engineering firm of Johnson & Anderson, Inc., was employed to prepare plans and specifications for construction of the project.

FINANCIAL STATEMENTS

A full financial statement for each drainage district which includes an itemized statement of the various accounts maintained for the funds received by the Oakland County Drain Commissioner in connection with the construction, operation and maintenance of all of the projects under the jurisdiction of the Oakland County Drain Commissioner are contained in Volume II of this Annual Report.

Reference should be made to the Table of Contents of the Financial Statements in Volume II for reference to any specific project or fund account.