



MONROE COUNTY
DEPARTMENT OF HEALTH

111 WESTFALL ROAD, CALLER 632
ROCHESTER, NEW YORK 14692

TELEPHONE 442-4000
AREA CODE 716

October 15, 1979

Mr. Lucien A. Morin
County Manager
Room 110, County Office Building
39 Main Street West
Rochester, New York 14614

Re: Identification and Testing of Chemical Dump Sites

Dear Mr. Morin:

The Landfill Monitoring Committee met on October 12, 1979 and approved Monograph #1 - The Lower Falls of the Genesee River Report prepared by the Landfill Review Committee of Monroe County. This report is a continuing follow-up of Legislative Communication #78659 from Mr. Murray to the Human Services Committee and Public Works Committee in August 1978.

A copy is enclosed for your information.

Very truly yours,

Joel L. Nitzkin
Joel L. Nitzkin, M.D.
Director

JLN:jm

Enc.

xc: Landfill Monitoring Committee

RECEIVED

OCT 17 1979

MONROE COUNTY
HEALTH DEPARTMENT

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THE LOWER FALLS

Several chemical seeps have been discharging from the Lower Falls of the Genesee River since the early 1970's. This paper discusses the problem, recent findings, and makes recommendations.

INTRODUCTION

The Lower Falls is located approximately 700 feet south of Driving Park Bridge in the City of Rochester, Monroe County, New York (Figure 1). The geographic area of concern includes the section between the Middle and Lower Falls, as well as the former Deep Hollow Creek Ravine (Figure 2).

Industrial development between the Middle and Lower Falls began 150 years ago as a result of readily available water power. A paper mill, a saw mill, and a furniture factory were located on the flats at various times during the late 1800's and early 1900's. Mill races were constructed immediately upstream of the Lower Falls to provide water power to these industries. In 1917 the Rochester Gas and Electric Corporation built a dam at the Middle Falls, Power Station Number 5 on the east bank of the Lower Falls, and a connecting tunnel. The City of Rochester constructed inverted sewer siphons in the early 1900's approximately 300 feet upstream of the Lower Falls. All of these features are important in considering the seeps presently occurring on the face of the Lower Falls. Figure 2 shows the area as it appeared in 1926, including industry, the dam, tunnel, hydropower station, the inverted sewer siphon, and Deep Hollow Creek.

As the industrial use of the area declined, Deep Hollow Ravine and the area along the Genesee River became a dumping ground. Much of the fill material came from excavated rock and other debris from the construction of Midtown Plaza. Figure 3 shows the maximum boundary of the dumping area as identified through aerial photo interpretation (Appendix A).

THE PROBLEM

The presence of chemical seepage on the face of the Lower Falls has been reported since the early 1970's. The Monroe County Health Department has investigated these reports since 1974 (Appendix C). The approximate location of the seeps is shown in Figure 4.

Seep A can best be described as a diffused seep which appears at several points. The seep is believed to be creosote which has leached from timbers used to shore up the hydropower tunnel constructed between the dam at the Middle Falls and Power Station 5 at the Lower Falls. Rochester Gas and Electric Corporation has reported a similar seepage problem within the tunnel itself. The tunnel and creosoted timber areas are shown in Figures 5 and 6. A geologist's report (Appendix D) points out that creosote from the tunnel timbers could move through interconnected natural jointing in the rocks to the face of the falls where it spreads out along horizontal planes in the weathered rock.

Seep B1 is continuous; chemical analysis show benzene, xylene, and toluene in concentrations greater than 10 ppm (Appendix E). Seep B2, which is located approximately 20 feet east and 3 feet below Seep B1, has an intermittent flow. Lab analysis indicates concentrations of benzene and xylene

at 8 ppm and toluene at 20 ppm. It is the conclusion of the Monroe County Health Department staff that Seep B2 is a dilution of Seep B1.

Three possible sources of the B Seeps have been identified:

- (1) A break in the inverted sewer siphons at the point where they cross the mill race;
- (2) A waste storage tank at the site of the old furniture factory which has broken as a result of the pressure from the construction debris and which is leaching through the mill race;
- (3) Chemical leachate from Deep Hollow Ravine

The seep is localized and water discharging from nearby rocks does not appear to have a similar composition, which suggests that the source is nearby and not general groundwater contamination. A waste storage tank on the site of the former furniture factory is the most likely source of contamination, although the possibility of a damaged sewer siphon or chemical leachate from Deep Hollow Creek cannot be ignored (Appendix C).

COMMUNITY IMPACT

Figure 7 indicates present land use of the area. Residential and commercial structures do not appear to be affected by any potential leachate from the dumping area since subsurface movement is toward the river and substantially below any dwelling (Appendix B). Homes in the area are on public water; therefore well contamination is not a consideration.

The area north of the Lower Falls is a popular fishing site, particularly during the spring salmon run. The impact of the pollutants on the fish and fishermen is not known at this time, but presents the greatest concern.

SUMMARY AND RECOMMENDATIONS

The seeps appearing at the Lower Falls appear to be isolated instances of localized sources of pollutants. To remedy the situation the following steps are recommended:

Seep A (Creosote)

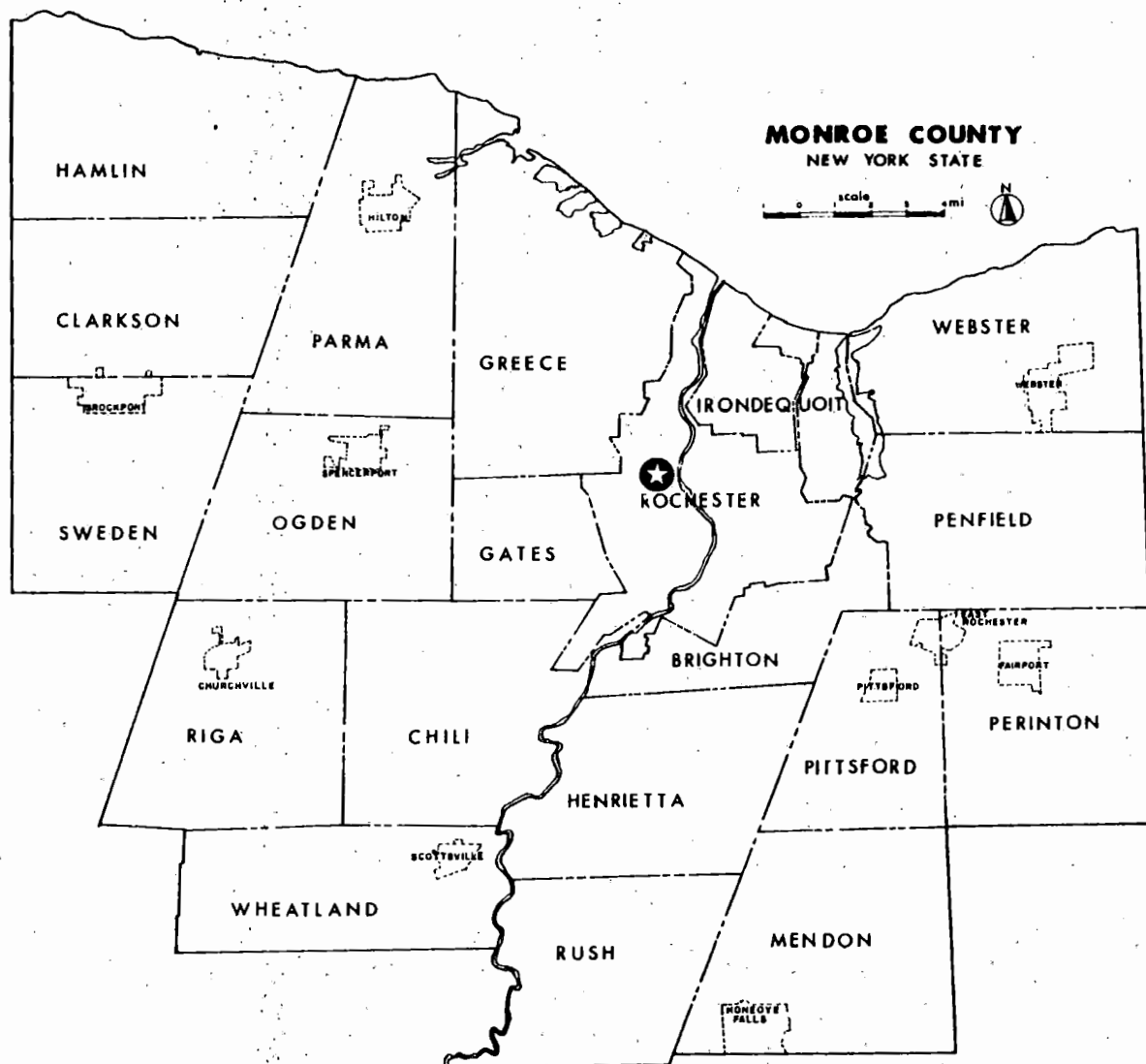
- (1) Additional samples should be taken by the Monroe County Health Department and sent to the New York State Health Lab for chemical identification. The NYS Department of Environmental Conservation and the Monroe County Health Department should determine if the creosote levels pose a hazard to fish and fishermen.
- (2) The Rochester Gas and Electric Corporation should evaluate the feasibility of collecting and disposing of any excess creosote in the tunnel headspace during its scheduled 1980 maintenance program and report its findings to the Monroe County Health Department.
- (3) RG&E should flush the residual creosote seeping at the face of the falls by distributing the normally released flow of the Genesee River over the entire face of the falls.

Seeps B1 and B2 (Chemical)

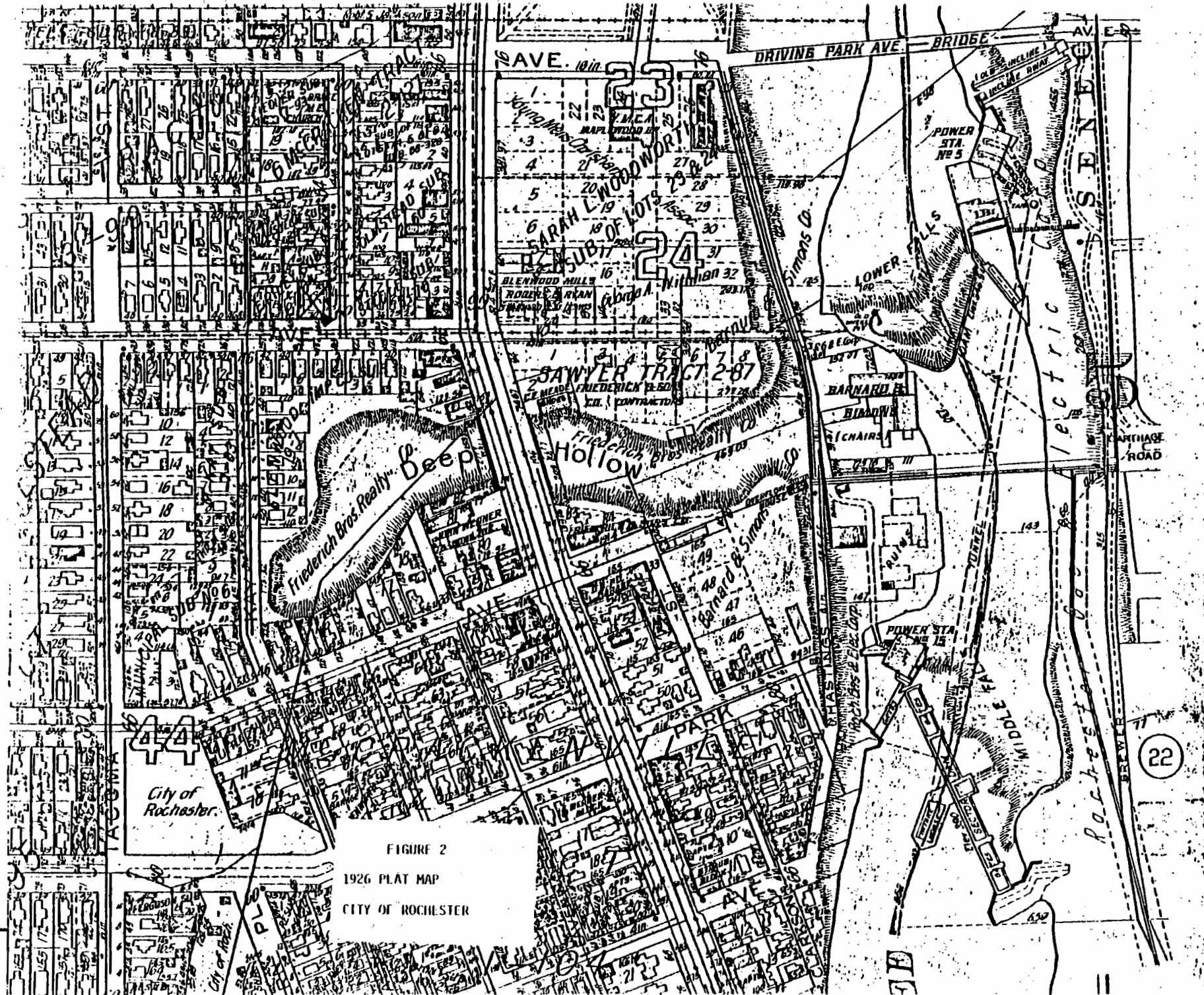
- (1) Additional samples should be taken by the Monroe County Health Department and sent to the New York State Health Lab for quantification of chemicals in the B1 Seep. NYS Department of Environmental Conservation and the Monroe County Health Department should determine if the chemical levels pose a hazard to fish or fishermen.

- (2) The Monroe County Pure Waters Division should determine if the sewer siphons at the point of mill race traverse are intact. If a leak is found, the siphons should be repaired.
- (3) If a pipe break is not found and if the chemical levels are determined to be a hazard, the City of Rochester, as the landowner, should evaluate methods for collecting and properly disposing of the material and identify the appropriate agency to carry out the corrective measures.

FIGURE 1



★
Location of Lower Falls
City of Rochester - Site No. 14



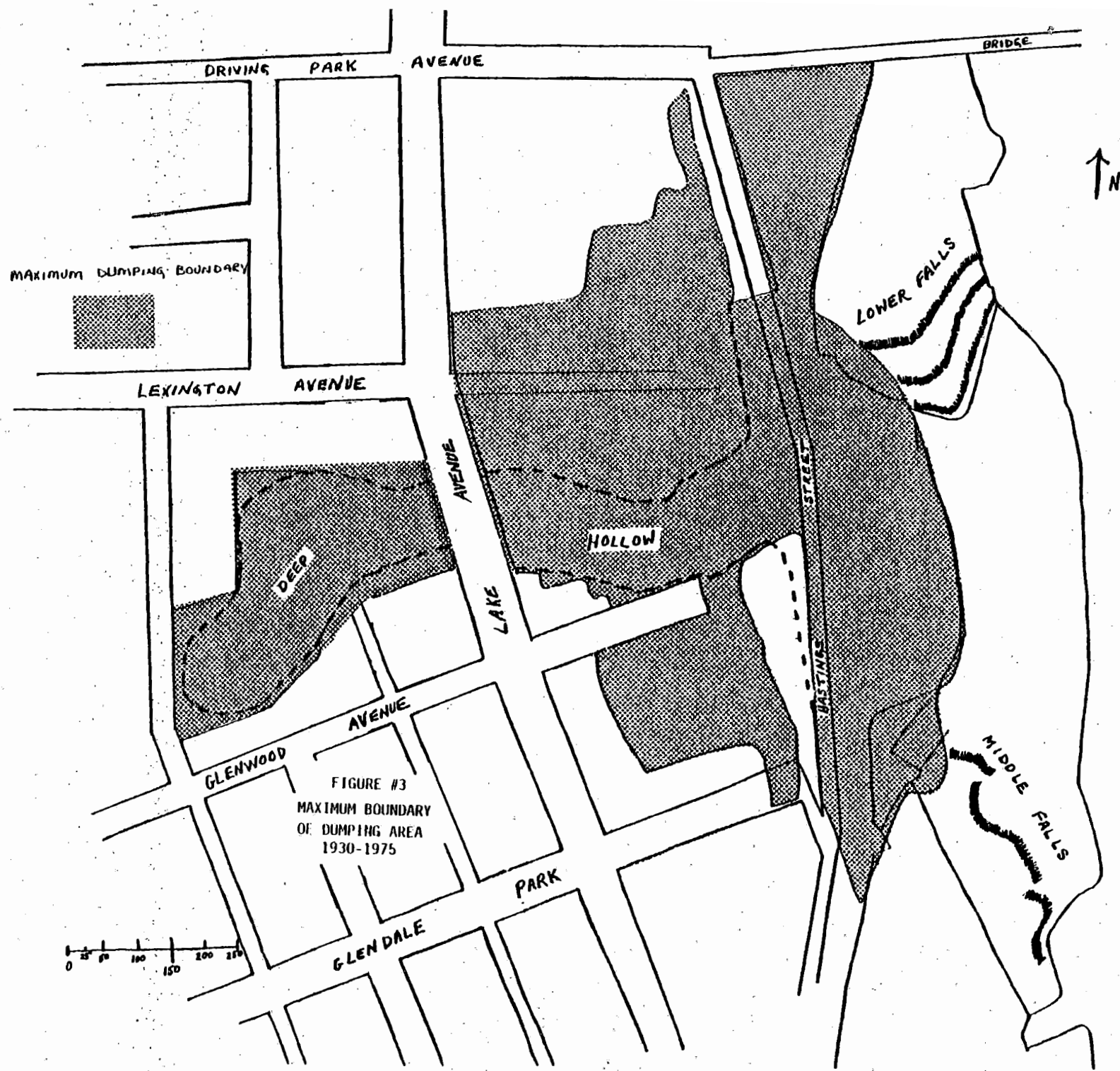
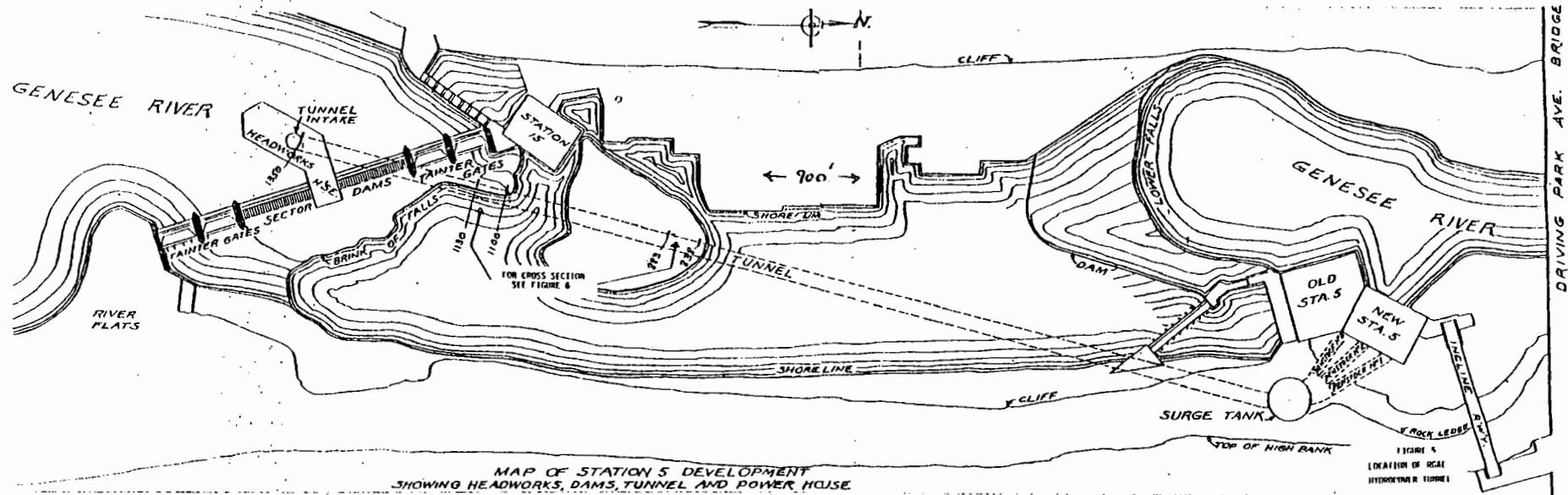




FIGURE 4
Seep Locations at
Lower Falls



Roof dropped April 14 - 7:45 AM, broke timbers & cracked concrete along & over from sta. 11+58 to 12+18 and back from 11+00 a distance of

Packed with timber above 12"x12" and grouted later.

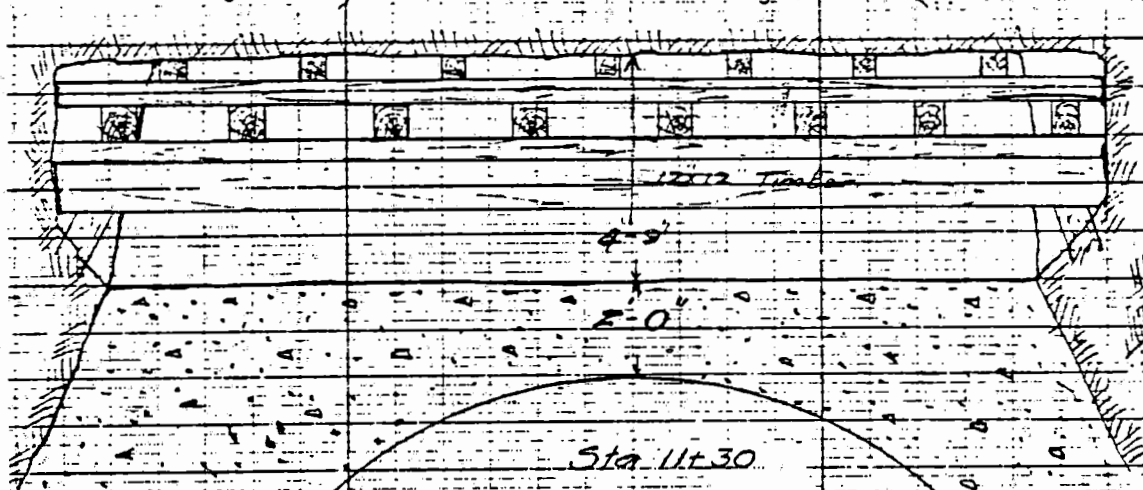
1+40.8
Feb 27

11+8
Feb 20

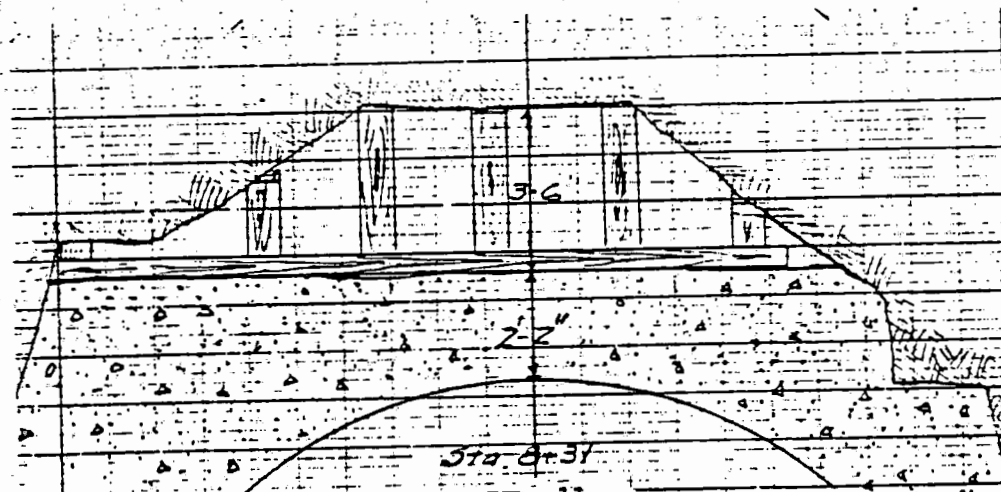
10+35.9
Feb 13

Concrete started May 5	Concrete started April 14	Concrete started April 14
finished May 10	finished April 25	finished April 25
Form dropped	Form dropped	Form dropped
1 section placed with	No concrete poured from	Form dropped
wooden forms	April 14 to April 23 on	" 12,
	account of fallen roof.	
Invert poured June 20		Invert poured June 21
from 12+13 to 11+22		from 11+22 to 10+40

Longitudinal section of tunnel showing timbers



cross section of tunnel at Sta. 11 + 30 (see Figure 5)



cross section of tunnel at Sta. 8 + 31 (see Figure 5)

FIGURE 6
Construction Drawing of
Creosoted Timber
Areas in RG&E
Hydropower Tunnel

- KEY**
- R - RESIDENTIAL
 - C - COMMERCIAL
 - I - INDUSTRIAL
 - V - VACANT
 - R/I - RECREATIONAL / INSTITUTIONAL

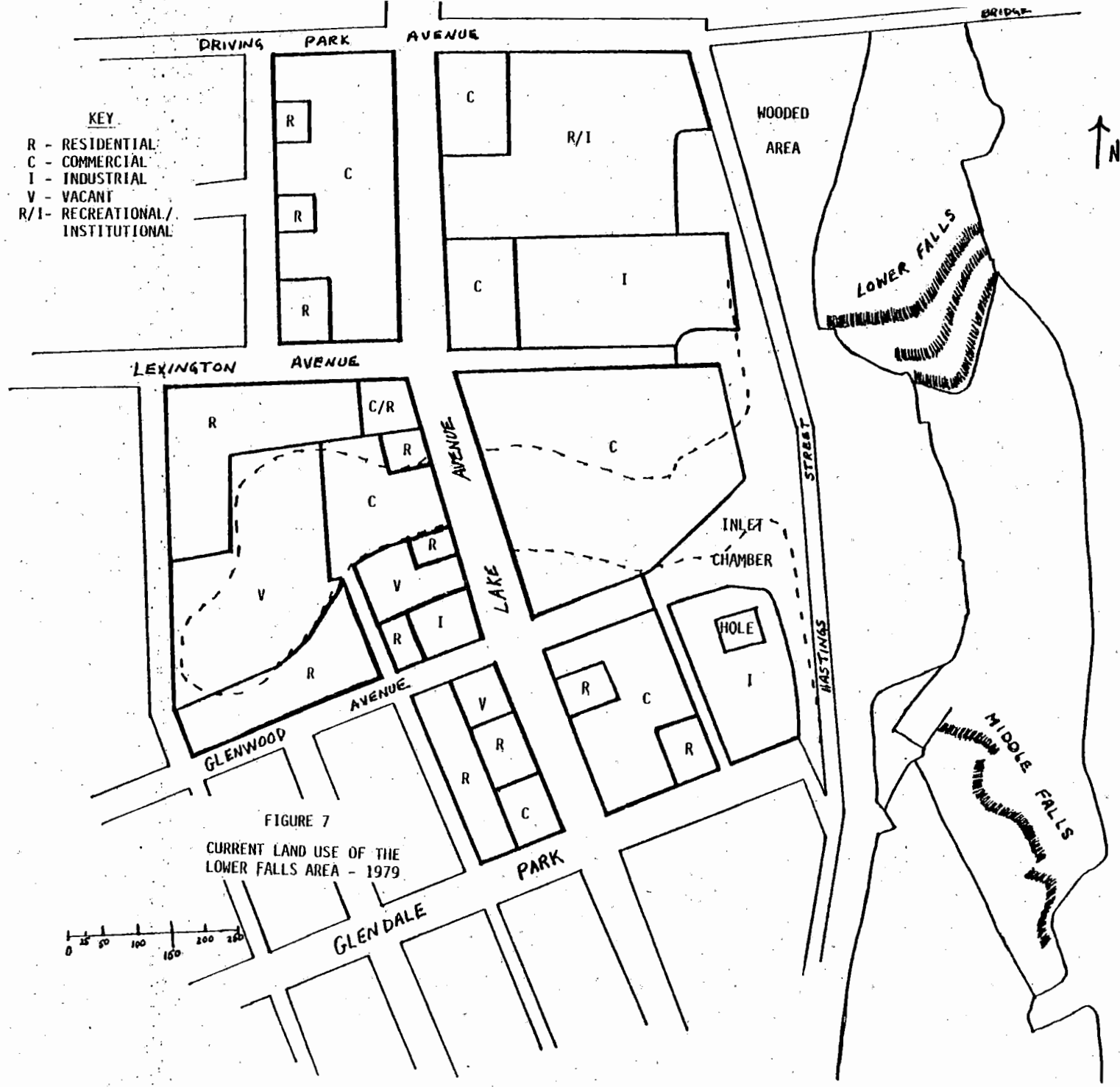
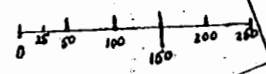


FIGURE 7
CURRENT LAND USE OF THE
LOWER FALLS AREA - 1979



APPENDIX A

AERIAL PHOTO INTERPRETATIONS OF THE LOWER FALLS AREA

The following sheets delineate the dumping and land use activities in the Lower Falls area for various years from 1930 through 1975 for which aerial photos were available. The interpretations were drawn by aerial photo interpreters at the Cornell Resource Information Laboratory, working under contract to the Monroe County Environmental Management Council. A descriptive narrative of the findings and a code key is included. The maximum boundary map shown in Figure 3 of the report was derived from these interpretations.

KEY FOR LOWER FALLS SITE

DUMPING

Active	D
Sprawl, loose debris	Ds
Backfilled	BF
Auto Junkyard	J

STRUCTURES

Residential	■ & R
Non-Residential	☒
Non-Residential, small	x
Farm	F
Towers	□

COMMERCIAL

Commercial	C
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PUBLIC

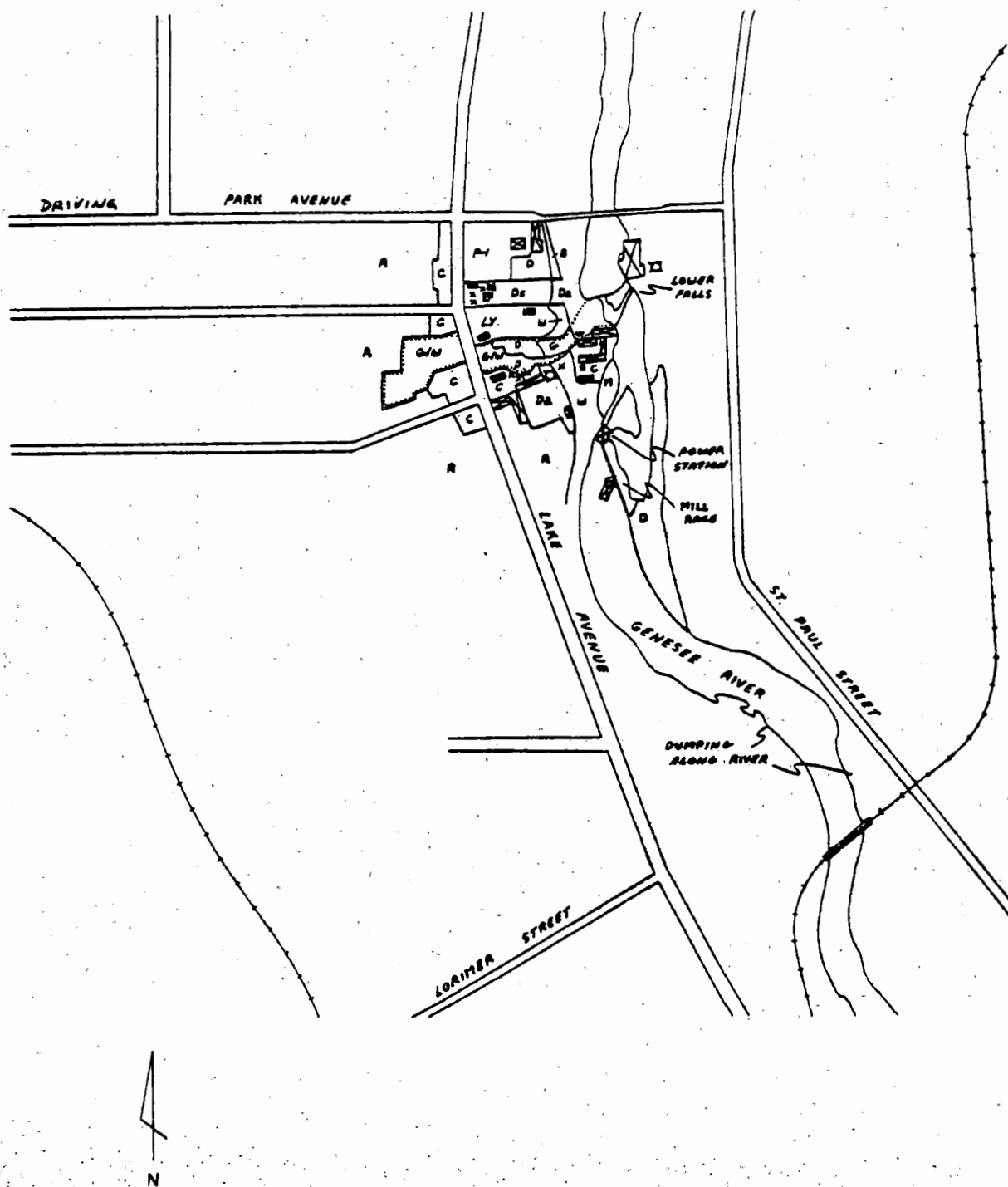
Education/Institutional	P-1
-------------------------	-----

VEGETATION/LANDFORM

Woodland	W
Brush	B
Idle	I
Gorge	G &
Depressed Area	U
Wet Spot	<u>⬆</u>

MISCELLANEOUS

Parking Lot	PL
Lumber Yard	LY
Abandoned	a
Historical Site	M



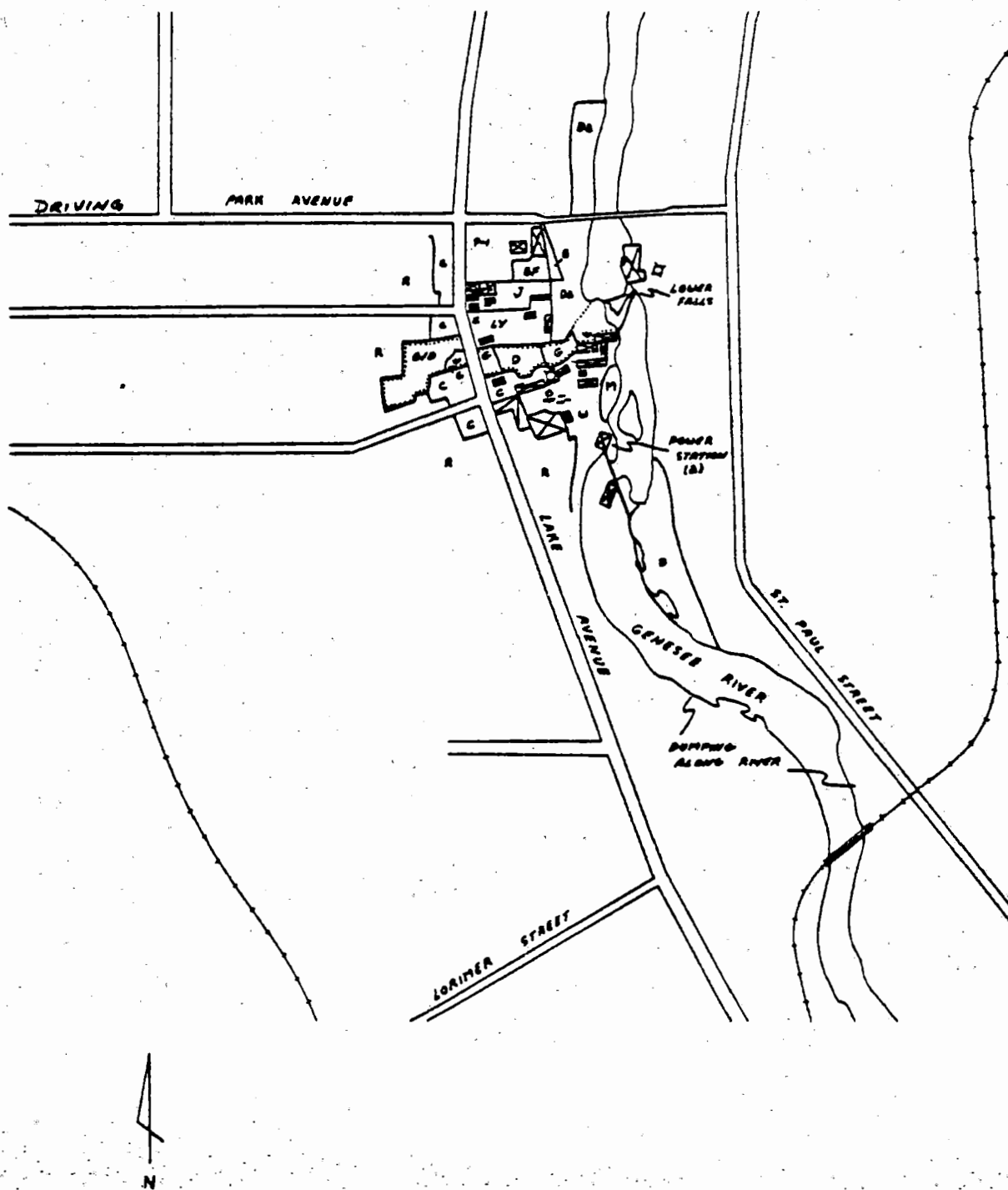
Prepared by:

Resource Information Lab
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

Date of Photography - 7/70
Scale of Photography - 1" = 1,000'
Approx. Map Scale - 1" = 800'



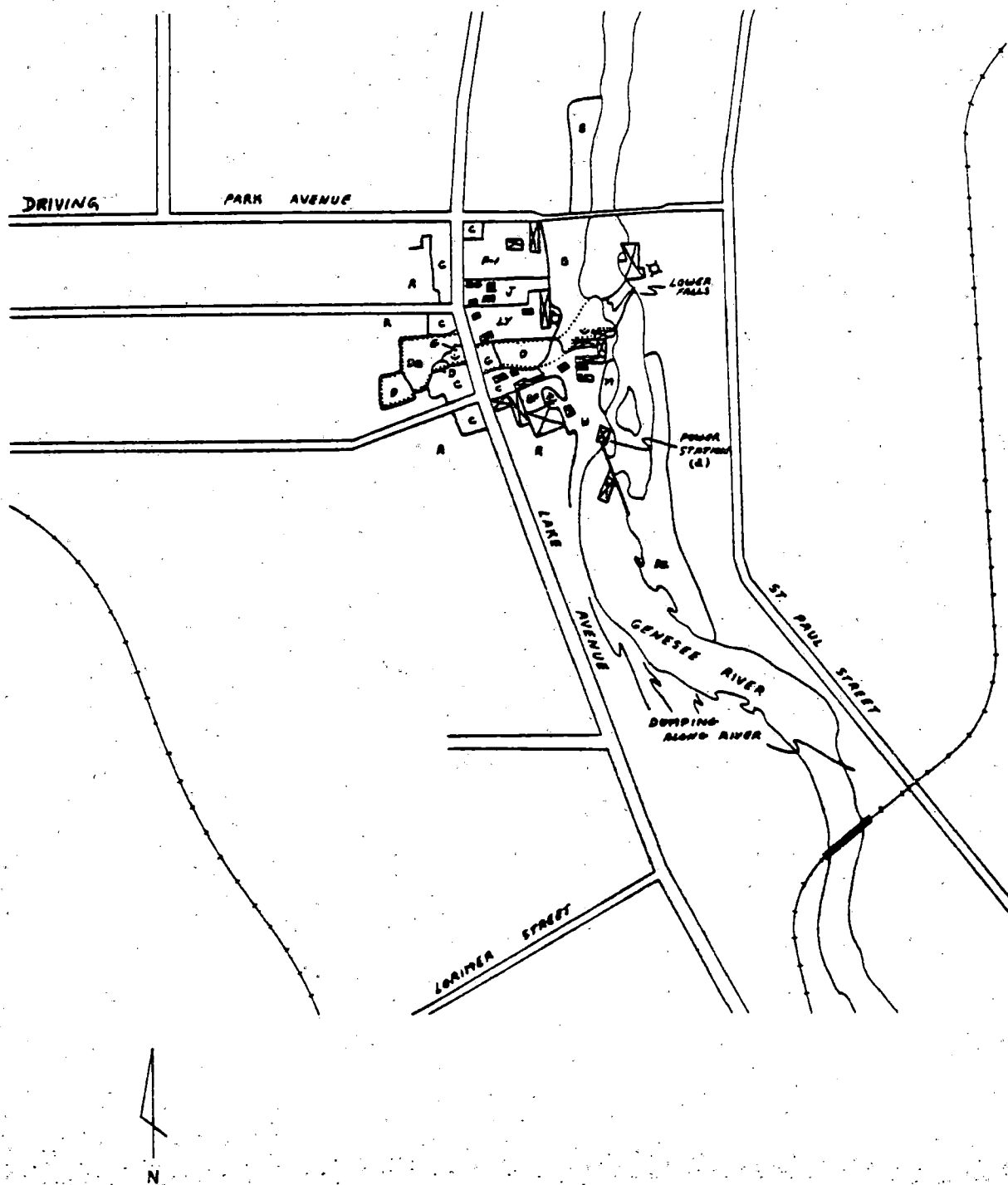
Prepared by:

Resource Information Lab
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

Date of Photography - 10/16/51
Scale of Photography - 1" = 1,662'
Approx. Map Scale - 1" = 800'



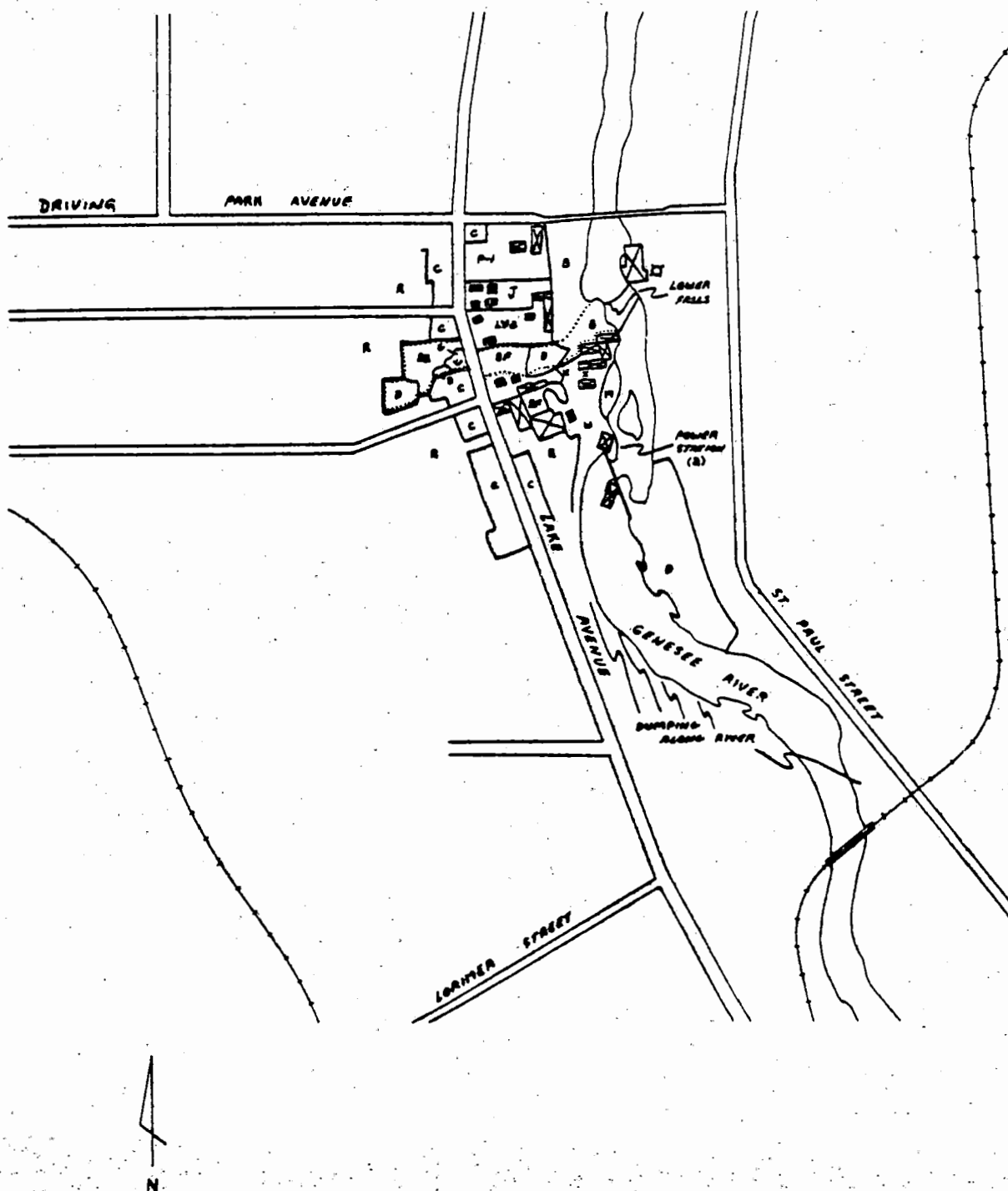
Prepared by:

Resource Information Lab
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

Date of Photography - 7/20/58
Scale of Photography - 1" = 4667'
Approx. Map Scale - 1" = 800'



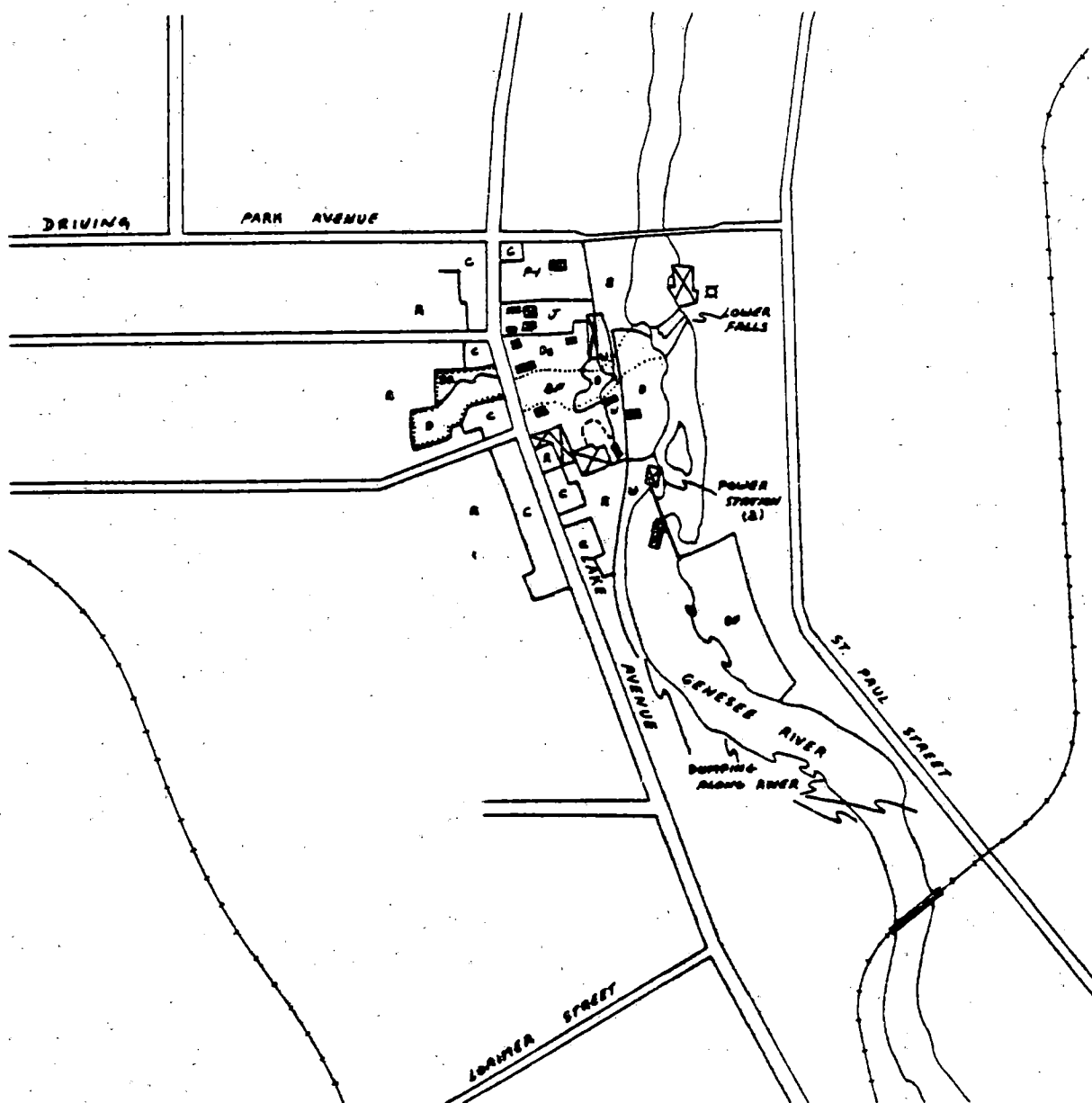
Prepared by:

Resource Information Lab.
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

Date of Photography - 5/05/61
Scale of Photography - 1"=1,000'
Approx. Map Scale - 1"=800'



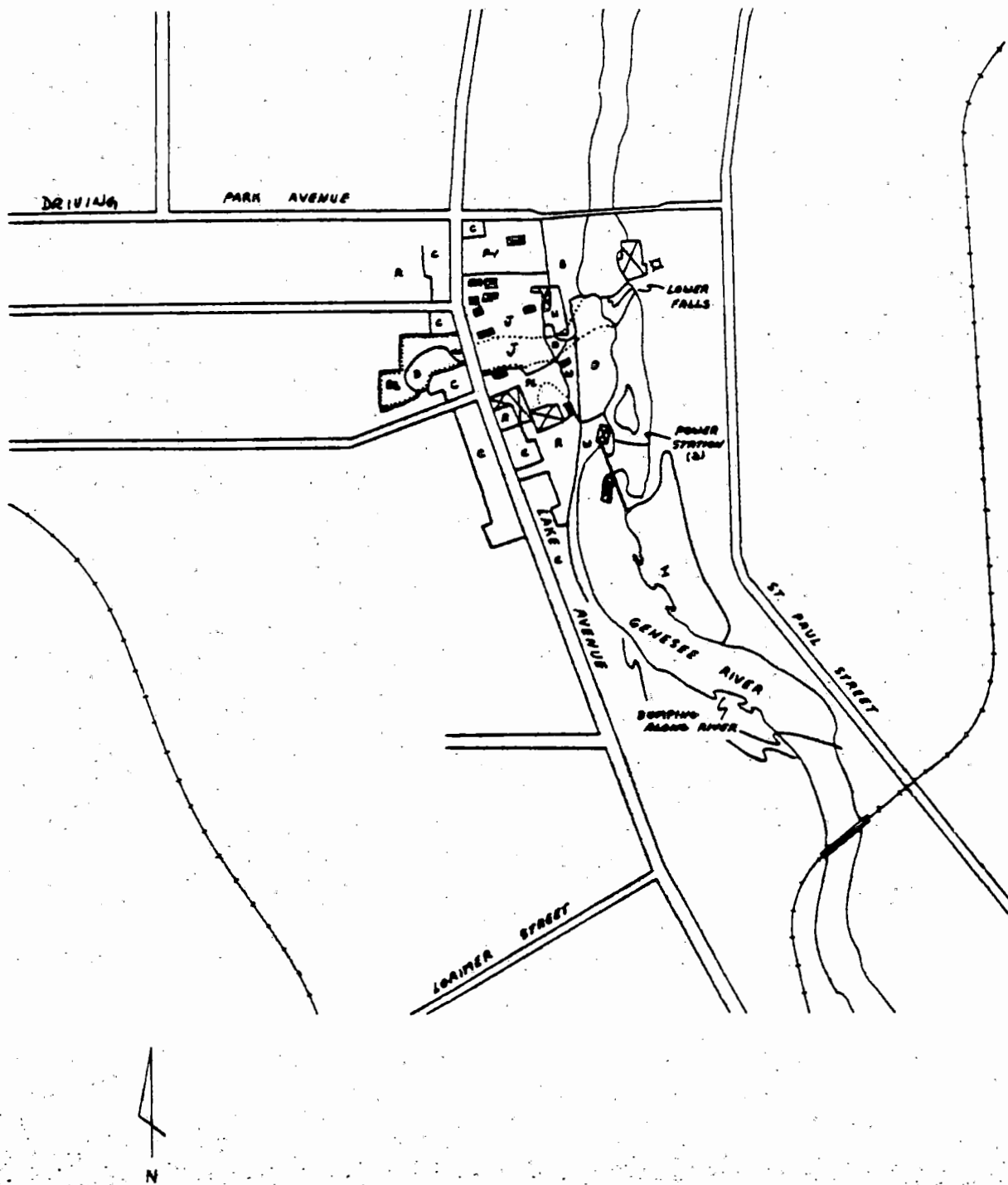
Prepared by:

Resource Information Lab
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

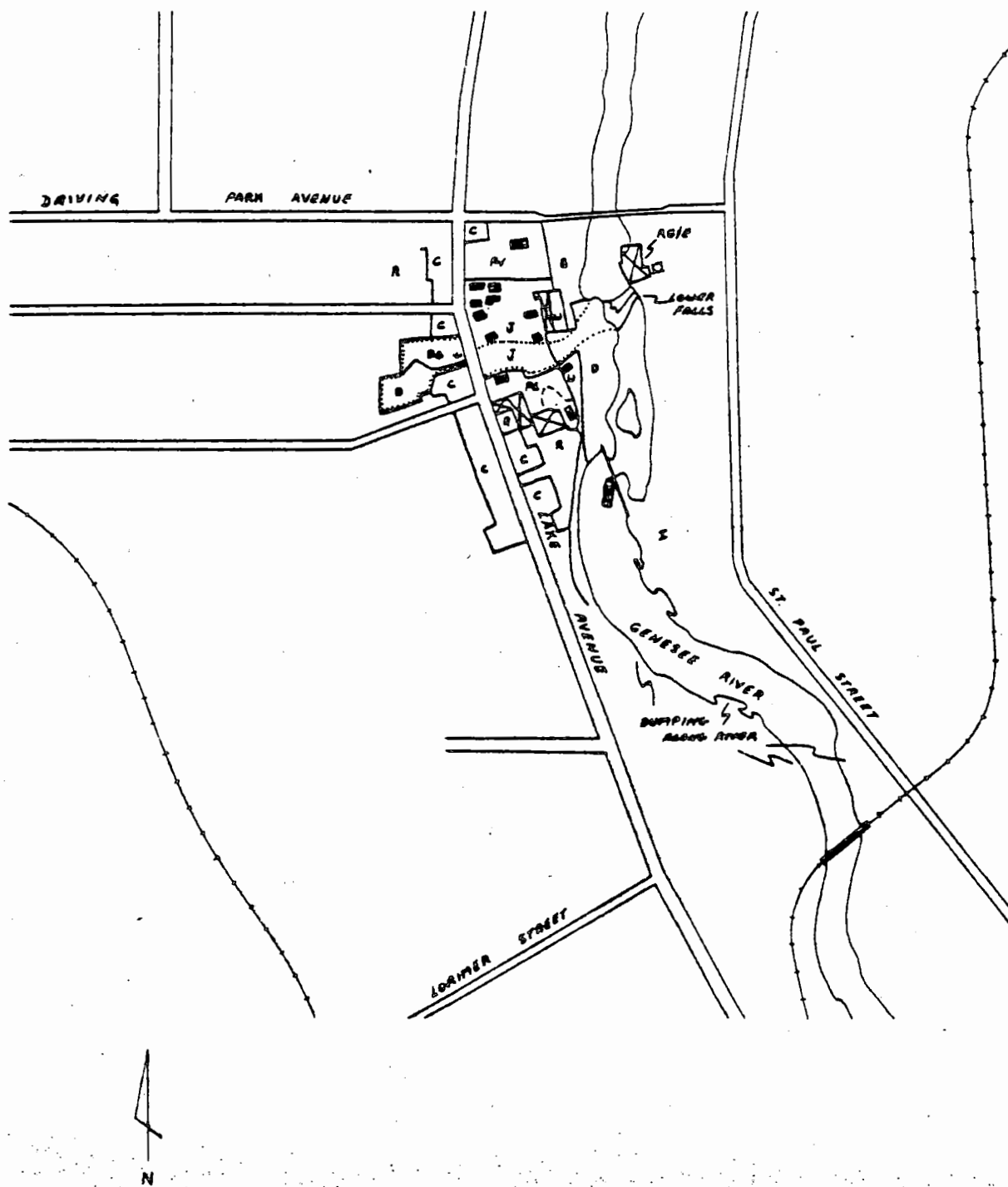
Date of Photography - 7/01/66
Scale of Photography - 1" = 1,667'
Approx. Map Scale - 1" = 800'



Prepared by: [unclear]
 Resource Information Lab
 Cornell University
 Ithaca, New York
 July, 1979

LAND FILL SITE -- LOWER FALLS
 CITY OF ROCHESTER

Date of Photography - 4/29/68
 Scale of Photography - 1" = 2,000'
 Approx. Map Scale - 1" = 800'



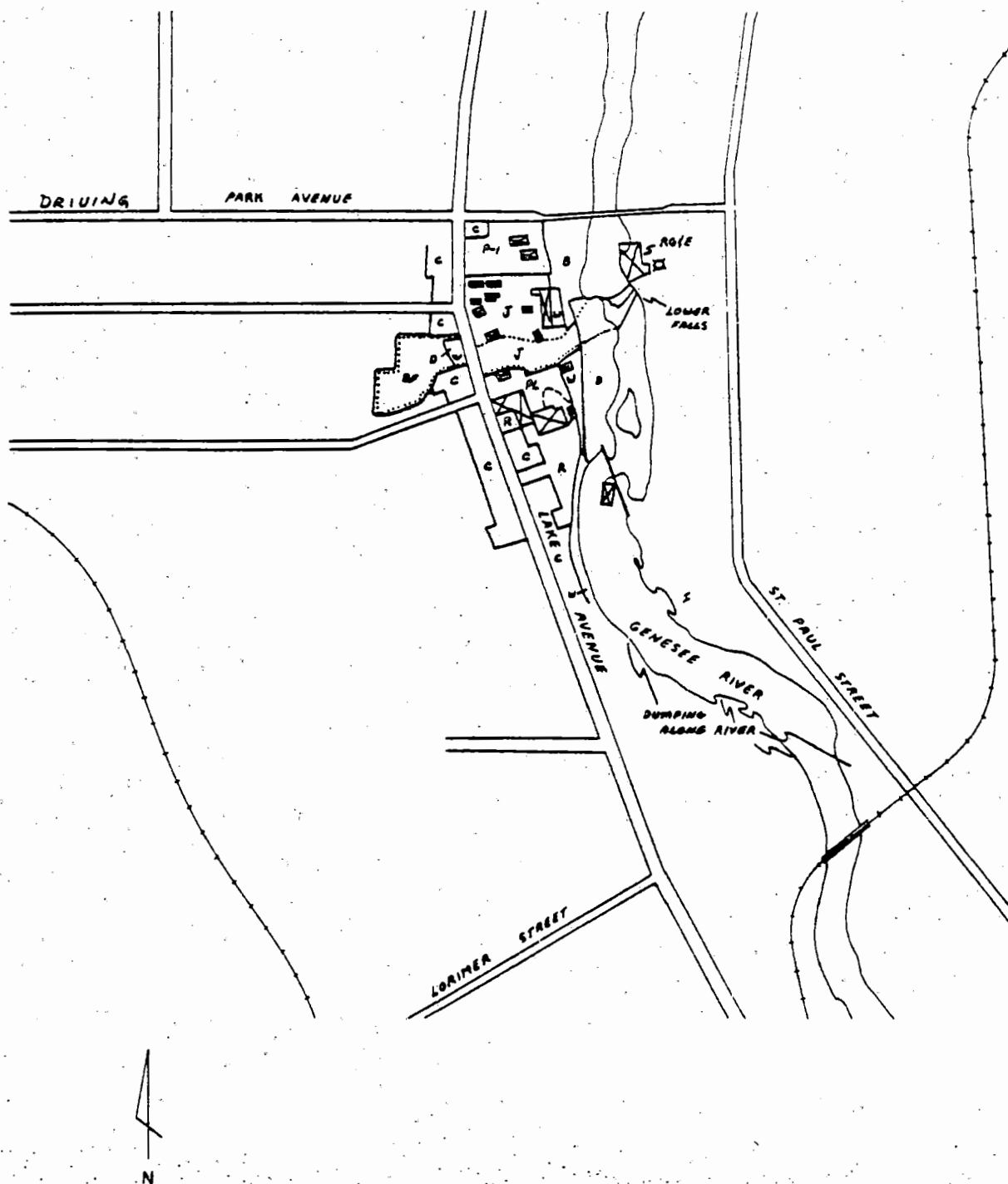
Prepared by:

Resource Information Lab
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

Date of Photography - 4/15/70
Scale of Photography - 1" = 1,000'
Approx. Map Scale - 1" = 800'



Prepared by:

Resource Information Lab
Cornell University
Ithaca, New York

July, 1979

LAND FILL SITE -- LOWER FALLS
CITY OF ROCHESTER

Date of Photography - 5/03/75
Scale of Photography - 1" = 800'
Approx. Map Scale - 1" = 800'

Monroe County Closed Landfill Study

Lower Falls Site

- 1930
- A wooded gorge is present from Kay Terrace to Hastings Street
 - Evidence of past dumping is present (adjacent to furniture factory) and probably obstructs former gorge outlet on the Genesee River
 - Active dumping is present between Lake Avenue and Hastings Street; the destruction of the gorge already well begun
 - Perched above Hastings Street is a round structure, vacant and resembling a cistern, vat, or roofless, short, squat tower. This structure is part of a complex of old buildings which appear to be inactive
 - Below the rim of the river gorge, but above river level, is a complex of buildings including one residence and several large multi-story structures. Lumber is stacked in neat piles within the complex and across Hastings Street on a level, backfilled plot. The visual evidence plus back-up information indicates furniture manufacturing
 - A depressed area adjacent to furniture factory suggests the location of former gorge outlet on the river
 - Adjacent and below furniture factory, near river level, are remains of older structures of historical significance--probably former milling and manufacturing sites--walls and foundations overgrown by thick vegetation
 - Active dumping is present on S/E corner of YMCA ground to fill in a low corner
 - Dump sprawl exists between YMCA grounds and lumber yard
 - Other evidence of former dumping is present below cistern/vat/tower structure in an attempt to fill in a low, wet area
 - Active dumping is present across river adjacent to dam/millrace
 - A structure, a power station which is still active, is present on north end of millrace/dam.
- 1951
- Twenty-one years later, almost the entire gorge is actively engaged as a dump site
 - The S/E corner of the YMCA grounds has been backfilled
 - An auto junkyard is present on former dump sprawl and appears to be elevated on level backfill
 - Inactive dump site located below cistern/vat/tower structure shows a recently constructed building--probably for light manufacturing purposes
 - The power station on the millrace/dam is now inactive.
- 1958
- Active dumping continues in the gorge, mainly concentrated between Lake Avenue and Hastings Street
 - Cistern/vat/tower structure is no longer present.

Lower Falls Site

- 1961
- Active dumping continues in the gorge, mainly concentrated in sections between Lake Avenue and Hastings Street as in 1958; however, approximately half of that section has been filled in. A fence and billboards screen this area from Lake Avenue and cars are parked indiscriminately on the premises
 - The lumberyard appears abandoned and shows dump sprawl
 - The furniture factory complex appears abandoned.
- 1966
- Concentration of dumping activity has been removed to the section west of Lake Avenue with the section east of Lake Avenue largely backfilled and idle
 - The furniture complex has vanished except for one building and become part of an extensive, active dump site.
- 1968
- Active dumping has all but disappeared from the section east of Lake Avenue, except for a small area above Hastings Street
 - Active dumping is present on factory site, debris accumulating in ascending layers from river level up towards street level
 - Active dumping is present west of Lake Avenue.
- 1970
- Former lumberyard site and dump site are combined into one unit containing an indiscriminate sprawl of junk cars and other debris
 - Active dumping continues just above Hastings Street, spreading downslope and fanning debris across street into dump
 - Active dumping on furniture site has accumulated layers of debris nearly level with Hastings Street in places
 - Power station has disappeared and site has become part of dump
 - Active dumping is continued west of Lake Avenue.
- 1975
- Active dumping on furniture factory site appears at a halt; debris layers are now level to Hastings Street in places
 - Dumping activity west of Lake Avenue limited to area of deepest depression near road; most of dump area has been backfilled and made level with surrounding terrain.

GEOLOGIC CONDITIONS BEARING ON THE FORMATION OF SEEPS OR
POTENTIAL LANDFILL PROBLEMS NEAR
THE LOWER FALLS

Published reports on the geology of the lower falls in the Rochester gorge may be confusing to the nongeologist because there has been a constant revision of stratigraphic nomenclature during the past 100 years. When reading the local geologic literature where abandoned terminology may be encountered, it is useful to refer to the summary of stratigraphic nomenclature changes that appears in the New York State Geological Association Guidebook for 1973, "Stratigraphy of the Genesee Gorge at Rochester" (Section I) by T. Grosso.

Another source of confusion is introduced when an attempt is made to extract specific information about geologic features from general geologic reports. These general reports, especially the older publications covering large areas or many topics, may contain imprecise or poorly phrased statements that can lead to some confusion when too specific a meaning is attached to random statements.

One example of the type of problem that can be encountered is the geologic setting of the lower falls area. The lower falls is considered to be "capped" by the Thorold Sandstone. In the past this rock unit has been called the Oneida, the Kodak, the upper Medina, and the Gray Band of Eaton. The thickness of the unit at the Falls is given in different publications as either 3 or 5 feet.

In old photographs in Fairchild's writings (see volume 6, Roch. Acad. Science) the Thorold Sandstone can clearly be seen capping a prominent bench along the west side of the falls approximately even with the top surface of a rectangular "mill race" outlet. At present this exposure is almost entirely hidden by brush, fill, and concrete. The Thorold in this area was a conspicuous band of light sandstone approximately even with the concrete structure that now caps the crest of the falls. The Thorold is not presently obvious in the riverbed near the falls.

The eroding face of the falls is somewhat irregular and sloping as indicated in the engineering profile accompanying this report (from Rochester Pure Waters, Wastewater Facilities Plan, Vol. V, Fig. 12, 1976). The sloping face of the top of the falls and the chemical seeps of current interest appear to be located near the middle part of the Grimsby Formation (formerly the Medina). This rock formation in the gorge consists of 55 feet of sandstone, shales, and siltstones. The upper 15 feet and lower 20 feet contain coarser, more thickly bedded sandstones with minor shale, whereas the middle 20 feet contain thinner sandy units with more prominent red to greenish shales.

A 1974 report to the Monroe County Health Department by L.M. Roe, Consulting Geologist, describes the seeps now believed to be creosote from the R.G. and E. tunnel as associated with a "massive sandstone unit near the base of the Grimsby Formation". However, later in the same report, Roe notes that the "oil" is entering the stratigraphic sequence "in the Grimsby Formation, probably close to the boundary with the upper Kodak (Thorold) Sandstone". Further on Roe again states that the "oil seeps are confined to structural surfaces in the lower portion of the Grimsby Formation. These descriptions are somewhat ambiguous. It appears that the main seeps are now near the middle of the Grimsby Formation, perhaps coming out near the top of a more shaley interval that is less permeable. However, much of the seepage is more likely to be moving along joints that are common in the local rocks. In this region two or three sets of nearly vertical joints are commonly present, trending roughly in easterly, northwesterly or northeasterly directions. The precise direction of these joint trends is not the controlling factor governing the movement of fluids, because the close spacing and intersecting nature of the joints allow flow to occur in nearly any direction, dependent upon the hydraulic gradient, the source of fluids, and the position of exposed rock faces.

It is important to note that all sandstones are not necessarily more permeable than all shales, as is commonly believed. The permeability of rocks is dependent not only on grain size, but upon the degree of cementation and natural rock structures such as joints and bedding planes. Laboratory water pressure tests in Volume V of the Pure Waters Report mentioned above show that both the Grimsby and Thorold Sandstones can be less permeable than the Williamson Shale or the Sodus Shale, but slightly more permeable than the Queenston Formation (largely shales). However, lab tests are run on solid, unbroken samples. Actual field permeability tests in borings in the Queenston show it can be more permeable than the Grimsby, but that permeabilities may vary from place to place. In summary, it is generally not advisable to estimate relative permeabilities from general observations that do not consider the natural jointing, cementation, or sedimentary structures present in actual field conditions. Some well cemented massive sandstones may be less jointed and less permeable than some shales with closely spaced joints and interbedded siltstones. In addition, the surface appearance and exact location of a groundwater seep at a rock face may be deceiving. Joints often become more numerous and more open near exposed rock faces (cliffs) due to the release of confining pressures. The gradual opening of such joints allows moving fluids to spread over larger areas in such areas. This can obscure the precise location of the main seepage zone or horizon.

The sequence of gently southward dipping (55 feet per mile) rock formations in the gorge at the lower falls includes all of the rocks on the profile view up to the Rochester Shale. The former (now filled) Deep Hollow Ravine cut into the side of the gorge to the west of the falls was eroded into all the formations from the Maplewood Shale up through the Rochester Shale. The movement of any leachate originating in the old ravine would be essentially dependent on the nature and permeability of the fill material,

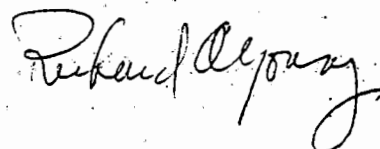
which has a much greater permeability than the rock formations adjacent to it. However, small amounts of fluids could seep into the rocks and reappear nearby in the walls of the gorge. Any significant leachate from the ravine would most likely move entirely within the fill through the path of least resistance. The topographic shape of the rock gorges and the nature of the fill material are the most critical factors. Any leachate that does enter the rocks near the falls will follow a path that is determined by: 1) the local hydrostatic pressure variation produced by the dam at the middle falls, 2) the groundwater normally present in the rocks that is derived from the area adjacent to the gorge, and 3) fluids permeating the fill in the buried ravine. The flow pattern in bedrock would be due to the interaction of all these contributions, but generally into the gorge from all sides. The lack of numerous large springs in the rocks near the lower falls indicates that significant amounts of water are not being contributed from the dam upstream, but the inferred pressure gradient could be preventing the normal downdip flow of water normally expected in bedrock.

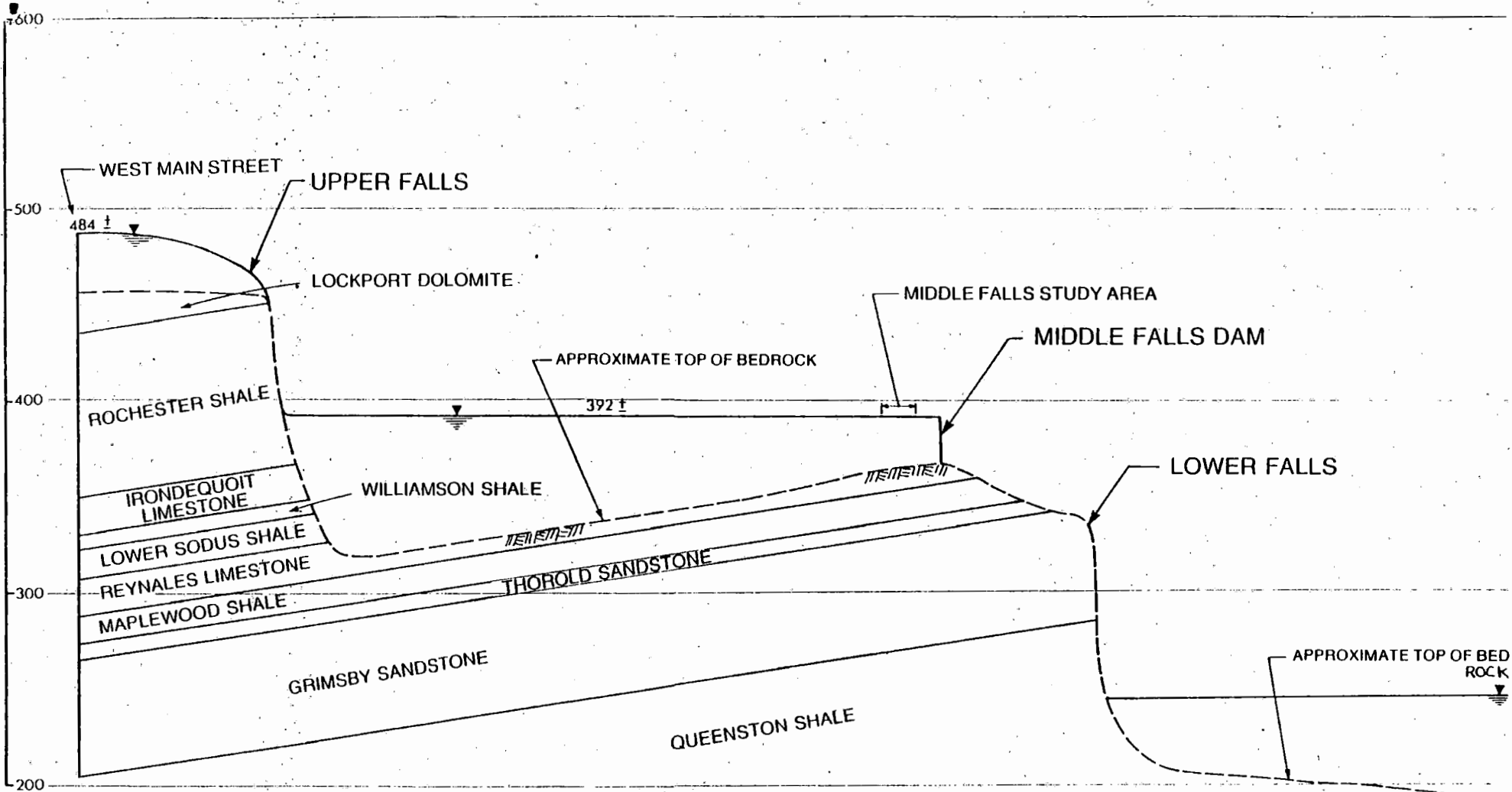
SUMMARY AND CONCLUSIONS:

If significant amounts of leachate were being generated from the fill in Deep Hollow Ravine, the leachate should appear as seeps coming out of the base of the fill adjacent to the lower falls or from permeable horizons in the rocks in the gorge walls close to the mouth of the ravine. The steepness of the ravine and the relatively slow rate at which it was filled would probably have prevented the accumulation of significant amounts of fluid wastes. The only potential hazard would seem to be from any containers that might release harmful substances long after they were disposed of. Random drilling from the surface for such unknown materials does not seem to be a practical or necessary solution in this area unless there is reason to suspect that known hazardous materials were placed in the fill.

The probable origin and suggested treatment of the known creosote and chemical seeps at the falls have been dealt with elsewhere in a separate report (Memorandum to MCEMC from R.A. Young, August 1979.)

Richard A. Young
September 28, 1979





From: Pure Waters
Wastewater Facilities Plan
Volume V, Figure 12. 1976

MEMORANDUM

TO: File

FROM: Richard S. Burton - Associate Chemist **RSB**

SUBJECT: Genesee River Lower Falls Seeps

DATE September 4, 1979
This replaces rough draft
circulated 8/23/79.

This is a summary of the progress to date in determining the content and source(s) of these seeps.

The first activity by our department with this problem occurred in late 1974. Samples were collected and analyzed by Dr. Kawahara, EPA, Cincinnati, but no useful results were obtained.¹

Site inspections were made by Dick Sutherland and myself and a contract for geological evaluation written for Dr. Leon Roe, then a student with Dr. Lundgren at the University of Rochester. Dr. Roe's report² concluded that the source(s) of the creosote seep was nearby (1000') and in the Grimsby sandstone.

Letters were sent on 19 August 1978 to Robert Gilkinson, Chief of Engineering at RG&E³ and Emil Zenie of Monroe County Pure Waters⁴ by G. Richard Sutherland of our department seeking assistance in determining the source of the creosote seep. Mr. Zenie's response⁵ gave some insight into the material in the filled ravine once called Deep Hollow, and concluded that no obvious source was located.

On 4 December 1975, I met with Gary Brierley, a geologist with Haley and Aldrich, Inc. In a memo to Mr. Sutherland dated 7 January 1976⁶, I summarized that meeting. No new source possibilities were discovered, and Mr. Brierley agreed with the previous conclusions of Dr. Roe that the source was nearby and most likely associated with the storage of chemicals at the furniture factory.

Mr. Sutherland responded on 30 January 1976⁷ that the material was probably of a small volume and that he would use his staff to pursue the investigation that spring.

During that initial investigation I had verbal information from Mr. Gilkinson of RG&E⁸ that a strong odor of creosote was encountered by workmen doing maintenance on the hydropower tunnel from the middle falls to RG&E's station #5 hydroelectric units. Mr. Gilkinson was not aware of a source, but we felt it must be the same as that of the lower falls seep.

The next involvement I had with the situation at the Lower Falls was in the Fall of 1978 when it was listed as a preliminary hot spot in the first stage of our closed landfill study.

In October 1978 I collected samples from the lower, creosote seep, and sent them to the New York State Health Department laboratory for analysis.

No results have been received on these samples.

On 14 June 1979 a correspondence was received from Mr. Morin⁹, Monroe County Manager with an attached letter from Legislator Benet¹⁰ expressing concern over the situation at the Lower Falls. This in combination with concern expressed by City Council via Neil Freedland caused our Landfill Review Committee to increase the priority of this site in our investigation.

I contacted J. Covey of RG&E and requested drawings of the hydroelectric tunnel. Mr. Covey indicated that RG&E had concluded that the creosote problem they had encountered in the tunnel was due to creosoted timbers used to shore up collapsing ceiling sections in the tunnel during its construction. The material entered the tunnel through weep holes (drain holes) connecting the space filled with timber to the tunnel. When the tunnel was empty the drain holes allowed creosote to enter the tunnel. Mr. Covey stated that major tunnel renovation was scheduled for 1980, and that it was planned to seal the seep out of the tunnel with grout at that time.

I obtained drawings of the tunnel location¹¹, and the as-built construction drawings¹². The section of the tunnel with creosoted timbers are indicated and are on a North-South line with the seeps at the Falls. The tunnel roof elevation is below the major seeps based on the computations of seep elevations of Mike Koral, Monroe County Health Department¹³ and Frank Clark, New York State Department of Environmental Conservation¹⁴.

On 18 July 1979 I wrote a letter to Mr. Leon White, Jr., Vice-President of RG&E¹⁵ regarding our investigation. In response to that letter, Mr. Elmer Daubert met with me at the Lower Falls on 2 August 1979 to inspect the area. Mr. Daubert stated he would report back to Mr. White, and that a response from RG&E would be forthcoming.

Additional samples were collected on 13 July 1979 and transmitted to the New York State Health Department Laboratory for analysis. I received a verbal report from Mr. John Orndorff on 22 August 1979 that the creosote sample was lost in the State Laboratory¹⁶.

The upper seep at the Lower Falls has been investigated separately. Verbal analytical results¹⁶ for samples of this material indicate levels of Benzene, Xylene and Toluene greater than 10 mg/L. Presumably, the actual levels were not determined, but I suspect that the Toluene level is much greater than 10 mg/L. It appears that additional samples will have to be collected.

The source of the upper seep is now considered to be one or more of three possibilities.

- 1) Sewer siphons crossing the old mill race which may have been damaged by the weight of blasted rock deposited in the area in the last 20 years.
- 2) Storage tanks which may have existed in the furniture factory area and been crushed by the fill in that area.
- 3) Material deposited in Deep Hollow.

The sewer maps for the siphon pipes¹⁷ indicate the cast iron pipes cross the old mill race in rock and from the top on the west side of the race to the bottom on the east side. Unless the pipes are encased in concrete, they would be under severe stress with the fill overburden. The Mill Race, as best I can determine at this time, exited at a point slightly above the upper seep and below the Falls' cap rock. Vertical fractures in the intervening rock would allow groundwater to exit at lower levels. (See maps and photos included in file).

The possibility of storage tanks at the furniture factory or drums dumped in Deep Hollow remains uncertain. Without further investigation the source(s) of the upper seep are speculative. The flow is relatively small, however, and should the material be deemed a hazard it could be pumped to the nearby sewer at a lower cost than that of drilling through rock to find the source.

Hopefully, complete analysis of these seeps will be forthcoming in the near future. A letter from Dr. Nitzkin to Dr. David Axelrod, New York State Commissioner of Health¹⁸ emphasized the importance of these analyses in determining the magnitude of this particular problem and in determining costs to be used in future landfill investigations.

Conclusion:

- 1) The lower seep is at this time concluded to be creosote from timbers in the RG&E Hydroelectric Tunnel. This conclusion is concurred with by Dr. R. Young¹⁹.
- 2) The upper seep is from one or more of three possible sources, as yet undetermined.

Recommendations:

- 1) The creosote seep should be continually flushed with water by blocking the sluiceway at the east side of the falls and causing water to discharge over the entire face of the falls.
- 2) When RG&E does their scheduled 1980 repair work on the tunnel, an effort should be made to reduce the amount of creosote in the tunnel support areas to the extent possible.
- 3) The upper seep should be reanalyzed to determine the actual concentration of the Benzene, Xylene and Toluene, and then some judgment made by New York State Department of Environmental Conservation if these chemicals pose a hazard to fish or fishermen.
- 4) If the upper seep is deemed a hazard it should be collected in a sump, and pumped to the sewer system via the Glenwood Screen-house.

RSB:emz

cc: Harry Sine
G. R. Sutherland

M E M O R A N D U M

8/1/79

TO: Ann Nelson, Monroe County Environmental
Management Council

FROM: R. A. Young *RA. Young*

SUBJECT: Visit to Genesee River Lower Falls in Rochester with R. Burton
(July 27, 1979) to inspect chemical seeps near falls

A. Creosote Seep

After talking with R. Burton and reviewing the history of the R.G. & E. tunnel construction I concur with his opinion that this seep is probably from the creosote used to treat lumber placed in problem areas during tunneling operations. However, the amount of material that is presently being released into the river suggests to me that excess liquid creosote must have been "poured" into the areas involved rather than simply used to treat the lumber prior to emplacement.

The precise location of the seep and the indication that it is coming out at higher levels than previously reported is not unusual. Rocks in the area are under hydrostatic pressure from natural groundwater, groundwater saturating the artificial fill on the west side of the river, and possibly from minor leaks in the tunnel, which has an intake considerably above the problem areas. Under such circumstances it is not unusual for groundwater to migrate along bedding planes, through thin permeable beds, or along joints in the rocks. The face of the Falls shows numerous joints that could convey water from the tunnel lining. Gradually such leakage would spread along interconnected joints, especially where such an open rock face is present.

I expect that natural jointing in the rocks is conveying most of the creosote to the face of the falls where it spreads out and appears to be coming out along horizontal bedding plane surfaces in the weathered rocks.

The reason that this seep appears to be getting worse has several possible explanations. (1) It may simply have gone unnoticed in the past. (2) It might have taken the creosote this long to travel the several hundred feet involved since construction of the tunnel. (3) Damage or aging of the tunnel lining may have allowed water pressure to force the creosote to move more rapidly in recent times (suggested by problems in tunnel maintenance where creosote is seeping into the tunnel). (4) A combination of the above factors could have been complicated by placement of the rock fill on the west bank of the river from construction of the downtown parking garage. This has raised the ground surface and undoubtedly the local water table. The rock fill would be very porous and store considerable water during wet seasons. This water could be increasing the local hydrostatic pressure near the falls, forcing more of the creosote to move out at the falls. Previously some of the creosote could have been moving in a more northwesterly direction, and not all intersected the face of the falls.

In any event, the most inexpensive solution would appear to be draining of the creosote trapped in the tunnel lining by boring short holes into the known problem areas. Portable core drilling equipment is available that can be carried by one person.

August 1, 1979

Surface drilling to determine the path of the pollutant or the area effected appears to be too expensive and of questionable value. Draining the remaining reservoirs of creosote would gradually solve the problem at the falls, as well as eliminate tunnel maintenance complaints. If feasible, grouting of the tunnel lining could be considered at the same time to further seal or strengthen the areas after they were drained.

B. Chemical Seep at West Side of Lower Falls

The chemical seep at the west side of the falls (near the creosote seep) is discharging a relatively large flow of water containing chemical substances (several gallons per minute). It does not appear to me to be a typical groundwater spring discharge for the following reasons. (1) It is very localized although the rocks nearby are similar and should have similar discharges. (2) If the chemicals had permeated the general area (groundwater), similar chemical discharges should be seen nearby where water is moving out through the rocks in the sides of the gorge. However, this discharge seems unique. (3) From discussion with R. Burton, the physical appearance of the seep has changed markedly over short periods of time (a few months). A whitish paint(?) residue coats the rocks nearby; but, R. Burton said it covered a greater area last spring. The flow was clear when we visited it. This suggests to me that the composition and/or concentration of the pollutants changes over the short term. This characteristic is almost impossible for groundwater discharge over any reasonable area. The groundwater would be a mixture from a wide area and subject to filtration in the soils. The paint(?) residue is unlikely to have travelled far through the ground.

All of the above lead me to suspect there is likely to be a leaking pipe or container not very distant from the outflow. I doubt if it could be more than a few hundred feet away. The changing nature of the fluids being discharged suggests to me a pipe which carries different liquids from time to time.

Without more specific information as to other possibilities I believe that drilling to locate a source for this seep would be very expensive and unrealistic. If any discharge pipes exist nearby I would try to investigate their condition before any random subsurface testing of the general area along the west bank of the falls. R. Burton had some ideas relating to construction of sewer lines and old records that I cannot recall in detail without reference to his drawings.

C. Reported Seep Upstream from Falls

This problem was not visible during our visit, but it also seems to be unrelated to the general movement of groundwater because of its erratic nature. Perhaps a connection between this reported seep and the one at the falls could be found.

Summary:

All of the seeps appear to be isolated instances of localized sources that need individual treatment rather than a broad approach, as a first step toward a solution.

August 1, 1979

Perhaps someone more familiar with the tunnels, sewage discharge lines, and construction in the area could shed more light on the source of the pollution, aside from the creosote problem. Any excavation would have to be based on existing records of sewer lines, etc. Chemical analyses over a short time should be able to confirm or eliminate the idea that the source of the main chemical seep (B) is actually changing in response to variable discharges.

NEW YORK STATE DEPARTMENT OF HEALTH
DIVISION OF LABORATORIES AND RESEARCH
ENVIRONMENTAL HEALTH CENTER

APPENDIX E

RESULTS OF EXAMINATION

(PAGE 1 OF 1)

LAB ACCESSION NO: 00941 YR/MO/DAY/HR SAMPLE REC'D: 79/07/16/08

REPORTING LAB: 17 EHC ALBANY

PROGRAM: 100 PUBLIC WATER SUPPLIES

STATION (SOURCE) NO:

DRAINAGE BASIN: NY GAZETTEER NO: 2701 COUNTY: MONROE

COORDINATES: DEG ' "N, DEG ' "W

COMMON NAME INCL SUBM'SHED: GENESEE RIVER LOWER FALLS ROCHESTER

EXACT SAMPLING POINT: SEEP ON FACE OF FALLS UPPER WEST SIDE

TYPE OF SAMPLE: 25 GROUND WATER

MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/10/16

REPORT SENT TO: CO (1) RC (1) LPHE (1) LHO (0) FED (0) CHEM (0)

PARAMETER	UNIT	RESULT	NOTATION
034409 BENZENE	MCG/L	10000.	GT
034509 XYLENES	MCG/L	10000.	GT
039209 TOLUENE	MCG/L	10000.	GT

LAB ACCESSION NO: C0942 YR/MO/DAY/HR SAMPLE REC'D: 79/07/16/08

REPORTING LAB: 17 EHC ALBANY

PROGRAM: 100 PUBLIC WATER SUPPLIES

STATION (SOURCE) NO:

DRAINAGE BASIN: NY GAZETTEER NO: 2701 COUNTY: MONROE

COORDINATES: DEG ' "N, DEG ' "W

COMMON NAME INCL SUBM'SHED: GENESEE RIVER LOWER FALLS ROCHESTER

EXACT SAMPLING POINT: MIDDLE GROUND WATER SEEP

TYPE OF SAMPLE: 25 GROUND WATER

MO/DAY/HR OF SAMPLING: FROM 00/00 TO 07/10/15

REPORT SENT TO: CO (1) RC (1) LPHE (1) LHO (0) FED (0) CHEM (0)

PARAMETER	UNIT	RESULT	NOTATION
034409 BENZENE	MCG/L	800.	
034509 XYLENES	MCG/L	800.	
039209 TOLUENE	MCG/L	2000.	

DIRECTOR DIV. ENVIRONMENTAL HEALTH
MONROE COUNTY HEALTH DEPARTMENT
111 WESTFALL ROAD
ROCHESTER NEW YORK 14602

DATE COMPLETED: 8/23/79

SUBMITTED BY: BURTON