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**JEROME PARK RESERVOIR DAM
BRONX COUNTY, NEW YORK**

NY 64

**PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**

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Prepared by
CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
91 ROSELAND AVENUE, P.O. BOX 91
CALDWELL, NEW JERSEY 07006

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DACW51-78-C-0035

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For
DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10007

DISTRIBUTION STATEMENT A

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79 01 31 027

REPORT DOCUMENTATION PAGE

REPORT NUMBER
REPORT DATE
PERFORMING ORGANIZATION

1. AUTHOR(s)
2. GOVT ACCESSION NO.

4. TITLE (and Subtitle)
Phase I Inspection Report
Jerome Park Reservoir Dam
Bronx County, New York
Inventory No. N.Y. 64

5. TYPE OF REPORT & PERIOD COVERED
Phase I Inspection Report
National Dam Safety Program
6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
Edward A. Nowatzki Ph. D.
Gary S. Salzman P.E.

8. CONTRACT OR GRANT NUMBER(s)
DACW51-78-C-0035

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Converse-Ward-Davis-Dixon
91 Roseland Avenue P.O. Box 91
Caldwell, New Jersey 07006

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
12 98 P.

11. CONTROLLING OFFICE NAME AND ADDRESS
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233
393970

12. REPORT DATE
5 September 1978
13. NUMBER OF PAGES

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)
Department of the Army
26 Federal Plaza / New York District, ColE
New York, New York 10007

15. SECURITY CLASS. (of this report)
UNCLASSIFIED
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
Approved for public release; Distribution unlimited.
6 National Dam Safety Program. Jerome Park Reservoir Dam (NDS NY 64, NYSDEC 135 M.), Lower Hudson River Watershed, Bronx County, New York. Phase I Inspection Report.

17. DISTRIBUTION STATEMENT (of this Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Bronx County
Jerome Park Reservoir
City of New York
Water Supply System

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.
The Jerome Park Reservoir Dam was judged to be safe.
393970

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EDITION OF PROGRESS OBSOLETE

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (THIS PAGE)

LOWER HUDSON RIVER WATERSHED
BRONX COUNTY, NEW YORK

JEROME PARK RESERVOIR DAM
CITY OF NEW YORK, NEW YORK
BUREAU OF WATER SUPPLY
NDS # NY 64
NYSDEC # 135 LH

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

Prepared by

CONVERSE WARD DAVIS DIXON
Consulting Engineers
91 Roseland Avenue, P. O. Box 91
Caldwell, New Jersey 07006

For

DEPARTMENT OF THE ARMY
New York District, Corps of Engineers
26 Federal Plaza
New York, New York 10007

ACCESSION for		
NTIS	White Section <input checked="" type="checkbox"/>	
DDC	Buff Section <input type="checkbox"/>	
UNANNOUNCED	<input type="checkbox"/>	
JUSTIFICATION _____		
BY _____		
DISTRIBUTION/AVAILABILITY _____		
Dist.	AVAIL.	_____
A		

5 September 1978

TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
Brief Assessment of General Condition and Recommended Action	ii
Overview Photograph	
Section 1 - Project Information	1
Section 2 - Engineering Data	11
Section 3 - Visual Inspection	15
Section 4 - Operational Procedures	21
Section 5 - Hydraulics and Hydrology	23
Section 6 - Structural Stability	24
Section 7 - Assessment, Recommendations and Remedial Measures	26

PLATES*

<u>Title</u>	<u>Plate No.</u>
Site Location Plan - USGS Quads	I
Plan and Sections (Plate No. 94) - March 1907	II
Lining and Embankments (Plate No. 2004-X) - October 1910	III
Gate House No. 7, Plan (Plate No. 110) - August 1907	IV
Gate House No. 2 (Plate No. 98) - August 1907	V
Gate House No. 5, Plan (Plate No. 105) - July 1907	VI
Waste Weir or Spillway (Plate No. 113) - June 1901	VII
Gate House No. 5, Sections (Plate No. 107) - July 1907	VIII
Gate House No. 7, Sections Looking North and South (Plate No. 112) - August 1907	IX
Gate House No. 7, Sections Looking East and West (Plate No. 111) - August 1907	X
Gate House No. 5, Sections Looking East (Plate No. 106) - July 1907	XI
Contract Drawing for Sluice Gates, Lifting Apparatus and Shed at Gate House No. 5 (Plate No. 9532-Y) - December 1911	XII

*Plate numbers in parentheses refer to NYCDWRBWS
plate numbers.

APPENDICES

<u>Title</u>	<u>Appendix</u>
Checklist - Engineering Data	A
Checklist - Visual Inspection	B
Computations	C
Photographs	D
Related Documents	E

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

BRIEF ASSESSMENT OF GENERAL CONDITION

AND

RECOMMENDED ACTION

Name of Dam: Jerome Park Reservoir Dam

Owner: City of New York, New York

State Located: New York

County Located: Bronx

Stream: New Croton Aqueduct

Date of Inspection: 1 August 1978

Inspection Team: Converse Ward Davis Dixon
91 Roseland Avenue, P. O. Box 91
Caldwell, New Jersey 07006

and

Lev Zetlin and Associates, Inc.
95 Madison Avenue
New York, New York 10016

Based on our visual inspection of the system and a review of the design drawings, the Jerome Park Reservoir Dam is judged to be in generally good condition structurally and functioning satisfactorily at this time. Because the reservoir has a large excess storage capacity and virtually no watershed of its own, and because of the control that can be exercised on inflow from the New Croton Aqueduct and outflow to the New York City water supply system, the usual screening guidelines established by the Department of Army, Office of Chief of Engineers (OCE) for rating spillway adequacy were not used. Instead, computations performed as part of this study show that there is no danger of overtopping of the dam and that the waste weir is adequate to handle even the most severe possible local storms, provided the reservoir is isolated from the supply system.

Our assessment of the general physical condition of the Jerome Park Reservoir Dam has led us to make the following recommendations which should be implemented as soon as practicable, preferably within the next three years:

1. The "lock dogs" observed to be missing on the five gate stems controlling flow to the south portal inlet in Gate House No. 5 should be replaced.
2. Loose or missing bricks on vandalized gate houses, and holes in the chain link fence surrounding the reservoir, should be repaired.
3. The low woody growth on the upstream face of the dam should be removed.
4. Vegetative growth in the concrete apron joints should be removed and the joints recaulked, if necessary.
5. A formal emergency warning procedure should be filed with police at the local precinct house, with the city uniform complaint number, and with the city uniform emergency number.
6. Security measures and their implementation should be re-evaluated and, if needed, a program for tighter security developed and followed.

Respectfully submitted,

CONVERSE WARD DAVIS DIXON

Edward A. Nowatzki

Edward A. Nowatzki, Ph.D., P.E.

Gary S. Salzman

Gary S. Salzman, P.E.



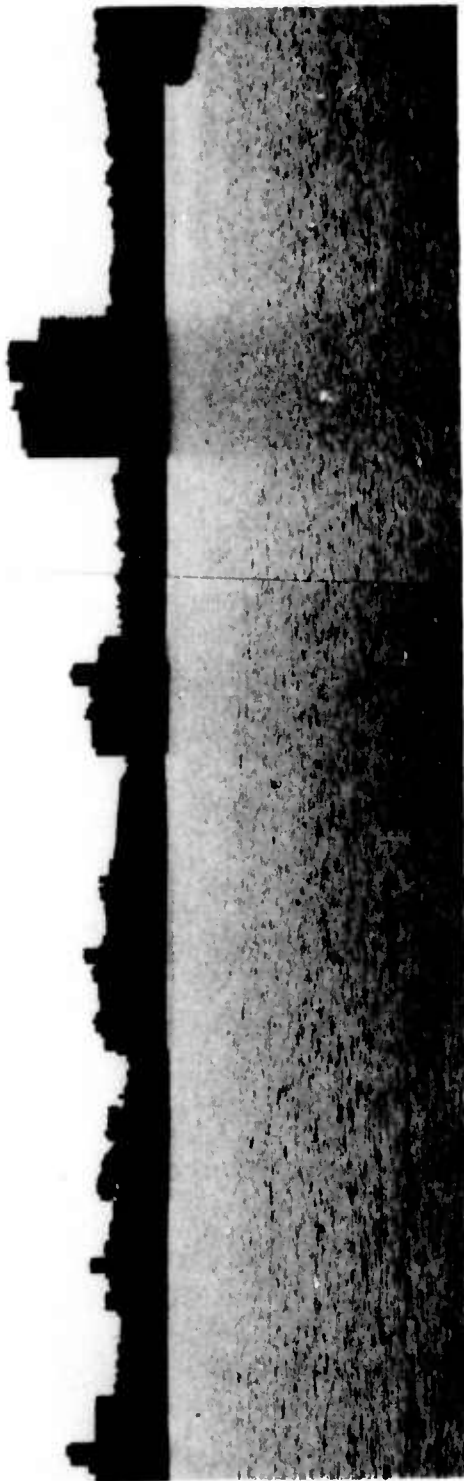
Date: 5 September 1978

Approved by:

Clark H. Benn

Colonel Clark H. Benn
New York District Engineer

Date: 27 September 1978



OVERVIEW - JEROME PARK RESERVOIR

SECTION 1

PROJECT INFORMATION

1.1 General

a. Authority

The authority to conduct this Phase I inspection and evaluation comes from the National Dam Inspection Act (P.L. 92-367) of 1972 in which the Secretary of the Army was authorized to initiate, through the Corps of Engineers, a program of safety inspections of non-federal dams throughout the United States. Management and execution of the program within the State of New York has been undertaken by the New York State Department of Environmental Conservation (NYSDEC).

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b. Purpose

The primary purpose of the inspection is to evaluate available data and to give an opinion as to whether the subject dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Description of Dam and Appurtenances

The Jerome Park Reservoir does not impound a natural stream and has no surrounding watershed of its own. It is a receiving and water supply distribution reservoir whose level is carefully controlled. The supply comes from the Croton Reservoir in Westchester County, New York, via a branch of the New Croton Aqueduct which continues beyond the Jerome Park Reservoir and terminates at Central Park in New York City. (The Old Croton Aqueduct is no longer in use.) The dam itself is a continuous structure that extends completely around an artificially created basin. Since the terms "upstream" and "downstream" have no meaning in this context, they are redefined here for the dam structure as follows: "upstream" means facing towards the reservoir; "downstream" means facing away from the reservoir. Similarly, since "right" and "left" have no meaning in this context, they will not be used here at all and compass points will be given instead. The long dimension of the reservoir lies along an approximate north-south line, parallel to the centerline of the New Croton Aqueduct at that location.

The original design drawings show a "West Basin" and an "East Basin" separated by a dividing wall and conduits (Refer to Plate II). It should be noted that construction of the "East Basin" was abandoned in 1905 and the site is now occupied by DeWitt Clinton High School, Bronx High School of Science, Lehman College (formerly Hunter College) and train yards of the New York City Transit Authority (Refer to Plate I). The word "basin", therefore, in this report refers to the West Basin only.

Since the West Basin was artificially formed both by excavation in rock and soil and by construction of earthen embankments, there are at least six different types of structures that can be used to categorize sections through the dam (Refer to Plate II). These include approximately 1000 feet of earthfill embankment, with a concrete core wall to rock and concrete lined upstream slopes at the northern end of the reservoir. Various types of earth retaining structures compose the rest of the perimeter, approximately 10,000 feet. Design drawings show that, regardless of the type of retaining structure used at a given location, all retaining walls extend into rock.

A roadway extends around the entire dam at about the earth embankment crest elevation. The roadway is paved except for about 2800 feet along the eastern side of the dam, south of Gate House No. 5.

The maximum height of the dam at any section, as measured from top of roadway to bottom of basin, is approximately 31 feet. Reportedly, the entire basin is concrete-lined (6-inch thick), although an original design drawing (Plate III), which shows the types of finished reservoir bottom for the East Basin, indicates that the bottom need not have been lined in areas of exposed rock. Approximately 70% of the basin's foundation material is rock. Photos taken in 1966 when the reservoir was emptied for repair indicate that the entire basin is concrete-lined.

There are basically seven appurtenant structures. These are (Plate II):

- 1) Gate House No. 1, located approximately 1 mile north of the reservoir. It is "on-line" with the New Croton Aqueduct and is the control point for diverting flow into the Jerome Park Branch of the New Croton Aqueduct.

2) Gate House No. 7, located at the northeast corner of the reservoir. It is "on-line" with the Jerome Park Branch of the New Croton Aqueduct. Water is drawn from the branch aqueduct through four 4-foot wide by 5-foot high gates in the east wing of Gate House No. 7, flows through Chamber No. 12 east to Chamber No. 12 west, and then enters the reservoir through the west inlet (Refer to Plate IV).

3) Gate House No. 2, located at the north central end of the reservoir. It contains gates that tap the reservoir and feed water through two 48-inch pipes to Gate House No. 5, from which distribution to Manhattan and the East and South Bronx is made (Refer to Plate V). We were advised that Gate House No. 2 also contains gates that, when opened, would drain the reservoir into the Broadway Sewer.

4) Gate House No. 3, located on the west central side of the reservoir. It contains gates that tap the reservoir and feed the water to Gate House No. 5, similar to Gate House No. 2.

5) Gate House No. 6, located at the southeast corner of the reservoir and not at the intersection of Reservoir Avenue and Kingsbridge Road as shown in Plate II. It contains gates that tap the reservoir directly and supply water to the South and East Bronx. It also contains a Microstrainer Plant as part of the water treatment facilities at the Reservoir. At the time of the inspection, Gate House No. 6 was not in operation.

6) Gate House No. 5, located on the east central side of the reservoir at the intersection of Goulden Avenue and East 205th Street. It contains a series of gates, chambers and valves by which the entire operation of the reservoir can be controlled (Plate VI). It is the terminus of the Jerome Park Branch of the New Croton Aqueduct. Six 2-foot wide by 5-foot high gates draw water from Chamber No. 8 at the end of the aqueduct branch and direct it into the reservoir via a tunnel that inlets the reservoir approximately 2100 feet south of the gate house. This provides a second source of supply to the reservoir. Gate House No. 5 is the heart of the distribution system since flow from Gate House Nos. 2 and 3 and distribution into the supply system or back into the New Croton Aqueduct (Shaft No. 21) can be controlled from it. Chemical treatment of water is also accomplished at Gate House No. 5.

7) A waste weir located at the northwestern corner of the reservoir between Gate House Nos. 2 and 3. This waste weir consists of three spillway sections 5.25 feet wide. The spillway sections are enclosed in a shaft, and water from the reservoir accesses the spillways via three 2-foot wide by 3-foot high portals (Refer to Plate VII). There are no gates on the spillways; they empty via a drop inlet into a conduit that leads to Gate House No. 2, and then to the Broadway Sewer and the Harlem River. The inverts of the access portals are approximately 11.5 feet below the spillway crests, and the invert of the sewer conduit is about 26.5 feet below the spillway crests. The elevation of the spillway crest is 135.1. (Note that 3.61 feet should be added to all elevations on design drawings shown as Plates II through XII to bring them to USGS datum.)

The "Report of a Structure Impounding Water" filed with the State of New York, Department of State Engineer and Surveyor by the Chief Engineer of the New York City Bureau of Water Supply in February 1925 (Refer to Appendix E) indicates that, in addition to the waste weir described in Section 1.2a and Plate VII, there are other waste weirs located in Gate House No. 5 and Gate House No. 2.

Plate VI shows that the two 5.25-foot wide waste weirs in Gate House No. 5 lead from the large chamber at the end of the aqueduct branch (Inlet Chamber No. 26 and Outlet Chamber No. 8 are connected by a conduit and form a single chamber) to Storage Chamber Nos. 32 and 33. Initially, these storage chambers appear to have been connected to the "East Basin", but we were apprised are not functional, and the waste weirs are not functional. Since the East Basin and Gate House No. 4 were never built, these weirs do not serve any useful function as overflow control devices today.

Plate V does not show any weir(s) in Gate House No. 2, and no mention of such an overflow device was made in our conversations with Bureau of Water Supply personnel.

b. Location

The dam is located in Bronx County, and within New York City, New York. The exact location is shown on Plate I, which is a composite taken from USGS 7.5 minute Quadrangle Sheets of Central Park, N.Y.-N.J., N40°45'00", W73°52'30", and Yonkers, N.Y.-N.J., N40°52'30", W73°52'30.

c. Size Classification

The dam is classified as "intermediate" (storage = 2380 acre-feet; height = 31 feet).

d. Hazard Classification

Because it is located in a densely populated section of New York City and adjacent to three schools, the hazard classification is "high".

e. Ownership

City of New York
Department of Water Resources
Bureau of Water Supply
Municipal Building
New York, New York 10007

f. Purpose of Dam

The dam was built to provide receiving, storage and distribution facilities for the New York City water supply system.

g. Design and Construction History

The dam was designed as part of the Croton Aqueduct System of the New York City water supply system by municipal engineers of the City of New York for the Aqueduct Commissioners. The oldest design drawings date back to 1889, with most of the original drawings completed in the early 1900s. There are over 610 design drawings on file with the City of New York Bureau of Water Supply at the Municipal Building in New York City, dating from 1889 to the present. It was virtually impossible within the time constraints of this study to review all of those drawings in detail. A list of the drawings, their abbreviated titles, and their dates and file numbers, are given in Appendix E. In our conversations with personnel of the New York City Department of Water Resources Bureau of Water Supply (NYCDWRBWS), both at the Municipal Building in Manhattan and at the dam site in the Bronx, we discovered that there are no formal computations on file with New York City that relate to the original design, construction or subsequent modifications for the Jerome Park Reservoir.

A construction history of the Croton System, complete with photographs and selected design drawings, was on file at the Bureau of Water Supply offices,

Tremont and Arthur Avenues, Bronx, New York 10457. Mr. Robert Ragucci of that office allowed us to inspect this 250+-page volume entitled Report of the Aqueduct Commissioners for 1895 to 1907. It contains a detailed description and many high-quality photographs of the construction of the Jerome Park Reservoir. Plates II and IV through XI were reproduced from this book. The reservoir was put into service in 1906.

As suggested by the dates of drawings listed in Appendix E, no major modifications were made to the dam or its appurtenant structures from the time it was put in operation until 1938. At that time, the superstructures of all the gate houses were changed from wood frame to the brick construction that exists today.

In 1966, the reservoir was drained to make modifications to Gate House No. 6, to repair deteriorated sections of the concrete liner and slope cover, and to remove whatever silt had accumulated in the reservoir since its opening in 1906. There were no written records or computations relating to these repairs and modifications; information was obtained from conversations with Bureau of Water Supply personnel, photos on file at the Bronx office, and drawings on file at the Manhattan office.

h. Normal Operating Procedure

The operating procedure is quite complex and can best be understood by reference to Plates II, IV, V, VI and VIII. Ordinarily, the gates in Gate House No. 1 are always kept open to allow diversion of flow from the New Croton Aqueduct into the Jerome Park Branch. Water from the diversion aqueduct is normally not fed directly into the water supply system, but is first allowed to enter the Jerome Park Reservoir. This is accomplished at Gate House No. 7 and/or at Gate House No. 5 (Refer to Section 1.2a). Normally, the reservoir is supplied through both gate houses simultaneously.

Water is taken out of the reservoir through gates located in Gate House Nos. 2 and 3. The gates in these gate houses, leading in each case to two 48-inch diameter cast iron pipes, are ordinarily left full open. Flow proceeds through the pipes to Main Chamber No. 19 in Gate House No. 5. Flow into Main Chamber No. 19 is controlled by four gates in Gate House No. 5, two each for Inlet Chamber Nos. 16 and 17 which receive flow from Gate House Nos. 3 and 2, respectively. Water also flows from the reservoir into Main Chamber No. 19 through a drop well located just west of Gate House No. 5 and just

south of the Shaft 21 feeder conduit. Flow from the drop well enters Inlet Chamber No. 13 in Gate House No. 5 and then through two control gates into Main Chamber No. 19. Ordinarily, the gates of the drop well inlet are left open.

All distribution to the water supply system takes place from Main Chamber No. 19 in Gate House No. 5. Supply to Manhattan's Central Park Reservoir is accomplished by feeding water from Main Chamber No. 19 through four gates, two each connected to Outlet Chamber Nos. 15 and 14, into an 11-foot diameter conduit that leads to the drop inlet of Shaft No. 21 (Refer to Plate VIII). Supply to the East and South Bronx is also accomplished by feeding water from Main Chamber No. 19 through two gates into Outlet Chamber No. 22, and then through two 48-inch diameter cast iron pipes into the distribution system.

In the normal operating procedure described above, water is treated in Gate House No. 5 before its distribution into the supply system.

The operation and maintenance of all equipment in the system is performed under the direction of Mr. George Kuse, who lives nearby and is available by telephone 24 hours a day.

Inflow and outflow quantities are dictated by seasonal and diurnal demands. Flow measurements and capacity computations are made daily. (Refer to Appendix E for "Croton Delivery and Consumption" records for January through May 1978.) Records of these measurements are on file at Bureau of Water Supply offices in Manhattan.

1.3 Pertinent Data

a. Drainage Area

Not applicable; reservoir level is controlled.

b. Discharge at Damsite

Discharge is controlled. Overflow spillway capacity (assuming only the waste weir between Gate House Nos. 2 and 3) = 200 cfs.

c. Elevations (feet above MSL)

Top of dam: 140.1.

Maximum pool (top of dam): 140.1.

Normal pool (top of waste weir): 135.1.
Bottom of reservoir: 108.6.
Aqueduct invert, G.H. #7: 122.4.
Chamber #12, G.H. #7: 110.6
Invert of conduit to reservoir, G.H. #7: 111.6
Aqueduct invert, G.H. #5: 122.3.
Inlet Chamber #26, G.H. #5: 122.1.
Outlet Chamber #8, G.H. #5: 122.1.
Invert of conduit to south portal, G.H. #5:
111.1.
Main Chamber #19, G.H. #5: 110.6.
Invert of conduit to Shaft #21, G.H. #5: 97.1.
Invert of collection chamber leading to two 48"
diameter supply lines below Chamber #22, G.H.
#5: 102.1.

d. Reservoir Length

Normal pool: 4500 fcet (approximate).

Maximum pool: 4500+ feet; there is about 5 feet
of freeboard and except for the embankment at
the northern end of the dam, the reservoir is
enclosed by near vertical retaining walls.

e. Storage (acre-feet)

Normal pool (spillway crest): 2380 acre-feet.

Maximum pool (top of dam): 2850 acre-feet.

f. Reservoir Surface Area (acres)

Normal pool (spillway crest): 94.

Maximum pool (top of dam): 94+ (see Section
1.3d above).

g. Dam

Type: Earthfill with core wall into rock and various types of concrete retaining structures founded in rock. Most of basin excavated in soil and rock. Retaining walls hold back virgin material and some construction backfill.

Length: 1100 feet (approximate - along perimeter roadway).

Height: Variable; 31 feet from bottom of basin to top of perimeter roadway.

Top width: Variable; approximately 45 feet at earth embankment section.

Side slopes: 1 horizontal to 4 vertical along retaining wall sections. 2-3/4 horizontal to 1 vertical on upstream embankment and 2-1/2 horizontal to 1 vertical on downstream embankment.

Core wall: Top width = 3 feet at elevation 137.1; 1 horizontal to 20 vertical upstream and downstream batter to elevation 77.1 where width = 9 feet. Constant thickness from that elevation to foundation into rock.

Retaining walls: Various sections; west and south walls have 1 horizontal to 4 vertical upstream batter and 1 horizontal to 6 vertical downstream batter (top width = 3'7"); north wall has 1 horizontal to 4 vertical upstream batter and vertical face downstream (top width = 3'3"); east wall is really a massive concrete structure that contains the Jerome Park Branch of the New Croton Aqueduct and the Old Aqueduct north of Gate House #5 (top width = 25'; bottom width = 30') and the south inlet conduit to the reservoir and the Old Aqueduct south of Gate House #5 (top width = 13.75'; bottom width = 35').

h. Diversion and Regulating Tunnels

The Jerome Park Reservoir can be completely bypassed by diverting flow at Gate House #1 from the Jerome Park Branch of the New Croton Reservoir and having it go directly into Shaft No. 21 via Shaft No. 20 (Refer to Plate II).

Flow can also be diverted from the Jerome Park Reservoir by the "Procedure to Isolate Jerome Park Reservoir from Distribution System" contained in Appendix E.

i. Spillway (Waste weir between Gate House Nos. 2 and 3)

Type: Concrete crest.

Length of weir: 3 sections 5.25 feet long separated by 1.75-foot-wide piers.

Width at crest: 2.75 feet.

Crest elevation: 135.1.

Gates: None.

Other: The spillway structure is enclosed in the retaining wall. Water from the reservoir accesses the spillway through three 2-foot wide by 3-foot high portals (invert elevation 123.6) in the upstream face of the retaining wall (Refer to Plate VII).

j. Regulating Outlets

There are at least 24 gates that can be operated to regulate flow. Refer to Section 1.2a and "Procedure to Isolate Jerome Park Reservoir from Distribution System" in Appendix E for details.

SECTION 2
ENGINEERING DATA

2.1 Design

As indicated previously, there are over 610 design drawings of the dam and its appurtenant structures dating back to 1889. These drawings contain plans, sections and structural details of the dam, each of the gate houses, the waste weir, the aqueduct, and other related items such as the chlorination equipment, the microstrainer, etc. Electrical, and plumbing and heating drawings are also available. All of these drawings are on file at the Manhattan office of the Bureau of Water Supply.

There is a large amount of engineering design data available from these drawings. Plates II through XI in this report are representative of the type of data contained in these drawings. There are, however, no structural design or hydraulic computations on file, although notes on some of the drawings indicate that the drawings are to accompany specifically numbered reports of the chief engineer. Thus, it appears that at one time such computations did exist.

The files also contain drawings showing the location plan for a large number of exploratory borings along the southern and eastern boundaries of the East Basin, a rock line profile at the southern end of the East Basin, and a crude geological cross section through the East Basin. No such data were found for the West Basin.

No information was available regarding the type of materials used in construction of embankments or in backfilling behind the retaining walls.

The only available source for hydrologic information (storage capacity, water surface area, etc.) was the Report of a Structure Impounding Water filed by the City of New York Bureau of Water Supply with the State of New York Department of State Engineer and Surveyor in February 1925 (Refer to Appendix E).

2.2 Construction

A construction history of the entire Croton System, complete with high-quality photographs and selected structural design drawings, was on file at the

Bronx office of the Bureau of Water Supply. This book, entitled Report of the Aqueduct Commissioners for 1895 to 1907, contains a chapter on the Jerome Park Reservoir. A brief perusal of this chapter and its accompanying photos showed that many of the design features were actually built as designed. For example, there is one photograph showing the embankment core wall just after its construction and prior to the construction of the embankment. From the photo, it is evident that the core wall was founded in rock, as indicated on the design drawings. The Aqueduct Commissioners' Report contains nineteen plates (Plates 94 through 113) of design drawings; nine of those plates have been reproduced and used as part of this report (Plate II and Plates IV through XI).

2.3 Operation

Operation records dating back to 1907, the year the Jerome Park Reservoir was put into service, are reportedly available at the Manhattan office of the Bureau of Water Supply. These records include the following data obtained from measurements made daily at 8 AM (storage and drafts in million gallons):

1. New Croton Aqueduct
 - a. Amount delivered to aqueduct
 - b. Amount taken by local communities
 - c. Aqueduct storage: (+) gain, (-) loss
 - d. Infiltration (assumed constant at +3.2 million gallons per day)
 - e. Amount delivered to New York City
($a - b \pm c + d$)
2. Distribution Reservoirs
 - a. Elevation of water level at Jerome Park Reservoir
 - b. Corresponding storage
 - c. Elevation of water level at Central Park Reservoir
 - d. Corresponding storage
 - e. Total storage

- f. Gain (+) or loss (-) from previous day's total storage
- g. Inches of rain at Central Park (recorded monthly)
- h. Monthly storage from rain at Central Park (rain yield = 5 mg/in)
- i. Consumption of Croton water in New York City (1e - 2f)

We were informed by Mr. Barkow of the Manhattan office that operation of the system was dictated by demand, and that under normal conditions, Croton Reservoir outflow was adjusted to keep the Jerome Park Reservoir at approximately elevation 133± (about two feet below the waste weir overflow level).

An example of data contained in these operation records is found in Appendix E for the months of January through May 1978. It is evident from these records that flow into and out of the Jerome Park Reservoir is very carefully controlled with no allowance being given to sources other than the aqueduct itself, i.e. contribution of rainfall and runoff at the damsite is negligible.

2.4 Evaluation

a. Availability

Except for the Report of a Structure Impounding Water, which was on file with NYSDEC, all data were obtained from NYCDWRBWS. The 610+ design drawings and the operation data for Jerome Park Reservoir were on file at the Manhattan office and were readily available if the potential user knew what he was looking for.

Other data, specifically relating to the day-by-day operations of the Jerome Park Reservoir, were available at the Bronx office or from conversations with the caretaker, Mr. George Kuse. All personnel interviewed by the inspection team were cooperative and very helpful.

b. Adequacy

There is a large amount of engineering design data; however, its nature is such that detailed engineering analyses could not be performed. Consequently, the assessment made here is based primarily on a general evaluation of the available data, the results

of the visual inspection, and conversations with personnel of NYCDWRBWS.

c. Validity

There is no reason to question the validity of the information contained on the available drawings or in the operations records. It must be kept in mind, however, that the East Basin shown in many of the design drawings was never completed. No detailed drawings were available to show how chamber connections, etc. were modified to account for that fact. Additionally, it must be kept in mind that the reference for elevations shown on all drawings is 3.61 feet higher than the USGS reference. Consequently, 3.61 feet must be added to all elevations to bring them to the standard reference used in this study.

2.5 Geology

a. General Geology

The Jerome Park Reservoir and Dam are located in the western part of the Borough of the Bronx, in New York City. The bedrock is the Fordham Gneiss. Although the region has been intensely glaciated, the glacial cover is marginal. There are no significant geologic structures noted.

b. Site Geology

The site is heavily urbanized. The combination of thin glacial cover, filled areas, and built-up areas has obliterated any rock outcrops. However, the literature and field observations elsewhere indicate the rock is folded.

There are no surface inlets or outlets to the reservoir, which is controlled by a subsurface aqueduct system.

c. Evaluation

There were no geologic features (stratification, faults, cavities, etc.) detected or suspected that could be expected to affect the dam or its appurtenant structures adversely.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General

The reservoir and dam are located in a high-density, residential neighborhood of the West Bronx in New York City. We first drove the city streets around the perimeter of the dam and found that Goulden Avenue on the east and Reservoir Avenue on the south are at elevations higher than that of the reservoir. Figure 1 in Appendix D shows a Lehman College parking lot behind the eastern retaining wall of the dam. The parking lot is at the same elevation as Goulden Avenue, which borders the reservoir to the east (Refer to Plate I). Reservoir Avenue to the south rises in elevation from its intersection with Goulden Avenue and then merges with Sedgwick Avenue at the southwest corner of the reservoir. The southern side of Reservoir Avenue and the western side of Sedgwick Avenue are lined with multi-story apartment houses. As Sedgwick Avenue runs north from its intersection with Reservoir Avenue, it drops in grade so that its elevation along most of the western and northern side of the dam is below that of the reservoir (Figs. 2 and 3, Appendix D). The area immediately north of the reservoir contains many high-rise apartments, all of whose entrances are below the reservoir elevation (Refer to Overview Photo). Most of these are located on Sedgwick Avenue North and on Van Cortland Avenue, which runs steeply downhill to Van Cortland Park South (Refer to Plate II). In the event of failure, flow of water would occur to the north down Van Cortland Avenue.

As indicated previously, the area east of Goulden Avenue containing the schools and the railroad train yard was at one time the proposed "East Basin" of the reservoir. The DeWitt Clinton High School athletic field, south of the building, is approximately 20 feet below the grade of Goulden Avenue. The western retaining wall of that athletic field was inspected and found to be in generally good condition, with some minor cracks and spalls. There were weep holes in the wall, but no seepage from them or from the soil in the area of the athletic field was observed.

b. Dam

The inspection of the dam was performed by driving the perimeter roadway on the crest to various locations, and then walking the site in those areas.

In general, all earthen embankments were found to be grass covered and very well maintained (Figs. 2 and 3, Appendix D). No seepage was detected on or at the toe of the downstream slopes. A chain link fence, with barbed wire top in some areas, encircles the reservoir (Fig. 3, Appendix D). Along the western and northern portions of the perimeter, the fence is at or near the toe or toe wall of the embankment. There is a paved city street usually within 50 feet of the fence in these areas, and beyond that private residences. Consequently, no evidence of seepage beyond the toe could be observed.

The earthfill and core wall section at the northern end of the reservoir was inspected and found to be in generally good condition. No significant deterioration of the upstream concrete apron was observed; vegetative growth in some of the construction joints was noted (Fig. 4, Appendix D).

The embankment and retaining wall along the western perimeter were inspected and found to be in generally good condition. A number of small bushes were observed growing on the upstream face of the embankment along the western portion of the perimeter (Figs. 2 and 5, Appendix D). There was no evidence of seepage on the downstream slope or at the downstream toe wall.

All sections of retaining wall at the water's edge along the western, southern and eastern boundaries of the dam were of stone masonry construction and consisted of mortared, rock-faced, granite blocks with a surface-finished granite cap (Figs. 1 and 5, Appendix D). In all cases, the retaining walls were found to be in generally good condition and very well maintained.

c. Appurtenant Structures

As indicated in Section 1.2a, there are seven major appurtenant structures: Gate Houses Nos. 1, 5, 7, 2, 3, 6 and the Waste Weir between Gate House Nos. 2 and 3.

Gate House No. 1, which is located about 1 mile north of the damsite in Van Cortland Park, was not inspected since we were informed that it had been sealed shut to guard against vandalism. Although it contains

the gates that divert flow into the Jerome Park Branch of the New Croton Aqueduct, we saw no reason to have the seals broken and inspect the operating equipment. We were told that the gates were always left open to divert water towards the Jerome Park Reservoir, but that water flowing in the Jerome Park Branch of the aqueduct could be controlled at Gate House Nos. 7 and 5 and made to bypass the reservoir completely (Refer to Section 1.2h).

Inspection of Gate House No. 5 revealed that it contains all of the chlorination and flow monitoring equipment currently in use (Fig. 6, Appendix D). It also contains the gates and gate stands by which almost the entire operation of the reservoir can be controlled (Fig. 7, Appendix D). We requested that Mr. Kuse arrange to have all active and relevant gates operated. He informed us that five of the six gates that control flow to the south portal (inlet to the reservoir south of Gate House No. 5) could not be operated since the bronze "lock dogs" had been stolen. We were informed that these gates were ordinarily left in the open position and were in such a position on the day of the inspection. The one gate that was operational was raised and lowered with difficulty by two men working a long lever such as that shown on Figures 6 and 7.

The four gates controlling flow from Main Chamber No. 19 in Gate House No. 5 to Shaft No. 21 (Manhattan's water supply line) were inspected and observed to operate satisfactorily. They are driven by a portable electric motor mounted on a tripod (see Background in Fig. 7, Appendix D).

None of the other gates in Gate House No. 5 were operated since their opening or closure would not be required in the event that the reservoir needed to be lowered or in case bypass of aqueduct water was desired.

The physical condition of Gate House No. 5 was found to be generally satisfactory (Fig. 8, Appendix D). There was not much evidence of vandalism, although Mr. Kuse noted that broken windows were commonplace.

The viaduct leading from Gate House No. 5 to Shaft No. 21 was inspected and found to be in satisfactory condition (Figs. 8 and 9, Appendix D).

The next appurtenant structure to be inspected was Gate House No. 7. It was found to be in generally good condition; some of the windows had been boarded up because of vandalism. The four gates (Rodney

Hunt) in the east bay of Gate House No. 7 were operated manually by a transferable crank handle that attached to the gate stems. Operation was performed easily by one man. A concrete boat ramp just south of Gate House No. 7 was also inspected and found to be in generally good condition.

Gate House Nos. 2 and 3 were visited; however, both of these had been "sealed" in order to protect the operating equipment inside from being vandalized. Sealing of a gate house consists of bricking up the windows and welding flexible steel doors shut. Figure 10 shows Gate House No. 3 in the sealed condition. We were informed that, under normal operation, the gates in Gate House Nos. 2 and 3 are left full open to draw water from the reservoir into the two 48-inch diameter pipes that lead to Gate House No. 5. Control of this flow is accomplished by gates in Gate House No. 5, as explained previously. We were also informed that, should an emergency situation arise that required the gates in Gate House Nos. 2 and/or 3 to be shut, the gate house structures could be "unsealed" in a short time (approximately 15 minutes). This inconvenience was deemed preferable to having gate stands smashed and chamber grills displaced and thrown into chambers by vandals as had been done previously. It is apparent in Figure 10 from the missing bricks on the parapet and corner face of Gate House No. 3, that vandalism is an acute problem.

The exposed portion of the waste weir was inspected and found to be in generally good condition (Fig. 11, Appendix D). Here again, the top grill had been replaced by steel plates welded to the grill mounts because of past experience with vandalism. Water was heard flowing over the waste weir; flowing water could also be observed through joints between the steel cover plates. From field observation and from a review of the design drawings, it seemed that if the weir structure should fail, water from the reservoir would flow freely into the Broadway Sewer.

The last structure to be inspected was Gate House No. 6. It too appeared to be in generally good physical condition. The microstraining equipment inside the building had not been in use for some time and was moderately rusted. We were informed that gates in Gate House No. 6, which would allow direct flow of water from the reservoir into the South Bronx distribution system, were shut and had not been used in at least 3 years.

The roadway that extends around the perimeter of the dam at about elevation 140.1 appeared to be in generally good condition. Occasional cracks (Fig. 5, Appendix D) were observed in the paved sections of the roadway on the northern, western and southern perimeter; however, inspection of the embankment near the cracks revealed that they were not due to movement or cracking of the embankment, but were probably the result of expansion or vehicular stress. The southern portion of the perimeter roadway is unpaved (Fig. 12, Appendix D); it is easily passable, although there is tall vegetative growth on its sides (Figs. 1 and 12, Appendix D).

A small section of the chain link fence surrounding the reservoir was missing along the eastern perimeter on the day of the inspection. We were informed by NYCDWRBWS personnel that breaches such as this were commonplace and that the one observed had not been there the previous day. It became apparent during the inspection and from conversations with Messrs Ragucci and Kuse that security measures in effect at the reservoir were not totally effective. We were informed that four trespassers had drowned in the reservoir in the past two years. On the day of the inspection, joggers (trespassers) were observed within the compound (Figs. 2 and 3, Appendix D).

d. Foundation

The foundation of the Jerome Park Reservoir Dam was not visible.

e. Reservoir Area

The reservoir area is limited to the pool itself and the dam structure. The area surrounding the reservoir immediately beyond the embankments is highly urbanized so that there is virtually no local watershed. The grass on the embankments is very well maintained and in general other features of the reservoir area (fences, toe walls, sidewalks, etc.) are kept in good repair.

f. Downstream Channel

The downstream channels are the potable water supply systems for Manhattan and the South and East Bronx, and the Broadway Sewer which empties into the Harlem River. None of these structures could be observed.

g. Evaluation

The subject dam and its appurtenant structures are in generally good condition and, with continued maintenance, can be expected to function satisfactorily under normal operating conditions. There was nothing observed at the time of the inspection to indicate that the dam is unsafe. Vandalism has been a problem, but now that all of the unattended gate houses have been "sealed", it is expected that damage due to vandals will be only superficial.

SECTION 4

OPERATIONAL PROCEDURES

4.1 Procedures

Mr. George Kuse, caretaker of the Jerome Park facility, described the operational procedures to us. He indicated that major control of the inflow was accomplished at the Croton Reservoir at the head of the New Croton Aqueduct. The procedures normally followed for more precise control of inflow and outflow were described in Section 1.2h. Operators followed those procedures to increase or decrease outflow in response to demand.

Mr. Bronstein, an engineer with NYCDWRBWS, provided us with a copy of the "Procedure to Isolate Jerome Park Reservoir from Distribution System" (Refer to Appendix E). This procedure would be used if the water level in the reservoir was to be maintained and if the distribution system were to be fed directly by the aqueduct without treatment of the water.

Mr. Kuse described to us a procedure that could be used to drain the reservoir. The Jerome Park Branch of the Aqueduct would be cut off either at the Croton Reservoir or at the diversion gates in Gate House No. 1. The four gates in Gate House No. 5 controlling flow from Gate House Nos. 2 and 3 and the two gates on the drop well inlet on Gate House No. 5 would be set at full open. The aqueduct take off gates (four in Gate House No. 7 and six in Gate House No. 5) would be closed. Actually, they could be left open if the aqueduct were entirely cut off. The four gates leading to Shaft No. 21 and the two gates leading to the Bronx distribution system in Gate House No. 5 would be set at full open. If this procedure were followed, it was reported that the reservoir could be completely drained within six days.

4.2 Maintenance of Dam

The dam appears to be well maintained; grass on embankment slopes is properly trimmed. Steps are being taken to tighten security and minimize serious damage to the dam, its appurtenant structures and its operating facilities by vandalism.

4.3 Maintenance of Operating Facilities

The operating facilities are in generally good condition. The only exception noted was that the "lock dogs" on five out of six gate controls in Gate House No. 5 were missing. These gates are important in that they control flow from the aqueduct to the reservoir via the south portal.

4.4 Warning Systems in Effect

The general condition of the dam and its appurtenant structures are checked periodically as part of the normal security measures. In case of an emergency, the police reportedly would call the Bureau of Water Supply, although the local police precinct has never been formally advised to do so. If the City Complaint Department Number or emergency number (911) were called, we were advised that appropriate personnel in the Bureau of Water Supply would be called, and cognizant personnel of that agency can be reached at any time during the day or night. Mr. Kuse, the caretaker, lives nearby and would be available on a 24-hour basis.

All gates that are normally used are easily accessible. Even those gates that are in "sealed" gate houses can be reached within 15 to 20 minutes. The main control of inflow to the Jerome Park Reservoir is accomplished by electrically driven gates at the Croton Reservoir end of the New Croton Aqueduct. In case of emergency, operators of the facility at Croton can reportedly be reached by telephone or by radio from Jerome Park.

4.5 Evaluation

Maintenance of the dam and its operating facilities, except for the one exception noted above, appears to be satisfactory. The emergency alert system in effect seems to be adequate, although we were not shown a written emergency warning procedure.

SECTION 5

HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Hydraulic Features

a. Design Data

The dimensions of all gates, chambers, weirs and connecting conduits are found on, or can be scaled from, Plates II through XI. A detailed drawing of a typical sluice gate and lifting apparatus is presented in Plate XII. There are no data or computations available on the hydraulic performance of any of the inlet or outlet structures. Flow computations performed as part of this study are found in Appendix C.

b. Experience Data

System inflow and outflow data are available as indicated in Section 1.2h and as presented in Appendix E.

Rating data for individual elements of the system are not available. Since inflow and outflow are carefully controlled, the concept of maximum recorded flow has little meaning.

c. Visual Observations

Under normal operating conditions, as was the case on the day of the inspection, water fills all chambers and none of the gates or inlet and outlet structures are visible. Consequently, none of the hydraulic features of the dam and its operating facilities could be observed directly.

5.2 Evaluation of Hydrologic Features

As indicated previously, the Jerome Park Reservoir is a controlled inflow and outflow reservoir that has virtually no watershed of its own. Since it can be isolated from the source of inflow, it is not in danger of being overtopped. Similarly, its waste weir is adequate to discharge an inflow of approximately 200 cfs if the reservoir is completely isolated from the distribution system. This would be more than enough to handle any runoff from the embankments. In these respects it has no hydrologic features that need to be evaluated as part of this study.

SECTION 6

STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual observations of the earthfill embankment and retaining wall/earthen back slope sections of the dam did not disclose any signs of structural instabilities or potential dangerous conditions such as seepage. The vertical and horizontal alignments of the embankment and the retaining wall sections appeared to have been maintained as evidenced by the lack of vertical and horizontal offset in the paved road around most of the perimeter. The condition of all concrete structures was generally good; there were no cracks in buildings, walls, concrete aprons, etc., to indicate foundation failure.

b. Design and Construction Data

No design computations or construction data relating directly to stability were available for review. Since no information was available regarding the nature of the embankment materials or their engineering properties, neither stability nor seepage analyses could be performed as part of this study.

A review of the design drawings and pictures taken during construction suggests that stability should not be a problem. All retaining walls are founded either in rock or in hardpan; embankments were constructed or cut at shallower than conventionally designed slopes. The earth fill section contains a concrete corewall founded in rock; construction photos show that the wall was built.

c. Operating Records

None available.

d. Post Construction Changes

No major structural changes have been made to the dam structure since its completion in 1907.

The superstructures of all gate houses were reconstructed in the 1930s and some modifications (micro-strainer installation) were made to Gate House No. 6 in the 1960s.

The reservoir was also drained and cleaned in the mid-1960s and the concrete lining and aprons repaired.

None of these post construction changes appear to have affected the stability of the dam structure in any way.

e. Seismic Stability

The Jerome Park Reservoir is nominally located in Seismic Risk Zone 1 according to the Algermissen Seismic Risk Map. Although earthquakes that cause minor damage can be expected to occur in this zone, the design and construction practices conventionally used for small earth dams are considered to be adequate in areas of low seismicity and the safety factors used for static conditions should preclude major damage for all but the most catastrophic earthquakes. However, no computations were performed to evaluate the effect of earthquakes on the subject dam.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Safety

Visual inspection of the system and a review of the design drawings indicate that the dam, its appurtenant structures, and its operating facilities are in generally good condition and functioning satisfactorily at this time.

Because the reservoir has a large excess storage capacity and virtually no watershed of its own, and because of the controlled nature of the inflow and outflow that enables the reservoir to be isolated from the supply and/or distribution systems, the waste weir is considered adequate to handle even the most severe local storms. (Refer to hydraulic/hydrologic computations in Appendix C.) For the same reasons, the concepts of Probable Maximum Flood (PMF) and Spillway Design Flood (SDF) do not seem applicable in this case for use as screening criteria for spillway adequacy.

b. Adequacy of Information

The information available to us was not adequate for a detailed analysis of the stability of the various dam sections. The safety assessment made above is based primarily upon visual observations of the structure on the day of the inspection and from the design drawings which indicate that the dam appears to have been designed according to conventional engineering practice (reasonable cut and fill slopes, cutoff wall in embankment, concrete liner and aprons, foundations to rock, etc.).

No hydrologic data were available; however, as indicated above, because of the nature of the dam, none were needed.

c. Urgency

Because no major deficiencies were detected in either the physical condition of the dam and its appurtenant structures or in the operations and maintenance programs, there is no urgency in performing the minor repairs recommended below.

d. Necessity for Further Investigations

There is no necessity for further investigations.

e. Recommendations and Remedial Measures

1. Alterations/Repairs

(a) "Lock dogs" should be provided; they were missing on the five gate stems controlling flow to the south portal inlet in Gate House No. 5.

(b) Loose or missing bricks on vandalized gate houses should be repaired.

(c) The low woody growth on the upstream face of the dam should be removed before its roots penetrate the embankment too deeply.

(d) Vegetative growth in the concrete apron joints should be removed and the joints recaulked, if necessary.

(e) Breaches of the chain link fence should be repaired.

The remedial work recommended above is not critical in terms of urgency. It should be done as soon as practicable, but preferably within the next three years.

2. Operations and Maintenance Programs

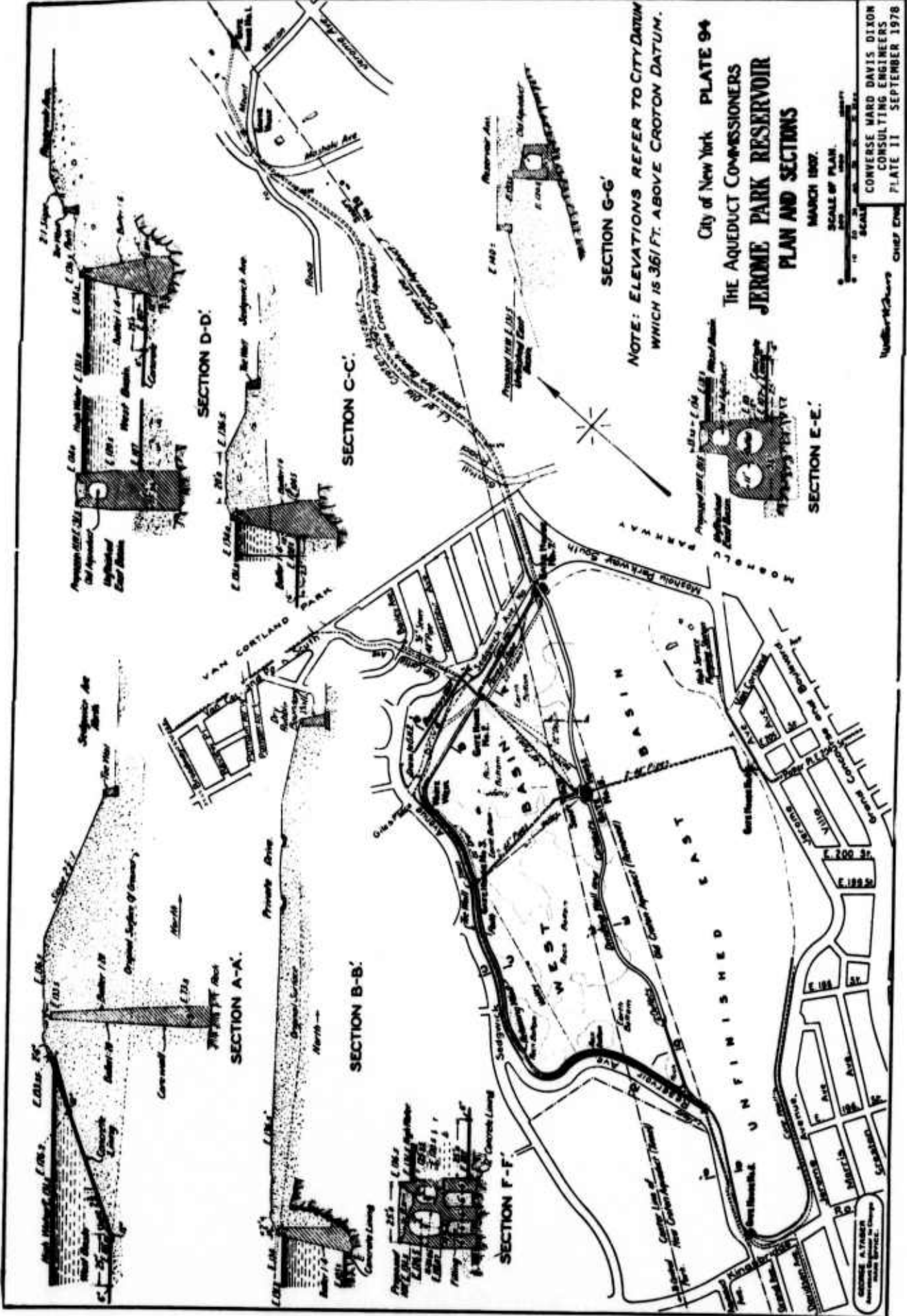
The operations and maintenance programs currently in effect seem to be satisfactory in general. Additional security measures are desirable to diminish the opportunity for vandalism and trespassing in general. A formal, chain-of-command, emergency warning procedure should be drawn up and presented to the police at the local precinct house, the city uniform complaint number, and the city uniform emergency number.



SCALE 1"=2000'

MAP SOURCE: BASE MAP WAS ADAPTED FROM U.S. GEOLOGICAL SURVEY MAPS, YONKERS, N.J.-N.Y. QUADRANGLE, 1956 AND CENTRAL PARK, N.Y.-N.J. QUADRANGLE, 1966, BOTH 7.5 MINUTE SERIES. (BASE MAP MAY NOT REFLECT RECENT CARTOGRAPHIC CHANGES).

PLATE I SITE LOCATION MAP



NOTE: ELEVATIONS REFER TO CITY DATUM WHICH IS 361 FT. ABOVE CROTON DATUM.

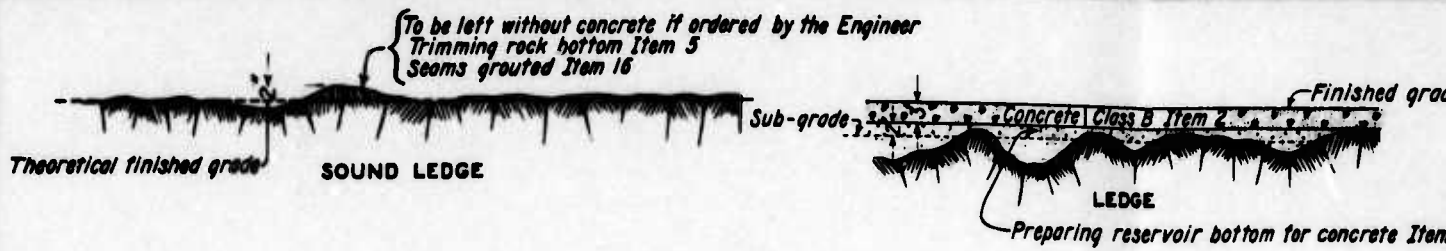
City of New York PLATE 94
 THE AQUEDUCT COMMISSIONERS
 JEROME PARK RESERVOIR
 PLAN AND SECTIONS

MARCH 1907.

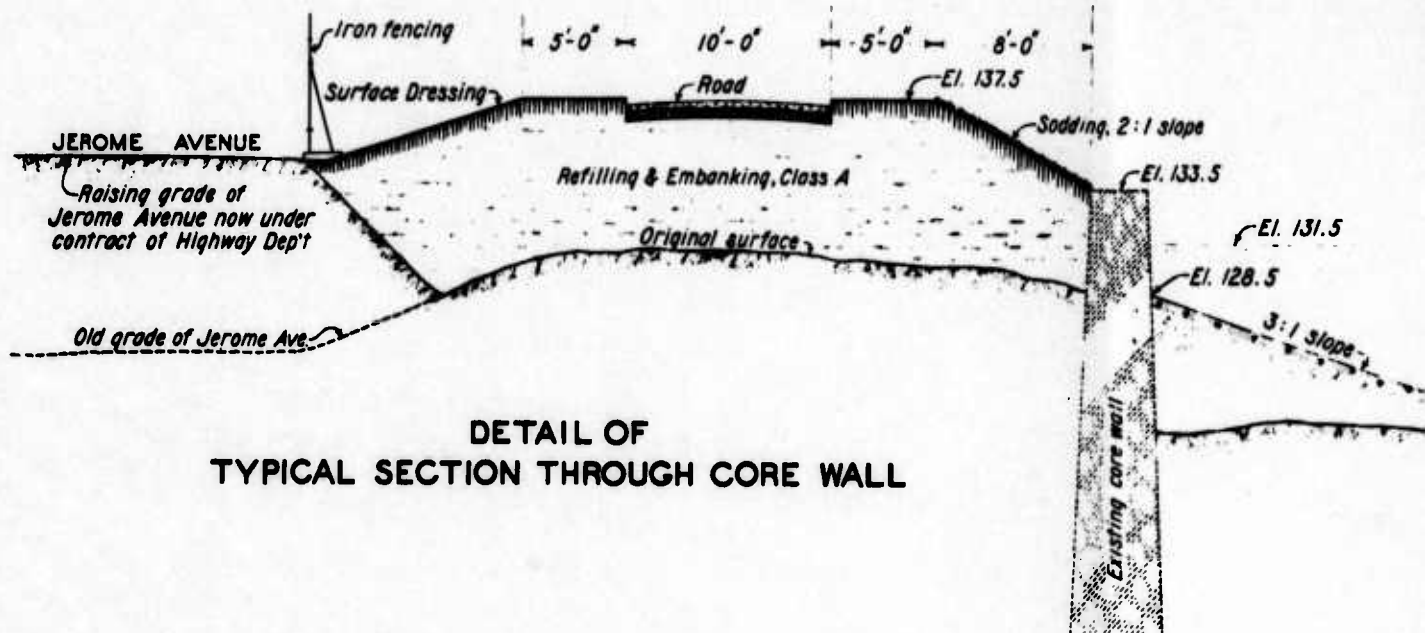
SCALE OF PLAN
 1" = 100'
 SCALE OF SECTIONS
 1" = 10'

CONVERSE HARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE II SEPTEMBER 1978

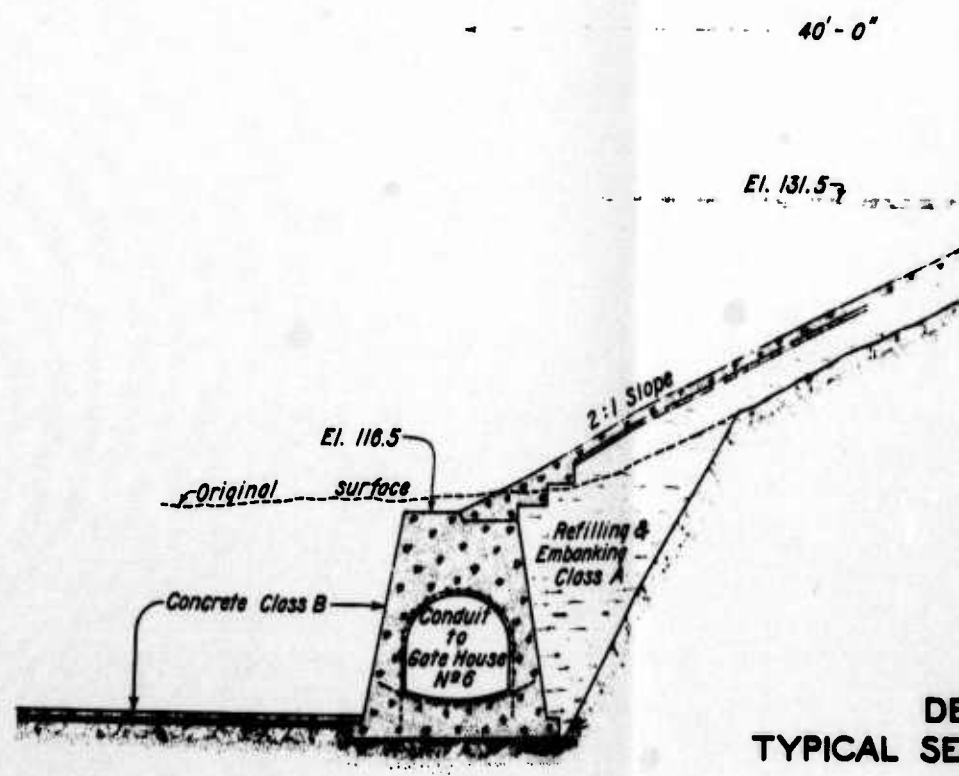
Numbered Sections
 CHIEF ENGINEER



TYPES OF FINISH

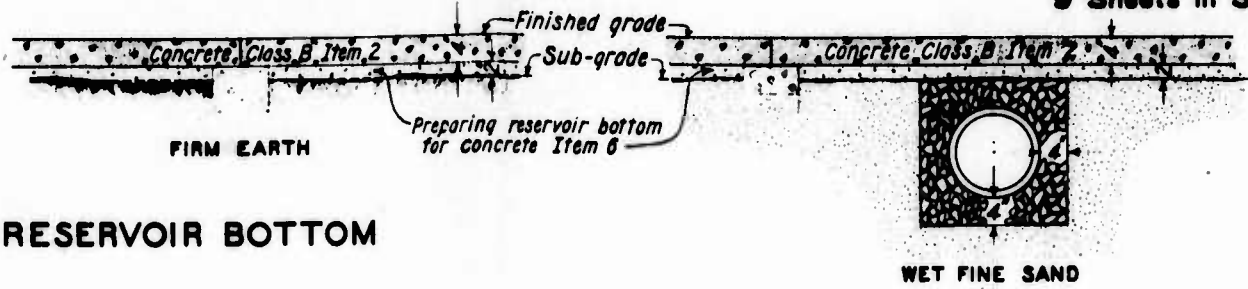


DETAIL OF
 TYPICAL SECTION THROUGH CORE WALL

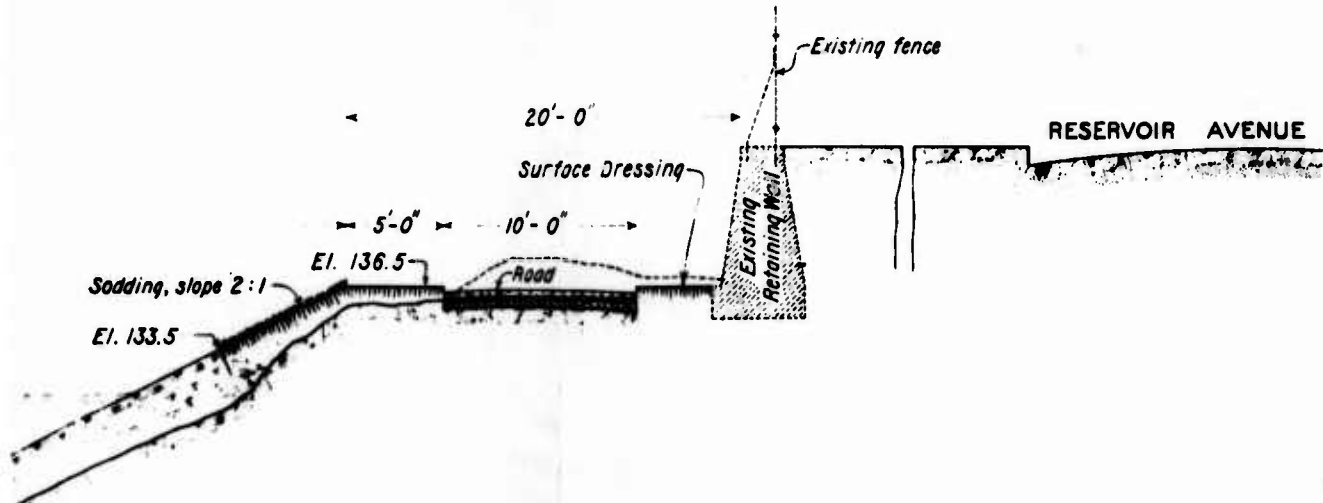
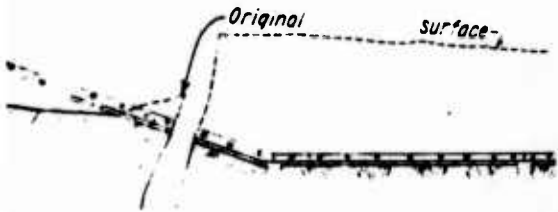


DE
 TYPICAL SE

Drawn by
 Traced by F.G.L.
 Checked by



RESERVOIR BOTTOM



DETAIL OF SECTION NEAR A-A

CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 BOROUGH OF MANHATTAN AND THE BRONX
CONTRACT DRAWINGS
 FOR
 COMPLETING THE EASTERLY BASIN
 OF THE
JEROME PARK RESERVOIR
LINING AND EMBANKMENTS

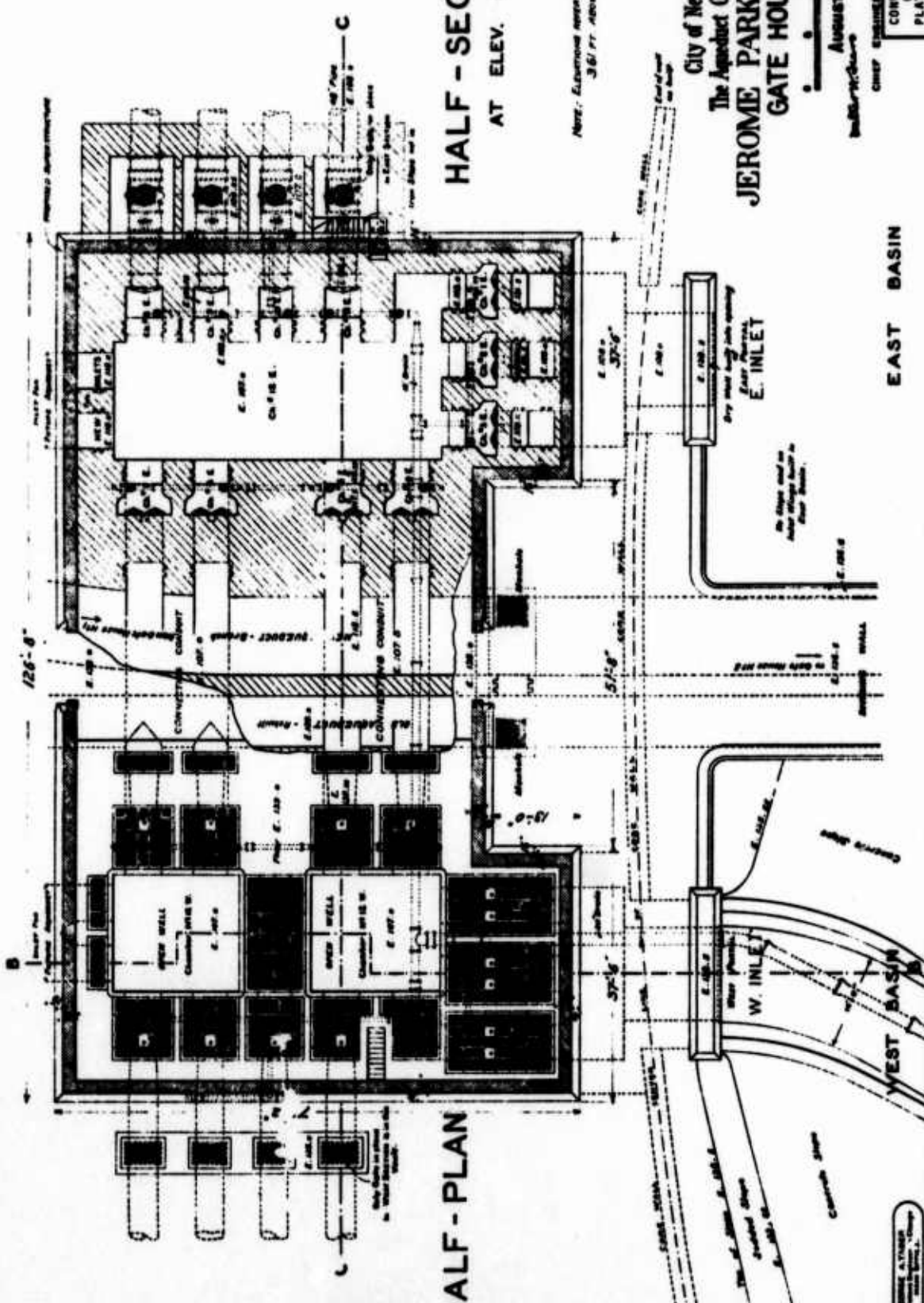
10123 FT.

OCT. 1910

Assistant Engineer

CONVERSE WARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE III SEPTEMBER 1978

Chief Engineer



HALF - PLAN

HALF - SECTION

AT ELEV. 131.5

NOTE: Elevation refers to City Datum which is 3.61 FT. ABOVE CHAMBER DATUM

CITY of New York PLATE 110
 The Appraiser Commissioners
JEROME PARK RESERVOIR
GATE HOUSE No 7

August, 1907
 Scale: 1" = 10' - 0"

CHIEF ENGINEER

CONVERSE WARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE IV - SEPTEMBER 1978

EAST BASIN

WEST BASIN

E. INLET

W. INLET



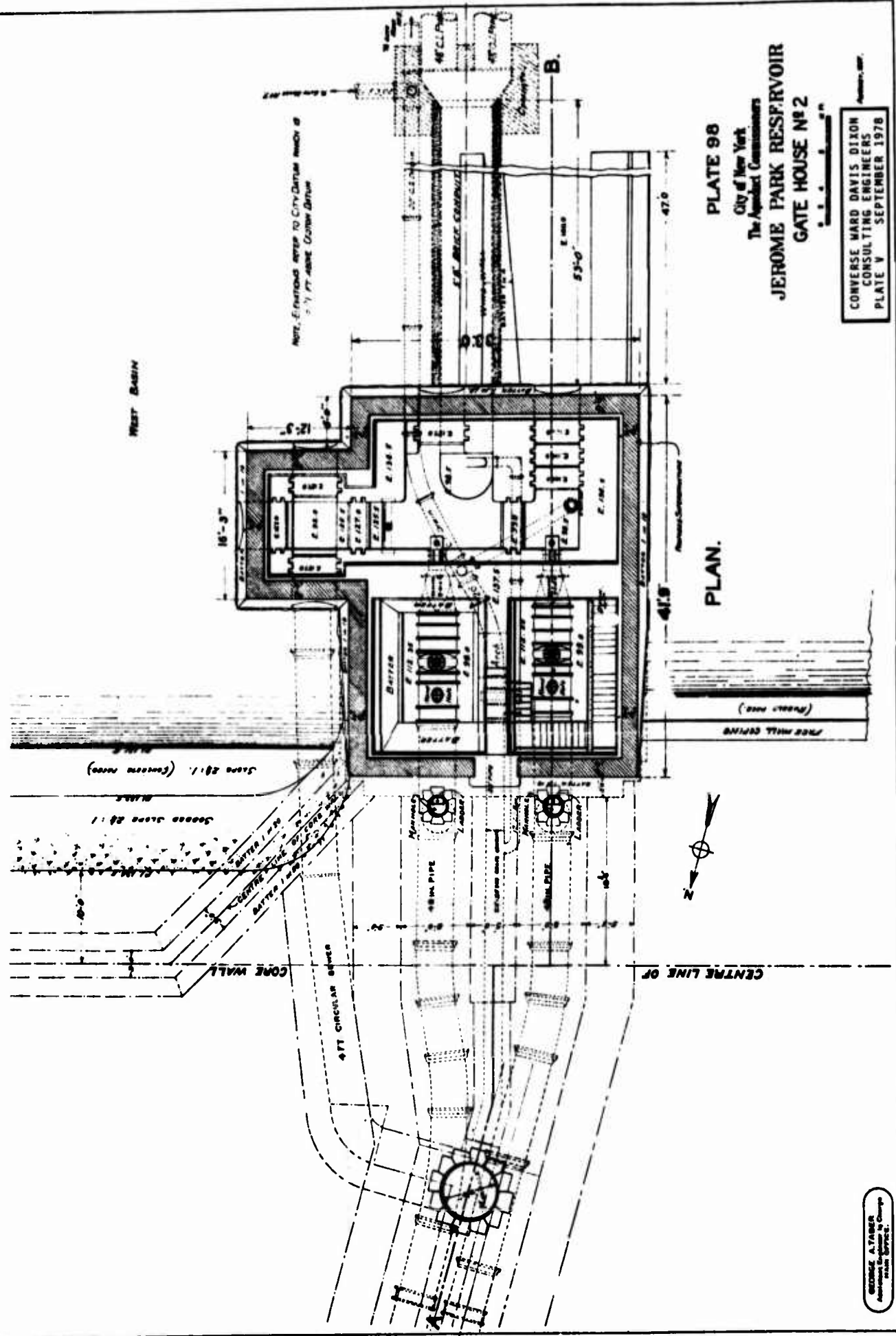


PLATE 98

City of New York
The Board of Commissioners
JEROME PARK RESERVOIR
GATE HOUSE NO. 2

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE V SEPTEMBER 1978

PLAN.

GEORGE A. TAYLOR
Architect & Engineer in Charge
1978

NOTE: ELEVATIONS REFER TO CITY DATUM WHICH IS 3.61 FEET ABOVE CURRENT DATUM.

EAST BASIN.
(Refurbished)

C:
New Approach Branch at 118.27
to Gate House No 7

A:
Inlet Chamber No 28
E. 118.5

WEST BASIN.

HORIZONTAL SECTION AT I-K.

GEORGE ALABARA
Consulting Engineer
100 West 42nd Street
New York 36, N.Y.

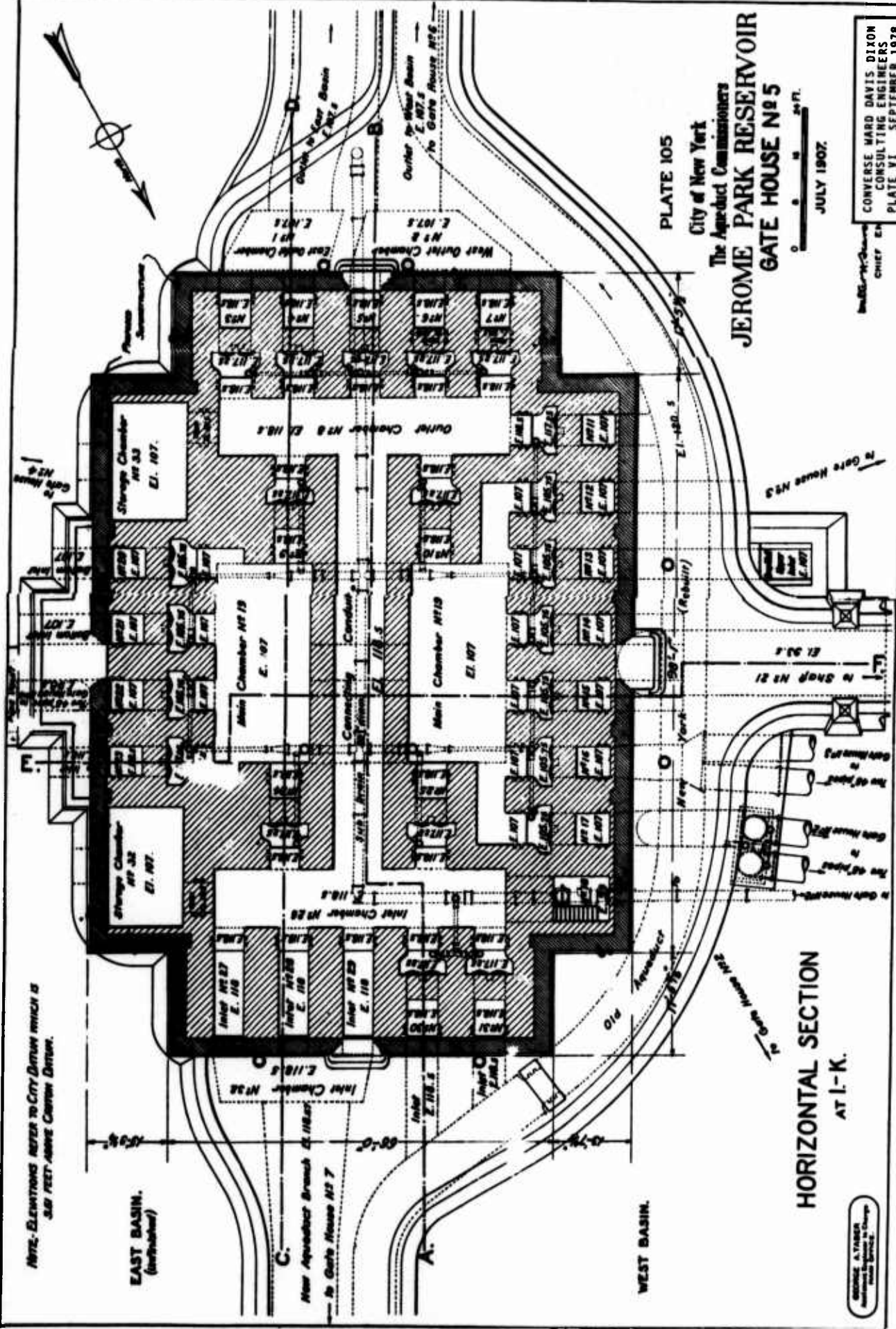


PLATE 105

City of New York
The Board of Commissioners
JEROME PARK RESERVOIR
GATE HOUSE NO 5

JULY 1907.

CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE VI SEPTEMBER 1978

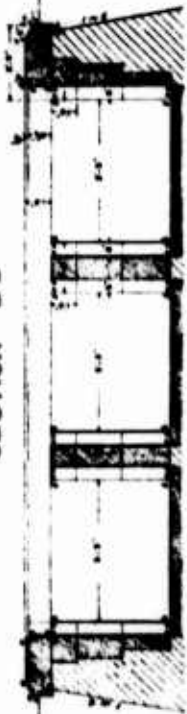
CHIEF ENGR.

THE AQUEDUCT COMMISSIONERS

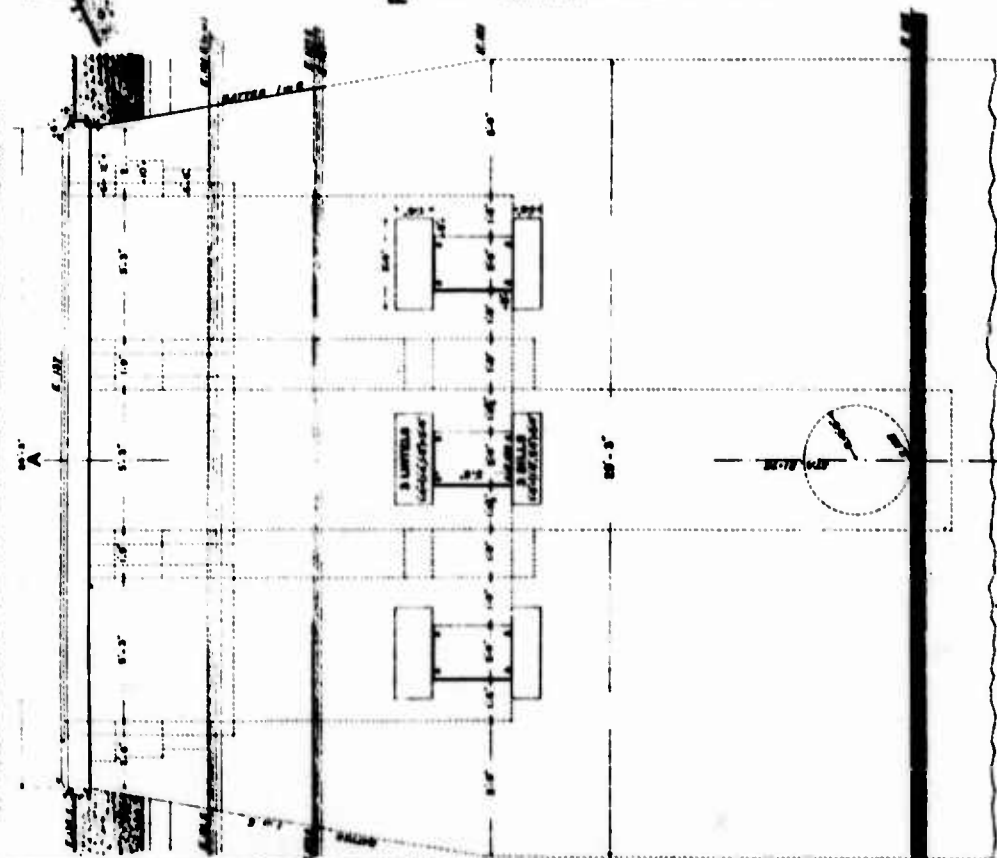
PLATE 113

JEROME PARK RESERVOIR
WASTE WEIR OR SPILLWAY
FOR
WEST SIDE OF RESERVOIR

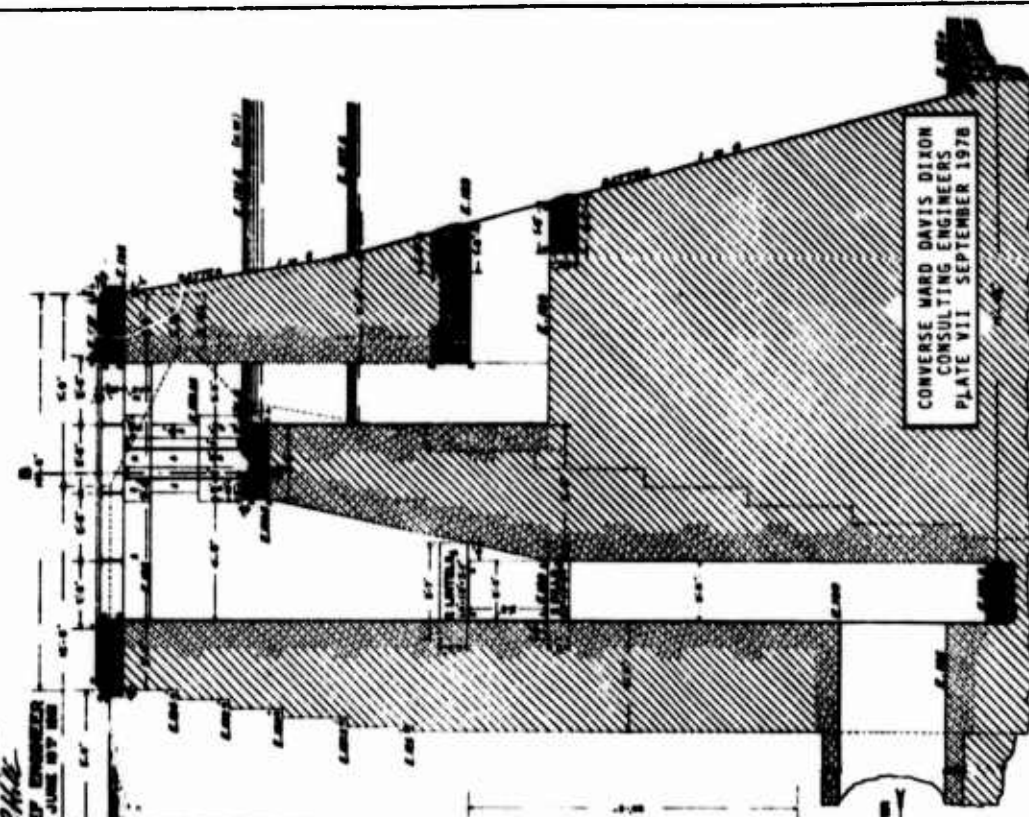
SECTION B B



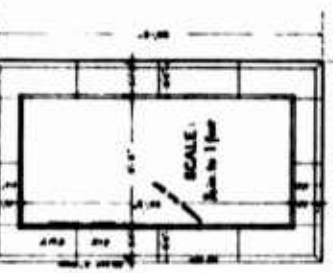
SCALE
CHIEF ENGINEER
JUNE 27, 1928



FRONT ELEVATION



PLAN OF TOP COURSE

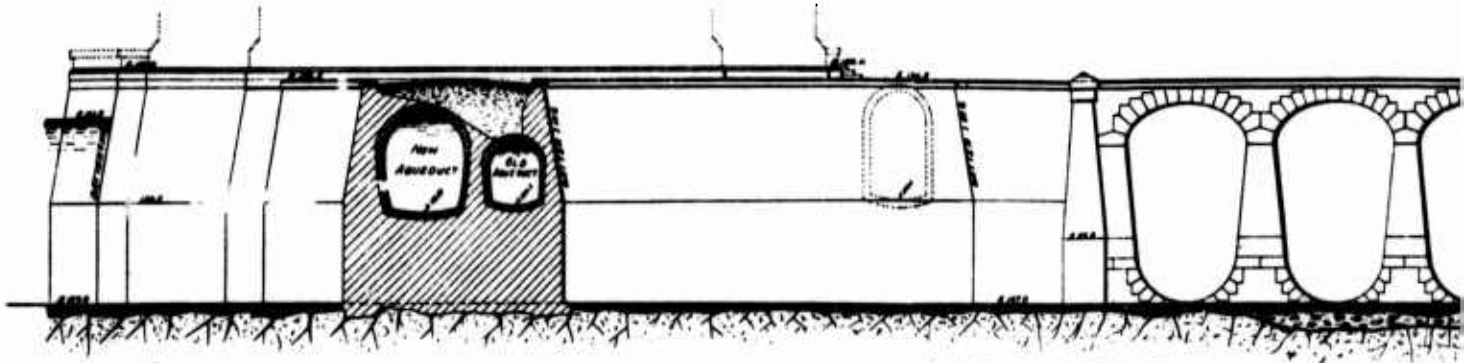


CONVERSE WARD DAVIS DIXON
CONSULTING ENGINEERS
PLATE VII - SEPTEMBER 1978

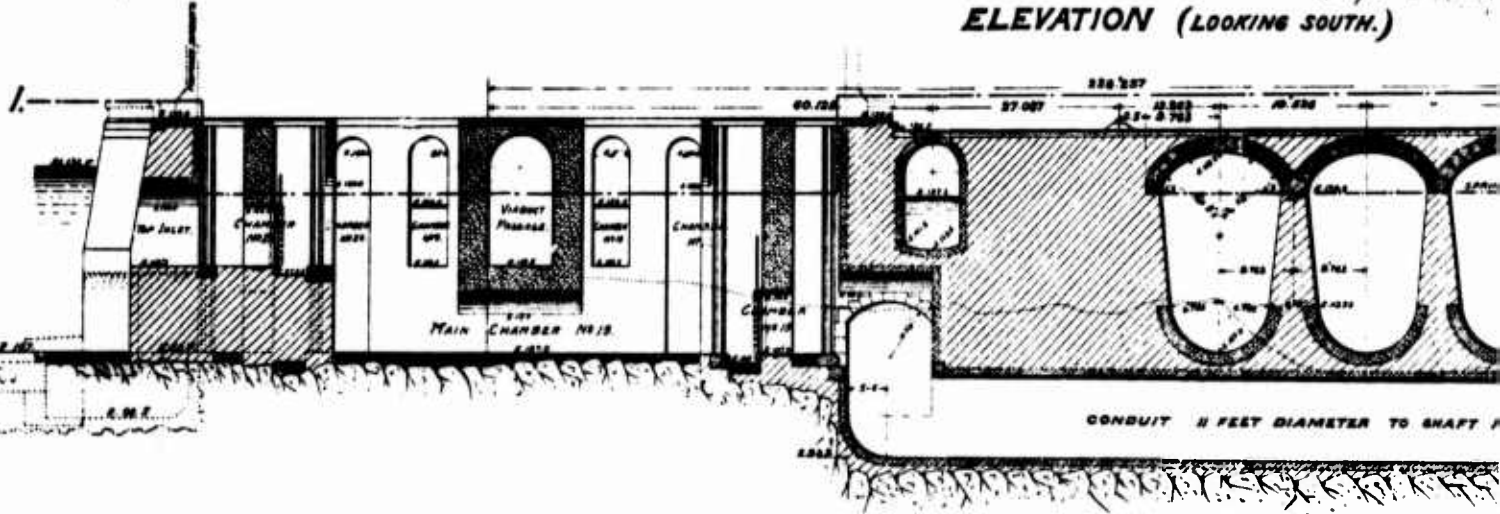
C.W. Davis
1878-1978

SECTION AA
AT STA. 110+78

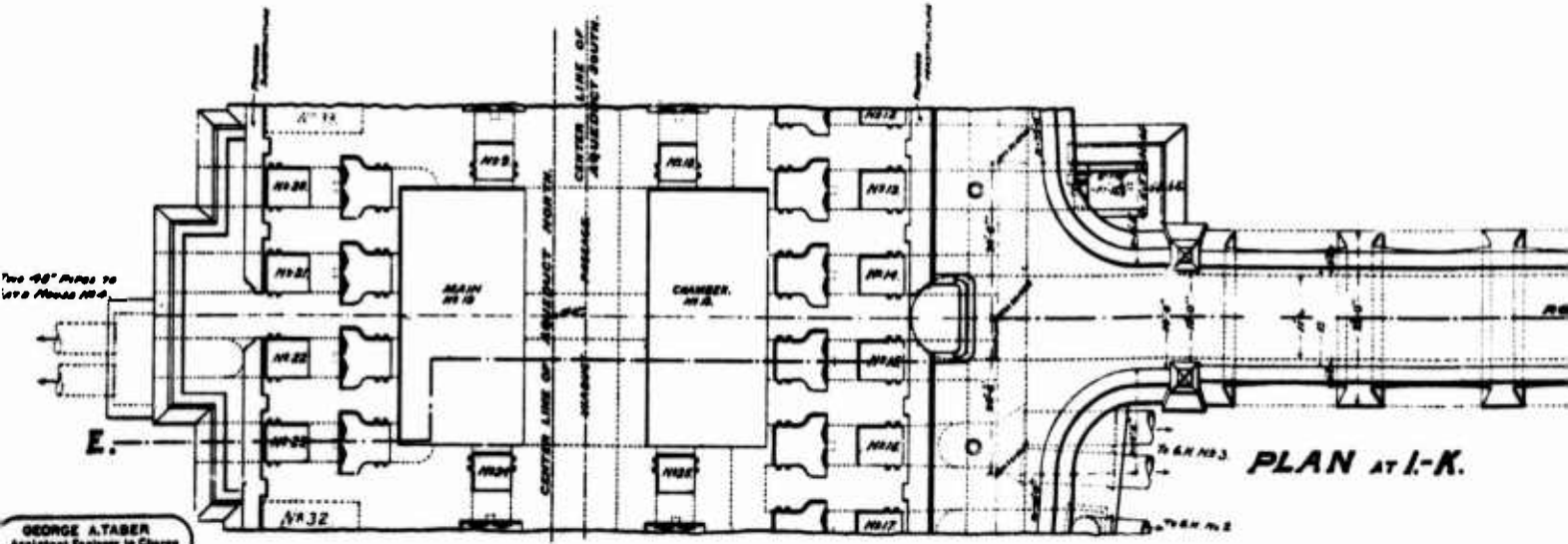
1



ELEVATION (LOOKING SOUTH.)

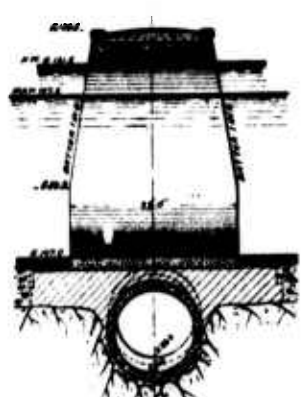
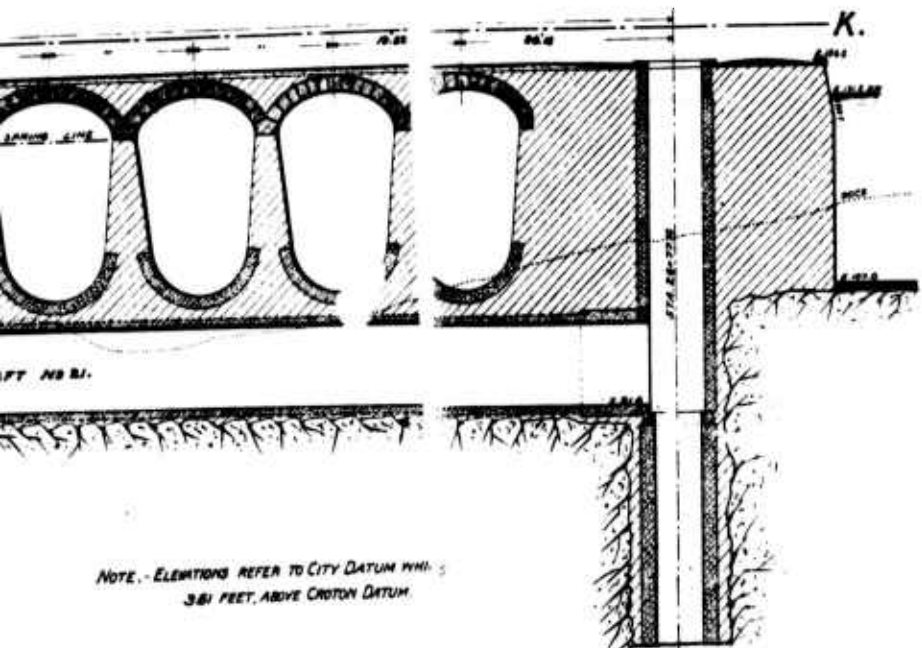
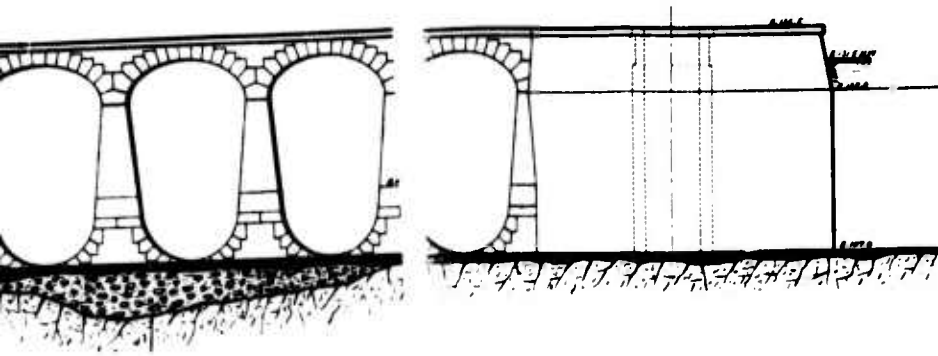


LONGITUDINAL SECTION E-F.



PLAN AT I-K.

GEORGE A. TABER
 Assistant Engineer in Charge
 MAIN OFFICE.



CROSS SECTION G-H.

NOTE. - ELEVATIONS REFER TO CITY DATUM WHICH IS 3.61 FEET ABOVE CROTON DATUM.

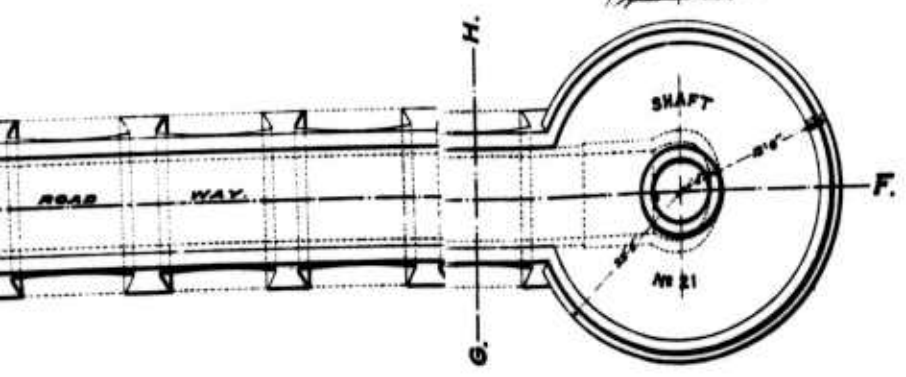
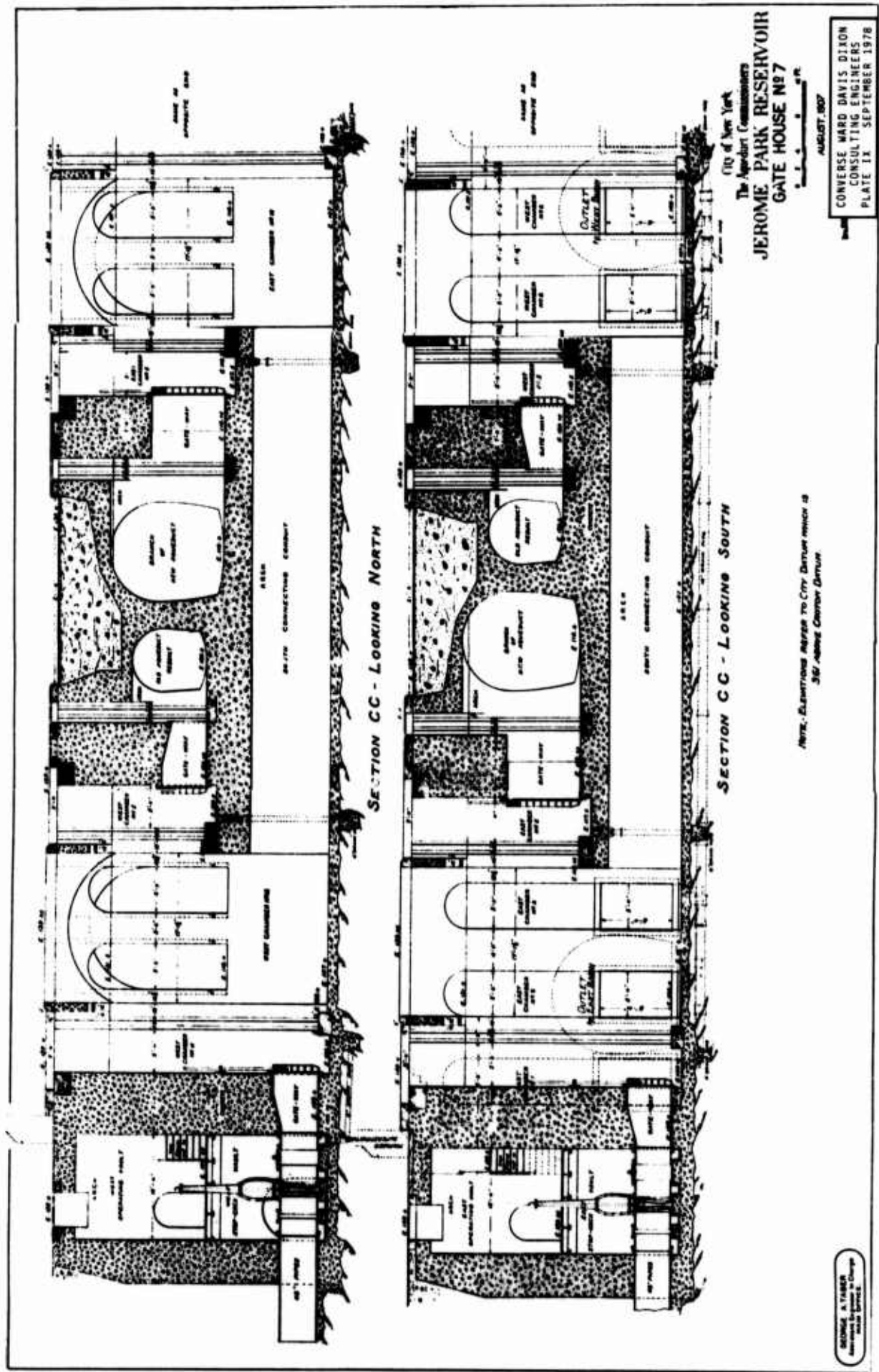


PLATE 107
 City of New York
 The Aqueduct Commissioners.
JEROME PARK RESERVOIR
GATE HOUSE No 5.

CHIEF ENGINEER

JULY, 1907

CONVERSE WARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE VIII SEPTEMBER 1978



City of New York
 The Board of Commissioners
JEROME PARK RESERVOIR
GATE HOUSE NO. 7
 AUGUST, 1907

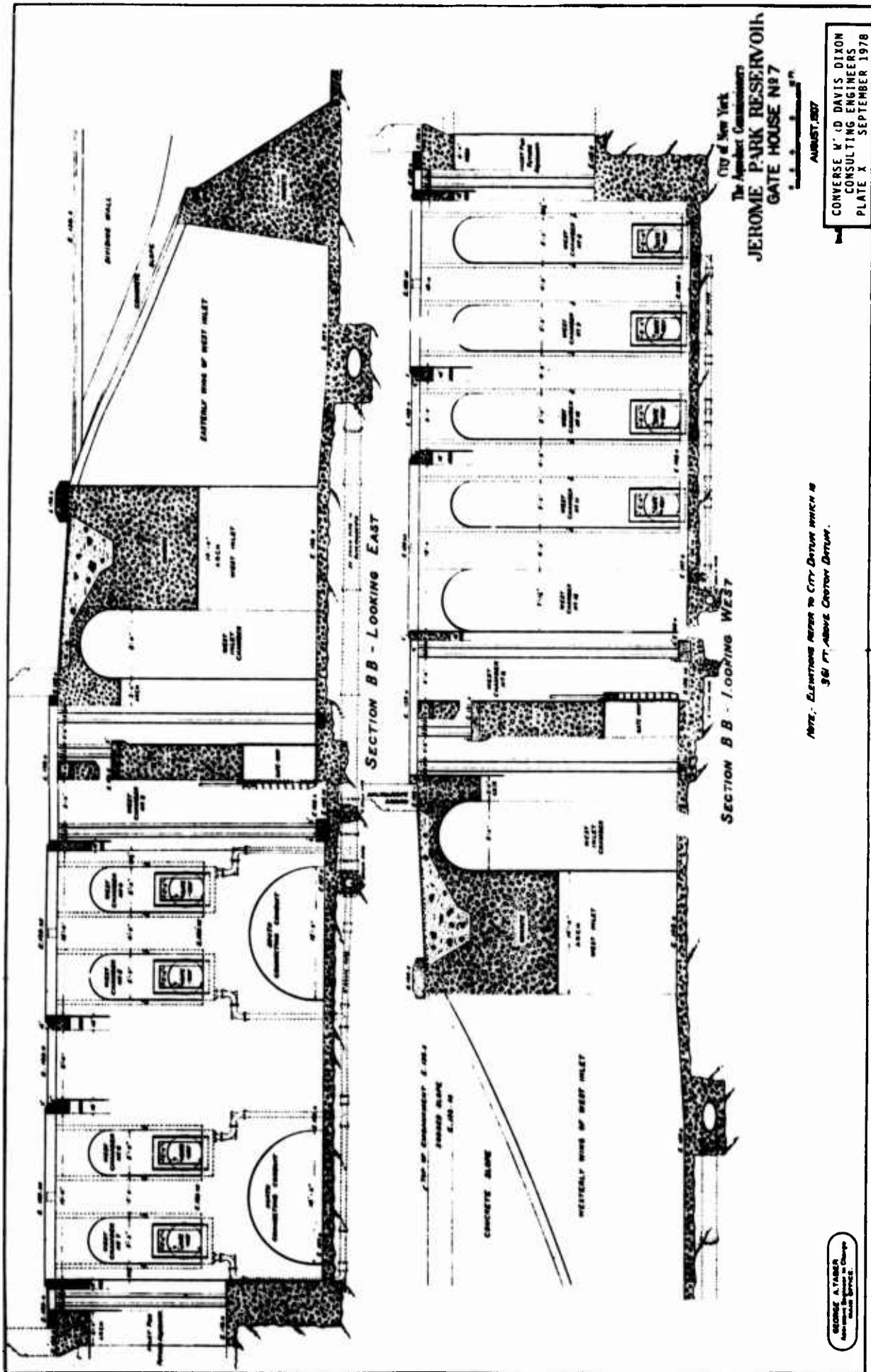
CONVERSE WARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE IX - SEPTEMBER 1978

SECTION CC - LOOKING NORTH

SECTION CC - LOOKING SOUTH

NOTE: Elevations agree to City Datum unless so
 noted. See General Notes.

ENGINEER
 ARCHITECT



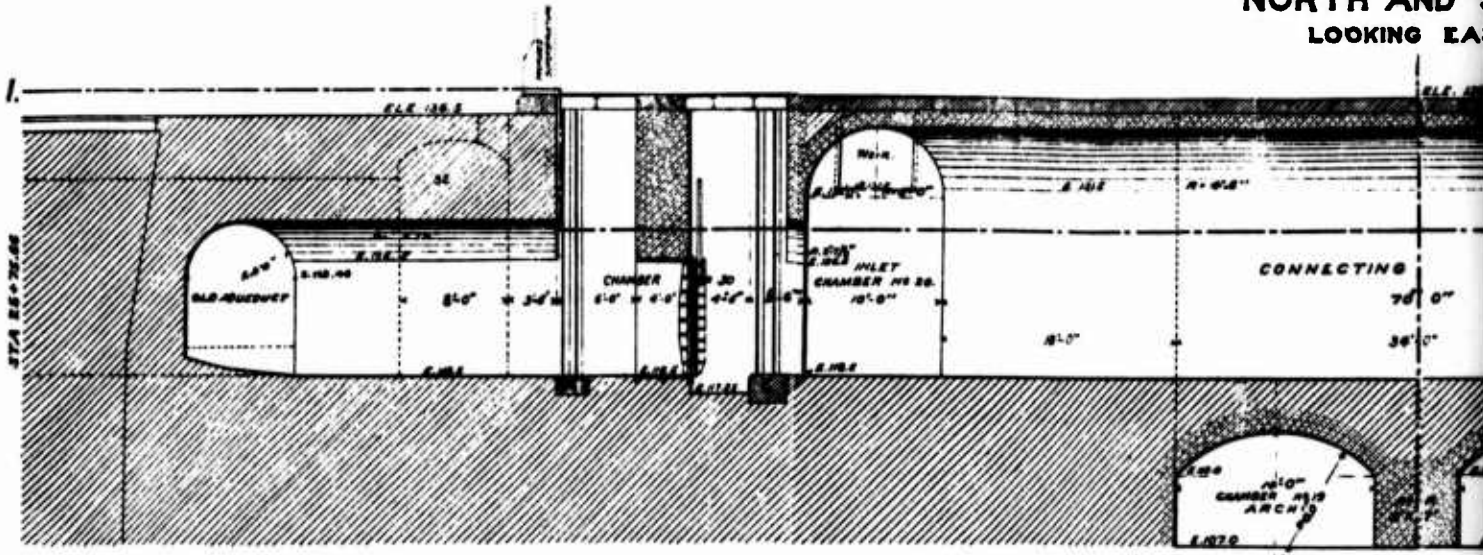
CITY of New York
 The Board of Commissioners
JEROME PARK RESERVOIR
GATE HOUSE NO. 7
 AUGUST, 1927

CONVERSE W. & DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE X - SEPTEMBER 1978

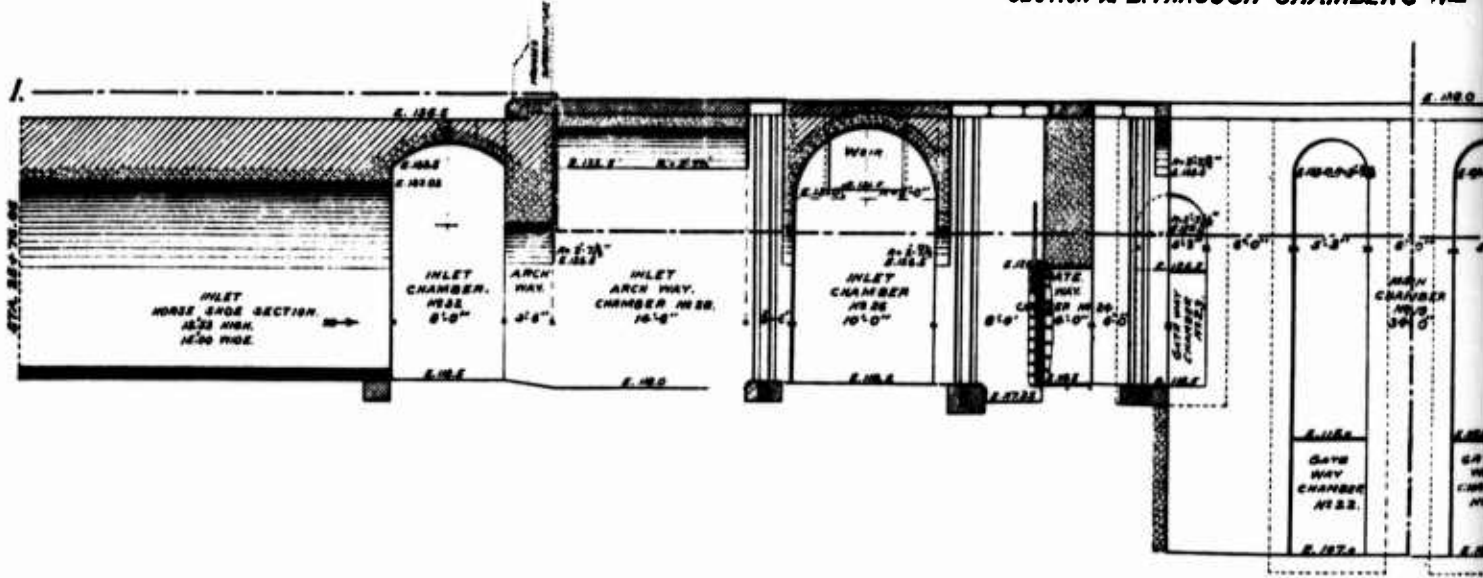
NOTE: ELEVATIONS REFER TO CITY DATUM WHICH IS
 361 FT. ABOVE CANTON DATUM.

GEORGE A. TABER
 Mechanical Engineer

**SECTIONS
NORTH AND
LOOKING EAST**



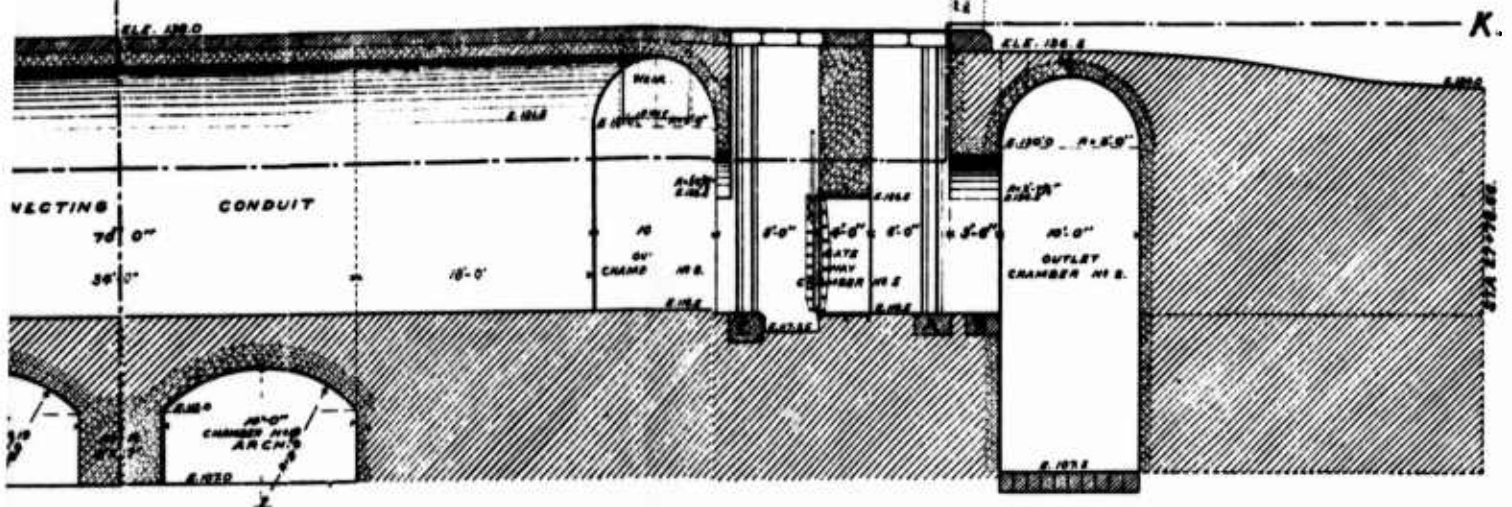
SECTION A-B. THROUGH CHAMBER'S NO. 28.



SECTION C-D. THROUGH INLET, CHAMBER'S NO. 28.

DRGE A. TABER
 Civil Engineer in Charge
 MAIN OFFICE.

SECTIONS
TH AND SOUTH.
LOOKING EAST.



CHAMBER'S NOS. - 30 - 26 - 19 - 8 - 5 AND 2.

NOTE.- ELEVATIONS REFER TO CITY DATUM WHICH IS
3.61 FT. ABOVE CROTON DATUM

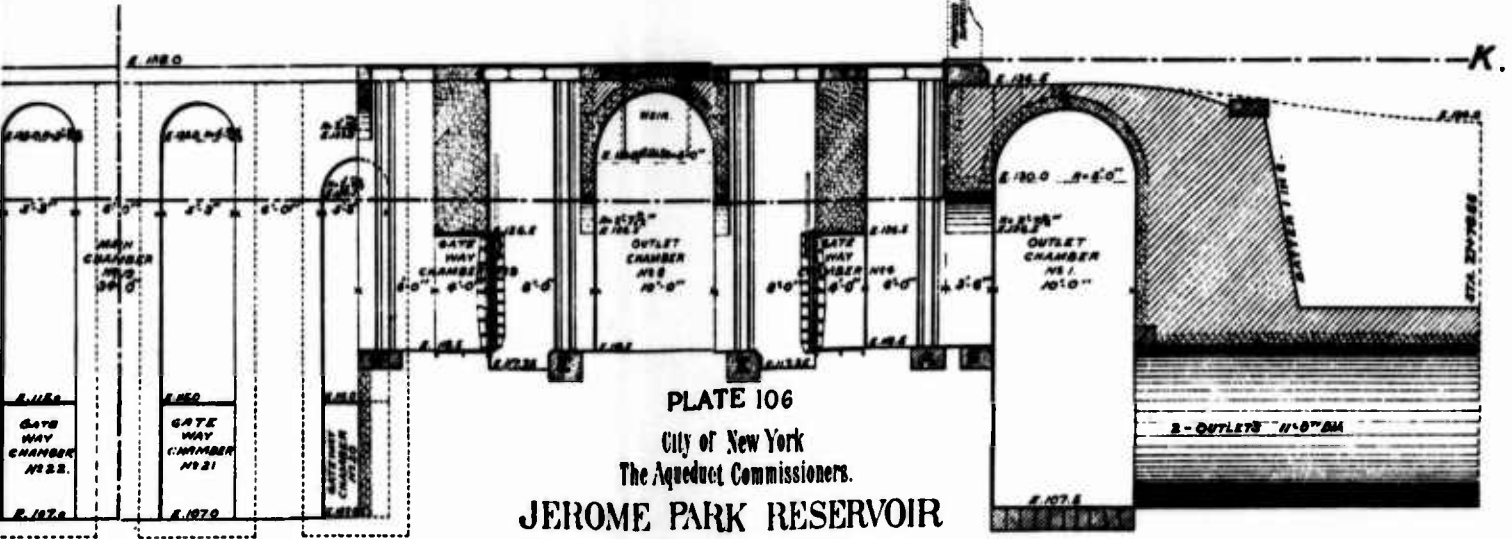


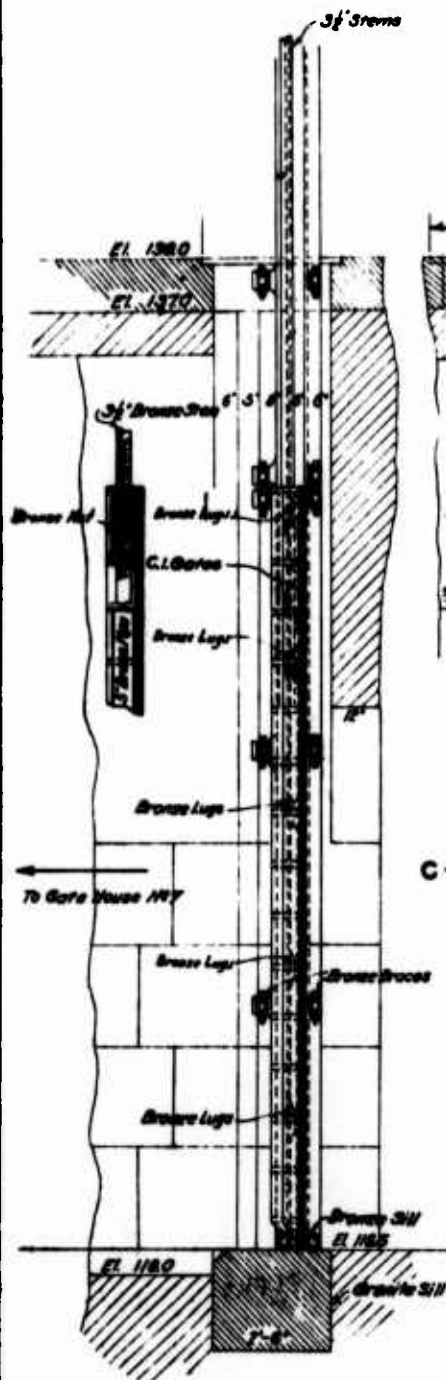
PLATE 106
 City of New York
 The Aqueduct Commissioners.
JEROME PARK RESERVOIR
GATE HOUSE NO. 5.

CHAMBER'S NOS. 32, 28, 26, 24, 19, 9, 8, 4, 1 AND OUTLET

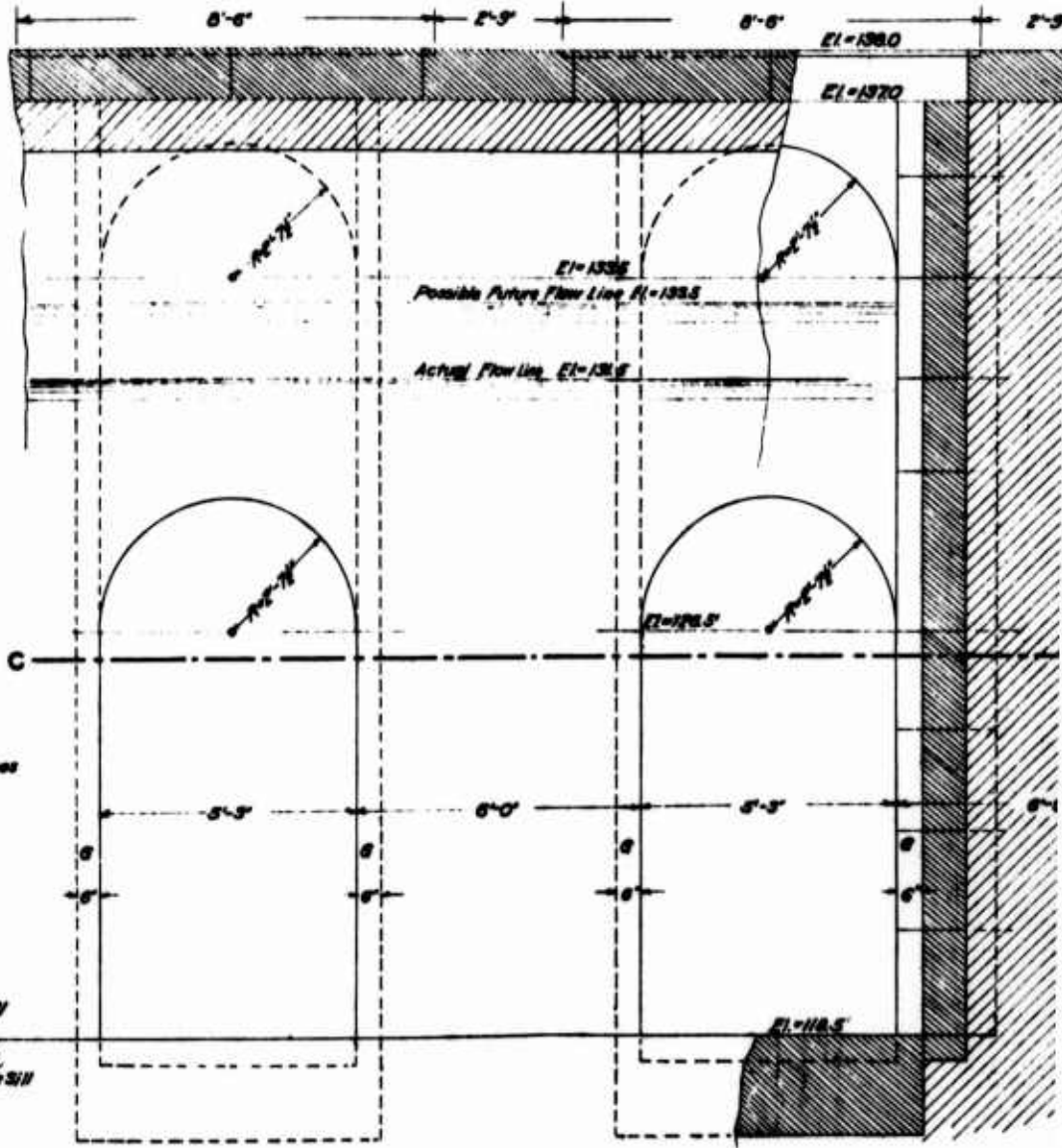
CONVERSE WARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE XI SEPTEMBER 1978

W. W. WARD
 CHIEF ENGINEER

JULY, 1907



SIDE ELEVATION A-A
Scale $\frac{1}{2}$ in. = 1 Ft.

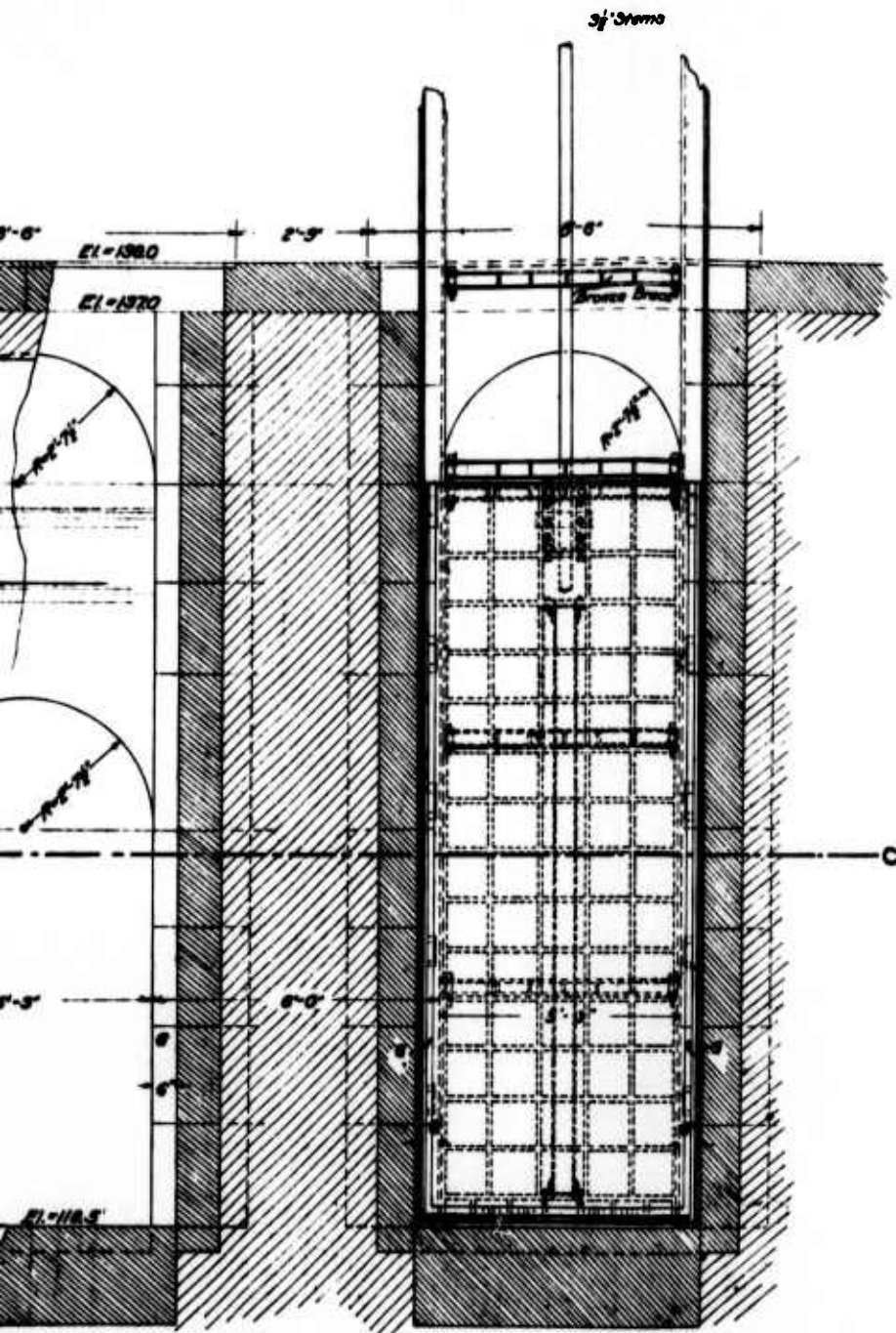


FRONT ELEVATION AND SECTION B-B
Scale $\frac{1}{2}$ in. = 1 Ft.

NOTE. Elevations refer to City Datum

DESIGNED BY *[Signature]*
DRAWN BY *[Signature]*
TRACED BY LINKER
CHECKED BY *[Signature]*

2



AND SECTION B-B
1/2 in. = 1 ft.

Elevations refer to City Datum

CITY OF NEW YORK
 DEPARTMENT OF WATER SUPPLY, GAS & ELECTRICITY
 BOROUGH OF MANHATTAN & THE BRONX
 CONTRACT DRAWINGS
 FOR
Sluice Gates, Lifting Apparatus and Shed
AT GATE HOUSE NO. 5
Jerome Park Reservoir

SCALES AS SHOWN

Assistant Engineer

CONVERSE WARD DAVIS DIXON
 CONSULTING ENGINEERS
 PLATE XII SEPTEMBER 1978

DECEMBER 1911

Chief Engineer

APPENDIX A
CHECKLIST - ENGINEERING DATA

CHECKLIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

NAME OF DAM: Jerome Park Reservoir Dam NDS ID NO.: NY 64RATED CAPACITY (ACRE-FEET) 2330 NYS DEC ID NO.: 135 LHELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 135.1ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): 135.1ELEVATION MAXIMUM DESIGN POOL: 140.1ELEVATION TOP DAM: 140.1

CREST (Waste Weir Spillway):

- a. Elevation 135.1
- b. Type Cut granite - sharp crested weir
- c. Width 2.75 feet
- d. Length Three sections each 5.25' separated by 1.75' pier
- e. Location Spillover Northwestern perimeter between GH #2
- f. Number and Type of Gates None and #3

OUTLET WORKS (Gate House Nos. 2 and 3):

- a. Type 2-48" diam. cast iron pipes that lead to gated*
- b. Location At base of gated chamber; east side of gate house
- c. Entrance inverts 99.1
- d. Exit inverts Unknown
- e. Emergency draindown facilities 2-48" diam. cast iron pipes that empty into the Broadway Sewer (GH #2 only. Pipes in GH #3 plugged.)

HYDROMETEOROLOGICAL GAGES:

- a. Type None
- b. Location None
- c. Records None

MAXIMUM NON-DAMAGING DISCHARGE: 200 cfs (approximate)

*chamber in GH #5.

CHECKLIST
HYDROLOGIC AND HYDRAULIC DATA
ENGINEERING DATA

OUTLET WORKS (Gate House No. 5):

- a. Type Gated, 11-foot diameter concrete conduit
- b. Location West side of GH #5 to drop inlet of Shaft #21
- c. Entrance invert 97.1
- d. Exit invert 95.0
- e. Length 175± feet

OUTLET WORKS (Gate House No. 5):

- a. Type 2-48" diam. cast iron pipes that lead to Bronx
distribution system
- b. Location At base of gated Outlet Chamber #22; east
side of gate house
- c. Entrance invert 102.1
- d. Exit invert Unknown
- e. Length Unknown

CHECKLIST

NAME OF DAM: Jerome Park Reservoir Dam

ENGINEERING DATA

NDS ID NO.: NY 64NYS DEC ID NO.: 135 LH

DESIGN, CONSTRUCTION, AND OPERATION
PHASE I

Sheet 1 of 5

ITEM	REMARKS
DRAWINGS	There are approximately 610+ design drawings on file at Manhattan office of NYCDWRBWS
REGIONAL VICINITY MAP	Dam shown on USGS 7½ minute quads of Central Park, N.Y.-N.J. (N4045.0, W7352.5) and Yonkers, N.Y.-N.J. (N4052.5, W7352.5)
CONSTRUCTION HISTORY	Available at Bronx office of NYCDWRBWS in form of book entitled <u>Report of the Aqueduct Commissioners for 1895 to 1907.</u>
TYPICAL SECTIONS OF DAM	Available from design drawings, e.g. Plate II
HYDROLOGIC/HYDRAULIC DATA	Inflow and outflow records available at Manhattan office of NYCDWRBWS. Entitled <u>Croton Delivery and Consumption</u> . No hydraulic data available except for details of typical gate structure (Plate XII). Conventional hydrologic data not applicable: no local watershed controlled inlet from supply watershed.

ITEM	REMARKS
OUTLETS: Plan Details Constraints Discharge Ratings	Plans and details available for outlets in Gate House Nos. 2, 3, 5 and 6. No constraints or discharge ratings available for any of the above.
RAINFALL/RESERVOIR RECORDS	Refer to "Hydrologic/Hydraulic Data" on previous page
DESIGN REPORTS	None available
GEOLOGY REPORTS	Some geologic cross sections available in design drawings. No formal reports available.
DESIGN COMPUTATIONS: Hydrology & Hydraulics Dam Stability Seepage Studies	None available

ITEM	REMARKS
<p>MATERIALS INVESTIGATIONS Boring Records Laboratory Field</p>	<p>No results of materials investigations available. Geological sections shown on some drawings of boring location plans and profiles.</p>
<p>POST-CONSTRUCTION SURVEYS OF DAM</p>	<p>None available</p>
<p>BORROW SOURCES</p>	<p>None available</p>
<p>MONITORING SYSTEMS</p>	<p>None for dam. Water quality and flow quantity carefully monitored in Gate House No. 5.</p>
<p>MODIFICATIONS</p>	<p>"East Basin" shown on all original design drawings was never completed. Gate house super-structures rebuilt in 1938/39. Microstrainer plant added to Gate House No. 6 in 1966/67. Two 48-inch diameter outlets to sewer in Gate House No. 3 were plugged in 1942/43.</p>

ITEM	REMARKS
HIGH POOL RECORDS	Available from operations records; see "Maintenance and Operations Records" below
POST-CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available
PRIOR ACCIDENTS OR FAILURE OF DAM Description Reports	None reported
MAINTENANCE AND OPERATION RECORDS	No formal maintenance records available. Information on major maintenance projects available from drawing file. Operating records entitled <u>Croton Delivery and Consumption</u> available. These records contain reservoir elevations measured daily; they extend back to time when dam was first put into service (1907).
SPILLWAY: Plan Sections Details	Plan, section and details of waste weir spillway available in drawings on file at Manhattan office of NYCDWRBWS (Plate VII)

ENGINEERING DATA

ITEM	REMARKS
OPERATING EQUIPMENT: Plans Details	Plans and details available for typical gate structure and lifting apparatus (Plate XII)
PREVIOUS INSPECTION Date: Findings	None on file with NYSDEC

APPENDIX B
CHECKLIST - VISUAL INSPECTION

CHECKLIST

VISUAL INSPECTION

PHASE I

NAME

OF Jerome Park

DAM: Reservoir Dam

County: Bronx

State: New York

NDS ID No.: NY 64

NYS DEC ID No.: 135 LH

Type of Dam: Earth embankment/core wall Hazard Category: High

Date(s) Inspection: 1 August 1978 Weather: Overcast Temperature: 68°F

Pool Elevation at Time of Inspection: 135.5 msl

Tailwater at Time of Inspection: N/A msl

Inspection Personnel:

E. A. Nowatzki (CWDD) G. Kuse (NYCDWSGE) P. Gossen (LZA)

G. S. Salzman (CWDD) T. Hook (NYCDWSGE)

A. Ragucci (NYCDWSGE) E. Bronstein (NYCDWSGE)

E. A. Nowatzki Recorder

Remarks:

EMBANKMENT

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None visible	Minor cracks in perimeter road not associated with embankment cracks
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None visible	
SLOUGHING OR EROSION: Embankment Slopes Abutment Slopes	None visible	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Appears OK both horizontally and vertically	
RIPRAP FAILURES	No rip rap. Mortared laid-up stone in some areas with vertical face at water line; appears to be in good condition	

EMBANKMENT

Sheet 2 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT WITH: Abutment Spillway Other Features	Appears OK	Embankment abuts toe wall on north, west and south portion of perimeter
ANY NOTICEABLE SEEPAGE	None visible	
RECORDING INSTRUMENTATION	None observed and none shown on plans	
DRAINS	None observed	

OUTLET WORKS

Sheet 1 of 2

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Actual outlet conduits not visible. Concrete in Gate House 5 chambers appears to be in generally good condition.	
INTAKE STRUCTURE	No inlet points were visible	Intake gates to Gate House No. 5 are located in each of Gate Houses 2 and 3 to feed two twin 48" pipes that lead to stilling basin in Gate (REFER TO SHEET 2)
OUTLET STRUCTURE	No outlet points were visible. 4 gates leading to Shaft 21 were operated and functioned properly.	Gate House 5 contains 4 gates that feed Shaft 21 which leads to Central Park Reservoir and other gates that lead to supply lines for (REFER TO SHEET 2)
OUTLET CHANNEL	Not visible	Outlet channel is basically the Manhattan and South and East Bronx water supply systems.
EMERGENCY GATE	Not visible	Gate House 2 contains gates for emergency discharge of reservoir into Broadway storm sewer which empties into Harlem River. Gate House 2 sealed but apparently can be opened quickly.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
INTAKE STRUCTURE		House 5. Inlet to stilling basin controlled at Gate House 5. An additional intake to stilling basin occurs through arched dome tunnel immediately west of Gate House 5. Controlled by gates in Gate House 5. Other gates in Gate House 5 are direct take off from the New Croton Aqueduct.
OUTLET STRUCTURE		South and East Bronx. Gate House 6 contains gates that allow discharge to South Bronx water system; presently inoperative.

UNGATED SPILLWAY

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Not visible, but could hear water flowing over spillway into drop inlet. Metal plates replaced grills; metal plates welded closed because of vandalism.	This is a covered, drop inlet overflow spillway. Water flows from drop inlet to Gate House 2 and then to Broadway Sewer (Refer to EMERGENCY GATE).
APPROACH CHANNEL	None	
DISCHARGE CHANNEL	Not visible	The discharge channel is the Broadway Sewer.
BRIDGE AND PIERS	None	

INSTRUMENTATION

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None visible	
OBSERVATION WELLS	None observed	
WEIRS	None observed	
PIEZOMETERS	None observed	
OTHER	Water level gages and flow meters monitor flow into and out of reservoir in Gate House 5.	

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GATE HOUSE NO. 7	All 4 gates manually operated well.	Contains 4 take off gates from Jerome Park Branch of New Croton Aqueduct. Take off empties directly into reservoir at north end.
GATE HOUSE NO. 5	Only 1 of 6 gates manually operated. Other 5 gates non-functional due to missing lock dogs. They are in open position.	Contains 6 take off gates from Jerome Park Branch of New Croton Aqueduct for delivery to reservoir by south portal.
GATE HOUSE NO. 1	Not observed	Located at Van Cortland Park north of reservoir. Sealed (due to vandalism) in open position on New Croton Aqueduct upstream of reservoir. Can be used to divert flow in Jerome Park Branch of New Croton Aqueduct and thereby control flow into Jerome Park Reservoir.

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GATE AT CROTON RESERVOIR	Not observed	Flow into New Croton Aqueduct controlled by gate on command from operating engineer at Jerome Park Reservoir.

RESERVOIR

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	<p>Stability: Earth embankment slopes about 3 horizontal to 1 vertical upstream (reservoir side) and 2 horizontal to 1 vertical downstream (street side). Upstream slopes are concrete covered along northern section.</p> <p>Cover: Good grass cover well maintained. Some woody growth on upstream face near water line.</p>	<p>All earthen slopes appear stable.</p>
SEDIMENTATION	None observed	<p>Woody growth (small trees and shrubs) should be removed.</p> <p>Little if any silt; probably some leaves.</p>
OTHER	<p>Stone masonry at water's edge appears recently mortared and well maintained.</p>	

DOWNSTREAM CHANNEL

Sheet 1 of 1

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
<p>CONDITION Obstructions Debris Other</p>	<p>Not applicable (Refer to OTHER below)</p>	
<p>SLOPES Cover Stability</p>	<p>Not applicable</p>	
<p>APPROXIMATE NUMBER OF HOMES AND POPULATION</p>	<p>Reservoir is located uphill from urban, high density residential area.</p>	<p>Hazard is "high".</p>
<p>OTHER</p>	<p>The downstream channel is the Broadway storm sewer and the potable water distribution system for Manhattan and the South and East Bronx.</p>	

APPENDIX C
COMPUTATIONS

S. J. E. N. Date 3/21/73
 CKD BY: SJD Date 4/1/73

Job # : 205
 Sheet 1 of 1

Sub. cat: Highways - Jerome Park Reservoir Waste Water Spillway

1) Sanitary Capacity

El of top of
 environment ≈ 136.5
 El of spillway
 crest ≈ 131.5
 $\approx 136.5 - 131.5 = 5'$

$$Q = C_d L H^{3/2}$$

$$C_d = 3.22 + 0.4 \left(\frac{H}{P}\right) = 3.22 + 0.4 \left(\frac{5}{11.5}\right) \approx 3.4$$

$$\therefore Q = 3.4 (5.25) (5)^{3/2} \approx 200 \text{ cfs } \checkmark$$

$$Q_T = 3 \times 200 \text{ cfs} = 600 \text{ cfs}$$

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 P. O. BOX 91
 CALDWELL, N. J. 07006

2) Sewer conduit capacity

(Refer to V.T. Chow, Handbook of Applied Hydrology, pgs 21-63)

$$Q = a \sqrt{\frac{2gH}{1 + K_e + K_b + K_f L}}$$

- H = total head = $(136.5 - 107) = 29.5$ feet
- a = cross sectional area of pipe $\approx 12.65 \text{ ft}^2$
- K_b = coef for bend loss = 0.45 for \perp concrete pipe, $n = 0.015$
- K_f = coef for friction loss = 0.00656 for 48" pipe having $n = 0.015$
- K_e = coef for entrance loss = 0.5 for \perp junction
- L = length of pipe (unknown) assume = 1000 ft measured on Plate II.

$$\therefore Q = 12.65 \text{ ft}^2 \sqrt{\frac{2 \cdot (32.2 \text{ ft/sec}^2) (29.5 \text{ ft})}{1 + 0.5 + 0.45 + 1000 (0.00656)}}$$

$$Q = 12.65 \text{ ft}^2 \sqrt{\frac{1900}{8.51}} = 189 \text{ cfs} \approx 200 \text{ cfs } \checkmark$$

3) Entrance Gate Capacity

Assume orifice flow through a 3' x 2' rectangular opening with entrance loss coef = 0.5

$$Q = 6 \text{ ft}^2 \sqrt{\frac{2(32.2 \text{ ft/sec}^2)(136.5 - 131.5) \text{ ft}}{1 + 0.5}} = 152 \text{ cfs } \checkmark$$

$Q_T = 152 \text{ cfs} \times 3 = 456 \text{ cfs } \checkmark$
 Therefore sewer conduit controls discharge at $\approx 200 \text{ cfs}$.

2. Waste Wier Date: 3/23/78
By: MD Date: 9-1-78
Subject: Hydrology of Jerome Lake Reservoir

Job # A1515 II E
Sheet 1 of 1

Waste wier discharge at maximum pool ≈ 200 cfs

$$200 \frac{\text{ft}^3}{\text{sec}} = \text{Rain intensity} \times \text{pond area}$$

$$200 \frac{\text{ft}^3}{\text{sec}} = \text{RI} \times 94 \text{ acres} \times \frac{43560 \text{ ft}^2}{\text{acre}}$$

$$\frac{200 \frac{\text{ft}^3}{\text{sec}}}{4.1 \times 10^6 \text{ ft}^2} = \text{RI}$$

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P. O. BOX 91
CALDWELL, N. J. 07006

$$\text{RI} = 4.88 \times 10^{-5} \frac{\text{ft}}{\text{sec}} \times \frac{60 \text{ sec}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} = 0.176 \frac{\text{ft}}{\text{hr}} \checkmark$$

$$\text{RI} \approx 2" / \text{hr}$$

\therefore Waste wier can handle this high intensity rainfall even after all of the excess storage capacity of the reservoir has been used up. (find feet)

$$\begin{aligned} \text{Excess storage capacity} &= 94 \text{ acres} \times \frac{43560 \text{ ft}^2}{\text{acre}} \times 5 \text{ ft} \\ &= 20.5 \times 10^6 \text{ ft}^3 \times \frac{7.48 \text{ gals}}{\text{ft}^3} \\ &= 153.34 \text{ million gals} \\ &= 470 \text{ acre feet } \checkmark \end{aligned}$$

Assume constant rain intensity for 24 hours.

$$\text{Required intensity to use up excess storage capacity (assuming no outflow from wier)} = \frac{5 \text{ ft}}{24 \text{ hrs}} = 2.5" / \text{hr}$$

This is NOT likely to occur for so long a period of time

APPENDIX D
PHOTOGRAPHS



FIGURE 1 EAST RETAINING WALL



FIGURE 2 WESTERN EMBANKMENT AND SEDGEWICK AVENUE
LOOKING NORTH



FIGURE 3 FENCE AND SEDGEWICK AVENUE DOWNSTREAM OF WESTERN EMBANKMENT LOOKING SOUTH

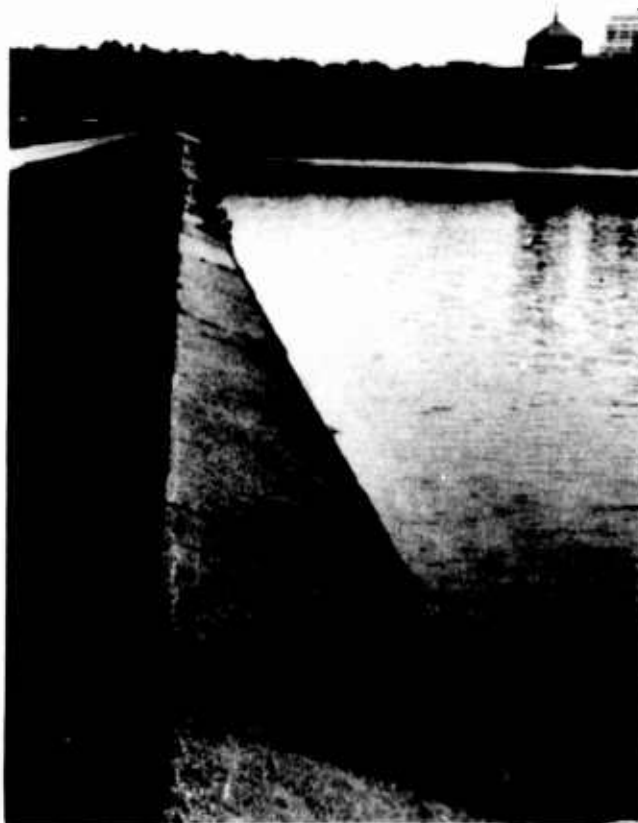


FIGURE 4 CONCRETE APRON AT NORTHERN END OF RESERVOIR



FIGURE 5 WASTE WIER AND SECTION OF RETAINING WALL
AND EMBANKMENT ON WESTERN SIDE OF RESERVOIR



FIGURE 6 GATEHOUSE No. 5 CHLORINATION EQUIPMENT



FIGURE 7 GATEHOUSE No. 5 GATE STAND ARRAYS



FIGURE 8 GATEHOUSE No. 5



FIGURE 9 VIADUCT LEADING FROM GATEHOUSE No. 5 (LEFT)
TO SHAFT No. 21 (RIGHT)



FIGURE 10 GATEHOUSE No. 3

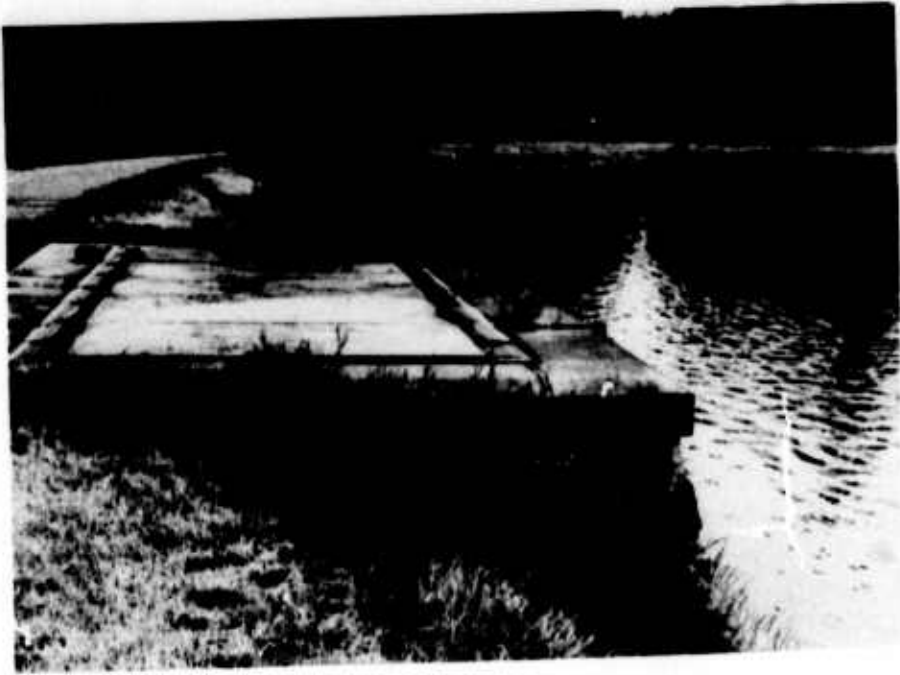


FIGURE 11 WASTE WIER



FIGURE 12 UNPAVED EASTERN PORTION OF PERIMETER ROAD

APPENDIX E
RELATED DOCUMENTS

STATE OF NEW YORK

DEPARTMENT OF

State Engineer and Surveyor

ALBANY

135 L Hudson

Report of a Structure Impounding Water

To assist in carrying out the provisions of Section 22 of the Conservation Law, being Chapter LXV of the Consolidated Laws of New York State, relating to safeguarding life and property and the erection, reconstruction, or maintenance of structures for impounding water, owners of such structures are requested to fill out as completely as possible this report form for each such dam or reservoir owned within the State of New York for which no plans or reports relative thereto are on file in this Department, and to return this report form, together with prints or photographs explanatory thereof to this department.

The Jerome Park Receiving & Distributing Reservoir

1. The structure is in the 24th Ward of the City of New York between Sedgwick & Jerome Avenues north of the Kingsbridge Road (Give exact distance and direction from a well-known bridge, dam, village main cross-roads or mouth of a stream)

2. Is any part of the structure built upon or does its pond flood any State lands? No.

3. The name and address of the owner is the City of New York

4. The structure is used for receiving and distributing water for water supply.

5. The material of the right bank, in the direction with the current, is; at the spillway crest elevation this material has a top slope of inches vertical to a foot horizontal on the center line of the structure, a vertical thickness at this elevation of feet, and the top surface extends for a vertical height of feet above the spillway crest.

6. The material of the left bank is; has a top slope of inches to a foot horizontal, a thickness of feet and a height of feet.

7. The natural material of the bed on which the structure rests is (clay, sand, gravel, boulders, granite, shale, slate, limestone, etc.) sand, gravel hardpan and gneiss

8. State the character of the bed and the banks in respect to the hardness, perviousness, water bearing, effect of exposure to air and to water, uniformity, etc. practically water-tight.

Note: The reservoir was formed by excavation and embankment.

9. If the bed is in layers, are the layers horizontal or inclined? If inclined what is the direction of the horizontal outcropping relative to the axis of the main structure and the inclination and direction of the layers in a plane perpendicular to the horizontal outcropping?

10. What is the thickness of the layers?

11. Are there any porous seams or fissures?

12. The watershed at the above structure and draining into the pond formed thereby is square miles.

13. The pond area at the spillway crest elevation is 94 acres and the pond impounds 10,367 cubic feet of water.

14. The maximum known flow of the stream at the structure was cubic feet per second on

(Date)

15. Has the spillway capacity ever been exceeded by a high flow?

Can any possible flood flow from the pond otherwise than through the wastes noted under 17 and 18 of this report? If so, give the location, the length and the elevation relative to the spillway crest and the character and slopes of the ground of such possible wastes

16. State if any damage to life or to any buildings, roads or other property could be caused by any possible failure of the above structure. Describe the location, the character and the use of buildings below the structure which might be damaged by any failure of the structure; of roads adjacent to or crossing the stream below the structure, giving the lowest elevation of the roadway above the stream bed and giving the shape, the height and the width of stream openings; and of any embankments or steep slopes that any flood could pass over. Also indicate the character and use made of the ground below the structure.

If any of the embankments which retain the water stored in the Jerome Park Reservoir should be ruptured considerable damage and probably loss of life might occur.

17. WASTES. The spillway of the above structure is feet long in the clear; the waters are held at the right end by a the top of which is feet above the spillway crest, and has a top width of feet; and at the left end by a the top of which is feet above the spillway crest, and has a top width of feet.

18. There is also for flood discharge a pipe inches inside diameter and the bottom is feet below the spillway crest; and a (sluice, gate outlet) feet wide in the clear by feet high, and the bottom is feet below the spillway crest.

For wast weirs of the reservoir see page 4. THIS PAGE IS BEST QUALITY PRACTICABLE FROM COPY FURNISHED TO DDC

19. APRON. Below the spillway there is an apron built of.....
(Material)
feet wide and.....feet thick. The downstream side of the apron has a thickness of..... feet
for a width of.....feet.

20. Has the structure any weaknesses which are liable to cause its failure in high flows?

No.

21. SKETCHES. On the back of this report make a sketch to scale for each different cross-section of the above structure at the greatest depth; giving the height and the depth from the surface of the foundation, the bottom width, the top width (for a concrete or masonry spillway at two feet below the crest), the elevation of the top in reference to the spillway crest, the length of the section, and the material of which the section is constructed; on the spillway section show a cross section of the apron, giving its width, thickness and material, and show the abutment or wash wall at the end of the spillway, giving its heights and thickness. Mark each section with a capital letter. Also sketch a plan; show the above sections by their top lines, giving the mark and the length of each; the openings by their horizontal dimensions; the abutments by their top width and top lengths from the upstream face of the spillway section; and outline the apron. Also sketch an elevation of each end of the structure with a cross section of the banks, giving the depth and width excavated into the banks.

22. WATER SUPPLY. The waters impounded by the above structure have (~~not~~) been used for a public water supply since 1906 by the City of New York.

According to the original plans the Jerome Park Reservoir was to consist of "An East Basin and a West Basin ". The construction of the former was abandoned in 1905. The West Basin was completed and put into service in 1906. Stores 103.64 million cubic feet and has a water surface of 94 acres.

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For the plans of the Jerome Park Reservoir see Report of the
Aqueduct Commissioners for 1895 to 1907.
Plates 94 to 113 inclusive.

Waste weirs to discharge overflowing Water : Are provided at the
following points.

In Gate house No. 2. These waste weir each 5-1/4 ft wide.

Wasteweir., between Gate houses No. 2 and 3, containing these
waste weirs each 5-1/4 ft wide.

Gate house No. 5 has two waste weirs each 5-1/4 ft. wide for the
West Basin.

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The above information is correct to the best of my knowledge and belief.

Municipal Building-New York

(Address of signer)

February 1925



(Signature)

Chief Engineer-Bureau of Water Supply

(A person signing for owner should indicate his title or authority)

Dept. N.S.G & E.

DATE	NEW CROTON AQUEDUCT				DISTRIBUTION RESERVOIRS										CONSUMPTION OF CROTON WATER IN CITY				
	DEPTH AT CROTON	DEPTH AT DUNNODIE	DELIVERED TO AQUEDUCT	TAKEN BY LOCAL COM'S	ROVE STR. (GAIN/LOSS)	INfiltration	DELIVERED TO CITY (3)(4) (5)(6)	RES. EL. JEROME	CONTENTS 135-50 TOP	CONTENTS 603.9 MG.	EL. CENTRAL PARK RES. 11940 TOP	CONTENTS 1018 + MG	TOTAL CONTENTS	GAIN (+) LOSS (-)		CENTRAL PARK RAIN	STOR. FROM RAIN 2105 MG	MULTIPLY INCL. BY	CONSUMPTION OF CROTON WATER IN CITY
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
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24																			
25																			
26																			
27																			
28																			
29																			
30																			
31																			
TOT																			
AV																			

Includes Croton water pumped at Moshala P. 4088.8
 But not Croton Falls, Croton Res. or other reservoirs.

Storages and Drafts in Million Gallons
 at Res. at Dunnodie

NEW CROTON DELIVERY AND CONSUMPTION MARCH 1978

MARCH 1978	NEW CROTON DELIVERY AND CONSUMPTION				DISTRIBUTION RESERVOIRS										CONSUMPTION OF CROTON WATER IN CITY
	DEPTH AT CROTON	DEPTH AT DUNWOODIE	DELIVERED TO AQUEDUCT	TAKEN BY LOCAL COMS.	AKUE STOR. (GAIN/LOSS)	INFLTRATION	DELIVERED TO CITY (3)(4)(5)(6)	EL. TROMPE RES. 135.50 TOP	CONTENTS 803.9 MG	EL. CENTRAL PARK RES. 119.40 TOP	CONTENTS 1018.4 MG	TOTAL CONTENTS	GAIN (+) LOSS (-)	CENTRAL PARK RAIN IN CHLT	
1			137	5.2	72.5	23.2	133.5	132.5	710	17.30	785	1606.2	+7.6	71.6	125.1
2			137	5.2	70.6	23.2	133.5	132.6	715.5	17.40	852	1671.7	+9.7	11.1	125.1
3			137	5.2	3.7	23.2	133.5	132.7	721	17.52	947	1833.5	+10.0	11.1	129.7
4			137	5.7	0	23.2	133.5	132.7	722.7	17.65	965	1893.5	-0.6	11.1	136.1
5			137	5.6	22.2	23.2	133.5	132.8	722.7	17.65	965	1893.5	-3.0	11.1	136.1
6			137	6.8	40.9	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
7			137	6.1	0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
8			137	6.3	18.0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
9			137	6.4	6.4	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
10			137	6.5	5.9	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
11			137	6.5	5.9	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
12			137	6.6	0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
13			137	6.9	0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
14			137	6.7	-1.5	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
15			137	6.4	41.0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
16			137	6.5	-0.5	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
17			137	6.2	0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
18			137	6.2	0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
19			137	5.4	23.0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
20			137	6.7	41.4	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
21			125	6.3	-4.8	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
22			113	6.3	-2.9	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
23			116	5.9	23.3	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
24			124	5.6	3.5	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
25			124	5.4	-0.1	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
26			124	5.6	-1.1	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
27			124	6.5	40.5	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
28			124	6.3	4.7	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
29			128	6.4	3.0	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
30			131	6.4	-7.6	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
31			131	6.5	12.2	23.2	133.5	132.8	722.7	17.65	965	1893.5	+3.0	11.1	136.1
TOT. AV.			4124	191.2	-3.9	97.2	4035.8								
			133	6.2		13.2	190.2								

Storages and Drafts in MILLION GALLONS
 All observations at BAN of Dr. 10000
 * Includes Croton water pumped at Moshelm P.S. 136
 But not Croton Fulk Cross Pump 137 Br. to Delaware Ave.

APRIL 14 1978

CROTON DELIVERY AND CONSUMPTION

NEW CROTON AQUEDUCT										DISTRIBUTION RESERVOIRS										* CONSUMPTION OF CROTON WATER IN CITY (13) + 15											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
DEPTH AT CROTON	DEPTH AT DANBODIE	DELIVERED TO AQUEDUCT	TAKEN BY LOCAL COM'S	AVG. STOR. GAIN (+) LOSS (-)	INFLTRATION	DELIVERED TO CITY (3-4) (5)+(6)	RES. 135.50 TPD	CONTENTS 803.9 MG	EL. CENTRAL	MARK RES. 11940 TPD	CONTENTS 1018.4 MG	TOTAL CONTENTS	GAIN (+) LOSS (-)	CENTRAL RAIN INCHES	STOR. FROM RAIN 214.5 MG	* CONSUMPTION OF CROTON WATER IN CITY	31	32	EL. CROTON	CONTENTS 135.50 TPD	CONTENTS 803.9 MG	EL. CENTRAL	MARK RES. 11940 TPD	CONTENTS 1018.4 MG	TOTAL CONTENTS	GAIN (+) LOSS (-)	CENTRAL RAIN INCHES	STOR. FROM RAIN 214.5 MG	* CONSUMPTION OF CROTON WATER IN CITY		
1		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	127.8	127.8	127.8														
2		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
3		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
4		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
5		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
6		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
7		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
8		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
9		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
10		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
11		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
12		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
13		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
14		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
15		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
16		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
17		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
18		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
19		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
20		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
21		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
22		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
23		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
24		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
25		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
26		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
27		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
28		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
29		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
30		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
31		131	5.4	70.0	3.2	127.8	132.30	706.4	117.50	1678.4	1678.4	-3.1	0.0	0.0	0.0	127.8	127.8	127.8													
TOT.		3685.0	100.4	42.9	96.0	3587.7	133.2	116.7	1743.0	6677.4	6677.4	757.6	2.38	11.9	3530.1	3530.1	3530.1														
AV.		122.8	6.3	3.2	3.2	119.6						1.92			117.7	117.7	117.7														

Storages and Drafts in MILLION GALLONS
 All observations at BAN of Day

* Includes Croton water pumped at Moshole
 But not Croton Falls, Cross Run or W.B. to Delaware Ave

1

Procedure to Isolate Jerome Park Reservoir from Distribution System

- 1 Shut 2 gates in Gatehouse No. 5 controlling flow from Gatehouse No. 2 (M 17)
- 2 Shut 2 gates in Gatehouse No. 5 controlling flow from Gatehouse No. 3 (M 10)
- 3 Shut 2 gates on Drop Well Inlet Gatehouse No. 5 (M 13)
- 4 Shut 3 gates in Gatehouse No. 5 controlling flow to South Outlet (M 5-5-7)
- 5 Open at least 3 of the 3 gates in Gatehouse No. 5 controlling flow from aqueduct to main chamber. (M 9, 10, 24, 25) (Operation of gates in steps 4 and 5 should be alternated)
- 6 Shut 4 gates in Gatehouse No. 7 controlling flow from aqueduct to east bay.
- 7 Shut 2 gates in Microstrainer Plant to stop flow out of Gatehouse No. 6 Reservoir water is now isolated. Croton water is now supplied to Shaft 21 and East Bronx directly from New Croton Branch Aqueduct in Gatehouse No. 5. Croton water out of Gatehouse No. 6 is replaced with reduced Catskill-Delaware from 12" regulator at 162nd Street and Jerome Avenue. Number of gates to be operated - 24
Length of time required - 4 hours.

Converse Water Div. B. Dixon
C.M. Duane, N.Y. 10006

August 3, 1978

ATTN: Mr. Edward Nowatki, P.E.

Continued

Here is information you requested!!!

This is to used in conjunction with

sketch #105 which is also enclosed

Very truly yours

EDWARD B. BEAULT

E.B. Beault - A.C.E.

CANAHA PARK RESERVOIR		Code	
Gate House #1, 2, 3, 4, 5, 6, 7	Showing Gates & Strap Details	info	
.. #1	Super Structure Plans	info	1577X-1600X
.. #6	"	info	1641X-1644X
.. #5	Pipe Runway, Gate - Details	info	9721-Y
.. #1, #2	Steel Doors for Vaults	info	9721-Y
.. #6	2-48" Main Section & Plan	info	
.. #7	Bios Plans	info	1700X-1700X
.. #6	"	info	1961X-1961X
.. #5	"	info	1961X-1961X
.. #4	"	info	1961X-1961X
.. #3	"	info	1961X-1961X
.. #2	"	info	1961X-1961X
.. #1	"	info	1961X-1961X
.. #7	"	info	1961X-1961X
.. #2, 3, 4	Gas Engine Down Current Pump (Void)	info	
.. #2, 3, 4, 6, 7	Straps & Railings for Vaults	info	
.. #1	Super Structure Plans	info (Void)	2560X-2560X
.. #1	Diverging Service Gates	info	3561X-3561X
.. #1	Stop planks in approach	info	9721-Z
Gate House #1, 2, 3, 4, 5, 6, 7	Small Scale Plans & Sections	info	1719X-2 1718X-2
.. #1	Floor Plan at Elevation 1156 & 1147.9	info	5091-X
.. #1	Plans & Sections	info	5082X to 5070X
.. #2	20" & 48" Drains & Drainage Syst.		4963X, 4964X
.. #2	Do		4993X to 5000X
.. #2	Blowoff	info	4963X to 4978X
.. #2	Iron Work, Pipes, Ladders		4979X to 4982X
.. #2	Sections & Plans	info	4940X to 4962X
.. #3	" " "	info	4924X to 4960X
.. #4	" " "	info	4900X to 4923X
.. #5	" " "	"	4845X to 4899X
.. #6	" " "	"	4902X, 4894X to 4894X
.. #7	" " "	info	605X, 4809X to 4833X
.. #7	Section of Old & New Approach	info	1011-Z
.. #2	Overflow & Blowoff Pipes	info	257-Z
Outlet Chamber	48" By Pass Discharge Pipe		24316-X
MAP	Location of Gate Houses	info	1961-X
Gate House #2	Hinges for Steel Door	info	9721-Z
Land Released to J.F. Comm.	East Basin	info	11290X, 11290X 110
Land Released	To Board of Transportation	info	21556-Z
"	To J.F. Comm. for Armory	info	2012-X
See "Real Estate" - Bronx			
Filters	General Re-arrangement	info	741-Y, 770-Y
"	Plans etc	info	734-Y to 740-Y
"	"	info	9227-Z, 9228-Z
"	"	info	9938X to 9945X
"	Bios for -	info	727-Z
Filterco Water	Distribution from Res.		741-Z
Armory	Site Plan & Section	info	749-Z, 750-Z
"	Plot Plan	info	9537-Y, 9538-Y
"	Survey of Site	info	9782-Y, 9535-Y
"	Retaining Wall at Armory Site	info	2049-X
Not Built	Contract Dugs to Concrete E. Basin	info	2001X to 2009X
"	General Plan	info	2002-X
"	Topography Before Construction	info	2001-X
"	Fence - East Side of East Basin	info	2009-X

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Void - See Water Designs

W.D.P.

JEROME PARK RESERVOIR

- CONTOUR MAP ✓
- GENERAL MAP ✓
- " " ✓
- STABLE
- KEEPER'S HOUSE
- JANITOR'S COTTAGE
- STREET ALIGNMENT DUGS
- CORRWALL " ✓
- BORINGS ✓
- APPROXIMATE SECTIONS ✓
- BREAST & DIVISION WALLS; ✓
- COAL WALLS ✓
- RETAINING WALLS ✓
- WASTE WEIR ✓
- CULVERTS
- POWER HOUSE
- GATE HOUSE # 7
- " " # 4

Showing Pipe System Plans

DIVISION WALL

PRELIMINARY STUDY

SECTIONS
Screens, Stop Planks & Iron Lighter, in hope with use of 3" section pipe

JEROME PARK RESERVOIR

- FENCING
- "
- EMERGENCY PUMPING STA.
- PUMP STA. STWAT # 3
- KEEPER'S HOUSE
- SECTION TOWER TOWER
- METER SETTINGS
- VAULT LIGHTS
- EAST BASIN COVERING
- EAST BASIN
- JULICA GATES ✓
- GATE STANOS
- SADDLE BLOCKS
- NORTH & SOUTH TANKS
- GATE HOUSE # 4 & # 6
- WALL ON RES.
- GATE HOUSE # 5
- LINING & EMBANKMENTS
- RETAINING WALL
- SUPERSTRUCTURES ✓
- COKE WALL SECTIONS ✓
- EAST BASIN
- SETTING FENCE
- 2-48" OUTLET MAINS
- GATE HOUSE # 1, 2, 3, 4, 5, 6, 7
- " " " " " "
- " " " " " "
- MAP ✓
- STATE MAP NO. 1
- " " # 5
- Reservoir and Gate Houses
- Filters
- GATE HOUSE # 4

NORTH & SOUTH ENDS ON RES.

PAINTING

EAST SIDE OF EAST BASIN

LOCALITY PLAN

GATE HOUSE, TUNNEL

MOVING & REPAIRING

ON EXISTING MAINS

OVER GATE CHAMBERS

GENERAL PLAN

LIFTING APPARATUS & JIBS

TEMPORARY HOUSING

FOR 48" PIPES

INLET CHAMBERS

CONNECTIONS

SECTIONS (NOT BUILT)

Frame cheds at

over Gate Houses

As BUILT

FILLING & GRADING

SOUTH WEST SIDE ON RES.

FROM GATE HOUSE # 3

PLANS, SECTIONS, DETAILS

Showing Terrain, Gate Houses Etc.

PROPOSED ASPHALT SURFACE

PROTECTION OF 2-48" CP. IN W. END OF Golden Ave.

Plan & Sections

Gen. Arrangement

Pipe Conn.

Year	Cost
1900	49874.70 4992.X
1895	4822.X, 4782.X 4987.X
"	4986.X
1898	5076.X to 5081.X
"	5057.X to 5075.X
"	5041.X to 5056.X
1896	5031.X to 5040.X
1897	5030.X
1901	5025.X to 5029.X
1896	5018.X to 5024.X
1903	5015.X to 5017.X
1900	5007.X to 5014.X
1900	5005.X, 5008.X
"	5006.X
1904	5001.X to 5003.X
7-10	9942.X
"	9946.X
1912	9428.X
	CARD # 5
7/5	16257.X
4/16	10828.X, 11028.X
1910	2009.X
2/26	17876-2
12/26	17999.X
1/18	11650.Y to 11654.Y
1/31	34.X
2/28	23849.X
2/26	9778.Y
2/26	9771.Y to 9778.Y
2/26	6033.X, 9771.Y
1/11	9531.Y to 9533.Y
4/14	9612.Y
"	9770.Y
10/10	2006.X, 2007.X
1910	2008.X
1911	9518.Y
1/10	2006.X V
10/10	2003.X L
2/14	2195.X, 2196.X
1901	6034.X V
1910	9273-2
2/9	9710-2
1/26	3202.X
1912	4844.X, 4862.X 4842.X
"	4797.X to 4822.X
4/08	6038.X V
1915	25216.X
1915	25770.X
1923	24150.X
"	23069.X to 23071.X
1917	778.Y
1912	770.Y
1919	11859.X
1930	72743.V

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Park Res		
8" Conduit lines from Rye Pond		245
Basin released to S.F. Comm.	1916	11290
Red Soundings	1913	11514
Assignment to Park Dept.	1915	10669
Fencing -	1925	16252
Saddle Blocks - Concrete Forms	1925	9719
Stuvia Saws & Lifting Machinery - Assoc. Equip.	1903 (Folder Form)	6111
Overflow & B.O. Pipe Line	Cont. Dips 1903 (Folder Form)	6116
G.H. #6 - Drainage & B.O.	" " " 1903 (Folder Form)	6122
Overflow & B.O. Sewers, etc.	" " " 1899 (Folder Form)	6123
Keeper's House	" " " 1897 (Folder Form)	6125
Overflow & B.O. Pipe	" " " 1902 (Folder Form)	6125
Pop Cock Valves & Special Castings	" " " 1903 (Folder Form)	6125
Gatehouse #5, Superstructure over	May 1938	27174-Y to 27175
Gatehouse #7	" " "	June 1938 27227-Y to 27228
Gatehouse #3	" " "	Jan 1938 27249-X to 27250
Gatehouse #2	" " "	Jan 1938 27246-X to 27247
Gatehouse #5 Plumbing & Heating	March 1939	27250
Gatehouse No. 5 Storage Room in Superstructure	Feb. 1940	28210-Y
Overflow & Drainage Sewers, Water Heats & App.		8682-X
Keeper's House - Cont. Draw. (Folder Form)	6/22/1907	6169-X
MAP OF	1918 (Roll)	6172-X
Grading Fencing & Misc. Improvements	1940	28567-X, 28568-X
Alterations to GH #2, 5-6, 7 to House Gasolene Equipment	1911	28520-X to 28521
Relocation of fence at G.H. #7	12/24/41	29293-X
Alterations to GH #5-6-7 to House Chlorinating Equipment	1942 (Renov)	28810-X to 28811-X
Proposed Concrete Driveway at Gate House #7	Nov. 12, 42	29462-Y
Steel Section & Details GH 2, 5, 7	12/18/42	29473-Y
Installation of Stop plants & removal of Sluice Gates and gatehouses	4/28/42	29447-Y
Proposed concrete steps for Stealing 18-inch cutters	4/19/43	29580-Y
Floating Jern Barrier - (Design, construction, etc. unlogged)	7/22/43	29589-Y
Installation of Pans & Hoses in Gate Houses 2, 5, 7	2/1/44	29732-X
G.H. #7 - Installation of Chlorine Equipment	1944	29756-X
Location of New & Old Corn Products, Van Cortlandt Park		28447-Z
G.H. #6 - Installation layout of Chlorine Equipment	1945	29937-X
G.H. #5 - Installation layout of Chlorine Equipment (Sh. 2 of 3)	1945	29938-X
G.H. #5 - Installation layout of Chlorine Equipment (Sh. 2 of 3)	1945	29939-X
G.H. #5 - Installation layout of Chlorine Equipment (Sh. 3 of 3)	1945	29940-X
G.H. #2 - Installation layout of Chlorine Equipment	1944	29879-X
Proposed repairs to building	3/12/47	30601-Z
" Wire Rope Railing bet. G.H. 5 & G.H. 6	11/27/47	31015-X
Prop. Standby Chlor. & Appoint. G.H. 2, 5, 7	4/51	32570-X
Jessie Pump. Sta. - New Suez Metal Work	5/64	32571-X
F. 2	7/67	39607-Z
Microstraining Screens at Gate House #6	1965	41615-X
" Screens at Gate House #6 - 1968 (Record Dregs)		39800-X to 39803-X
New Fencing at Jessie Res.	2/67	40904-Y
Paving Driveway & Chain Link Fence	6/68	40925-X
Painting Gate House #5	4/69	41759-Y
New Electrical System G.H. #5	6/69	41626-X