
ARDSLEY

FLOOD RISK MANAGEMENT PROJECT

Saw Mill River Left Bank

SAW MILL RIVER BASIN

ARDSLEY, N.Y.

*FLOODWALLS, INTERIOR DRAINAGE SYSTEM AND FLOOD DAMAGE
REDUCTION CHANNEL*

2010 PERIODIC INSPECTION REPORT No.1

TEXT AND APPENDICES

Kurt Schollmeyer, P.E.

**08 August 2011
ITR 09 September 2011
Final 20 January 2012**



**American Recovery And
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New York District



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PREFACE

The purpose of the Periodic Inspection (PI) of the Ardsley, Saw Mill River Left Bank (NAR1) Flood Risk Management Project (FRMP) was to identify deficiencies in accordance with USACE guidelines. This assessment of the general condition of the FRMP is based on available data and visual inspections. Detailed investigation and analysis involving hydrology and hydraulics, topographic mapping, subsurface investigations, testing, and detailed computational evaluations is beyond the scope of this inspection. However, the PI process includes a review of operations and maintenance (O&M), operational adequacy, structural stability, and historical design criteria. The inspection is intended to identify levee safety issues that are deemed to require: future studies, additional monitoring, or associated repairs, as appropriate. It is also intended to facilitate changes in current design standards and foster communication with the public sponsors about the FRMP's overall condition.

The condition of any flood reduction system depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It is incorrect to assume the condition of the FRMP at the time of Periodic Inspection is representative now, or will continue to represent the condition in the future. Only through continued inspection, maintenance, repair, and rehabilitation can there be a reasonable chance that unsafe conditions can be identified, mitigated, and/or avoided.

The USACE is moving towards a risk analysis process to manage levee systems. Risk analysis includes (1) risk assessment, (2) risk communication, and (3) risk management. For levee systems, the risk is the likelihood of inundation and its adverse consequences. Inundation can result from levee breaches, overtopping, or poor interior drainage. Adverse consequences include loss of life, property and income, and undesirable environmental effects. USACE views public sponsor involvement as being critical to this risk analysis process. Public sponsor involvement and communication is important during every step: routine inspections, periodic inspections, assessment, and management. The public sponsor is ultimately responsible to provide the operation, maintenance, repair, rehabilitation and flood fighting associated with the FRMP.

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PART I. EXECUTIVE SUMMARY

The Ardsley Flood Risk Management Project (NAR1) is a federally authorized; non-federally operated and maintained, urban flood risk management project located wholly in the Village of Ardsley, New York.

The project has been divided into three reaches: Downstream Reach, Middle Reach, and Upstream Reach. The Downstream Reach consists of channel and embankment improvements of the Saw Mill River. The Middle Reach contains non-structural flood proofing of commercial buildings. The Upstream Reach includes a floodwall, channel and embankment improvements, as well as interior drainage. The portions of the Saw Mill River between these reaches were not improved as part of this project. Overall, the project decreases the probability and reduces the impact of flooding to portions of the Village of Ardsley, along the left bank of the Saw Mill River.

This report concerns the Periodic Inspection (PI) of the Ardsley Flood Risk Management Project.

The State of New York, represented by the Department of Environmental Conservation (NYSDEC) and the Village of Ardsley, is responsible for operating and maintaining the project. New York State is identified as the Public Sponsor.

Congress authorized the Flood Risk Management Project (FRMP) at Ardsley, New York, in the Flood Control Act of 1965, section 201. The project was endorsed by the New York State Department of Environmental Conservation in 1982.

The construction of the project was completed on 28 November 1989.

The FRMP was inspected for this PI on 12 July and 20 August 2010. Representatives from the village and New York State attended the inspection.

The list below contains more notable deficiencies, which were identified and characterized according to USACE criteria during the inspection:

- The public sponsor does not have an Emergency Action Plan nor do they maintain a supply of flood fighting materials.
- The flap gate on undocumented 8 inch drain line is stuck open.
- Gaps exist between the arched superstructure of Old Ashford Ave. Bridge deck and the top of the floodwall.
- Vegetation hinders flow along the Flood Damage Reduction Channel.
- Vegetation and trees greater than 2 inch diameter are growing against the floodwall.
- Recent survey information is unavailable.
- Vegetation in ponding areas and interceptor ditches is not maintained.
- A thorough video inspection of the culverts has not been provided.
- As-built non-structural flood proofing was not present or available on structures #2 and 4.
- Sink holes exist above 30 inch interior drainage culvert.
- The inlets to a pair of HDPE pipes beneath Old Ashford Ave. Bridge are undetermined.
- The installation of pedestrian bridge should be investigated.

The complete listing of deficiencies can be found in the Periodic Inspection Report. All deficiencies should be addressed pursuant to the US Army Corps of Engineers' direction.

The schedule for the next Periodic Inspection is yet to be determined. The next Routine/Annual Inspection is scheduled for FY 2012.

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PART II. INSPECTION TEAM AND DATE OF INSPECTION

2.1 Date of Inspection

On 28 June 2010, a representative from the village accompanied the A/E on a reconnaissance of the Ardsley Flood Risk Management Project (FRMP). In attendance were Richard Thompson, Kurt Schollmeyer, Salvatore Triano, and William Murphy IV.

The Ardsley Flood Risk Management Project was inspected on 12 July and 20 August 2010. The weather was fair on both days and the average temperature was 78.3°F and 75.4°F, respectively. The entire team inspected the whole FRMP on July 12. Due to emergency paving work at that time, the village was unable to supply personnel to operate the drainage structures. This part of the inspection was postponed until 20 August when village staff was available to operate the valves.

2.2 Inspection Team

The members of the Inspection Team and representatives of the USACE and the public sponsors attending the inspection are listed below. A copy of the sign-in sheets for the inspection is included in Appendix A.

	12-Jul- 2010	20-Aug- 2010
U.S. Army Corps of Engineers (USACE), New York District		
Encer Shaffer, P.E. – New York Office	X	
New York State Department of Environmental Conservation		
Arthur Crawford – Region 3	X	
John Harrington – Region 3	X	
Olabisi Kenku – Albany Office	X	
Dale O Bryon – Region 3	X	
Village of Ardsley		
Richard Thompson – Superintendent of Department of Public Works Ardsley DPW staff	X	X
New York District A/E Inspection Team		
Kurt Schollmeyer, P.E. – Hydraulics, Inspection Team Leader (e4sciences)	X	X
Salvatore J. Triano, P.E. – Structural, Geotechnical (e4sciences)	X	
William Murphy III – Quality Control (e4sciences)	X	
Bruce Ward – Chief Geologist (e4sciences)	X	
James Trotta – Geologist, Inspection Tablet Operator (e4sciences)	X	
William Murphy IV – Field Operations Coordinator (e4sciences)	X	X

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PART III. SYSTEM BACKGROUND INFORMATION

3.1 System Name

Within the National Levee Database (NLD), the system name is “Ardsley Flood Control Project” and the segment name is incorrectly identified as the “Ardsley, Saw Mill River Right Bank”.¹ In this report, the project is identified as the Ardsley Flood Risk Management Project (FRMP). It was formerly known as the Flood Protection Works at Ardsley, New York.

3.2 Project Type

The Ardsley FRMP is a federally authorized and non-federally operated and maintained flood risk management project.

3.3 Authority

Congress authorized the Ardsley FRMP in the Flood Control Act of 1965, section 201. The New York State Department of Environmental Conservation endorsed the project in 1982.²

3.4 Cost

At March 1983 price levels, the cost of the project was estimated to be \$4,870,000 (Federal \$4,140,000 and Non-Federal \$730,000).³

3.5 Completion Date

The construction of the project was completed on 28 November 1989.⁴

3.6 Public Sponsor

New York State is responsible for the operation and maintenance of the project. The New York State Department of Environmental Conservation (NYSDEC) represents the State of New York and is the public sponsor of this FRMP. The NYSDEC in concert with the Village of Ardsley operate, maintain and rehabilitate the FRMP on behalf of the state.

Assurances of local cooperation for the Ardsley FRMP were issued by the New York State Department of Environmental Conservation (NYSDEC) on 25 January 1982 and confirmed in their 18 March 1982 letter. The FRMP was transferred to the local interests on 28 November 1989 for their operation and maintenance.⁵

¹ <http://nld.usace.army.mil/>, accessed 2 February 2012.

² “Operation and Maintenance Manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York”, dated 1989, Page 1.

³ “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, pages 16-18 and Appendix G.

⁴ “Operation and Maintenance Manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York”, dated 1989, Page 5.

⁵ Ibid, Page 6.

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The provisions for Operation and Maintenance are prescribed in the Code of Federal Regulations (CFR), Title 33-Navigation and Navigable Waters, Chapter II-Corps of Engineers, Department of the Army, Department of Defense, Part 208-Flood Control Regulations, Section 208.10-Local flood protection works; maintenance and operation of structures and facilities.

The 1989 “Operation and Maintenance manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York” provides direction as to the services needed to inspect, operate, and maintain the channels, floodwalls, drainage structures, ponding areas, and flood proofing.

3.7 Points of Contact

The Village of Ardsley contact is Richard Thompson, Department of Public Works, (phone 914-406-6806; email ardsleymanager@optonline.net).

The NYSDEC Region 3 contact is John Harrington (phone 845-256-2273; email jwharrin@gw.dec.state.ny.us).

The contact for the NYSDEC state-wide is Stephen Len (phone 518-402-8142; email selen@gw.dec.state.ny.us).

3.8 Location

The location of the Ardsley FRMP is in the Village of Ardsley, County of Westchester, New York (Figure 1).

The project area is located along the Saw Mill River and is approximately 7.2 miles above the mouth of the river in Yonkers. The project begins at the Saw Mill River Parkway and continues upstream to a point 1,250 feet above the Ashford Avenue Viaduct. The drainage area of the Saw Mill River basin is 20.7 square miles at the project site.⁶

Ardsley is a single-segment Flood Risk Management Project. The area protected by the system encompasses mostly commercial properties with rental apartments located above several retail establishments.

⁶ Ibid, Page 1.



Figure 1. Site location map of the Ardsley Flood Risk Management Project

3.9 Potential Consequences of Flooding

In the Village of Ardsley, the floodplain of the Standard Project Flood (SPF) covers approximately 23.5 acres of commercially developed land. The project was designed to protect against a flood equal to 57% of the SPF and having a 167-year return period.⁷ Plates 1 and 2 in the General Design Memorandum⁸ depict flood delineations for the design flood (1,850 cfs) and Standard Project Flood (SPF; 3,265 cfs)⁹ for existing and improved conditions, respectively.

The Flood Insurance Study (FIS) of Westchester County, dated September 28, 2007, prepared by the Federal Emergency Management Agency (FEMA) notes that “In the Village of Ardsley, currently, there are no structural measures of flood protection for the Village of Ardsley. Prior to 1972, the New York State Department of Public Works realigned and widened portions of the Saw Mill River and constructed culverts and retaining walls during construction of the New York State Thruway.”¹⁰ There is no further explanation of this statement or any other mention of the Ardsley Flood Risk Management Project in that study.

⁷ “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, Page 6. “Operation and Maintenance Manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York”, dated 1989, Page 3.

⁸ Ibid, Plates 1 & 2.

⁹ “Operation and Maintenance Manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York”, dated 1989, Page 3.

¹⁰ “Flood Insurance Study, Westchester County New York (All Jurisdictions)”, dated September 28, 2007, Volume 1 of 3, Page 48.

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3.10 Investigations Prior to Construction

The “General Design Memorandum (Phase II – Project Design), Saw Mill River at Ardsley, New York”, dated April 1983, with its Appendices, describes investigations leading up to the 1983 design memorandum.

3.11 History of Remedial Measures

In our review of the historical documentation, the 17 November 2003 inspection identified two items related to the spalling of concrete and the accumulation of vegetation in the ponding area.¹¹ It is unknown whether these items were addressed before the 2009 routine inspection.¹²

It was observed during the PI that the concrete surface of the floodwall has been recently repaired. The vegetation in ponding area #2 was found to be unmaintained.

¹¹ Letter from John F. Tavolaro, Acting Chief, Operations Division, to Ms. Lucinda Collins, Director, Bureau of Program Resources & Flood Protection, New York State Department of Environmental Conservation, dated December 12, 2003. This letter refers to the inspection on November 17, 2003.

¹² “Flood Damage Reduction System Inspection Report”, Routine Inspection of Ardsley, New York, dated May 27, 2009. Overall System Rating was Acceptable.

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PART IV. PRE-INSPECTION PACKET INFORMATION

4.1 Project Description

The project has been divided into three reaches: Downstream Reach, Middle Reach and Upstream Reach. Due to the changes in elevation across the project, the closure elevations for the structures in each reach vary accordingly.

The elevations shown in the as-built drawings collected for the Periodic Inspection are referenced to the NGVD, 1929 datum. The appropriate conversion from NGVD 1929 elevation to NAVD 1988 elevation, which is the current vertical datum standard recommended in ER 1110-2-8160¹³, would be NGVD 1929 elevation minus 0.991 feet.

Downstream Reach:

The Downstream Reach, between Elm Street Bridge and the Saw Mill River Parkway Bridge, consists of an improved 20 feet wide riprap-lined trapezoidal Flood Damage Reduction Channel (FDRC) with 1v:2h side slopes. The Conrail Bridge in this area was removed.

Middle Reach:

The Middle Reach, from the New York State Thruway to the Ashford Avenue Viaduct, consists of non-structural flood proofing for 3 structures. In general, the improvements consist of providing permanent and temporary closures for three masonry type structures.

Upstream Reach:

In the Upstream Reach, the protection consists of a floodwall 718 feet in length on the left bank of the Saw Mill River. This extends from the Ashford Avenue Viaduct upstream to tie into high ground at the headwall of the New York City Department of Environmental Protection blow-off tunnel. Parallel to the FDRC, the floodwall varies from 14 feet to 16 feet in height; perpendicular to the FDRC (parallel to the Blow-off Channel) the floodwall height varies from 15 feet to 1 foot.

Beginning a few feet upstream of the viaduct the FDRC consists of a concrete flume, 20 feet wide for a distance of 445 feet. The wall on the left side of this channel section rises above the adjacent grade and protects the area like a floodwall. The remaining 758 feet of channel consists of a 10-foot-wide earth-lined trapezoidal section stabilized with a riprap embankment along the right side. The old Ashford Avenue Bridge was not removed or raised. Its left abutment was capped to the elevation of the top of the channel and faced with concrete under the bridge structure to provide continuity to the concrete of the channel section. The blow-off channel was extended and modified to tie in with the relocated FDRC.

¹³ USACE ER 1110-2-8160, *Policies for Referencing Project Elevation Grades to Nationwide Vertical Datums*, dated 1 March 2009.

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The interior drainage improvements located in the upstream reach are as follows¹⁴:

1. Above American Legion Drive, a 200 feet long interceptor ditch, No. 2, receives flow from an existing upland stream. This interceptor ditch discharges into inlet structure No. 1 which transitions into an approximate 140 feet long, 60 inch diameter pipe. This pipe terminates at junction chamber No. 2 which transitions at outlet structure No. 3 into an approximate 150 feet long riprap lined channel, terminating at an intake structure that connects directly into the existing New York City Aqueduct blow off tunnel. The tunnel discharges into a 10 feet bottom riprap channel adjacent to the closure wall. This 441 feet long channel has a 10 feet wide bottom with 1:2.5 side slopes, and transitions into the main channel.
2. Drop inlets Nos. 3, 4, and 5 near Heatherdell Road discharge into a 450 feet long interceptor ditch (No. 1) at outlet structure No. 2, joining the main channel about 200 feet above the confluence with the blow-off channel.
3. Drop inlets Nos. 6, 7, and 8 along American Legion Drive discharge into the intake structure.
4. A small ponding area (#1) with a surface area of 0.03 acres is adjacent to the concrete channel immediately upstream of the Ashford Avenue viaduct, with one drainage structure, drainage structure No. 1. The discharge of drainage structure No. 1 is protected with a flap gate.
5. At Ardsley Square, the discharge of drainage structure No. 2 (a road drainage inlet) is protected with a flap gate.
6. A large ponding area (#2) with a surface area of 1.28 acres is adjacent to the floodwall and closure wall with two drainage structures, drainage structures Nos. 3 and 4. The discharge of drainage structure Nos. 3 and 4 are both protected with a flap gate.

The portions of the Saw Mill River channel between these reaches were not improved as part of this project. The hydraulic capacity of these non-USACE channels has a direct bearing on the capacity of the FRMP improvements. These channels include earthen trapezoidal channels, NYS Thruway and Saw Mill River Parkway underpasses.

¹⁴ “Operation and Maintenance Manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York”, dated 1989, Page 1-3

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GENERAL DATA

The general data for the Ardsley Flood Control Project are as follows:

Downstream Reach

Rip rap FDRC	trapezoidal
Length	220 feet
Channel bottom lining	riprap 12 inch thick
Channel bank lining	riprap 15 inch thick
Embankment slopes	V:H = 1:2
Bottom width	20 feet
Average channel slope	0.0007 feet/feet

Middle Reach

Non-structural floodproofing*	3 buildings
-------------------------------	-------------

Upstream Reach

Earthen FDRC	trapezoidal
Length	758 feet
Embankment slopes	V:H = 1:2-1/2
<hr/>	
Concrete FDRC	U-Shaped
Length	445 feet
Channel depth	13-18 feet
<hr/>	
Length of floodwalls	718 linear feet
Average height of floodwalls**	14 feet
Number of pump stations	N/A
Number of drainage structures***	13**

*Includes both permanent and temporary closures for brick-or-masonry-type structures.
**Average height based on the face of the wall above the improved channel bottom. Range is 1 to 16 feet above grade on the protected side.
***Three drainage structures along the channel/floodwall contain sluice and flap gates; 1 drainage structure contains only a flap gate. The remaining 9 structures are part of the interior drainage system.

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4.2 Hydrologic and Hydraulic Information

The Saw Mill River basin is situated in the southwestern part of Westchester County, New York. The watershed, with a drainage area of 26.5 square miles (mi²), is approximately rectangular, having a length of 19 miles and an average width of 1.4 miles. The narrow watershed generally consists of gently rolling hills on both sides of the valley, wooded in various sections, but generally cleared and developed as a parkway in the valley bottom. The Saw Mill River starts in a small pond in the town of New Castle at an elevation of about 500 feet above mean sea level, and flows in a southwesterly direction passing through the City of Yonkers, where it enters a concrete covered conduit about 800 feet long and subsequently empties into the Hudson River. The Ardsley area is located approximately 7.2 miles above the mouth of the Saw Mill River at the Hudson River and has a drainage area of approximately 20.2 mi² near Ashford Avenue.¹⁵

Before completion of the USACE improvements, the General Design Memorandum (GDM) noted the historic flooding at Ardsley: “A flood problem exists along both banks of the Saw Mill River in Ardsley, New York. The right bank floods near Elm Street and the left bank floods from Ashford Avenue upstream for approximately 1,000 feet. The flooding is a result of high river stages caused by backwater from insufficient channel capacity downstream and numerous bridges, along with inadequate storm drainage. Flooding in previous years occurred on the average of one to two times a year.”¹⁶

A description of the flood problems and the studies resulting in a plan of flood control to prevent damaging overflow from the Saw Mill River at Ardsley, New York are contained in the (1) Survey Report for Flood Control, dated July 1964 (Senate Document 258, 89th Congress, 1st Session, dated 9 August 1965); (2) Feasibility Report for Flood Control, dated December 1972 (House Document 519, 94th Congress, 2nd Session, dated 8 June 1976), and; (3) Local Flood Protection Affirmation Study, Phase I – Advanced Engineering and Design, dated June 1980.¹⁷

The GDM notes, “The Saw Mill River flows through a long narrow residential basin and empties within the highly developed area of the City of Yonkers. The upper portion of the watershed is largely wooded and undeveloped, while the lower portion is thickly settled, with several large manufacturing plants located near the river. The Saw Mill River basin has a high degree of valley storage, which is a result of its being parallel to the Saw Mill River Parkway throughout most of its length. This flood plain storage is most significant below the Hawthorne Circle area. Above that point, the Conrail Railroad embankment and the natural topography limit the extent of the flood plain. These physical characteristics of the basin cause the flood wave peak to decrease as it progresses downstream within the basin from a maximum near Eastview above Elmsford.”¹⁸

According to the GDM, the most significant flood events for which flood marks or reported maximum stages are available occurred in 1972 and 1975.¹⁹

- In 1972, Tropical Storm Agnes in the Saw Mill River basin caused the highest flood stage of record up to that time at the Yonkers recording gage, reaching a peak-recorded stage of 96.54 feet NGVD 1929 on 20 June 1972. The previous stage of record was 96.33 NGVD 1929 and occurred during the October 1955 flood. The peak discharge at Yonkers during

¹⁵ “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, Appendix A, Page A-1.

¹⁶ Ibid, Page B-1.

¹⁷ Ibid, Appendix B, Page B-1.

¹⁸ Ibid, Appendix A, Page A-10.

¹⁹ Ibid, Appendix A.

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tropical storm Agnes was 640 cubic feet per second (cfs) compared to the October 1955 discharge of 890 cfs. The high flood stage of the June 1972 flood was caused by backwater effects due to debris in the channel downstream of the gage, according to the U.S. Geological Survey.

- In 1975, Hurricane Eloise caused the highest flood stage of record at the Yonkers gage, reaching a peak-recorded stage of 98.25 feet NGVD 1929 on 27 September 1975, or approximately 2.25 feet above bank-full stage. The associated peak discharge was 1,020 cfs and is the largest flood of record. At the Ardsley area, the peak discharge was estimated to be 1,200 cfs from the hydrologic model.

Before the USACE channel improvements, the GDM described the condition of the Saw Mill River: “The alignment of the existing channel is for the most part gently curved. There are two locations where sharp bends occur: near the limits of the upstream end of the improvements, there is a double bend “S” type curve, and below the downstream end of the improvements, there is a sharp left bend near the Saw Mill River Parkway. The stream slope is very flat, usually less than one-foot drop/one thousand foot of run. The land adjacent to the river is fairly well built up with commercial business and residential dwellings with backyards abutting the channel. The channel throughout the reach consists of a silt-sand mixture. The channel bottom is relatively “mucky” and side slopes are steep. The sharp bends near the upstream limit of the improvement are subjected to erosion and the channel depth from top of bank to invert is about four feet. The following tables give information on the existing channel and bridges.”²⁰

**EXISTING CHANNEL – BANKFULL CAPACITIES
AT SELECTED STATION
(PRIOR TO IMPROVEMENT)**

STATION	LOW BANK ELEVATION (1 ft – msl)	DEPTH (ft) TO INVERT	TOPWIDTH (ft)	CHANNEL VELOCITY (fps)	POINT DISCHARGE (cfs)
359+60	126.2	6.2	125	3.6	530
363+64	128.5	7.7	67	3.6	880
366+80	126.6 (top of wall)	7.4	100	4.7	830
374+55	128.5	6.8	220	1.3	590

²⁰ Ibid, Appendix B, Pages B1-B2.

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EXISTING BRIDGE SECTION INFORMATION

(PRIOR TO IMPROVEMENT)

BRIDGE NAME, STATION (CENTERLINE OF BRIDGE)	WIDTH (ft) NORMAL TO CHANNEL (AT LOW STEEL)	ELEVATION (ft msl) INVERT	LOW STEEL (ft msl)	FLOW CAPACITY WITH BACKWATER (cfs)	VELOCITY THROUGH BRIDGE at CAPACITY (fps)	REMARKS
Saw Mill River Parkway (350+43)	30	115.9	124.4	230	1.3	Remain as Existing
Conrail (351+46)	34	118.5	126.0	640	3.0	Remove
Elm Street (353+15)	26	120.1	129.9	1750	7.0	Remain as Existing
New York State Throughway [sic] (355+37)	28	120.0	129.6	1250	4.7	Remain as Existing
Ashford Avenue Viaduct (366+18)	24	121.0	130.5	1150	5.2	Remain as Existing
Old Ashford Avenue (368+01)	22	121.0	130.0	1000	5.2	Remain as Existing

4.3 Technical Summary of Foundation Conditions

The 1983 GDM indicates that the soils beneath the project consist of well graded sand with silt some 4 feet to 12 feet deep. Miscellaneous fill was observed near the railroad embankment. Beneath this is very compact glacial till that consists of sand, little to some gravel and, little to some silt with occasional cobbles and boulders. Bedrock was returned in two bore holes as high as 8 feet and 2.5 feet below grade. These tests were adjacent to the Blow-off Channel and north of Ardsley Square. The GDM concludes that the encountered foundations soils will provide firm bearing for the concrete floodwalls.²¹

4.4 Instrumentation

There is no known instrumentation for monitoring potential movements, instability, or excess pore-water pressure that could affect stability.

At the time of the GDM, the U.S. Geological Survey operated one stream-gage recording station in the Saw Mill River basin, on the Saw Mill River at Yonkers, New York. The gage is located on the left bank, just upstream from Old Croton Aqueduct, near the intersection of Nepperhan Avenue and Center Street, and 1.2 miles upstream from the mouth of the river.²²

Currently, USGS stream gage 01376500 on the Saw Mill River at Yonkers NY is active but maintained by the USGS New York Water Science Center. There are daily discharge records

²¹ “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, Appendix D, Page D3, Paragraph D8

²² Ibid, Appendix A, Page A-10.

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from 1943 to 1995, peak streamflow records from 1945 to 2010, and field streamflow measurements from 1944 to 2011.²³

4.5 Past Floods and System Performance

Specific documents related to the performance of the levee systems during a major flood were not in the document archives reviewed in preparation of this Pre-Inspection Packet.

During the Periodic Inspection, representatives of the local sponsors were asked if the embankments and floodwalls have overtopped. They do not maintain records relating to the systems performance following a major high water event although this is required under 33 CFR Section 208.10.

4.6 Project Condition Based on Prior Annual Inspection

The joint annual inspection of the project was performed by representatives of the NYSDEC/Village of Ardsley and USACE on 27 May 2009, and an Inspection Report was prepared, dated 27 July 2009.

Items from Prior Inspections

The following remarks are noted in a “Flood Damage Reduction System Inspection Report,” dated 27 May 2009:

- Encroachments: “Very minor debris problem noted along the length of the project; occasional shopping bag, potato chip bag, soda cans, et cetera. Fallen leaves were noted but not in significant quantities to cause a problem.” This item was rated “Acceptable”

Overall System Rating: Acceptable (27 July 2009 Report)

Deficiencies were noted in a letter from Mr. John F. Tavoraro, Acting Chief, Operations Division, USACE, dated 12 December 2003, to Ms. Lucinda Collins, Director, Bureau of Program Resources & Flood Protection, NYSDEC.²⁴ This letter referred to a 17 November 2003, inspection with the following comments:

“1. The concrete at the base of the floodwall continues to spall; now the steel temperature reinforcing has completely corroded. In order to prevent further damage this work must be done this year.”

“2. The brush in south end of holding pond #2 is beginning to grow back. Routine removal of the brush must continue to be incorporated in the projects [sic] annual maintenance program. Continued and consistent removal will help promote growth of more desirable vegetation cover within the ponding area.”

No rating was provided for the Ardsley FRMP in this letter.

²³ http://waterdata.usgs.gov/nwis/nwisman/?site_no=01376500&agency_cd=USGS, accessed April 14, 2011.

²⁴ Letter from John F. Tavoraro, Acting Chief, Operations Division, to Ms. Lucinda Collins, Director, Bureau of Program Resources & Flood Protection, New York State Department of Environmental Conservation, dated December 12, 2003.

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4.7 Accomplishments/Developments since the 2009 Annual Inspection

There have been no reported problems or deficiencies since the last routine inspection in 2009.

4.8 Design Criteria Review

Section 4.8 identifies differences between the criteria used for the design of the project and the current criteria USACE uses in their designs. Refer to section 5.2 for recommendations on addressing these differences.

4.8.1 Geotechnical

During the design of the Flood Risk Management Project (FRMP), a series of geotechnical borings were advanced. The results and data obtained from the subsurface exploration program were used to define the soil strength parameters in the design of the flood control works. Appendix D of the Phase II – General Design Memorandum (GDM) includes copies of the boring logs.²⁵

Based on a review of the boring log summaries, the original site included a layer of topsoil approximately six inches in depth. Below the topsoil layer, well-graded sand with some silt was identified at depths ranging from 4 feet to 12 feet. It is possible that this layer of soil is recently placed miscellaneous fill, as the blow counts are indicative of an unconsolidated deposit. Near the railroad bed, the soils appear to be miscellaneous sandy fill. Below this layer is compact glacial till which generally consists of sand and gravel with silt, clay, and occasional boulders or cobbles. In addition, a pocket of running sands was identified in Boring DH-8A at 16 feet below grade. “Running sands” are defined as a sandy deposit that fills the void of the drill hole during sample retrieval.

Borings were advanced to depths ranging from 10 feet to 53 feet. In several of the borings, bedrock was encountered at varying depths ranging from 2.5 feet to 31 feet below the ground surface. This is consistent with the character of bedrock in this area.

Unsuitable fill material and soft or loose soils located beneath the footprint of the flood walls were removed by excavation. The floodwalls were founded on the glacial till with the spoils from the excavation used for backfill adjacent to the floodwalls or other structures.

Permeability tests were conducted in five borings to determine the in-situ seepage rates of the soil deposits. Further, laboratory tests were conducted on soil samples retrieved. The results of the field and laboratory tests were used in the seepage analyses.

²⁵ “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, Appendix D.

4.8.1.1 Seepage Analysis

Data from the site investigation program coupled with the laboratory test results were used to evaluate the seepage potential for the completed “L” and “T” type floodwalls. Based on these analyses, the depth of the footings for the floodwalls was designed. The orientation on embedment depths were set to prevent a quick condition in the soils from developing during flood conditions as well as during normal operations. The GDM, in Appendix D, presents the following conclusion; “None of the critical gradients were less than one and, therefore, the soil will not develop a quick condition on the protected side.”²⁶

4.8.1.2 Stability Analyses

The design of the “L” and “T” type floodwall sections were evaluated for stability under four loading conditions. These conditions reflect the anticipated flood loadings at two different flood elevations, wind load effects, and earthquake loads. The results of the analyses indicate that the resulting forces are adequately applied to the base of the wall systems. Factors of safety against sliding are reported to be greater than 1.5. In addition, the GDM in Appendix D presents the following conclusion: “All safety factors for all cases are greater than 1.0 and the walls are safe from a circular and sliding failure.”²⁷

The current guideline recommends three borings/soundings at 1,000 feet intervals: one located at the river-side toe, one at the crown, and one at the landside toe of the levee. In highly urbanized areas and areas of complex geology, the guideline recommends additional borings. The use of geophysical methods to interpolate the subsurface conditions in between borings is also recommended.²⁸

For the Ardsley project, 25 borings were performed at various intervals along the bank with only one boring at each interval. Generally, the interval spacing criteria in ETL 1110-2-569 were satisfied. However, the number of borings conducted at each interval does not meet the criteria set forth. Therefore, subsurface conditions may be present which were not addressed in the design of the flood protection works.

4.8.2 Structural

The type of floodwall used for this project was concrete “L” and “T” type walls. The majority of the floodwalls for this project are T-walls with spread footings. In general, the ground surface on the protected side of the walls is higher than the channel bottom, so that during normal conditions, the walls are acting as earth retaining structures. The design of the walls and the footings were based on the available depth to competent soils and the proximity of various obstructions. The height of the wall sections vary from a few feet to 16 feet. All wall sections are constructed of reinforced concrete.

An inspection letter from the USACE, dated 12 December 2003, states that a section of the base of the floodwall continues to spall and that the steel temperature reinforcement is corroded. With exception of this deficiency, no other significant deficiencies of the structural components of the

²⁶ “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, Appendix D, Page D4, Paragraph D15.

²⁷ Ibid, Appendix D, Page D3, Paragraph D10.

²⁸ USACE ETL 1110-2-569, *Design Guidance For Levee Underseepage*, dated 1 May 2005, page 6.

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project with respect to current design criteria were noted in the review of the available documents.

The Saw Mill River flood damage reduction channel intersects several structures near the project. These include the Saw Mill River Parkway, NYS Thruway, Ashford Avenue Viaduct, the Old Ashford Avenue Bridge and a 60 inch Westchester County owned sanitary sewer main. The interior drainage system connects with the NYCDEP Aqueduct blowoff tunnel forty-three feet below grade. The integrity of these structures is vital to the function of the Ardsley FRMP. The project archives did not contain any record of the foundation or structural design of these elements. A review of their design was therefore not possible prior to the Periodic Inspection.

4.8.3 Civil

USACE EM 1110-2-2902 states that corrugated metal pipe (CMP) may be used in rural levee systems when risk of substantial property damage and loss of life is low.²⁹

The construction specifications indicate that either RCP or CMP may be used for this project. The as-built drawings do not identify the type of pipe materials that were installed. During the Periodic Inspection, observations were made of the pipe materials used, the locations where they are used, and their condition. These observations are noted in §5.2.3.

The Saw Mill River FRMP is not a rural system, and therefore, based on current standards, corrugated pipe should not be present in the system. Furthermore, in EM 1110-2-2902, it is recommended that the minimum diameter of corrugated metal pipe should be 36 inches to facilitate maintenance. Several of the discharge structures have pipes that are less than 36 inches in diameter. The materials used during the construction of the Ardsley Flood Control Project were not identified on the as-built drawing set.

4.8.4 Hydrology and Hydraulics

The operations and maintenance manual provides for a design flood of 1,850 cfs with a 167-year return period. This is 57% of the standard project flood of 3,265 cfs. The largest flood was estimated to be 1,200 cfs based on flooding within the 20.2-square mile drainage area caused by Hurricane Eloise in September 1975.³⁰

“The floodwalls were designed to provide the freeboard recommended in EM 1110-2-1601³¹. Three feet is provided where floodwalls are used. The closure wall perpendicular to the stream in the upstream reach has five feet of freeboard. Bridge freeboard will not be provided for the remaining bridges (Conrail Bridge removed) due to the nature of their construction and importance. Consideration was given to providing freeboard on the right bank where the Thruway was adjacent to the channel. However, it was determined not to be necessary because the Thruway is on the unprotected side.”³²

²⁹ USACE EM 1110-2-2902, *Conduits, Culverts and Pipes*, dated 31 March 1998.

³⁰ “Operation and Maintenance Manual, Ardsley Flood Control Project, Saw Mill River, Ardsley, New York”, dated 1989, Page 3.

³¹ USACE EM 1110-2-1601, *Hydraulic Design of Flood Control Channels*, dated 1 July 1970, updated 30 June 1994.

³² “General Design Memorandum (Phase II — Project Design), Saw Mill River at Ardsley, New York.” dated April 1983, Appendix B, page B-3.

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Current levee design guidelines state, “The term and concept of freeboard to account for these uncertainties is no longer used in the design of levee projects. The risk-based analysis directly accounts for hydraulic uncertainties and establishes a nominal top of protection.”³³

A re-evaluation of this project in terms of a risk-based assessment to evaluate the adequacy of the top of the floodwalls is beyond the scope of a Periodic Inspection.

4.8.5 Mechanical and Electrical

No significant deficiencies of the mechanical components of the system with respect to current design criteria were noted in the review of available documentation.

4.9 Emergency Action Plan

The Policy Guidance on Periodic Inspection Procedures for the Levee Safety Program, dated 17 December 2008, calls for the sponsor to have an Emergency Action Plan. The “General Items for All Flood Damage Reduction Segments/System” section of the Inspection Checklist to be used for this Periodic Inspection also requires the sponsor to have a written specific flood response plan and a solid understanding of how to operate, maintain, and staff the system during a flood. An Emergency Action Plan was not included in the document archives reviewed in preparation of this Pre-Inspection Packet.

The availability of an Emergency Action Plan was discussed with the NYSDEC/Village of Ardsley personnel during the Periodic Inspection. They do not have a plan that addresses emergency operation of the Ardsley FRMP.

³³ USACE EM 1110-2-1913, *Design and Construction of Levees*, dated 30 April 2000, page 6-1

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PART V. 2010 PERIODIC INSPECTION FINDINGS AND EVALUATIONS

5.1 Results of Inspection

5.1.1 Introduction

This section highlights system deficiencies that were observed during the 2010 Periodic Inspection (PI). The focus of the PI was on the FRMP improvements designed to protect a portion of the village on the left bank of the Saw Mill River. These improvements include the floodwall, interior drainage system, and flood damage reduction channel (relocation of the Saw Mill River). In areas immediately adjacent to the project, observations were made of the more notable deficiencies of non-FRMP improvements that have a direct bearing on the capacity of the FRMP. Selected photographs of system features and deficiencies taken during the field inspection activities are included in Appendix C. The completed 2010 Periodic Inspection “Advanced Report” (Checklist) includes the inspection results for the project and presents the Individually Rated Items as either, Acceptable (A), Minimally Acceptable (M), Unacceptable (U) or Not Applicable (N/A). A copy of the 2010 Advanced Report is included in Appendix D. Figure 2 is a map of the inspection points listed in the 2010 Advanced Report

The following paragraphs detail and describe the deficiencies identified during the inspection. The item numbers correspond to the item numbers in the Advance Report and in Table 1. Items rated Acceptable (A) or Not Applicable (N/A) in the Advanced Report are not included or discussed below. Discussions related to recommendations of the noted deficiencies follow in Part VI of this report.

5.1.2 General Items for All Flood Damage Reduction Segments/Systems

5.1.2.1 Operations and Maintenance Manuals

During the 2010 periodic inspection, the public sponsor was asked about an Operation and Maintenance (O&M) manual for the Ardsley Flood Risk Management Project (FRMP). Neither the NYSDEC nor the Village of Ardsley has a copy of the 1989 O&M manual.

These manuals are a key component of the FRMP and, as such, they are essential to assure the FRMP will continue to operate as authorized.

This item is rated as minimally acceptable (M).

5.1.2.2 Emergency Supplies and Equipment

The NYSDEC has delegated the routine maintenance and emergency repair of this system to Village of Ardsley. The village does have heavy equipment available to repair damage that may occur to the FRMP. They do not stock sand bags to repair the FRMP and they do not stockpile emergency supplies.

These emergency supplies and equipment are a key component of the FRMP and, as such, they are essential to assure the FRMP will continue to operate as authorized.

This item is rated as minimally acceptable (M).

5.1.2.3 Flood Preparedness and Training

The public sponsor does not have any programs in place to train village or state employees on the operation of the system and response to flooding.

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Flood preparedness and training are essential to assure the FRMP will continue to operate as authorized.

This item is rated as minimally acceptable (**M**).

5.1.2.4 Emergency Action Plan

The public sponsor does not have a written Emergency Action Plan in place to direct flood fighting activities or address flooding that may occur behind this system.

An Emergency Action Plan is essential to assure the FRMP will continue to operate as authorized.

This item is not rated as part of the Advanced Report but is considered a safety item.

5.1.2.5 Compliance with Project Agreement

The NYSDEC and the Village of Ardsley have no means to remove vegetation from the ponding areas. Just prior to the periodic inspection, the village removed vegetation from the berm adjacent to the protected side of the floodwall. They do not maintain the vegetation on the exposed side of the floodwall or along the channel. They do not operate or maintain the sluice/flap gates. As such, the public sponsor is not fully supporting the Project Agreement.

The public sponsor must comply with all aspects of the project agreement to assure the FRMP will continue to operate as authorized.

This item is not rated as part of the Advanced Report.

5.1.3 Floodwalls

5.1.3.1 Item #1 - Unwanted Vegetation Growth

During the periodic inspection, five observations were made of unwanted vegetation growth within the vegetation-free zones of the floodwall. Dense vegetation adjacent to the protected side of the floodwall, immediately south of ponding area #2, consisted of trees greater than 2 inches in diameter and brush. This vegetation became so dense that the inspection team could not gain access to 200 feet of the floodwall/channel upstream of the old Ashford Avenue Bridge.

Vines were observed growing on the wall on both sides of drainage structure #3. At the bend at the northern limits of the floodwall, trees as tall as thirty feet high are growing adjacent to the exposed side of the floodwall.

This item is rated as unacceptable (**U**).

5.1.3.2 Item #2 – Encroachments

Animal burrows were observed during the periodic inspection immediately adjacent to the floodwall. Three locations were noted on the protected side and one location on the exposed side.

Tree stumps and limbs were observed lying against the exposed side of the floodwall.

The slope leading from the floodwall to the Blow-off Channel contains a 6 feet-wide by 3 feet-deep depression that is located 5 feet from the wall. This hole may be the remains of a tree that was removed.

Between the gasoline station and the flood wall, a utility pole and chain link fence were found within 4 feet of the protected side of the floodwall.

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A contractor is making repairs to the NYCDEP aqueduct blow-off tunnel. They have created an access way for the workers and installed temporary fencing that encroach upon the FRMP.

South of ponding area #2, an 8 inch ductile iron pipe was observed to penetrate the floodwall. On the protected side, the route of this pipe was lost in the dense vegetation. On the exposed side, the discharge of the pipe is protected with a flap gate, which is frozen in the wide-open position. This pipe is not shown on the as-built drawings.

The inlets to a pair of HDPE pipes beneath Old Ashford Ave. Bridge are undetermined.

This item is rated as unacceptable (**U**).

5.1.3.3 Item #3 - Closure Structures

As there is no checklist category reserved for non-structural flood proofing, we have made use of this section for our comments.

Building #1: Flood proofing measures were installed. The electrical service extends below the top elevation of the flood proofing structures.

Building #2: Addition added to back of building. Flood proofing improvements were not observed. This is not noted on the As-built plans.

Building #3: Flood proofing improvements were not constructed. This is noted on the As-built plans. The owner reports flood water up to the loading dock.

Building #4: Closure structure and stop logs are unavailable or missing and owner reports having up to 6 feet of water in the garage.

This item is rated as unacceptable (**U**).

5.1.3.4 Item #4 - Concrete Surfaces

The abutment of Saw Mill River Road at the NYCDEP blow-off tunnel is visibly deteriorated. Vegetation is visible and a few stones have already fallen out.

Concrete spalling was observed on the recently repaired sections of the protected side of the floodwall. Damage is mainly on the curved portion of the floodwall.

A surface crack has formed in a horizontal joint that runs a foot below the top of the floodwall.

Gaps exist between the arched superstructure of Old Ashford Ave. Bridge deck and the top of the floodwall.

This item is rated as unacceptable (**U**).

5.1.4 Interior Drainage System

5.1.4.1 Item #1 - Vegetation and Obstructions

A discarded piece of equipment (conveyor belt) obstructs the access gate to ponding area #1.

Interceptor ditch #1 appears to have been filled with sediments just upstream of its confluence with the Saw Mill River. Farther upstream, vegetation encroaches upon this ditch. Just downstream from the discharge of outlet structure #2, flow in this ditch is impeded by a large sediment deposit.

The intake structure/blow-off tunnel connection was incorporated into a NYCDEP work site. As such, we were unable to inspect the structure. Sediment and vegetation partially block the flow in

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interceptor ditch #2, just west of American Legion Drive. Sediment, debris, and vegetation impede the discharge of interceptor ditch #2 into inlet structure #1. At the start of interceptor ditch #2, dense vegetation was observed.

A depression observed next to drop inlet #3 may be the result of soil entering either the culvert or the drainage structure.

Adjacent to a parking lot on the protected side of floodwall, ponding area #2 contains considerable vegetation. The local public sponsor has no equipment that can operate on the soft saturated soils in this basin.

This item is rated as minimally acceptable (U).

5.1.4.2 Item #2 - Encroachments

A small ADS drainage pipe was recently added to the right bank of interceptor ditch #1.

This item is rated as minimally acceptable (M).

5.1.4.3 Item #3 - Ponding Areas

Vegetation is overgrowing ponding area #1 and 2.

This item is rated as minimally acceptable (M).

5.1.4.4 Item #7 - Foundation of Concrete Structures

Sinkholes were observed above the 30 inch drainage culvert leading from drop inlet #4. This may be the result of soil washing into the culvert. Also noted was some debris that was visible in the grate at the side of the road at drop inlet #5.

This item is rated as unacceptable (U).

5.1.4.5 Item #9 - Culverts/Discharge Pipes

The trash rack for outlet structure #3 contains some debris.

A thorough video inspection of the culverts has not been provided

This item is rated as minimally acceptable (U).

5.1.4.6 Item #10 - Sluice/Slide Gates

The gate to DS#1 sluice gate contains debris. Sluice gates have not been maintained in accordance with USACE guidelines and need lubrication.

This item is rated as minimally acceptable (M).

5.1.4.7 Item #11 - Flap Gates

The 36 inch flap gate outlet to drainage structure (DS) #4 is in good condition. However, sediments are building up in the discharge channel.

This item is rated as minimally acceptable (M).

5.1.5 Flood Damage Reduction Channels

5.1.5.1 Item #1 - Vegetation and Obstructions

Opposite of the floodwall, heavy vegetation was observed to be growing on the west (right bank) channel embankment in riprap protection.

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Vegetation was observed growing along both sides of concrete channel upstream of the old Ashford Avenue Bridge. A weep hole has vegetation growing out of it downstream of the old bridge.

Immediately downstream of the project (south of the Ashford Avenue Viaduct), a large pile of debris (3 feet high) was observed to obstruct more than half of the channel. Also noted here were a large number of trees near the left bank of the channel.

Just downstream of Elm Street a large tree has fallen partially blocking the flow of the relocated channel. Between Elm Street and the Saw Mill Parkway, vegetation and obstructions were observed in the riprap embankment and channel bed. A pedestrian bridge replaced the old Putnam line (Conrail) railroad bridge; it is not shown on the as-built plans.

This item is rated as unacceptable (**U**).

5.1.5.2 Item #2 - Shoaling

Sediment and debris were found accumulating in the channel downstream of the old Ashford Avenue Bridge.

This item is rated as minimally acceptable (**M**).

5.1.5.3 Item #3 - Encroachments

A steel guy wire extends from a building on the left side of the channel to an anchor on the right side of the channel. The wooden access deck from Ardsley Square to ponding area #1 is in poor condition and needs to be replaced. Galvanized steel conduits (possibly electrical) run along the right side of the concrete channel and under the old Ardsley bridge. Debris in the channel and vegetation growing on the outside of the channel wall was noted near Ardsley Square. The chain link fence atop the channel wall, adjacent to the NYS Thruway is not shown on the as-built plans.

The existing drainage channel, shown on the as-built plans, downstream of Ashford Avenue (South of USACE Project) was replaced with a 60 inch culvert. Sediments shoaling at the discharge of this culvert are restricting drainage flow.

This item is rated as minimally acceptable (**M**).

5.1.5.4 Item #5 - Concrete Surfaces

A scour hole at the bottom of the concrete channel was observed immediately downstream of the old Ashford Avenue Bridge. The sediment from this scour appears to be the deposition noted in section 5.1.5.2.

The concrete facade of Ashford Avenue Bridge on the left side is severely deteriorated and its failure could compromise integrity of the concrete channel.

This item is rated as minimally acceptable (**M**).

5.1.5.5 Item #10 - Riprap Revetments & Banks

Heavy vegetation growth was noted on the riprap-protected slopes on the right bank of the Saw Mill River opposite of the floodwalls.

Vegetation was observed to be growing through riprap on the embankments near Elm Street.

This item is rated as minimally acceptable (**M**).

5.2 Design Criteria Review

Section 4.8 Design Criteria Review identifies where the project's documented design criteria was found not to meet current design guidelines. This section evaluates these design issues in light of the insight gained during the Periodic Inspection (PI) and offers recommendations where items are found to be deficient (related to rated items M and U).

5.2.1 Geotechnical

5.2.1.1 Subsurface Investigation

Three of the five field permeability tests and three of the five drill holes sampled for sieve analysis occurred along the alignment of the floodwall. As the borings were generally homogenous in nature, no additional geophysical investigations were made between the borings. Given this, we find no need to resample systematically and reevaluate the subsurface soil conditions for this project.

5.2.1.2 Seepage Analysis

Given the advancements that have occurred in the study of seepage analysis, and the fact that the close proximity of ponding area #2 prohibits observation of seepage issues, we recommend doing a back analysis of the 1983 GDM seepage analysis and toe drain filter design. This information will be helpful in evaluating these structures at the next periodic inspection.

5.2.1.3 Stability Analysis

Given the aid of computer programs that did not exist when the project was designed, we recommend that a back analysis of the 1983 GDM stability analysis design be performed. Of particular interest is to determine if the drainage structures have any effect on the performance of the floodwall monolith. This information will be helpful in evaluating these structures at the next periodic inspection.

5.2.2 Structural

It is prudent practice to re-evaluate classically designed structures periodically to verify their performance during conditions not fully considered during their original design. The current design criteria that is applicable to the structures in this project include; USACE ER-1110-02-1806 *Earthquake Design*, EM-1110-2-2104 *Strength Design for Hydraulic Structures*, and EM-1110-2-2502 *Retaining and Flood Wall Design*.

5.2.3 Civil

The drainage structures located in the floodwall are all formed from concrete that was cast when the wall was poured. Interior drainage culverts were observed to be constructed of reinforced concrete pipe. As such, they conform to the pipe material requirements of USACE EM 1110-2-2902.

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In order for operation personnel to access the ladders of drainage structures # 1, 3, and 4 (that lead to the sluice gate operating wheels), they must enter and cross through the ponding areas. The sponsor should reconsider the ailing wooden catwalk to DS #1/ponding area #1. An alternative might be to construct a fiberglass walkway on top of the channel wall. Such a walkway could connect Ardsley Square directly to DS #1 as well as provide access to the ponding area. For drainage structures #'s 3 and 4, one solution would be to place a short section of culvert in front of the inlet and fill it over so as to extend the berm around the structure.

The local public sponsor needs to be encouraged to maintain a vegetation-free zone within 15 feet of the foundation of the floodwall and along the channel walls and embankments. The ponding areas have become overgrown with undesirable plants. The high groundwater level and soft ground surface prevent the sponsor from using a tractor to cut this vegetative growth. The vegetation in these ponding areas should be eradicated, the surface improved sufficiently to support the sponsor's maintenance equipment and the entire area vegetated with grass cover. Alternatively, a low-growing facultative-wetland planting may be suggested by the Corps.

5.2.4 Hydrology and Hydraulics

Although the hydrology and hydraulics of the Saw Mill River has been extensively studied in the past, the work is out of date and not comprehensive. For example, the 2007 Flood Insurance Study notes, "currently, there are no structural measures of flood protection for the Village of Ardsley."³⁴ A completely new drainage study of the Saw Mill River is warranted for the Ardsley FRMP. The study should include a detailed hydraulic analysis of the backwater created by the overpasses between the NYS Thruway and Saw Mill River Parkway during flooding conditions. This new analysis will utilize current USACE guidelines including the risk-based analysis approach of EM 1110-2-1619.³⁵

5.2.5 Mechanical/Electrical

No significant deficiencies of the mechanical components of the system with respect to current design criteria were noted in the review of available documentation.

5.3 Levee Safety Issues

Table 1 contains a summary of all the Levee Safety Issues sorted by category and rated item. This table includes a recommendation on the proper corrective action as well as an indication as to the urgency of each issue.

³⁴ "Flood Insurance Study - Westchester County, New York (All Jurisdictions) Volume 1 of 3", FEMA Dated 28 September 2007, page 48

³⁵ USACE EM 1110-2-1619, *Risk-Based Analysis for Flood Damage Reduction Studies*, dated 1 August 1996

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PART VI. LEVEE SAFETY ISSUES

6.1 Introduction

This section has been developed to discuss the recommendations and conclusions related to the items identified in Part V. References made in this section to USACE standards and guidelines include the United States Army Corps of Engineers *Levee Owner's Manual for Non-Federal Flood Control Works*, March 2006, as well as other standards that can be obtained at: http://www.usace.army.mil/LeveeSafety/KeyDocuments/Pages/lev_keydocs.aspx.

6.1.1 General Items for All Flood Damage Reduction Segments/Systems

The public sponsor must obtain a copy of the 1989 Operation and Maintenance (O&M) manual and use it to develop a current manual. The manual should incorporate the inspection and maintenance of Saw Mill River channel downstream of the project improved FDRC, as well as contact information indentifying those responsible for the O&M of intersecting utilities and highways. A memorandum of understanding with these entities would assist in the future coordination of maintenance and operation. It would be beneficial if the new manual were to include system specific monitoring of system performance associated with significant storm events. Federal Regulation 33 CFR Section 208.10 requires inspections following a major high water period. With a current O&M, the public sponsor can develop an Emergency Action Plan that addresses potential flooding. The public sponsor must acquire and maintain a supply of flood fighting materials in accordance with the Emergency Action Plan.

The specifications indicate that an Early Warning System was to be installed and connected to the Ardsley Police Department. There was no mention of this system in the O&M manual or by the public sponsor during the PI. We recommend that the reason why this was not included in the project be determined.

6.1.2 Floodwalls

Municipal, utility, or private party encroachments need to be surveyed to determine whether they lie within the boundary of the project easement. Encroachments should be either removed if inappropriate or documented as acceptable. The flap gate on the 8 inch drainage line should be repaired immediately as this is a breach in the flood protection.

Flood water has been reported flowing north from Ardsley Square toward ponding area #2 on the protected side of the channel/floodwall. The existing gaps exist between the arched superstructure of Old Ashford Ave. Bridge deck and the top of the floodwall are the likely source. The full depth of these voids should be filled with masonry and sealed with hydraulic cement.

Vegetation should be removed from the vegetative-free zones adjacent to the exposed and protected sides of the floodwall in accordance with USACE guidelines. Much of this work should be performed by hand due to the configuration of the wall and its proximity to the river and the ponding area. When this is complete, an inspection can be made of the southernmost 200 feet of the floodwall that was inaccessible during the PI.

The construction at Ardsley Square intercepted several drainage conveyances. A pair of HDPE pipes beneath the Old Ashford Ave. Bridge were found to empty into the channel at this location. As the size of these culverts do not match those listed on the as-built drawing, it is uncertain if these culverts are the same conveyances that were encountered during construction. Therefore, it is imperative to determine the location and elevation of the inlet of these culverts.

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Eliminate all burrowing animals from the project and completely fill in their burrows in accordance with USACE guidelines. Any slumping of the floodwall embankment caused by the burrows as well as tree removal shall be regraded, topsoiled, seeded, and mulched in accordance with USACE guidelines. Remove all debris from within the vegetative-free zone of the floodwall.

The archive contained no documentation explaining why the non-structural flood proofing was not found on two structures. The design was to provide a between 15 and 70-year level of protection for three structures.³⁶ It would be prudent to document the owners' lack of interest in providing flood protection for their property or to re-evaluate these structures with respect to a new H&H study. The owners of building # 1, which was improved, should be advised that the bottom of their electrical panel might be subject to flooding as it is at an elevation that is lower than the top of non-structural floodproofing that protects the structure.

The public sponsor must make repairs to the cracking and spalling noted at the locations noted along the floodwall in accordance with USACE guidelines. The damaged masonry of the Saw Mill River Road abutment should be brought to the attention of the responsible authority.

6.1.3 Interior Drainage System

The vegetation in the two ponding areas should be maintained in accordance with USACE guidelines. The local sponsor has expressed their inability to maintain these areas with their standard mowing equipment. Ponding area #1 should be maintained by hand, as no access was provided for equipment. Ponding area #2 may have a water table that is too high to support the growth of grasses as it is overgrown with a mix of wetland facultative vegetation. The public sponsor is seeking the input of the Corps as to how to maintain the grass cover or what alternatives to grass may exist.

A maintenance program should be established to mow, clean, remove sediments, and repair the interceptor ditches and related structures. Once the NYCDEP contractor has completed their work, the intake structure/blow-off tunnel connection should be inspected. Sinkholes and voids adjacent to drop inlet #s 3 and 4 should be excavated and the problem that is creating them repaired.

Municipal, utility, or private party encroachments listed in section 5.1.4 need to be surveyed to determine whether they lie within the boundary of the project easement. Encroachments should be either removed if inappropriate or documented as acceptable.

The sluice gates and flap gates should be maintained, inspected, and operated in accordance with USACE guidelines. Sediment should be removed between the discharge of the drainage structure and the river.

All culverts should be cleaned regularly, kept cleared of debris, and undergo a thorough video inspection every five (5) years.

³⁶ "Saw Mill River at Ardsley, New York - General Design Memorandum (Phase II - Project Design)", USACE, dated 4 April 1983, page 3

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6.1.4 Flood Damage Reduction Channels

Vegetation growing on the embankments and behind channel walls should be removed in accordance with USACE guidelines.

A program is needed to monitor the channels for debris, especially downed trees, and to remove them promptly. The local public sponsor must include the practice of maintaining the Saw Mill River channel below the upper upstream area of the FRMP.

Municipal, utility, or private party encroachments listed in section 5.1.5 need to be surveyed to determine whether they lie within the boundary of the project easement. Encroachments should be either removed if inappropriate or documented as acceptable. The wood walkway along the channel wall should be replaced. This should make a connection to DS #1 as well as ponding area #1.

Shoaling of sediments in the channel should be removed and scours repaired in accordance with USACE guidelines. The Corps must encourage the public sponsor to maintain the channel and the interior drainage that leads to it on the south side of Ashford Avenue.

The public sponsor should be encouraged to engage those responsible for the rights of way that cross the FDRC to join them in a memorandum of understanding. Such a memo would address, for example, the maintenance of the abutment of the Ashford Avenue viaduct as its deteriorating condition could affect the performance of the channel at its base.

The As-built plans indicate that the Conrail Bridge was removed as part of the project. During the PI, the inspectors found that the railroad was converted into a pedestrian walkway with a new bridge over the Saw Mill River. The Corps archives did not contain information on this new bridge or the effect its abutments may have on the hydraulics of the river. The installation of pedestrian bridge should be investigated.

6.2 Certification

The current FEMA Flood Insurance Study states, “currently, there are no structural measures of flood protection for the Village of Ardsley.”³⁷ The FRMP at Ardsley was designed to provide protection against a flood of the Saw Mill River with a return period of 167 years.³⁸ The level of protection provided includes three to five feet of freeboard above the design flow thereby satisfying FEMA requirement for this criterion³⁹.

Satisfying this criteria is a critical component in determining if a FRMP is suitable for certification under 44 CFR Section 65.10. The public sponsor’s apparent lack of compliance with the Project Agreement, noted in section 5.1.2.5, could be grounds for the Ardsley FRMP not to be incorporated into the program.

³⁷ “Flood Insurance Study - Westchester County, New York (All Jurisdictions) Volume 1 of 3”, FEMA dated 28 September 2007, page 48

³⁸ "Saw Mill River at Ardsley, New York - General Design Memorandum (Phase II - Project Design)", USACE, dated 4 April 1983, page 12

³⁹ Ibid, page B-3

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6.3 Next Periodic Inspection

The schedule for the next Periodic Inspection is yet to be determined. The next Routine/Annual Inspection should be scheduled for FY 2012.

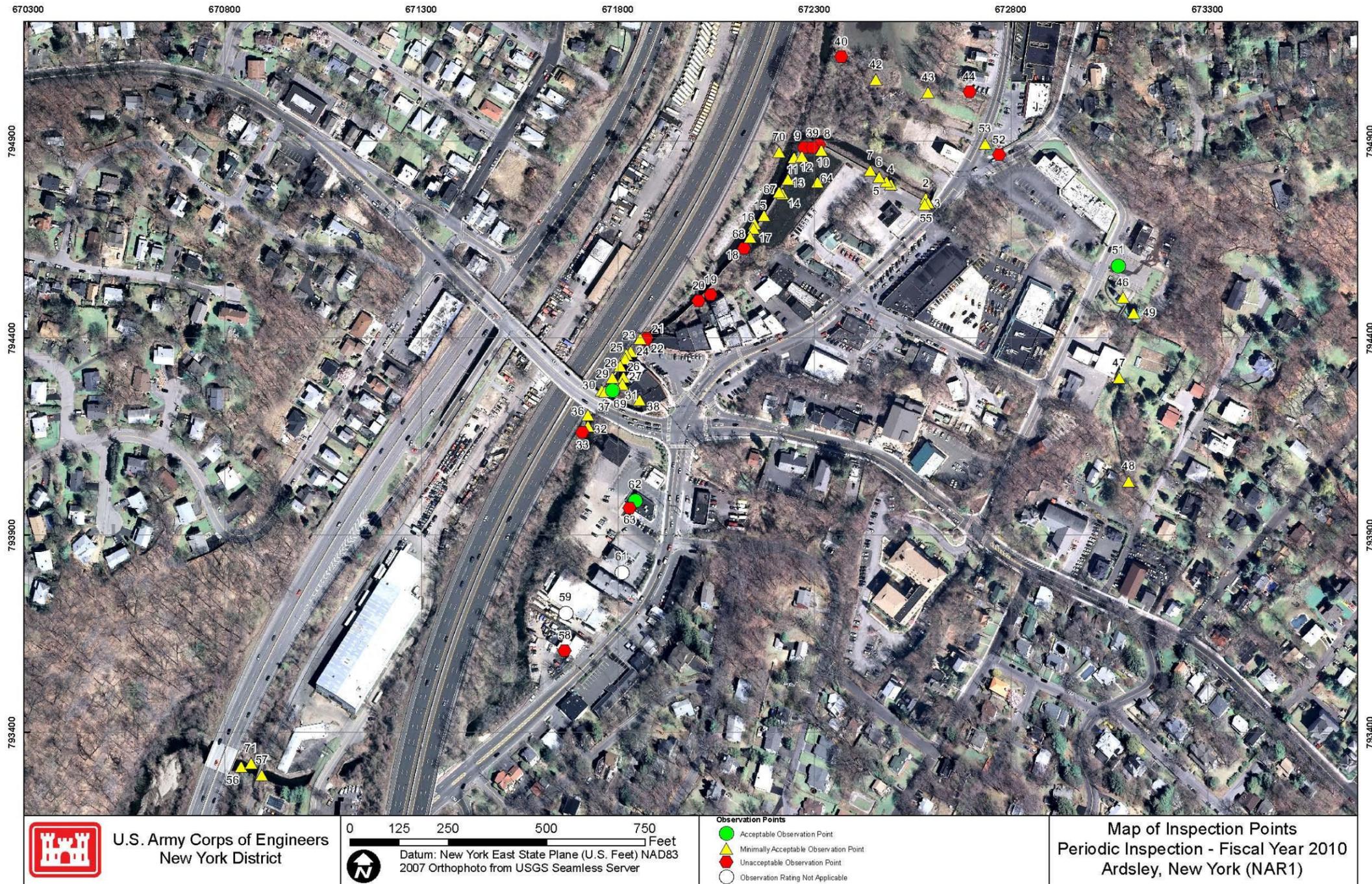


Figure 2. Map of inspection points for the 2010 Periodic Inspection of the Ardsley, Saw Mill River Left Bank, Flood Risk Management Project

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Table 1: Summary of Levee Safety Issues

Category / Rated Item	Levee Safety Issue	Repair / Evaluation Recommendation	Impact on System Performance ¹	Item Rating ²
General Items				
1. O & M Manuals	Neither the State nor the Village of Ardsley has a copy of an O&M manual.	The public sponsor must obtain the O&M manual and develop a current one.	Immediate	M
2. Emergency Supplies	There are no flood-fighting supplies.	The public sponsor needs to acquire and maintain a supply of flood fighting materials.	Future	M
3. Flood Preparedness	They have no written Emergency Action Plan nor have they been tested by a flood. An Early Warning System was to be installed and connected to the Ardsley Police Department.	The public sponsor must develop an Emergency Action Plan. The O&M manual does not refer to the warning system – the Corps should look into this.	Future	M
Floodwalls				
1. Unwanted Vegetation Growth	Vegetation and trees >2 inches in diameter are growing against the floodwall.	Maintain vegetation in accordance with USACE guidelines. Much of this work should be performed by hand.	Immediate	U
2. Encroachments	An undocumented 8 inch diameter ductile iron pipe is a breach in the flood protection as it penetrates the floodwall. Animal burrows were found next to the floodwall. A utility pole and chain-link fence were noted to be immediately adjacent.	The 8 inch flap gate should be repaired immediately. Eliminate all burrowing animals from the project and completely fill in their burrows. Verify and monument the limits of the project easements in the field.	Immediate	U
3. Closure Structures	No documentation for why the non-structural flood proofing was not found on two structures.	A dialog with the current owners is prudent. This may lead to an updated study.	Immediate	U
4. Concrete Surfaces	Gaps exist between the arched superstructure of Old Ashford Ave. Bridge deck and the top of the floodwall. Spalling and cracking of concrete surface and horizontal joint at top of wall. Stones falling from Saw Mill River Rd. abutment.	The full depth of the voids beneath old Ashford Ave. Bridge should be filled with masonry and sealed with hydraulic cement. Repair concrete in accordance with USACE guidelines. Contact the party responsible for repairing the road abutment.	Immediate	U
Interior Drainage System				
1. Vegetation and Obstructions	The ponding areas and interceptor ditches are full of vegetation.	Remove vegetation and sediment in accordance with USACE guidelines.	Immediate	U
2. Encroachments	A small drainage pipe was recently added to the right bank of interceptor ditch #1.	Verify and monument the limits of the project easements in the field.	Future	M
3. Ponding Areas	Vegetation is overgrowing ponding area #s 1 & 2.	Ponding area #1 should be maintained by hand. Ponding area #2 may have a water table that is too high for grasses. The public sponsor should determine whether to re-establish a grass cover or provide an alternative to grasses for the Corps to review.	Immediate	M
7 Foundation of Concrete Structures	A sinkhole was observed above the 30 inch drainage culvert leading from drop inlet #3 to #4.	Voids and sinkholes adjacent to these structures should be excavated and the problem that is creating them repaired.	Immediate	U

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Category / Rated Item	Levee Safety Issue	Repair / Evaluation Recommendation	Impact on System Performance¹	Item Rating²
9. Culverts/Discharge Pipes	The trash rack for outlet structure #3 contains some debris. No thorough video inspection of culverts on record.	Clean and thoroughly video inspect all culverts.	Immediate	U
10. Sluice/Slide Gates	Sediments are building up in the drainage structures. Sluice gates not properly lubricated. .	Maintain all sluice gates in accordance with USACE guidelines.	Immediate	M
10. Flap Gates/ Flap Valves/ Pinch Valves	Sediments are building in front of the flap gates. Flap gates not properly lubricated. .	Maintain all flap gates in accordance with USACE guidelines.	Immediate	M
Flood Damage Reduction Channels				
1. Vegetation and Obstructions	Vegetation was observed growing along both sides of concrete channel and along the riprap embankment. Debris and tree limbs noted in the channel.	Maintain vegetation in accordance with USACE guidelines. Debris in the channel should be removed.	Immediate	U
2. Shoaling	Sediment and debris were found accumulating in channel downstream of the old Ashford Avenue Bridge.	Remove shoals between project segments in accordance with USACE guidelines.	Future	M
3. Encroachments	The abutments of the new pedestrian bridge may interfere with the flow in the FDRC. Channel encroachments are not shown on the as-built plans. The wood walkway needs to be replaced.	The installation of pedestrian bridge should be investigated. Encroachments should be either removed if inappropriate or documented as acceptable. The sponsor should redesign and replace the walkway along the channel south of Ardsley Square.	Future	M
5. Concrete Surfaces	Scour hole at bottom of concrete channel was observed immediately downstream of the old Ashford Avenue Bridge. The concrete facade of Ashford Avenue Bridge is severely deteriorated.	Repair the damaged concrete in accordance with USACE guidelines. Contact the party responsible for repairing the bridge abutment.	Future	M
10. Riprap Revetments & Banks	Heavy vegetation growth was noted on the riprap-protected slopes on the right bank of the Saw Mill River opposite of the floodwalls.	Vegetation growing on the embankments should be removed in accordance with USACE guidelines.	Future	M

Notes. ¹Impact on System Performance: Immediate (I), Future (F), or To Be Determined (TBD). ²Item Rating from the Checklist: Acceptable (A), Minimally Acceptable (M), or Unacceptable (U).

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Appendix A.

Inspection Sign-in Sheets

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Ardsley Flood Control Project

Periodic Inspection
Sign In

7/12/2010

	Name	Organization	Cell Phone #
1	Kurt Schollmeyer	E-4	845 242 1516
2	James Trotta	E-4	914-774-5968
3	Bruce Ward	Earthworks / E4 sciences	203 788-8103
4	SALVATORE J. TRIANO	EARTHWORKS / E4 SCIENCES	203-788-8100 / ²⁷⁰ 914 419 5152
5	Bill Murphy	e4sciences / Earthworks	203-270-8100 / 203 820 7320
6	Dale O'Brien	NYS DEC	845-256-3099
7	John Harrington	NYS DEC	845-256-2273
8	Ence SHAFER	USACE	845-323-0020
9	WILLIAM MURPHY	e4sciences / EARTHWORKS	203-948-5250
10	RICHARD THOMPSON	VILLAGE OF ARDSLEY	914-406-6806
11	OLABISI KENKUN	NYS DEC ALBANY NY	518-482-9476
12	ARTHUR CRAWFORD	NYS DEC WHITEPINE	914-428-2500
13			
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Appendix B.

2009 Routine/Annual Inspection Report



US Army Corps
of Engineers®

Flood Damage Reduction System Inspection Report

Name of System: _____ Ardsley, New York _____

Public Sponsor(s): _____ NYSDEC/Village of Ardsley _____

Public Sponsor Representative: [Steve Len](#) _____

Sponsor Phone: _____ Steve Len 518-402-8142 _____

Sponsor Email: _____ selen@gw.dec.state.ny.us _____

Corps of Engineers Inspector: _____ R. Smith, and S. McDevitt _____ Date of Inspection: 27 May 2009 _____

Inspection Report Prepared By: _____ R. Smith _____ Date Report Prepared: 27 May 2009 _____

Internal Technical Review (for Periodic Inspections) By: _____ Date of ITR: _____

Final Approval By: _____ Date Approved: _____

Type of Inspection: <ul style="list-style-type: none"> <input type="checkbox"/> Initial Eligibility Inspection <input checked="" type="checkbox"/> Continuing Eligibility Inspection (Routine) <input type="checkbox"/> Continuing Eligibility Inspection (Periodic) 	Overall System Rating: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Acceptable <input type="checkbox"/> Minimally Acceptable <input type="checkbox"/> Unacceptable
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Contents of this Report: <ul style="list-style-type: none"> <input type="checkbox"/> Instructions <input type="checkbox"/> Initial Eligibility Inspection <input type="checkbox"/> General Items for All Flood Control Works <input type="checkbox"/> Levee Embankments <input type="checkbox"/> Concrete Floodwalls <input type="checkbox"/> Sheet Pile and Concrete I-walls <input type="checkbox"/> Interior Drainage System <input type="checkbox"/> Pump Stations <input type="checkbox"/> FDR system Channels 	Note: In addition to the report contents indicated here, a plan view drawing of the system, with stationing, should be included with this report to reference locations of items rated less than acceptable. Photos of general system condition and any noted deficiencies should also be attached.
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**US Army Corps
of Engineers®**

Flood Damage Reduction System Public Sponsor Pre-Inspection Report

The following information is to be provided by the levee district sponsor prior to an inspection. This information will be used to help evaluate the organizational capability of the levee district to manage the levee system maintenance program.

1. Levee system and district: (name of the system and levee district)
2. Reporting period: (month/day/year to month/day/year)
3. Summary of maintenance required by last inspection report:
4. Summary of maintenance performed this reporting period:
5. Summary of maintenance planned next reporting period:
6. Summary of changes to system since last inspection:
7. Problems/ issues requiring the assistance of the US Army Corps of Engineers:

Public Sponsor Pre-Inspection Report

The following information is to be provided by the levee district sponsor prior to an inspection

8. Levee district organization: (elected or appointed levee district officials and key employees)				
Name	Position	Mailing Address	Phone Number	Email Address

General Instructions for the Inspection of Flood Damage Reduction Systems

A. Purpose of USACE Inspections:

The primary purpose of these inspections is to prevent loss of life and catastrophic damages; preserve the value of Federal investments, and to encourage non-Federal sponsors to bear responsibility for their own protection. Inspections should assure that Flood Damage Reduction structures and facilities are continually maintained and operated as necessary to obtain the maximum benefits. Inspections are also conducted to determine eligibility for Rehabilitation Assistance under authority of PL 84-99 for Federal and non-Federal systems. (ER 1130-2-530, ER 500-1-1)

B. Types of Inspections:

The Corps conducts several types of inspections of Flood Damage Reduction systems, as outlined below:

Initial Eligibility Inspections	Continuing Eligibility Inspections	
	Routine Inspections	Periodic Inspections
IEIs are conducted to determine whether a non-Federally constructed Flood Damage Reduction system meets the minimum criteria and standards set forth by the Corps for initial inclusion into the Rehabilitation and Inspection Program.	RIIs are intended to verify proper maintenance, owner preparedness, and component operation.	PIIs are intended to verify proper maintenance and component operation and to evaluate operational adequacy, structural stability, and safety of the system. Periodic Inspections evaluate the system's original design criteria vs. current design criteria to determine potential performance impacts, evaluate the current conditions, and compare the design loads and design analysis used against current design standards. This is to be done to identify components and features for the sponsor that need to be monitored more closely over time or corrected as needed. (Periodic Inspections are used as the basis of risk assessments.)

C. Inspection Boundaries:

Inspections should be conducted so as to rate Flood Damage Reduction "systems" as complete and independent units, regardless of relevant "project" or "segment" boundaries.

Project	System	Segment
A flood damage reduction project is made up of one or more flood damage reduction systems which were under the same authorization.	A flood damage reduction system is made up of one or more flood damage reduction segments which collectively provide flood damage reduction to a defined area. Failure of one segment within a system constitutes failure of the entire system. Failure of one system does not affect another system.	A flood damage reduction segment is defined as a discrete portion of a flood damage reduction system that is operated and maintained by a single entity. A flood damage reduction segment can be made up of one or more features (levee, floodwall, pump stations, etc).

D. Land Use Definitions:

The following three definitions are intended for use in determining minimum required inspection intervals and initial requirements for inclusion into the Rehabilitation and Inspection Program. Inspections should be considered for all systems that would result in significant environmental or economic impact upon failure regardless of specific land use.

Agricultural	Rural	Urban
Protected population in the range of zero to 5 households per square mile protected.	Protected population in the range of 6 to 20 households per square mile protected.	Greater than 20 households per square mile; major industrial areas with significant infrastructure investment. Some protected urban areas have no permanent population but may be industrial areas with high value infrastructure with no overnight population.

E. Use of the Inspection Report Template:

The report template is intended for use in all Army Corps of Engineers inspections of levee and floodwall systems and flood damage reduction channels. The section of the template labeled "Initial Eligibility" only needs to be completed during Initial Eligibility Inspections of Non-Federally constructed Flood Damage Reduction Systems. The section labeled "General Items" needs to be completed with every inspection, along with all other sections that correspond to features in the system. The section labeled "Public Sponsor Pre-Inspection Report" is intended for completion before the inspection, if possible.

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F. Individual Item / Component Ratings:

Assessment of individual components rated during the inspection should be based on the criteria provided in the inspection report template, though inspectors may incorporate additional items into the report based on the characteristics of the system. The assessment of individual components should be based on the following definitions.

Acceptable Item	Minimally Acceptable Item	Unacceptable Item
The inspected item is in satisfactory condition, with no deficiencies, and will function as intended during the next flood event.	The inspected item has one or more minor deficiencies that need to be corrected. The minor deficiency or deficiencies will not seriously impair the functioning of the item as intended during the next flood event.	The inspected item has one or more serious deficiencies that need to be corrected. The serious deficiency or deficiencies will seriously impair the functioning of the item as intended during the next flood event.

G. Overall System Ratings:

Determination of the overall system rating is based on the definitions below. Note that an Unacceptable System Rating may be either based on an engineering determination that concluded that noted deficiencies would prevent the system from functioning as intended during the next flood event, or based on the sponsor's demonstrated lack of commitment or inability to correct serious deficiencies in a timely manner.

Acceptable System	Minimally Acceptable System	Unacceptable System
All items or components are rated as Acceptable.	One or more items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the system from performing as intended during the next flood event.	One or more items are rated as Unacceptable and would prevent the system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

H. Eligibility for PL84-99 Rehabilitation Assistance:

Inspected systems that are not operated and maintained by the Federal government may be Active in the Corps' Rehabilitation and Inspection Program (RIP) and eligible for rehabilitation assistance from the Corps as defined below:

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
The system is active in the RIP and eligible for PL84-99 rehabilitation assistance.	The system is Active in the RIP during the time that it takes to make needed corrections. Active systems are eligible for rehabilitation assistance. However, if the sponsor does not present USACE with proof that serious deficiencies (which had previously resulted in a minimally acceptable system rating) were corrected within the established timeframe, then the system will become Inactive in the RIP.	The system is Inactive in the RIP, and the status will remain Inactive until the sponsor presents USACE with proof that all items rated Unacceptable have been corrected. Inactive systems are ineligible for rehabilitation assistance.

I. Reporting:

After the inspection, the Corps is responsible for assembling an inspection report (or a summary report if it was a Periodic Inspection) including the following information:

- a. All sections of the report template used during the inspection, including the cover and pre-inspection materials. (Supplemental data collected, and any sections of the template that weren't used during the inspection do not need to be included with the report.)
- b. Photos of the general system condition and noted deficiencies.
- c. A plan view drawing of the system, with stationing, to reference locations of items rated less than acceptable.
- d. The relative importance of the identified maintenance issues should be specified in the transmittal letter.
- e. If the Overall System Rating is Minimally Acceptable, the report needs to establish a timeframe for correction of serious deficiencies noted (not to exceed two years) and indicate that if these items are not corrected within the required timeframe, the system will be rated as Unacceptable and made Inactive in the Rehabilitation Inspection Program.

J. Notification:

Reports are to be disseminated as follows within 30 days of the inspection date.

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
Reports need to be provided to the local sponsor and the county emergency management agency.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, and to the FEMA region.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, FEMA region, and to the Congressional delegation within 30 days of the inspection.



General Items for All Flood Damage Reduction Systems

For use during all inspections of all Flood Damage Reduction Systems

Rated Item	Rating	Rating Guidelines		Location/ Remarks/ Recommendations
1. Operations and Maintenance Manuals	A	A	Levee Owner's Manual, O&M Manuals, and/or manufacturer's operating instructions are present.	
		M	Sponsor manuals are lost or missing or out of date; however, sponsor will obtain manuals prior to next scheduled inspection.	
		U	Sponsor has not obtained lost or missing manuals identified during previous inspection.	
2. Emergency Supplies and Equipment (A or M only)	A	A	The sponsor maintains a stockpile of sandbags, shovels, and other flood fight supplies which will adequately supply all needs for the initial days of a flood fight. Sponsor determines required quantity of supplies after consulting with inspector.	
		M	The sponsor does not maintain an adequate supply of flood fighting materials as part of their preparedness activities.	
3. Flood Preparedness and Training (A or M only)	A	A	Sponsor has a written system-specific flood response plan and a solid understanding of how to operate, maintain, and staff the FDR system during a flood. Sponsor maintains a list of emergency contact information for appropriate personnel and other emergency response agencies.	
		M	The sponsor maintains a good working knowledge of flood response activities, but documentation of system-specific emergency procedures and emergency contact personnel is insufficient or out of date.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
1. Unwanted Vegetation Growth ¹	A	A A grass-only or paved zone is maintained on both sides of the floodwall, free of all trees, brush, and undesirable weeds. The vegetation-free zone extends 15 feet from both the land and riverside of the floodwall, at ground-level, to the centerline of the tree. Additionally, an 8-foot root-free zone is maintained around the entire structure, including the floodwall toe, heel, and any toe-drains. If the floodwall access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 and/or Corps policy for regional vegetation variance.	
		M Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the floodwall.	
		U Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above. This vegetation threatens the operation or integrity of the floodwall and must be removed.	
2. Encroachments	A	A No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the floodwall.	
		M Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the floodwall.	
3. Closure Structures (Stop Log Closures and Gates) (A or U only)	N/A	A Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in	
		U Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of ins	
		N/A There are no closure structures along this component of the FDR system.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
4. Concrete Surfaces	A	A Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	
		M Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
5. Tilting, Sliding or Settlement of Concrete Structures ¹	A	A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
6. Foundation of Concrete Structures ²	A	A No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stable until the next inspection.	
		U Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	

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¹ The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

² Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
7. Monolith Joints	A	A The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
		M The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
		U The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A There are no monolith joints in the floodwall.	
8. Underseepage Relief Wells/ Toe Drainage Systems	A	A Toe drainage systems and pressure relief wells necessary for maintaining FDR system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which wo	
		M Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance records are incomplete or indicate irregular cleaning and pump testing.	
		U Toe drainage systems or pressure relief wells necessary for maintaining FDR system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
		N/A There are no relief wells/ toe drainage systems along this component of the FDR system.	
9. Seepage	A	A No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U Evidence or history of active seepage, extensive saturated areas, or boils.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines		Location/ Remarks/ Recommendations
1. Vegetation and Obstructions	A	A	No obstructions, vegetation, debris, or sediment accumulation noted within interior drainage channels or blocking the culverts, inlets, or discharge areas. Concrete joints and weep holes are free of grass and weeds.	
		M	Obstructions, vegetation, debris, or sediment are minor and have not impaired channel flow capacity or blocked more than 10% of any culvert openings, but should be removed. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.	
		U	Obstructions, vegetation, debris, or sediment have impaired the channel flow capacity or blocked more than 10% of a culvert opening. Sediment and debris removal required to re-establish flow capacity.	
2. Encroachments	A	A	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the interior drainage system.	very minor debris problem noted along the length of the project: occasional shopping bag, potato chip bag, soda cans, ecetera. Fallen leaves were noted but not in significant quantities to cause a problem.
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of this component of the interior drainage system.	
3. Ponding Areas	A	A	No trash, debris, structures, or other obstructions present within the ponding areas. Sediment deposits do not exceed 10% of capacity.	
		M	Trash, debris, excavations, structures, or other obstructions present, or inappropriate activities that will not inhibit operations and maintenance. Sediment deposits do not exceed 30% of capacity.	
		U	Trash, debris, excavations, structures, or other obstructions, or other encroachments or activities noted that will inhibit operations, maintenance, or emergency work. Sediment deposits exceeds 30% of capacity.	
		N/A	There are no ponding areas associated with the interior drainage system.	
4. Fencing and Gates ¹	A	A	Fencing is in good condition and provides protection against falling or unauthorized access. Gates open and close freely, locks are in place, and there is little corrosion on metal parts.	
		M	Fencing or gates are damaged or corroded but appear to be maintainable. Locks may be missing or damaged.	
		U	Fencing and gates are damaged or corroded to the point that replacement is required, or potentially dangerous features are not secured.	
		N/A	There are no features noted that require safety fencing.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ Proper operation of this item must be demonstrated during the inspection.

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
5. Concrete Surfaces (Such as gate wells, outfalls, intakes, or culverts)	A	A Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	
		M Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A There are no concrete items in the interior drainage system.	
6. Tilting, Sliding or Settlement of Concrete and Sheet Pile Structures ¹ (Such as gate wells, outfalls, intakes, or culverts)	A	A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
		N/A There are no concrete items in the interior drainage system.	
7. Foundation of Concrete Structures ² (Such as culverts, inlet and discharge structures, or gatewells.)	A	A No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. The rate of erosion is such that the structure is expected to remain stable until the next inspection.	
		U Erosion or bank caving observed that may lead to structural instabilities before the next inspection.	
		N/A There are no concrete items in the interior drainage system.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

¹ The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

² Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
8. Monolith Joints	N/A	A	The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.
		M	The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.
		U	The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.
		N/A	There are no monolith joints in the interior drainage system.
9. Culverts/Discharge Pipes ¹	A	A	There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are
		M	There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does no
		U	Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judg
		N/A	There are no discharge pipes/ culverts.

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¹ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

Interior Drainage System



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For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
10. Sluice / Slide Gates ¹	A	A Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.	
		M Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.	
		U Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.	
		N/A There are no sluice/ slide gates.	
11. Flap Gates/ Flap Valves/ Pinch Valves ²	A	A Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	
		M Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A There are no flap gates.	
12. Trash Racks (non-mechanical)	A	A Trash racks are fastened in place and properly maintained.	
		M Trash racks are in place but are unfastened or have bent bars that allow debris to enter into the pipe or pump station, bars are corroded to the point that up to 10% of the sectional area may be lost. Repair or replacement is required.	
		U Trash racks are missing or damaged to the extent that they are no longer functional and must be replaced. (For example, more than 10% of the sectional area may be lost.)	
		N/A There are no trash racks, or they are covered in the pump stations section of the report.	
13. Other Metallic Items	N/A	A All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.	
		M Corrosion seen on metallic parts appears to be maintainable.	
		U Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.	
		N/A There are no other significant metallic items.	

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¹ Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

² Proper operation of this item must be demonstrated during the inspection.

Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/ Remarks/ Recommendations
14. Riprap Revetments of Inlet/ Discharge Areas	N/A	A	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees
		N/A	There is no riprap protecting this feature of the system, or riprap is discussed in another section.
15. Revetments other than Riprap	N/A	A	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.
		U	Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees
		N/A	There are no such revetments protecting this feature of the system.

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable. FDR = Flood Damage Reduction

Flood Damage Reduction System Supplemental Data Sheet

This form is intended for the Corps' internal use and may not need to be updated with every inspection.

Name of System: Sponsor: Location: River Basin: Project Description: Authority that Project was Constructed Under: Date of Construction: Approximate Annual Maintenance Costs: Construction: <input type="checkbox"/> Federally Constructed <input type="checkbox"/> Non-Federally Constructed Maintenance: <input type="checkbox"/> Federally Maintained <input type="checkbox"/> Non-Federally Maintained	
National Flood Insurance Program: a. Is the project currently in the NFIP? <input type="checkbox"/> Yes <input type="checkbox"/> No b. If in the NFIP, Date of Certification (per 44 CFR 65.10):	
Datum Information: a. Datum used for the design and construction of this project is: b. Current recommended datum for this project is: c. Has the project been converted to the current recommended datum? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Levee Embankment Data: a. Levee Designed Gage Function Reading/Station: b. Level of Protection Provided: c. Average Height of Levee: d. Average Crown Width: e. Average Side Slope:	Protected Features (For use in preparing estimates and PIRs): a. Total acres protected: b. Total agricultural production acres protected: c. Towns: d. Businesses: e. Residences: f. Roads: g. Utilities: h. Barns: i. Machine Sheds: j. Outbuildings: k. Irrigation Systems: l. Grain Bins: m. Other Facilities:



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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

Periodic Inspection Report No.1

Draft August 2011; ITR September 2011, Final January 2012

Appendix C.

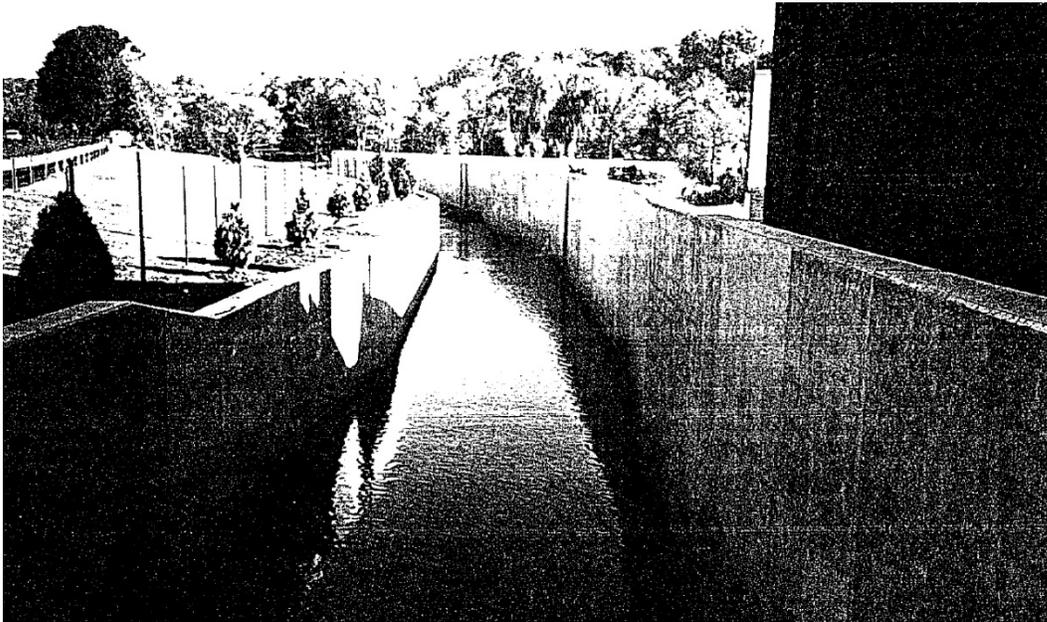
Selected Photographs

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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

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Draft August 2011; ITR September 2011, Final January 2012



From O&M manual 1989. View looking upstream at the improved concrete channel. Note the landscaping trees above the right-bank wall.



July 12, 2010. Looking upstream along the concrete channel. Vegetation encroachment on both sides of channel.

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Flood Risk Management Project

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From O&M manual 1989. View looking downstream from blowoff channel confluence. Floodwall is on the left.



July 12, 2010. Looking upstream towards blowout tunnel. Floodwall is on the right.

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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

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Draft August 2011; ITR September 2011, Final January 2012



From O&M manual 1989. View of ponding area No. 2 with floodwall and drainage structure No. 4 in background.



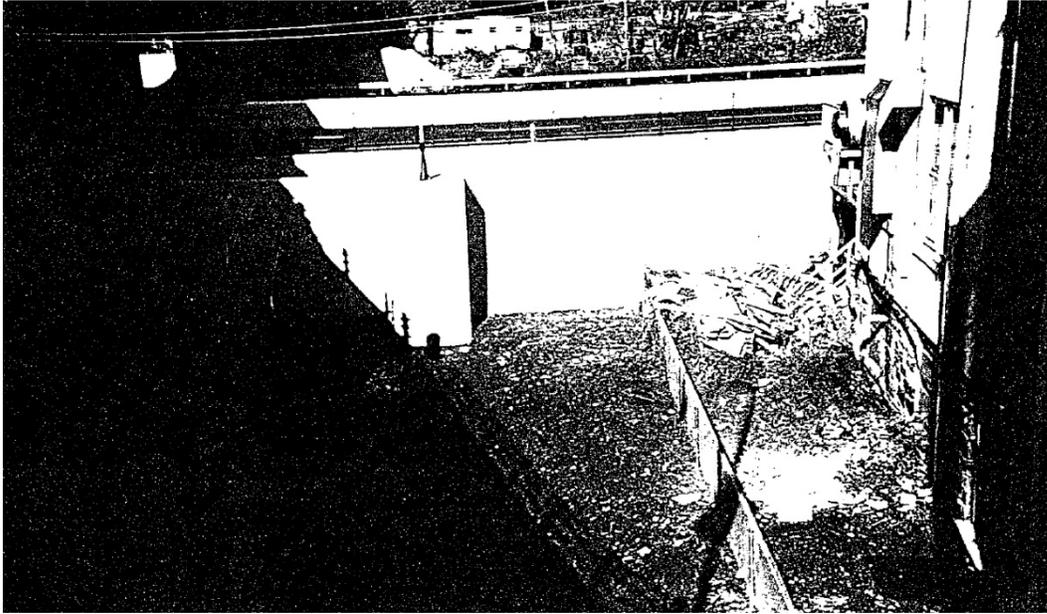
July 12, 2010. Ponding area No. 2 overgrown with vegetation. Drainage structures #3 (far) and #4 (near) along floodwall.

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Flood Risk Management Project

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From O&M manual 1989. View from Ashford Avenue of ponding area No. 1 with drainage structure No. 1.



July 12, 2010. Ponding area No. 1 with drainage structure No. 1. Note vegetation in the basin and along the fence.

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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

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From O&M manual 1989. View of outlet from blowoff tunnel and junction chamber No. 1.



July 12, 2010. Outlet of blowoff tunnel. Grill removed and leaning against the concrete wall (photo right) to give access to NYCDEP contractor. Riprap slope covered with vegetation.

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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

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Draft August 2011; ITR September 2011, Final January 2012



From O&M manual 1989. View of upstream end of project showing automatic drainage gate for DS#4 in concrete wall and riprapped right bank of channel.



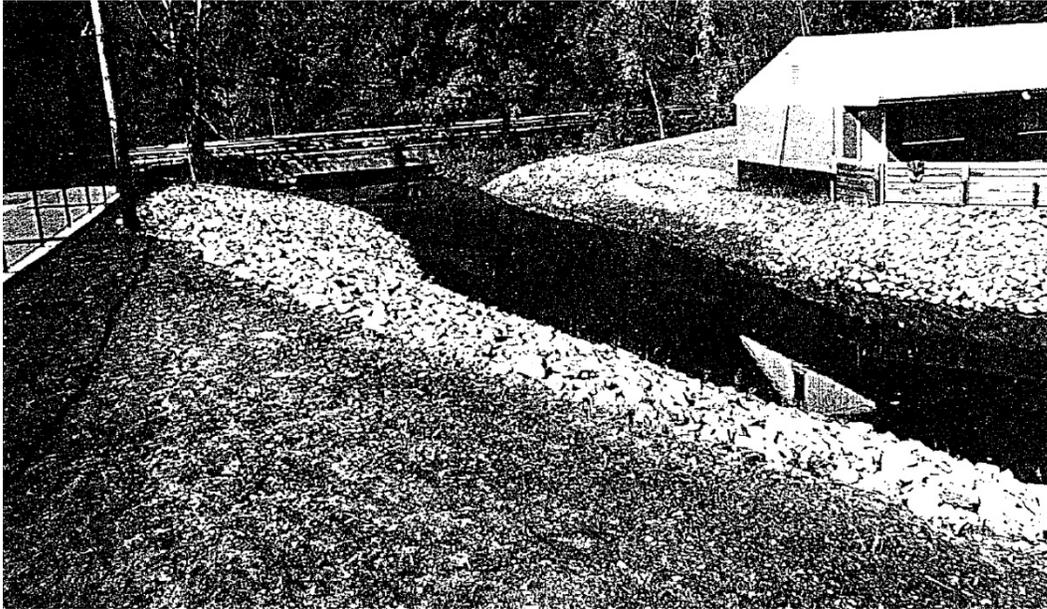
July 12, 2010. Automatic drainage gate for DS#4 in left-bank concrete wall.

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Flood Risk Management Project

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Draft August 2011; ITR September 2011, Final January 2012



From O&M manual 1989. View of downstream area earthen channel improvement. Note clear riprap lining channel banks. Old railroad bridge in the background.



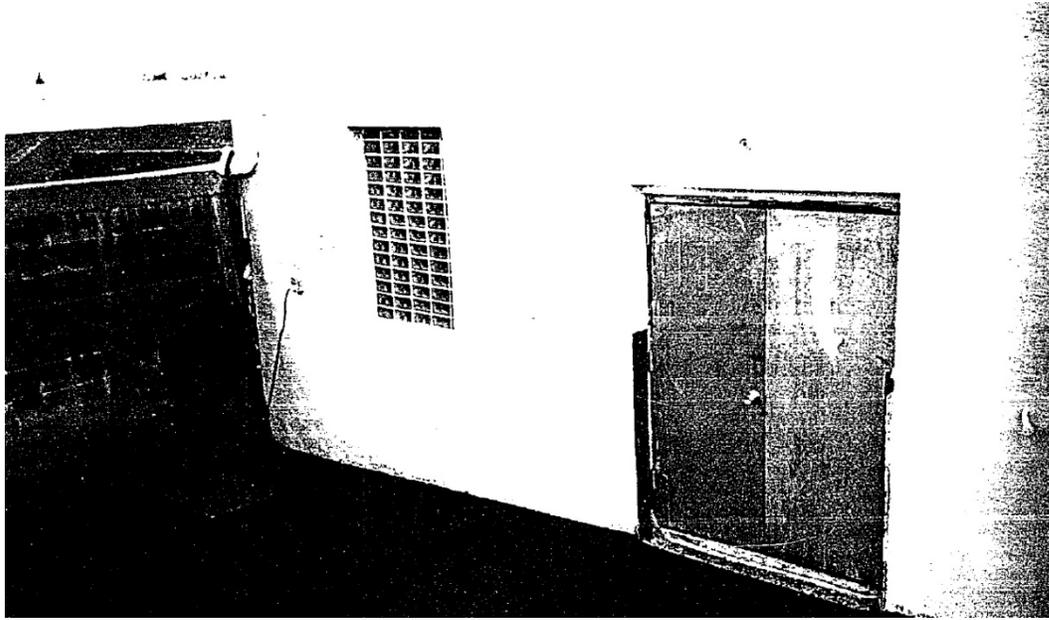
July 12, 2010. Downstream along earthen channel improvement from immediately downstream of the Elm Street Bridge. Note dense vegetation growing along channel banks and within riprap.

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Flood Risk Management Project

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From O&M manual 1989. View of floodproofing of structure No. 1., waterproof door, provisions for a portable sump pump, glass bricked windows.



July 12, 2010. Flood-shield door and glass-bricked windows at Structure No. 1.

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July 12, 2010. Signage for Ardsley Flood Risk Management Project, located in the parking lot within ponding area No. 2.

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Flood Risk Management Project

Periodic Inspection Report No.1

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Appendix D.

2010 Periodic Inspection Advanced Report (Checklist)



**US Army Corps
of Engineers®**

Flood Damage Reduction Segment / System Inspection Report

Name of Segment / System:	NAR1 - Ardsley, Saw Mill River Left Bank		
Public Sponsor(s):	NYSDEC / Village of Ardsley, NY		
Public Sponsor Representative:	John Harrington (NYSDEC) & Richard Thompson (Public Works, Ardsley)		
Sponsor Phone:	845-256-2273 (JH) & 914-406-6806 (RT)		
Sponsor Email:	jwharrin@gw.dec.state.ny.us (JH) & ardsleymanager@optonline.net (RT)		
Corps of Engineers Inspector:	Encer R. Shaffer, P.E. (USACE), Kurt Schollmeyer, P.E. (A/E)	Date of Inspection:	7/1/2010
Inspection Report Prepared By:	Kurt Schollmeyer, P.E. e4sciences Earthworks LLC	Date Report Prepared:	8/8/2011
Internal Technical Review (for Periodic Inspections) By:	Michael P. Taylor, P.E., GeoDesign, Inc.	Date of ITR:	9/9/2011
Final Approved By:		Date Approved:	

Type of Inspection:	<input type="checkbox"/> Initial Eligibility Inspection <input type="checkbox"/> Continuing Eligibility Inspection (Routine) <input checked="" type="checkbox"/> Continuing Eligibility Inspection (Periodic)	Overall Segment / System Rating:	<input type="checkbox"/> Acceptable <input type="checkbox"/> Minimally Acceptable <input type="checkbox"/> Unacceptable
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Contents of Report:	<input checked="" type="checkbox"/> Instructions <input type="checkbox"/> Initial Eligibility Inspection <input checked="" type="checkbox"/> General Items for All Flood Control Works <input type="checkbox"/> Levee Embankment <input checked="" type="checkbox"/> Concrete Floodwalls <input type="checkbox"/> Sheet Pile and Concrete I-walls <input checked="" type="checkbox"/> Interior Drainage System <input type="checkbox"/> Pump Stations <input checked="" type="checkbox"/> FDR System Channels	<p>Note: In addition to the report contents indicated here, a plan view drawing of the system, with stationing, should be included with this report to reference locations of items rated less than acceptable. Photos of general system condition and any noted deficiencies should also be attached.</p> <p>Note: This inspection rating represents the Corps evaluation of operations and maintenance of the flood damage reduction system and may be used in conjunction with other information for a levee certification determination for National Flood Insurance Program (NFIP) purposes if applicable. An Acceptable Corps inspection rating, alone, does not equate to a certifiable levee for the NFIP. It is recommended for levee systems currently accredited by the Federal Emergency Management Agency (FEMA) for NFIP purposes receiving a Corps Minimally Acceptable or Unacceptable rating be evaluated by the levee owner to determine the potential impacts to the certification for FEMA.</p>
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**US Army Corps
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Flood Damage Reduction Segment / System Public Sponsor Pre-Inspection Form

The following information is to be provided by the levee district sponsor prior to an inspection. This information will be used to help evaluate the organizational capability of the levee district to manage the levee segment / system maintenance program.

1. Levee segment / system and district: (name of the segment / system and levee district) NAR1 - Ardsley, NY, Saw Mill River Left Bank, New York District
2. Reporting period: (month/day/year to month/day/year) 05/27/2009 to 07/01/2010
3. Summary of maintenance required by last inspection report: System rated Acceptable (Inspection report dated 05/27/2009)
4. Summary of maintenance performed this reporting period: Public sponsor cut vegetation along floodwall on the protected side in the vicinity of ponding area #2.
5. Summary of maintenance planned next reporting period: None reported.
6. Summary of changes to segment / system since last inspection: None reported.
7. Problems/ issues requiring the assistance of the US Army Corps of Engineers: No requests made.



US Army Corps
of Engineers®

**Flood Damage Reduction Segment / System
Inspection Report**

**Pre-Inspection Form
Page 1 of 2**

General Instructions for the Inspection of Flood Damage Reduction Segments / Systems

A. Purpose of USACE Inspections:

The primary purpose of these inspections is to prevent loss of life and catastrophic damages; preserve the value of Federal investments, and to encourage non-Federal sponsors to bear responsibility for their own protection. Inspections should assure that Flood Damage Reduction structures and facilities are continually maintained and operated as necessary to obtain the maximum benefits. Inspections are also conducted to determine eligibility for Rehabilitation Assistance under authority of PL 84-99 for Federal and non-Federal systems. (ER 1130-2-530, ER 500-1-1)

B. Types of Inspections:

The Corps conducts several types of inspections of Flood Damage Reduction systems, as outlined below:

Initial Eligibility Inspections	Continuing Eligibility Inspections	
	Routine Inspections	Periodic Inspections
IEIs are conducted to determine whether a non-Federally constructed Flood Damage Reduction system meets the minimum criteria and standards set forth by the Corps for initial inclusion into the Rehabilitation and Inspection Program.	RIs are intended to verify proper maintenance, owner preparedness, and component operation.	PIs are intended to verify proper maintenance and component operation and to evaluate operational adequacy, structural stability, and safety of the system. Periodic Inspections evaluate the system's original design criteria vs. current design criteria to determine potential performance impacts, evaluate the current conditions, and compare the design loads and design analysis used against current design standards. This is to be done to identify components and features for the sponsor that need to be monitored more closely over time or corrected as needed. (Periodic Inspections are used as the basis of risk assessments.)

C. Inspection Boundaries:

Inspections should be conducted so as to rate each Flood Damage Reduction "Segment" of the system. The overall system rating will be the lowest segment rating in the system.

Project	System	Segment
A flood damage reduction project is made up of one or more flood damage reduction systems which were under the same authorization.	A flood damage reduction system is made up of one or more flood damage reduction segments which collectively provide flood damage reduction to a defined area. Failure of one segment within a system constitutes failure of the entire system. Failure of one system does not affect another system.	A flood damage reduction segment is defined as a discrete portion of a flood damage reduction system that is operated and maintained by a single entity. A flood damage reduction segment can be made up of one or more features (levee, floodwall, pump stations, etc).

D. Land Use Definitions:

The following three definitions are intended for use in determining minimum required inspection intervals and initial requirements for inclusion into the Rehabilitation and Inspection Program. Inspections should be considered for all systems that would result in significant environmental or economic impact upon failure regardless of specific land use.

Agricultural	Rural	Urban
Protected population in the range of zero to 5 households per square mile protected.	Protected population in the range of 6 to 20 households per square mile protected.	Greater than 20 households per square mile; major industrial areas with significant infrastructure investment. Some protected urban areas have no permanent population but may be industrial areas with high value infrastructure with no overnight population.

E. Use of the Inspection Report

Template:

The report template is intended for use in all Army Corps of Engineers inspections of levee and floodwall systems and flood damage reduction channels. The section of the template labeled "Initial Eligibility" only needs to be completed during Initial Eligibility Inspections of Non-Federally constructed Flood Damage Reduction Systems. The section labeled "General Items" needs to be completed with every inspection, along with all other sections that correspond to features in the system. The section labeled "Public Sponsor Pre-Inspection Report" is intended for completion before the inspection, if possible.



F. Individual Item / Component

Ratings:

Assessment of individual components rated during the inspection should be based on the criteria provided in the inspection report template, though inspectors may incorporate additional items into the report based on the characteristics of the system. The assessment of individual components should be based on the following definitions.

Acceptable Item	Minimally Acceptable Item	Unacceptable Item
The inspected item is in satisfactory condition, with no deficiencies, and will function as intended during the next flood event.	The inspected item has one or more minor deficiencies that need to be corrected. The minor deficiency or deficiencies will not seriously impair the functioning of the item as intended during the next flood event.	The inspected item has one or more serious deficiencies that need to be corrected. The serious deficiency or deficiencies will seriously impair the functioning of the item as intended during the next flood event.

G. Overall Segment / System Ratings:

Determination of the overall system rating is based on the definitions below. Note that an Unacceptable System Rating may be either based on an engineering determination that concluded that noted deficiencies would prevent the system from functioning as intended during the next flood event, or based on the sponsor's demonstrated lack of commitment or inability to correct serious deficiencies in a timely manner.

Acceptable System	Minimally Acceptable System	Unacceptable System
All items or components are rated as Acceptable.	One or more items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the segment / system from performing as intended during the next flood event.	One or more items are rated as Unacceptable and would prevent the segment / system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

H. Eligibility for PL84-99 Rehabilitation

Assistance:

Inspected systems that are not operated and maintained by the Federal government may be Active in the Corps' Rehabilitation and Inspection Program (RIP) and eligible for rehabilitation assistance from the Corps as defined below:

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
The system is active in the RIP and eligible for PL84-99 rehabilitation assistance.	The system is Active in the RIP during the time that it takes to make needed corrections. Active systems are eligible for rehabilitation assistance. However, if the sponsor does not present USACE with proof that serious deficiencies (which had previously resulted in a minimally acceptable system rating) were corrected within the established timeframe, then the system will become Inactive in the RIP.	The system is Inactive in the RIP, and the status will remain Inactive until the sponsor presents USACE with proof that all items rated Unacceptable have been corrected. Inactive systems are ineligible for rehabilitation assistance.

I. Reporting:

After the inspection, the Corps is responsible for assembling an inspection report (or a summary report if it was a Periodic Inspection) including the following information:

- a. All sections of the report template used during the inspection, including the cover and pre-inspection materials. (Supplemental data collected, and any sections of the template that weren't used during the inspection do not need to be included with the report.)
- b. Photos of the general system condition and noted deficiencies.
- c. A plan view drawing of the system, with stationing, to reference locations of items rated less than acceptable.
- d. The relative importance of the identified maintenance issues should be specified in the transmittal letter.
- e. If the Overall System Rating is Minimally Acceptable, the report needs to establish a timeframe for correction of serious deficiencies noted (not to exceed two years) and indicate that if these items are not corrected within the required timeframe, the system will be rated as Unacceptable and made Inactive in the Rehabilitation Inspection Program.



J. Notification:

Reports are to be disseminated as follows within 30 days of the inspection date.

If the Overall System Rating is Acceptable	If the Overall System Rating is Minimally Acceptable	If the Overall System Rating is Unacceptable
Reports need to be provided to the local sponsor and the county emergency management agency.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, and to the FEMA region.	Reports need to be provided to the local sponsor, state emergency management agency, county emergency management agency, FEMA region, and to the Congressional delegation within 30 days of the inspection.



General Items for All Flood Damage Reduction Segments / Systems

For use during all inspections of all Flood Damage Reduction Segments / Systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
1. Operations and Maintenance Manuals	M	A Levee Owner's Manual, O&M Manuals, and/or manufacturer's operating instructions are present.	Neither the NYSDEC nor the Village of Ardsley has a copy of the 1989 O&M manual. (M)
		M Sponsor manuals are lost or missing or out of date; however, sponsor will obtain manuals prior to next scheduled inspection.	
		U Sponsor has not obtained lost or missing manuals identified during previous inspection.	
2. Emergency Supplies and Equipment (A or M only)	M	A The sponsor maintains a stockpile of sandbags, shovels, and other flood fight supplies which will adequately supply all needs for the initial days of a flood fight. Sponsor determines required quantity of supplies after consulting with inspector.	Neither the NYSDEC nor the Village of Ardsley stockpile emergency supplies. The Village does have heavy equipment available to repair damage that may occur to the FRMP. They do not stock sand bags to repair the levee. (M)
		M The sponsor does not maintain an adequate supply of flood fighting materials as part of their preparedness activities.	
3. Flood Preparedness and Training (A or M only)	M	A Sponsor has a written system-specific flood response plan and a solid understanding of how to operate, maintain, and staff the FDR system during a flood. Sponsor maintains a list of emergency contact information for appropriate personnel and other emergency response agencies.	They do not have a written Emergency Action Plan and have not been tested by flooding in several years. (M)
		M The sponsor maintains a good working knowledge of flood response activities, but documentation of system-specific emergency procedures and emergency contact personnel is insufficient or out of date.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable.
FDR = Flood Damage Reduction



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations	
1. Unwanted Vegetation Growth ¹	U	A	A grass-only or paved zone is maintained on both sides of the floodwall, free of all trees, brush, and undesirable weeds. The vegetation-free zone extends 15 feet from both the land and riverside of the floodwall, at ground-level, to the centerline of the tree. Additionally, an 8-foot root-free zone is maintained around the entire structure, including the floodwall toe, heel, and any toe-drains. If the floodwall access easement doesn't extend to the described limits, then the vegetation-free zone must be maintained to the easement limits. Reference EM 1110-2-301 and/or Corps policy for regional vegetation variance.	<p>NAR1_2010_a_0016: Vine growing on protected side of floodwall. Also some cracking and spalling.: Remove vegetation in accordance with USACE guidelines. Fill cracks and repair spalling in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0018: South of DS#3 significant vegetation (vines and trees) grow along the protected side of the floodwall for about 200 ft.: Remove vegetation in accordance with USACE guidelines. (U)</p> <p>NAR1_2010_a_0020: South of this point the inspection team was unable to inspect the protected side of the floodwall because of the dense vegetation.: Remove vegetation in accordance with USACE guidelines. (U)</p> <p>NAR1_2010_a_0008: Near the west end of the blow off channel there are large trees growing within 15 ft of the exposed side of the floodwall.: Remove vegetation in accordance with USACE guidelines. (U)</p> <p>NAR1_2010_a_0009: Adjacent to the Saw Mill River dense vegetation and trees are growing within 15 ft of the exposed side of the floodwall. Trees here range from 5 to 30 ft in height.: Remove vegetation in accordance with USACE guidelines. (U)</p>
		M	Minimal vegetation growth (brush, weeds, or trees 2 inches in diameter or smaller) is present within the zones described above. This vegetation must be removed but does not currently threaten the operation or integrity of the floodwall.	
		U	Significant vegetation growth (brush, weeds, or any trees greater than 2 inches in diameter) is present within the zones described above. This vegetation threatens the operation or integrity of the floodwall and must be removed.	
2. Encroachments	U	A	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the floodwall.	<p>NAR1_2010_a_0012: 6-inch-diameter animal burrow 3 ft. from floodwall on protected side.: Remove vegetation to expose burrows. Eliminate burrowing animals; completely fill in burrows in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0013: More animal burrows on protected side. Most appear fresh.: Remove vegetation to expose burrows. Eliminate burrowing animals; completely fill in burrows in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0015: Stumps and tree limbs adjacent to exposed face of floodwall.: Remove debris. (M)</p> <p>NAR1_2010_a_0017: Large burrow on the protected side of the floodwall. At least a foot deep.: Remove vegetation to expose burrows. Eliminate burrowing animals; completely fill in burrows in accordance with USACE guidelines (M)</p> <p>NAR1_2010_a_0019: Ductile iron drain through floodwall is not on</p>
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.	
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the floodwall.	

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 FDR = Flood Damage Reduction



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
			<p>approved plans. It has a flap gate, which is stuck open.: Repair flap gate. Investigate easement agreement and dispose of encroachment accordingly. (U)</p> <p>NAR1_2010_a_0002: NYCDEP contractor is currently working on the New Croton Aqueduct blow off tunnel that discharges into the project.: Gates and debris at the head of the blow off channel are to be removed when the work area is cleaned up. (M)</p> <p>NAR1_2010_a_0004: Large and fresh animal burrow on exposed side of floodwall.: Eliminate burrowing animals; completely fill in burrows in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0005: The embankment slope on the exposed side has a depression 5 ft. from floodwall, 6 ft. wide and 3 ft. deep. It may be the result of removing a tree.: Regrade to approved line and grade, reseed and mulch in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0006: Utility pole within 4 ft. of floodwall on protected side.: Investigate easement agreement and dispose of encroachment accordingly. (M)</p> <p>NAR1_2010_a_0007: Chain link fence encroaching on protected side of floodwall. Extends 6 ft. out from floodwall.: Investigate easement agreement and dispose of encroachment accordingly. (M)</p> <p>NAR1_2010_a_0021: Two new corrugated ADS drain pipes (8" & 4") at top of the old Ardsley bridge abutment. These drains may be on the as-built drawings (see sheet CC-ARD-417).: Inlet for both pipes should be located to determine if flap gates may be required. (U)</p>
<p>3. Closure Structures (Stop Log Closures and Gates) (A or U only)</p>	<p>U</p>	<p>A Closure structure in good repair. Placing equipment, stoplogs, and other materials are readily available at all times. Components are clearly marked and installation instructions/ procedures readily available. Trial erections have been accomplished in accordance with the O&M Manual.</p> <p>U Any of the following issues is cause for this rating: Closure structure in poor condition. Parts missing or corroded. Placing equipment may not be available within the anticipated warning time. The storage vaults cannot be opened during the time of inspection. Components of closure are not clearly marked and installation instructions/ procedures are not readily available. Trial erections have not been accomplished in accordance with the O&M Manual.</p>	<p>NAR1_2010_a_0058: Building #4: Closure structure and stop logs are unavailable or missing and owner reports having up to 6 ft. of water in the garage.: Owner should be advised that the structure can not be flood proofed without the stop log closures and flood shield in place. (U)</p> <p>NAR1_2010_a_0059: Building #3: Flood proofing improvements were not constructed. This is noted on the As-built plans. The owner reports flood water up to loading dock.: Owner</p>

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 FDR = Flood Damage Reduction



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		N/A There are no closure structures along this component of the FDR segment / system.	should be notified that the proposed USACE flood proofing improvements were not originally installed and their property may be subject to flooding. (NA) NAR1_2010_a_0061: Building #2: Addition added to back of building. Flood proofing improvements were not constructed. This is noted on the As-built plans.: Owner should be notified that the proposed USACE flood proofing improvements were not originally installed. As such their property may be subject to flooding. (NA) NAR1_2010_a_0063: Building #1. Electrical service extends below the top elevation of the flood proofing structures.: The property owner should be notified by the public sponsor that the electrical services should be raised above the elevation flood proofing structures. (U)
4. Concrete Surfaces	U	A Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	NAR1_2010_a_0011: Significant horizontal cracks and spalling on top of floodwall.: Fill cracks and repair spalling in accordance with USACE guidelines. (M) NAR1_2010_a_0003: The headwall adjacent to the NYCDEP blow off tunnel at Saw Mill River Road is visibly deteriorated. Vegetation is visible and a few stones have already fallen out.: The public sponsor must determine which municipal entity is responsible for the headwall and have the damaged repaired. (M) NAR1_2010_a_0010: Concrete spalling on recently repaired areas on the protected side of the floodwall. Damage is mainly on the curved portion of the floodwall.: Fill cracks and repair spalling in accordance with USACE guidelines. (M) NAR1_2010_a_0022: Gaps between arched superstructure of Old Ashhford Avenue Bridge deck and top of floodwall need to be sealed.: Repair gaps under bridge in accordance with USACE guidelines. (U)
		M Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
5. Tilting, Sliding or Settlement of Concrete Structures ²	A	A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U There are areas of tilting, sliding, or settlement (either active or	

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FDR = Flood Damage Reduction



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
6. Foundation of Concrete Structures ¹	A	A No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stable until the next inspection.	
		U Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
7. Monolith Joints	A	A The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	NAR1_2010_a_0055: Missing caulking in monolith joint at base of flood wall on exposed side.: Clean and reseal joints in accordance with USACE guidelines. (M)
		M The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
		U The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A There are no monolith joints in the floodwall.	
8. Underseepage Relief Wells/ Toe Drainage Systems	NA	A Toe drainage systems and pressure relief wells necessary for maintaining FDR segment / system stability during high water functioned properly during the last flood event and no sediment is observed in horizontal system (if applicable). Nothing is observed which would indicate that the drainage systems won't function properly during the next flood, and maintenance records indicate regular cleaning. Wells have been pumped tested within the past 5 years and documentation is provided.	
		M Toe drainage systems or pressure relief wells are damaged and may become clogged if they are not repaired. Maintenance	

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		records are incomplete or indicate irregular cleaning and pump testing.	
		U Toe drainage systems or pressure relief wells necessary for maintaining FDR segment / system stability during flood events have fallen into disrepair or have become clogged. No maintenance records. No documentation of the required pump testing.	
		N/A There are no relief wells/ toe drainage systems along this component of the FDR segment / system.	
9. Seepage	A	A No evidence or history of unrepaired seepage, saturated areas, or boils.	
		M Evidence or history of minor unrepaired seepage or small saturated areas at or beyond the landside toe but not on the landward slope of levee. No evidence of soil transport.	
		U Evidence or history of active seepage, extensive saturated areas, or boils.	

¹ Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

² The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

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Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0011 **Title:** USACE_CENAN_NAR1_2010_a_0011_1.jpg **Caption:** Significant cracks and spalling on top of floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0012 **Title:** USACE_CENAN_NAR1_2010_a_0012_1.jpg **Caption:** 6-inch-wide animal burrow located 3 feet from floodwall on the protected side.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0013 **Title:** USACE_CENAN_NAR1_2010_a_0013_1.jpg **Caption:** Animal burrow on protected side of floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0015 **Title:** USACE_CENAN_NAR1_2010_a_0015_1.jpg **Caption:** Debris and stumping along exposed side of floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0016 **Title:** USACE_CENAN_NAR1_2010_a_0016_1.jpg **Caption:** Vine growing on protected side of floodwall. Also note cracking and spalling.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0017 **Title:** USACE_CENAN_NAR1_2010_a_0017_1.jpg **Caption:** Large burrow on the protected side of the floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0018 **Title:** USACE_CENAN_NAR1_2010_a_0018_1.jpg **Caption:** South of DS#3 significant vegetation (vines and trees) grow along the protected side of the floodwall for about 200 ft.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0019 **Title:** USACE_CENAN_NAR1_2010_a_0019_1.jpg **Caption:** Pipe penetration of floodwall not on approved plans.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls

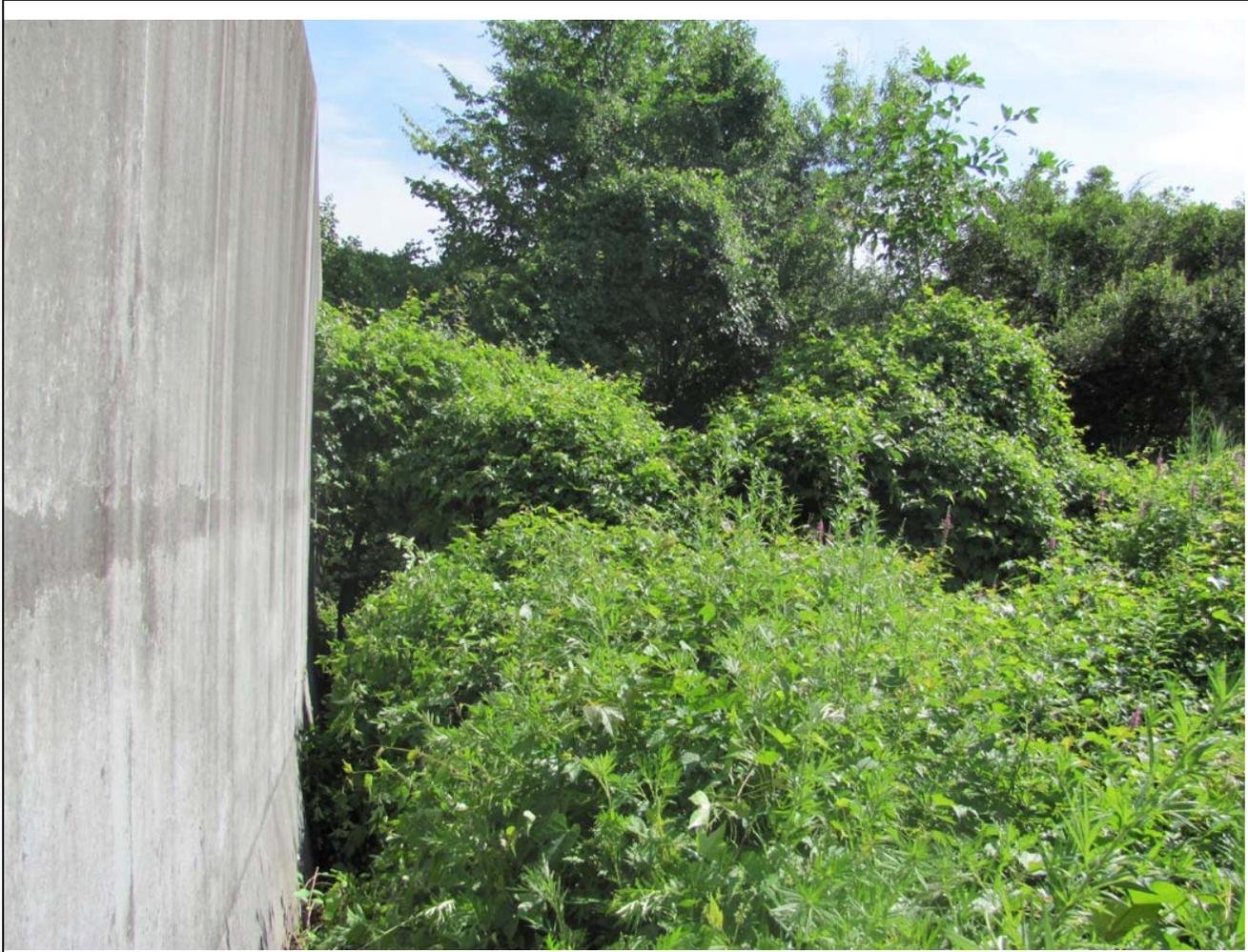


Inspect ID: NAR1_2010_a_0019 **Title:** USACE_CENAN_NAR1_2010_a_0019_2.jpg **Caption:** Undocumented drain pipe. 8" flap gate is very stiff and won't close on its own. Needs lubrication.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0020 **Title:** USACE_CENAN_NAR1_2010_a_0020_1.jpg **Caption:** Thick vegetation encroachment along protected side of floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0020 **Title:** USACE_CENAN_NAR1_2010_a_0020_2.jpg **Caption:** Thick vegetation encroachment along protected side of floodwall. South of this point the inspection team was unable to inspect the protected side of the floodwall because of the dense vegetation.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0002 **Title:** USACE_CENAN_NAR1_2010_a_0002_1.jpg **Caption:** NYCDEP contractor is currently working on the New Croton Aqueduct blow off tunnel that discharges into the project.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0003 **Title:** USACE_CENAN_NAR1_2010_a_0003_1.jpg **Caption:** The headwall adjacent to the NYCDEP blow off tunnel at Saw Mill River Road is visibly deteriorated. Vegetation is visible and a few stones have already fallen out.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0004 **Title:** USACE_CENAN_NAR1_2010_a_0004_1.jpg **Caption:** Animal burrow on the exposed side of the floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0005 **Title:** USACE_CENAN_NAR1_2010_a_0005_1.jpg **Caption:** The embankment slope on the exposed side has a depression 5 ft. from floodwall, 6 ft. wide and 3 ft. deep. It may be the result of removing a tree.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0006 **Title:** USACE_CENAN_NAR1_2010_a_0006_1.jpg **Caption:** Utility pole within 4 ft. of the floodwall on the protected side.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0007 **Title:** USACE_CENAN_NAR1_2010_a_0007_1.jpg **Caption:** Chain link fence encroaching on the protected side of the floodwall. Extends 6 ft. out from the floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0008 **Title:** USACE_CENAN_NAR1_2010_a_0008_1.jpg **Caption:** Near the west end of the blow-off channel there are large trees growing within 15 ft of the exposed side of the floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0009 **Title:** USACE_CENAN_NAR1_2010_a_0009_1.jpg **Caption:** Adjacent to the Saw Mill River dense vegetation and trees are growing within 15 ft of the exposed side of the floodwall. Trees here range from 5 to 30 ft. in height.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0010 **Title:** USACE_CENAN_NAR1_2010_a_0010_1.jpg **Caption:** Concrete spalling on recently repaired areas on the protected side of the floodwall. Damage is mainly on the curved portion of the floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0021 **Title:** USACE_CENAN_NAR1_2010_a_0021_2.jpg **Caption:** Drainage at Ardsley Square may not be properly abandoned.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0021 **Title:** USACE_CENAN_NAR1_2010_a_0021_1.jpg **Caption:** Two new corrugated ADS drain pipes (8" & 4") at top of the old Ardsley bridge abutment. These drains may be on the as-built drawings (see sheet CC-ARD-417).



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0022 **Title:** USACE_CENAN_NAR1_2010_a_0022_1.jpg **Caption:** Gap between arched superstructure of Old Ashford Avenue Bridge deck and top of floodwall.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0022 **Title:** USACE_CENAN_NAR1_2010_a_0022_2.jpg **Caption:** Void beneath horizontal steel supporting the Old Ashford Avenue Bridge, Potential connection to voids between top of floodwall and brick arch in bridge.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0022 **Title:** USACE_CENAN_NAR1_2010_a_0022_3.jpg **Caption:** View from ponding area #1 northward under wood walkway looking towards Ardsley Square. Potential connection to voids between top of floodwall and brick arch in bridge.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0055 **Title:** USACE_CENAN_NAR1_2010_a_0055_1.jpg **Caption:** Missing caulking in monolith joint at base of flood wall on exposed side.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0058 **Title:** USACE_CENAN_NAR1_2010_a_0058_1.jpg **Caption:** Building #4: Closure structure and stop logs are unavailable or missing and owner reports having up to 6 ft. of water in the garage.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0058 **Title:** USACE_CENAN_NAR1_2010_a_0058_2.jpg **Caption:** Building #4: remains of channel to receive stop logs.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0059 **Title:** USACE_CENAN_NAR1_2010_a_0059_1.jpg **Caption:** Building #3, stop log closure structure was not constructed. This deletion is noted on the As-built plans.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0061 **Title:** USACE_CENAN_NAR1_2010_a_0061_1.jpg **Caption:** Addition to Building #2. No flood proofing was installed or remains. This is noted on the As-built plans.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0062 **Title:** USACE_CENAN_NAR1_2010_a_0062_1.jpg **Caption:** Building #1 with flood shield installed protecting door.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0062 **Title:** USACE_CENAN_NAR1_2010_a_0062_2.jpg **Caption:** Building # 1 flood shield door protection and glazed window blocks.



Floodwalls

For use during Initial and Continuing Eligibility Inspections of all floodwalls



Inspect ID: NAR1_2010_a_0063 **Title:** USACE_CENAN_NAR1_2010_a_0063_1.jpg **Caption:** Electric service not above elevation of flood protection. The level of flood protection is about 6-8 inches below the top of the wall at the right side of the photo.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
1. Vegetation and Obstructions	U	A	No obstructions, vegetation, debris, or sediment accumulation noted within interior drainage channels or blocking the culverts, inlets, or discharge areas. Concrete joints and weep holes are free of grass and weeds.
		M	Obstructions, vegetation, debris, or sediment are minor and have not impaired channel flow capacity or blocked more than 10% of any culvert openings, but should be removed. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.
		U	Obstructions, vegetation, debris, or sediment have impaired the channel flow capacity or blocked more than 10% of a culvert opening. Sediment and debris removal required to re-establish flow capacity.
2. Encroachments	M	A	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the interior drainage system.
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.
		U	Unauthorized encroachments or inappropriate activities noted are likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of this component of the interior drainage system.
			<p>NAR1_2010_a_0038: Large metal conveyor belt obstructing access to gate.: Investigate easement agreement and dispose of encroachment accordingly. (M)</p> <p>NAR1_2010_a_0040: Interceptor ditch #1 appears to have been filled in at this location.: Regrade channel to approved line and grade, reseed and mulch in accordance with USACE guidelines. (U)</p> <p>NAR1_2010_a_0042: Vegetation encroachment along interceptor ditch #1.: Remove vegetation in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0044: Considerable volume of sediment and vegetation obstructing flow.: Remove vegetation and sediment in accordance with USACE guidelines. (U)</p> <p>NAR1_2010_a_0046: Sediment and vegetation partially blocking flow interceptor ditch #2, just west of American Legion Drive.: Remove sediment in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0047: Sediment, debris and vegetation is impeding the discharge of interceptor ditch #2 through inlet structure #1.: Clear debris and sediment. (M)</p> <p>NAR1_2010_a_0048: The start of interceptor ditch #2 contains dense vegetation.: Remove vegetation in accordance with USACE guidelines. (M)</p> <p>NAR1_2010_a_0051: NYCDEP work site included the intake structure at blow-off tunnel connection. We were unable to inspect the structure.: Inspect when work area is removed. (A)</p> <p>NAR1_2010_a_0053: Drop inlet #3 has a depression next to it which may compromise integrity.: Video inspect culvert for possible leaks. Repair as needed and restore backfill around drainage culvert to finished grade. (M)</p>

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable.
FDR = Flood Damage Reduction



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
3. Ponding Areas	M	A No trash, debris, structures, or other obstructions present within the ponding areas. Sediment deposits do not exceed 10% of capacity.	NARI_2010_a_0064: Ponding area #2: Considerable vegetation on protected side of floodwall adjacent to parking lot.: Remove vegetation in accordance with USACE guidelines. (M)
		M Trash, debris, excavations, structures, or other obstructions present, or inappropriate activities that will not inhibit operations and maintenance. Sediment deposits do not exceed 30% of capacity.	
		U Trash, debris, excavations, structures, or other obstructions, or other encroachments or activities noted that will inhibit operations, maintenance, or emergency work. Sediment deposits exceeds 30% of capacity.	
		N/A There are no ponding areas associated with the interior drainage system.	
4. Fencing and Gates ¹	A	A Fencing is in good condition and provides protection against falling or unauthorized access. Gates open and close freely, locks are in place, and there is little corrosion on metal parts.	
		M Fencing or gates are damaged or corroded but appear to be maintainable. Locks may be missing or damaged.	
		U Fencing and gates are damaged or corroded to the point that replacement is required, or potentially dangerous features are not secured.	
		N/A There are no features noted that require safety fencing.	
5. Concrete Surfaces (Such as gate wells, outfalls, intakes, or culverts)	A	A Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	
		M Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A There are no concrete items in the interior drainage system.	
6. Tilting, Sliding or Settlement of Concrete and Sheet Pile Structures ² (Such as gate wells, outfalls, intakes, or culverts)	NA	A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		N/A There are no concrete items in the interior drainage system.	
7. Foundation of Concrete Structures ³ (Such as culverts, inlet and discharge structures, or gatewells.)	U	A No active erosion, scouring, or bank caving that might endanger the structure's stability.	NAR1_2010_a_0052: Small sinkhole above 30 inch drainage culvert. Also some debris visible in grate at the side of the road at drop inlet #5.: Video inspect culvert for possible leaks. Repair as needed and restore backfill around drainage culvert to finished grade. (U)
		M There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. The rate of erosion is such that the structure is expected to remain stable until the next inspection.	
		U Erosion or bank caving observed that may lead to structural instabilities before the next inspection.	
		N/A There are no concrete items in the interior drainage system.	
8. Monolith Joints	NA	A The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
		M The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
		U The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A There are no monolith joints in the interior drainage system.	
9. Culverts/ Discharge Pipes ⁴	U	A There are no breaks, holes, cracks in the discharge pipes/ culverts that would result in significant water leakage. The pipe shape is still essentially circular. All joints appear to be closed and the soil tight. Corrugated metal pipes, if present, are in good condition with 100% of the original coating still in place (either asphalt or galvanizing) or have been relined with appropriate material, which is still in good condition. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	NAR1_2010_a_0049: Trash rack for outlet structure #3 contains some debris.: Clean 60 in. culvert and perform video inspection. (M) Item rated Unacceptable (U) because of lack of video inspection.
		M There are a small number of corrosion pinholes or cracks that could leak water and need to be repaired, but the entire length of pipe is still structurally sound and is not in danger of collapsing. Pipe shape may be ovalized in some locations but does not appear to be approaching a curvature reversal. A limited number of joints may have opened and soil loss may be beginning. Any open joints should be repaired prior to the next inspection. Corrugated metal pipes, if present, may be showing corrosion and pinholes but there are no areas with total section loss. Condition of pipes has been verified using television camera video taping or visual inspection methods within the past five years, and the report for every pipe is available for review by the inspector.	
		U Culvert has deterioration and/or has significant leakage; it is in danger of collapsing or as already begun to collapse. Corrugated metal pipes have suffered 100% section loss in the invert. HOWEVER: Even if pipes appear to be in good condition, as judged by an external visual inspection, an Unacceptable Rating will be assigned if the condition of pipes has not been verified using television camera video taping or visual inspection methods	

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		within the past five years, and reports for all pipes are not available for review by the inspector.	
	N/A	There are no discharge pipes/ culverts.	
10. Sluice / Slide Gates ⁵	M	A	Gates open and close freely to a tight seal or minor leakage. Gate operators are in good working condition and are properly maintained. Sill is free of sediment and other obstructions. Gates and lifters have been maintained and are free of corrosion. Documentation provided during the inspection.
		M	Gates and/or operators have been damaged or have minor corrosion, and open and close with resistance or binding. Leakage quantity is controllable, but maintenance is required. Sill is free of sediment and other obstructions.
		U	Gates do not open or close and/or operators do not function. Gate, stem, lifter and/or guides may be damaged or have major corrosion.
		N/A	There are no sluice/ slide gates.
11. Flap Gates/ Flap Valves/ Pinch Valves ¹	M	A	Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.
		M	Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.
		U	Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.
		N/A	There are no flap gates.
12. Trash Racks (non-mechanical)	A	A	Trash racks are fastened in place and properly maintained.
		M	Trash racks are in place but are unfastened or have bent bars that allow debris to enter into the pipe or pump station, bars are corroded to the point that up to 10% of the sectional area may be lost. Repair or replacement is required.
		U	Trash racks are missing or damaged to the extent that they are no longer functional and must be replaced. (For example, more than 10% of the sectional area may be lost.)
		N/A	There are no trash racks, or they are covered in the pump stations section of the report.
13. Other Metallic Items	NA	A	All metal parts are protected from corrosion damage and show no rust, damage, or deterioration that would cause a safety concern.
		M	Corrosion seen on metallic parts appears to be maintainable.
		U	Metallic parts are severely corroded and require replacement to prevent failure, equipment damage, or safety issues.
		N/A	There are no other significant metallic items.
14. Riprap Revetments of Inlet/ Discharge Areas	NA	A	No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.
		M	Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		<p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p> <p>N/A There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.</p>	
15. Revetments other than Riprap	NA	<p>A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.</p> <p>M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.</p> <p>U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.</p> <p>N/A There are no such revetments protecting this feature of the segment / system.</p>	

¹ Proper operation of this item must be demonstrated during the inspection.

² The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

³ Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

⁴ The decision on whether or not USACE inspectors should enter a pipe to perform a detailed inspection must be made at the USACE District level. This decision should be made in conjunction with the District Safety Office, as pipes may be considered confined spaces. This decision should consider the age of the pipe, the diameter of the pipe, the apparent condition of the pipe, and the length of the pipe. If a pipe is entered for the purposes of inspection, the inspector should record observations with a video camera in order that the condition of the entire pipe, including all joints, can later be assessed. Additionally, the video record provides a baseline to which future inspections can be compared.

⁵ Proper operation of the gates (full open and closed) must be demonstrated during the inspection if no documentation is available. Be aware of both manual and electrical operators.

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Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0014 **Title:** USACE_CENAN_NAR1_2010_a_0014_1.jpg **Caption:** Drainage structure (DS) #4 outlet is a 36" wide flap gate in good condition. Sediments are building up in the discharge channel.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0040 **Title:** USACE_CENAN_NAR1_2010_a_0040_1.jpg **Caption:** Interceptor ditch #1 appears to have been filled.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0042 **Title:** USACE_CENAN_NAR1_2010_a_0042_1.jpg **Caption:** Vegetation encroachment along interceptor ditch #1.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0043 **Title:** USACE_CENAN_NAR1_2010_a_0043_1.jpg **Caption:** Encroachment - ADS drainage pipe discharging into interceptor ditch #1.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0044 **Title:** USACE_CENAN_NAR1_2010_a_0044_2.jpg **Caption:** Sedimentation and vegetation in interceptor ditch #1 that could impede flow.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems

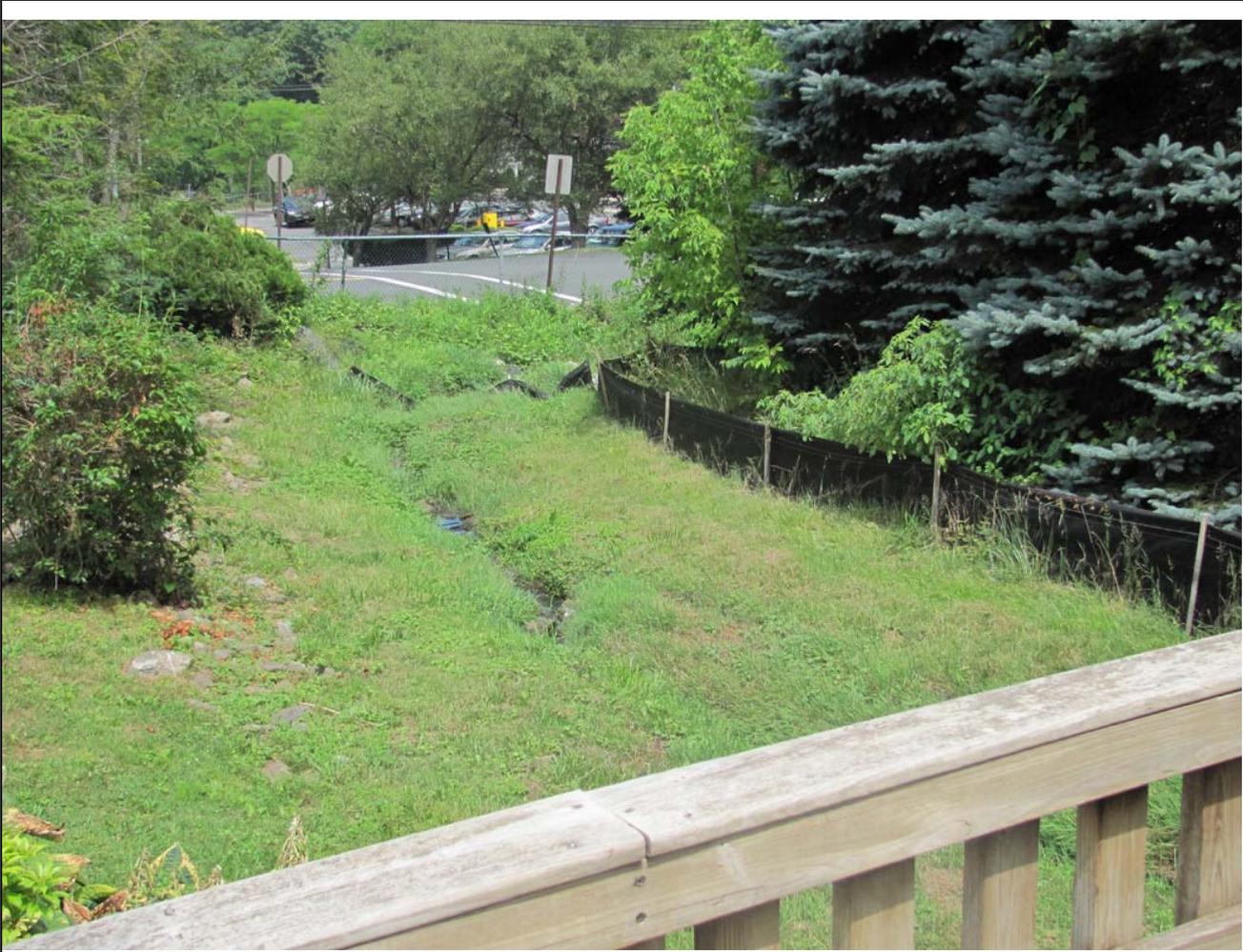


Inspect ID: NAR1_2010_a_0044 **Title:** USACE_CENAN_NAR1_2010_a_0044_1.jpg **Caption:** Sedimentation and vegetation in interceptor ditch #1 that could impede flow.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0046 **Title:** USACE_CENAN_NAR1_2010_a_0046_1.jpg **Caption:** Sediment and vegetation partially blocking flow in interceptor ditch #2, just west of American Legion Drive.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0047 **Title:** USACE_CENAN_NAR1_2010_a_0047_1.jpg **Caption:** Sediment, debris and vegetation blocking flow through drainage structure.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0048 **Title:** USACE_CENAN_NAR1_2010_a_0048_1.jpg **Caption:** The start of interceptor ditch #2 contains dense vegetation.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0049 **Title:** USACE_CENAN_NAR1_2010_a_0049_1.jpg **Caption:** Trash rack for outlet structure #3 contains some debris.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0051 **Title:** USACE_CENAN_NAR1_2010_a_0051_1.jpg **Caption:** NYCDEP work site included the intake structure at blow off tunnel connection. We were unable to inspect the structure.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0052 **Title:** USACE_CENAN_NAR1_2010_a_0052_1.jpg **Caption:** Sink hole in recently repaired asphalt on sidewalk above 30 inch drainage pipe.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0053 **Title:** USACE_CENAN_NAR1_2010_a_0053_1.jpg **Caption:** Drop inlet #3 has a depression next to it that may compromise its integrity.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0064 **Title:** USACE_CENAN_NAR1_2010_a_0064_1.jpg **Caption:** Dense vegetation on protected side of floodwall at ponding area #2.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0067 **Title:** USACE_CENAN_NAR1_2010_a_0067_1.jpg **Caption:** Drainage structure #4 sluice gate fully closed.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0068 **Title:** USACE_CENAN_NAR1_2010_a_0068_1.jpg **Caption:** Obstruction preventing drainage structure #3 sluice gate from fully closing.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0068 **Title:** USACE_CENAN_NAR1_2010_a_0068_2.jpg **Caption:** Obstruction (stick) preventing drainage #3 sluice gate from fully closing.



Interior Drainage System

For use during Initial and Continuing Eligibility Inspections of interior drainage systems



Inspect ID: NAR1_2010_a_0069 **Title:** USACE_CENAN_NAR1_2010_a_0069_1.jpg **Caption:** Sediment obstruction preventing drainage structure #1 sluice gate from fully closing.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
1. Vegetation and Obstructions	U	A	No obstructions, vegetation, debris, or sediment accumulation within the channel. Concrete channel joints and weep holes are free of grass and weeds.
		M	Obstructions (including log jams), vegetation, debris, or sediment are minor and have not impaired channel flow capacity, but should be removed. Sediment shoals have not developed to the extent that they can support vegetation other than non-aquatic grasses. A limited volume of grass and weeds may be present in concrete channel joints and weep holes.
		U	Obstructions (including log jams), vegetation, debris or sediment have impaired the channel flow capacity. Sediment shoals are well established and support woody and/or brushy vegetation. Sediment and debris removal required to re-establish flow capacity.
2. Shoaling ¹ (sediment deposition)	M	A	No shoaling or minor, non-vegetated shoaling is present.
		M	More widespread vegetated and non-vegetated shoaling is present. Non-aquatic grasses are present on shoal. No trees or brush is present on shoal, and channel flow is not significantly reduced. Sediment and debris removal recommended.
		U	Shoaling is well established, stabilized by saplings, brush, or other vegetation. Shoals are diverting flow to channel walls. Channel flow capacity is reduced and maintenance is required.
3. Encroachments	M	A	No trash, debris, unauthorized structures, excavations, or other obstructions present within the easement area. Encroachments have been previously reviewed by the Corps, and it was determined that they do not diminish proper functioning of the channel.
		M	Trash, debris, unauthorized structures, excavations, or other obstructions present, or inappropriate activities noted that should be corrected but will not inhibit operations and maintenance or emergency operations. Encroachments have not been reviewed by the Corps.
		U	Unauthorized encroachments or inappropriate activities noted are

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 FDR = Flood Damage Reduction



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		likely to inhibit operations and maintenance, emergency operations, or negatively impact the integrity of the channel.	accordingly. (M) NARI_2010_a_0029: Lots of debris and vegetation on outer wall on both sides of channel.: Clear debris and vegetation in accordance with USACE guidelines. (M) NARI_2010_a_0036: Existing drainage channel south of Ashford Ave. (South of USACE Project) replaced with a 60 in. culvert. Sediments from the culvert are restricting flow.: Verify permit. Request that the public sponsor remove sediment. (M)
4. Erosion	A	A No head cutting or horizontal deviation observed.	
		M Head cutting and horizontal deviation evident, but is less than 1 foot from the designed grade or cross section.	
		U Head cutting and horizontal deviation of more than 1 foot from the designed grade or cross section. Corrective actions required to stop or slow erosion.	
5. Concrete Surfaces	M	A Negligible spalling, scaling or cracking. If the concrete surface is weathered or holds moisture, it is still satisfactory but should be seal coated to prevent freeze/ thaw damage.	NARI_2010_a_0026: Scour hole at bottom of concrete channel. Sediment appears to be the deposition noted at point 25.: Repair concrete surfaces in accordance with USACE guidelines. (M) NARI_2010_a_0037: Concrete of Ashford Avenue bridge on left side is severely deteriorated and its failure could compromise integrity of concrete channel.: Request NYSDOT to repair bridge abutment in order to protect the concrete channel. (M)
		M Spalling, scaling, and open cracking present, but the immediate integrity or performance of the structure is not threatened. Reinforcing steel may be exposed. Repairs/ sealing is necessary to prevent additional damage during periods of thawing and freezing.	
		U Surface deterioration or deep cracks present that may result in an unreliable structure. Any surface deterioration that exposes the sheet piling or lies adjacent to monolith joints may indicate underlying reinforcement corrosion and is unacceptable.	
		N/A There are no concrete items in the channel.	
6. Tilting, Sliding or Settlement of Concrete Structures ²	A	A There are no significant areas of tilting, sliding, or settlement that would endanger the integrity of the structure.	
		M There are areas of tilting, sliding, or settlement (either active or inactive) that need to be repaired. The maximum offset, either laterally or vertically, does not exceed 2 inches unless the movement can be shown to be no longer actively occurring. The integrity of the structure is not in danger.	
		U There are areas of tilting, sliding, or settlement (either active or inactive) that threaten the structure's integrity and performance. Any movement that has resulted in failure of the waterstop (possibly identified by daylight visible through the joint) is unacceptable. Differential movement of greater than 2 inches between any two adjacent monoliths, either laterally or vertically, is unacceptable unless it can be shown that the movement is no longer active. Also, if the floodwall is of I-wall construction, then any visible or measurable tilting of the wall toward the protected side that has created an open horizontal crack on the riverside base of a monolith is unacceptable.	
		N/A There are no concrete items in the channel.	
7. Foundation of Concrete Structures ³	A	A No active erosion, scouring, or bank caving that might endanger the structure's stability.	
		M There are areas where the ground is eroding towards the base of the structure. Efforts need to be taken to slow and repair this	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable.
FDR = Flood Damage Reduction



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		erosion, but it is not judged to be close enough to the structure or to be progressing rapidly enough to affect structural stability before the next inspection. For the purposes of inspection, the erosion or scour is not closer to the riverside face of the wall than twice the floodwall's underground base width if the wall is of L-wall or T-wall construction; or if the wall is of sheetpile or I-wall construction, the erosion is not closer than twice the wall's visible height. Additionally, rate of erosion is such that the wall is expected to remain stable until the next inspection.	
		U Erosion or bank caving observed that is closer to the wall than the limits described above, or is outside these limits but may lead to structural instabilities before the next inspection. Additionally, if the floodwall is of I-wall or sheetpile construction, the foundation is unacceptable if any turf, soil or pavement material got washed away from the landside of the I-wall as the result of a previous overtopping event.	
		N/A There are no concrete items in the channel.	
8. Slab and Monolith Joints	A	A The joint material is in good condition. The exterior joint sealant is intact and cracking/ desiccation is minimal. Joint filler material and/or waterstop is not visible at any point.	
		M The joint material has appreciable deterioration to the point where joint filler material and/or waterstop is visible in some locations. This needs to be repaired or replaced to prevent spalling and cracking during freeze/ thaw cycles, and to ensure water tightness of the joint.	
		U The joint material is severely deteriorated or the concrete adjacent to the monolith joints has spalled and cracked, damaging the waterstop; in either case damage has occurred to the point where it is apparent that the joint is no longer watertight and will not provide the intended level of protection during a flood.	
		N/A There are no concrete items in the channel.	
9. Flap Gates/ Flap Valves/ Pinch Valves ⁴	A	A Gates/ valves open and close easily with minimal leakage, have no corrosion damage, and have been exercised and lubricated as required.	NAR1_2010_a_0030: Drainage structure #1. Flap gates operate, but are partially blocked by sediment. Also some sediment in valve chamber. Handrail is loose on top.: Clean DS#1 and lubricate flap gate. Repair handrail at the top of the floodwall. (M)
		M Gates/ valves will not fully open or close because of obstructions that can be easily removed, or have minor corrosion damage that requires maintenance.	
		U Gates/ valves are missing, have been damaged, or have deteriorated to the point that they need to be replaced.	
		N/A There are no flap gates.	
10. Riprap Revetments & Banks	M	A No riprap displacement or stone degradation that could pose an immediate threat to the integrity of channel bank. Riprap intact with no woody vegetation present.	NAR1_2010_a_0070: Heavy vegetation growth on right-bank riprap-protected slopes.: Remove vegetation to restore flows and minimize displacement of riprap. (M) NAR1_2010_a_0071: Vegetation growth through riprap near Elm Street.: Remove vegetation to restore flows and minimize displacement of riprap. (M)
		M Minor riprap displacement or stone degradation that could pose an immediate threat to the integrity of the channel bank. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U Significant riprap displacement, exposure of bedding, or stone degradation observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Rock protection is hidden by dense brush, trees, or grasses.	

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable.
FDR = Flood Damage Reduction



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels

Rated Item	Rating	Rating Guidelines	Location/Remarks/Recommendations
		N/A There is no riprap protecting this feature of the segment / system, or riprap is discussed in another section.	
11. Revetments other than Riprap	NA	A Existing revetment protection is properly maintained, undamaged, and clearly visible.	
		M Minor revetment displacement or deterioration that does not pose an immediate threat to the integrity of the levee. Unwanted vegetation must be cleared or sprayed with an appropriate herbicide.	
		U Significant revetment displacement, deterioration, or exposure of bedding observed. Scour activity is undercutting banks, eroding embankments, or impairing channel flows by causing turbulence or shoaling. Revetment protection is hidden by dense brush and trees.	
		N/A There are no such revetments protecting this feature of the segment / system.	

¹ If weather and flow conditions allow, inspectors should walk in the channel and probe shoal areas in order to estimate extent of blockage of the cross-sectional area where shoaling is present.

² The sponsor should be monitoring any observed movement to verify whether the movement is active or inactive.

³ Inspectors must have as-built drawings available during the inspection so that the lateral distance to the heel and toe of the floodwalls can be determined in the field.

⁴ Proper operation of this item must be demonstrated during the inspection.

Key: A = Acceptable. M = Minimally Acceptable; Maintenance is required. U = Unacceptable. N/A = Not Applicable.
FDR = Flood Damage Reduction



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of Engineers®

Flood Damage Reduction Segment / System
Inspection Report

D-72

Flood Damage Reduction Channels
Page 4 of 26

Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0023 **Title:** USACE_CENAN_NAR1_2010_a_0023_1.jpg **Caption:** Vegetation encroaching on both sides of channel.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0024 **Title:** USACE_CENAN_NAR1_2010_a_0024_1.jpg **Caption:** Guy wire encroaching over channel. NYS Thruway in background.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0025 **Title:** USACE_CENAN_NAR1_2010_a_0025_1.jpg **Caption:** Sedimentation and rocks in concrete channel.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0026 **Title:** USACE_CENAN_NAR1_2010_a_0026_1.jpg **Caption:** Scour hole in bottom of the concrete channel.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0027 **Title:** USACE_CENAN_NAR1_2010_a_0027_1.jpg **Caption:** Deck on top of channel wall (only access way to DS#1).



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0027 **Title:** USACE_CENAN_NAR1_2010_a_0027_2.jpg **Caption:** Deck on top of channel wall (only access way to DS#1).



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0028 **Title:** USACE_CENAN_NAR1_2010_a_0028_1.jpg **Caption:** Metal conduits (pipes) on right side of concrete channel not on as-built plans.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0029 **Title:** USACE_CENAN_NAR1_2010_a_0029_1.jpg **Caption:** Chain-link fence between concrete channel and NYS Thruway not on as-built plans.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0029 **Title:** USACE_CENAN_NAR1_2010_a_0029_2.jpg **Caption:** Trees encroaching and overhanging on western bank (right bank; photo left) of channel wall need to be taken down.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0030 **Title:** USACE_CENAN_NAR1_2010_a_0030_1.jpg **Caption:** DS #1 outlet pipe full of debris.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0030 **Title:** USACE_CENAN_NAR1_2010_a_0030_2.jpg **Caption:** Loose handrail on top of DS#1.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0031 **Title:** USACE_CENAN_NAR1_2010_a_0031_1.jpg **Caption:** Weep hole has vegetation growing out of it.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0032 **Title:** USACE_CENAN_NAR1_2010_a_0032_1.jpg **Caption:** Shoaling along left bank of the earthen channel that is just downstream of the project. Approximately half the channel is obstructed by this debris.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0033 **Title:** USACE_CENAN_NAR1_2010_a_0033_1.jpg **Caption:** Large trees along left bank downstream of concrete channel.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0036 **Title:** USACE_CENAN_NAR1_2010_a_0036_1.jpg **Caption:** Debris at headwall of 60 in. culvert on the south side of Ashford Ave. (located south of the USACE project). Note that this pipe replaced a ditch that was shown on the approved plans.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0037 **Title:** USACE_CENAN_NAR1_2010_a_0037_1.jpg **Caption:** Deterioration of concrete at Ashford Avenue bridge.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0039 **Title:** USACE_CENAN_NAR1_2010_a_0039_1.jpg **Caption:** Vegetation along right bank growing into channel that could impede flow.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0056 **Title:** USACE_CENAN_NAR1_2010_a_0056_1.jpg **Caption:** Large tree has fallen and is partially blocking flow of relocated channel immediately downstream of Elm Street.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0057 **Title:** USACE_CENAN_NAR1_2010_a_0057_1.jpg **Caption:** Vegetation growth through riprap-protected slopes and encroaching in flood reduction channel.



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0057 **Title:** USACE_CENAN_NAR1_2010_a_0057_2.jpg **Caption:** Pedestrian bridge that replaced RR bridge from the old Putnam RR line. Pedestrian bridge is not on the as-built plans.



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Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0070 **Title:** USACE_CENAN_NAR1_2010_a_0070_1.jpg **Caption:** Photo looking upstream. Vegetation growing through riprap revetment along right bank (photo left).



Flood Damage Reduction Channels

For use during Initial and Continuing Eligibility Inspections of flood damage reduction channels



Inspect ID: NAR1_2010_a_0071 **Title:** USACE_CENAN_NAR1_2010_a_0071_1.jpg **Caption:** Heavy vegetation growth through riprap-protected slope (photo right).



Flood Damage Reduction Segment / System Supplemental Data Sheet

This form is intended for the Corps' internal use and may not need to be updated with every inspection.

Name of Segment / System: NAR1 - Ardsley, Saw Mill River Left Bank Sponsor: NYSDEC / Village of Ardsley Location: Ardsley, NY River Basin: Saw Mill River Project Description: The project has been divided into three reaches, Downstream Reach, Middle Reach and Upstream Reach. Due to the changes in elevation across the project site, the closure elevations for these structures vary accordingly. Authority that Project was Constructed Under: Flood Control Act of 1965, Section 201 (Public Law 89-298 89th Congress) Date of Construction: 11/28/1989 Approximate Annual Maintenance Costs: Construction: <input checked="" type="checkbox"/> Federally Constructed <input type="checkbox"/> Non-Federally Constructed Maintenance: <input type="checkbox"/> Federally Maintained <input checked="" type="checkbox"/> Non-Federally Maintained	
National Flood Insurance Program: a. Is the project currently NFIP? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No b. If in the NFIP, Date of Certification (per 44 CFR 65.10):	
Datum Information: a. Datum used for the design and construction of this project is: NGVD 1929 b. Current recommended datum for this project is: NAVD 1988 c. Has the Project been converted to the current recommended datum? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
Levee Embankment Data: a. Levee Designed Gage Function Reading/Station: b. Level of Protection Provided: 1,850 cfs (57% SPF), return period of 167 years c. Average Height of Levee: d. Average Crown Width: e. Average Side Slope: 1:2 and 1:2.5	Protected Features (For use in preparing estimates and PIRs): a. Total acres protected: 6 b. Total agriculture production acres protected: c. Towns: d. Businesses: e. Residences: f. Roads: g. Utilities: h. Barns: i. Machine Sheds: j. Outbuildings: k. Irrigation Systems: l. Grain Bins: m. Other Facilities:



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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

Periodic Inspection Report No.1

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Appendix E.

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Appendix F.

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NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

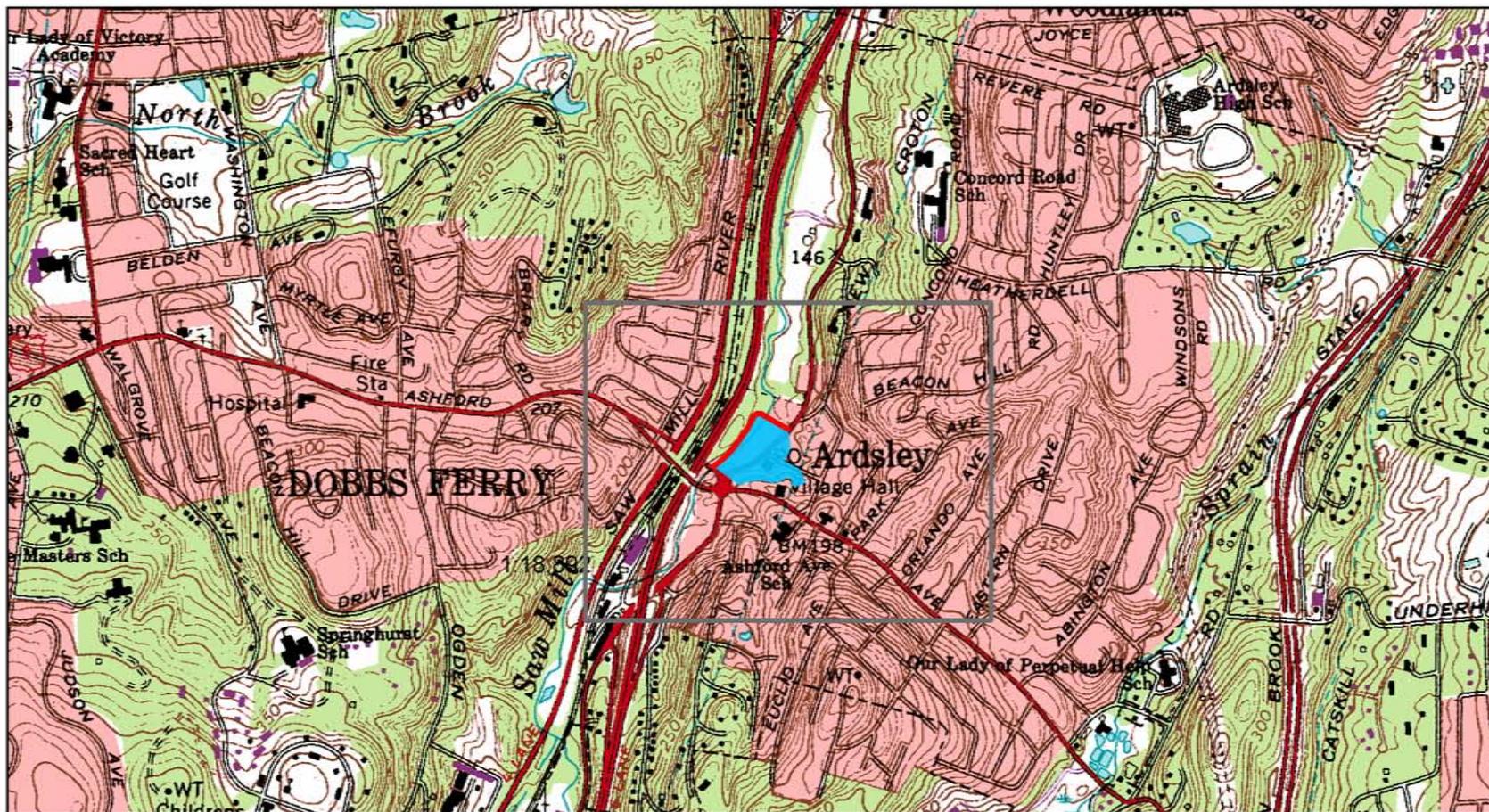
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Appendix G.

Plates

USGS topography map of area surrounding the Ardsley Flood Control Project



Mapped, edited, and published by the Geological Survey
 Control by USGS and USC&GS
 Topography by photogrammetric methods from aerial photographs
 taken 1965. Field checked 1967
 Supersedes map dated 1957



QUADRANGLE LOCATION

WHITE PLAINS, N. Y.
 N4100—W7345/7.5

1967
 PHOTOREVISED 1979
 AMS 6266 III SE—SERIES V821

Revisions shown in purple and woodland compiled from
 aerial photographs taken 1977 and other source data
 This information not field checked. Map edited 1979
 Purple tint indicates extension of urban areas
 Boundary lines shown in purple compiled from latest
 information available from the controlling authority

Polyconic projection. 1927 North American datum
 10,000-foot grid based on New York coordinate system, east zone
 1000-meter Universal Transverse Mercator grid ticks,
 zone 18, shown in blue

670300

670800

671300

FOR OFFICIAL USE ONLY
671800

672300

672800

673300

794900

794400

793900

793400

794900

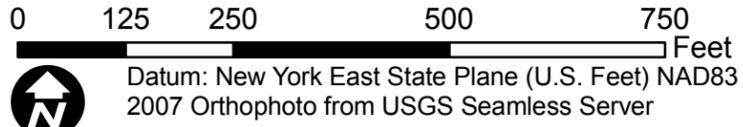
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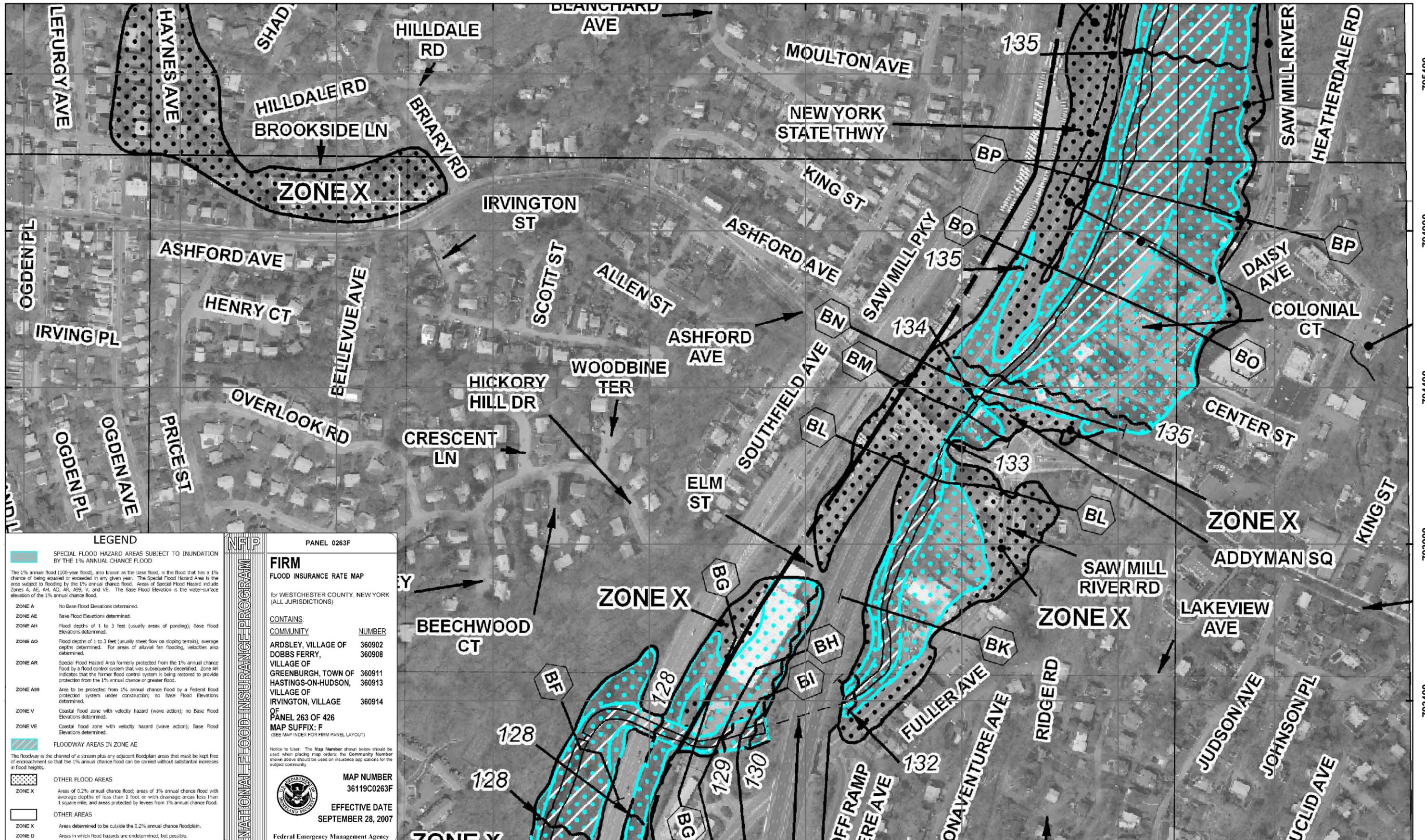
U.S. Army Corps of Engineers
New York District



G-2

- Observation Points**
- Acceptable Observation Point
 - ▲ Minimally Acceptable Observation Point
 - Unacceptable Observation Point
 - Observation Rating Not Applicable

Map of Inspection Points
Periodic Inspection - Fiscal Year 2010
Ardsley, New York (NAR1)



795400
794900
794400
793900
793400

795400
794900
794400
793900
793400

LEGEND

- SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD
- The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.
- ZONE A**
No Base Flood Elevations determined.
- ZONE AE**
Base Flood Elevations determined.
- ZONE AH**
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO**
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR**
Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently identified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99**
Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V**
Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE**
Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.
- FLOODWAY AREAS IN ZONE AE
- The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.
- OTHER FLOOD AREAS**
- ZONE X
Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- OTHER AREAS**
- ZONE X
Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D
Areas in which flood hazards are undetermined, but possible.

FIRM
FLOOD INSURANCE RATE MAP

for WESTCHESTER COUNTY, NEW YORK
(ALL JURISDICTIONS)

CONTAINS:

COMMUNITY	NUMBER
ARDSLEY, VILLAGE OF	360902
DOBBS FERRY, VILLAGE OF	360908
GREENBURGH, TOWN OF	360911
HASTINGS-ON-HUDSON, VILLAGE OF	360913
IRVINGTON, VILLAGE OF	360914

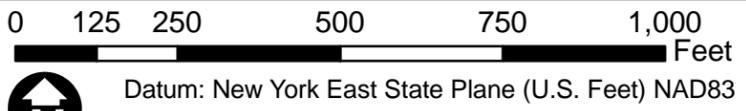
OF PANEL 263 OF 426
MAP SUFFIX: F
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
36119C0263F

EFFECTIVE DATE
SEPTEMBER 28, 2007

Federal Emergency Management Agency



U.S. Army Corps of Engineers
New York District

Flood Rate Insurance Map (FIRM)
Map # 36119C0263F
Ardsley, NY

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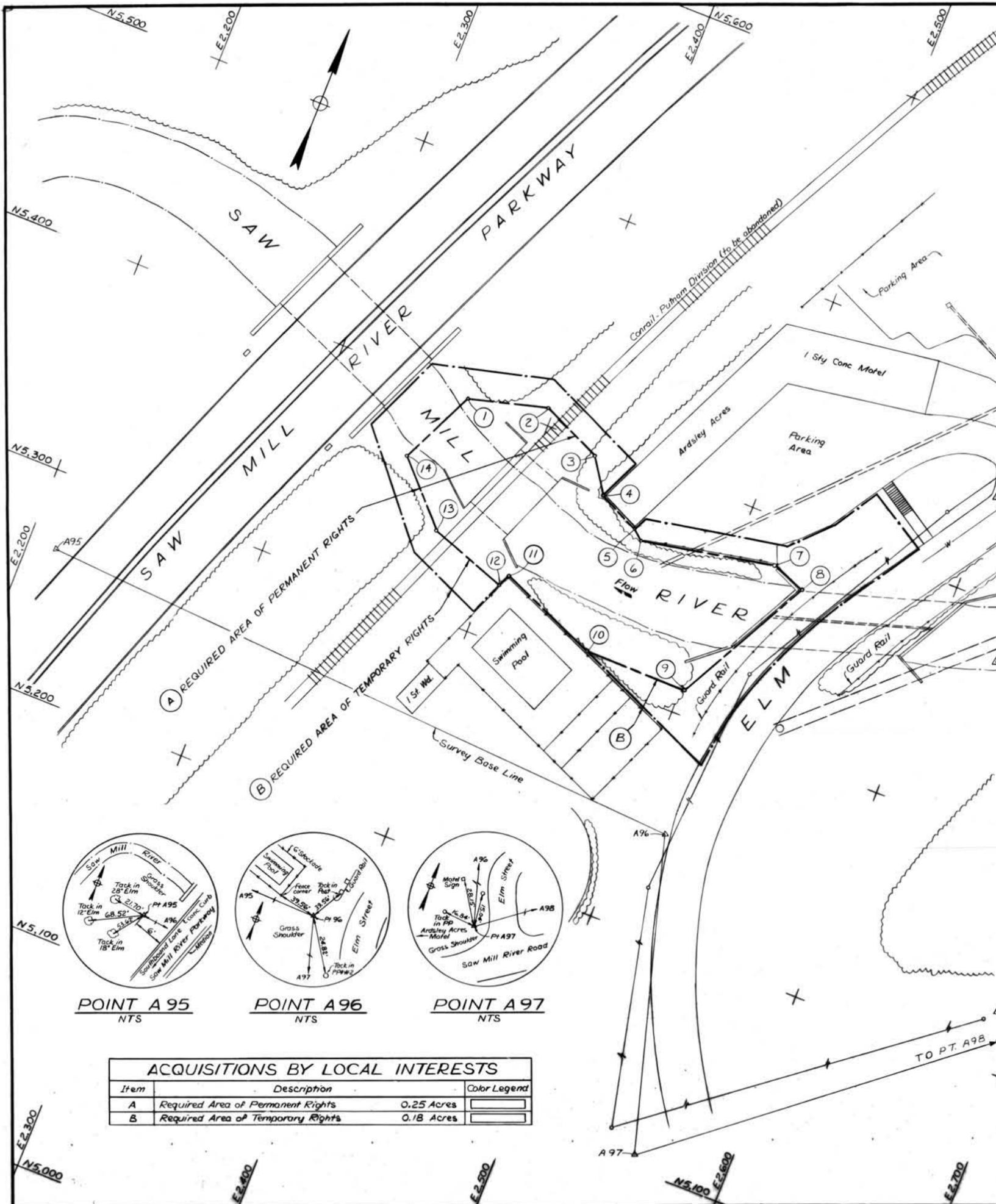
NAR1 – Ardsley, Saw Mill River Left Bank
Flood Risk Management Project

Periodic Inspection Report No.1

Draft August 2011; ITR September 2011, Final January 2012

Appendix H.

Maps and Drawings



DATA FOR PERMANENT ACQUISITION

Point	Coordinates		Course	Distance	Bearing	Point	Coordinates		Course	Distance	Bearing
	North	East					North	East			
1	5,398	2,362	1-2	36.40'	N74°-03'-17"E	80	6,446	3,382	80-81	18.44'	S49°-23'-55"E
2	5,408	2,397	2-3	30.87	S65°-05'-43"E	81	6,434	3,396	81-82	22.20	S35°-50'-16"W
3	5,395	2,425	3-4	18.03	S33°-41'-24"E	82	6,416	3,383	82-83	19.21	N51°-20'-25"W
4	5,380	2,435	4-5	21.02	S64°-39'-14"E	83	6,428	3,368	83-84	81.22	S37°-59'-55"W
5	5,371	2,454	5-6	5.66	S45°-00'-00"E	84	6,364	3,318	84-85	56.22	S38°-30'-02"W
6	5,367	2,458	6-7	62.17	N78°-52'-15"E	85	6,320	3,283	85-15	28.43	N50°-42'-38"W
7	5,379	2,519	7-8	17.09	S69°-26'-38"E	84	6,364	3,318	84-86	70.46	S34°-35'-32"E
8	5,373	2,535	8-9	70.24	S28°-01'-28"W	86	6,306	3,358	86-87	19.31	S21°-15'-02"W
9	5,311	2,502	9-10	48.01	N88°-48'-23"W	87	6,288	3,351	87-88	19.65	N75°-15'-23"W
10	5,312	2,454	10-11	49.40	N68°-37'-46"W	88	6,293	3,332	88-89	23.26	N64°-32'-12"W
11	5,330	2,408	11-12	5.39	S21°-48'-05"W	89	6,303	3,311	89-85	32.76	N58°-44'-11"W
12	5,325	2,406	12-13	37.00	N71°-04'-31"W	66	6,838	3,958	66-90	130.23	S42°-30'-38"W
13	5,337	2,371	13-14	37.48	N43°-55'-09"W	90	6,742	3,870	90-91	11.40	N52°-07'-30"W
14	5,364	2,345	14-1	38.01	N26°-33'-54"E	91	6,749	3,861	91-92	56.08	S50°-03'-49"W
15	6,338	3,261	15-16	46.69	N46°-44'-09"E	92	6,713	3,818	92-93	18.60	S53°-44'-46"W
16	6,370	3,295	16-17	78.01	N36°-08'-07"E	93	6,702	3,803	93-94	66.07	S50°-31'-39"W
17	6,433	3,341	17-18	3.61	S56°-18'-36"E	94	6,660	3,752	94-95	28.60	N53°-31'-51"W
18	6,431	3,344	18-19	43.42	N38°-27'-13"E	95	6,677	3,729	95-96	132.65	S49°-35'-10"W
19	6,465	3,371	19-20	32.57	N17°-52'-43"E	96	6,591	3,628	96-97	47.93	S66°-38'-40"W
20	6,496	3,361	20-21	153.91	N49°-28'-46"E	97	6,572	3,584	97-98	4.47	N26°-33'-54"W
21	6,596	3,498	21-22	76.58	N40°-45'-49"E	98	6,576	3,582	98-99	40.71	S62°-10'-33"W
22	6,654	3,548	22-23	41.79	N21°-02'-15"W	99	6,557	3,546	99-100	5.10	S11°-18'-36"E
23	6,693	3,533	23-24	35.47	N40°-25'-34"E	100	6,552	3,547	100-101	14.32	S65°-13'-29"W
24	6,720	3,556	24-25	175.01	N34°-03'-12"E	101	6,546	3,534	101-102	11.70	S19°-58'-59"E
25	6,865	3,654	25-26	47.54	N67°-45'-04"E	102	6,535	3,538	102-103	23.09	S72°-20'-60"W
26	6,883	3,698	26-27	184.23	N22°-40'-04"E	103	6,528	3,516	103-104	13.93	S21°-02'-15"E
27	7,053	3,769	27-28	60.67	N08°-31'-51"E	104	6,515	3,521	104-105	72.62	S67°-19'-10"W
28	7,113	3,778	28-29	37.64	N16°-59'-27"E	105	6,487	3,454	105-76	21.59	N76°-36'-27"W
29	7,149	3,789	29-30	36.06	N33°-41'-24"E	106	6,660	4,538	106-107	42.05	S64°-39'-14"E
30	7,179	3,809	30-31	69.57	N18°-26'-06"E	107	6,642	4,576	107-108	84.21	S04°-05'-08"W
31	7,245	3,831	31-32	118.46	N11°-41'-22"E	108	6,558	4,570	108-109	65.86	S59°-55'-53"E
32	7,361	3,855	32-33	38.08	S76°-19'-43"E	109	6,525	4,627	109-110	54.72	S27°-19'-07"E
33	7,352	3,892	33-34	123.32	S08°-23'-35"W	110	6,476	4,652	110-111	138.00	S20°-58'-46"W
34	7,230	3,874	34-27	38.33	S15°-01'-26"W	111	6,348	4,603	111-112	27.87	S01°-01'-15"W
127	7,193	3,864	127-28	51.24	S72°-58'-46"E	112	6,320	4,602	112-113	24.00	S30°-34'-45"W
128	7,178	3,913	128-29	84.05	S55°-10'-32"E	113	6,299	4,590	113-114	89.14	S03°-12'-56"E
129	7,130	3,982	129-130	27.73	S64°-21'-32"E	114	6,210	4,595	114-115	80.41	S10°-45'-03"E
130	7,118	4,007	130-131	74.97	S80°-47'-20"E	115	6,131	4,610	115-116	27.46	S79°-30'-31"W
131	7,106	4,081	131-41	60.46	S55°-47'-03"E	116	6,126	4,583	116-117	130.00	N22°-37'-12"W
41	7,072	4,131	41-42	116.50	S55°-29'-29"E	117	6,246	4,533	117-118	65.49	N07°-00'-59"E
42	7,006	4,227	42-43	40.36	S41°-59'-14"E	118	6,311	4,541	118-119	30.71	N24°-10'-45"E
43	6,976	4,254	43-44	58.14	S26°-33'-54"E	119	6,339	4,554	119-120	41.71	N54°-09'-03"E
44	6,924	4,280	44-45	84.53	N62°-31'-32"E	120	6,363	4,587	120-121	113.74	N20°-58'-46"W
45	6,963	4,355	45-46	8.06	S29°-44'-42"E	121	6,470	4,628	121-122	85.86	N59°-40'-35"W
46	6,956	4,359	46-47	100.18	S62°-40'-04"W	122	6,513	4,554	122-123	27.02	N38°-59'-28"W
47	6,910	4,270	47-48	54.63	N23°-44'-58"W	123	6,534	4,537	123-124	31.62	N18°-26'-06"W
48	6,960	4,248	48-49	72.40	N57°-24'-27"W	124	6,564	4,527	124-125	33.11	N25°-01'-01"E
49	6,999	4,187	49-50	81.27	N55°-31'-40"W	125	6,594	4,541	125-126	30.87	N65°-05'-43"W
50	7,045	4,120	50-132	66.03	N54°-51'-57"W	126	6,607	4,513	126-106	58.60	N25°-15'-11"E
132	7,083	4,066	132-133	62.97	N79°-56'-22"W						
133	7,094	4,004	133-134	38.01	N63°-26'-06"W						
134	7,111	3,970	134-135	66.57	N57°-15'-53"W						
55	6,962	3,926	55-56	106.33	S58°-51'-05"E						
56	6,907	4,017	56-57	94.94	S66°-24'-19"E						
57	6,869	4,104	57-58	13.04	N85°-36'-05"E						
58	6,870	4,117	58-59	36.62	S55°-00'-29"E						
59	6,849	4,147	59-60	12.81	N38°-39'-35"E						
60	6,859	4,155	60-61	42.43	S45°-00'-00"E						
61	6,829	4,185	61-62	29.73	S47°-43'-35"W						
62	6,809	4,163	62-63	45.22	N54°-54'-15"W						
63	6,835	4,126	63-64	47.01	S23°-50'-19"W						
64	6,792	4,107	64-65	31.11	S45°-00'-00"W						
65	6,770	4,085	65-66	144.06	N61°-50'-02"W						
66	6,838	3,958	66-67	38.29	N40°-45'-49"E						
67	6,867	3,983	67-68	158.15	N60°-01'-50"W						
68	6,946	3,846	68-69	25.32	N80°-54'-35"W						
69	6,950	3,821	69-70	32.28	S73°-48'-39"W						
70	6,941	3,790	70-71	31.83	S46°-16'-23"W						
71	6,919	3,767	71-72	95.05	S26°-18'-04"W						
72	6,832	3,724	72-73	185.83	S34°-01'-56"W						
73	6,678	3,620	73-74	56.59	S43°-34'-04"W						
74	6,637	3,581	74-75	66.22	S38°-15'-16"W						
75	6,585	3,540	75-76	141.77	S49°-00'-15"W						
76	6,492	3,433	76-77	27.20	S53°-58'-21"W						
77	6,476	3,411	77-78	23.35	S46°-44'-09"W						
78	6,460	3,394	78-79	1.41	N45°-00'-00"W						
79	6,461	3,393	79-80	18.60	S36°-15'-14"W						
135	7,147	3,914	135-136	35.47	N68°-29'-55"W						
136	7,160	3,881	136-137	27.66	S77°-28'-16"W						
137	7,154	3,854	137-35	133.15	S14°-20'-58"W						
35	7,025	3,821	35-36	83.01	S58°-47'-58"E						
36	6,982	3,892	36-55	39.45	S59°-32'-04"E						

SURVEY BASE LINE DATA

Point	Coordinates		Course	Distance	Bearing
	North	East			
A95	5,265.92	2,213.15	A95-A96	305.84	S86°-25'-27"E
A96	5,246.85	2,518.39	A96-A97	146.41	S15°-53'-09"E
A97	5,106.03	2,558.46	A97-A98	108.43	N50°-49'-13"E
A98	5,789.23	3,396.76	A98-A99	402.58	N05°-27'-22"E
A99	6,189.98	3,435.04	A99-A100	1157.37	N49°-26'-33"E
A100	6,942.52	4,314.35			
208	6,636.85	4,558.98	208-209	358.51	S25°-45'-29"W
209	6,313.96	4,403.18	209-226	200.12	S67°-31'-45"E
226	6,237.47	4,588.11	226-300	241.64	N24°-39'-18"E
300	6,457.08	4,688.91	300-301	177.72	N10°-10'-12"E
301	6,632.01	4,702.29	301-208	161.38	N88°-16'-53"W
227	6,912.65	3,650.22	227-206	524.35	S32°-15'-19"W
206	6,469.22	3,370.38	206-228	9.18	N44°-17'-38"W
228	6,475.79	3,363.97	228-229	300.04	S33°-57'-54"W
229	6,226.94	3,196.34			

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

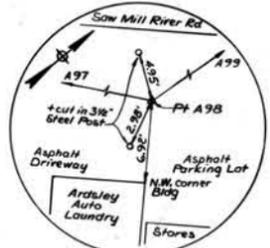
DRAWN BY: *SM*
CHECKED BY: *DS*
DESIGNED BY: *Thomas R. ...*
REVIEWED BY: *...*
SUBMITTED: *C. ...*
APPROVED: *M. P. ...*
DATE: 1 JULY 1987

SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
LOCAL COOPERATION REQUIREMENTS

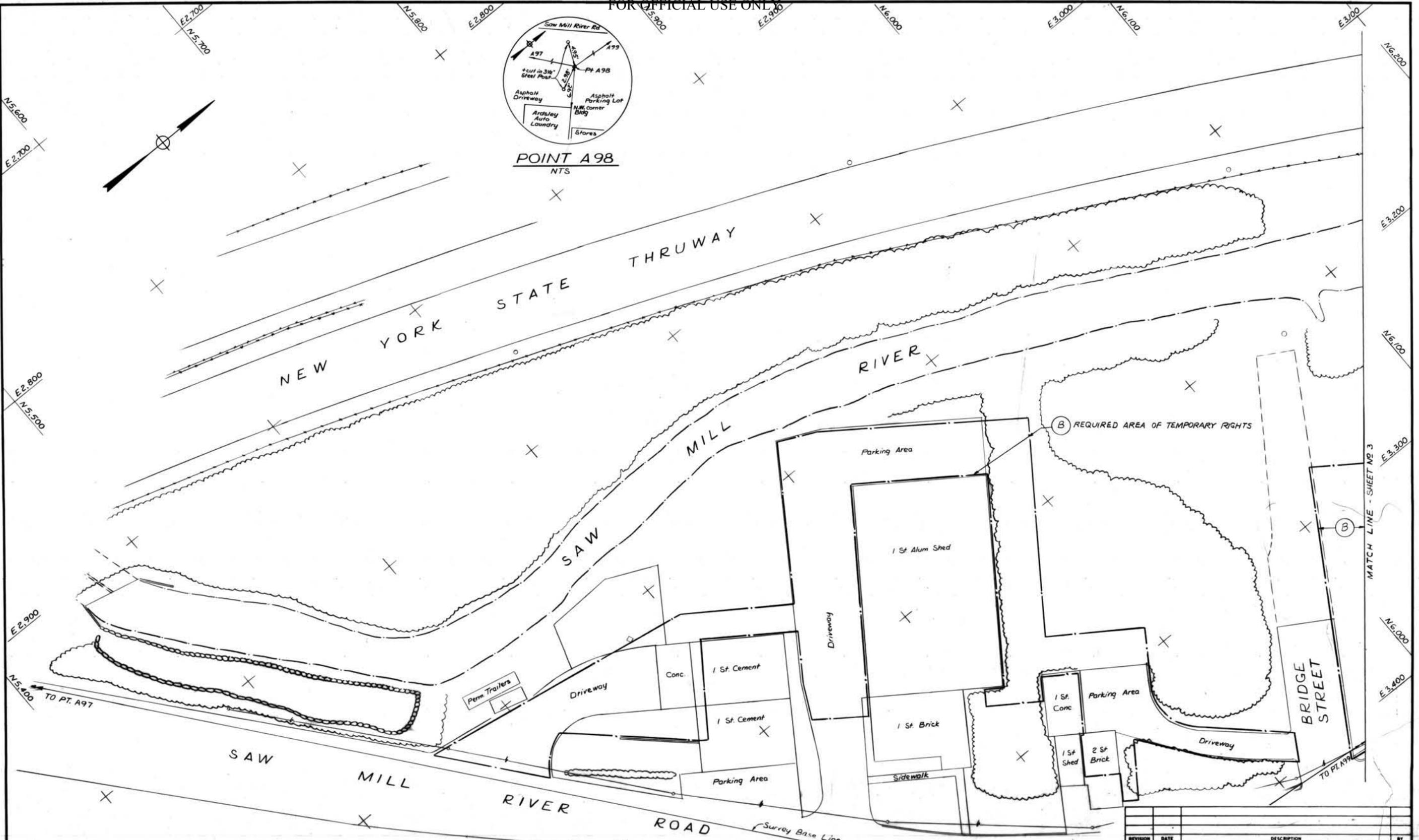
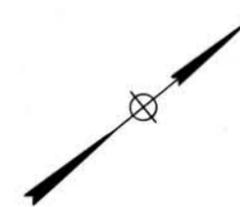
RECOMMENDED: *Stanley Felick*
SCALE AS SHOWN
DRAWING NUMBER: CC-ARD-101
SHEET 1 OF 5

ACQUISITIONS BY LOCAL INTERESTS

Item	Description	Color Legend
A	Required Area of Permanent Rights	0.25 Acres
B	Required Area of Temporary Rights	0.18 Acres



POINT A98
NTS

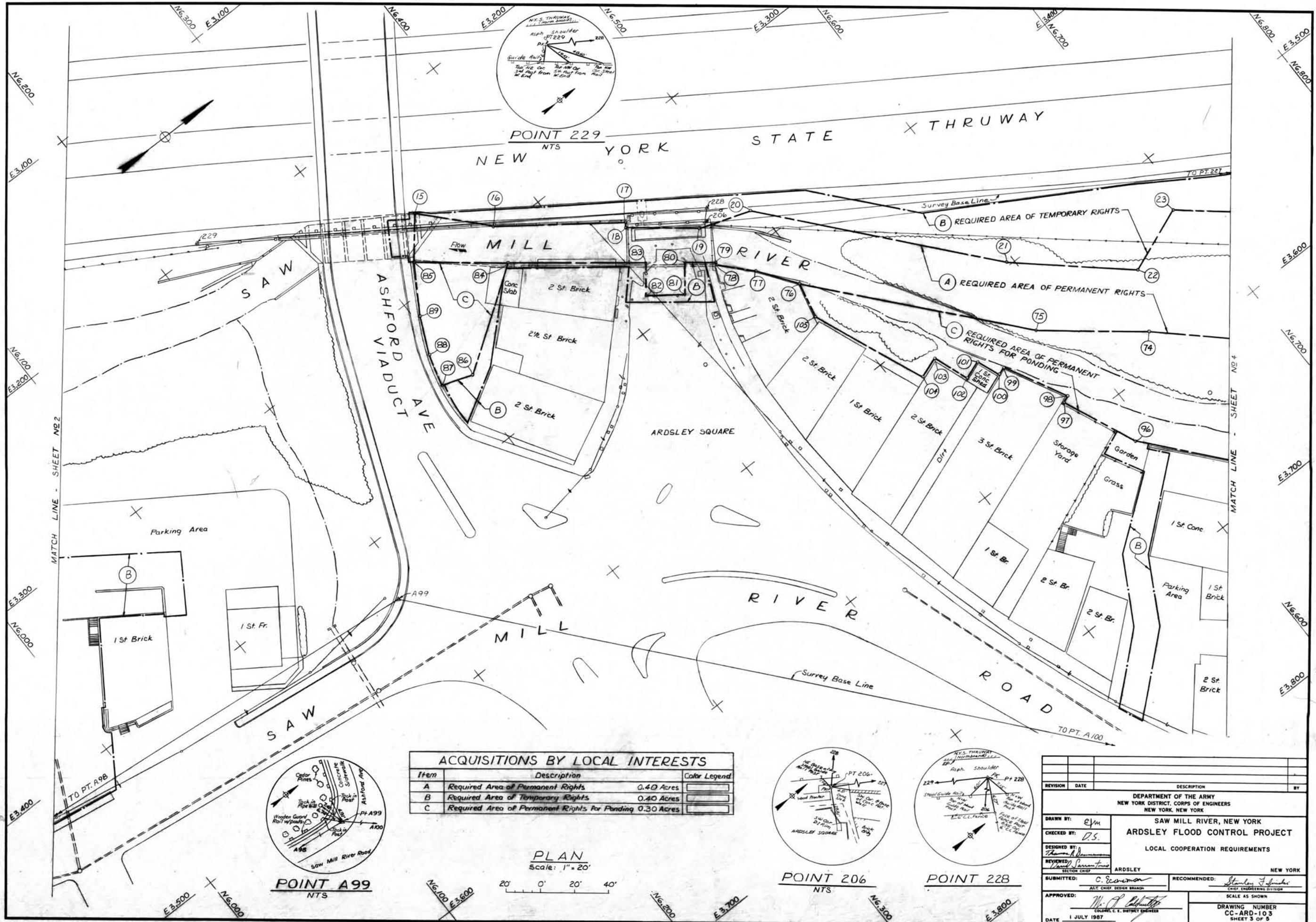


ACQUISITIONS BY LOCAL INTERESTS		
Item	Description	Color Legend
B	Required Area of Temporary Rights	0.60 Acres

PLAN
Scale: 1" = 20'

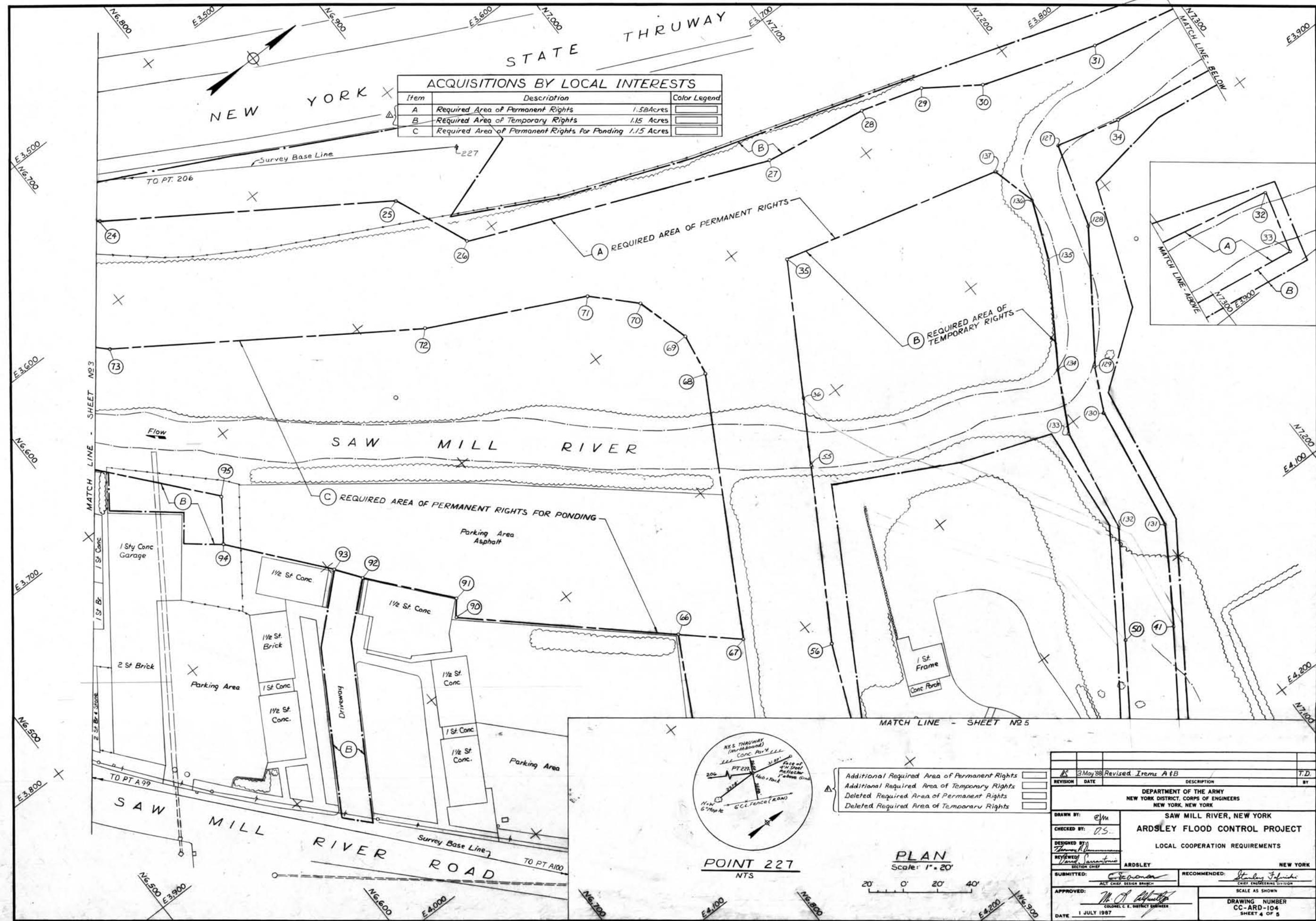


REVISION		DATE	DESCRIPTION	BY
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK				
SAW MILL RIVER, NEW YORK				
ARDSLEY FLOOD CONTROL PROJECT				
LOCAL COOPERATION REQUIREMENTS				
DRAWN BY:	<i>gm</i>	CHECKED BY:	<i>D.S.</i>	DESIGNED BY:
REVIEWED:	<i>[Signature]</i>	APPROVED:	<i>[Signature]</i>	DATE:
SUBMITTED:		RECOMMENDED:		
ACT. CHIEF ENGINEER		ACT. CHIEF ENGINEER		
APPROVED:		SCALE AS SHOWN		
COUNCIL Y. DISTRICT ENGINEER		DRAWING NUMBER		
DATE: 1 JULY 1987		CC-ARD-102		
		SHEET 2 OF 2		



REVISION	DATE	DESCRIPTION	BY
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT LOCAL COOPERATION REQUIREMENTS			
DRAWN BY: EJM	SECTION CHIEF		
CHECKED BY: D.S.	ACT. CHIEF DESIGN BRAND		
DESIGNED BY: [Signature]	RECOMMENDED: [Signature]		
REVIEWED: [Signature]	SCALE AS SHOWN		
SUBMITTED: C. Roseman	DRAWING NUMBER CC-ARD-103 SHEET 3 OF 5		
APPROVED: [Signature]	DATE: 1 JULY 1987		

ACQUISITIONS BY LOCAL INTERESTS		
Item	Description	Color Legend
A	Required Area of Permanent Rights	1.58 Acres
B	Required Area of Temporary Rights	1.15 Acres
C	Required Area of Permanent Rights for Ponding	1.15 Acres

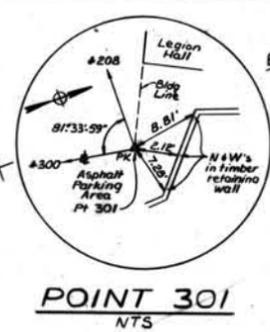
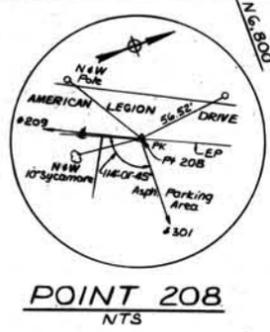
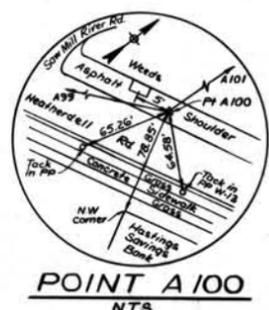


REVISION	DATE	DESCRIPTION	BY
1	3 May 88	Revised Items A & B	T.D.
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT LOCAL COOPERATION REQUIREMENTS			
DRAWN BY: e/m		NEW YORK	
CHECKED BY: O.S.		ARDSLEY	
DESIGNED BY: [Signature]		RECOMMENDED: Stanley F. [Signature]	
REVIEWED BY: [Signature]		SCALE AS SHOWN	
SUBMITTED: [Signature]		DRAWING NUMBER	
APPROVED: [Signature]		CC-ARD-104	
DATE: 1 JULY 1987		SHEET 4 OF 5	

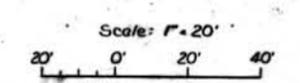
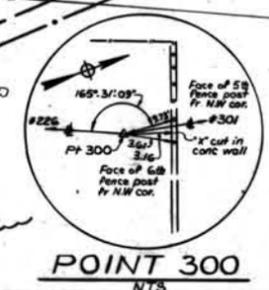
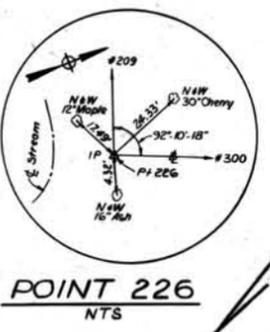
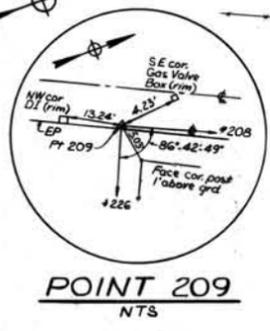


ACQUISITIONS BY LOCAL INTERESTS			
Item	Description	Color Legend	
A	Required Area of Permanent Rights	0.86 Acres	<input type="checkbox"/>
B	Required Area of Temporary Rights	0.30 Acres	<input type="checkbox"/>

WORK TO BE PERFORMED BY LOCAL INTERESTS			
Item	Description	Color Legend	
D	Existing Utilities within area to be relocated as required		<input type="checkbox"/>



<input type="checkbox"/>	Deleted Area of Permanent Rights	<input type="checkbox"/>
<input type="checkbox"/>	Deleted Area of Temporary Rights	<input type="checkbox"/>
<input type="checkbox"/>	Additional Area of Temporary Rights	<input type="checkbox"/>



Revision	Description	Date	Approved
1	Revised Items A and B	19 May 88	RF

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

**SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
LOCAL COOPERATION REQUIREMENTS**

Designed by: *Thomas D...*
Drawn by: *Ejm*
Checked by: *DS*

Reviewed by: *Paul B...*
Approved by: *...*

Sheet reference number: CC-48-105
Date: 1 JULY 1987
Scale: AS SHOWN
Sheet 5 of 5

SAW MILL RIVER, NEW YORK

ARDSLEY FLOOD CONTROL PROJECT

ARDSLEY NEW YORK

INDEX TO DRAWINGS		
SHEET NO.	TITLE	DRAWING NO.
1	INDEX TO DRAWINGS	CC-ARD-401
2	GENERAL PLAN & LOCATION MAP	CC-ARD-402
3	ALIGNMENT DATA	CC-ARD-403
4	PLAN-DOWNSTREAM AREA STA 0+00D TO 1+76D	CC-ARD-404
5	PLAN-MIDDLE AREA	CC-ARD-405
6	PLAN-UPSTREAM AREA STA 0+00U TO STA 4+91U	CC-ARD-406
7	PLAN-UPSTREAM AREA STA 4+91U TO STA 12+10U † STA 0+00W TO STA 3+09W STA 0+00B TO STA 3+54B	CC-ARD-407
8	PLAN-UPSTREAM AREA STA 3+09W TO STA 4+44.5W † STA 3+54B TO STA 4+41B †	CC-ARD-408
9	PLAN-UPSTREAM AREA INTERCEPTOR DITCH NO.2	CC-ARD-409
10	MISCELLANEOUS DETAILS DOWNSTREAM AREA	CC-ARD-410
11	MAIN CHANNEL PROFILE	CC-ARD-411
12	MISCELLANEOUS PROFILES	CC-ARD-412
13	PROFILES-INTERCEPTOR DITCHES NO.1 & 2	CC-ARD-413
14	CROSS SECTIONS STA 0+27U TO STA 8+02U	CC-ARD-414
15	CROSS SECTIONS STA 8+89U TO STA 11+23U STA 1+69B TO STA 4+18B	CC-ARD-415
16	CROSS SECTIONS PONDING AREAS NO.1 & 2 INTERCEPTOR DITCHES NO.1 & 2	CC-ARD-416
17	WALL PLAN STA 0+00U TO STA 3+49U	CC-ARD-417
18	WALL PLAN STA 3+49U TO STA 6+94U	CC-ARD-418
19	WALL PLAN STA 6+94U TO STA 7+66.98U STA 0+00W TO STA 2+40W	CC-ARD-419
20	WALL PLAN STA 2+40W TO STA 4+44.5W †	CC-ARD-420

INDEX TO DRAWINGS		
SHEET NO.	TITLE	DRAWING NO.
21	CONCRETE CHANNEL WALL DETAILS	CC-ARD-421
22	FLOODWALL DETAILS NO.1	CC-ARD-422
23	FLOODWALL DETAILS NO.2	CC-ARD-423
24	JUNCTION CHAMBER NO.1 DROP INLETS NO.1 & 2 DRAINAGE STRUCTURE NO.1	CC-ARD-424
25	DRAINAGE STRUCTURES NO.3 & 4 OUTLET STRUCTURE NO.1	CC-ARD-425
26	DRAINAGE STRUCTURE NO.2 OUTLET STRUCTURE NO.2	CC-ARD-426
27	DROP INLET NO.3, 4 & 5 DROP INLETS NO.6, 7 & 8 BOX CULVERT	CC-ARD-427
28	BLOWOFF TUNNEL-LOCATION PLAN & SECTION	CC-ARD-428
29	BLOWOFF TUNNEL-PLAN, SECTIONS & DETAILS	CC-ARD-429
30	BLOWOFF TUNNEL-SECTIONS	CC-ARD-430
31	BLOWOFF TUNNEL-DETAILS	CC-ARD-431
32	MIDDLE AREA FLOODPROOFING - BUILDING ELEVATIONS	CC-ARD-432
33	MIDDLE AREA FLOODPROOFING - DETAILS	CC-ARD-433
34	MISCELLANEOUS DETAILS NO.1	CC-ARD-434
35	MISCELLANEOUS DETAILS NO.2	CC-ARD-435
36	PLANTING PLAN NO.1	CC-ARD-436
37	PLANTING PLAN NO.2	CC-ARD-437
38	SUB-SURFACE EXPLORATIONS	CC-ARD-438
39	SUB-SURFACE EXPLORATIONS	CC-ARD-439
40	SUB-SURFACE EXPLORATIONS	CC-ARD-440
41	SUB-SURFACE EXPLORATIONS	CC-ARD-441
42	SUB-SURFACE EXPLORATIONS	CC-ARD-442
43	HYDROLOGICAL DATA NO.1	CC-ARD-443
44	HYDROLOGICAL DATA NO.2	CC-ARD-444
45	PERMANENT SIGN LETTERING-REFERENCE	CC-ARD-445
46	INLET STRUCTURE NO.1 JUNCTION CHAMBER NO.2 OUTLET STRUCTURE NO.3	CC-ARD-446

△ The following drawings have been added:
Sheet No. 2A, 3A, 9A, 13A, 28A, 29A, 30A, 27A & 31A

INDEX TO SURVEY SHEETS		
SHEET NO.	TITLE	DRAWING NO.
1	TOPOGRAPHIC SURVEY	CS-ARD-501
THRU		THRU
12	TOPOGRAPHIC SURVEY	CS-ARD-512

Contractors Working Area Note:

At locations where work is required adjacent to a building or other structure, the contractor's limit line may be shown inside the building or structure line for clarity. The actual limit is the outside face of the building or structure.

General Notes:

- Elevations are in feet and tenths and refer to the National Geodetic Vertical Datum of 1929.
- Coordinates are based on an arbitrary Grid System.
- All cross sections are drawn perpendicular to a reference line unless otherwise noted.
- Explanation of section designations - The section designations used are represented by fractions, the numerator of which is the section reference and the denominator is the sheet number on which the section is taken or shown.
- All exposed concrete corners shall be chamfered one inch unless otherwise noted.
- Existing utilities and structures shall be protected during construction by the contractor.
- All dimensions in plan are horizontal unless otherwise noted.
- Riprap Bedding Material and crushed stone are shown symbolically only.
See Specifications for actual sizes and shapes.

BASE BID and BID OPTION

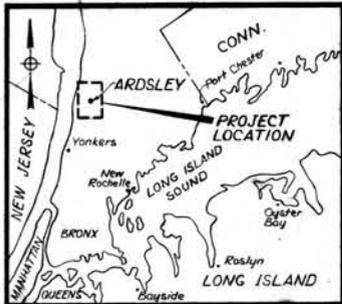
The Base Bid consists of all work in the Downstream Area. The Bid Option consists of all work in the Middle and Upstream Areas.

LEGEND

- DH5-DRILL HOLE
- TPI-TEST PIT
- AH1-AUGER HOLE
- ⓑ PAYMENT ITEM NUMBER
- Ⓢ WALL MONOLITH NUMBER

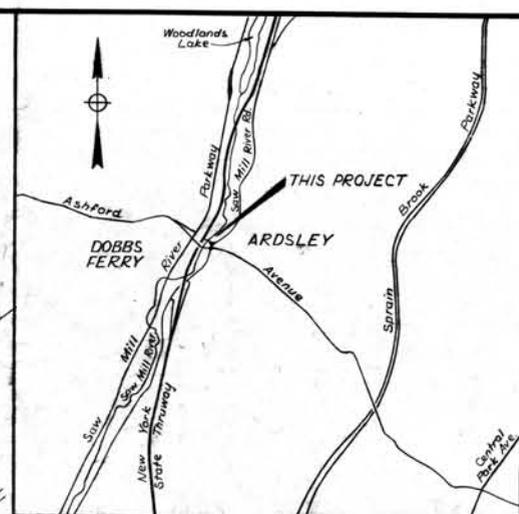
△	Light drawings have been added. As-Built	31 JUL 90	D.P.
△	Added Sheet No. 46	5 May 89	R.F.
△	Added Reference Drawing	21 Jun 88	T.D.
Revision	Description	Date	Approved
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
Designed by:	SAW MILL RIVER, NEW YORK		
Drawn by:	ARDSLEY FLOOD CONTROL PROJECT		
Checked by:	INDEX TO DRAWINGS		
Reviewed by:	ARDSLEY NEW YORK		
Approved by:	Approval Recommended:	Sheet reference number:	Date: 20 JULY 1987
		CC-ARD-401	Scale: AS SHOWN
			Sheet 1 of 44

AS-BUILT



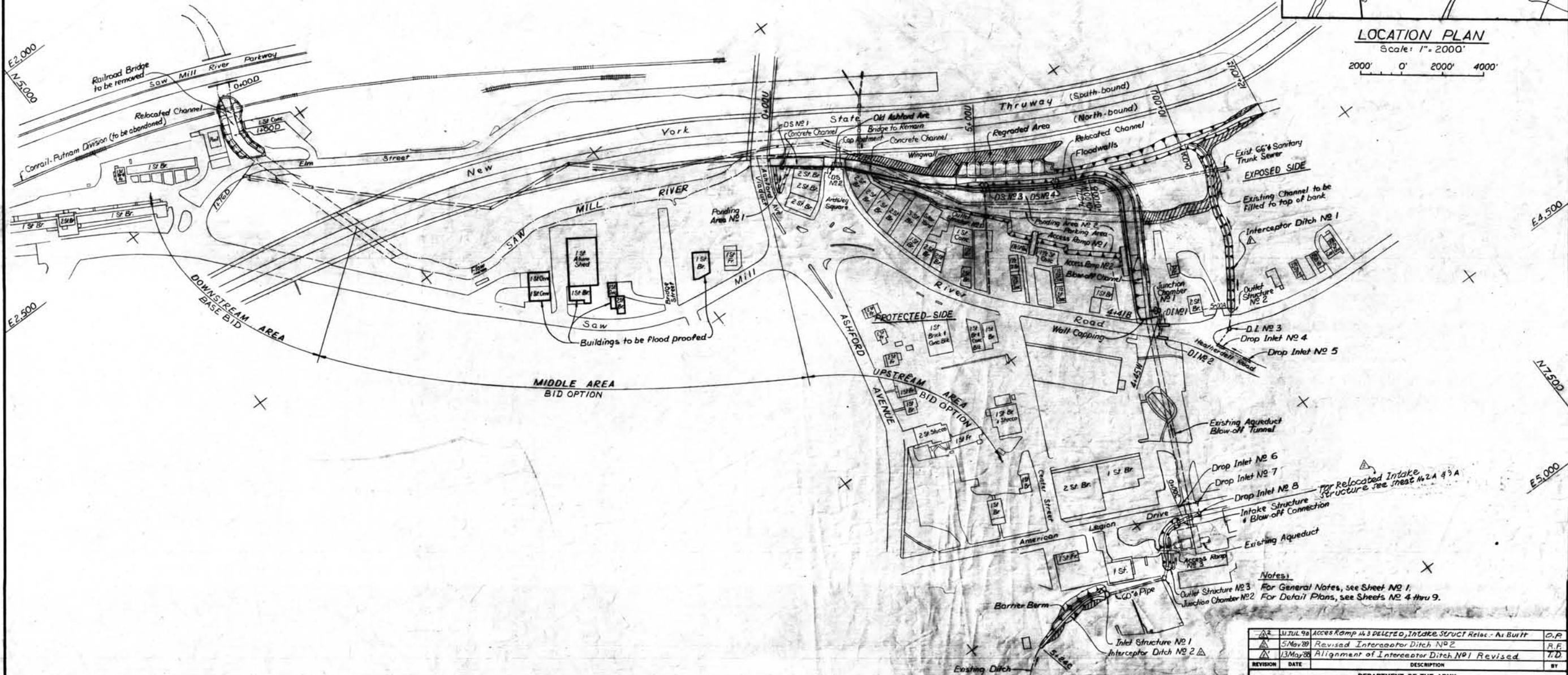
VICINITY MAP

Scale in Miles



LOCATION PLAN

Scale: 1" = 2000'



RECORD DRAWING OF WORK AS BUILT

Scale: 1" = 100'



Notes:
 1. For General Notes, see Sheet No. 1.
 2. For Detail Plans, see Sheets No. 4 thru 9.

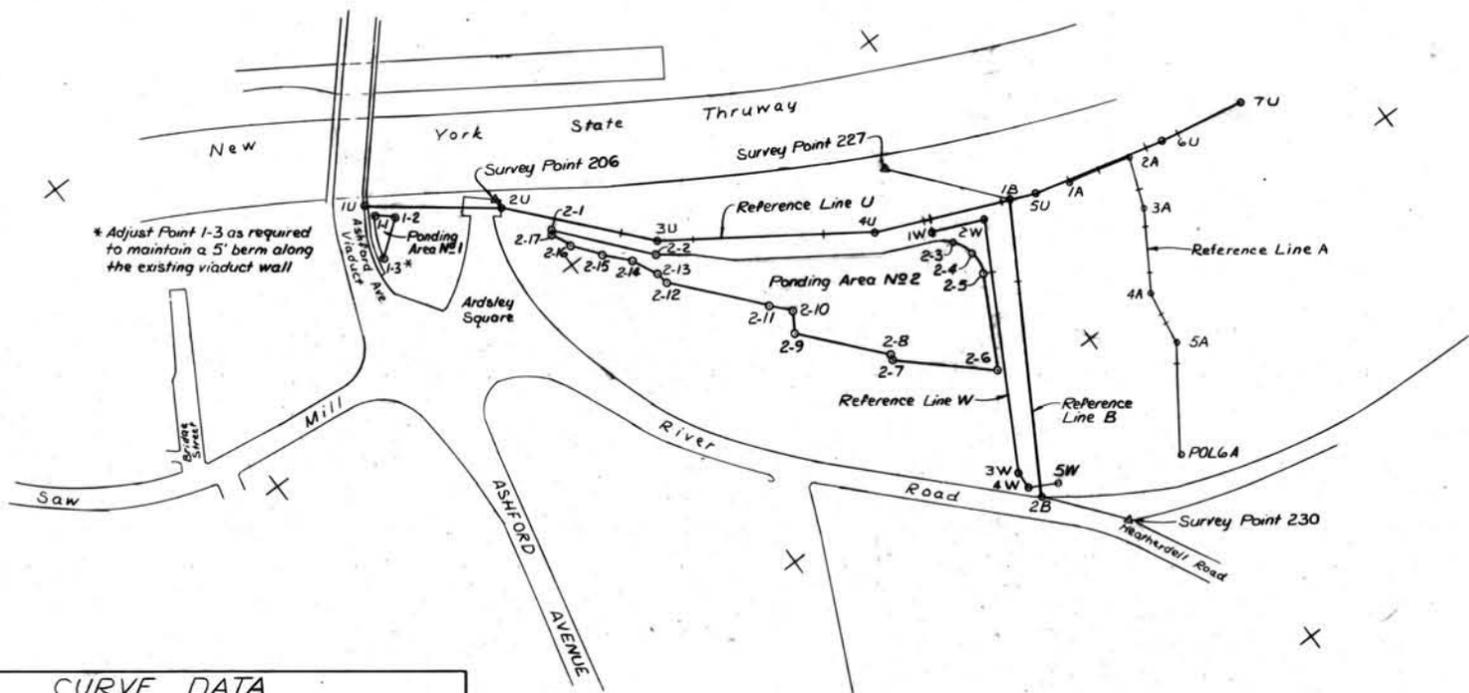
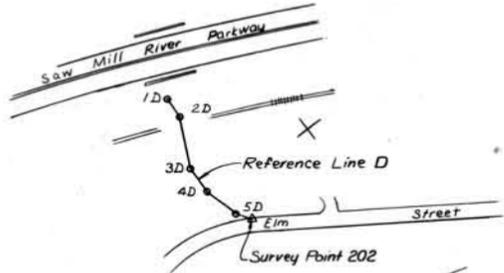
REVISION	DATE	DESCRIPTION	BY
1	11/17/90	Access Ramp #3 DELETED, Intake Struct Reloc - As Built	C.P.
2	5/10/91	Revised Interceptor Ditch No. 2	R.F.
3	13/May/91	Alignment of Interceptor Ditch No. 1 Revised	T.D.

DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK	
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT GENERAL PLAN	
DRAWN BY: <i>EM</i> CHECKED BY: <i>D.S.</i> DESIGNED BY: <i>[Signature]</i> REVIEWED BY: <i>[Signature]</i> APPROVED: <i>[Signature]</i> DATE: 20 JULY 1997	ARDSLEY NEW YORK RECOMMENDED: <i>[Signature]</i> SCALE AS SHOWN DRAWING NUMBER CC-ARD-402 SHEET 2 OF 4

Point	Station	Offset Distance From Reference Line (Ft)	Elevation
1-1	0+17U	—	123.2
1-2	0+45U	—	123.2
2-1	2+60U	—	124.6
2-2	3+91U	—	124.0
2-3	0+33W	—	123.5
2-4	0+76W	—	123.6
2-5	1+21W	—	123.5
2-14	3+63.5U	32	—
2-15	3+15U	32	—
2-16	2+87U	30	—
2-17	2+62U	23.5	124.6

Point	North	East	Elevation
1-3	6301.5	3341.5	123.5
2-6	6875.0	3960.0	124.5
2-7	6768.0	3869.0	123.8
2-8	6774.0	3860.0	123.8
2-9	6688.0	3754.0	123.7
2-10	6705.0	3728.0	123.4
2-11	6682.5	3707.5	—
2-12	6583.0	3595.0	—
2-13	6581.0	3576.0	123.9

Point	Coordinates		Course	Distance	Bearing
	North	East			
202	5366.72	2549.29	202-5D	23.40	S 65° 27' 39" W
206	6469.22	3370.38	206-2U	18.24	N 77° 21' 56" E
226	6237.47	4588.11	226-7C	14.91	S 78° 30' 33" W
227	6912.65	3650.22	227-1B	175.08	N 51° 23' 18" E
230	6898.45	4224.71	230-2B	129.06	S 52° 00' 18" W



* Adjust Point 1-3 as required to maintain a 5' berm along the existing viaduct wall

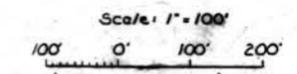
Point	Coordinates		Course	Distance	Bearing
	North	East			
1D	5379	2354	1D-2D	33.73	S 78° 01' 26" E
2D	5372	2387	2D-3D	69.08	S 67° 53' 26" E
3D	5346	2451	3D-4D	36.06	S 86° 49' 13" E
4D	5344	2487	4D-5D	43.01	N 72° 24' 27" E
5D	5357	2528	—	—	—
1U	6323	3270	1U-2U	191.13	N 38° 11' 40" E
2U	6473.21	3388.18	2U-3U	200.50	N 49° 39' 30" E
3U	6603	3541	3U-4U	304.54	N 34° 09' 35" E
4U	6855	3712	4U-5U	217.08	N 24° 12' 13" E
5U	7053	3801	5U-6U	188.74	N 15° 21' 42" E
6U	7235	3857	6U-7U	119.36	N 08° 40' 23" E
7U	7353	3869	—	—	—
1W	6911.46	3759.58	1W-2W	75.00	N 24° 12' 13" E
2W	6979.87	3790.33	2W-3W	342.23	S 60° 26' 06" E
3W	6811	4088	3W-4W	22.36	S 79° 41' 42" E
4W	6807	4170	4W-5W	45.89	N 23° 46' 20" E
5W	6849	4128.5	—	—	—
1B	7021.91	3787.03	1B-2B	392.49	S 58° 52' 12" E
2B	6819	4123	—	—	—
1A	7100.15	3818.10	1A-2A	90.00	N 15° 21' 42" E
2A	7186.94	3841.94	2A-3A	65.66	S 72° 19' 16" E
3A	7167	3904.5	3A-4A	115.24	S 56° 51' 41" E
4A	7104	4001	4A-5A	68.31	S 81° 32' 23" E
5A	7097	4049	5A-POLLA	158.65	S 55° 39' 32" E
POLLA	7008	4200	—	—	—

Point	Interior Angle	Radius	Tangent Distance	Length of Curve	Point of Curvature	Point of Tangency
3U	15° 29' 55"	367.43	50'	99.39'	3+42.40U	4+1.79U
4U	9° 57' 22"	803.65	70	139.65	6+26.33U	7+65.98U
5U	8° 50' 31"	646.71	50	99.80	8+63.06U	9+62.86U
6U	6° 41' 19"	427.82	25	49.94	10+76.60U	11+26.54U
2W	95° 21' 41"	68.29	75	113.66	0+00W	1+13.66W
1B	96° 55' 35"	99.22	112	167.85	0+00B	1+67.85B
2A	87° 40' 58"	46.86	45	71.71	0+45A	1+16.71A
3A	15° 27' 35"	152.21	20.66	41.07	1+16.71A	1+57.78A
4A	27° 40' 42"	121.78	30	58.83	2+22.36A	2+81.19A
5A	28° 52' 51"	116.50	30	58.72	2+89.50A	3+48.22A
2C	75° 58' 50"	38.41	30	50.94	0+29.06C	0+80.00C
3C	23° 44' 49"	42.81	9	17.74	1+23.45C	1+41.19C
6C	30° 55' 40"	72.29	20	39.02	3+37.04C	3+76.06C
7C	07° 45' 43"	294.82	20	39.94	4+04.68C	4+44.62C

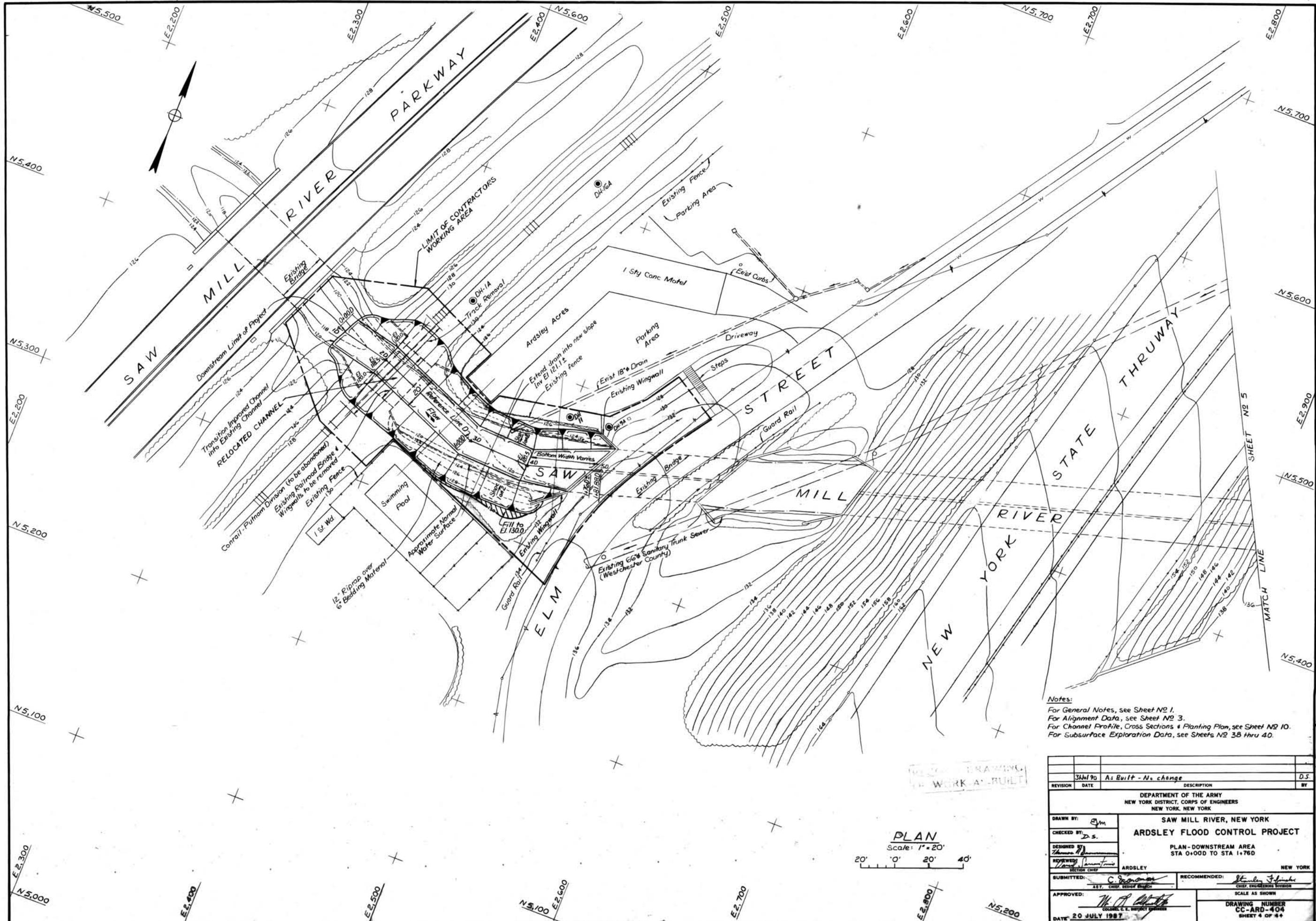
Point	Coordinates		Course	Distance	Bearing
	North	East			
1C	6600	4556.5	1C-2C	59.06	S 13° 12' 46" W
2C	6548.5	4543	2C-3C	82.46	S 62° 46' 04" E
3C	6504.77	4616.31	3C-4C	38.79	S 39° 01' 15" E
4C	6474.63	4640.73	4C-5C	142.05	S 20° 58' 46" W
5C	6342.00	4589.88	5C-6C	44.00	S 27° 35' 09" W
6C	6303	4569.5	6C-7C	68.62	S 03° 20' 31" E
7C	6234.5	4573.5	7C-8C	109.04	S 11° 06' 14" E
8C	6127.5	4594.5	—	—	—

Notes:
For General Notes, see Sheet No. 1
For Survey Point Tie-down data, see Topographic Sheets.

RECORD DRAWING OF WORK AS-BUILT



U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT ALIGNMENT DATA			
Designed by: Drawn by:	Checked by: D. S.	Reviewed by: Approval Recommended by:	Sheet reference number: Date: 20 JULY 1987 Scale: AS SHOWN CC-ARD-403 Sheet 5 of 40
Revision Description Date Approved		1 Revised Alignment of Reference Line C - As Built 31 Jul 79 R.F. 2 Revised Alignment of Reference Line C 5 May 81 R.F. 3 Revised Alignment of Reference Line A 13 May 81 T.D.	

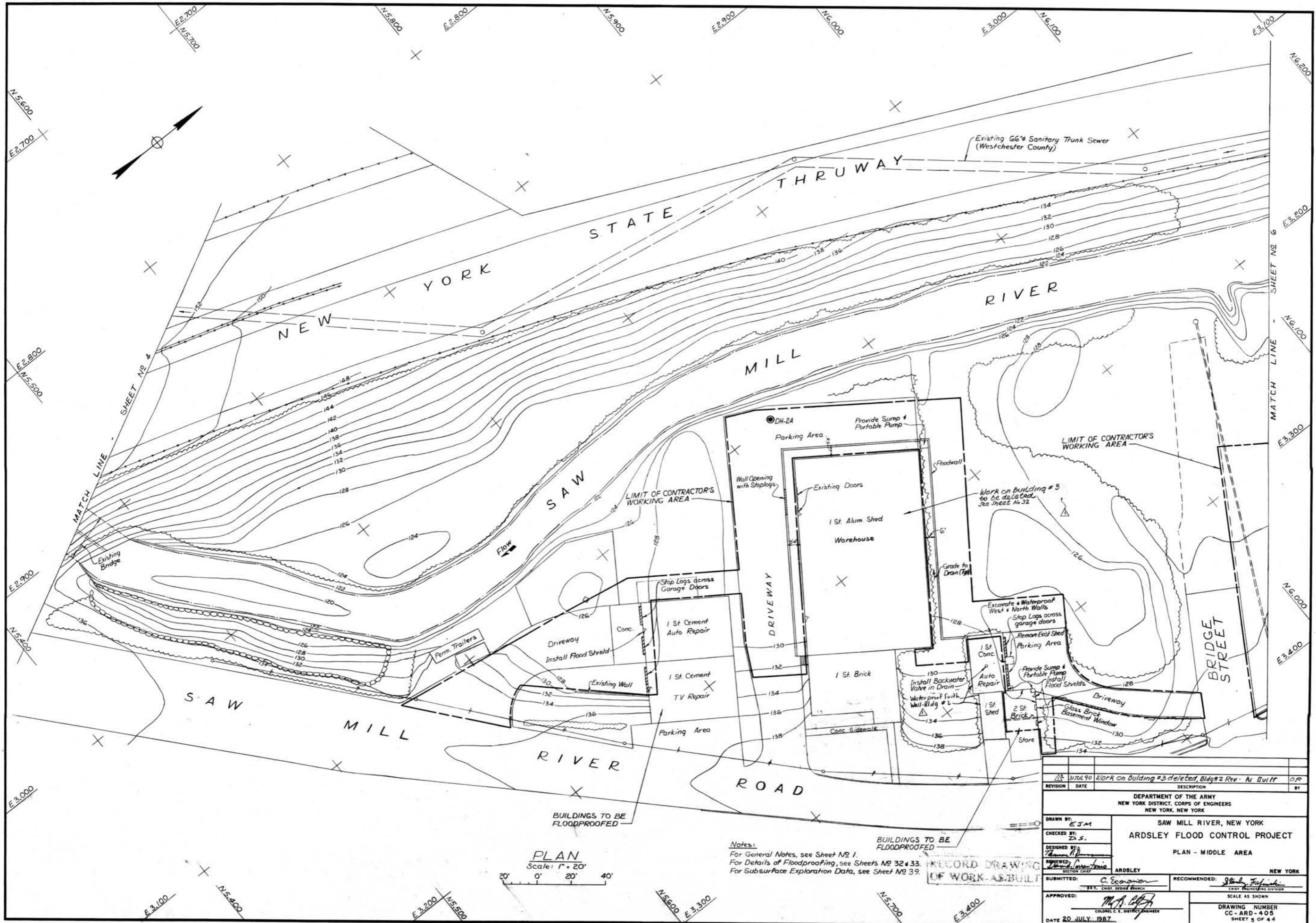


Notes:
 For General Notes, see Sheet N2 1.
 For Alignment Data, see Sheet N2 3.
 For Channel Profile, Cross Sections & Planting Plan, see Sheet N2 10.
 For Subsurface Exploration Data, see Sheets N2 38 thru 40.

PLAN
 Scale: 1" = 20'
 20' 0' 20' 40'

WORK AS BUILT

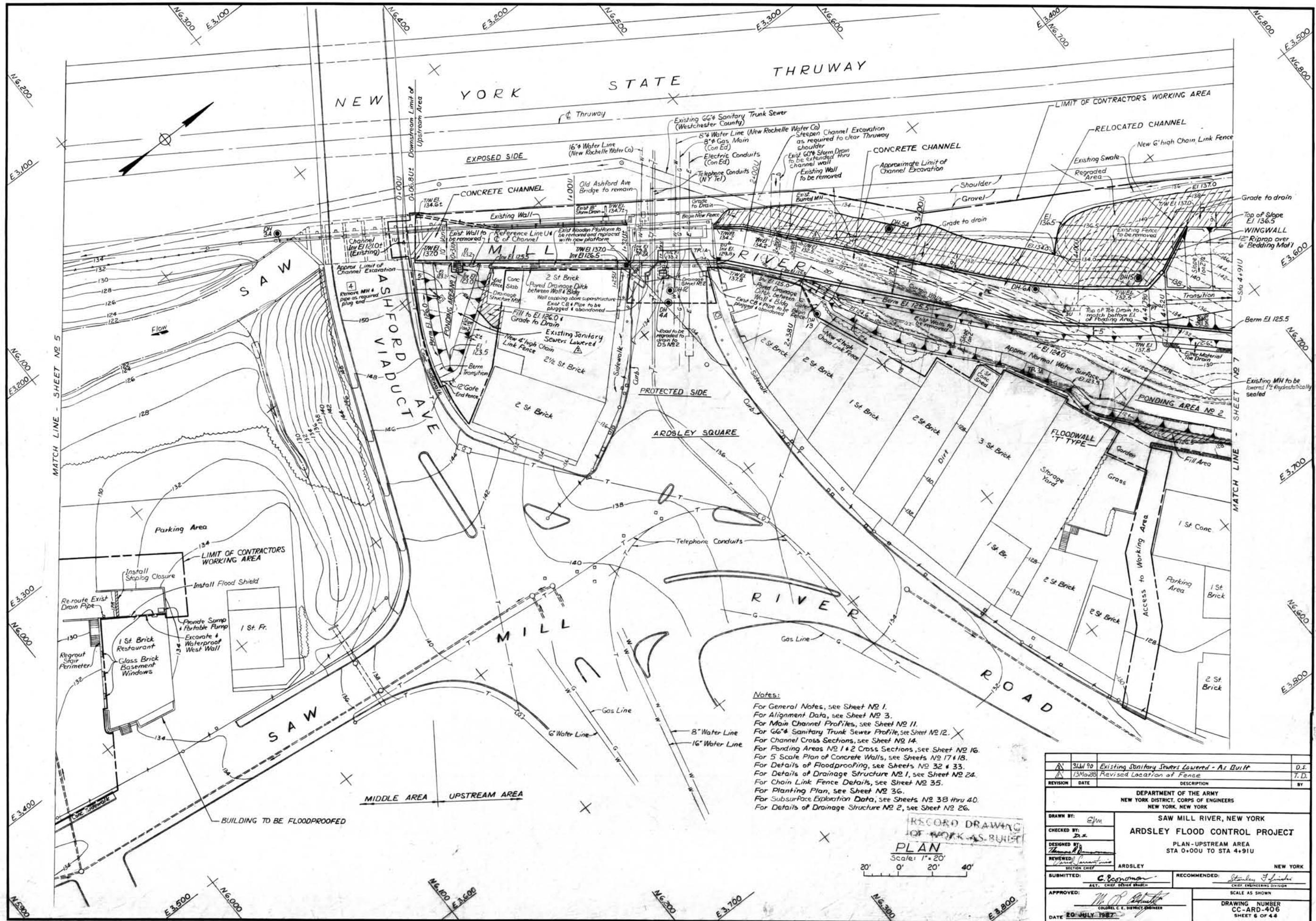
REVISION	DATE	DESCRIPTION	BY
3	Jul 90	As Built - No change	D.S.
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
DRAWN BY: <i>Sym</i>		SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT	
CHECKED BY: <i>D.S.</i>		PLAN - DOWNSTREAM AREA STA 0+00 TO STA 1+760	
DESIGNED BY: <i>Thomas H.</i>		ARDSLEY NEW YORK	
REVIEWED BY: <i>Thomas H.</i>		SUBMITTED: <i>C. Brown</i> ASST. CHIEF, DISTRICT ENGINEER	
APPROVED: <i>W. A. [Signature]</i>		RECOMMENDED: <i>St. [Signature]</i> CHIEF, ENGINEERING DIVISION	
DATE: 20 JULY 1987		SCALE AS SHOWN DRAWING NUMBER CC-ARD-404 SHEET 4 OF 4	



PLAN
Scale: 1" = 20'
0' 20' 40'

Notes:
For General Notes, see Sheet No 1.
For Details of Floodproofing, see Sheets No 32 & 33.
For Subsurface Exploration Data, see Sheet No 39.

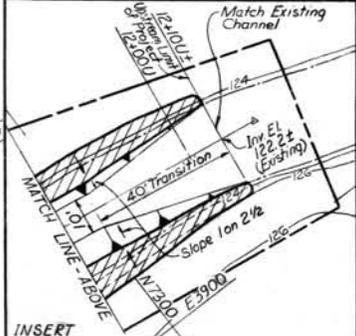
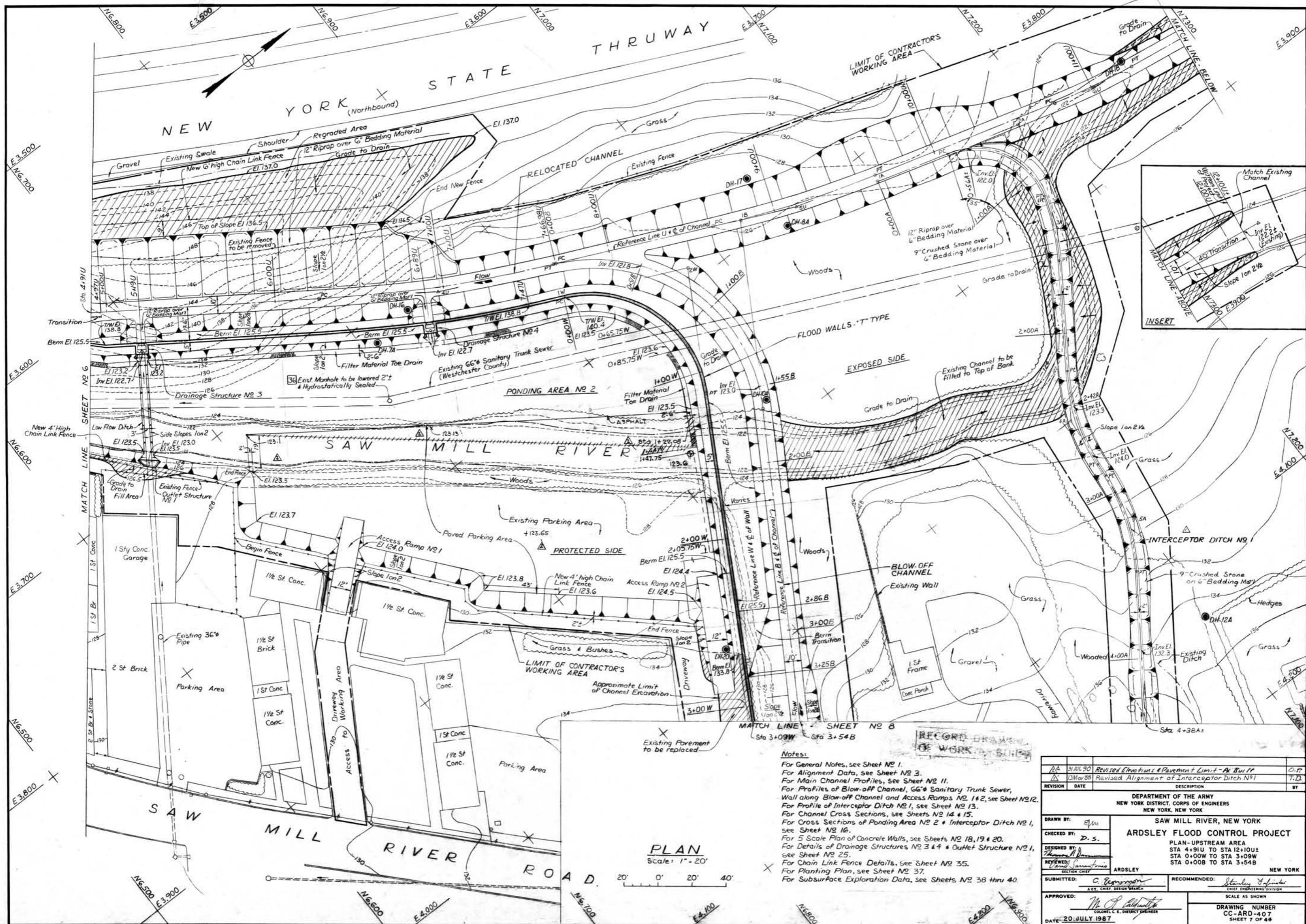
REVISION	DATE	DESCRIPTION	BY
1	3/7/87	Work on Building #3 deleted, Bldg #2 Rev - As Built	OP
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
DRAWN BY: EJM		SAW MILL RIVER, NEW YORK	
CHECKED BY: Z.S.		ARDSLEY FLOOD CONTROL PROJECT	
DESIGNED BY: Thomas M.		PLAN - MIDDLE AREA	
APPROVED: Thomas M.		ARDSLEY NEW YORK	
SUBMITTED: C. Economou		RECOMMENDED: Stanley J.	
APPROVED: M.A. [Signature]		SCALE AS SHOWN	
DATE 20 JULY 1987		DRAWING NUMBER CC-ARD-405 SHEET 5 OF 44	



Notes:
 For General Notes, see Sheet No 1.
 For Alignment Data, see Sheet No 3.
 For Main Channel Profiles, see Sheet No 11.
 For 66" Sanitary Trunk Sewer Profile, see Sheet No 12.
 For Channel Cross Sections, see Sheet No 14.
 For Ponding Areas No 1 & 2 Cross Sections, see Sheet No 16.
 For 5 Scale Plan of Concrete Walls, see Sheets No 17 & 18.
 For Details of Floodproofing, see Sheets No 32 & 33.
 For Details of Drainage Structure No 1, see Sheet No 24.
 For Chain Link Fence Details, see Sheet No 35.
 For Planting Plan, see Sheet No 36.
 For Subsurface Exploration Data, see Sheets No 38 thru 40.
 For Details of Drainage Structure No 2, see Sheet No 26.

RECORD DRAWING
OF WORK AS BUILT
PLAN
 Scale: 1" = 20'
 20' 0' 20' 40'

314190	Existing Sanitary Sewers Lowered - As Built	D.S.	
134000	Revised Location of Fence	T.D.	
REVISION	DATE	DESCRIPTION	BY
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT PLAN - UPSTREAM AREA STA 0+000 TO STA 4+910			
DRAWN BY: <i>EJM</i> CHECKED BY: <i>22</i> DESIGNED BY: <i>Thomson</i> REVIEWED: <i>Thomson</i> SECTION CHIEF	ARDSLEY NEW YORK		
SUBMITTED: <i>C. Egan</i> ALT. CHIEF, DESIGN BRANCH	RECOMMENDED: <i>Stanley F. ...</i> CHIEF, ENGINEERING DIVISION		
APPROVED: <i>W. C. ...</i> COLONEL, C. E. DISTRICT ENGINEER	SCALE AS SHOWN		
DATE: 20 JULY 1987	DRAWING NUMBER CC-ARD-406 SHEET 6 OF 44		



Notes:
 For General Notes, see Sheet No. 1.
 For Alignment Data, see Sheet No. 3.
 For Main Channel Profiles, see Sheet No. 11.
 For Profiles of Blow-off Channel, 66" Sanitary Trunk Sewer, Wall along Blow-off Channel and Access Ramps No. 1 & 2, see Sheet No. 12.
 For Profile of Interceptor Ditch No. 1, see Sheet No. 13.
 For Channel Cross Sections, see Sheets No. 14 & 15.
 For Cross Sections of Ponding Area No. 2 & Interceptor Ditch No. 1, see Sheet No. 16.
 For 5 Scale Plan of Concrete Walls, see Sheets No. 18, 19 & 20.
 For Details of Drainage Structures No. 3 & 4 & Outlet Structure No. 1, see Sheet No. 25.
 For Chain Link Fence Details, see Sheet No. 35.
 For Planting Plan, see Sheet No. 37.
 For Subsurface Exploration Data, see Sheets No. 38 thru 40.

PLAN
 Scale: 1" = 20'



REVISION	DATE	DESCRIPTION	BY
1	3/14/90	Revised Elevations & Pavement Limit - As Built	C.P.
2	13/Mar/88	Revised Alignment of Interceptor Ditch No. 1	T.D.

DEPARTMENT OF THE ARMY
 NEW YORK DISTRICT, CORPS OF ENGINEERS
 NEW YORK, NEW YORK

SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
 PLAN-UPSTREAM AREA
 STA 4+91U TO STA 12+10U
 STA 0+00W TO STA 3+09W
 STA 0+00B TO STA 3+54B

NEW YORK

SECTION CHIEF: *C. Bergman*
 A.S.T. CHIEF DESIGN ENGINEER

RECOMMENDED: *Stanley J. Fisher*
 CHIEF ENGINEERS DIVISION

APPROVED: *M. J. [Signature]*
 COLONEL, C. E. DISTRICT ENGINEER

SCALE AS SHOWN

DRAWING NUMBER
 CC-ARD-407
 SHEET 7 OF 44

DATE: 20 JULY 1987



Notes:
 For General Notes, see Sheet No. 1.
 For Alignment Blk's, see Sheet No. 3.
 For Profiles of Blow-off Channel & Wall along Blow-off Channel, see Sheet No. 12.
 For Profile of Interceptor Ditch No. 1, see Sheet No. 13.
 For Cross Sections of Blow-off Channel, see Sheet No. 15.
 For Cross Sections of Interceptor Ditch No. 1, see Sheet No. 16.
 For 5 Scale Plan of Concrete Walls, see Sheet No. 20.
 For Details of Junction Chamber No. 1, Drop Inlets No. 1 & 2, & Drainage Structure No. 1, see Sheet No. 24.
 For Details of Outlet Structure No. 2 and Drop Inlets No. 3, 4 & 5, see Sheet No. 26.
 For Planting Plan, see Sheet No. 37.
 For Subsurface Exploration Data, see Sheet No. 40.

RECORD DRAWING
 OF WORK AS BUILT

NO.	DATE	DESCRIPTION	BY
1	5/24/79	Rev. Elevations, Relocated O.S. No. 2 - As Built	J.P.
2	13 May 80	Revised Stationing Along Reference Line A & Location of Existing	T.D.

DEPARTMENT OF THE ARMY
 NEW YORK DISTRICT, CORPS OF ENGINEERS
 NEW YORK, NEW YORK

**SAW MILL RIVER, NEW YORK
 ARDSLEY FLOOD CONTROL PROJECT**

PLAN - UPSTREAM AREA
 STA 3+09W TO STA 4+44.5W;
 STA 3+54B TO STA 4+11B

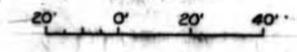
DRAWN BY: *EJW*
 CHECKED BY: *D.S.*
 DESIGNED BY: *...*
 REVIEWED BY: *...*

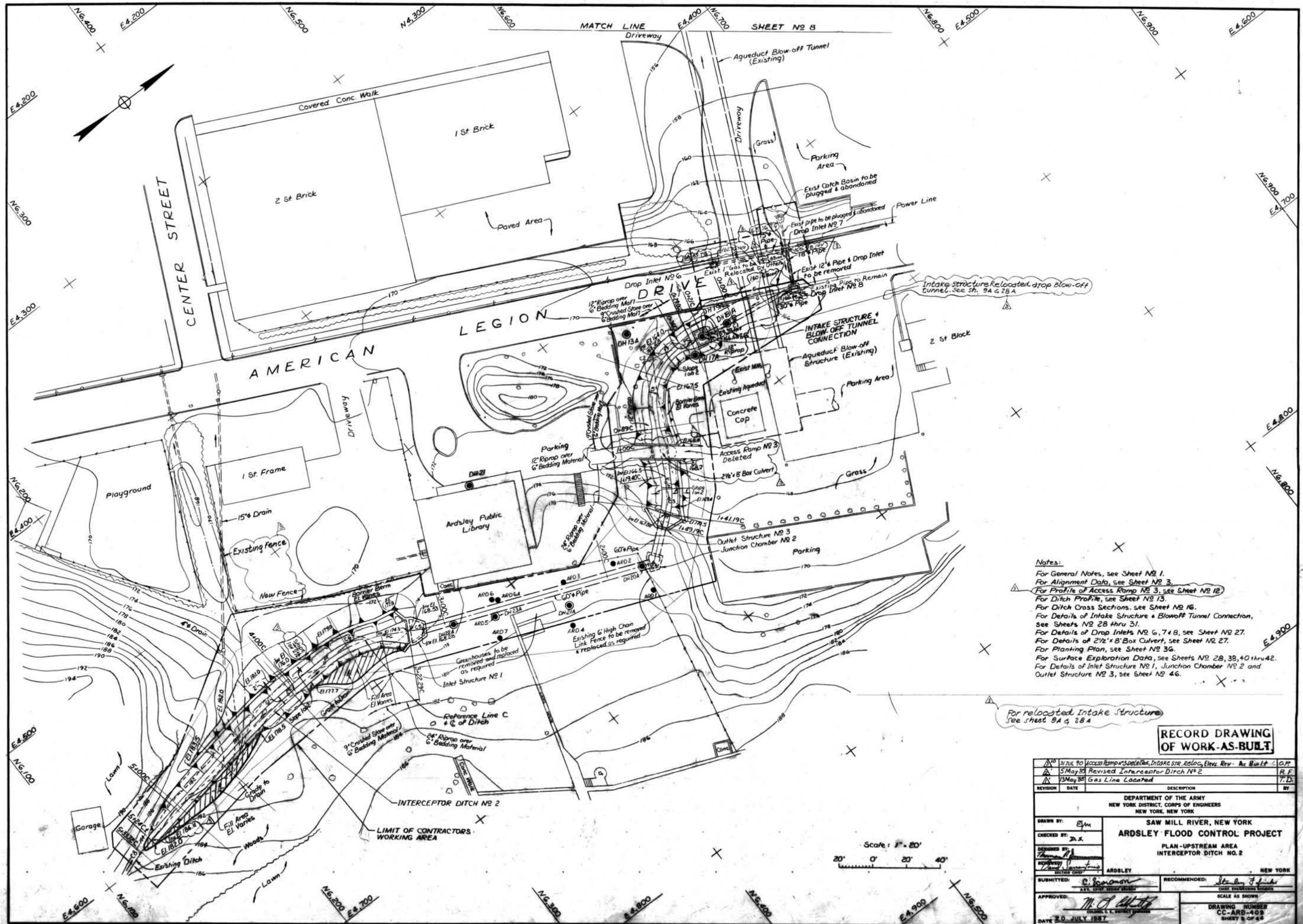
APPROVED: *C. Scam...*
 DATE: 20 JULY 1987

RECOMMENDED: *...*
 SCALE AS SHOWN

DRAWING NUMBER
 CC-ARD-408
 SHEET 8 OF 44

PLAN
 Scale: 1" = 20'





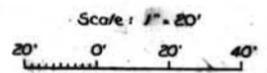
- Notes:**
- For General Notes, see Sheet No. 1.
 - For Alignment Data, see Sheet No. 3.
 - For Profile of Access Ramp No. 3, see Sheet No. 12.
 - For Ditch Profile, see Sheet No. 13.
 - For Ditch Cross Sections, see Sheet No. 16.
 - For Details of Intake Structure & Blow-off Tunnel Connection, see Sheets No. 28 thru 31.
 - For Details of Drop Inlets No. 6, 7 & 8, see Sheet No. 27.
 - For Details of 2 1/2' x 8' Box Culvert, see Sheet No. 27.
 - For Planting Plan, see Sheet No. 36.
 - For Surface Exploration Data, see Sheets No. 28, 38, 40 thru 42.
 - For Details of Inlet Structure No. 1, Junction Chamber No. 2 and Outlet Structure No. 3, see Sheet No. 46.

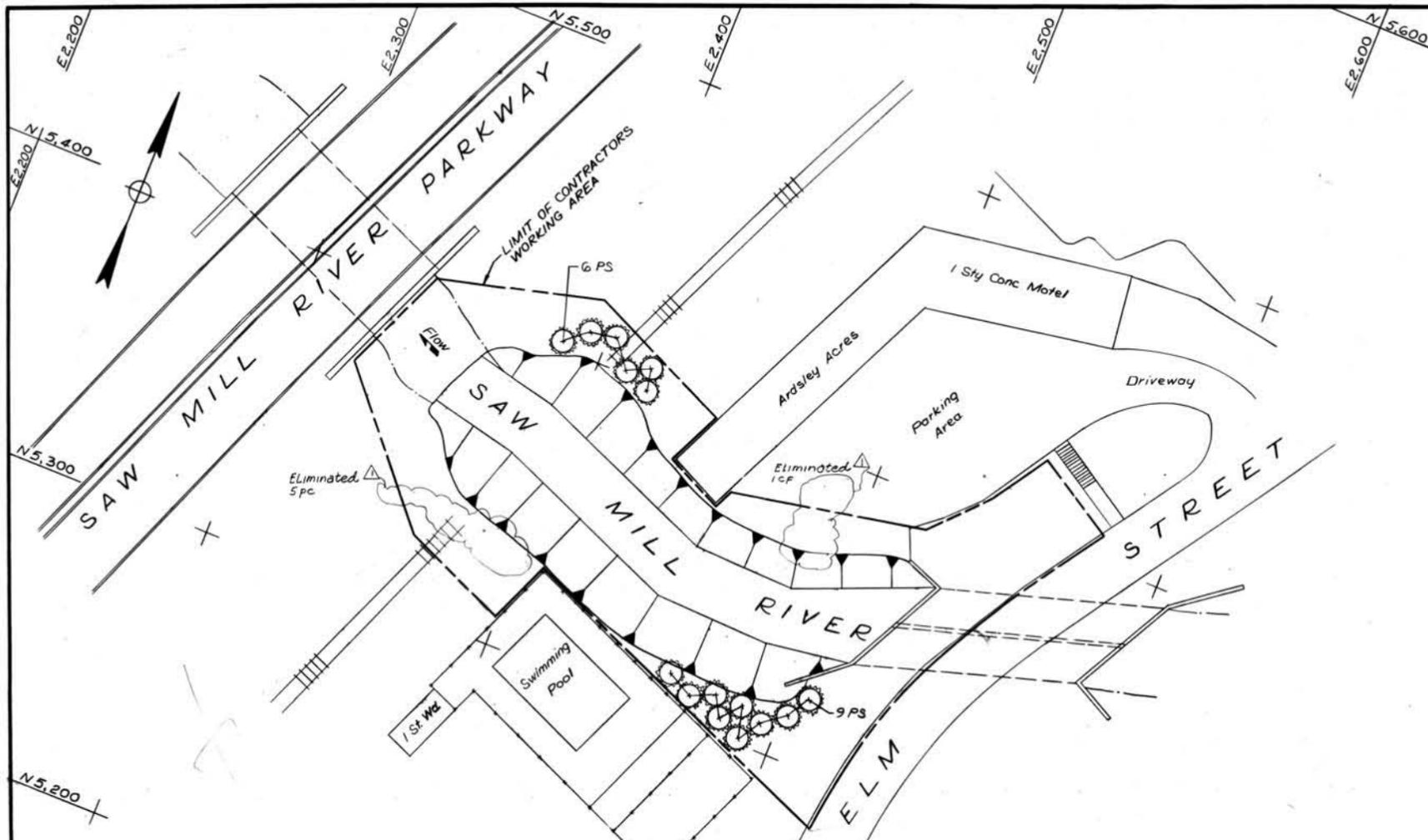
For relocated Intake Structure see sheet 9A & 28A

RECORD DRAWING OF WORK-AS-BUILT

REVISION	DATE	DESCRIPTION	BY
1	31 JUL 90	Access Ramp Deleted, Intake Str. Reloc. Elev. Rev. As Built	C.P.F.
2	5 May 88	Revised Interceptor Ditch No. 2	R.F.
3	13 May 88	Gas Line Located	T.D.

DRAWN BY: <i>E.M.</i>		DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK	
CHECKED BY: <i>D.S.</i>		SAW MILL RIVER, NEW YORK	
DESIGNED BY: <i>Thomas J. ...</i>		ARDSLEY FLOOD CONTROL PROJECT	
SUPERVISOR: <i>Thomas J. ...</i>		PLAN-UPSTREAM AREA	
SECTION CHIEF: <i>Thomas J. ...</i>		INTERCEPTOR DITCH NO. 2	
SUBMITTED: <i>C. Scammon</i>	RECOMMENDED: <i>Stanley F. ...</i>	NEW YORK	
APPROVED: <i>M. A. ...</i>	SCALE AS SHOWN	DRAWING NUMBER CC-ARD-409 SHEET 9 OF 48	
DATE 20 JULY 1987			



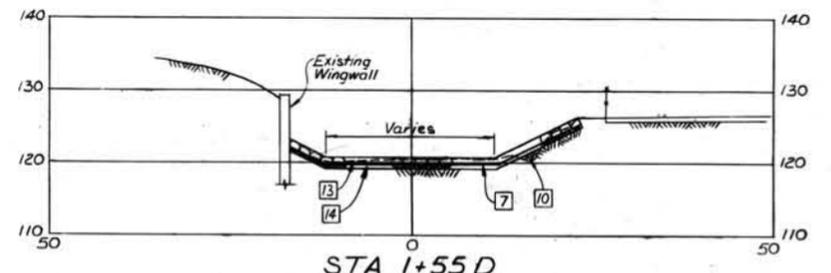
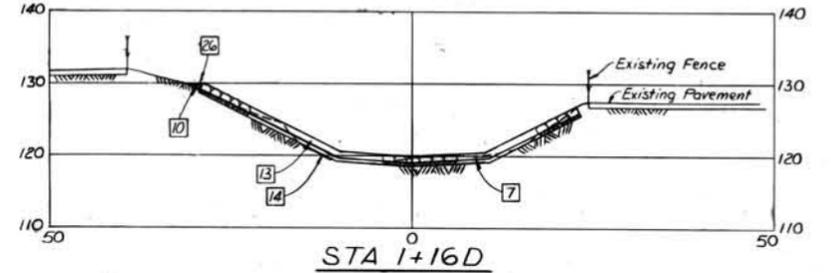
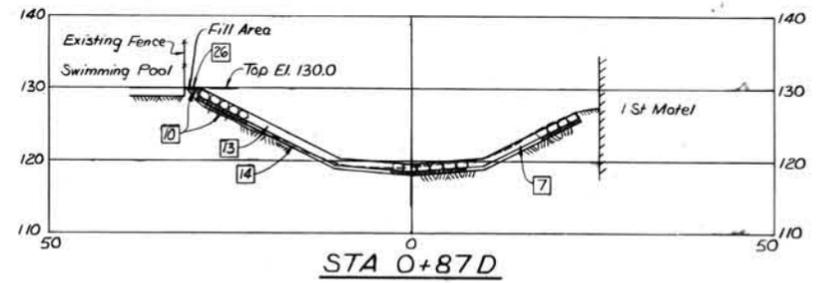
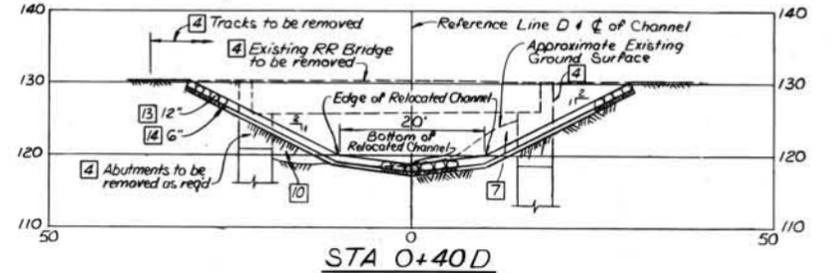


PLANT LIST (This Sheet)

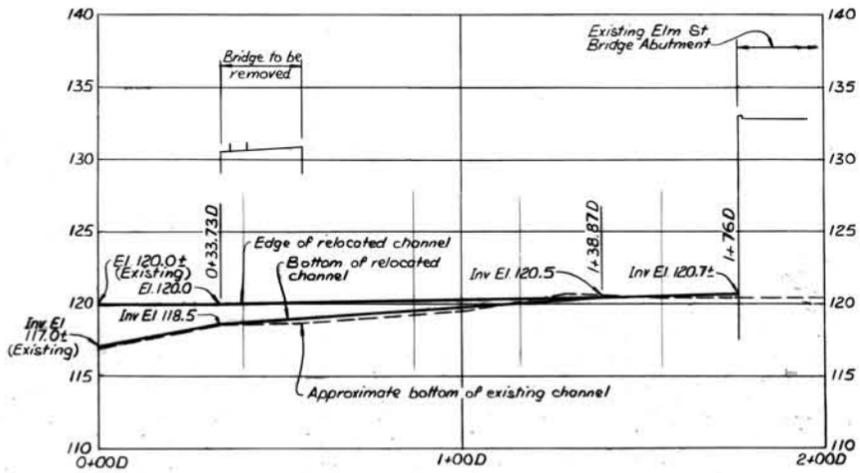
Symbol	Quantity	Botanical and Common Name	Size	Root
CF				
PS	15	<i>Pinus strobus</i> White Pine	4'-5' High	B+B

5 ps moved to location north of Ardsley Acres along Thruway

PLANTING PLAN
Scale: 1" = 20'



TYPICAL CROSS SECTIONS (Sections taken looking downstream)
Scale: 1" = 10'



PROFILE
Horizontal Scale: 1" = 20'
Vertical Scale: 1" = 5'

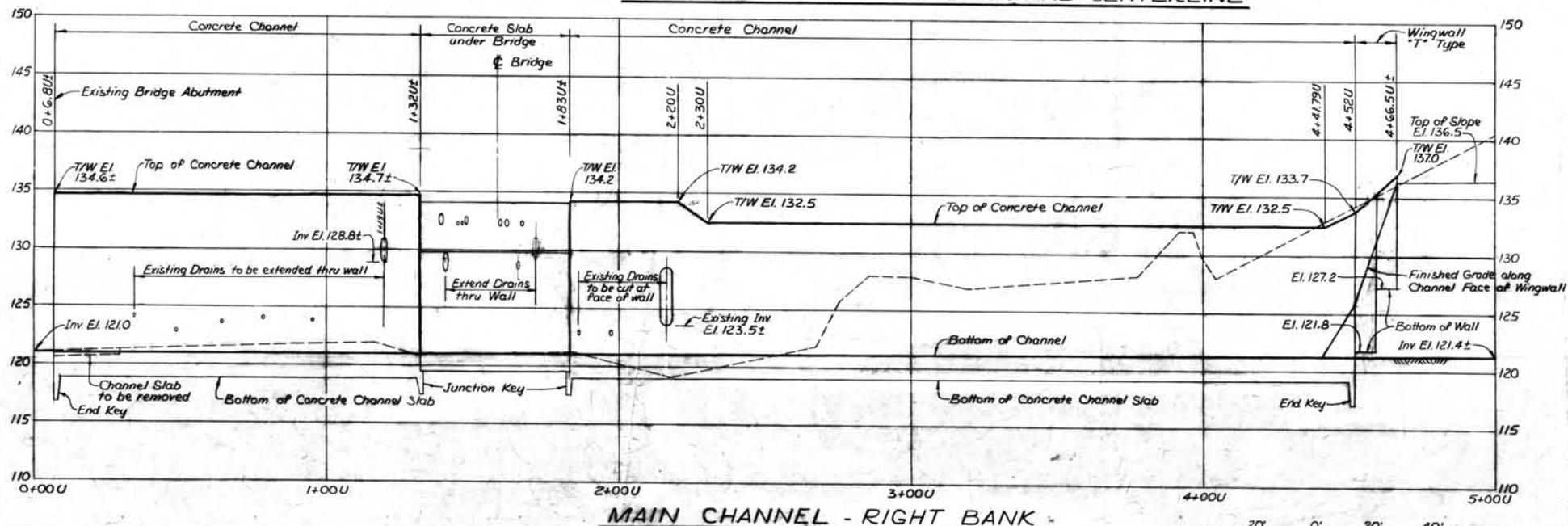
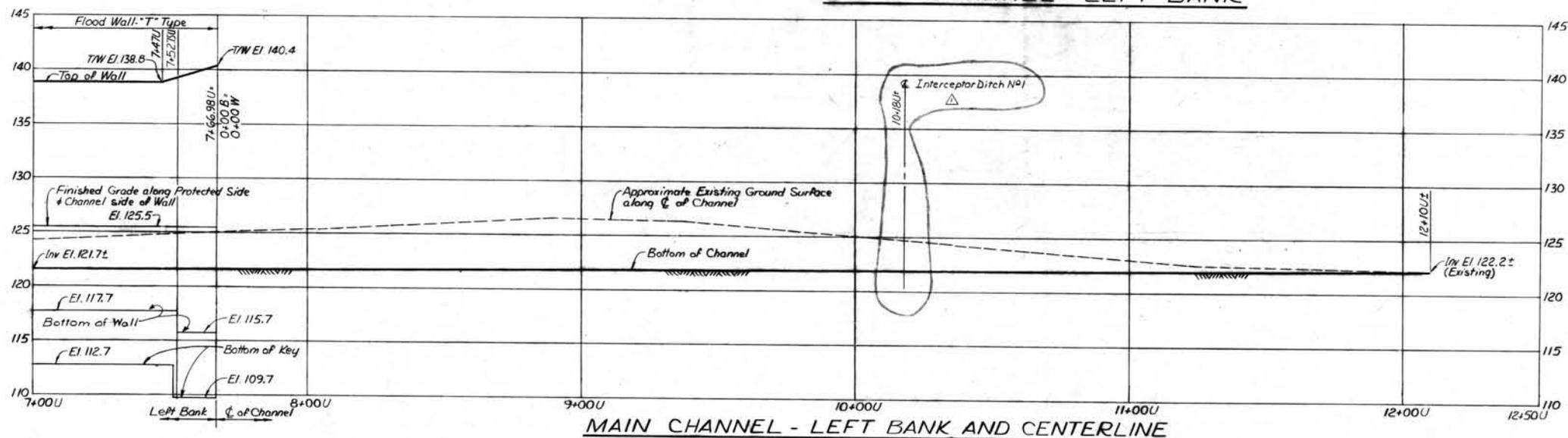
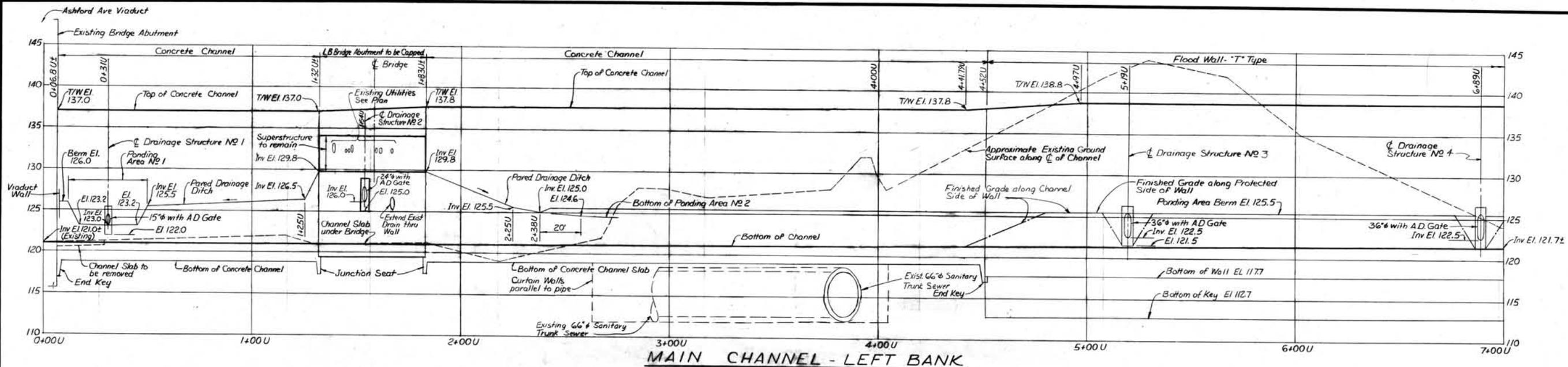
PAYMENT ITEM LEGEND

- 7 Excavation, Unclassified
- 10 Compacted Fill, Common
- 13 Riprap
- 14 Bedding Material
- 26 5" Topsoil + Seeding

Notes:
For General Notes, see Sheet No. 1.
For Plan of Improvement, see Sheet No. 4.

RECORD DRAWING OF WORK AS BUILT

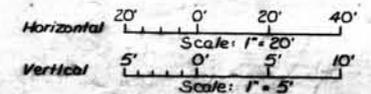
REVISION DATE DESCRIPTION BY 3 30 JUL 90 Eliminated six trees - as built C.P.	
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK	
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT MISCELLANEOUS DETAILS DOWNSTREAM AREA	
DRAWN BY: <i>ajm</i> CHECKED BY: <i>D.S.</i> DESIGNED BY: <i>W. J. ...</i> SECTION CHIEF	SUBMITTED: <i>C. ...</i> EST. CHIEF ENGINEER APPROVED: <i>M.P. ...</i> CHIEF, DISTRICT ENGINEER
RECOMMENDED: <i>...</i> SCALE AS SHOWN	DRAWING NUMBER CC-ARD-410 SHEET 10 OF 48
DATE 20 JULY 1987	

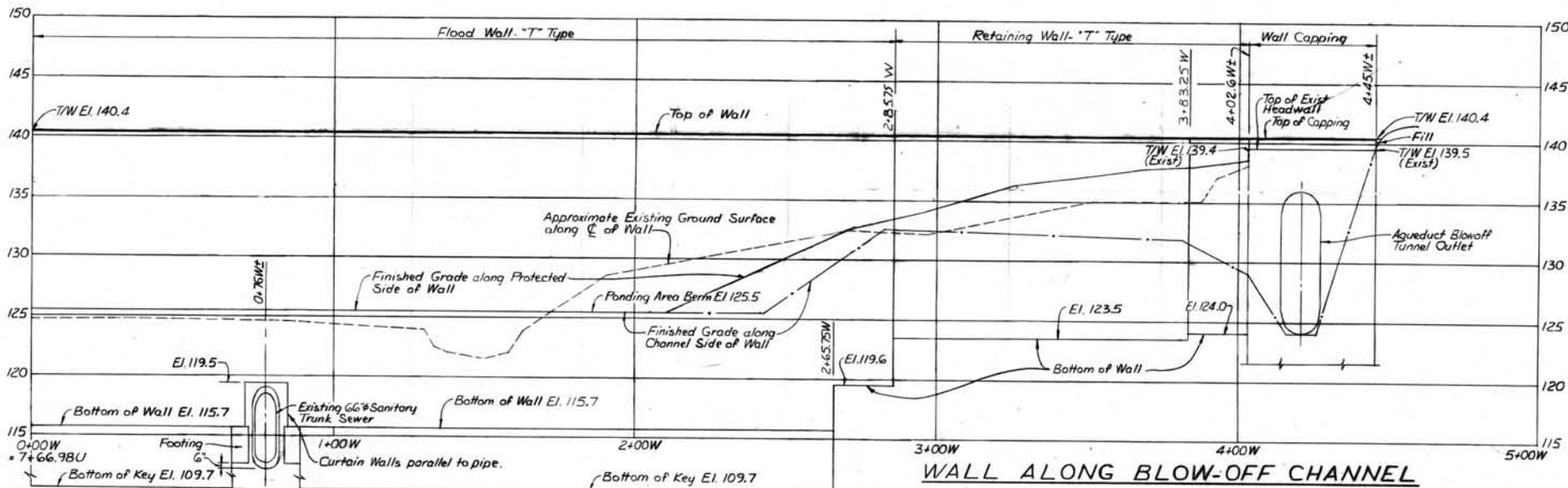


Notes:
 For General Notes, see Sheet No. 1.
 For Plan of Improvement, see Sheets No. 6 & 7.

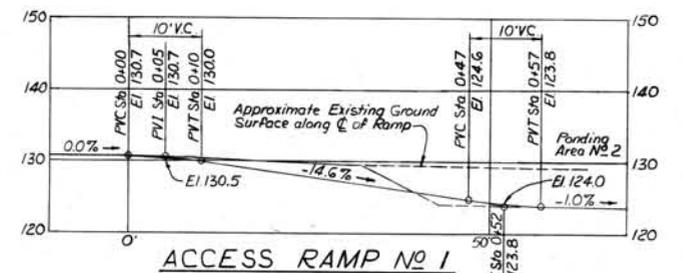
RECORD DRAWING
 WORK AS BUILT

DATE	3/10/90	As built - No change	D.S.
REVISION	13 May 88	Added Interceptor Ditch No. 1	T.D.
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
DRAWN BY: <i>EM</i>		SAW MILL RIVER, NEW YORK	
CHECKED BY: <i>DS</i>		ARDSLEY FLOOD CONTROL PROJECT	
DESIGNED BY: <i>Thomas R. ...</i>		MAIN CHANNEL PROFILE	
REVIEWED BY: <i>James J. ...</i>		ARDSLEY NEW YORK	
SUBMITTED BY: <i>C. Scammon</i>		RECOMMENDED BY: <i>Stanley ...</i>	
APPROVED BY: <i>W. P. ...</i>		SCALE AS SHOWN	
DATE: 20 JULY 1987		DRAWING NUMBER: CC-ARD-411 SHEET 11 OF 48	

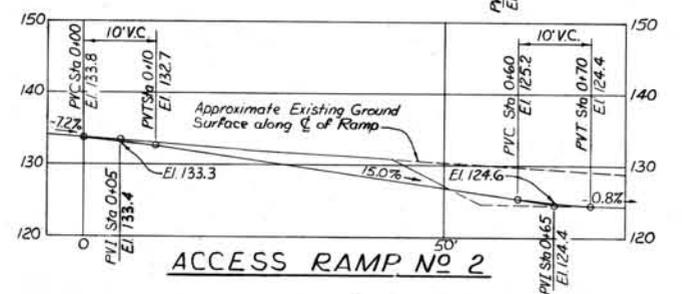




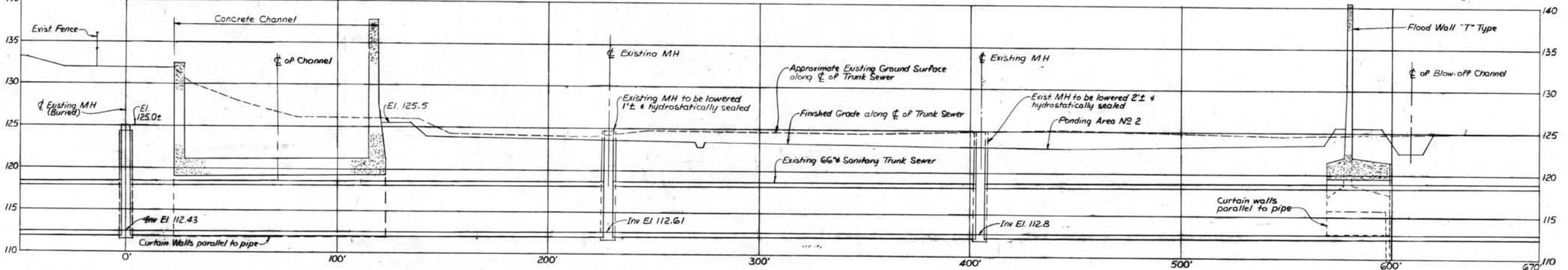
WALL ALONG BLOW-OFF CHANNEL



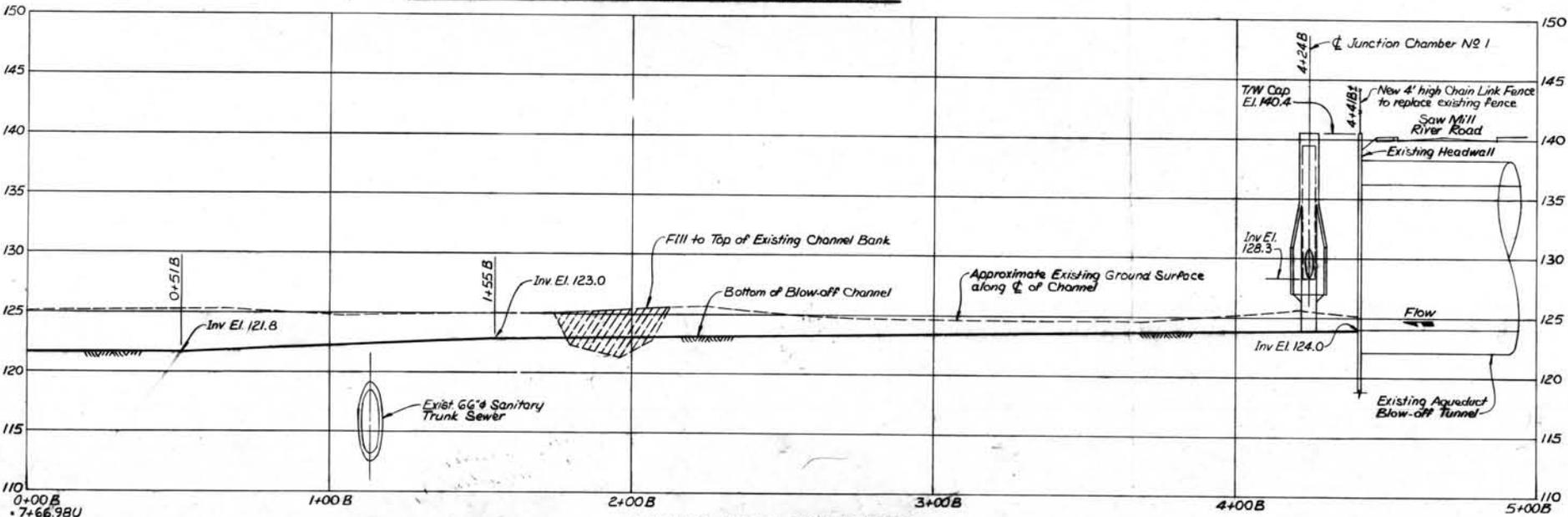
ACCESS RAMP NO 1



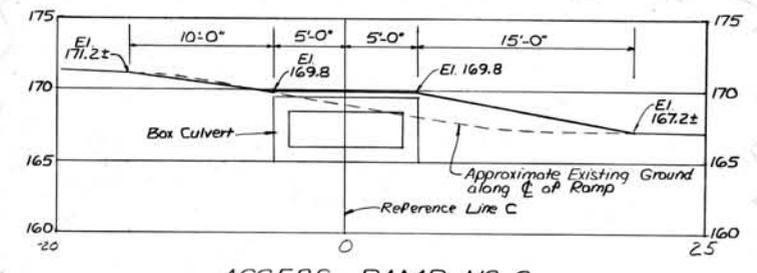
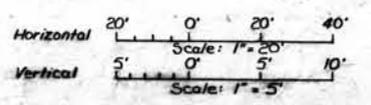
ACCESS RAMP NO 2



EXISTING 66" SANITARY TRUNK SEWER



BLOW-OFF CHANNEL

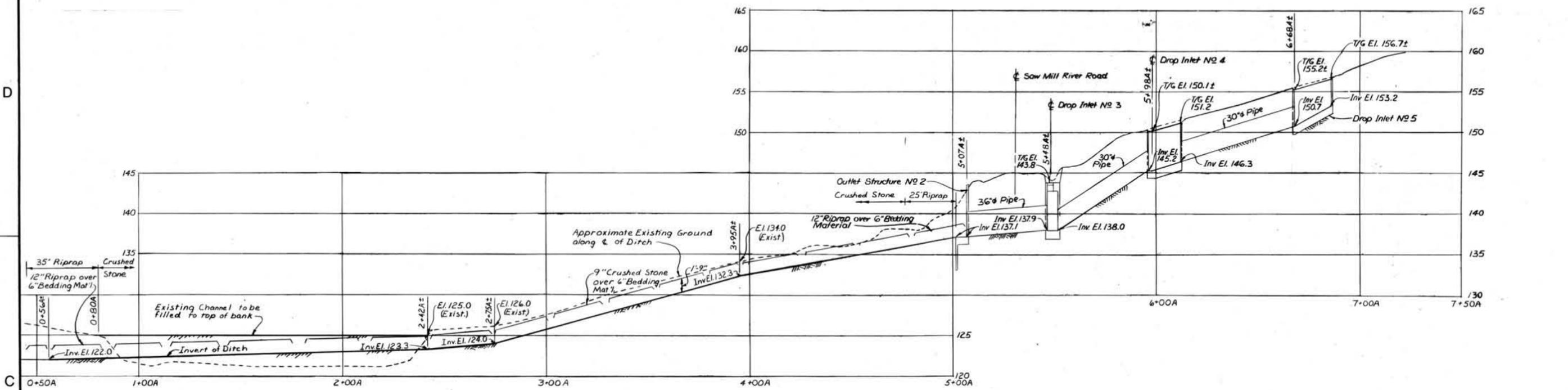


ACCESS RAMP NO 3

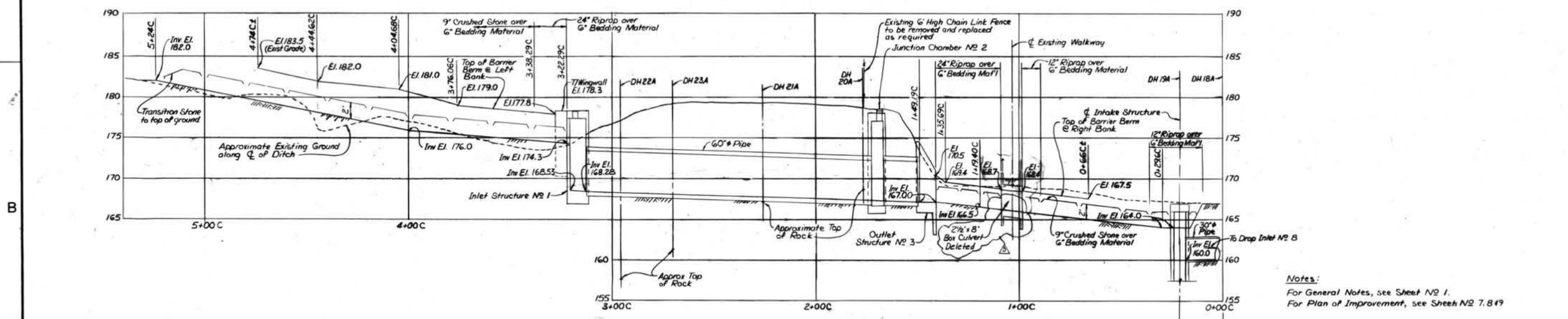
Notes:
For General Notes, see Sheet No. 1.
For Plan of Improvement, see Sheets No. 6, 7 & 8.

RECORD DRAWING OF WORK-AS-BUILT

REVISION	DATE	DESCRIPTION	BY
1	9/24/90	Deleted Access Ramp No. 3 - as built	D.P.
2	12/10/88	Deleted Interceptor Ditch No. 1	T.D.
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
DRAWN BY: EJM		SAW MILL RIVER, NEW YORK	
CHECKED BY: D.S.		ARDSLEY FLOOD CONTROL PROJECT	
DESIGNED BY: Thomas R. ...		MISCELLANEOUS PROFILES	
REVIEWED BY: ...		SECTION CHIEF: ARDSLEY	
SUBMITTED BY: C. ...		RECOMMENDED BY: Stanley ...	
APPROVED BY: M. ...		SCALE AS SHOWN	
DATE: 20 JULY 1987		DRAWING NUMBER: CC-ARD-412	
		SHEET 12 OF 44	



INTERCEPTOR DITCH NO. 1



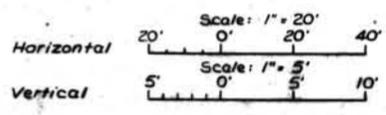
INTERCEPTOR DITCH NO. 2

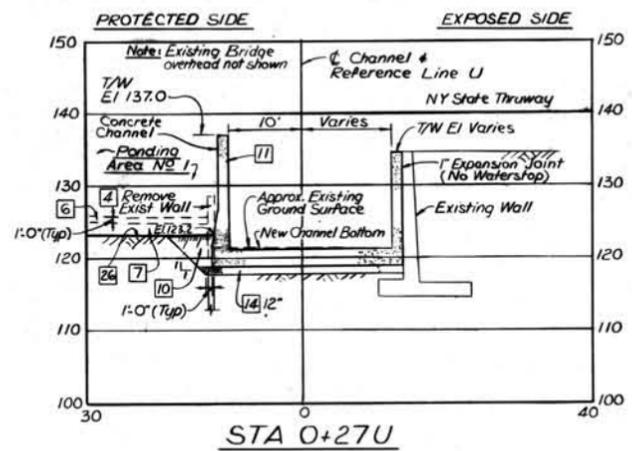
Notes:
 For General Notes, see Sheet No. 1.
 For Plan of Improvement, see Sheet No. 7.849

RECORD DRAWING
 OF WORK AS-BUILT

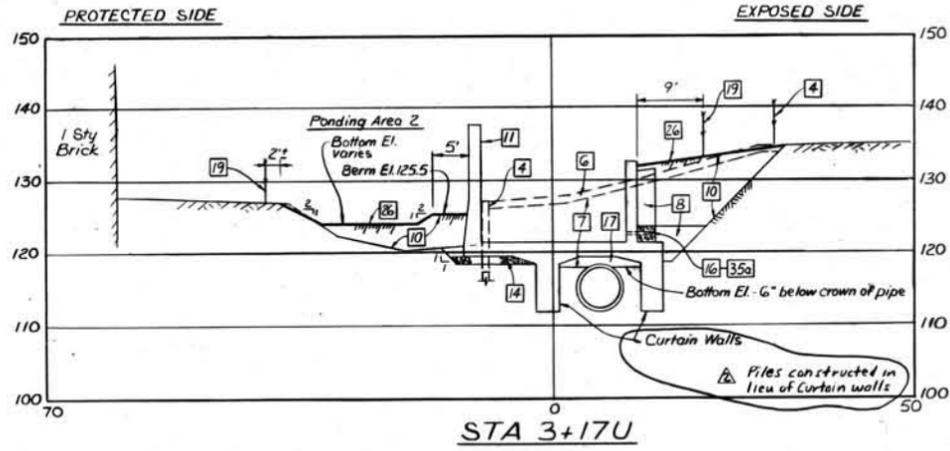
Revision	Description	Date	Approved
1	24" x 8' Box Culvert Deleted - as built	3/7/79	C.P.
2	Revised Interceptor Ditch No. 2	5/1/79	T.D.
3	Revised Interceptor Ditch No. 1	13/5/79	T.D.

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
Designed by: <i>Thomas J. Drummond</i>	SAW MILL RIVER, NEW YORK		
Drawn by: <i>EJM</i>	ARDSLEY FLOOD CONTROL PROJECT		
Checked by: <i>DL</i>	PROFILES - INTERCEPTOR DITCHES NO. 1 & 2		
Reviewed by: <i>David J. ...</i>	Approval Recommended: <i>...</i>	Sheet reference number: CC-ARD-412	Date: 20 JULY 1987
Consent: <i>C. ...</i>	Approved by: <i>...</i>	Scale: AS SHOWN	Sheet: 13 of 49

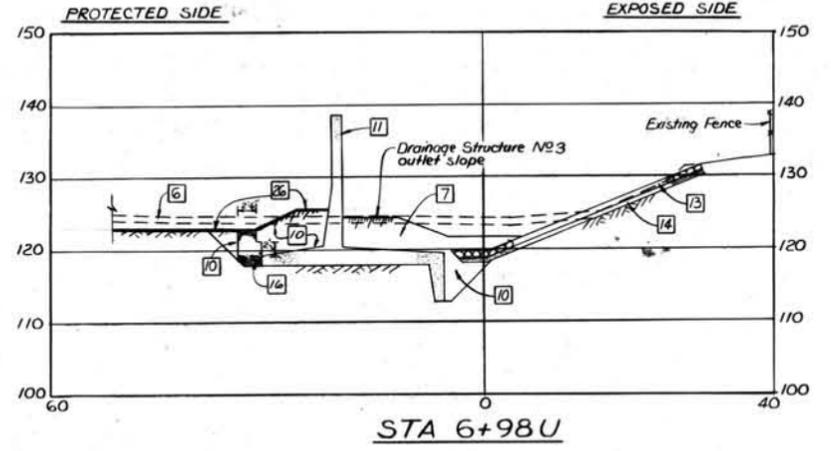




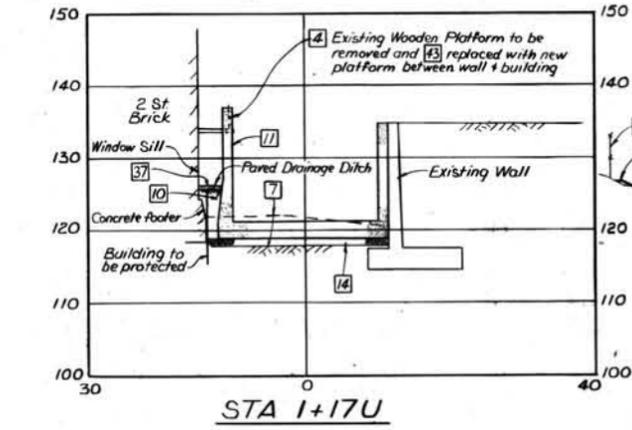
STA 0+27U



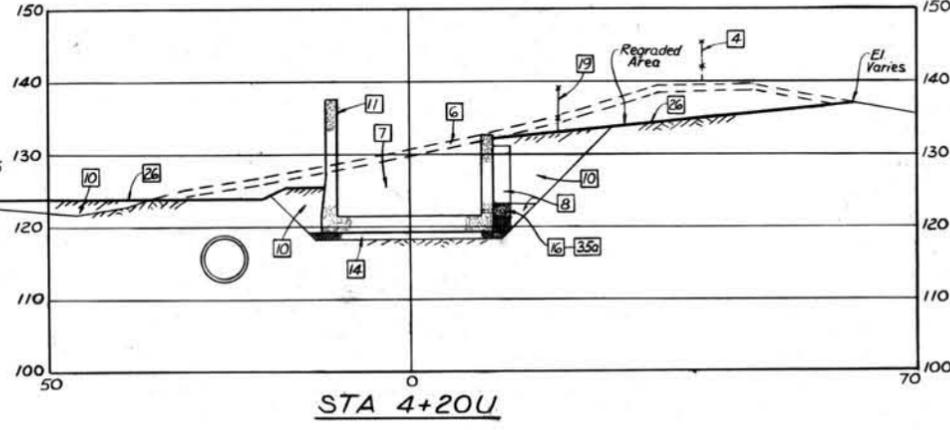
STA 3+17U



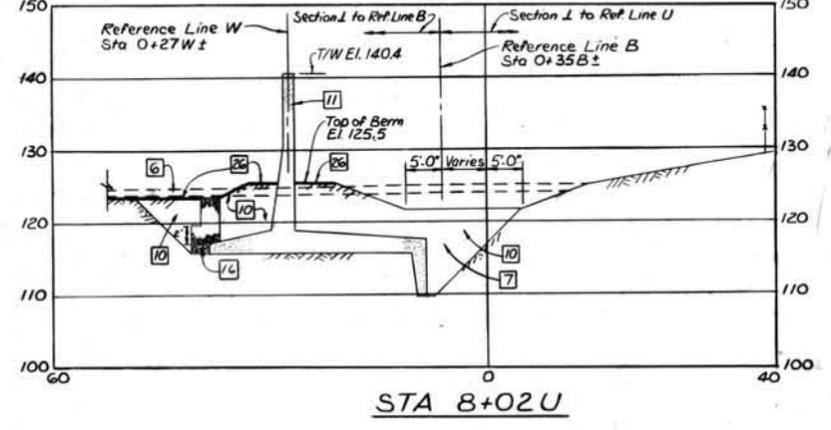
STA 6+98U



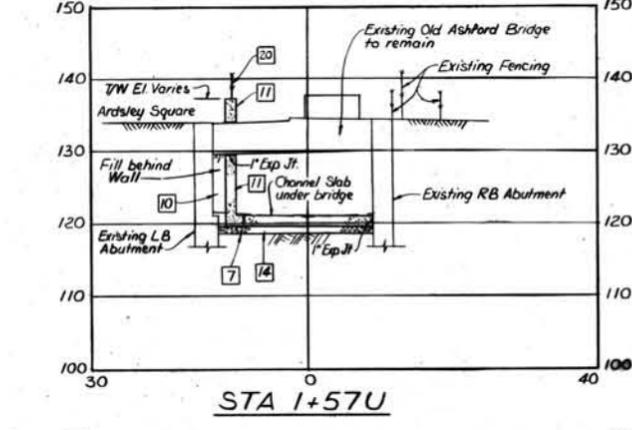
STA 1+17U



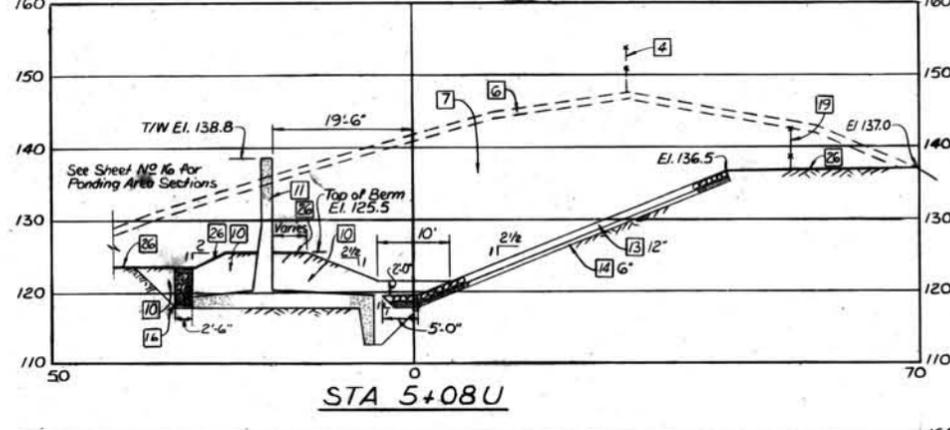
STA 4+20U



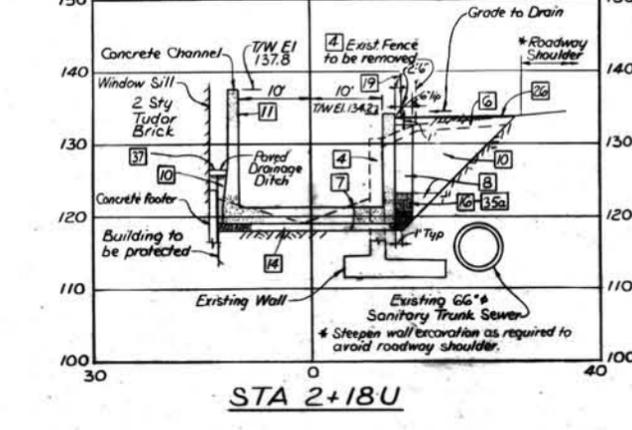
STA 8+02U



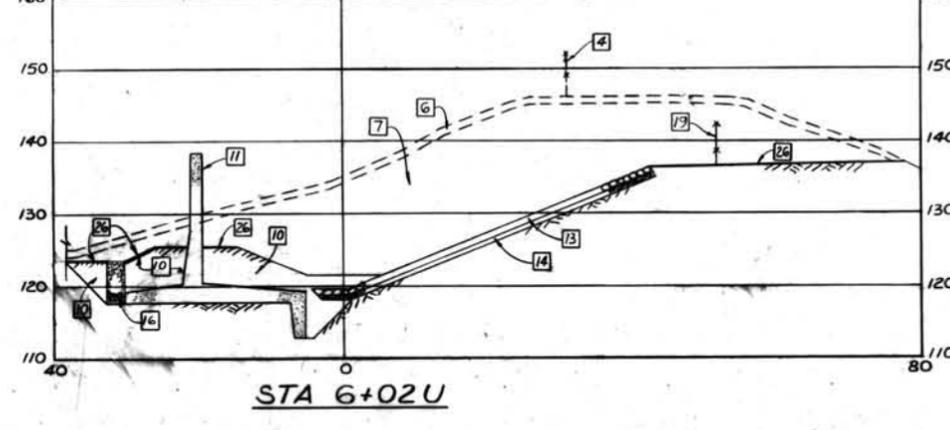
STA 1+57U



STA 5+08U



STA 2+18U



STA 6+02U

PAYMENT ITEM LEGEND

- 4 Structures to be removed
- 6 Excavation, Stripping
- 7 Excavation, Unclassified
- 8 Compacted Fill, Pervious
- 10 Compacted Fill, Common
- 11 Concrete
- 13 Riprap
- 14 Bedding Material
- 16 Filter Material
- 17 Granular Material
- 19 6' High Chain Link Fence
- 26 5" Topsoil & Seeding
- 28 6" Longitudinal Wall Drain
- 37 Bituminous Ditch Lining
- 40 3'-6" Pipe Railing

Notes:
 For General Notes, see Sheet No. 1.
 For Plan of Improvement, see Sheets No. 6 & 7.
 For Channel Profiles, see Sheets No. 11 & 12.
 For Details of Longitudinal Drains, Paved Drainage Ditch, & Chain Link Fence, see Sheets No. 34 & 35.

RECORD DRAWING OF WORK-AS-BUILT

Revised	Description	Date	Approved
1	curtain walls replaced by pile - as built	4/16/90	D.P.
2	Revised Fence Location STA 2+18U, STA 3+17U	13MAY90	T.D.

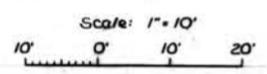
U.S. ARMY ENGINEER DISTRICT
 CORPS OF ENGINEERS
 NEW YORK, NEW YORK

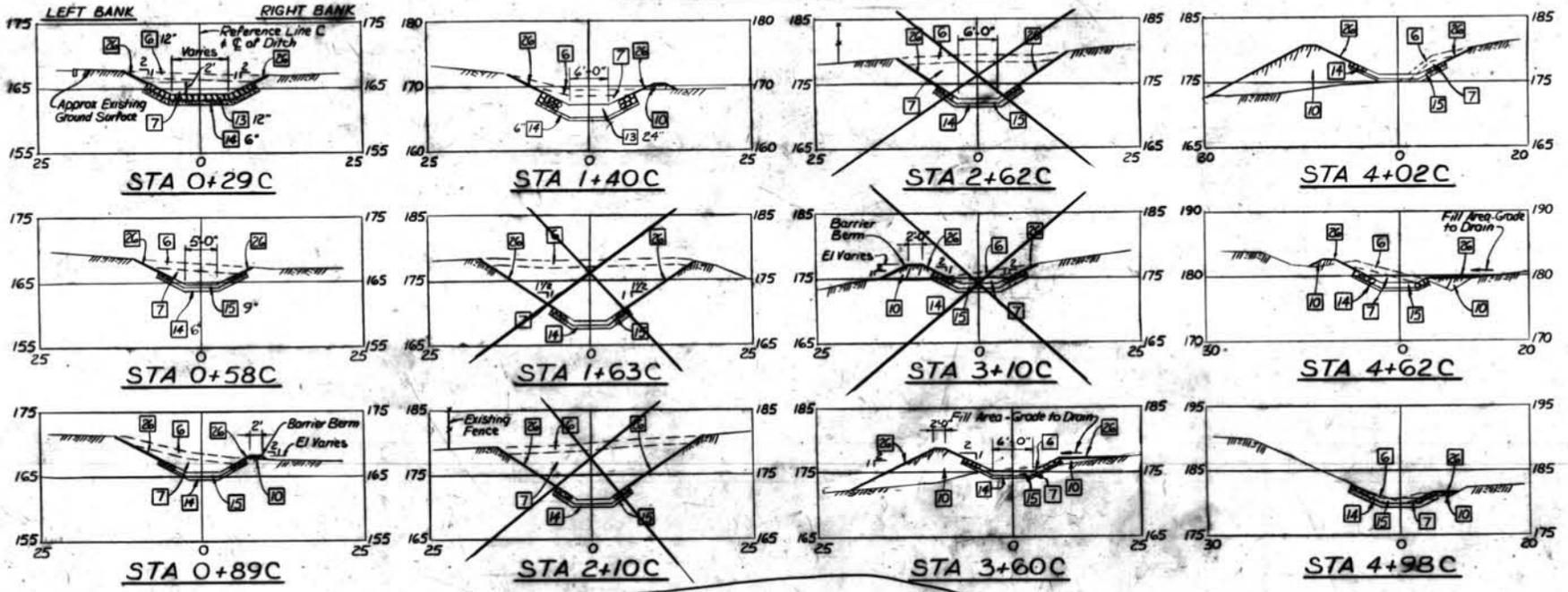
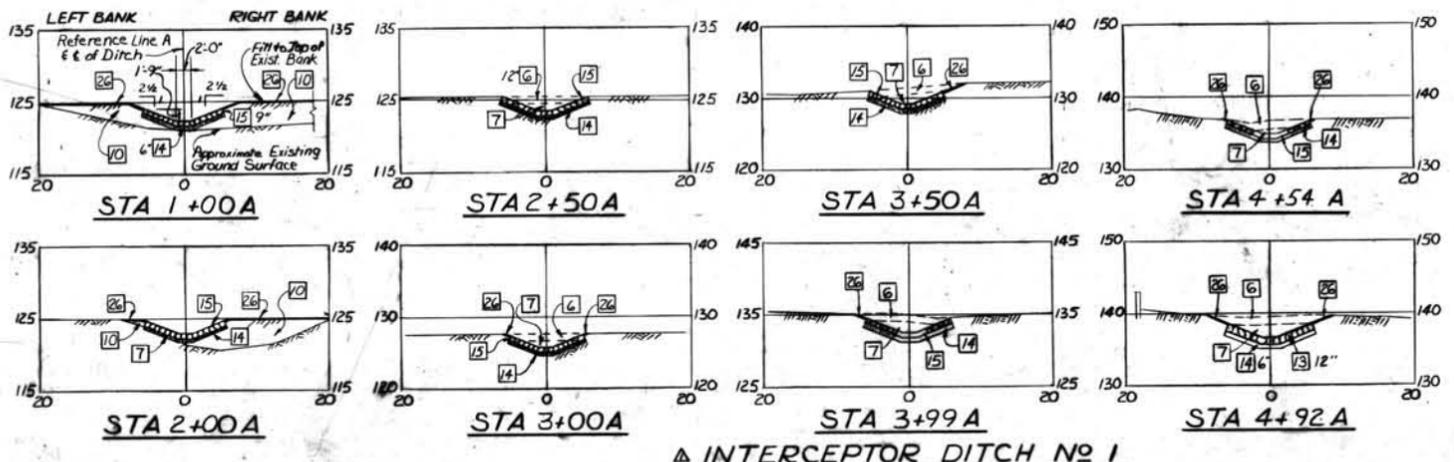
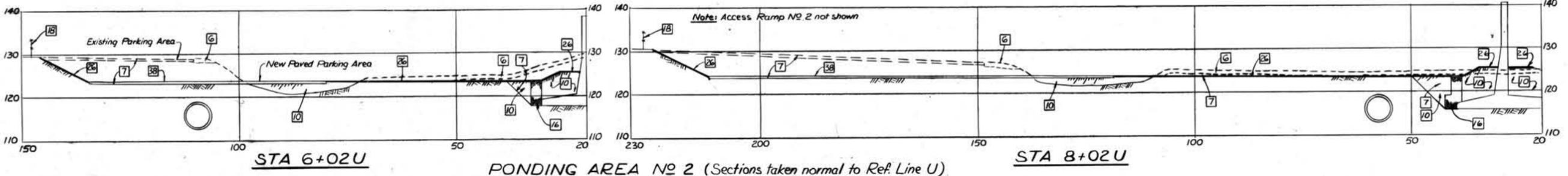
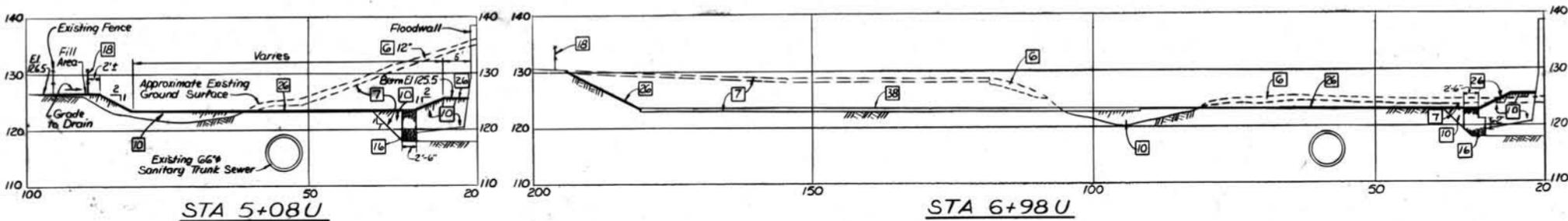
Designed by: *Thomas R. [Signature]*
 Drawn by: *720*
 Checked by: *J.S.*
 Reviewed by: *David [Signature]*
 Concurred by: *C. [Signature]*

SAW MILL RIVER, NEW YORK
 ARDSLEY FLOOD CONTROL PROJECT
 CROSS SECTIONS - STA 0+27U TO STA 8+02U

Approval Recommended: *Stan [Signature]*
 Approved by: *[Signature]*

Sheet reference number: CC-ARD-414
 Date: 20 JULY 1987
 Scale: AS SHOWN
 Sheet 14 of 14





INTERCEPTOR DITCH NO 2

Notes:
 For General Notes, see Sheet No 1.
 For Plan of Improvement, see Sheets No 7, 8 & 9.
 For Interceptor Ditch Profiles, see Sheet No 13.
 For Details of Chain Link Fence, Bituminous Ditch Lining & Bituminous Pavement, see Sheet No 35.

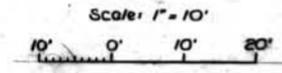
PAYMENT ITEM LEGEND

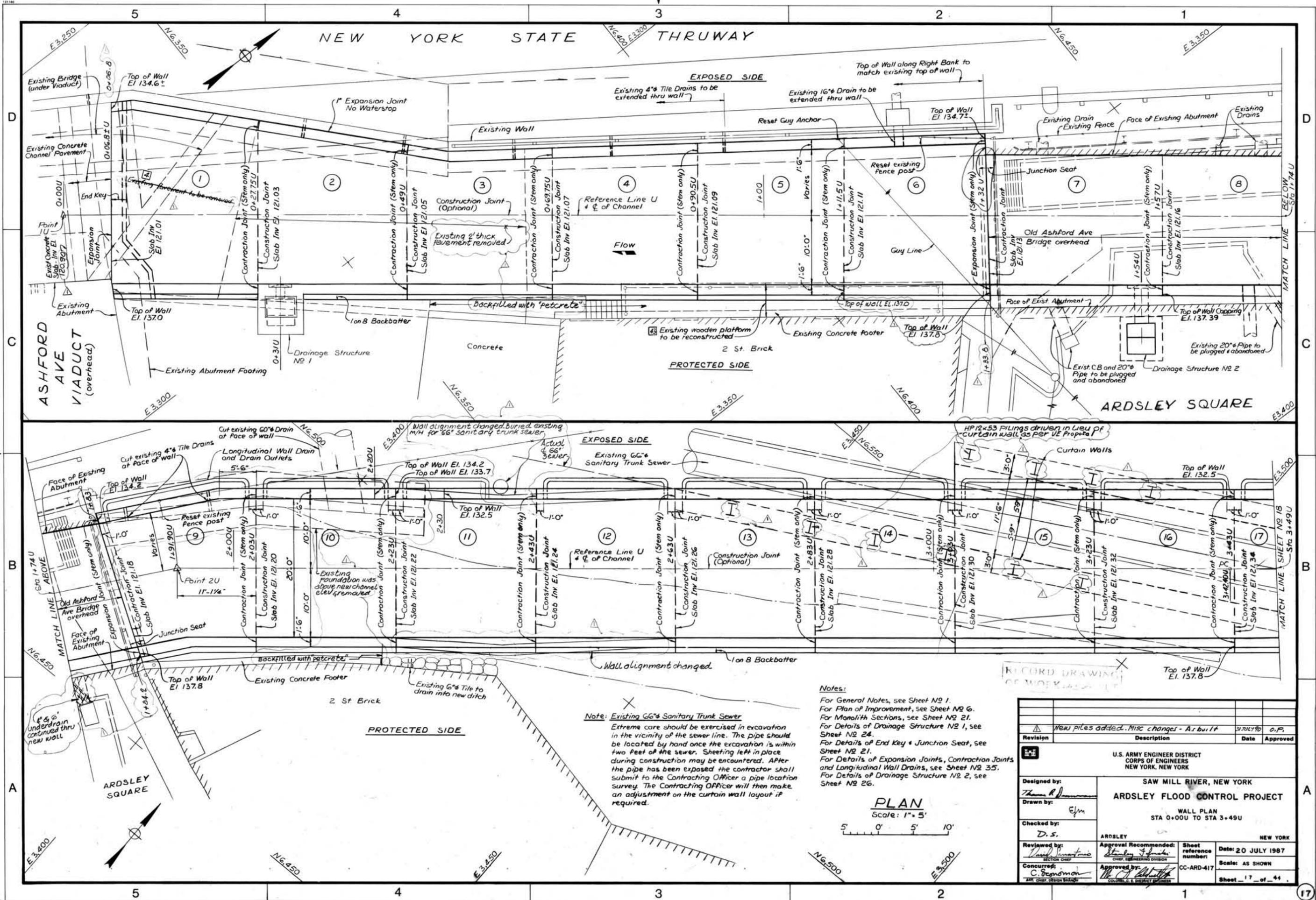
- 6 Excavation, Stripping
- 7 Excavation, Unclassified
- 10 Compacted Fill, Common
- 13 Riprap
- 14 Bedding Material
- 15 Crushed Stone
- 18 4' High Chain Link Fence
- 24 5" Topsoil & Seeding
- 28 Bituminous Pavement
- 16 Filter Material

**RECORD DRAWING
 OF WORK-AS-BUILT**

Revision	Description	Date	Approved
1	As Built - No change	31 Jul 90	D.S.
2	Revised Interceptor Ditch No 2	5 May 87	T.D.
3	Revised Interceptor Ditch No 1	13 May 88	T.D.

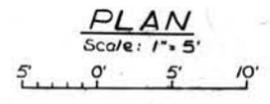
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	
Designed by: <i>Frank D.</i>	SAWMILL RIVER, NEW YORK
Drawn by: <i>CJM</i>	ARDSLEY FLOOD CONTROL PROJECT
Checked by: <i>O.S.</i>	CROSS SECTIONS PONDING AREAS NO. 1 & 2 INTERCEPTOR DITCHES NO. 1 & 2
Reviewed by: <i>David J. ...</i>	Sheet reference number Date: 20 JULY 1987
Concurred: <i>C. ...</i>	Scale: AS SHOWN Sheet 18 of 45





Note: Existing 66" Sanitary Trunk Sewer
 Extreme care should be exercised in excavation in the vicinity of the sewer line. The pipe should be located by hand once the excavation is within two feet of the sewer. Sheeting left in place during construction may be encountered. After the pipe has been exposed the contractor shall submit to the Contracting Officer a pipe location survey. The Contracting Officer will then make an adjustment on the curtain wall layout if required.

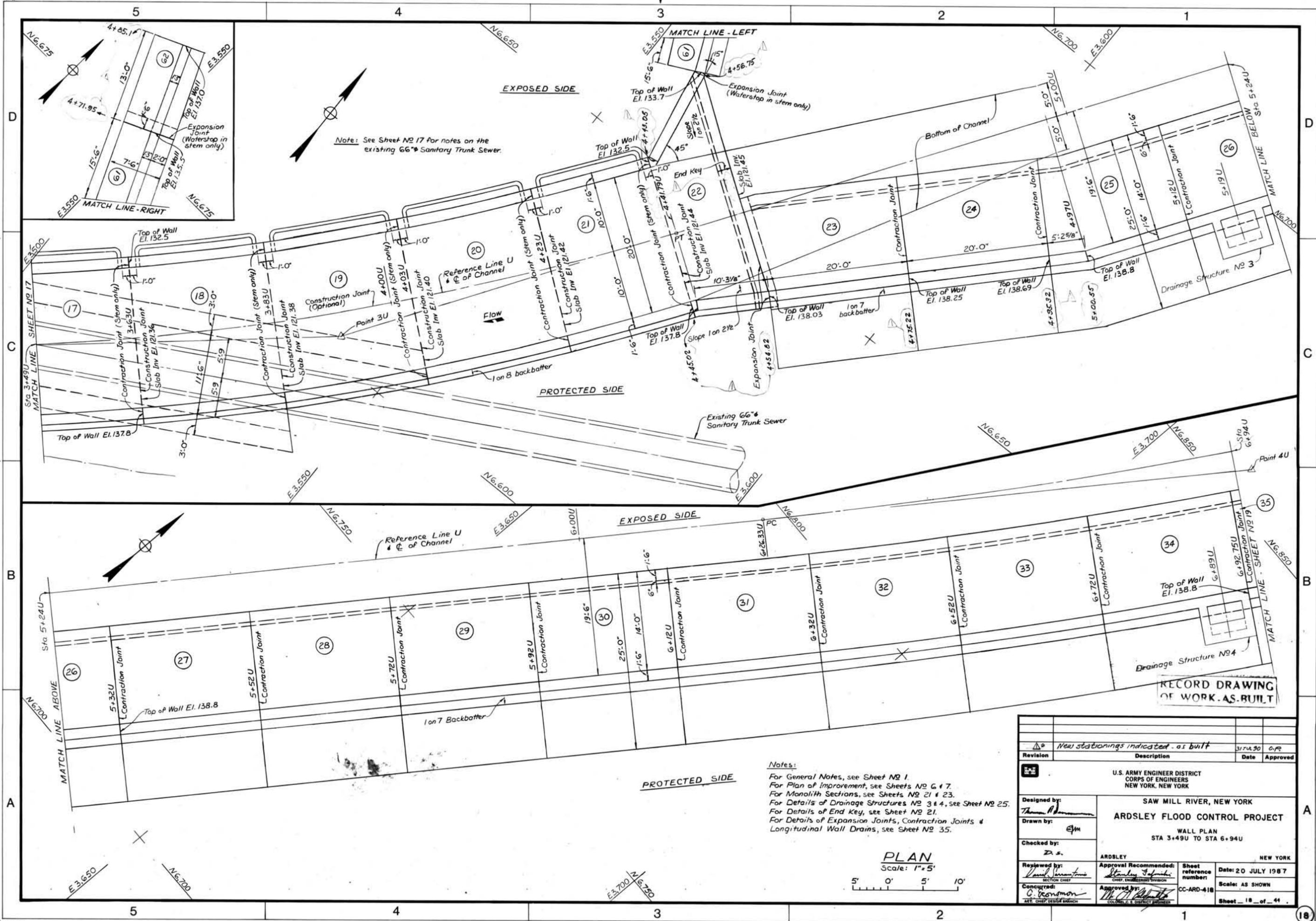
Notes:
 For General Notes, see Sheet N2 1.
 For Plan of Improvement, see Sheet N2 G.
 For Manolith Sections, see Sheet N2 21.
 For Details of Drainage Structure N2 1, see Sheet N2 24.
 For Details of End Key & Junction Seat, see Sheet N2 21.
 For Details of Expansion Joints, Contraction Joints and Longitudinal Wall Drains, see Sheet N2 35.
 For Details of Drainage Structure N2 2, see Sheet N2 26.



RECORD DRAWING
 OF WORK DONE

Revision	Description	Date	Approved
1	New piles added. Misc changes - As built	30 JULY 90	C.P.

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	
SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT WALL PLAN STA 0+00U TO STA 3+49U	
Designed by: <i>Thomas R. D.</i>	ARDSLEY SECTION CHIEF
Drawn by: E/jm	Approval Recommended: <i>Stanley J. ...</i> DISTRICT ENGINEER
Checked by: D.S.	Sheet reference number: CC-ARD-417
Reviewed by: <i>C. Brennan</i> ARS. CHIEF DESIGN ENGINEER	Date: 20 JULY 1987 Scale: AS SHOWN Sheet 17 of 44



Note: See Sheet No 17 for notes on the existing 66" Sanitary Trunk Sewer.

Notes:
 For General Notes, see Sheet No 1.
 For Plan of Improvement, see Sheets No 6 & 7.
 For Monolith Sections, see Sheets No 21 & 23.
 For Details of Drainage Structures No 3 & 4, see Sheet No 25.
 For Details of End Key, see Sheet No 21.
 For Details of Expansion Joints, Contraction Joints & Longitudinal Wall Drains, see Sheet No 35.

PLAN
 Scale: 1" = 5'
 5' 0' 5' 10'

Revision	Description	Date	Approved
1	New stationings indicated - as built	3/7/80	O.P.

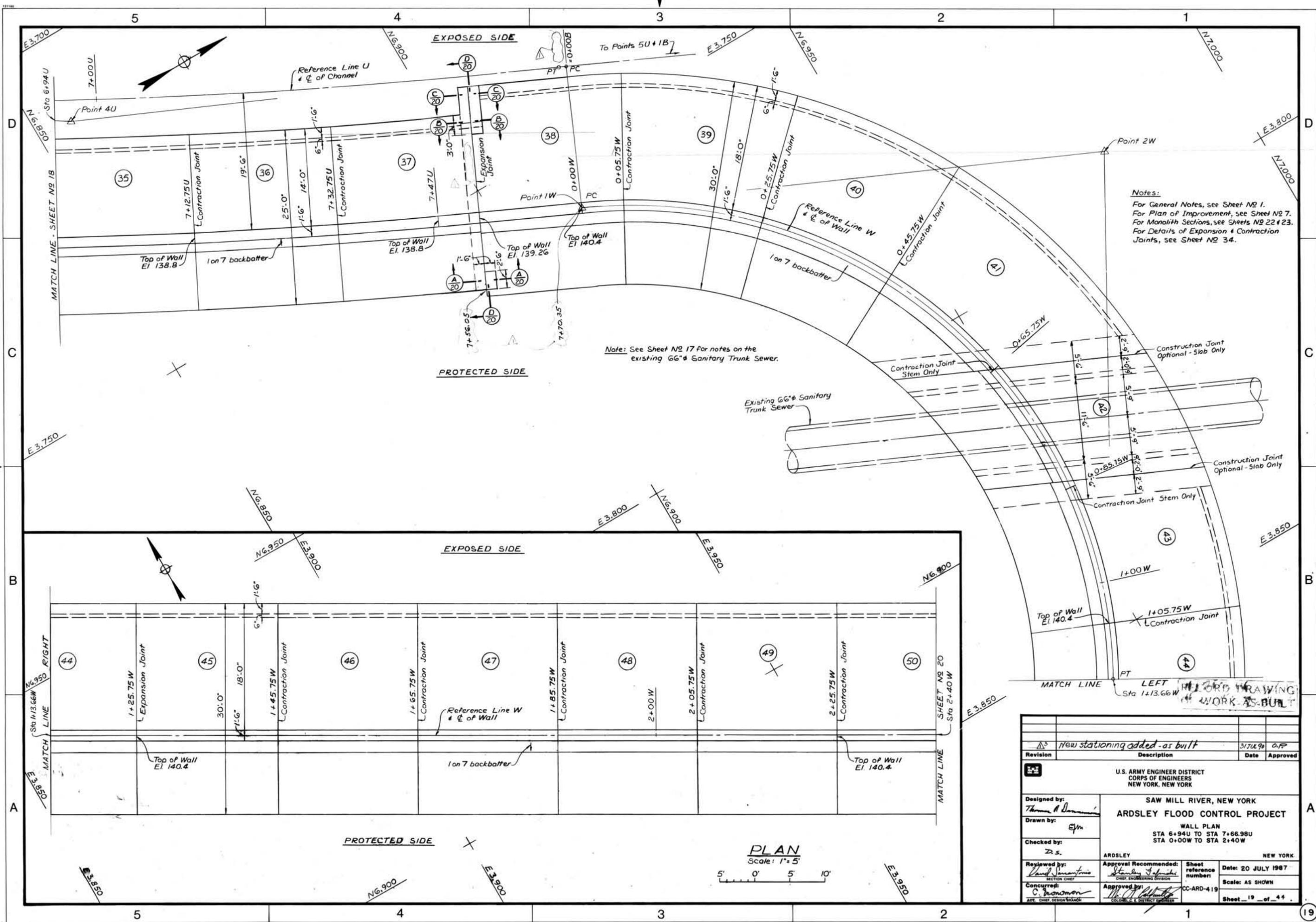
U.S. ARMY ENGINEER DISTRICT
 CORPS OF ENGINEERS
 NEW YORK, NEW YORK

Designed by: *Thomas J. ...*
 Drawn by: *EJM*
 Checked by: *Z.S.*

SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
 WALL PLAN
 STA 3+49U TO STA 6+94U

Reviewed by: *Paul J. ...*
 Approved by: *W. ...*

Sheet reference number: CC-ARD-418
 Date: 20 JULY 1987
 Scale: AS SHOWN
 Sheet 18 of 44

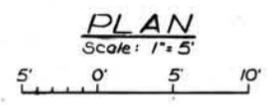


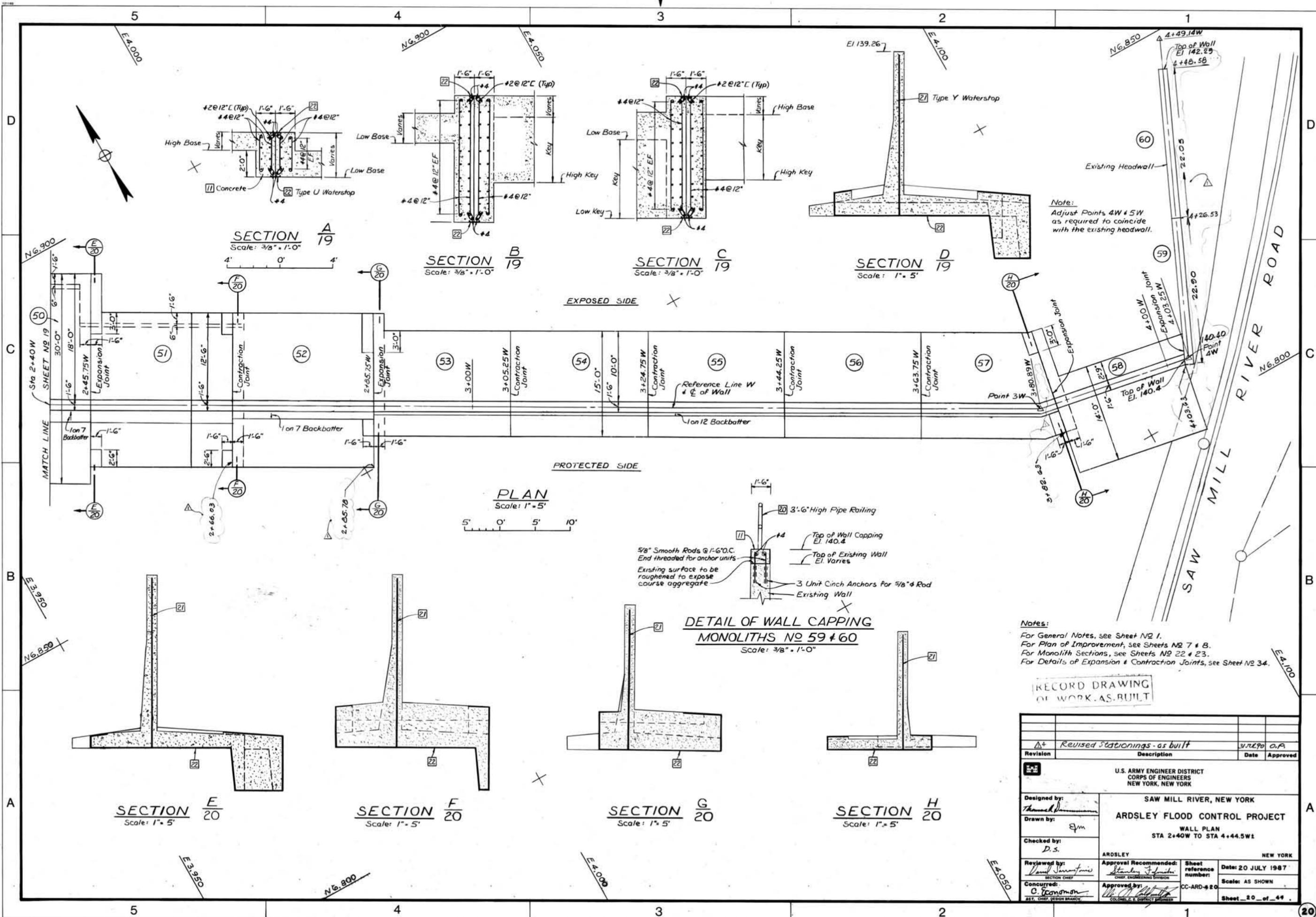
Notes:
 For General Notes, see Sheet No 1.
 For Plan of Improvement, see Sheet No 7.
 For Manolith Sections, see Sheets No 22 & 23.
 For Details of Expansion & Contraction Joints, see Sheet No 34.

Note: See Sheet No 17 for notes on the existing 66" Sanitary Trunk Sewer.

RECORD DRAWING
 WORK AS BUILT

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK		SAH MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT WALL PLAN STA 6+94U TO STA 7+66.98U STA 0+00W TO STA 2+40W	
Designed by: <i>Thomas A. ...</i>	Drawn by: <i>EJM</i>	Checked by: Z.S.	Reviewed by: <i>David ...</i> SECTION CHIEF
Concurred by: <i>C. ...</i> ADJ. CHIEF DISTRICT ENGINEER	Approved by: <i>...</i> COLONEL & DISTRICT ENGINEER	Sheet reference number: CC-ARD-419	Date: 20 JULY 1987 Scale: AS SHOWN Sheet 19 of 44





Revision	Description	Date	Approved
Δ+	Revised Stationings - as built	3/12/90	O.F.

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: *Thomas J. ...*
 Drawn by: *Ejm*
 Checked by: *D.S.*
 Reviewed by: *Donald J. ...*
 Concurred by: *C. ...*

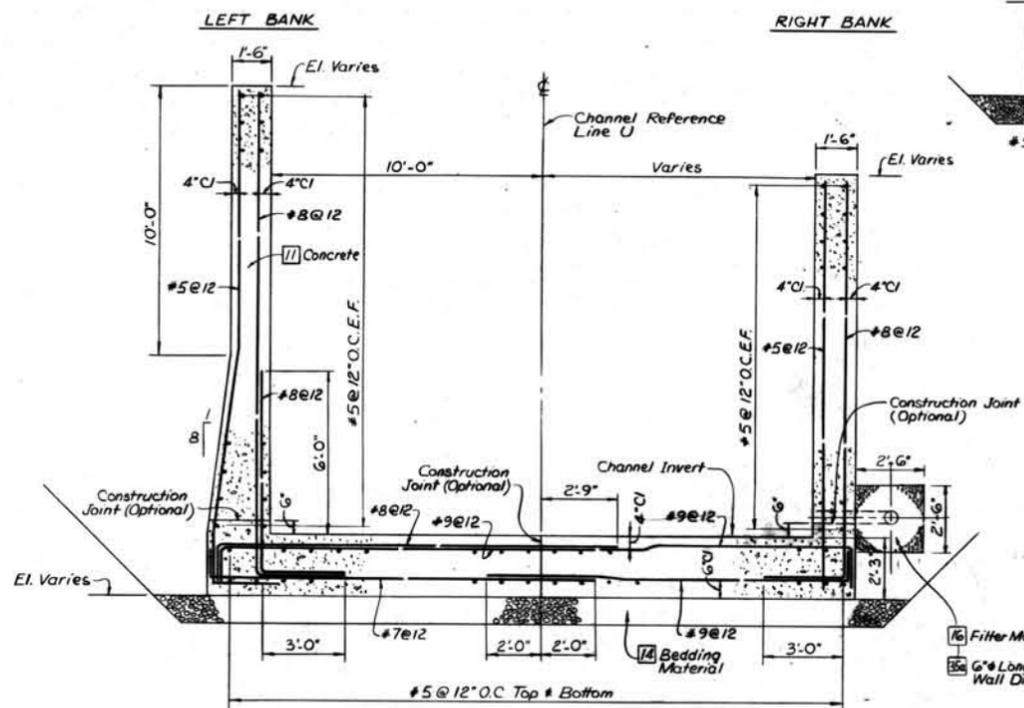
SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
 WALL PLAN
 STA 2+40W TO STA 4+44.5W

ARDSLEY NEW YORK

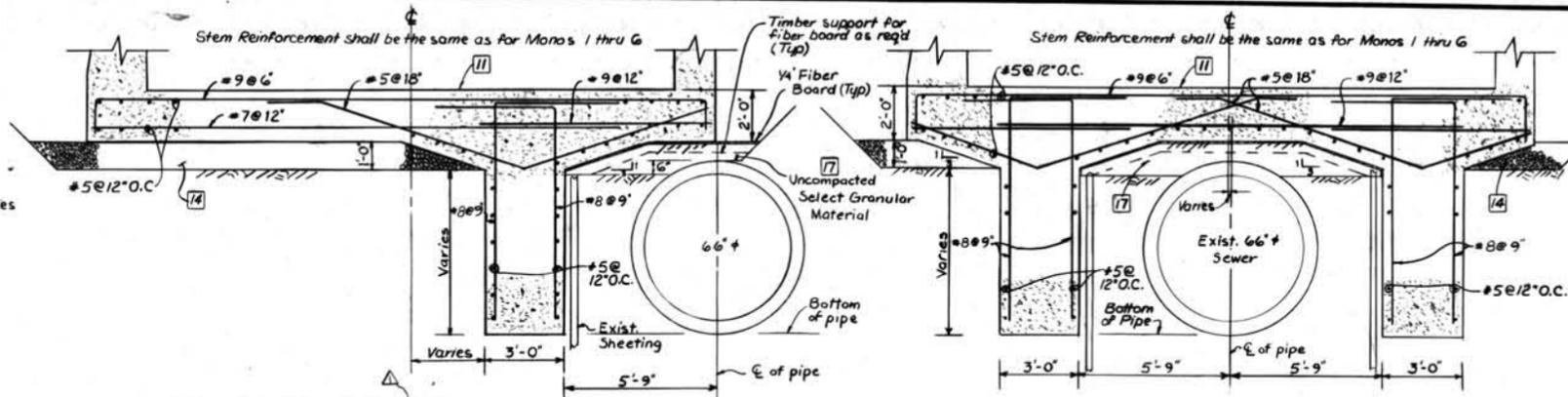
Approval Recommended by: *Stanley ...*
 Chief, ENGINEERING DIVISION

Approved by: *...*
 COLONEL & DISTRICT ENGINEER

Sheet reference number: CC-ARD-420
 Date: 20 JULY 1987
 Scale: AS SHOWN
 Sheet 20 of 44

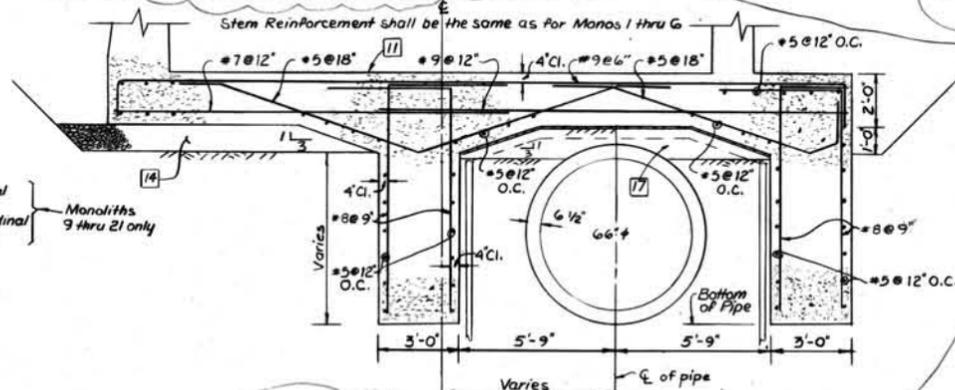


TYPICAL SECTION
MONOLITHS NO 1 THRU 6
NO 9 THRU 12
NO 20 AND 21



TYPICAL SECTION MONOLITHS NO 13 AND 14
19 OPPOSITE HAND

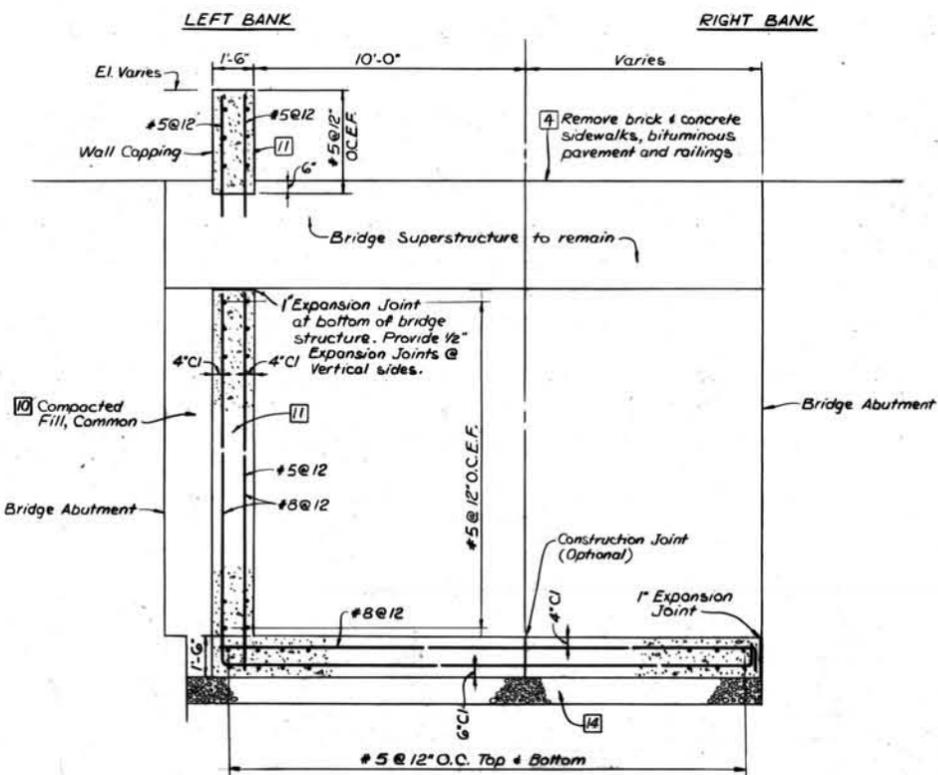
TYPICAL SECTION MONOLITH NO 17



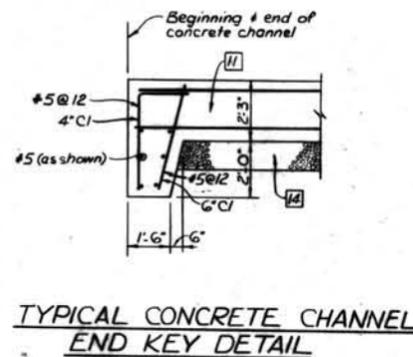
TYPICAL SECTION MONOLITHS NO 15 AND 16
18 OPPOSITE HAND

HP 12x53 Pilings driven in lieu of curtain wall as per V6 proposal

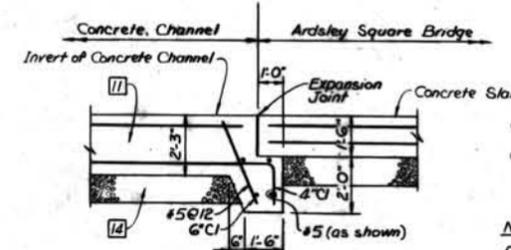
Concrete Channel, Floodwall, & Retaining Wall Notes:
Concrete: Compressive Strength 3000 psi @ 28 days, Regular Weight.
Steel: Reinforcing Bars ASTM A615 Grade 60, Welded Wire Fabric ASTM A185.



TYPICAL SECTION
MONOLITHS NO 7 & 8

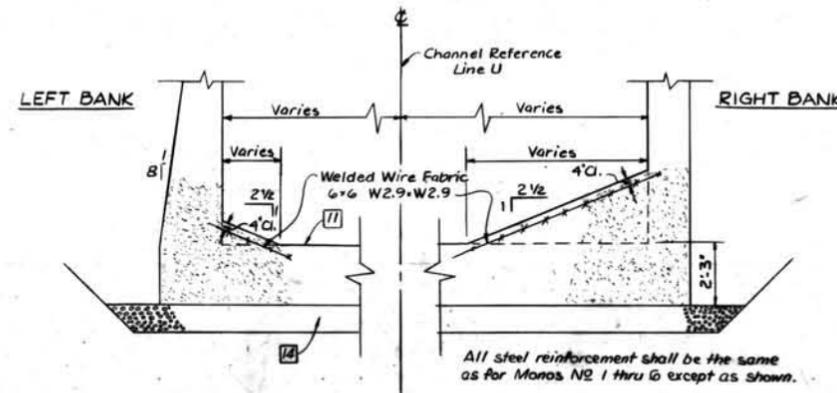


TYPICAL CONCRETE CHANNEL
END KEY DETAIL



SECTION AT JUNCTION WITH
CONCRETE CHANNEL AT THE
ARDSLEY SQUARE BRIDGE

Notes:
For General Notes, see Sheet No 1.
For Plan of Monoliths, see Sheets No 17 & 18.



TYPICAL SECTION MONOLITH NO 22

RECORD DRAWING
OF WORK-AS-BUILT

Scale: 3/8" = 1'-0"

Revision	Description	Date	Approved
1	Revised Typical Section Monoliths as built	3/24/90	G.P.

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: G. J. J...
Drawn by: E.J.M.
Checked by: S.H...
Reviewed by: L. R...
Concurred: C. R...

SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
CONCRETE CHANNEL WALL DETAILS

ARDSLEY
NEW YORK

Approved Recommended: [Signature]
Approved: [Signature]

Sheet reference number: CC-ARD-421
Date: 20 JULY 1987
Scale: AS SHOWN
Sheet 21 of 44

D

D

C

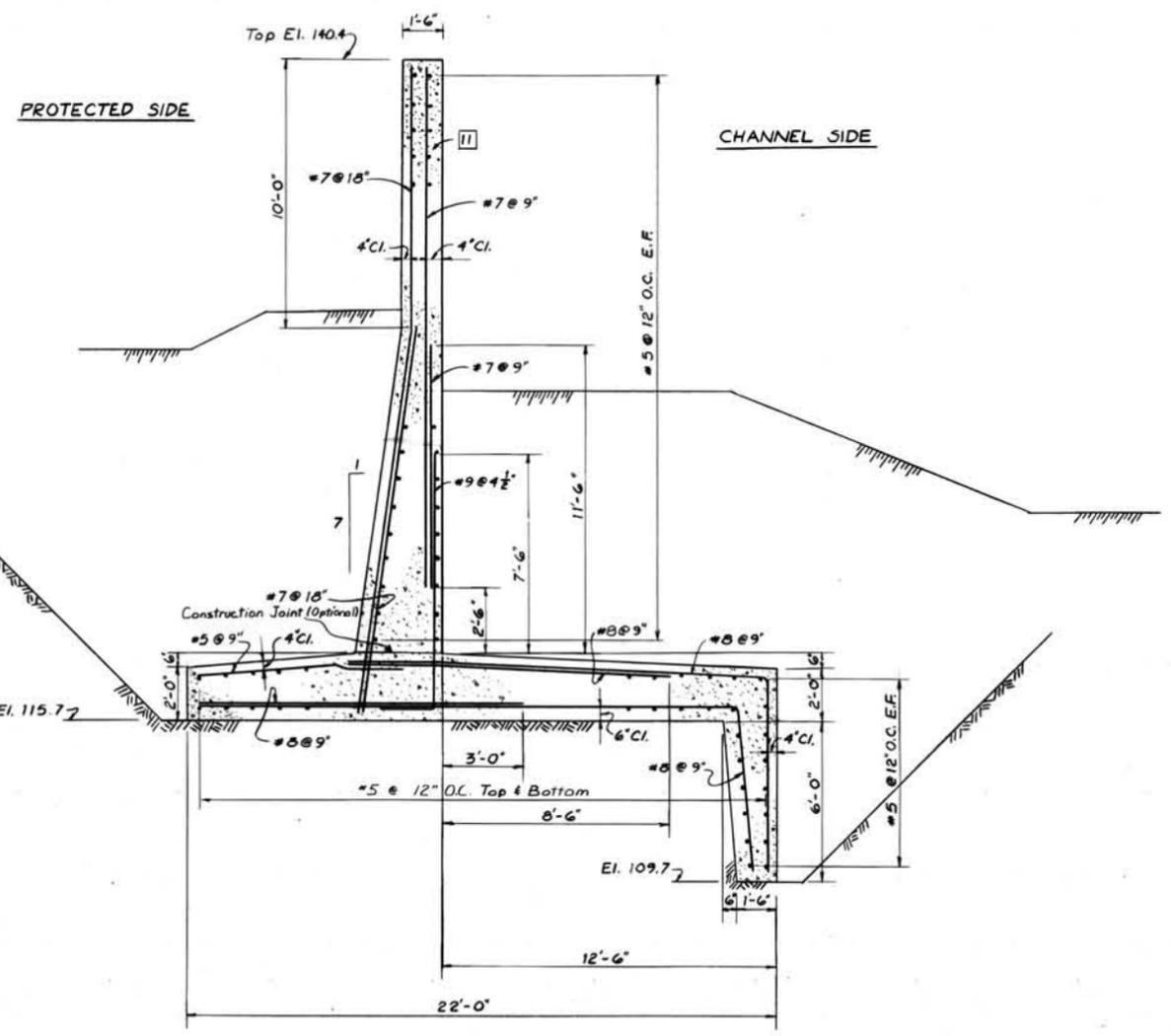
C

B

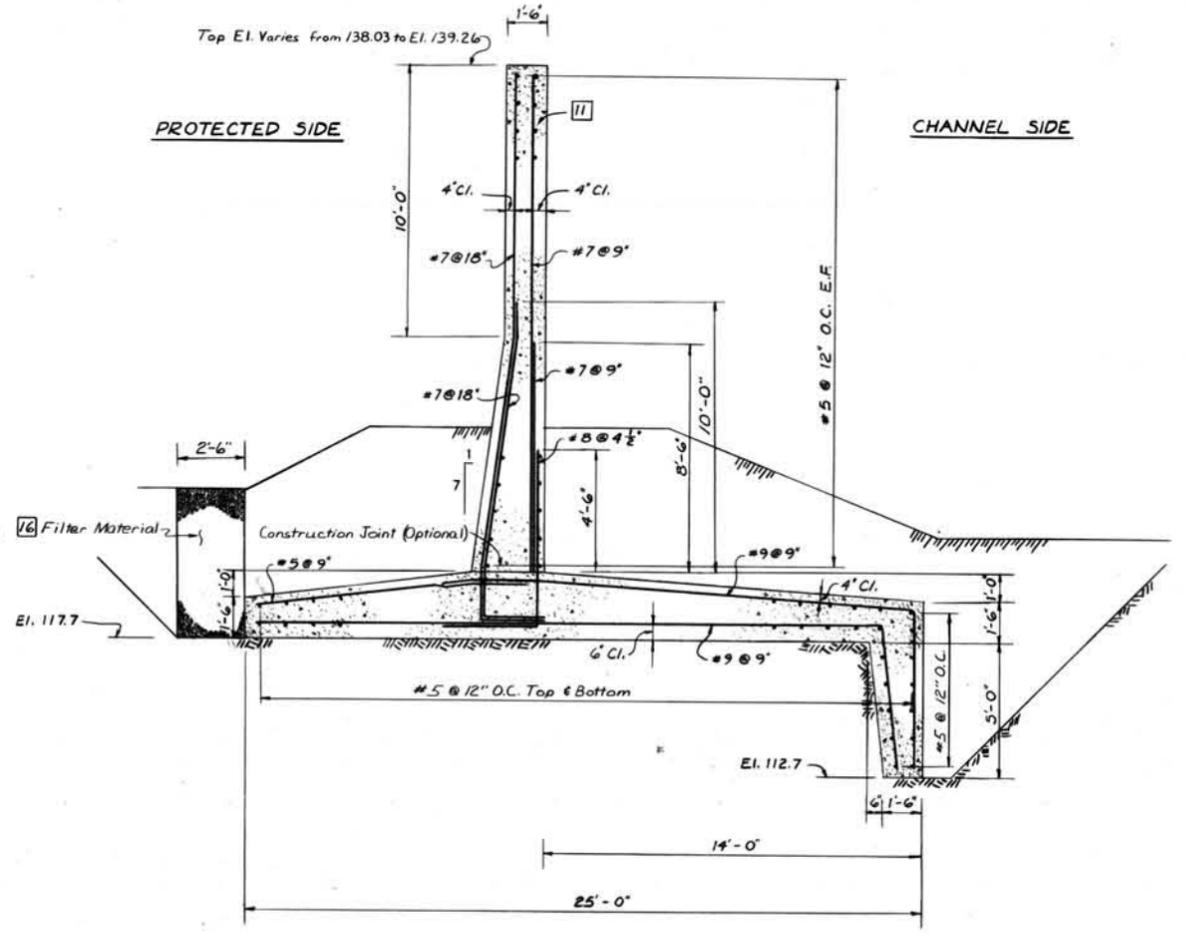
B

A

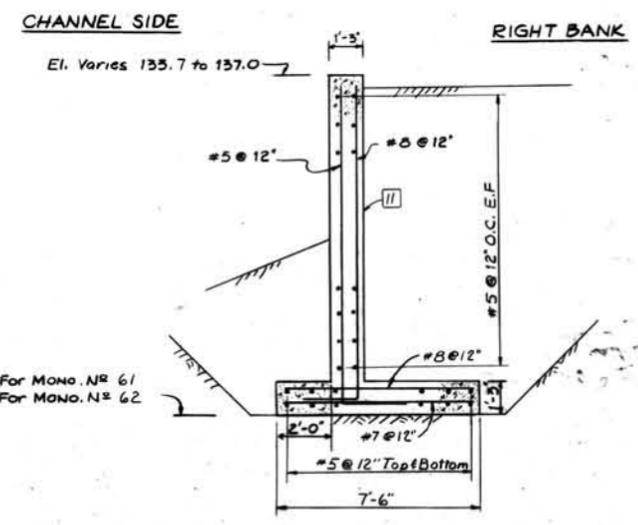
A



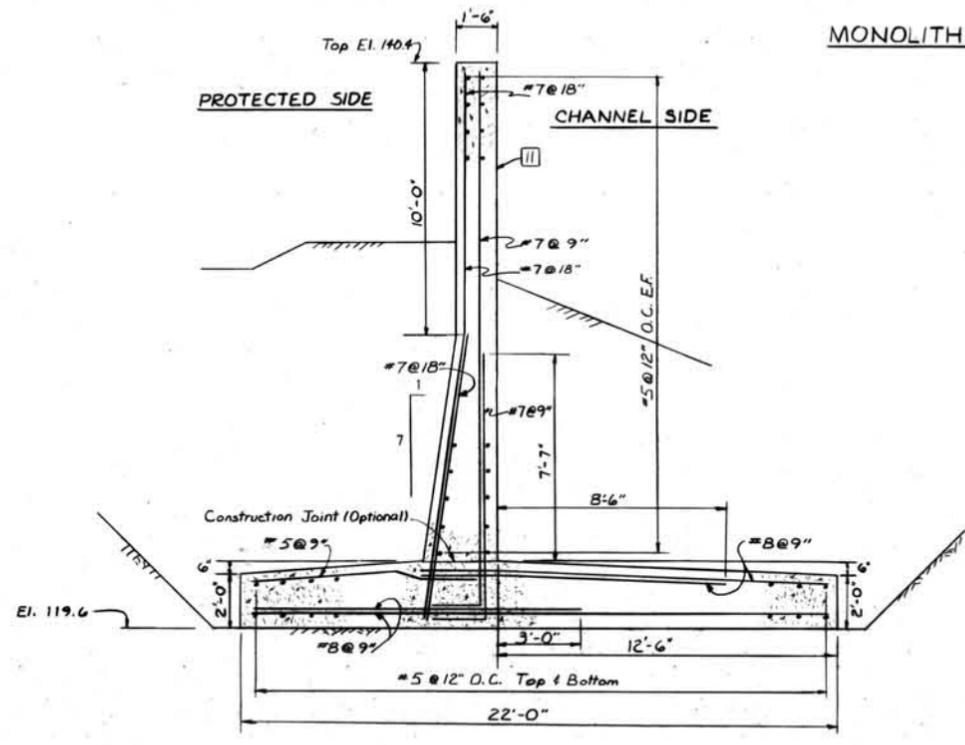
MONOLITH No 51



MONOLITH No 23 THRU 37



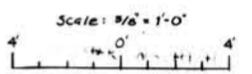
MONOLITH No 61 AND 62



MONOLITH No 52

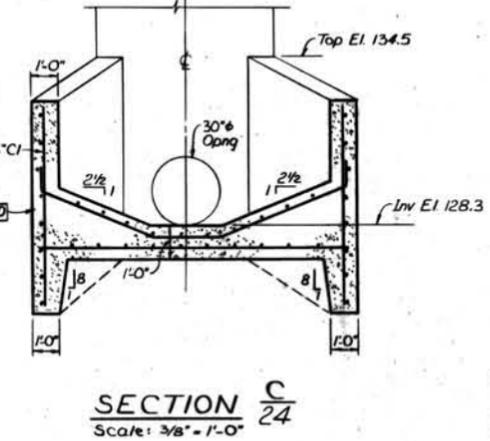
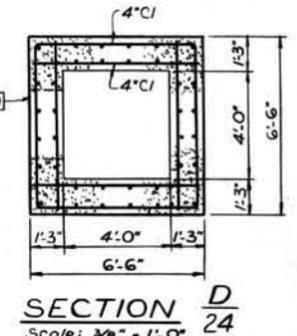
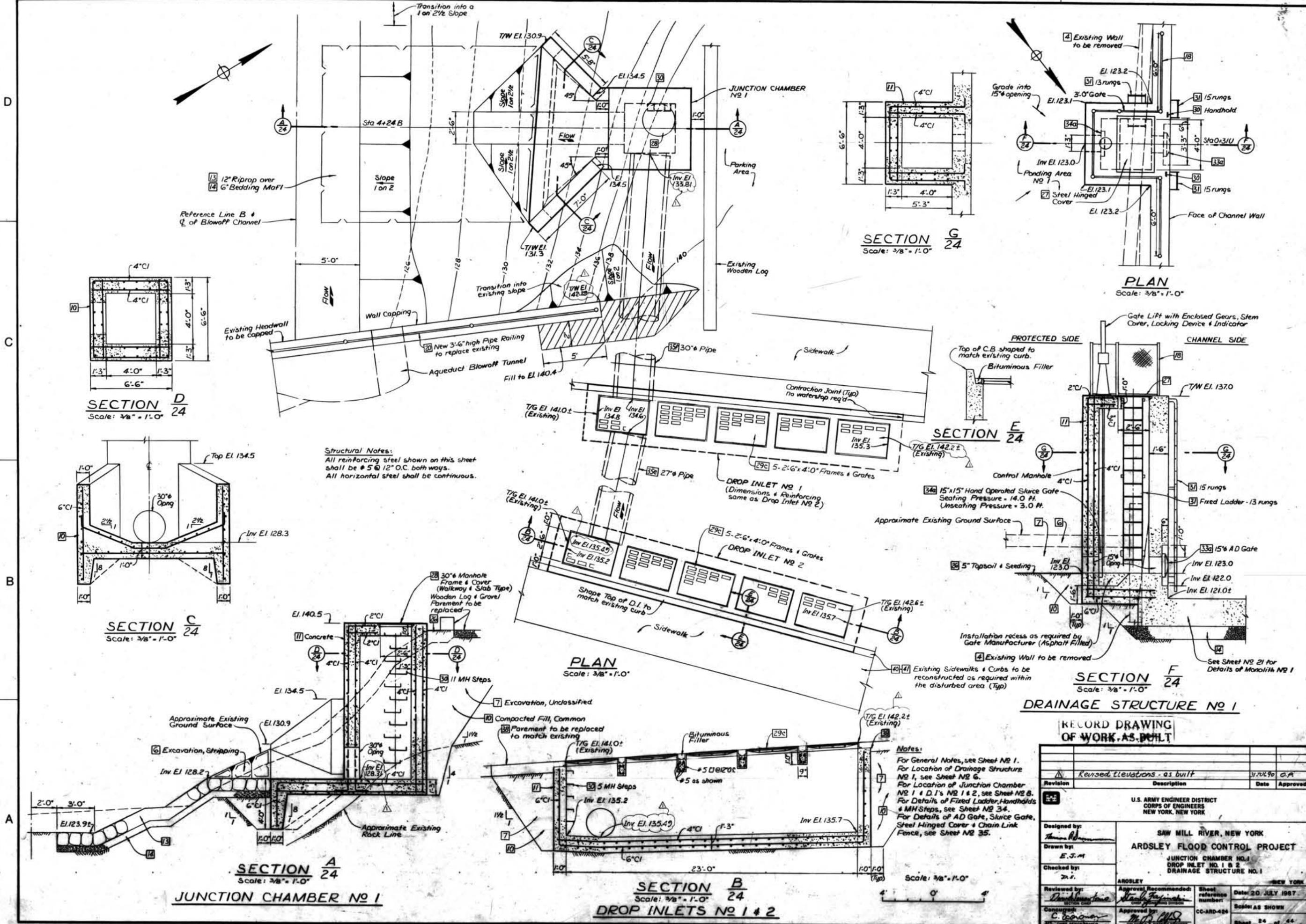
NOTES:
 For General Notes, see Sheet No. 1.
 For Plan of Monoliths, see Sheets No. 18 & 20.
 For Concrete Channel, Floodwall, & Retaining Wall
 Notes, see Sheet No. 21.

RECORD DRAWING
 OF WORK AS BUILT



El. 121.8 For Mono. No 61
 El. 127.2 For Mono. No 62

As built - No change		3/1/90	D.S.
Revision	Description	Date	Approved
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
Designed by: <i>J. Bonoma</i> Drawn by: A.C.		SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT FLOODWALL DETAILS NO. 2	
Checked by: <i>S. Hong</i>	Approved/Recommended: <i>W. J. F. ...</i> <small>Chief Engineer</small>	Sheet reference number: CC-ARD-42	Date: 20 JULY 1987 Scale: AS SHOWN Sheet 23 of 49



SECTION A 24
Scale: 3/8" = 1'-0"
JUNCTION CHAMBER NO 1

SECTION B 24
Scale: 3/8" = 1'-0"
DROP INLETS NO 1 & 2

SECTION G 24
Scale: 3/8" = 1'-0"

SECTION E 24

SECTION F 24
Scale: 3/8" = 1'-0"
DRAINAGE STRUCTURE NO 1

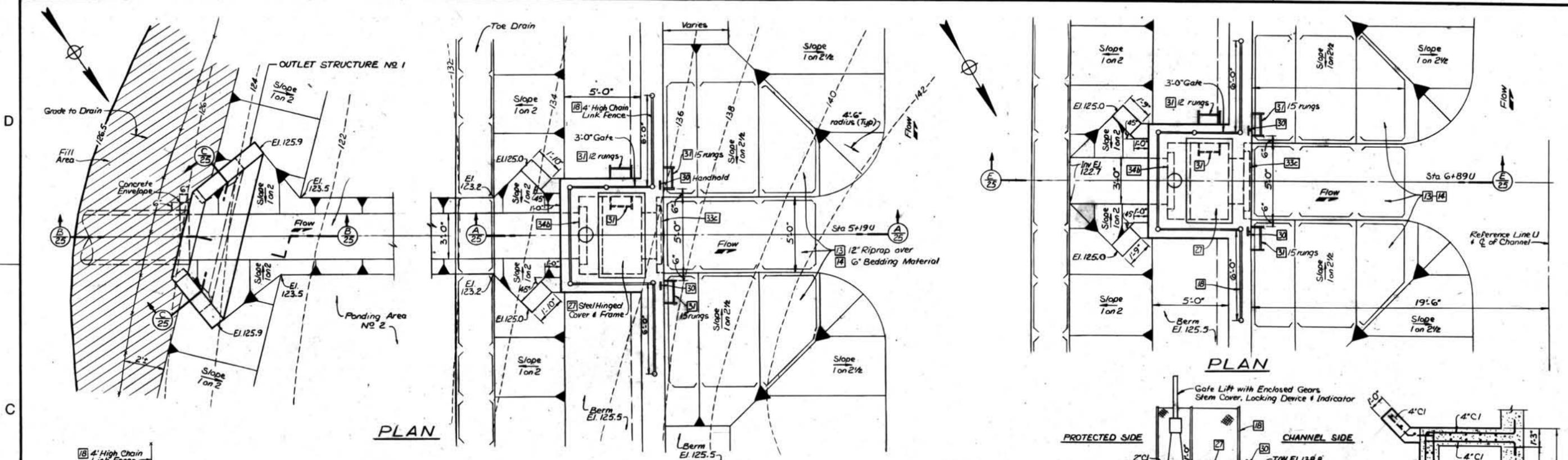
PLAN
Scale: 3/8" = 1'-0"

PLAN
Scale: 3/8" = 1'-0"

Structural Notes:
All reinforcing steel shown on this sheet shall be # 5 @ 12" O.C. both ways.
All horizontal steel shall be continuous.

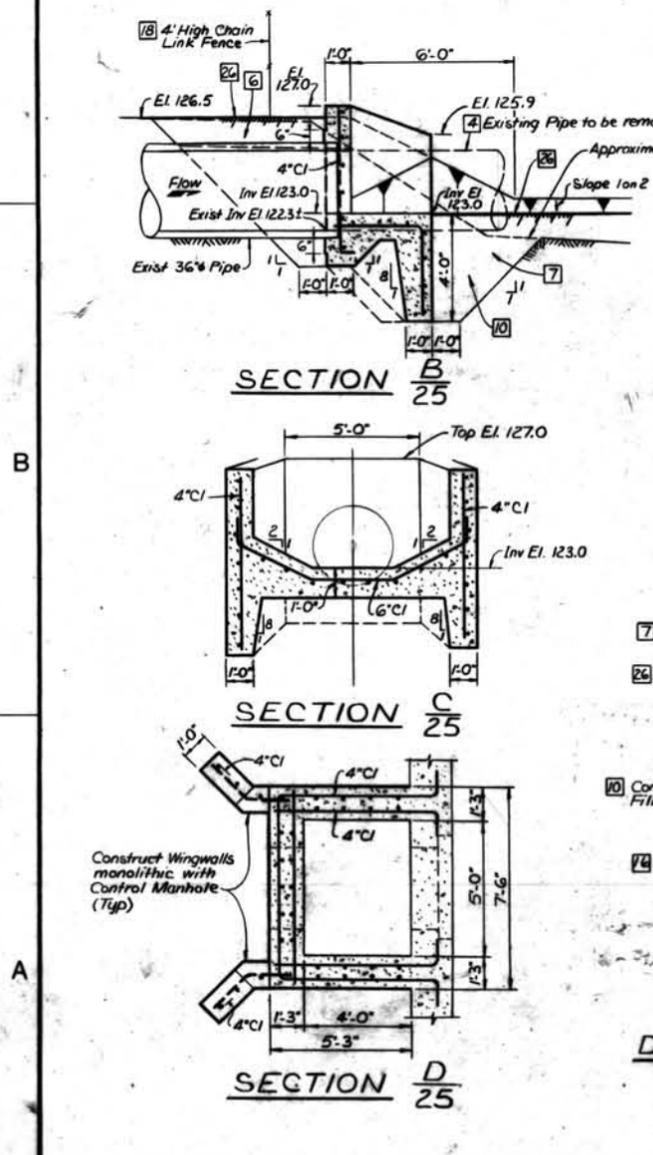
Notes:
For General Notes, see Sheet No 1.
For Location of Drainage Structure No 1, see Sheet No 6.
For Location of Junction Chamber No 1 & D.I.'s No 1 & 2, see Sheet No 8.
For Details of Fixed Ladder, Handholds & MH Steps, see Sheet No 34.
For Details of AD Gate, Sluice Gate, Steel Hinged Cover & Chain Link Fence, see Sheet No 35.

RECORD DRAWING OF WORK AS BUILT			
Revision	Description	Date	Approved
1	Revised elevations - as built	1/17/90 G.A.	
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
Designed by:	SAW MILL RIVER, NEW YORK		
Drawn by:	ARDSLEY FLOOD CONTROL PROJECT		
Checked by:	JUNCTION CHAMBER NO. 1 DROP INLET NO. 1 & 2 DRAINAGE STRUCTURE NO. 1		
Reviewed by:	Approval Recommended:	Sheet reference number:	Date: 20 JULY 1987
Concurred:	Approved by:	CC-ARD-424	Scale: AS SHOWN
			Sheet 24 of 44



PLAN

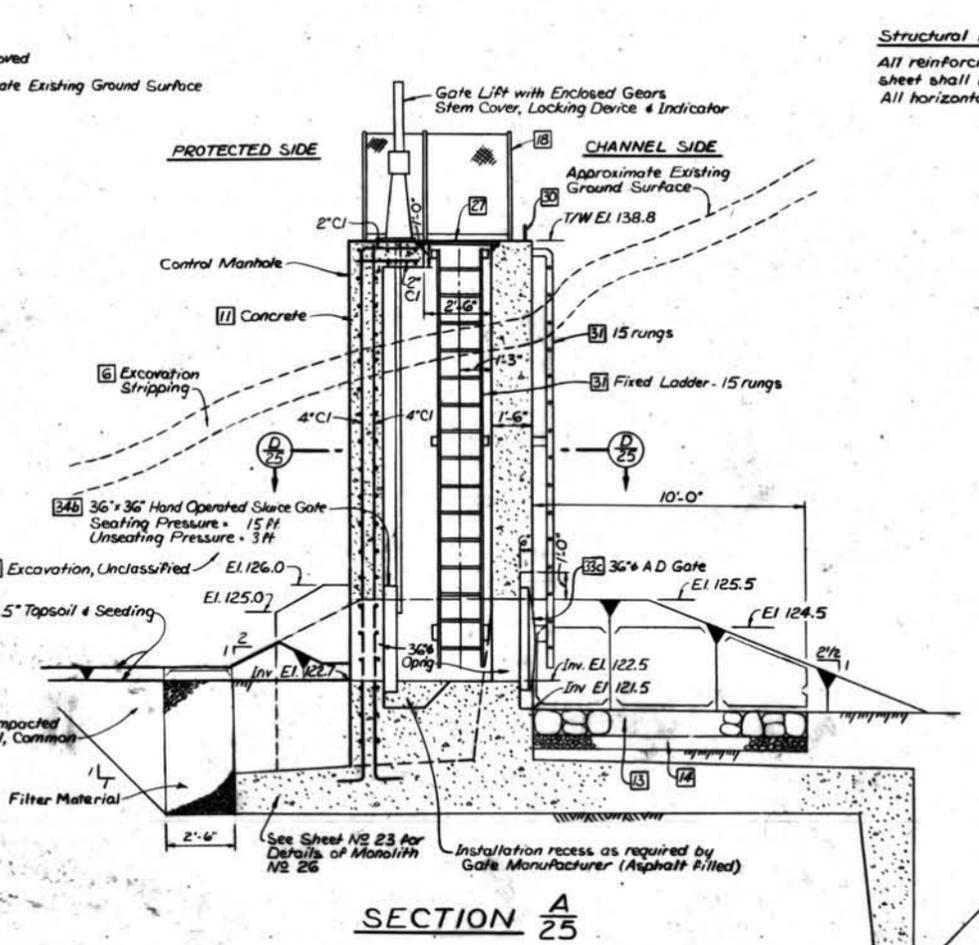
PLAN



SECTION B 25

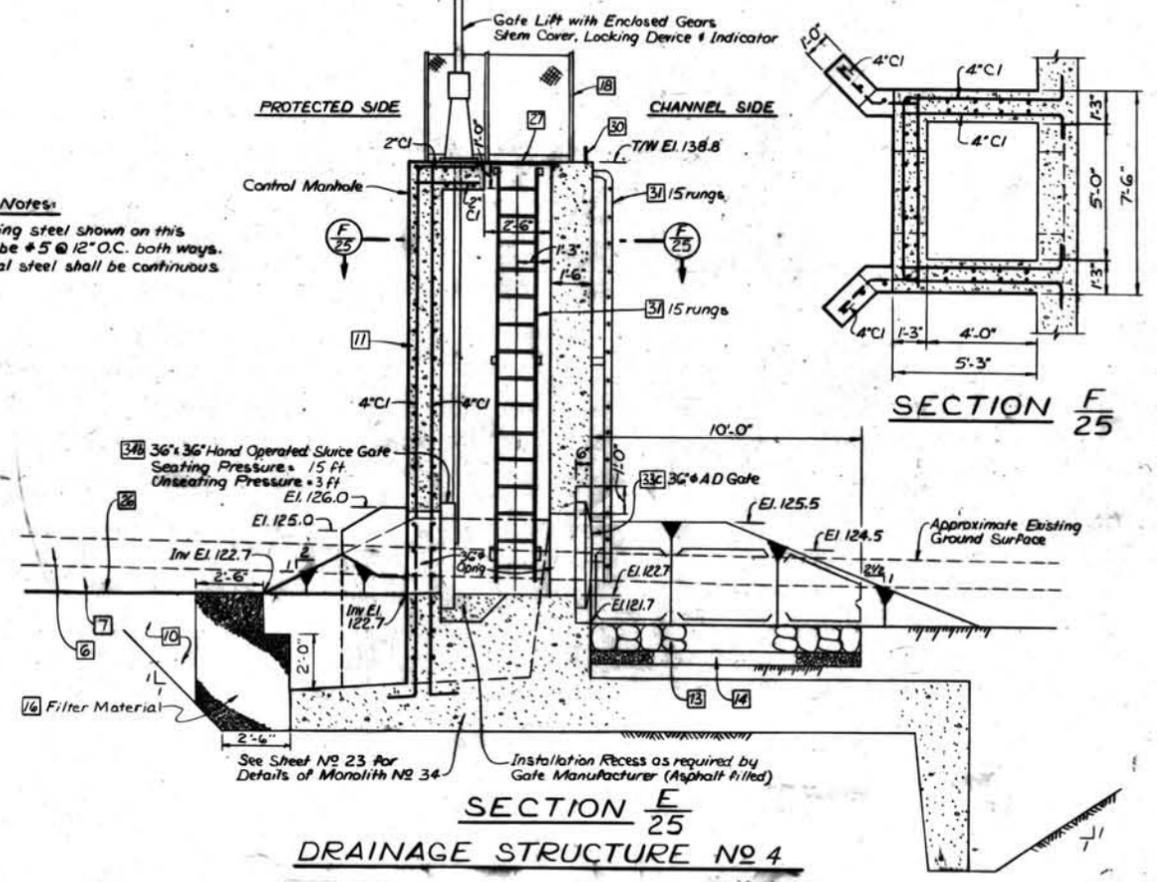
SECTION C 25

SECTION D 25



SECTION A 25

DRAINAGE STRUCTURE NO. 3



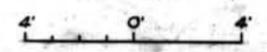
SECTION E 25

SECTION E 25
DRAINAGE STRUCTURE NO. 4

Structural Notes:
 All reinforcing steel shown on this sheet shall be #5 @ 12" O.C. both ways.
 All horizontal steel shall be continuous.

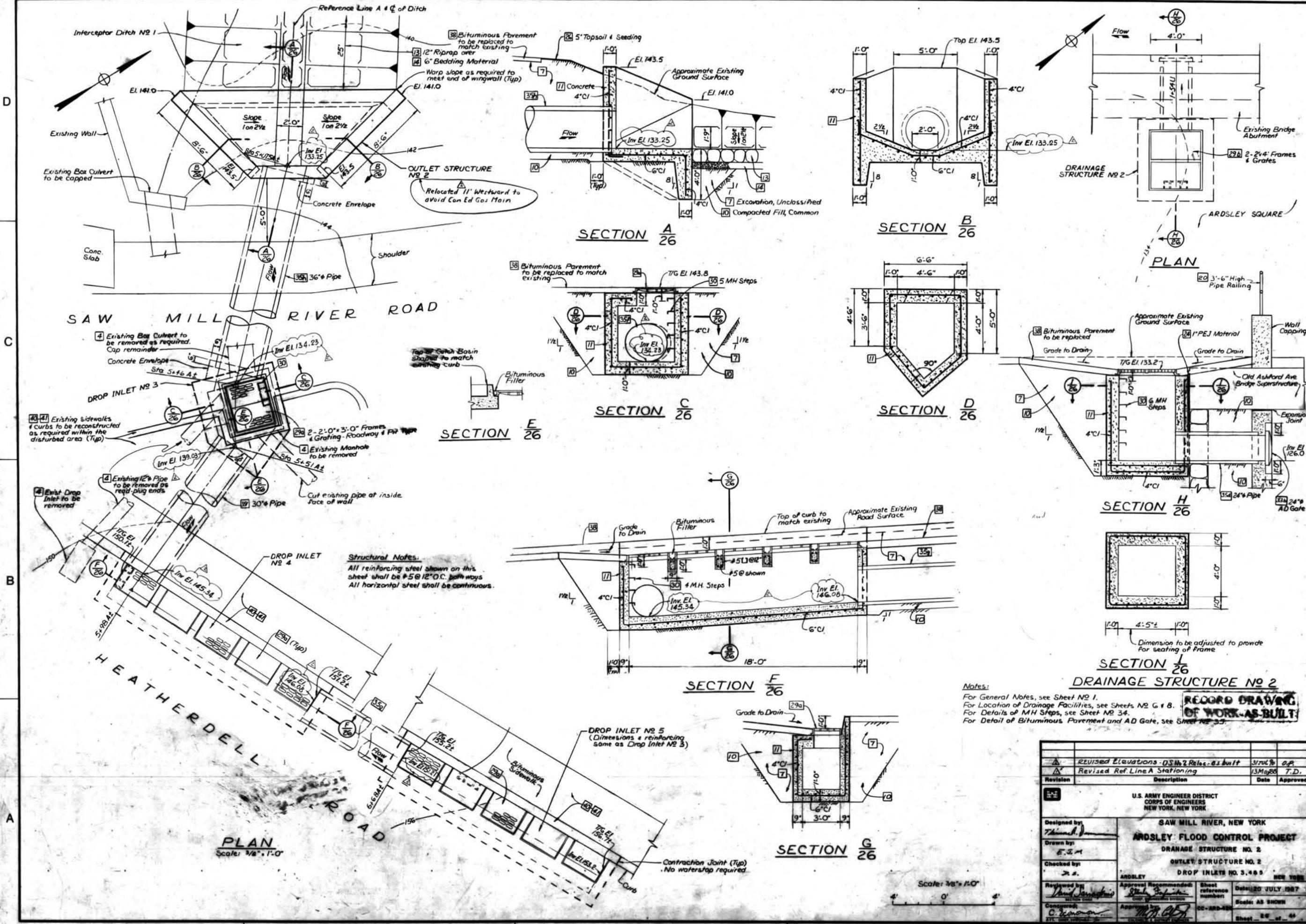
Notes:
 For General Notes, see Sheet No. 1.
 For Location of Structures, see Sheet No. 7.
 For Details of Fixed Ladder, Handholds, see Sheet No. 34.
 For Details of A.D. Gate, Sluice Gate, Steel Hinged Cover & Chain Link Fence, see Sheet No. 35.

Scale: 3/8" = 1'-0"



REVISION			
Revision	Description	Date	Approved
1	As built - No change	3/11/90	D.S.

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	
Designed by: <i>Thomas A. ...</i>	SAW MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT DRAINAGE STRUCTURES NO. 3 & 4 OUTLET STRUCTURE NO. 1
Drawn by: <i>EM</i>	ARDSLEY NEW YORK
Checked by: <i>...</i>	Reviewed by: <i>...</i>
Approved Recommended: <i>...</i>	Sheet reference number: CC-ARD-25
Date: 20 JULY 1987	Scale: AS SHOWN
Sheet 25 of 44	



Structural Notes:
All reinforcing steel shown on this sheet shall be #5 @ 12" O.C. both ways.
All horizontal steel shall be continuous.

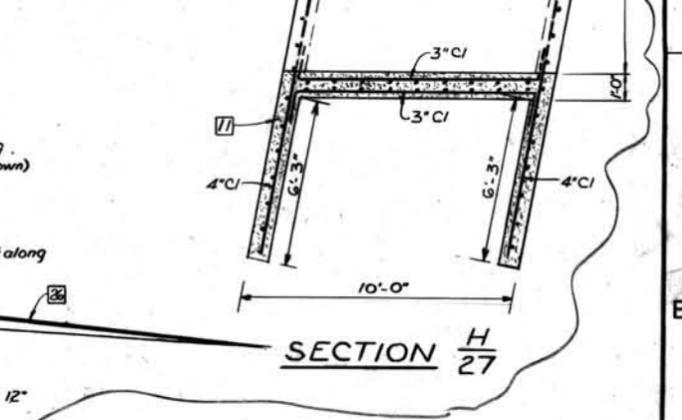
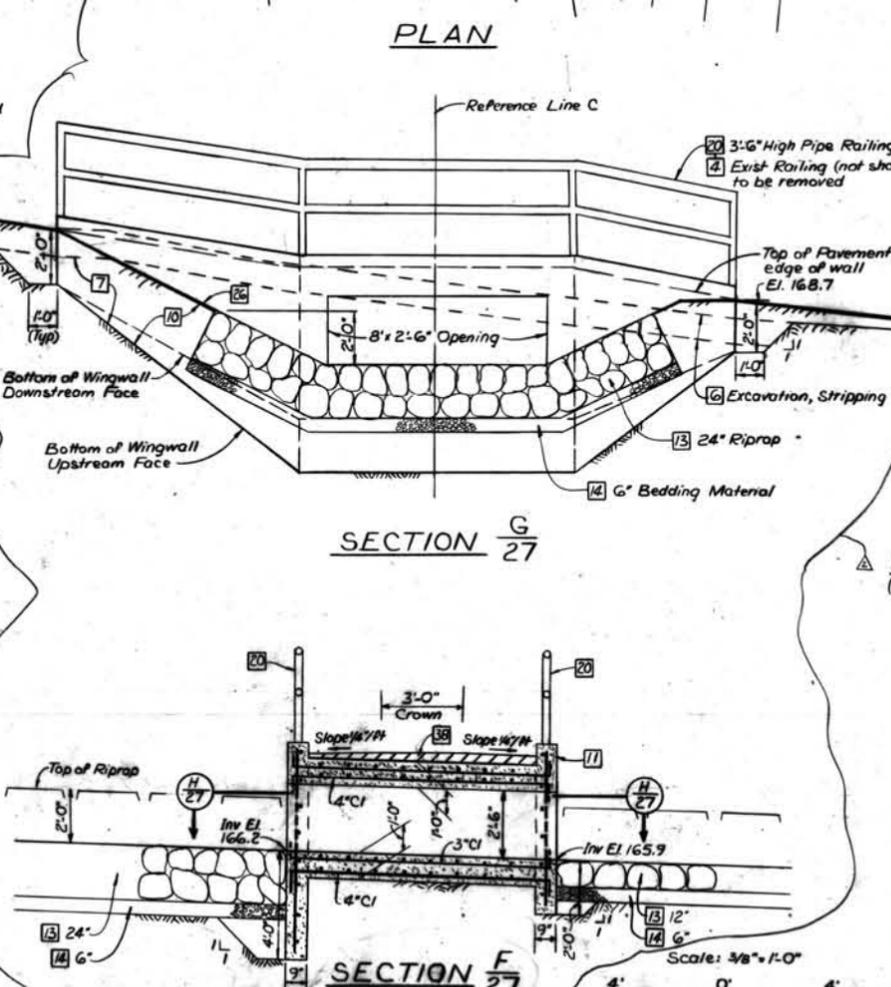
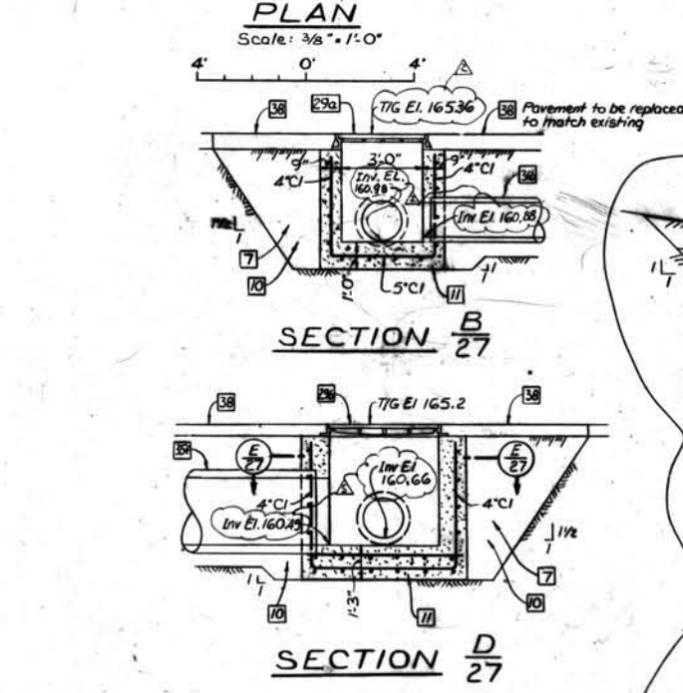
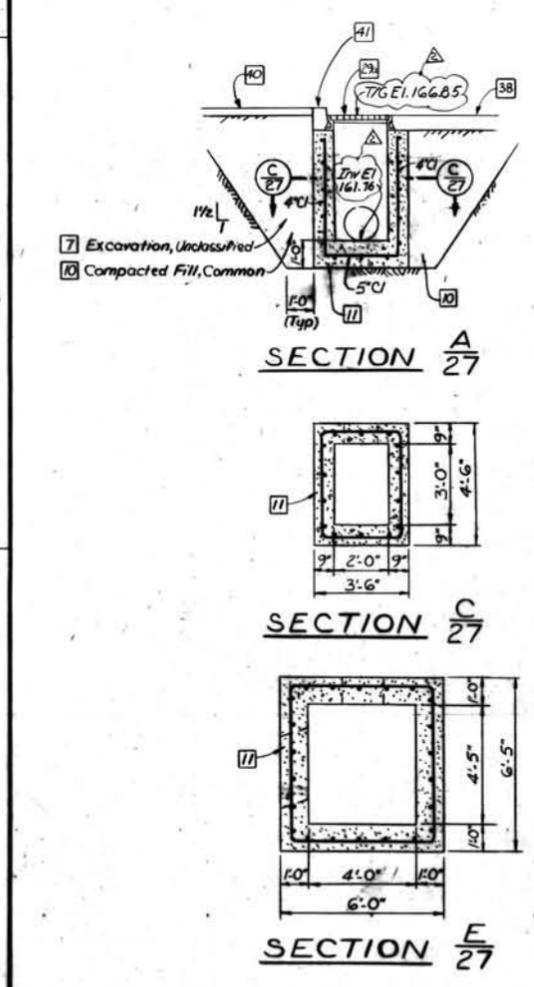
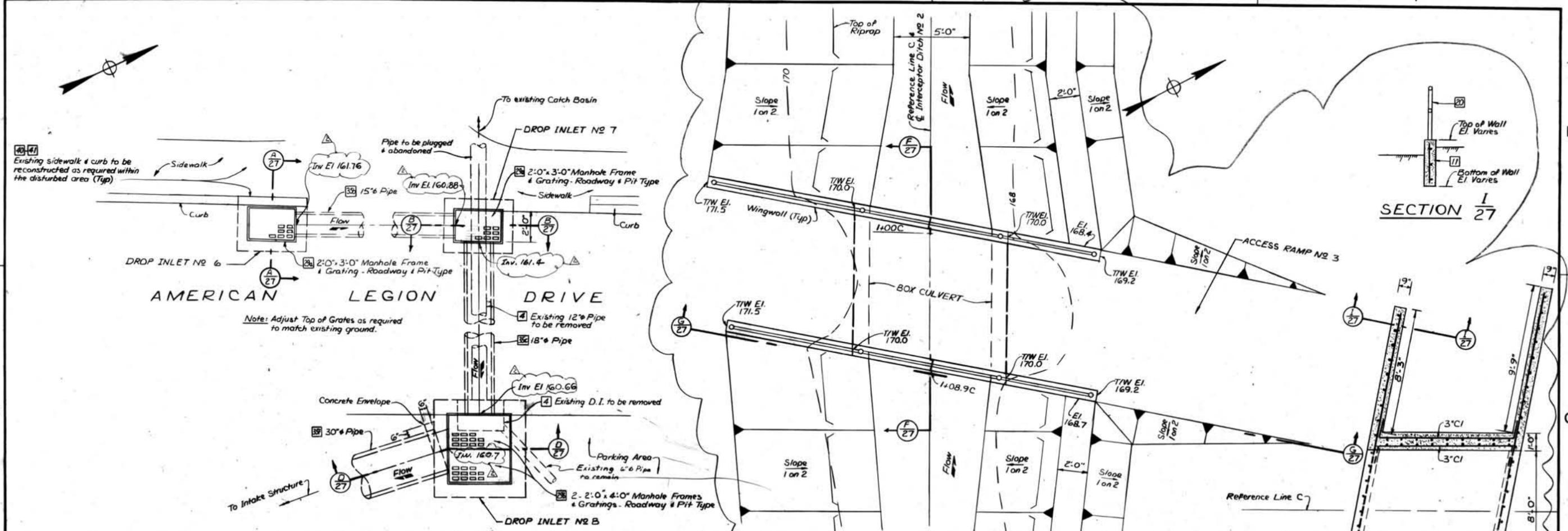
Notes:
For General Notes, see Sheet No. 1.
For Location of Drainage Facilities, see Sheets No. 2 G & B.
For Details of MH Steps, see Sheet No. 34.
For Detail of Bituminous Pavement and AD Gate, see Sheet No. 35.

RECORD DRAWING OF WORK-AS-BUILT

Revision	Description	Date	Approved
1	REVISED ELEVATIONS - DS No. 2 Reloc. as built	3/10/87	OP
2	REVISED REF. LINE A STATIONING	13/MAY/88	T.D.

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER, NEW YORK			
ARDSLEY FLOOD CONTROL PROJECT			
DRAINAGE STRUCTURE NO. 2			
OUTLET STRUCTURE NO. 2			
DROP INLETS NO. 3, 4 & 5			
Designed by <i>Thomas J. ...</i>	Reviewed by <i>David ...</i>	Sheet reference number DC-ARD-25	Date 20 JULY 1987
Drawn by <i>E.J.M.</i>	Approved by <i>M.H. ...</i>	Scale AS SHOWN	Sheet 25 of 44
Checked by <i>S.S.</i>	Approved by <i>M.H. ...</i>		
Concurred by <i>C. ...</i>			

Scale: 3/8" = 1'-0"



Structural Notes:
All reinforcing steel shown on this sheet shall be #5 @ 12" O.C. both ways.
All horizontal steel shall be continuous.

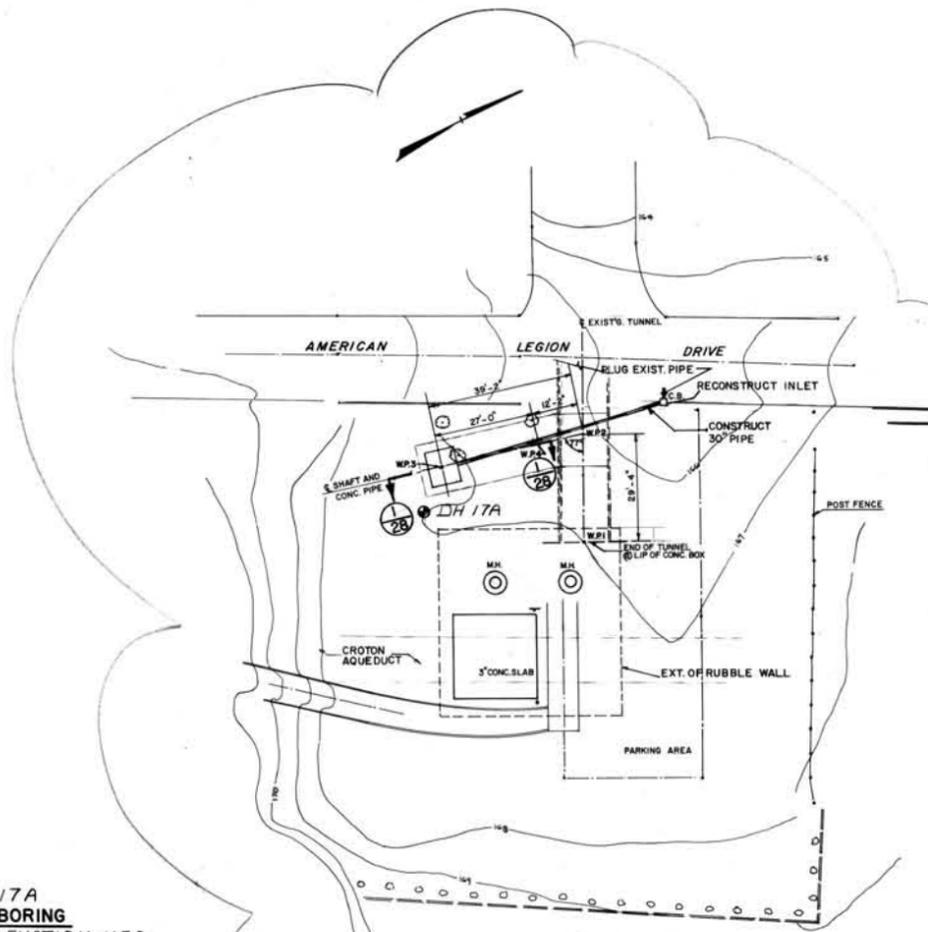
Notes:
For General Notes, see Sheet No. 1.
For Location of Drainage Facilities, see Sheet No. 9.
For Details of Bituminous Pavement, see Sheet No. 35.

deleted Access Ramp, see Plan on sheet 9 of 44 (Request by NYSDEP)

RECORD DRAWING OF WORK AS BUILT

Revision	Description	Date	Approved
1	Deleted Access Ramp No. 3, Rev. Elevation - as built	3/7/68	DRP
2	Revised Box Culvert	5/May/87	T.D.

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	
Designed by: Drawn by: <i>EM</i> Checked by: <i>ZS</i> Reviewed by: <i>David J. ...</i> Approved by: <i>C. ...</i>	SAWMILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT DROP INLETS NO. 6, 7 & 8 BOX CULVERT SHEET NO. 27 OF 44



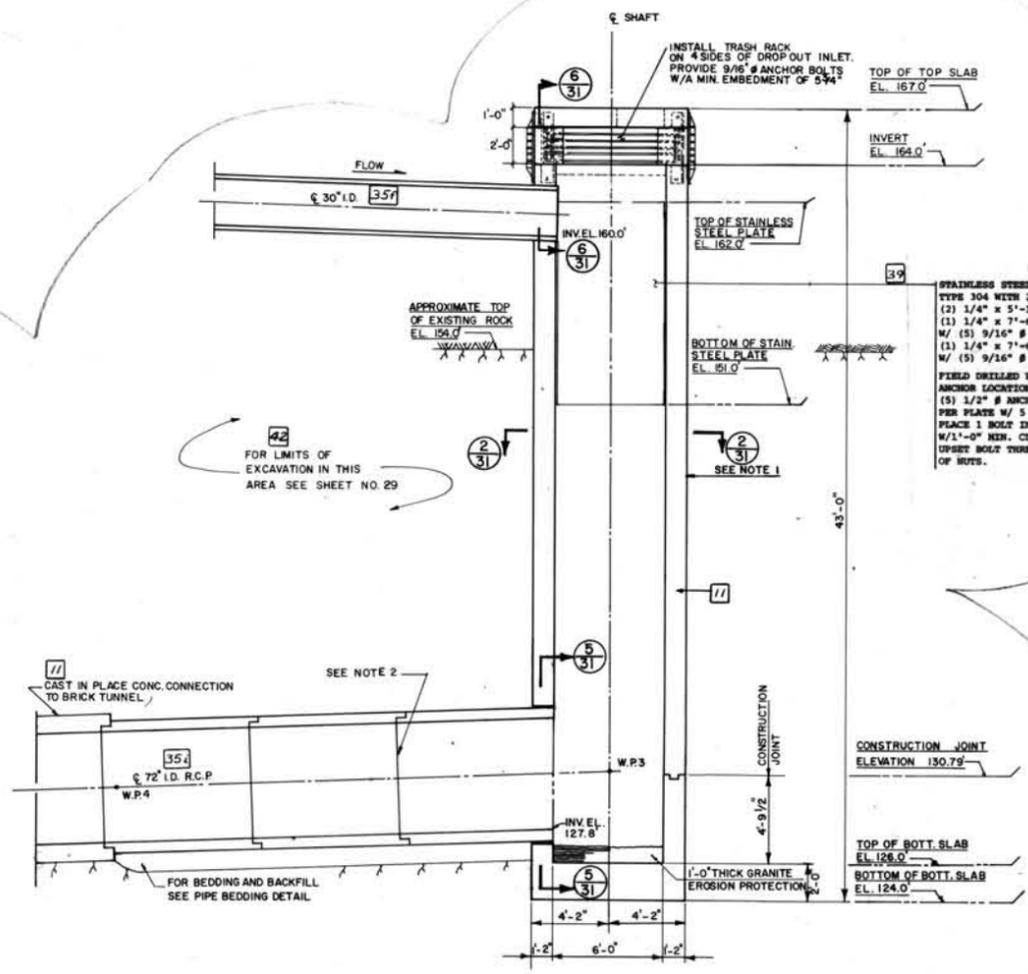
DH 17A
LOG OF BORING
GROUND ELEVATION 167.0

TEST BORING LOG		BORING NO.
DEPTH (FEET)	DESCRIPTION	REMARKS
0-1	Topsoil - brown sandy silt, pieces of stones, root fibers (SM-SC)	
1-1	Gray coarse to medium SAND, fine gravels, root fragments (decomposed rock)	Castings driven by rotary drill, 11/2" to 1 1/2" dia.
2-2	Brown sand/silt, fine gravels, root fragments, soft (SM)	
3-3	Gray fine to medium SAND, highly weathered, decomposed, soft (SM)	
4-4	Gray pebbly mica SAND, moderately to slightly weathered, fractured, hard, massive (Fracture formation - drab/clay)	Begin coring at 10'-0" of 30-inch pipe.
5-5	Gray pebbly mica SAND, moderately to slightly weathered, fractured, hard, massive (Fracture formation - drab/clay)	
6-6	Gray pebbly mica SAND, very slightly weathered to fresh, massive, slightly fractured to intact (Fracture formation - drab/clay)	
7-7		
8-8		
9-9		
10-10		
11-11		
12-12		
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46-46		
47-47		
48-48		
49-49		
50-50		



NOTES:
OVERFLOWS FROM CROTON AQUEDUCT INTO BLOWOFF TUNNEL CAN NOT BE CONTROLLED. CONTRACTOR SHALL MONITOR WATER ELEVATION IN AQUEDUCT TO SIGNAL POSSIBLE OVERFLOWS INTO BLOWOFF TUNNEL.
ALL CONSTRUCTION SHOULD BE PERFORMED IN A SAFE MANNER IN THE EVENT BLOWOFF TUNNEL FLOW SHOULD OCCUR.

For Relocated Intake Structure see Plan on sheet 3A of 44 & 28A of 44

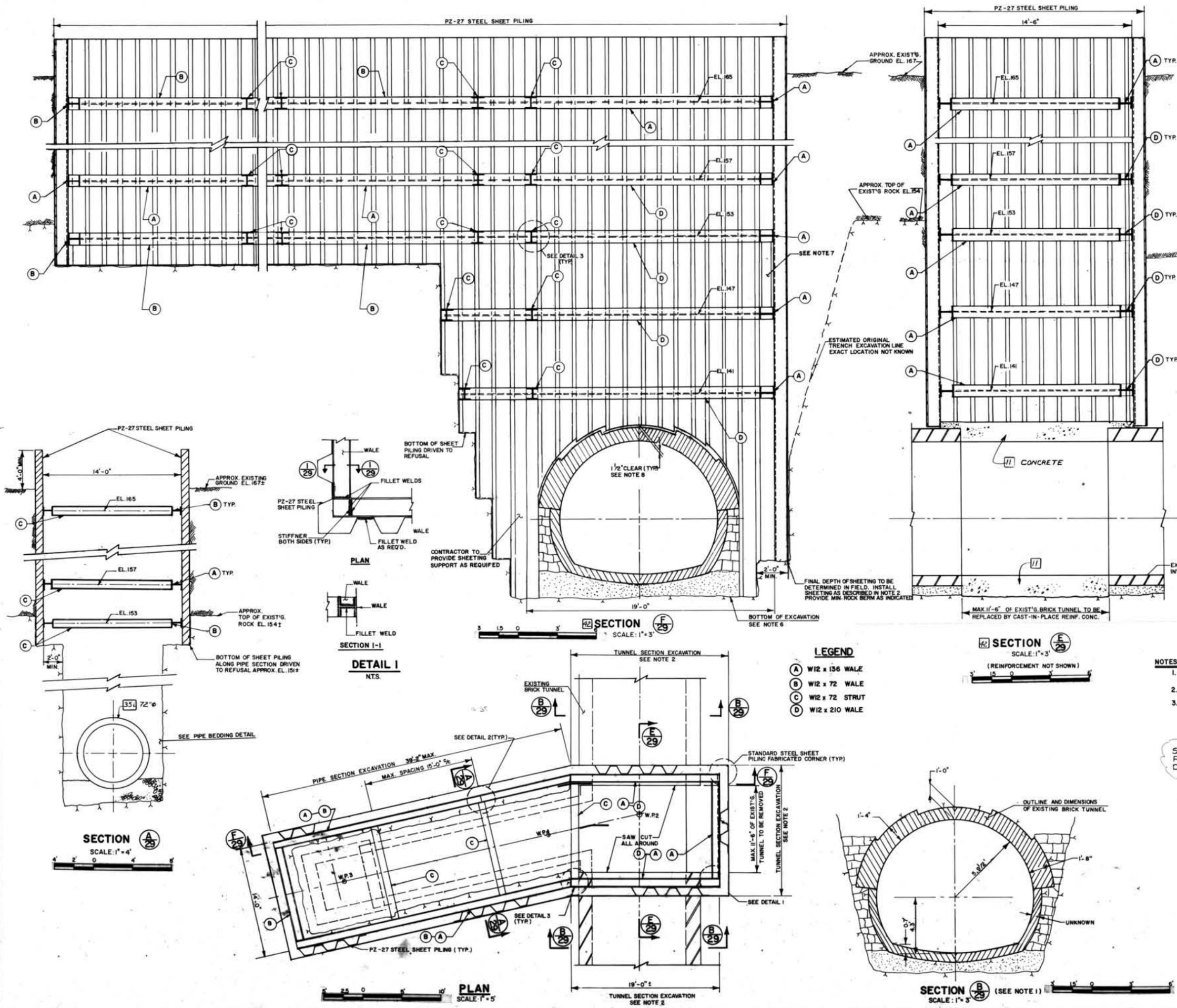


NOTE:
1. SHAFT WALLS TO BE FORMED AGAINST ROCK FROM EL. 154.0' TO THE BOTTOM. WALL THICKNESS SHOWN ON DRAWINGS ARE MIN. REQ'D.
2. PROVIDE ELASTOMERIC GASKET IN BETWEEN EACH PIPE SEGMENT.

RECORD DRAWING
OF WORK-AS-BUILT

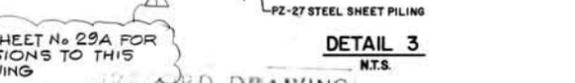
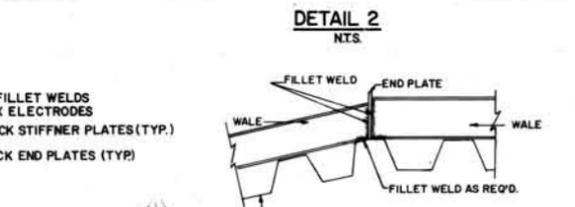
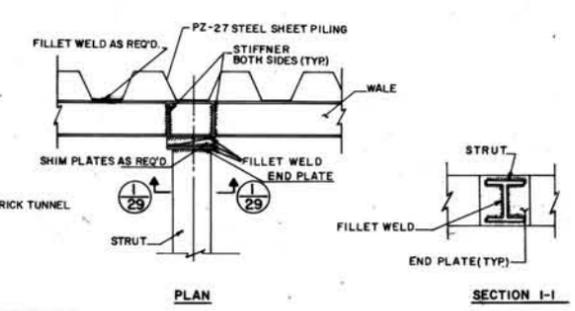
- General Notes Intake Structure And Blowoff Connection
- Design Specifications:
ACI 318-83 - American Concrete Institute Building Code Requirements for Reinforced Concrete
 - Concrete Design Stresses:
A.) Specified Compressive Strength (F_c)..... 4000Psi
B.) Extreme Fiber in Compression (F_c)..... 1800Psi
 - Reinforcement Steel:
A.) ASTM A615 (Grade 60) (F_s) = 24,000Psi
B.) Epoxy coated reinforcing is necessary from El. 124'-0" through construction joint at El. 130'-9 1/2"
 - Work Points
A.) — indicates location of work point

Intake Structure relocated - as built		3/11/90	OP
Revision	Description	Date	Approved
THE RBA GROUP		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	
Designed by: KJVK	SAW MILL RIVER, NEW YORK		
Drawn by: F.L.	ARDSLEY FLOOD CONTROL PROJECT		
Checked by: R.M.	BLOWOFF TUNNEL		
Reviewed by: David J. ...	LOCATION PLAN AND SECTION		
Approved by: ...	Sheet reference number: CC-490-428	Date: 20 JULY 1987	Scale: AS SHOWN
Approved by: ...	Sheet: 28 of 48		



- TUNNEL AND SHEETING NOTES:**
- DIMENSIONS INDICATED AND DETAILS OF EXISTING TUNNEL CROSS SECTION INDICATED ARE BASED ON ORIGINAL DESIGN DRAWINGS. ACTUAL DIMENSIONS AND DETAILS MAY VARY.
 - BELOW ELEVATION 155, SHEETING SHALL BE INSTALLED AS SPECIFIED WITH THE FOLLOWING ADDITIONAL REQUIREMENTS: SHEETING WALL SHALL BE ADVANCED BY ALTERNATELY EXCAVATING BELOW THE TOE OF THE SHEETING AND THEN DRIVING THE SHEETING TO THE BOTTOM OF THE PREPARED EXCAVATION IN STEPS OF 3 FT. MAXIMUM SO AS TO MINIMIZE THE POTENTIAL FOR DAMAGE TO THE EXISTING TUNNEL. VOIDS RESULTING FROM OVEREXCAVATION BENEATH SHEETING BE FILLED WITH CONCRETE.
 - PZ-27 SHEET PILING SHALL HAVE THE FOLLOWING PROPERTIES:

PER FT.	WEIGHT		SECTION MODULUS	
	PER SQ. FT. OF WALL	NOMINAL WEB THICKNESS	PER FT.	OF WALL
LBS.	LBS.	IN.	IN. ³	
40.5	27.0	3/8	30.2	
 - CONTRACTOR SHALL PROVIDE TEMPORARY INTERNAL SUPPORT FOR THE EXISTING BRICK TUNNEL PRIOR TO DRIVING SHEET PILING. PROPOSED INTERNAL SUPPORT SHALL BE APPROVED BY THE CONTRACTING OFFICER.
 - ANY DAMAGES TO THE BRICK TUNNEL RESULTING FROM THE CONSTRUCTION ACTIVITIES SHALL BE REPAIRED AS DIRECTED BY CONTRACTING OFFICER.
 - EXCAVATE TO A DEPTH OF 1'-6" FROM THE TUNNEL INVERT OR TO SOUND ROCK WHICHEVER IS GREATER.
 - CONTRACTOR SHALL PROVIDE VERTICAL BRACES AND TEMPORARY SUPPORT FOR STRUTS AND WALES DURING SHEETING INSTALLATION AS DESCRIBED IN NOTE 2 ABOVE.
 - CONTRACTOR SHALL PREVENT SOIL AND/OR WATER INFILTRATION AS REQUIRED.
 - INTERNAL DIMENSIONS OF NEW REINFORCED CONCRETE TUNNEL TO MATCH THAT OF THE EXISTING BRICK TUNNEL.
 - ALL INTERIOR CONCRETE SURFACE SHALL RECEIVE FINISHES AS SPECIFIED.
 - ALL SHEETING, STRUTS AND WALES SHALL BE LEFT IN PLACE. SHEETING SHALL BE CUT 3' BELOW PROPOSED SURFACE ELEVATION.
 - ALL CAST-IN-PLACE CONCRETE SHALL BE 4000 PSI.
 - STRUTS AND WALES SHALL BE ASTM A36.
 - STEEL REINFORCEMENT FOR CAST-IN-PLACE CONCRETE SHALL BE BY ASTM A615 GRADE 60.
 - CONTRACTOR SHALL UTILIZE CONSTRUCTION METHODS AND PROCEDURES TO INSURE THE INTEGRITY OF THE EXISTING BRICK TUNNEL.
 - ALL CONSTRUCTION JOINTS SHALL HAVE 9" P.V.C. WATERSTOP.

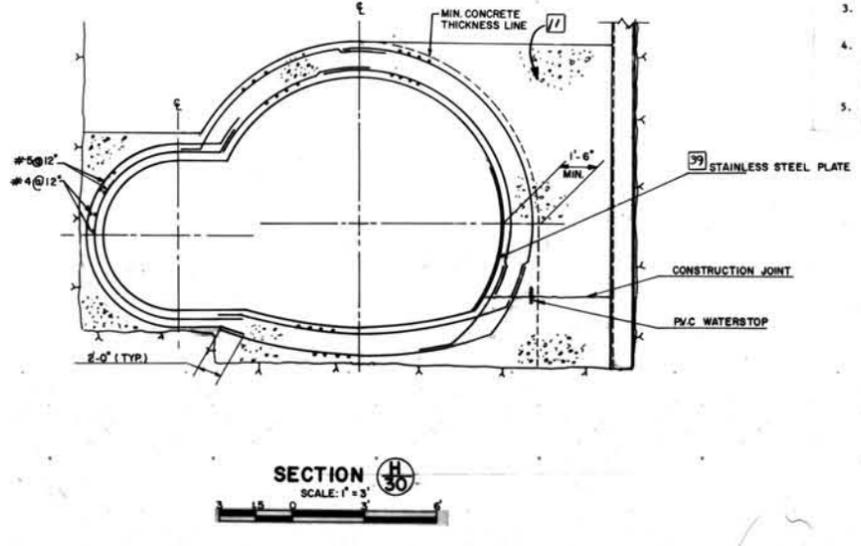
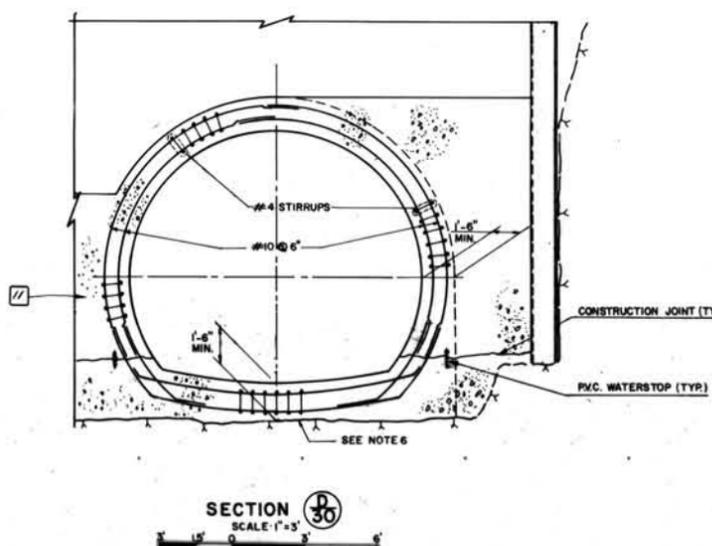
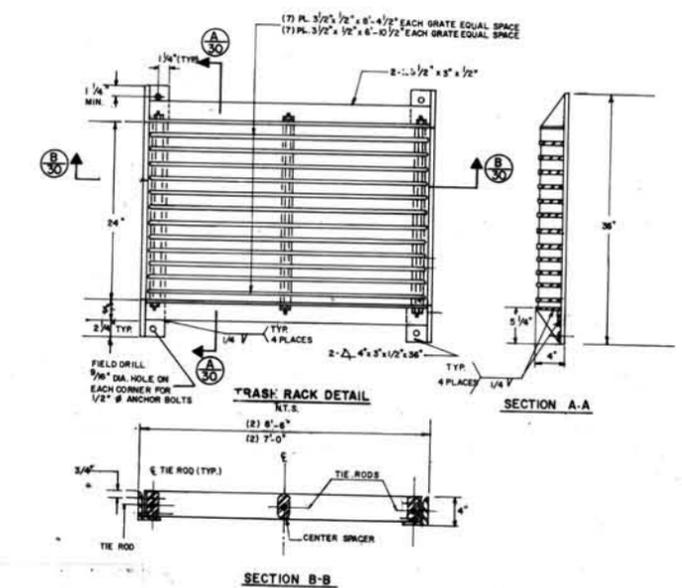
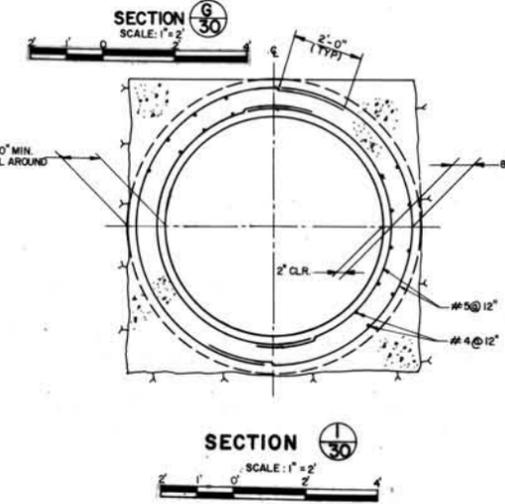
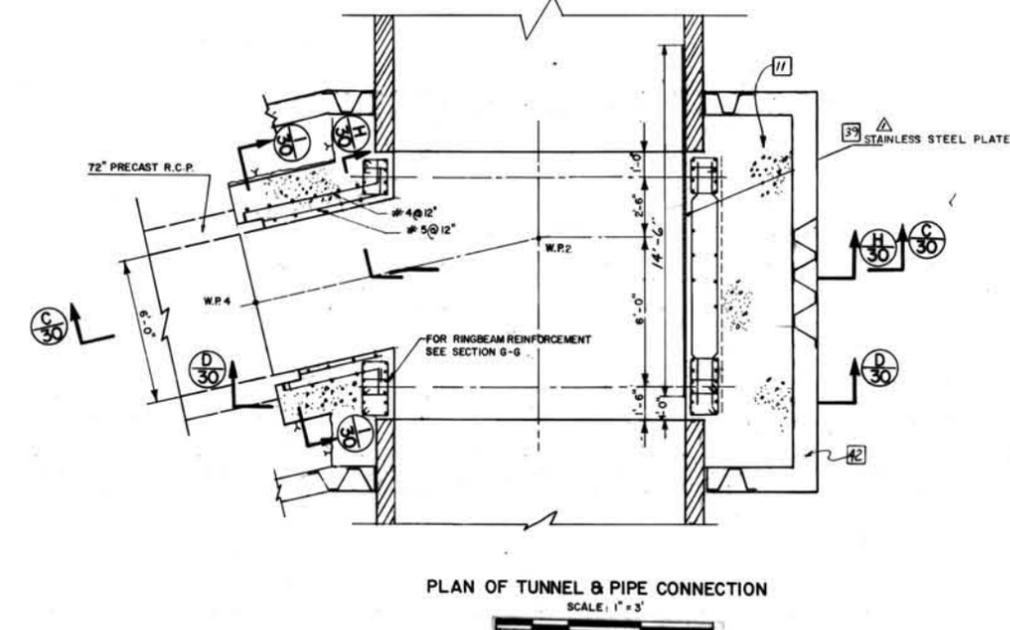
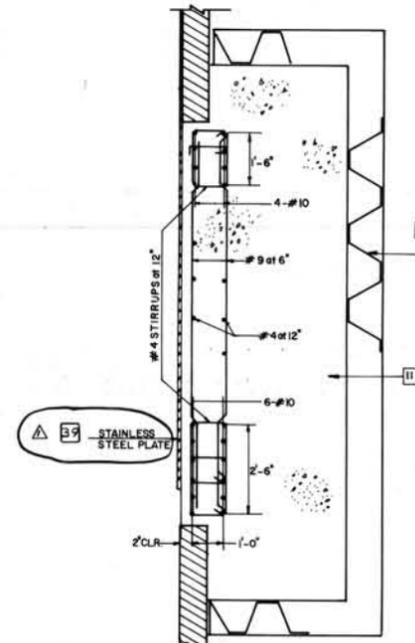
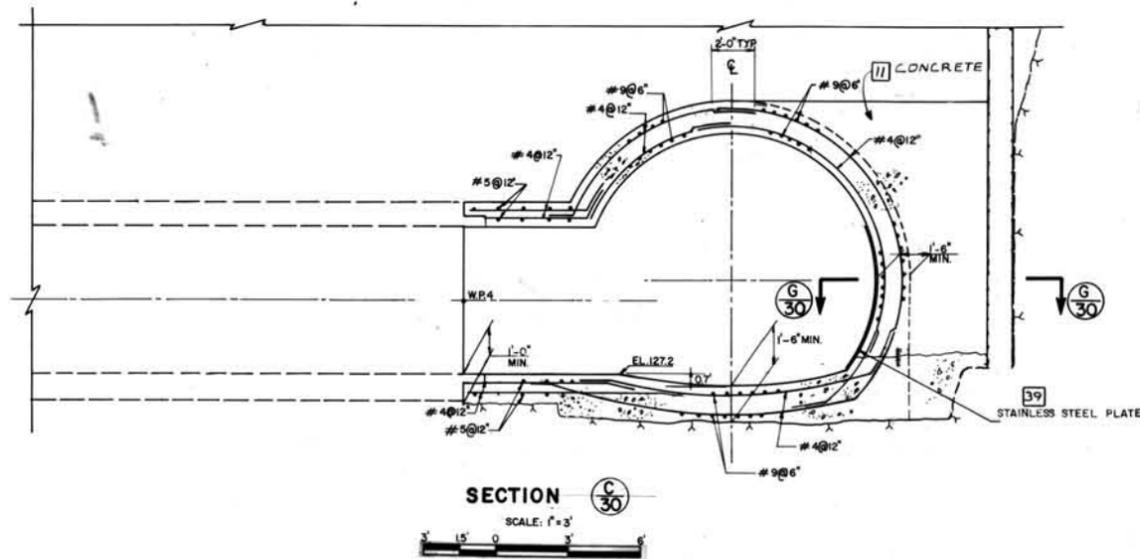


NOTES:
 1. 5/16" FILLET WELDS E70XX ELECTRODES
 2. 1" THICK STIFFENER PLATES (TYP.)
 3. 1" THICK END PLATES (TYP.)

SEE SHEET No 29A FOR REVISIONS TO THIS DRAWING

WORK DRAWING OF WORK-AS-BUILT

Revision	Description	Date	Approved
FOR REVISIONS SEE SHEET No 29A-O.D. UNIT 317X9 O.P.			
THE RBA GROUP		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK	
Designed by: R.U.M.	SAW MILL RIVER, NEW YORK		
Drawn by: EL	ARDSLEY FLOOD CONTROL PROJECT		
Checked by: R.M.	BLOWOFF TUNNEL		
Reviewed by:	PLAN, SECTIONS AND DETAILS		
Approval Recommended:	Sheet reference number	Date: 20 JULY 1982	
Approved by:	CO-ORD-42	Scale: AS SHOWN	
Sheet 259 of 49			



- NOTES:**
- All exposed metal parts shall be galvanized. Welding, machining and drilling shall be done before galvanizing. All dimensions are finished dimensions and include galvanizing.
 - Frame and grating shall be tested for accuracy of fit before delivery.
 - Bolt holes shall be 9/16" Dia. unless otherwise specified. Bolts (not rivets or welds) shall be used to join frames to concrete.
 - Anchor bolts shall be 1/2" Dia. x 8" with square or hexagonal head and nut. Tie Rods shall be 1/2" Dia. x 27 1/2", threaded 1 1/2" on bolt ends. Use two, 1/2" Dia. square head nut each end.
 - All parts shall be of structural grade steel, except spacers, which shall be either cast iron or steel.

NOTE:
 STAINLESS STEEL PLATE
 TYPE 304 WITH 2B FINISH
 (1) 1/4" x 5'-11 3/4" x 14'-6"
 W/ (3) 9/16" HOLES
 FIELD DRILLED TO SUIT EXPANSION
 ANCHOR LOCATION
 (5) 1/2" DIA STAINLESS STEEL BOLTS
 PER PLATE W/A MIN. EMBEDMENT OF
 5 3/4"
 PLACE 1 BOLT AT EA. CORNER OF THE PLATE
 W/A MIN. 1'-0" CLEARANCE FROM EDGES
 AND 1 BOLT AT THE CENTER OF THE PLATE.
 UPSET BOLT THREADS TO PREVENT LOOSENING
 OF NUTS.

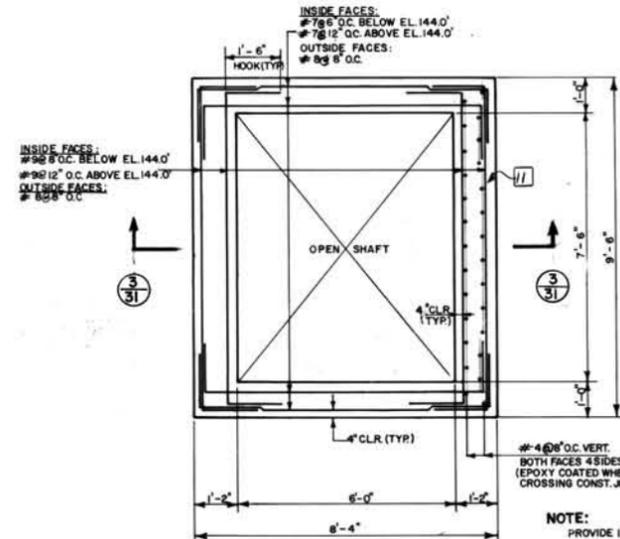
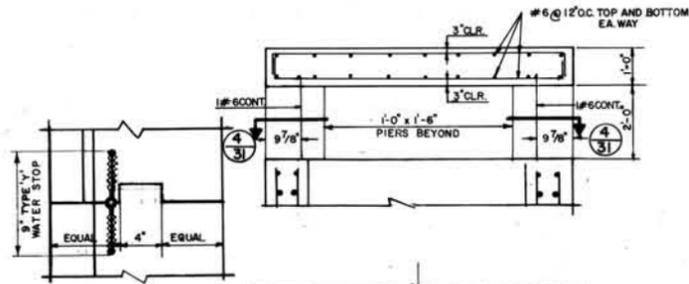
- STRUCTURAL STEEL NOTES:**
- ALL STRUCTURAL STEEL INCLUDING CONNECTIONS EXCEPT COLD FORMED STEEL SHALL CONFORM TO STANDARD SPECIFICATION OF ASTM A-36
 - ALL STEEL DETAILS AND CONNECTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENT OF THE AISC SPECIFICATIONS ADOPTED IN 1978.
 - ALL WELDING SHALL BE PERFORMED BY QUALIFIED WELMERS IN ACCORDANCE WITH AWS SPECIFICATIONS LATEST EDITIONS. ALL WORKING ELECTRODES SHALL CONFORM TO AWS A5.1, GRADE E-70. BARE ELECTRODES AND GRANULAR FLUX SHALL CONFORM TO AWS A5.17, F-70 AWS FLUX CLASSIFICATION.
 - SHOP AND FIELD CONNECTIONS NOT SPECIFICALLY DETAILED ON THE DRAWINGS SHALL BE BOLTED OR WELDED.
 - SHORING SHALL REMAIN IN PLACE UNTIL CONCRETE HAS ATTAINED ADEQUATE STRENGTH TO WITHSTAND THE SUPERIMPOSED LOADS WITHOUT ANY OVERSTRESS.
 - THE PROVISIONS OF THE AMERICAN CONCRETE INSTITUTE (ACI) BUILDING CODE, ACI 318.83 SHALL APPLY TO THIS STRUCTURE.
 - MIXING, PLACING CURING, ETC. OF CONCRETE SHALL CONFORM TO THE LATEST 1983 CODE ACI SPECIFICATIONS AND STANDARDS.
 - STEEL REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR DEFORMED STEEL BARS FOR CONCRETE REINFORCEMENT". ALL REINFORCEMENT SHALL BE INTERMEDIATE GRADE DEFORMED BILLET STEEL AND SHALL CONFORM TO ASTM A615, GRADE 60.
 - INCLUDE ALL SPACER, CHAIRS, BOLSTERS, TIES AND OTHER DEVICES NECESSARY FOR PROPERLY PLACING, SPACING, SUPPORTING AND FASTENING REINFORCEMENT IN PLACE. (METAL ACCESSORIES SHALL BE GALVANIZED WHERE LEGS WILL BE EXPOSED IN FINISHED CONCRETE SURFACES). ACCESSORIES SHALL CONFORM TO REQUIREMENTS OF THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI) "MANUAL OF STANDARD PRACTICE FOR REINFORCED CONCRETE CONSTRUCTION". CHAIRS AND OTHER ACCESSORIES FABRICATED FROM CONCRETE, CERAMIC OR PLASTIC MAY BE USED IN PLACE OF FERROUS ACCESSORIES WHEN APPROVED BY THE CONTRACTING OFFICER.

- CONCRETE NOTES:**
- ALL CONCRETE EXPOSED TO WEATHER SHALL BE AIR ENTRAINED
 - ALL REINFORCEMENT SHOULD BE SECURELY HELD IN PLACE WHILE PLACING CONCRETE. IF REQUIRED ADDITIONAL BARS OR STIRRUPS SHALL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR ALL BARS
 - CONTRACTOR SHALL SUBMIT DRAWINGS SHOWING INTENDED POURING SEQUENCE AND LOCATION OF CONSTRUCTION JOINTS TO THE CONTRACTING OFFICER FOR APPROVAL.

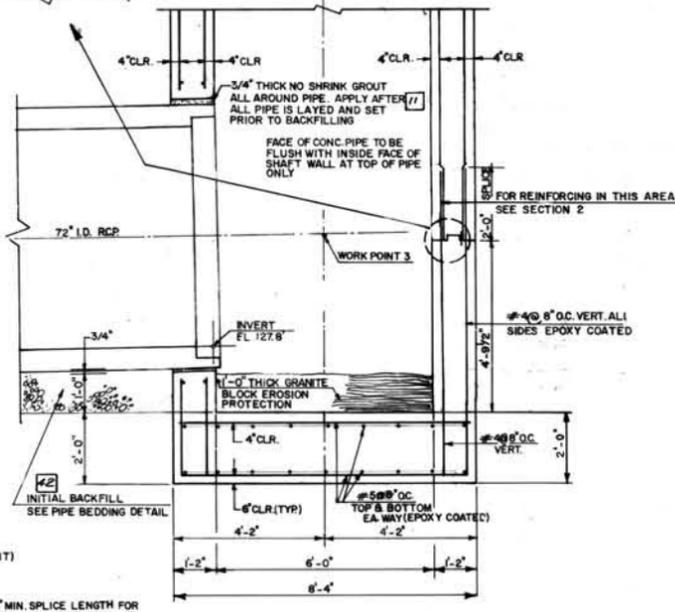
For revisions on this sheet see sheet 30A
 REVISION DRAWING
 OF WORK AS-BUILT

For Revisions see sheet 30A - As Built Revised Dimensions of Stainless Steel Plate		3/18/80 O.P. 1/31/80 T.D.
Revision	Description	Date Approved
THE RBA GROUP		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK
Designed by: K.P.V.	SAU MILL RIVER, NEW YORK ARDSLEY FLOOD CONTROL PROJECT BLOWOFF TUNNEL SECTIONS	
Drawn by: F.L.	ARDSLEY APPROVAL RECOMMENDED: [Signature]	
Checked by: R.M.	Sheet reference number: CC-ARD-430	Date: 20 JULY 1987
Reviewed by: [Signature]	Scale: AS SHOWN	Sheet 30 of 47

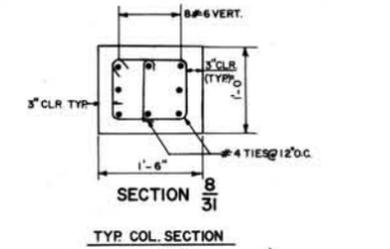
NOTE:
9" TYPE 'Y' WATER STOP AROUND THE SHAFT WALL IN EVERY CONSTRUCTION JOINT IN THE SHAFT.



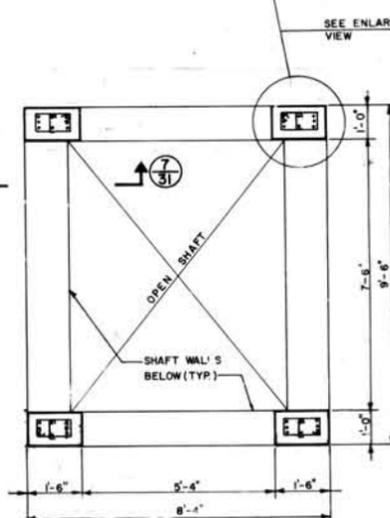
SECTION 2
SCALE: 1" = 2'



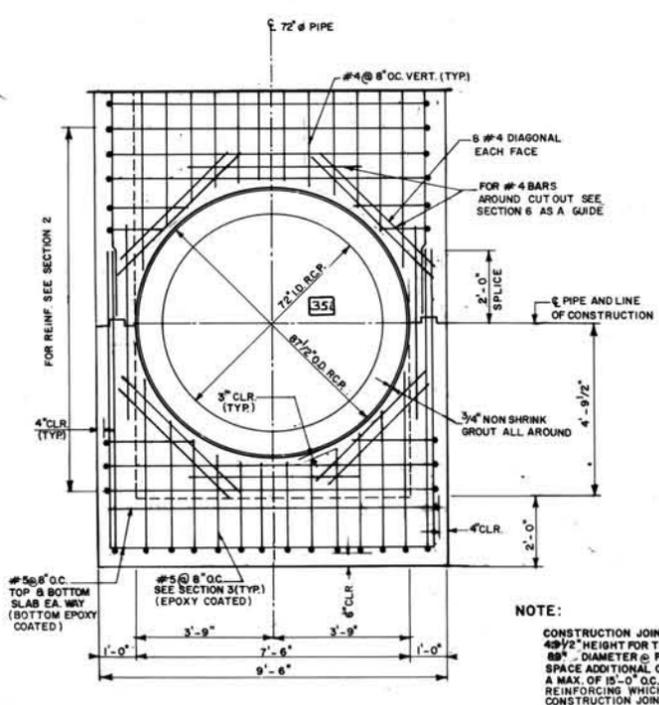
SECTION 3
SCALE: 1" = 2'



SECTION 8/31
TYP. COL. SECTION
N.T.S.

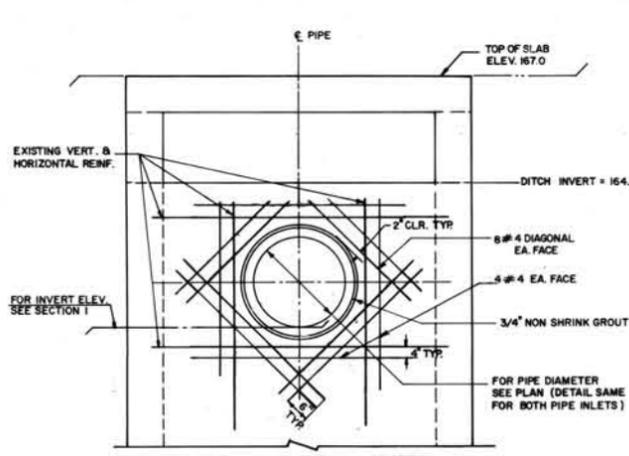


SECTION 7/31
SCALE: 1" = 2'

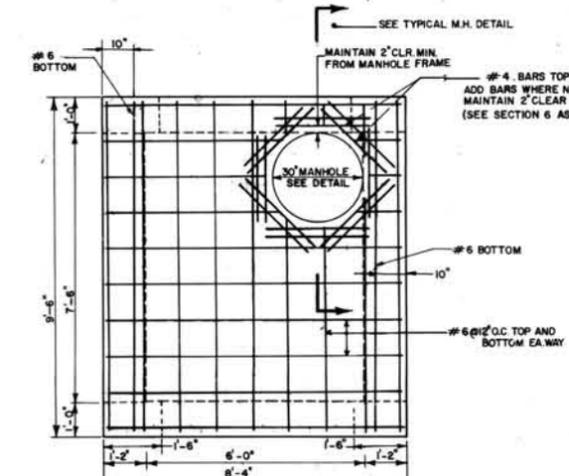


SECTION 5
SCALE: 1" = 2'

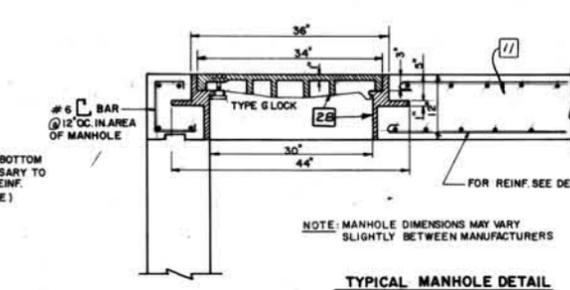
NOTE:
CONSTRUCTION JOINT SHOULD CONTINUE @ 49 1/2" HEIGHT FOR THREE SIDES AND FOLLOW 88" DIAMETER @ PIPE INLET. SPACE ADDITIONAL CONSTRUCTION JOINTS A MAX. OF 15'-0" O.C. REINFORCING WHICH PASSES THROUGH LOWEST CONSTRUCTION JOINT SHALL BE EPOXY COATED



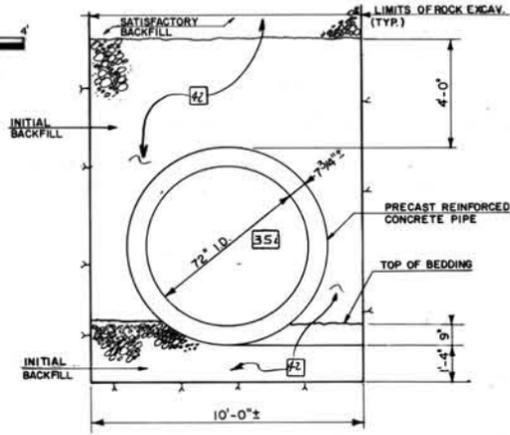
SECTION 6
SCALE: 1" = 2'



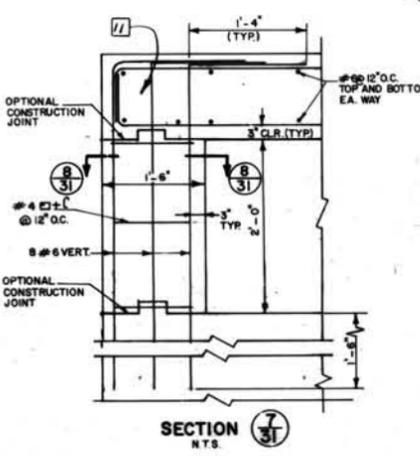
DETAIL M1
SCALE: 1" = 2'



TYPICAL MANHOLE DETAIL
N.T.S.



PIPE BEDDING DETAIL
SCALE: 3/8" = 1'-0"



SECTION 7
N.T.S.

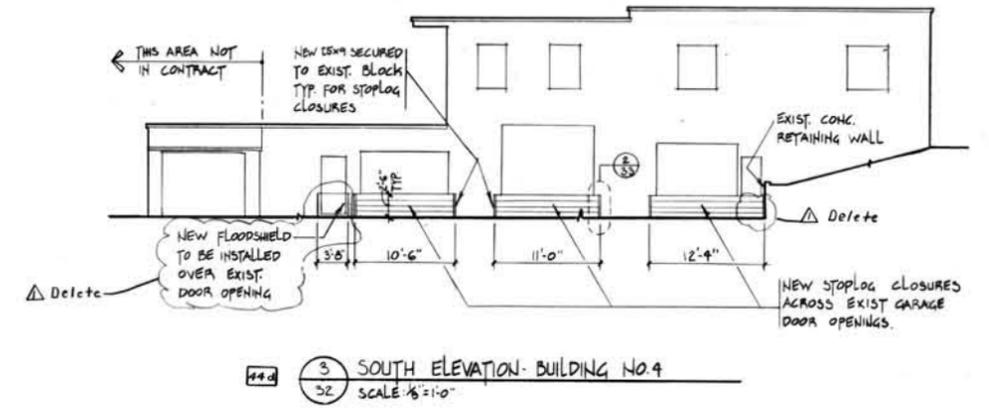
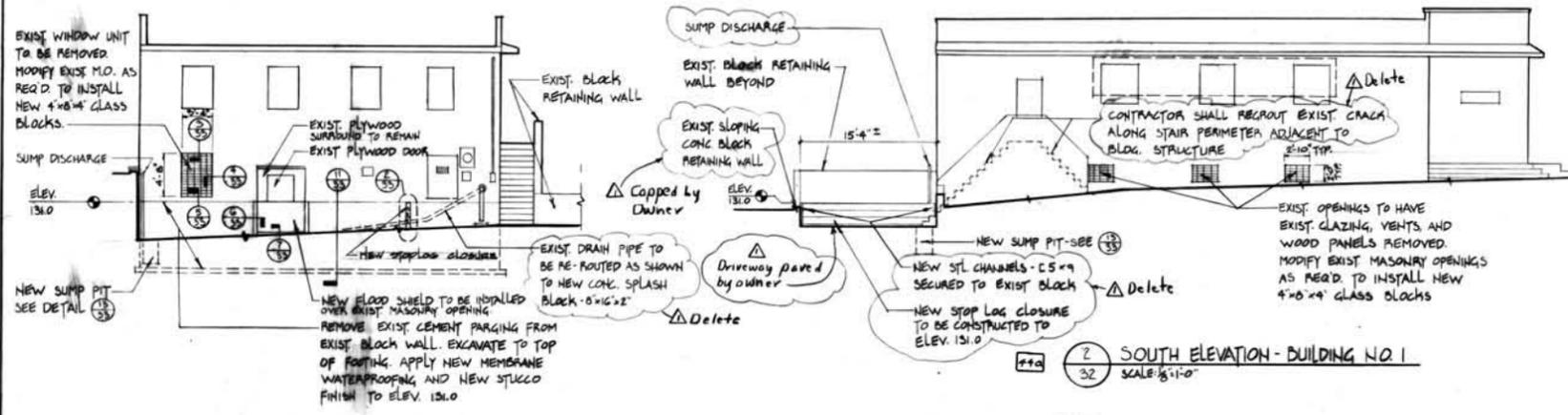
FOR REVISIONS ON SHEET 31 SEE SHEET 31A

RECORD DRAWING OF WORK AS BUILT

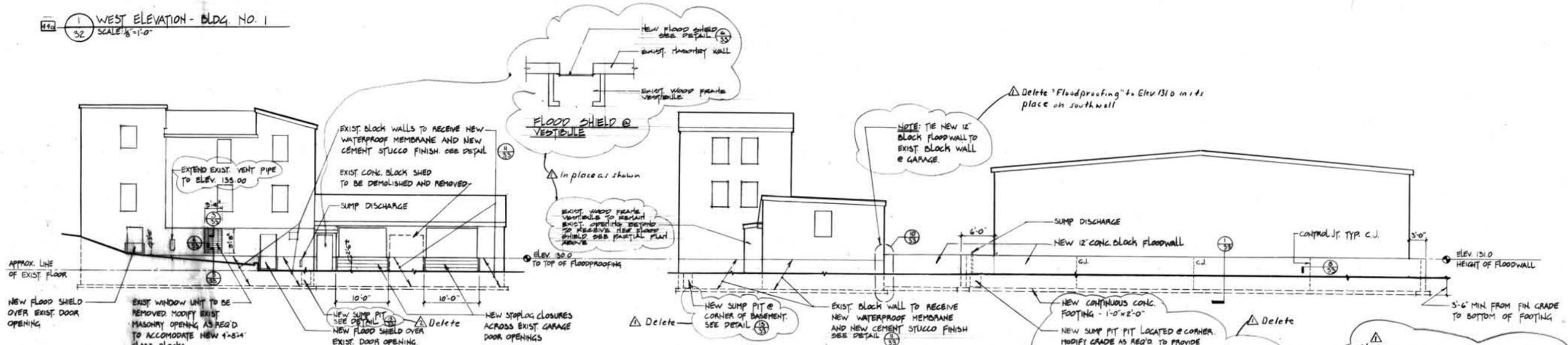
Revision	Description	Date	Approved
1	FOR REVISIONS see sheet 31A. as built	7/20/87	R.P.

THE RBA GROUP U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK

Designed by: K.P.V. SAW MILL RIVER, NEW YORK
 Drawn by: F.L. US Army Corps of Engineers
 Checked by: R.M. ARDSLEY FLOOD CONTROL PROJECT
 Reviewed by: [Signature] ARDSLEY
 Approved by: [Signature] ARDSLEY
 Date: 20 JULY 1987
 Scale: AS SHOWN
 Sheet: 31 of 36



1 WEST ELEVATION - BLDG. NO. 1
SCALE: 1/8" = 1'-0"

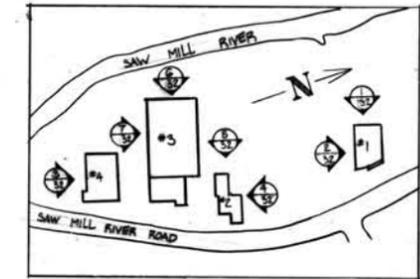
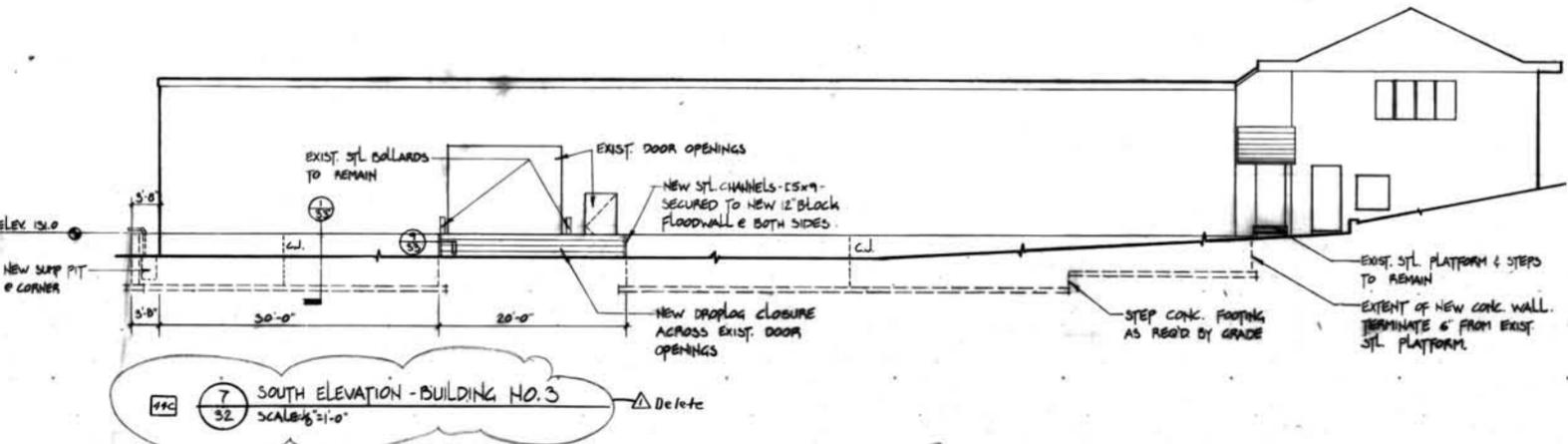


6 WEST ELEVATION - BUILDING NO. 3
SCALE: 1/8" = 1'-0"

- Notes:**
- Work on Building No. 3 completely eliminated
 - Building No. 1
 - No Stop Logs
 - No grouting along Perimeter of Stairs Deleted due to Owner Improvements
 - Existing Drain Pipe to be rerouted
 - Sump as Storm Sewer piped underground
 - Delete New Sump Pit at Building No. 2 waterproofing to South end of building because Floodwall was deleted
 - Building No. 4
 - New Floodshield to be eliminated
 - Stop logs must cross both Garage and Entrance End Stop logs at Garage Doors.

FIELD DRAWING OF WORK AS BUILT

4 NORTH ELEVATION - BUILDING NO. 2
SCALE: 1/8" = 1'-0"



SCALE: 1/8" = 1'-0"

Revision	Description	Date	Approved
1	Revisions as noted - As Built	3/17/90	G.P.

THE RBA GROUP

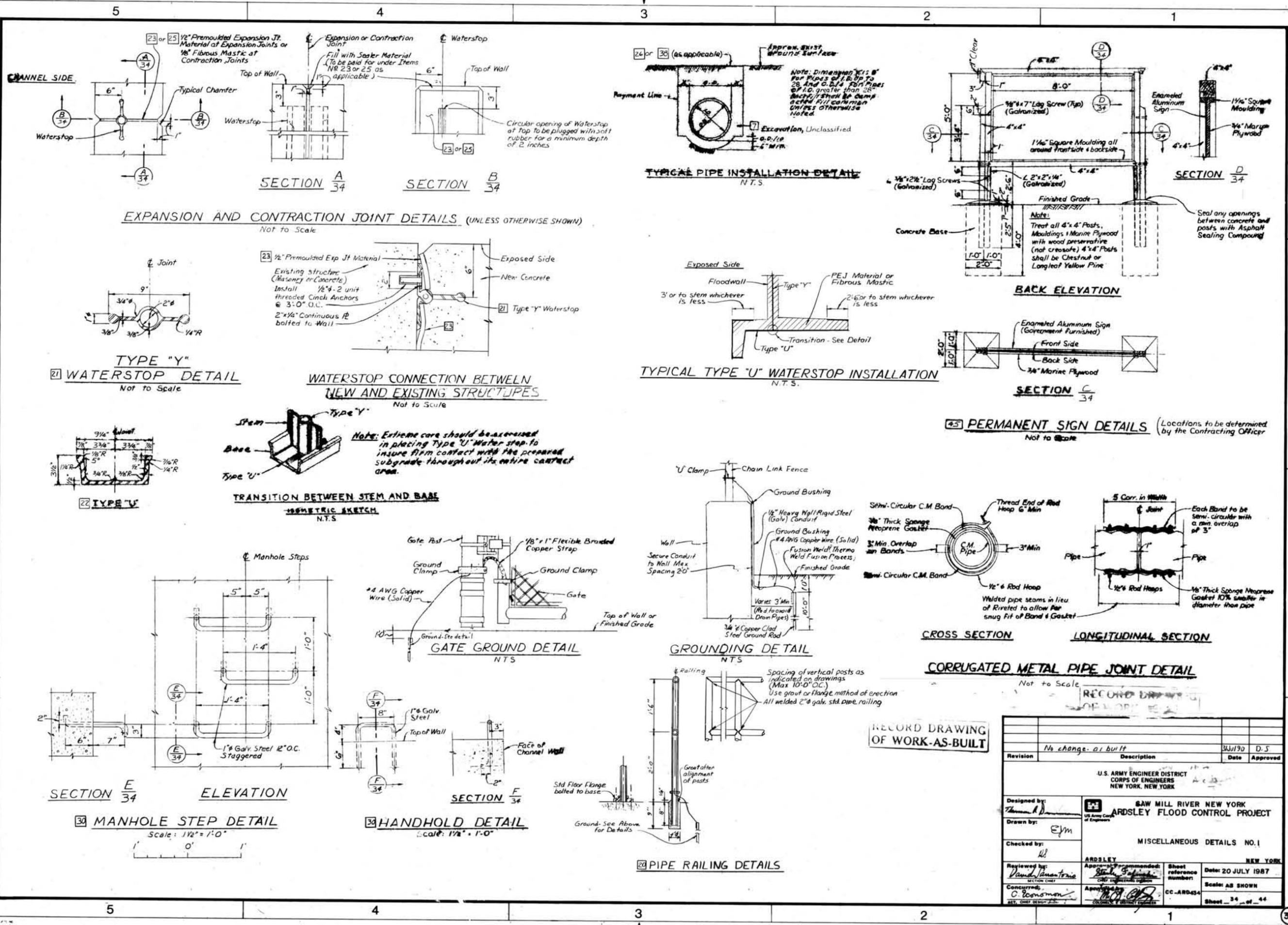
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: RBA
Drawn by: J.B.
Checked by: J.B.
Submitted by: J.B.
Reviewed by: David...
Approved by: C. ...

SAWMILL RIVER, NEW YORK

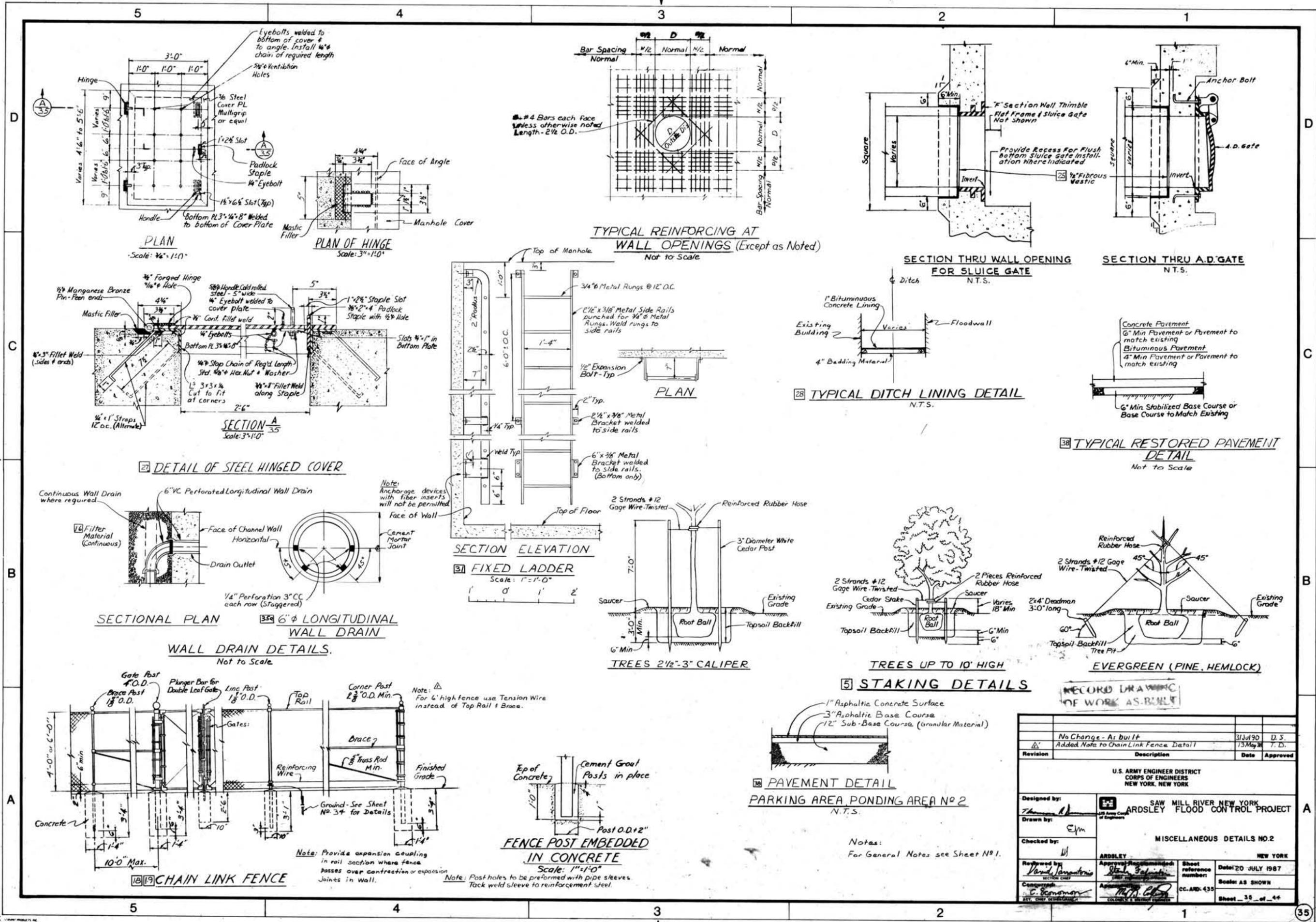
ARDSLEY FLOOD CONTROL PROJECT
MIDDLE AREA FLOODPROOFING
BUILDING ELEVATIONS

Sheet reference number: CC-40-438
Date: 30 JULY 1987
Scale: AS SHOWN
Sheet 38 of 48



RECORD DRAWING OF WORK-AS-BUILT

Revision	Description	Date	Approved
	No change as built	30 Jul 90	D-5
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER NEW YORK ARDSLEY FLOOD CONTROL PROJECT			
MISCELLANEOUS DETAILS NO. 1			
Designed by:	ARDSLEY NEW YORK		
Drawn by:	ARDSLEY FLOOD CONTROL PROJECT		
Checked by:	MISCELLANEOUS DETAILS NO. 1		
Reviewed by:	Approved by:	Sheet reference number:	Date: 20 JULY 1987
Concurred by:	Approved by:	CC-ARD-434	Scale: AS SHOWN
			Sheet 34 of 44



Revision	Description	Date	Approved
	No Change - As built	31 Jul 90	D.S.
Δ	Added Note to Chain Link Fence Detail	13 May 87	T.D.

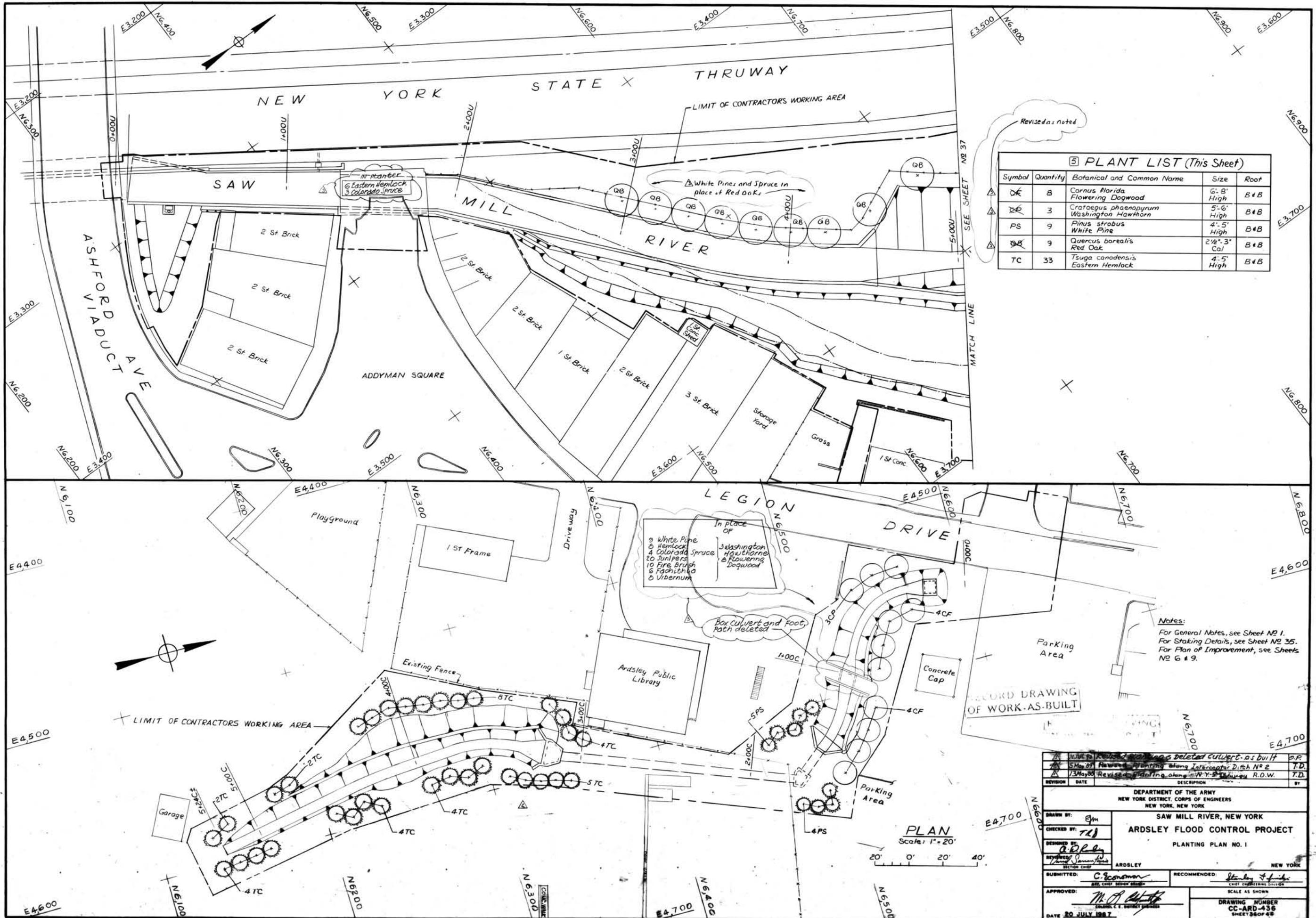
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: *[Signature]*
Drawn by: Eym
Checked by: *[Signature]*
Reviewed by: *[Signature]*
Approved by: *[Signature]*

SAW MILL RIVER NEW YORK
ARDSLEY FLOOD CONTROL PROJECT

MISCELLANEOUS DETAILS NO. 2
NEW YORK

Sheet reference number: *[Blank]*
Date: 20 JULY 1987
Scale: AS SHOWN
CC-ARD-430
Sheet 35 of 44



Revised as noted

Symbol	Quantity	Botanical and Common Name	Size	Root
8B	8	Cornus florida Flowering Dogwood	6'-8' High	B+B
9B	3	Crataegus phaenopyrum Washington Hawthorn	5'-6' High	B+B
PS	9	Pinus strobus White Pine	4'-5' High	B+B
9B	9	Quercus borealis Red Oak	2 1/2" x 3" Cal	B+B
TC	33	Tsuga canadensis Eastern Hemlock	4'-5' High	B+B

Notes:
 For General Notes, see Sheet No. 1.
 For Staking Details, see Sheet No. 35.
 For Plan of Improvement, see Sheets No. 6 & 9.

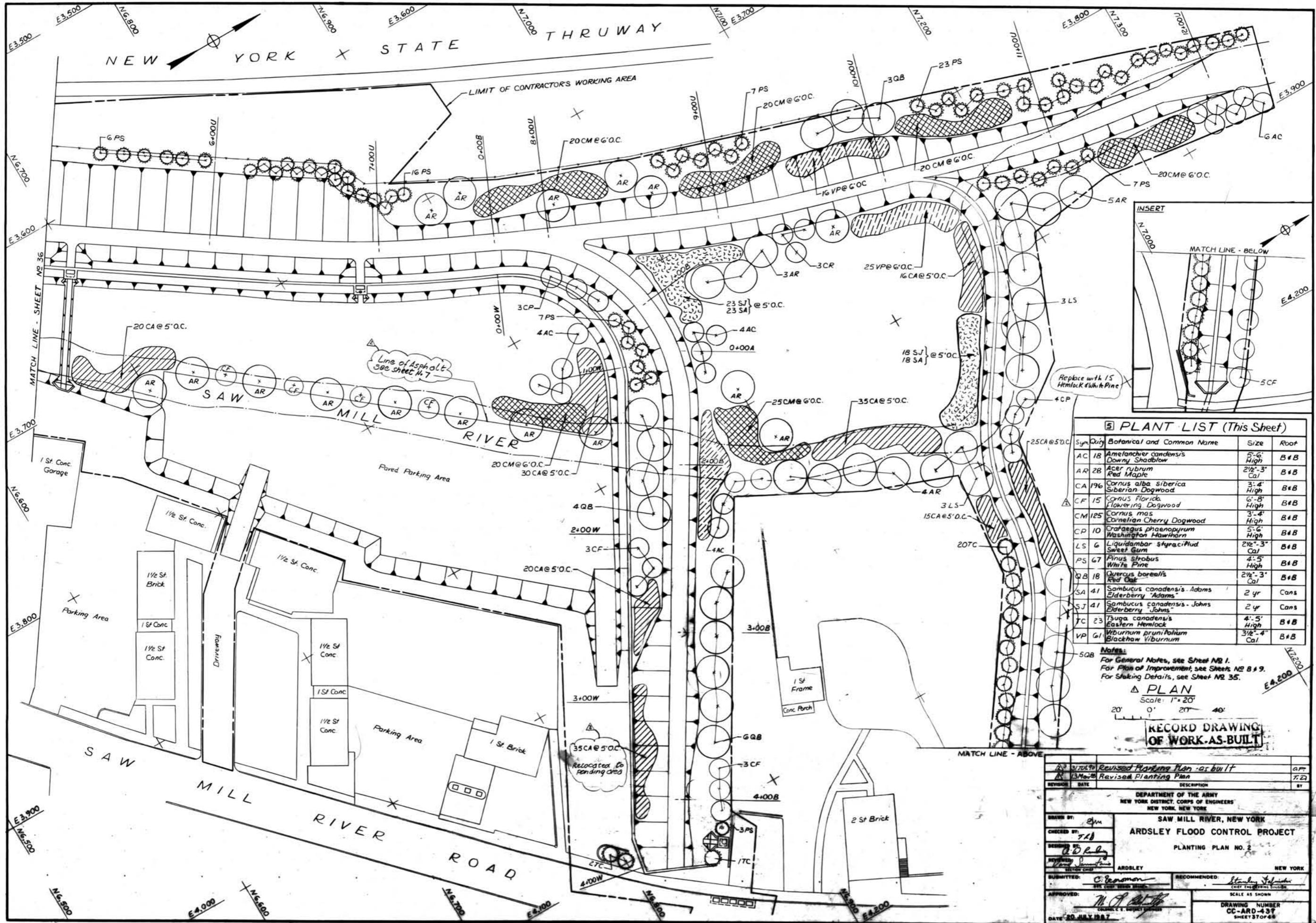
REVISION	DATE	DESCRIPTION	BY
1	11/16/87	Deleted culvert as built	P.P.
2	5/10/88	Revised planting along Interceptor Ditch No. 2	T.D.
3	1/3/88	Revised planting along N.Y.S. Thruway R.O.W.	T.D.

DEPARTMENT OF THE ARMY
 NEW YORK DISTRICT, CORPS OF ENGINEERS
 NEW YORK, NEW YORK

SAW MILL RIVER, NEW YORK
 ARDSLEY FLOOD CONTROL PROJECT
 PLANTING PLAN NO. 1

DRAWN BY: *SM*
 CHECKED BY: *TKJ*
 DESIGNED BY: *ADL*
 REVIEWED BY: *...*
 SUBMITTED: *C. Goodman*
 APPROVED: *M.A. ...*
 DATE: 20 JULY 1987

RECOMMENDED: *...*
 SCALE AS SHOWN
 DRAWING NUMBER: CC-ARD-436
 SHEET 26 OF 49



PLANT LIST (This Sheet)

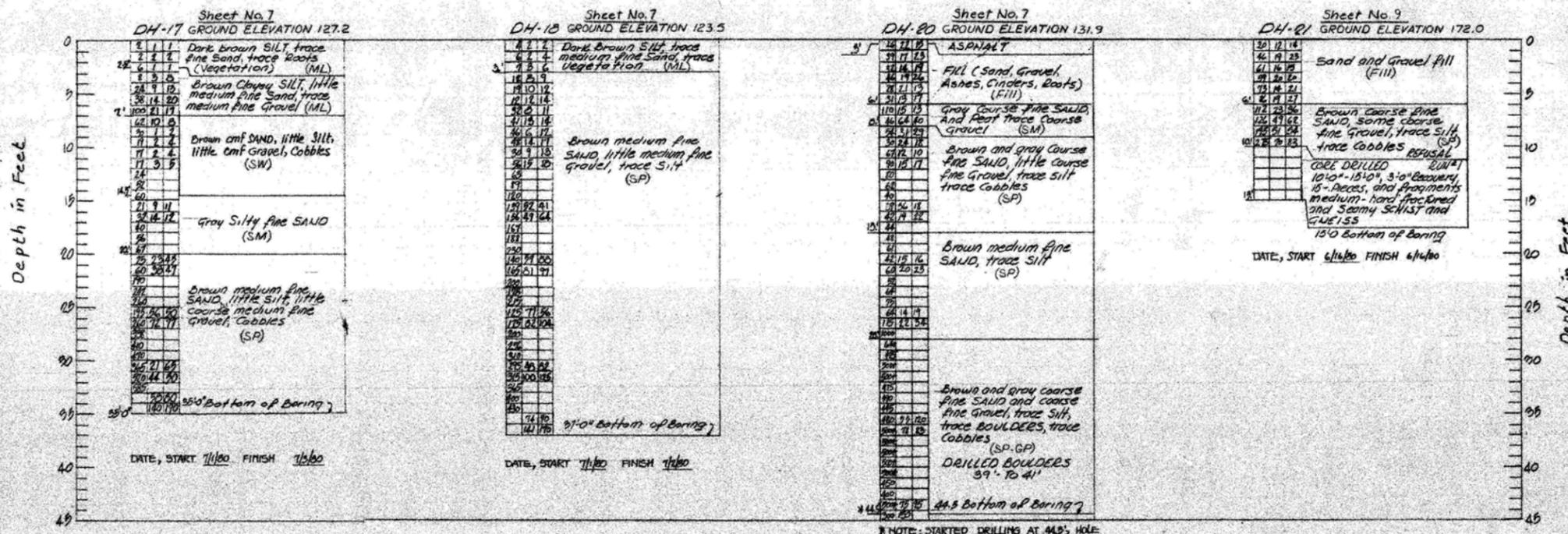
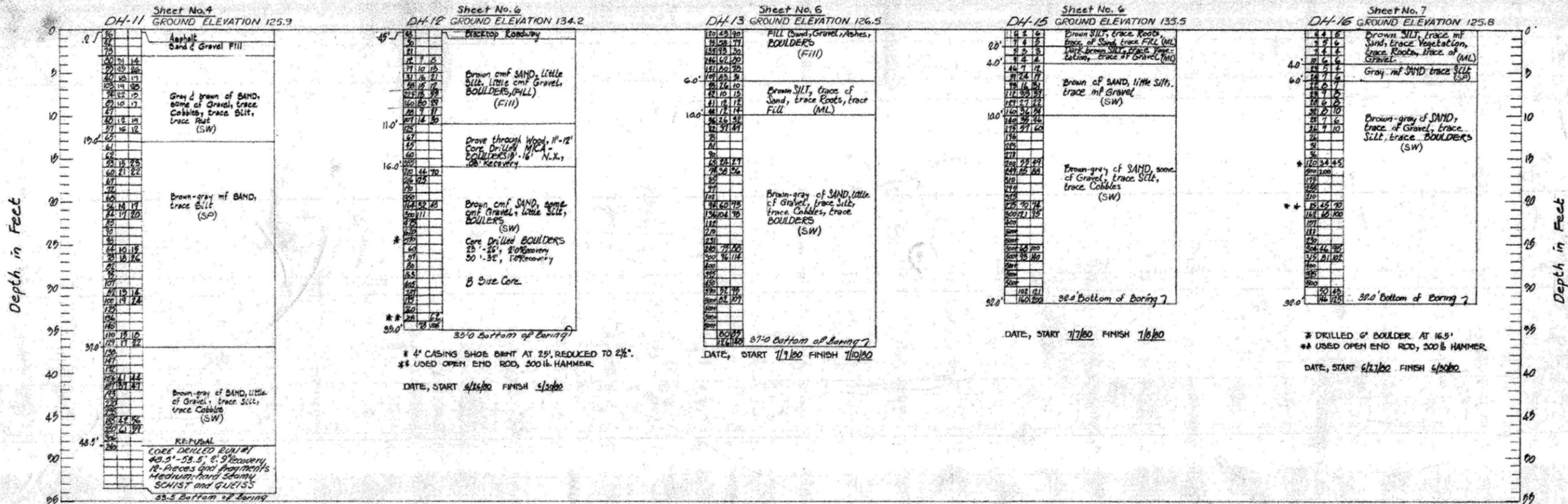
Sym	Qty	Botanical and Common Name	Size	Root
AC	18	Amelanchier canadensis Downy Shadblow	5'-6' High	B+B
AR	28	Acer rubrum Red Maple	2 1/2'-3' Cal	B+B
CA	196	Cornus alba siberica Siberian Dogwood	3'-4' High	B+B
CF	15	Cornus florida Flowering Dogwood	6'-8' High	B+B
CM	125	Cornus mas Cornelian Cherry Dogwood	3'-4' High	B+B
CP	10	Crataegus phaenopyrum Washington Hawthorn	5'-6' High	B+B
LS	6	Liquidambar styraciflua Sweet Gum	2 1/2'-3' Cal	B+B
PS	67	Pinus strobus White Pine	4'-5' High	B+B
QB	18	Quercus borealis Red Oak	2 1/2'-3' Cal	B+B
SA	41	Sambucus canadensis - Adams Elderberry 'Adams'	2 yr	Cans
SJ	41	Sambucus canadensis - Johns Elderberry 'Johns'	2 yr	Cans
TC	23	Tsuga canadensis Eastern Hemlock	4'-5' High	B+B
VP	61	Viburnum prunifolium Blackhaw Viburnum	3 1/2'-4' Cal	B+B

Notes:
 For General Notes, see Sheet N2 1.
 For Plan of Improvement, see Sheets N2 B & 9.
 For Staking Details, see Sheet N2 35.

PLAN
 Scale: 1" = 20'
 0' 20' 40'

RECORD DRAWING OF WORK-AS-BUILT

DATE	20 JULY 1987	DESCRIPTION	Revised Planting Plan
BY	TJZ	BY	AP
DEPARTMENT OF THE ARMY NEW YORK DISTRICT, CORPS OF ENGINEERS NEW YORK, NEW YORK			
SAW MILL RIVER, NEW YORK			
ARDSLEY FLOOD CONTROL PROJECT			
PLANTING PLAN NO. 2			
DRAWN BY:	AP	SECTION CHIEF:	ARDSLEY
CHECKED BY:	TJZ	RECOMMENDED:	C. Penomen
DESIGNED BY:	B. D. Kelly	SCALE AS SHOWN	
APPROVED:	M. J. [Signature]	DRAWING NUMBER	CC-ARD-437
		SHEET NUMBER	37 OF 68



CONTRACTOR: THE HALLER DRILLING COMPANY, INC.
FOR URBITRAN ASSOCIATES, INC.

NOTES:
1. BLOWS PER FOOT ON 2" DIAMETER CASING USING 300 POUND HAMMER DROPPED 24 INCHES, EXCEPT WHERE OTHERWISE NOTED.
2. BLOWS PER 6 INCHES ON SAMPLE SPOON, 2" O.D. AND 1 1/2" I.D. USING 10 LB. HAMMER DROPPED 20 INCHES, EXCEPT WHERE OTHERWISE NOTED.
3. FOR GENERAL SUBSURFACE EXPLORATION NOTES SEE SHEET NO. 39.

**RECORD DRAWING
OF WORK AS BUILT**

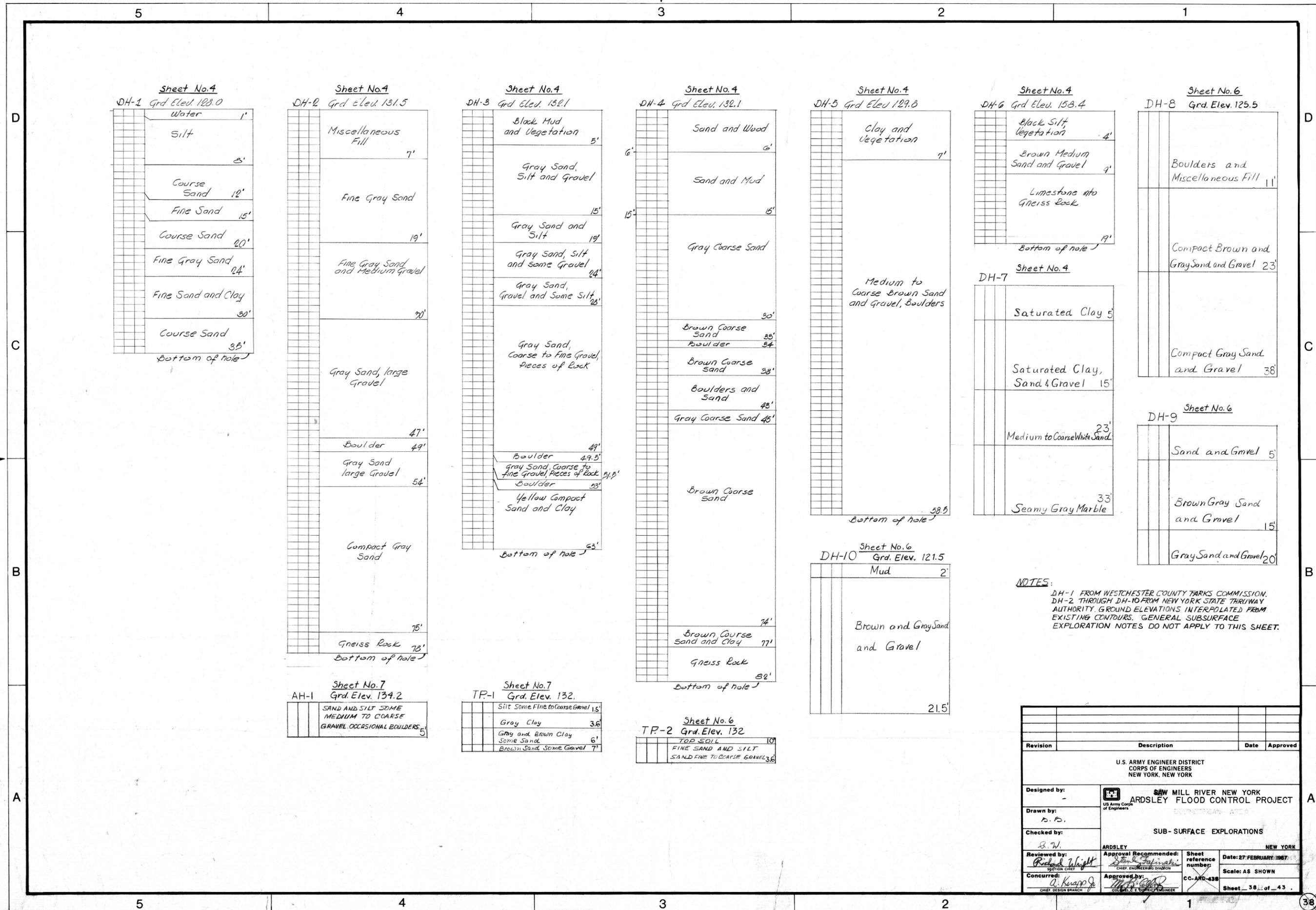
REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

DRAWN BY: [Signature]
CHECKED BY: [Signature]
DESIGNED BY: [Signature]
SUBMITTED: C. [Signature]
APPROVED: [Signature]
DATE: 20 JULY 1967

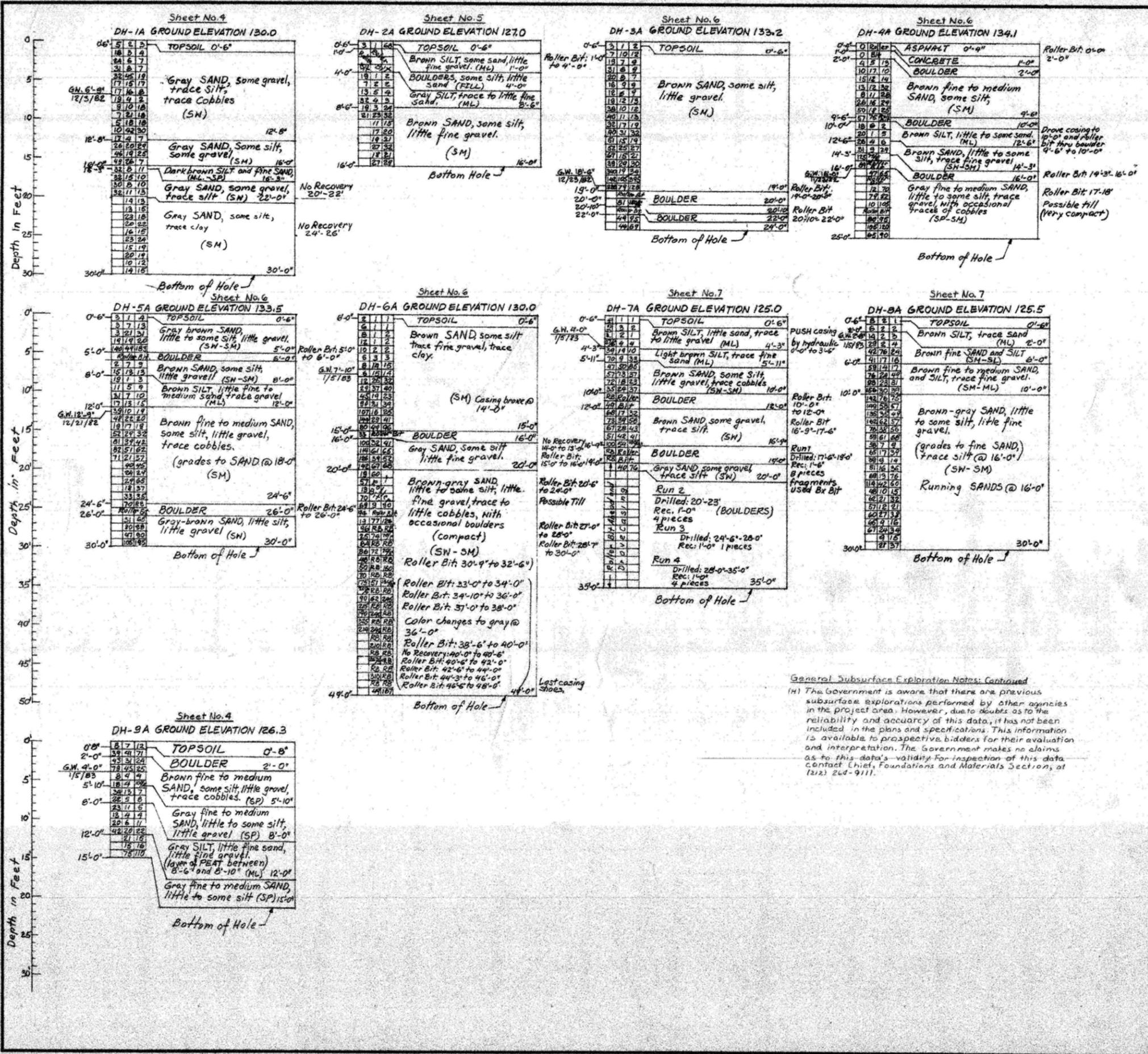
SAW MILL RIVER, NEW YORK
ARDSLEY FLOOD CONTROL PROJECT
SUB-SURFACE EXPLORATIONS

SCALE AS SHOWN
DRAWING NUMBER
CC-ARD-430
SHEET 26 OF 46



NOTES:
 DH-1 FROM WESTCHESTER COUNTY PARKS COMMISSION.
 DH-2 THROUGH DH-10 FROM NEW YORK STATE THRUWAY
 AUTHORITY. GROUND ELEVATIONS INTERPOLATED FROM
 EXISTING CONTOURS. GENERAL SUBSURFACE
 EXPLORATION NOTES DO NOT APPLY TO THIS SHEET.

Revision	Description	Date	Approved
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
Designed by:	SAW MILL RIVER NEW YORK ARDSLEY FLOOD CONTROL PROJECT SUB-SURFACE EXPLORATIONS		
Drawn by:	R. P.		
Checked by:	R. W.		
Reviewed by:	Richard Wright SECTION CHIEF	Approval Recommended: Frank Palomaki CHIEF, ENGINEERING DIVISION	Sheet reference number: CC-AND-438
Concurred by:	A. Krupp CHIEF, DESIGN BRANCH	Approved by: [Signature] COLONEL, C.E. DIVISION	Date: 27 FEBRUARY 1967 Scale: AS SHOWN Sheet 38 of 43



General Subsurface Exploration Notes

- The soil logs, notes and other test data shown are the results of interpretations made by representatives of the Corps of Engineers from personal observations made during the exploration period of the following: a) samples of subsurface materials recovered during exploration, b) records of exploration as prepared by the drill operator and Government inspector and c) other records pertinent to surface and subsurface conditions. The samples and records are available for inspection upon request to Chief, Foundations and Materials Branch, New York District, Corps of Engineers, New York, N. Y.
- Explanation of the classifications and terms
 - Bedrock - Natural solid mineral matter occurring in great thickness and extent in its natural location. It is classified according to geological type and structure (joints, bedding, etc.) and described as solid, weathered, broken, fragmented or decomposed depending on its condition.
 - Soils - Sediments or other unconsolidated accumulations of particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter.

Size Component Terms

Size Component Terms	Proportion Terms by Weight
Boulder..... larger than 8 inches	Major Component is shown with all letters capitalized
Cobble or Small Stone..... 8 inches to 3 inches	Minor Component percentage terms of Total sample are:
Gravel..... 3 inches to 4.75 mm (#4 sieve)	and..... 40 to 50 percent
coarse..... 3 inches to 3/8 inches	some..... 20 to 40 percent
medium..... 3/8 inches to 4.75 mm	little..... 10 to 20 percent
Sand..... 4.75 mm (#4 sieve) to 0.075 mm (#200 sieve)	trace..... 1 to 10 percent
coarse..... 4.75 mm to 2.00 mm (#10 sieve)	
medium..... 2.00 mm to 0.42 mm (#40 sieve)	
fine..... 0.42 mm to 0.075 mm (#200 sieve)	

Silt and Clay..... finer than 0.075 mm. Distinction between each based on Plasticity Index and Liquid Limit.

- Gradation Terms - The terms coarse, medium and fine are used to describe gradation of Sands and Gravel. When no gradation term is used, the component is graded from coarse to fine. Other gradings are used, such as medium to fine, fine, etc.
- The terms used to describe the various soil components and proportions are derived at by visual estimates of the recovered soil samples. Other terms are used when the recovered samples are not truly representative of the natural materials, such as, soil containing numerous cobbles and boulders which cannot be sampled, finely stratified soils, organic soils, and fills. The terms (SM-GM) etc. refer to the Unified Soil Classification System as per Manual MIL-STD-419B dated 12 June 1958.
- Ground Water - The date shown directly below the ground water (G.W.) is the date on which the water level in the exploration was measured. The measurement was made during exploration work or immediately after completion, unless otherwise noted. The depth recorded is influenced by exploration methods, the soil type and weather conditions during exploration. Where no water was found it is so indicated. It is anticipated that the ground water will rise during periods of wet weather. In addition, perched ground water above the water levels indicated (or above the bottom of the hole where no ground water is indicated) may be encountered at changes in soil strata or top of rock.

LEGEND

- DH-X = DRILL HOLE
- TP-Y = TEST PIT
- AH-Z = AUGER HOLE

DH-X	El.	XX.X (A)	(B)	(C)	(D)	(E)	(F)
G.W. 2.1	Date	18	25	18	10	Press	
		25	10	15	12	Tube	
		22	30	13	10		
		10			12		
		18	11	29	18		
Run	D - 5.0'						
	R - 3.5'						

- (A) Surface elevation at top surface of water at time and location of exploration. DATUM M.S.L.
- (B) Blows per foot on 4" diameter casing using 300 pound hammer dropped 24" inches, except where otherwise noted.
- (C) Blows per 6 inches on sample spoon, 2 inches O.D. and 1 5/8 inches I.D. using 140 pound hammer dropped 30 inches, except where otherwise noted. The symbol P indicates that the soil sampler was pushed into the soil by hand or by the weight of the hammer.
- (D) Ground Water Depth G.W. see General Note 2a.
- (E) Undisturbed Sample - 3 inch diameter, pressed hydraulically unless otherwise noted.
- (F) Rock or Boulder Drilling Data D = Length drilled, R = amount recovered of length drilled using NX diamond bit, unless otherwise noted. Where indicated, the pieces refer to the number of natural breaks in the recovered core as evaluated by the Government Inspector or Geologist.
- (G) RB - Roller Bit

General Subsurface Exploration Notes: Continued

(H) The Government is aware that there are previous subsurface explorations performed by other agencies in the project area. However, due to doubts as to the reliability and accuracy of this data, it has not been included in the plans and specifications. This information is available to prospective bidders for their evaluation and interpretation. The Government makes no claims as to this data's validity for inspection of this data contact Chief, Foundations and Materials Section, at (212) 260-9111.

Subsurface explorations were performed during Nov-Dec. 1962

RECORD DURING OF WORK ASSURED

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

DRAWN BY: SAW MILL RIVER, NEW YORK

CHECKED BY: ARDSLEY FLOOD CONTROL PROJECT

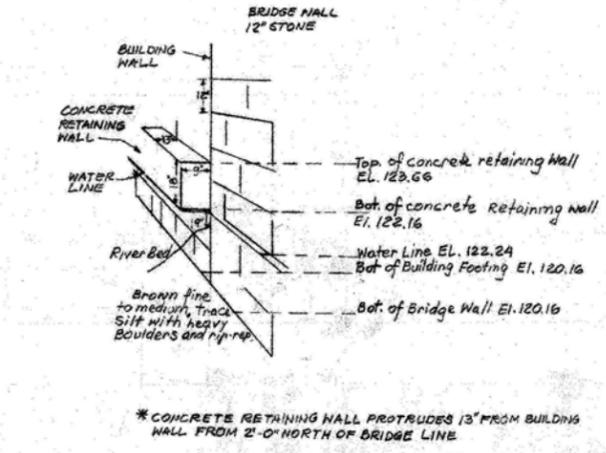
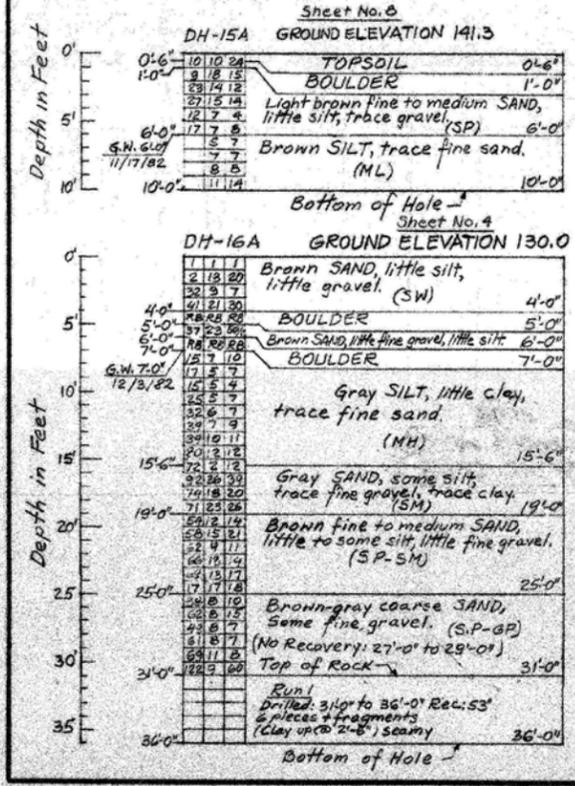
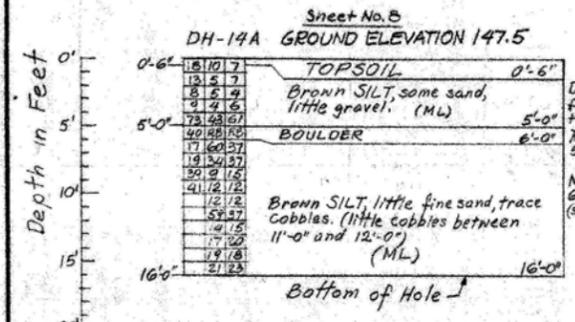
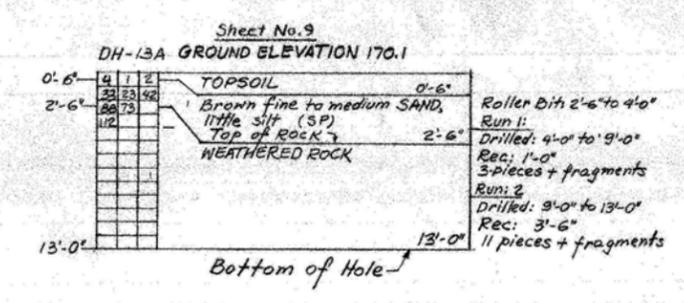
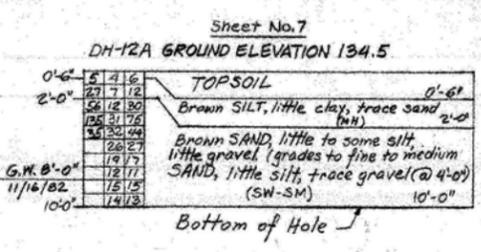
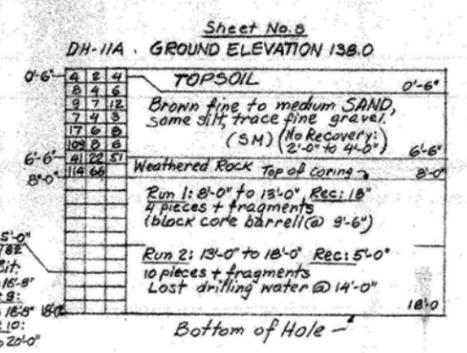
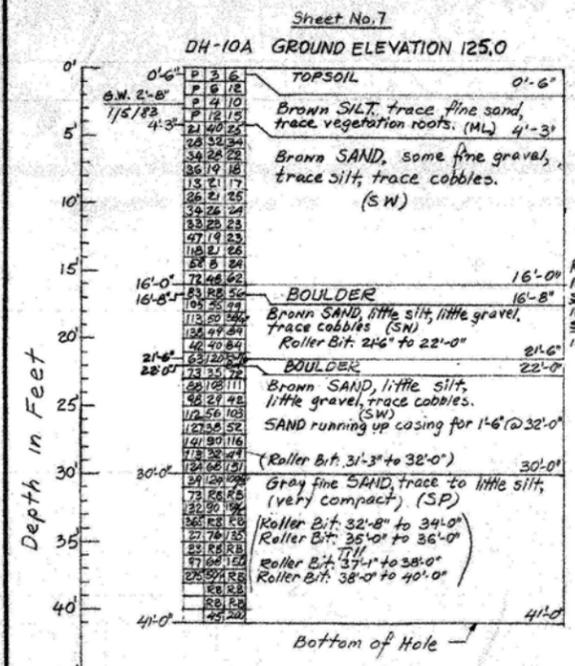
INSPECTED BY: SUB-SURFACE EXPLORATIONS

RECOMMENDED BY: ARDSLEY, NEW YORK

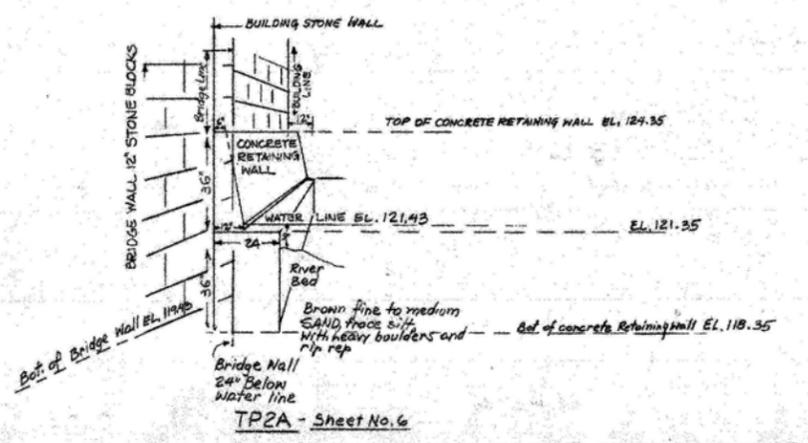
APPROVED: C. Senora (ACT. CHIEF, FOUNDATIONS AND MATERIALS BRANCH)

DATE: 20 JULY 1962

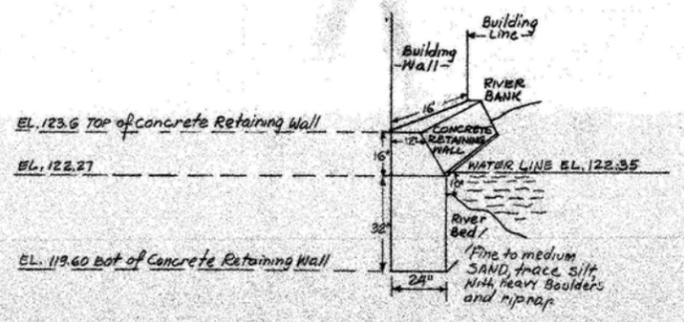
DRAWING NUMBER: CC-ARD-4-53
SHEET 1 OF 4



TP1A - Sheet No. 6
NORTH EDGE OF BRIDGE OVER THE SAW MILL RIVER AT ARDSLEY SQUARE



SOUTH EDGE BRIDGE OVER SAW MILL RIVER @ ARDSLEY SQUARE



TP3A - Sheet No. 6
T.P. 3A IS LOCATED 16'-0" NORTH OF RCA LABORATORY B BUILDING LINE ON THE SAW MILL RIVER

FOR GENERAL SUBSURFACE EXPLORATION NOTES, SEE SHEET NO. 39

RECORDED DRAWING OF WORK AS BUILT

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
NEW YORK, NEW YORK

DRAWN BY: SAH MILL RIVER, NEW YORK
CHECKED BY: ARDSLEY FLOOD CONTROL PROJECT
DESIGNED BY: SUB-SURFACE EXPLORATIONS

REVIEWED BY: ARDSLEY NEW YORK
SUBMITTED BY: C. BOYD SMITH RECOMMENDED BY: [Signature]
APPROVED BY: [Signature] SCALE AS SHOWN
DATE: 20 JULY 1987 DRAWING NUMBER: CC-ARD-444 SHEET 2 OF 44

SHEET NO. 9

ARD-1 GROUND ELEVATION 179.5

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Topsoil	
2	2		Brown fine to medium silty SAND (SM)	
3	3		Same	Rock cuttings 8-8" depth
4	4		Gray fine silty SAND with mica (rock cuttings)	Dry
5			End of boring at 6'-0"	Auger refusal at 6'

DATE, START 6/3/87 FINISH 6/3/87

SHEET NO. 9

ARD-2 GROUND ELEVATION 179.0

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Brown fine to medium silty SAND (top soil)	
2	2		Brown fine to medium silty SAND trace root fibers (SH)	Unobstructed drilling to 6'
3	3		Yellowish brown, fine SAND, and clayey silt, trace mica (SM-SC)	
4	4		Same	Small rock or obstruction but fairly easy drilling
5	5		Yellowish brown medium to fine SAND some silt, trace mica (SM)	
6	6		Same (little gravel)	Stopped at 10' depth per instructions from Corps via TPK/JEC

DATE, START 6/3/87 FINISH 6/3/87

SHEET NO. 9

ARD-3 GROUND ELEVATION 179.2

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Topsoil	
2	2		Brown medium to fine silty SAND (SM)	
3	3		Yellowish brown medium to fine silty SAND (SM)	
4	4		Same	
5	5		Very pale brown fine SILT with mica (rock fragments) (SP)	Gray fine material with mica very dry
6			End of boring at 5'-0"	Auger refusal at 6'

DATE, START 6/1/87 FINISH 6/1/87

SHEET NO. 9

ARD-4 GROUND ELEVATION 180.4

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Topsoil	
2	2		Brown medium to fine silty SAND (SM)	
3	3		Brown medium to fine silty SAND with gravel and rock fragments (SP)	Cobbles at 3' b/c some boulders or gravel
4	4		Same	
5	5		Same	
6	6		Same	
7	7		Same	
8	8		Same	
9	9		Same	
10	10		Same	
11	11		Same	Trace of gravel
12	12		Same	
13	13		Same	
14	14		Same	Net at approx. 15' during drilling
15	15		Same	
16	16		Same	
17	17		End of boring at 17'-0"	Auger refusal at 17'-0"

DATE, START 6/1/87 FINISH 6/1/87

SHEET NO. 9

ARD-5 GROUND ELEVATION 178.8

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Brown medium to fine silty SAND (SM)	
2	2		Same	Some reddish fine material at bottom possibly brick. Auger refusal at 1'-6"
3	3		Bottom of boring at 1'-6"	

DATE, START 5/29/87 FINISH 5/29/87

SHEET NO. 9

ARD-6 GROUND ELEVATION 178.5

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Brown medium to fine SAND (SM)	
2	2		Reddish brown fine to medium SAND with rock fragments and gravel (SP)	Rock fragments on auger cuttings
3	3		End of boring at 2'-0"	Auger refusal at 2'-0"

DATE, START 6/1/87 FINISH 6/1/87

SHEET NO. 9

ARD-6A GROUND ELEVATION 178.5

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Reddish brown fine to medium silty SAND (brick fragments) (SM)	
2	2		Red brick and mortar	Augered into brick
3	3		End of boring at 2'-0"	
4	4			*Two samples taken (1) red fine auger cuttings (ground brick)
5	5			(2) red lumps (gray inside) mortar coated with red brick powder
6	6			Drilled through 3' of brick in about 10 minutes
7	7			Mortar lumps easily crushed with hammer

DATE, START 6/3/87 FINISH 6/3/87

SHEET NO. 9

ARD-7 GROUND ELEVATION 179.9

DEPTH FT.	CASING BLOW COUNT	SAMPLE NO.	IDENTIFICATION	REMARKS
1	1		Topsoil	
2	2		Brown medium to fine silty SAND trace root fibers (SM)	
3	3		Brown medium to fine silty SAND (SM)	
4	4		Brown medium to fine silty clayey SAND (SM-SC)	Some gravel or boulders encountered but fairly easy drilling
5	5		Brown medium to fine silty, clayey SAND (SM-SC)	
6	6		Brown medium to fine silty, clayey SAND (SM-SC)	
7	7		Same	
8	8		End of boring at 10'-6"	Auger refusal at 10'-6"

DATE, START 5/29/87 FINISH 5/29/87

NOTES:

- FOR GENERAL SUBSURFACE EXPLORATION NOTES, SEE SHEET NO. 39.
- GROUND ELEVATIONS INTERPOLATED FROM EXISTING CONTOURS.

RECORD DRAWING OF WORK AS-BUILT

CONTRACTOR: GENERAL BORING, INC.

Revision	Description	Date	Approved
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS NEW YORK, NEW YORK			
Designed by:	SAW MILL RIVER NEW YORK ARDSLEY FLOOD CONTROL PROJECT		
Drawn by:	SUB-SURFACE EXPLORATIONS		
Checked by:	NEW YORK		
Reviewed by:	Approval Recommended:	Sheet reference number:	Date: 20 JULY 1987
Concurred:	Approved by:	CC-ARD-441	Scale: AS SHOWN
		Sheet	41 of 44

SHEET NO. 9
DH-18A GROUND ELEVATION 166.7

DEPTH FT.	CASING SIZES	BLINDS	SAMPLE NO.	LOGS	NO. OF SAMPLES	NO. OF TESTS	IDENTIFICATION	REMARKS
1			1				Topsoil Brown medium to fine sand with rock fragments (SP)	
2							Same	Casing advanced by rotary drilling to 22' depth.
3							Same	100% drilling water loss from beginning to top of rock.
4							Same	
5							Same	
6							Same	
7							Same	
8							Same	
9							Same	
10							Same	
11							Same	
12							Same	
13							Same	
14							Same	
15							Same	
16							Same	
17							Same	
18							Same	
19							Same	
20							Same	
21							Same	
22							Same	
23							Same	
24							Same	
25							Same	
26							Same	
27							Same	
28							Same	
29							Same	
30							Same	
31							Same	
32							Same	
33							Same	
34							Same	
35							Same	
36							Same	
37							Same	
38							Same	
39							Same	
40							Same	
41							Same	
42							Same	
43							Same	
44							Same	
45							Same	
46							Same	
47							Same	
48							Same	
49							Same	
50							End of Boring at 50'-0"	Water at 29.5' at completion of drilling-1:45pm

DATE, START 5/11/87 FINISH 5/12/87

SHEET NO. 9
DH-19A GROUND ELEVATION 167.1

DEPTH FT.	CASING SIZES	BLINDS	SAMPLE NO.	LOGS	NO. OF SAMPLES	NO. OF TESTS	IDENTIFICATION	REMARKS
1			1				Topsoil Brown silty sand, trace clay (SM-SC)	
2							Same	
3							Same	
4							Same	
5							Same	
6							Same	
7							Same	
8							Same	
9							Same	
10							Same	
11							Same	
12							Same	
13							Same	
14							Same	
15							Same	
16							Same	
17							Same	
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26							Same	
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32							Same	
33							Same	
34							Same	
35							Same	
36							Same	
37							Same	
38							Same	
39							Same	
40							Same	
41							Same	
42							Same	
43							Same	
44							Same	
45							Same	
46							Same	
47							Same	
48							Same	
49							Same	
50							End of Boring at 50'-0"	

DATE, START 5/12/87 FINISH 5/13/87

SHEET NO. 9
DH-20A GROUND ELEVATION 178.8

DEPTH FT.	CASING SIZES	BLINDS	SAMPLE NO.	LOGS	NO. OF SAMPLES	NO. OF TESTS	IDENTIFICATION	REMARKS
1			1				Topsoil Brown fine to medium silty sand (SM)	
2							Same	
3							Same	
4							Same	
5							Same	
6							Same	
7							Same	
8							Same	
9							Same	
10							Same	
11							Same	
12							Same	
13							Same	
14							Same	
15							Same	
16							Same	
17							Same	
18							Same	
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35							Same	
36							Same	
37							Same	
38							Same	
39							Same	
40							Same	
41							Same	
42							Same	
43							Same	
44							Same	
45							Same	
46							Same	
47							Same	
48							Same	
49							Same	
50							End of Boring at 20'-0"	

DATE, START 6/3/87 FINISH 6/3/87

SHEET NO. 9
DH-21A GROUND ELEVATION 179.8

DEPTH FT.	CASING SIZES	BLINDS	SAMPLE NO.	LOGS	NO. OF SAMPLES	NO. OF TESTS	IDENTIFICATION	REMARKS
1			1				Topsoil Brown medium to fine silty clay sand (SM)	
2							Same	
3							Same	
4							Same	
5							Same	
6							Same	
7							Same	
8							Same	
9							Same	
10							Same	
11							Same	
12							Same	
13							Same	
14							Same	
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16							Same	
17							Same	
18							Same	
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21							Same	
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40							Same	
41							Same	
42							Same	
43							Same	
44							Same	
45							Same	
46								