



Catskill Aqueduct Repair & Rehabi

Town of Yorktown Planning Board

Public Hearing

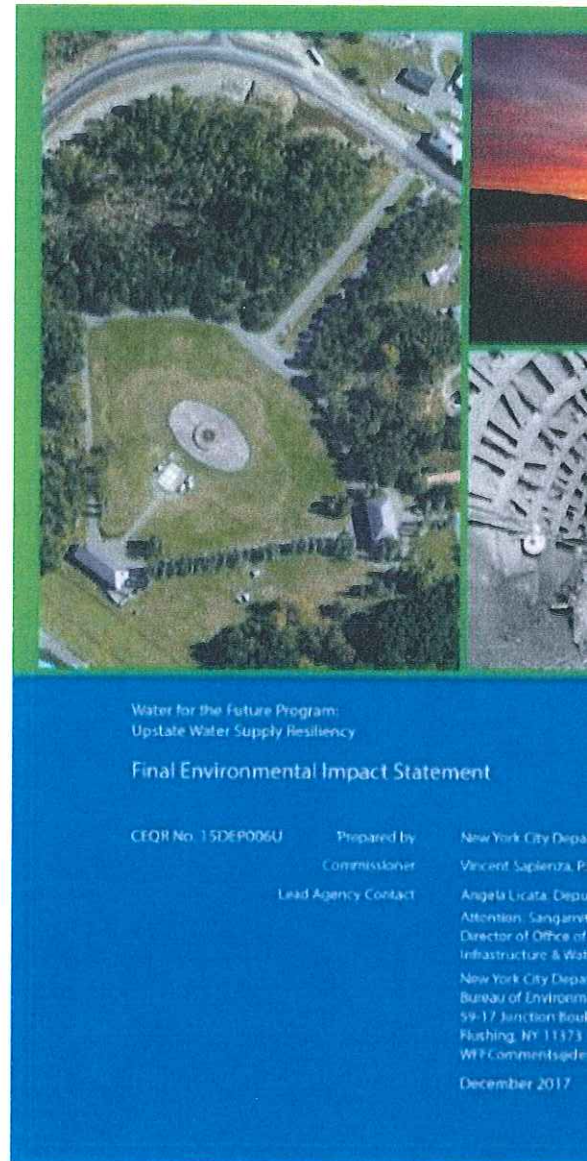
Re: Wetland Permit Applications

Sites 2A, 6, 10, & 11

September 25, 2018

Agenda

- Program / Project Overview
- Sites Requiring Wetland Permits
- Schedule



Water for the Future Program:
Upstate Water Supply Resiliency

Final Environmental Impact Statement

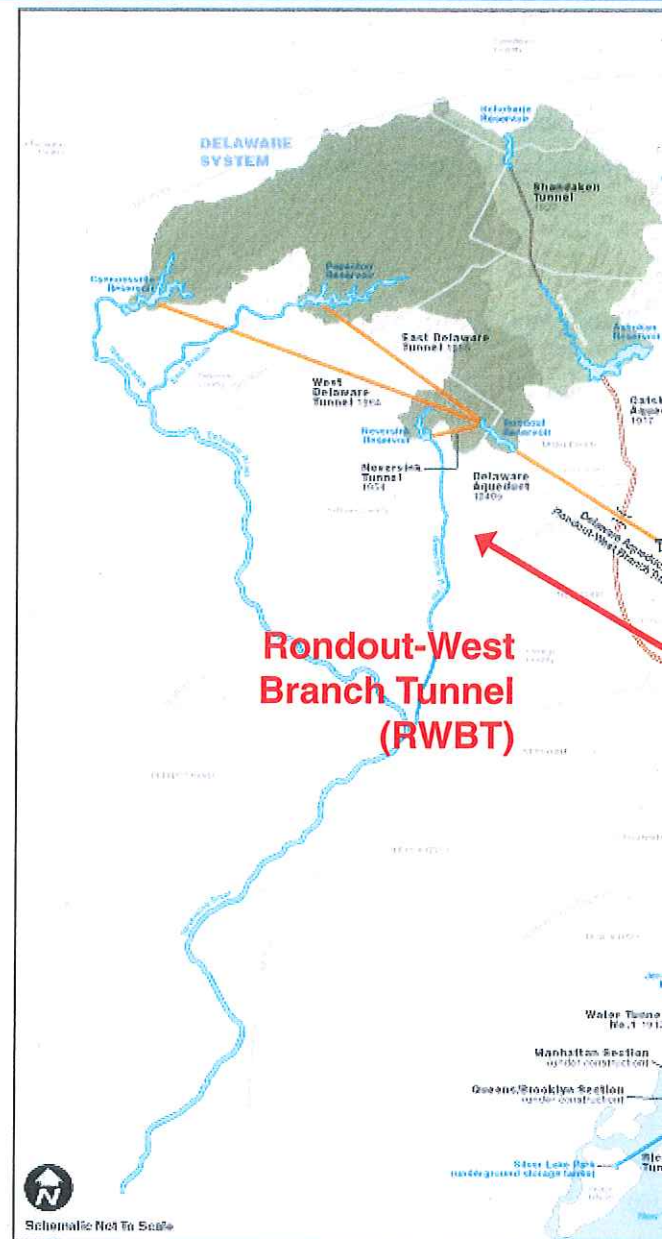
CEQR No. 15DEP006U

Prepared by
Commissioner
Lead Agency Contact

New York City Depa
Vincent Sapienza, P
Angela Licata, Depu
Attention: Sangam
Director of Office of
Infrastructure & Wat
New York City Depa
Bureau of Environm
59-17 Junction Boul
Flushing, NY 11373
WFFComments@dep
December 2017

Water For the Future Program - Overview

- Delaware Aqueduct
 - 85 mile tunnel conveys up to 800 million gallons per day (mgd) of water to upstate communities and NYC
 - Found to have been leaking 15-35 mgd in the 1990's
- Water for the Future
 - Program developed to fix the Delaware
 - Construction of two shafts and a bypass tunnel across the Hudson River underway
 - Connection and decommissioning of the bypassed section planned for 2022
- Needed Support "Projects"
 - **Catskill Aqueduct Repair and Rehabilitation**
 - Conservation / Demand Management
 - Modified operations of reservoir system



Catskill Aqueduct Repair and Rehabilitation

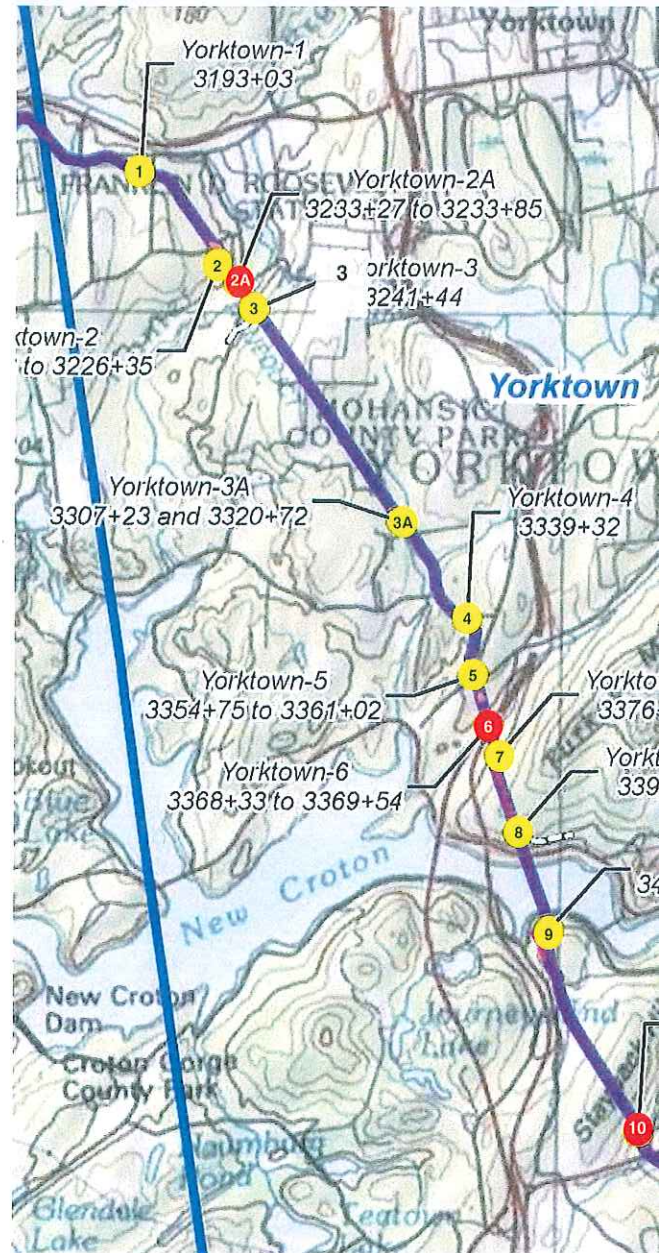
Goal: Rehabilitation the 74 mile Catskill Aqueduct to ensure the structural integrity, extend the useful life, and restore transmission capacity prior to the RWBT shutdown.

- **Leak Mitigation**
 - Repairs at identified leaks and surface expressions along the Aqueduct
 - Installation on-site facilities to eliminate any discharge of chlorine-treated aqueduct water
- **Mechanical/Structural Repair & Chemical Addition**
 - Repair aging equipment used during operation of the Aqueduct
 - Includes drain valves (siphon drains and culvert drains), installation of new air vents, installation of new access “boatholes”, and repair of Aqueduct bridge crossings
 - Install chlorination facility in the existing Ashokan Screen Chamber
 - Install dechlorination facility at the Pleasantville Alum Plant site
- **Condition Assessment / Biofilm Removal**
 - Removal of surface deposits (biofilm) from the inside walls of the Aqueduct to restore its carrying capacity and aid inspections.
 - Repairs of cracks, leaks, or defects will be made from inside the Aqueduct following inspections

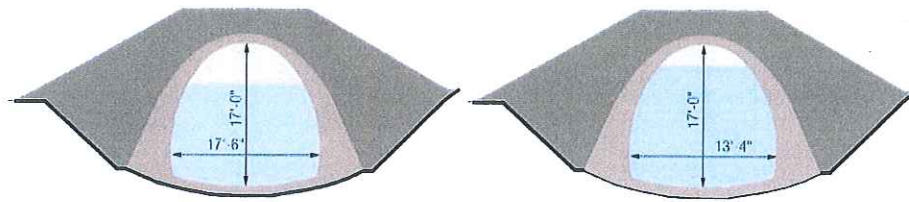


Town of Yorktown - Scope

- 13 primary locations where work will occur in Yorktown.
- 4 of the 13 require wetland permits (red circles)
- Project-wide Activities:
- Leak Mitigation
 - 1 Internal Repair location
- Mechanical/Structural Repair & Chemical Addition
 - 6 Siphon Drain Blow-offs replaced (2 locations)
 - 4 Culvert Drains (3 sealed, 1 replaced)
 - 1 New Air Vent to be installed
 - 3 New Boatholes to be installed
 - Valve replacement at Croton Lake
- Condition Assessment / Biofilm Removal
 - 3 primary locations for biofilm removal and staging

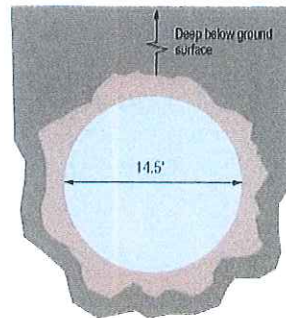


Aqueduct Segment Types



Cut-and-Cover Tunnel

Grade Tunnel



Pressure Tunnel



Steel Pipe Siphon

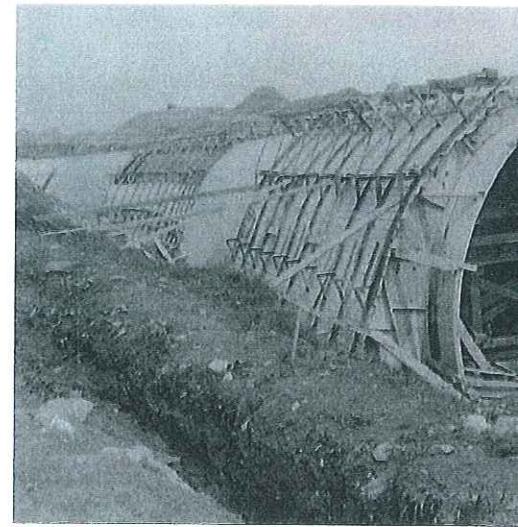


Figure 9.2-6: Historic Photograph of the Peekskill Cut-and-Cover Tunnel, M

Figure 9.2-5: Types of Tunnel Segments along the Upper Catskill Aqueduct

Work Activity – Access and Vents

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

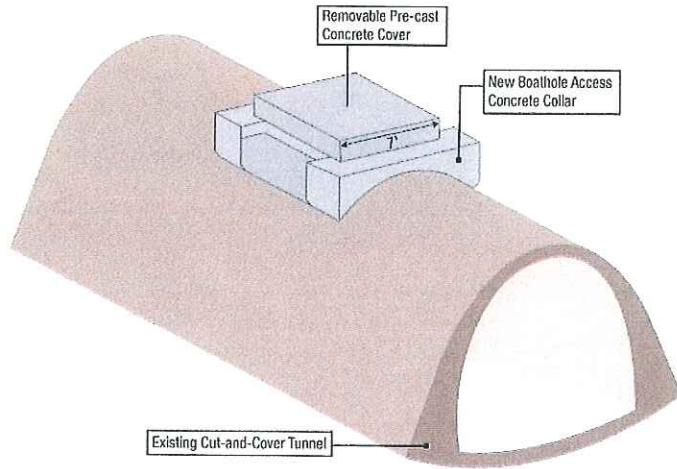


Figure 9.2-15: Boathole Installation

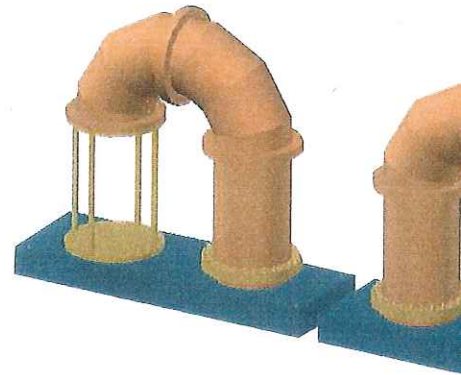
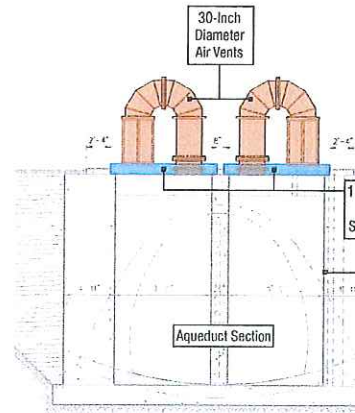


Figure 9.2-16: Air Vent Installation Example

WFP: Update Water Supply Resiliency E&BIS

Work Activity – Culvert Drain and Blow Off Repair

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

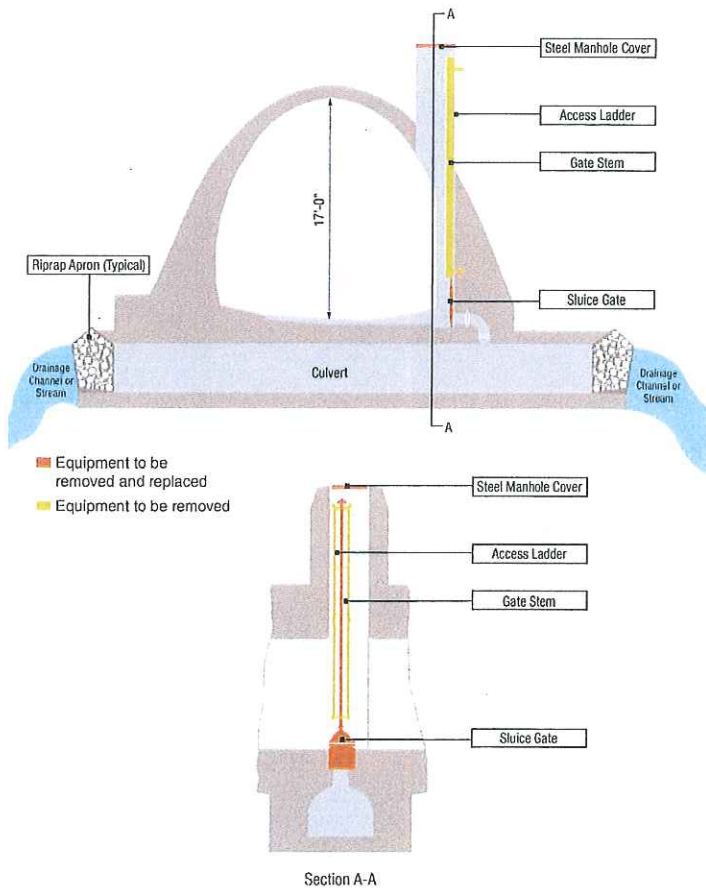


Figure 9.2-17: Culvert Drain Sluice Gate Repairs

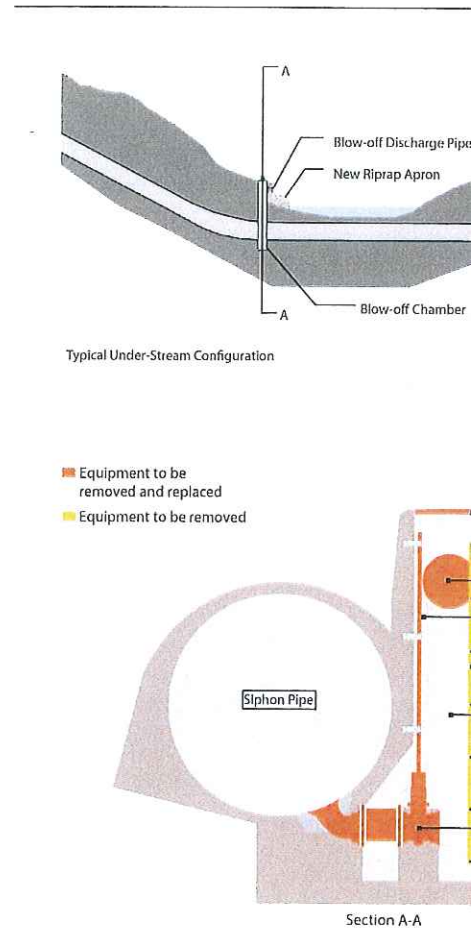
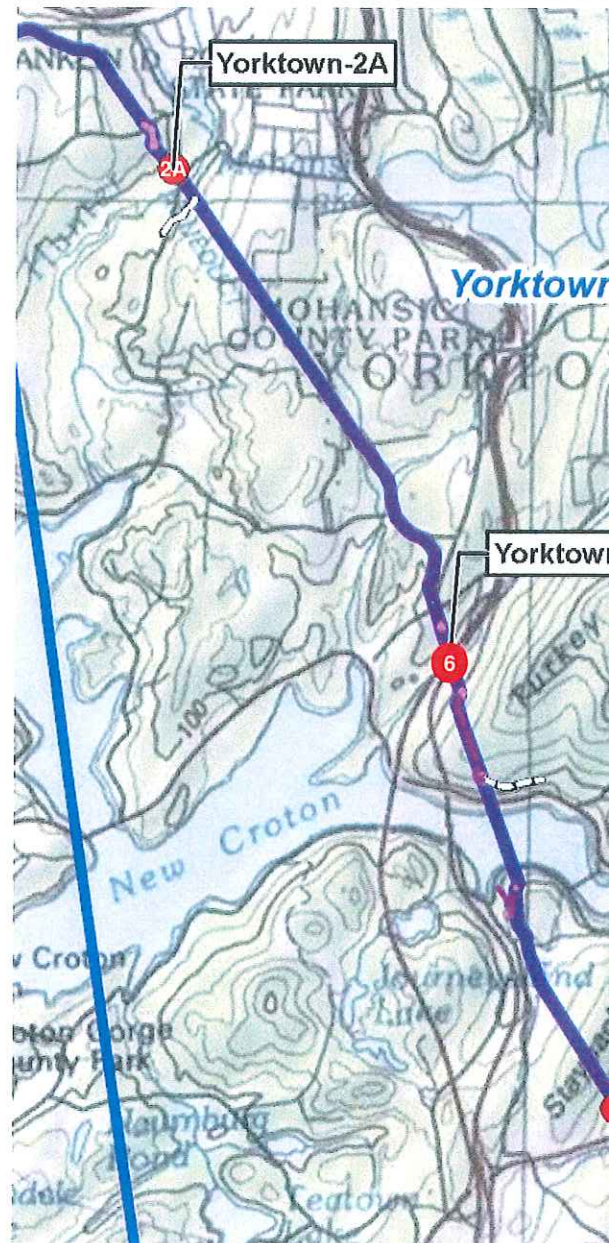


Figure 9.2-13: Siphon Drain Blow-off Valve Repairs – Under-Stream Configuration

WPP: Upstate Water Supply Resiliency E&BIS

Town of Yorktown – Sites Requiring Wetland Permits

- 4 of 13 sites require wetland permits
- **Yorktown-2A:**
 - Location: 0.25 mile southeast of Jacob Road, just north of Hunter Brook.
 - Access: White Hill Road
 - Work:
 - Steel Pipe Siphon Access Manholes
 - Hunters Brook SPS Blow-off Chambers
- **Yorktown-6:**
 - Location: Median of the Taconic State Parkway, Turkey Mountain Brook
 - Access: Taconic State Parkway, left northbound lane
 - Work:
 - Steel Pipe Siphons Blow-off Chambers
 - Steel Pipe Siphon Access Manholes



Yorktown-2A – Hunters Brook

CAT-RR Town of Yorktown
 Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
 Jacob Road Study Area Impact Analysis

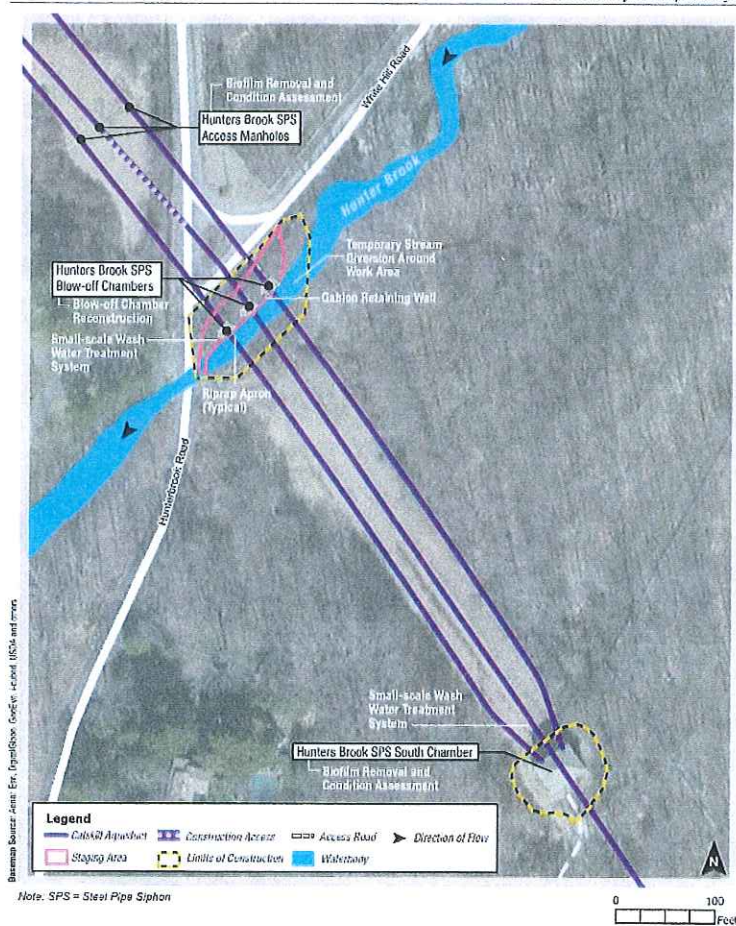


Figure 9.14-7: Site Plan for Hunters Brook SPS Blow-off Chambers and Hunter Brook SPS South Chamber – Jacob Road Study Area



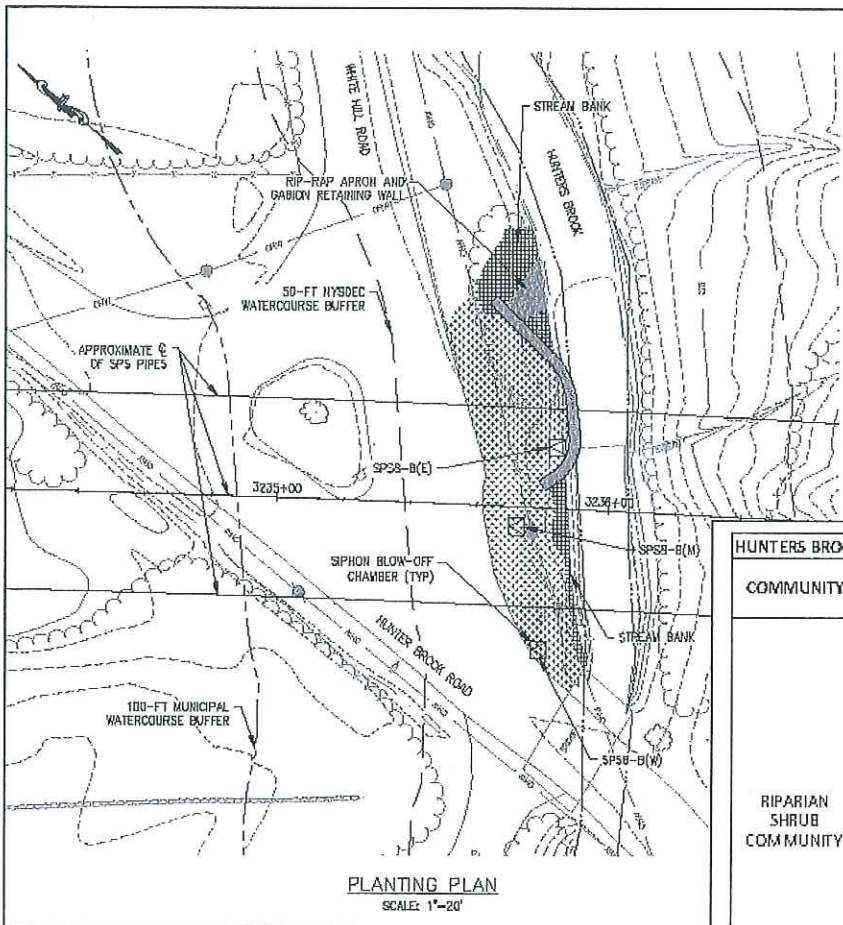
Photograph 1: Hunters Brook Steel Pipe Siphon east blow-off chamber.




Photograph 2: Hunterbrook Road at White Hill Road intersection. Chambers would be accessed from the property.


Figure 9.14-3: Photographs – Jacob Road Study Area

Yorktown-2A – Hunters Brook



LEGEND

 RIPARIAN SHRUB COMMUNITY

 RIPARIAN SEEDING AREA

NOTES:

- SEE CI-348 FOR SITE PREPARATION, DEMOLITION, AND RESTORATION WORK.
- SEE LP-005 FOR PLANTING DETAILS.

HUNTERS BROOK SPS PLANT LIST:

COMMUNITY	PLANT FORM	INDICATOR STATUS	SCIENTIFIC NAME	COMMON NAME
RIPARIAN SHRUB COMMUNITY	SHRUBS	FAC	VIBURNUM DENTATUM	SOUTHERN ARROW-WOOD
		OBL	SALIX SERICEA	SILKY WILLOW
		FACW	CORNUS AMOMUM	SILKY DOGWOOD
			SAMBUCUS NIGRA	BLACK ELDER
	HERBACEOUS	OBL	GLYCERIA CANADENSIS	BATTLESNAKE MANNA GRASS
			GLYCERIA GRANDIS	AMERICAN MANNA GRASS
			LEERSIA ORYZOIDES	RICE CUT GRASS
			CALAMAGROSTIS CANADENSIS	BLUEJOINT
		FACW	ELYMUS VIRGINICUS	VIRGINIA WILD RYE
		RIPARIAN		
RIPARIAN SEEDING AREA	SEED MIX	OVERSEED WITH RIPARIAN BUFFER MIX (BASIN BOTTOM) AT		
		STREAM BANK SEED MIX TOTAL (.056 ACRES)= 1.1-1.7 LBS		
		SOURCE: PINELANDS NURSERY, INC.; ERNST SEED CO. OR VERMONT WET EQUIVALENT.		

PLANT SCHEDULE

Yorktown-6 – Turkey Mountain Brook

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
Chapman Road Study Area Impact Analysis

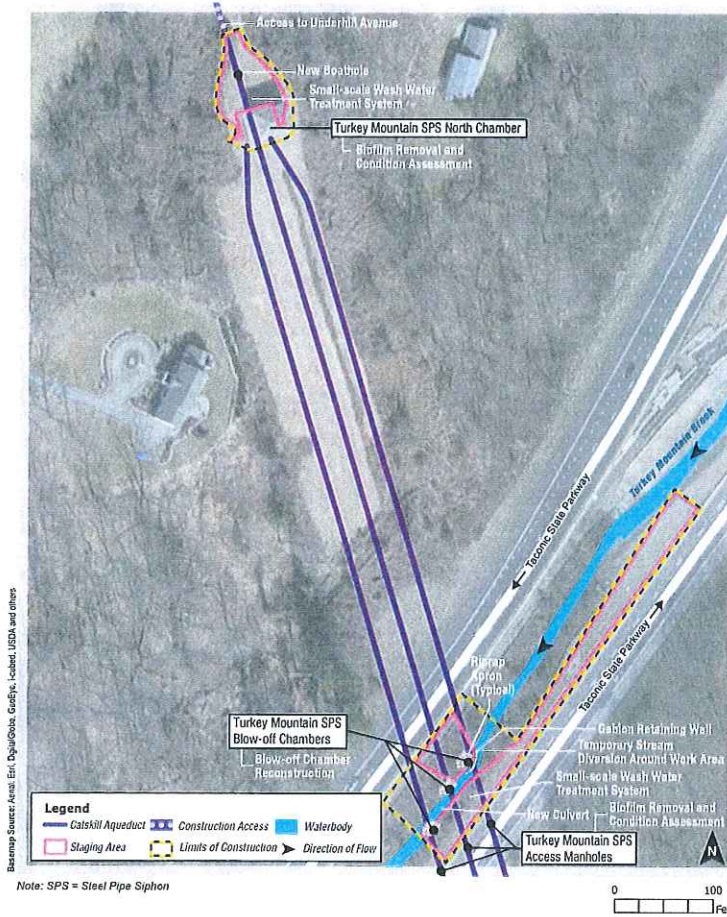
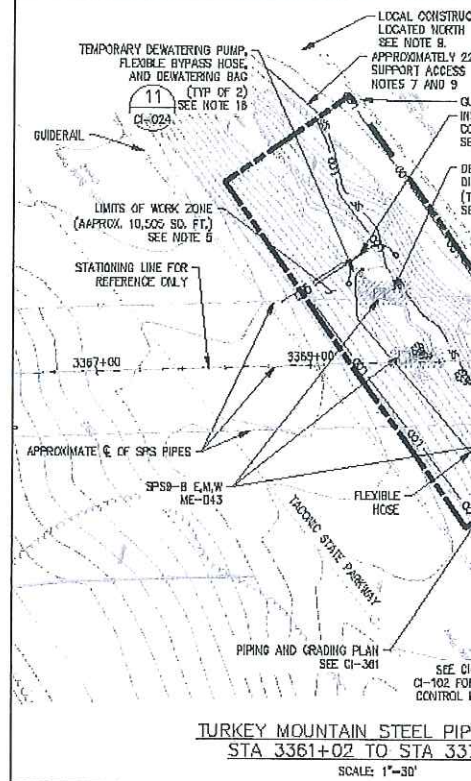


Figure 9.14-16: Site Plan for Turkey Mountain SPS North Chamber and Turkey Mountain SPS Blow-off Chambers – Chapman Road Study Area

WFF: Upstate Water Supply Resiliency EBEIS

9.14-10

Catskill Aqueduct Repair and Rehabilitation

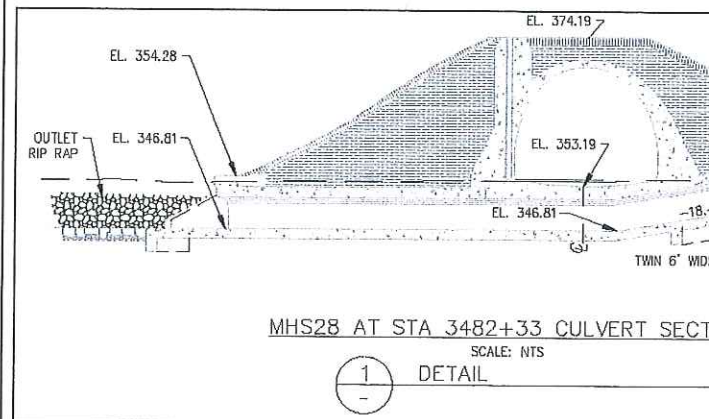
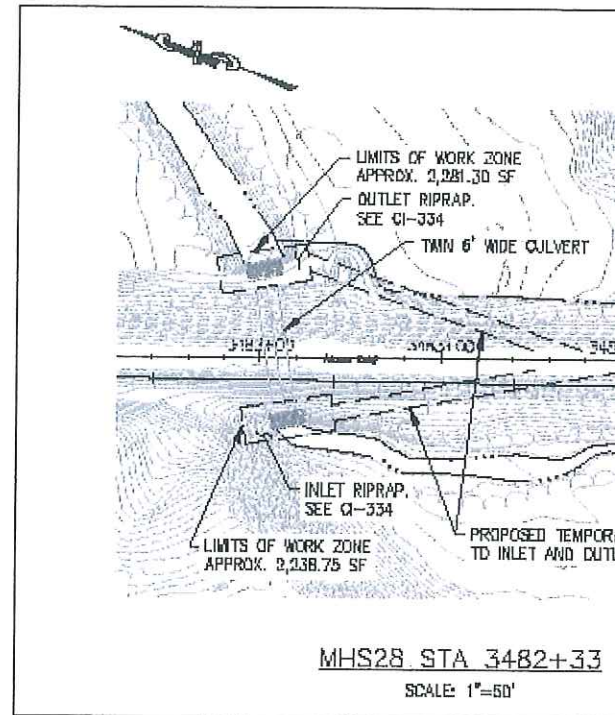
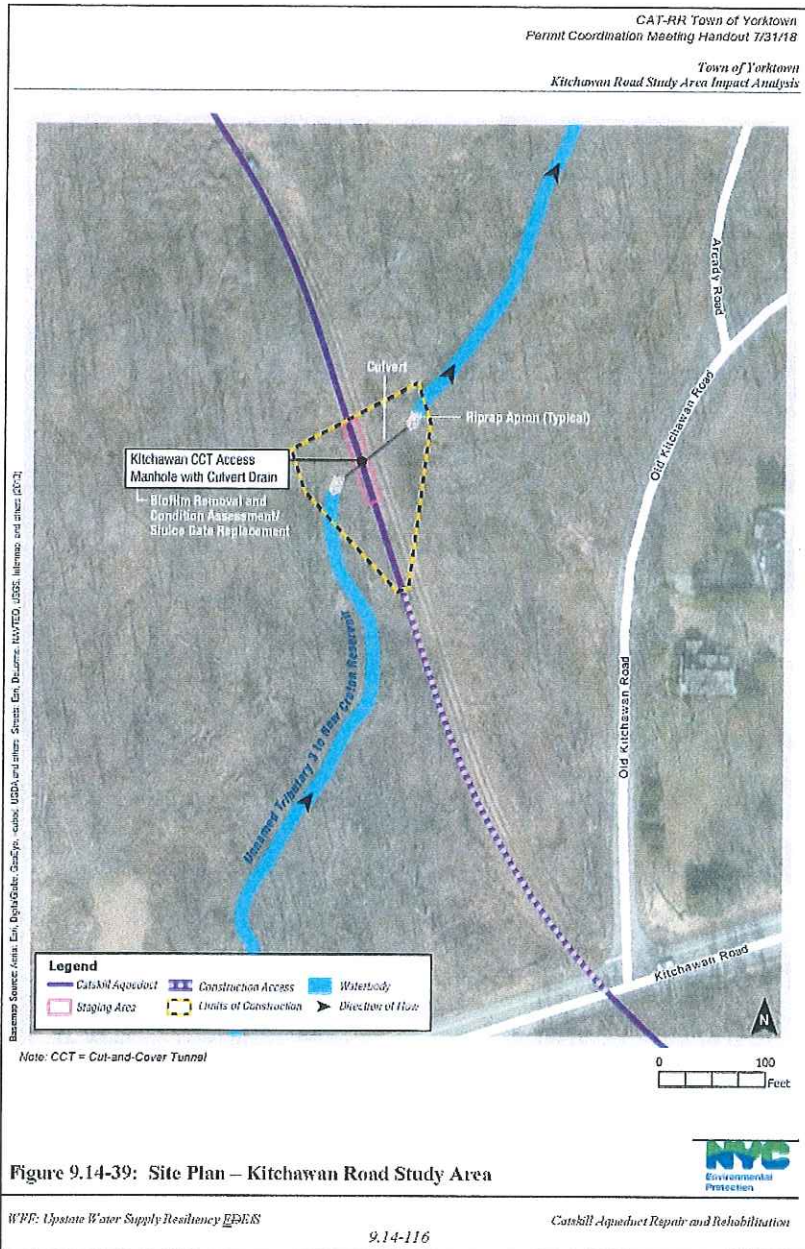


Town of Yorktown – Sites Requiring Wetland Permits



- **Yorktown-10:**
 - Location: North of Kitchawan Reservoir, immediately north of the New Croton Reservoir
 - Access: Kitchawan Road
 - Work: Kitchawan Cut & Access Manhole with
- **Yorktown-11:**
 - Location: Pines Bridge
 - Access: Pines Bridge Access Road
 - Work: Kitchawan Cut & Access Manhole

Yorktown-10 – Kitchawan Culvert Drain



Yorktown-11 – Pines Bridge Rd Access P

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
Pines Bridge Road Study Area Impact Analysis

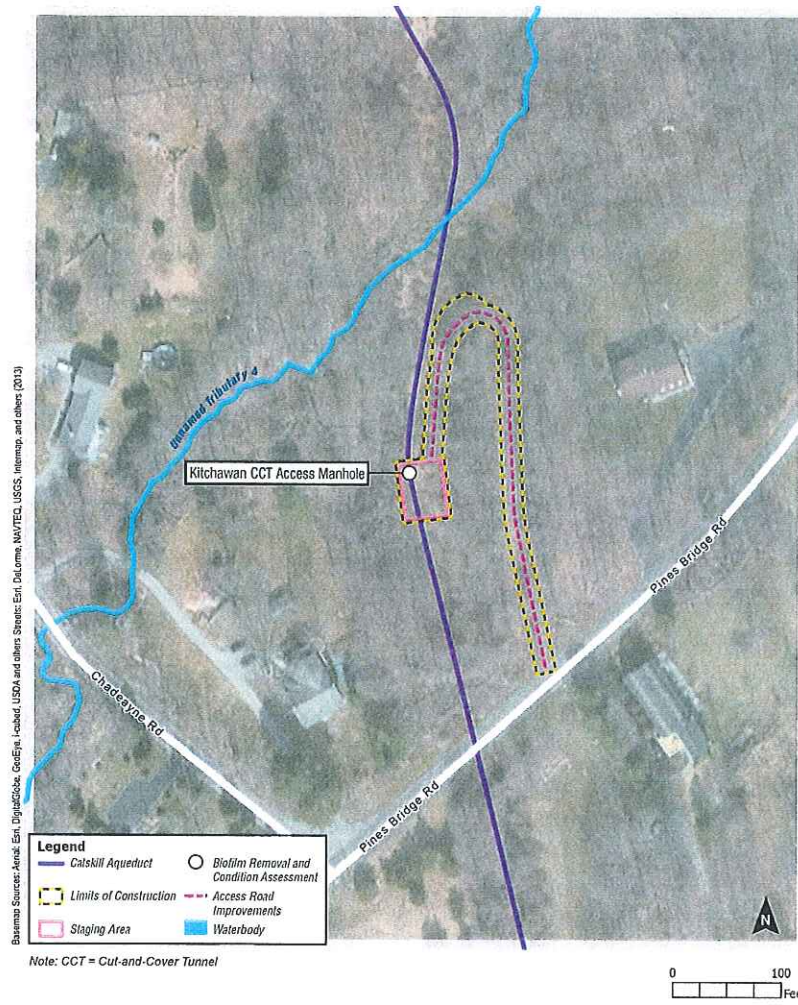


Figure 9.14-47: Site Plan – Pines Bridge Road Study Area

WFP: Upstate Water Supply Resiliency EDEIS

9.14-142

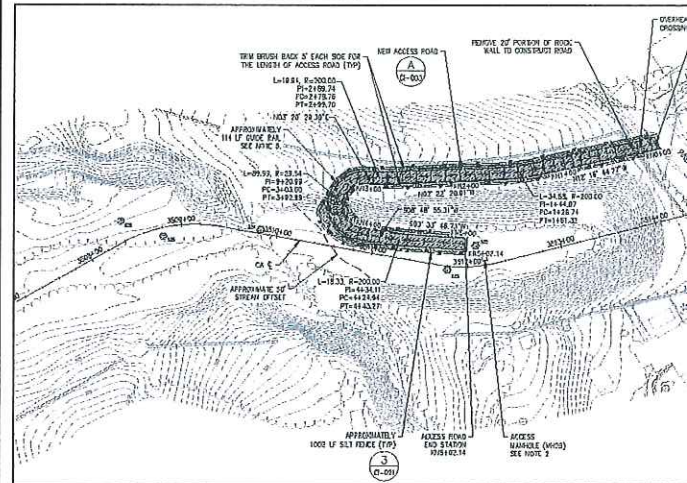
Catskill Aqueduct Repair and Rehabilitation



Photograph 1: Looking southwest towards Kitchawan CCT Access Photo taken from the berm of the aqueduct where off Pines Bridge Road is proposed.



Photograph 2: Looking north towards location of proposed access Pines Bridge Road.



Disturbance

Table 3. Regulated Water Resources Disturbance

Location	Watercourse Below Ordinary High Water (Square Feet)		100-foot Co (Square
	Temporary	Permanent	Temporary
Yorktown-2A	650	820	4,240
Yorktown-6	950	210	1,600
Yorktown-10	560	0	4,810
Yorktown-11	0	0	0
Total	2,160	1,030	10,650
Total Watercourse Disturbance	3,190		NA
Total 100-foot Control Area Disturbance	NA		24,900
Total Disturbance to Regulated Water Resources (Watercourses and Control Areas)	28,090		

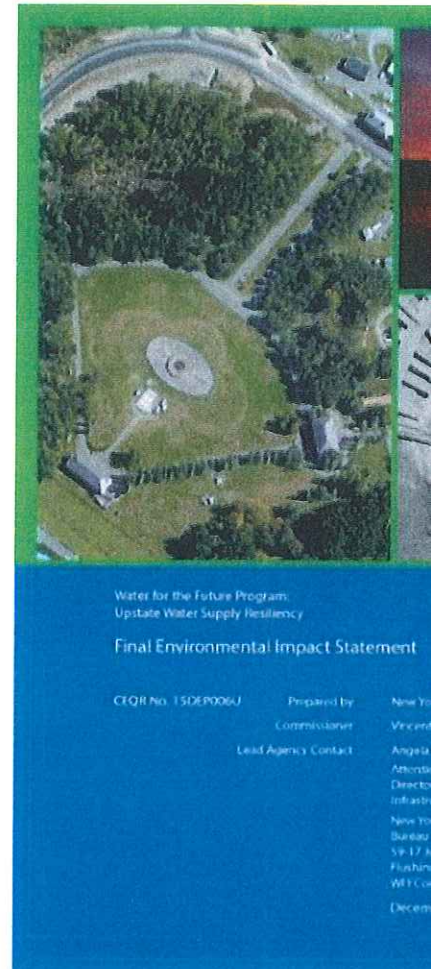
Notes:

All estimates have been rounded to the nearest hundredth

NA = Not Applicable

Anticipated Schedule

- Overall Construction (CAT-RR):
 - Intermittent, short duration work, Fall 2018 through June 2021
 - Fall Shutdowns planned from 2018 through 2020
- Yorktown-specific work:
 - **Regulated wetland areas – Spring/Summer 2019: Yorktown-2A, 6, 10, 11**
 - Other work areas, intermittent, short duration work:
 - Fall 2018 – staging area and site preparation
 - Spring 2019 – mechanical work
 - Fall 2019 – interior aqueduct work
 - Fall 2020 – interior aqueduct work
- Environmental Impact Statement (EIS):
 - Final EIS: December 15, 2017
 - Findings Statement: January 5, 2018



http://www.nyc.gov/html/dep/html/environmental_reviews/upstate_water_supply_resiliency.shtml

Thank you!

NYC® **Water** for the **Future**
Environmental Protection





Catskill Aqueduct Repair & Rehabi

Town of Yorktown Planning Board

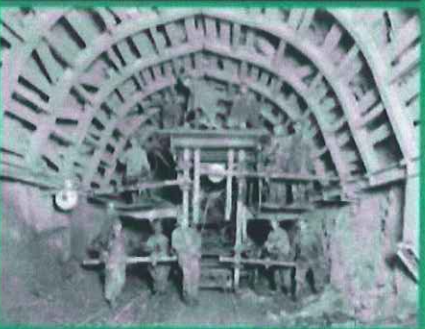


Public Hearing

Re: Wetland Permit Applications


Sites 2A, 6, 10, & 11

September 25, 2018

/ Project Overview Requiring Wetland Permits



Water for the Future Program:
Upstate Water Supply Resiliency

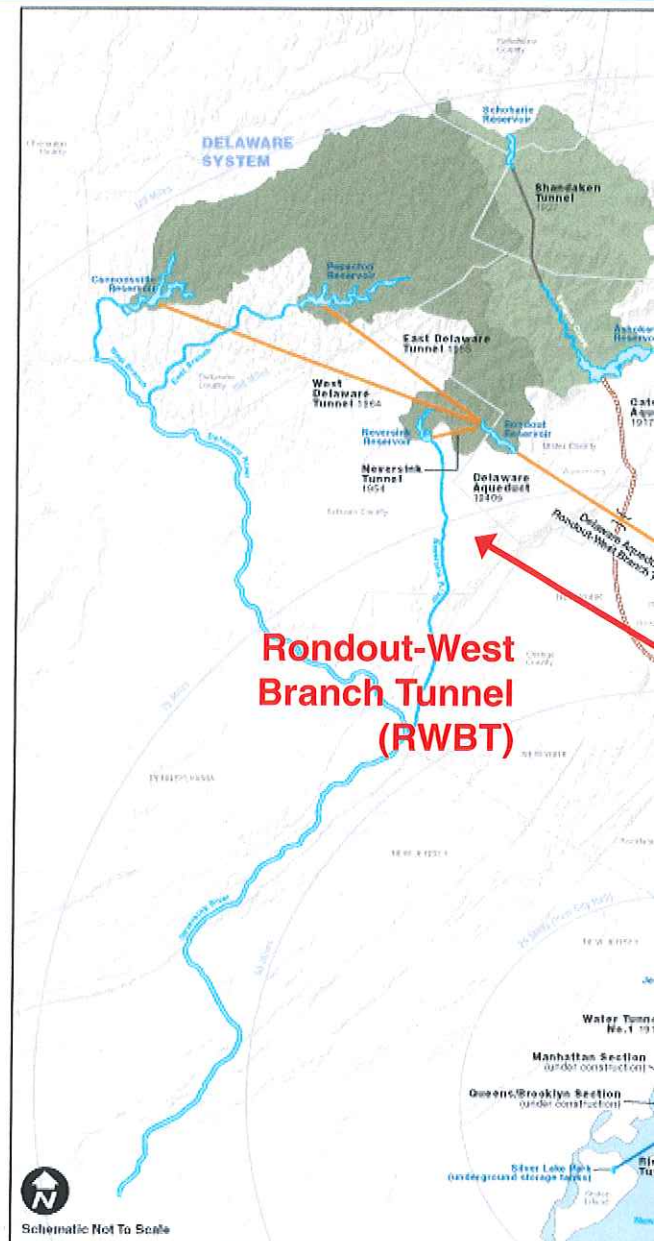


Final Environmental Impact Statement

CEQR No. 15DEP006U	Prepared by Commissioner	New York City Department of Environmental Protection Vincent Sapiezka, PE.
	Lead Agency Contact	Angela Licata, Deputy Commissioner of Sustainability Attention: Sangamithra Iyer, PE, Director of Office of Water Supply Infrastructure & Watershed Assessment New York City Department of Environmental Protection Bureau of Environmental Planning and Analysis 59-17 Junction Boulevard Flushing, NY 11373 WFFComments@deputy.gov December 2017

Water For the Future Program - Overview

- Delaware Aqueduct
 - 85 mile tunnel conveys up to 800 million gallons per day (mgd) of water to upstate communities and NYC
 - Found to have been leaking 15-35 mgd in the 1990's
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 - Program developed to fix the Delaware
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 - Connection and decommissioning of the bypassed section planned for 2022
- Needed Support “Projects”
 - **Catskill Aqueduct Repair and Rehabilitation**
 - Conservation / Demand Management
 - Modified operations of reservoir system



All Aqueduct Repair and Rehabilitation

Rehabilitate the 74 mile Catskill Aqueduct to ensure integrity, extend the useful life, and restore capacity prior to the RWBT shutdown.

Identified leaks and surface expressions along the Aqueduct
Site facilities to eliminate any discharge of chlorine-treated water

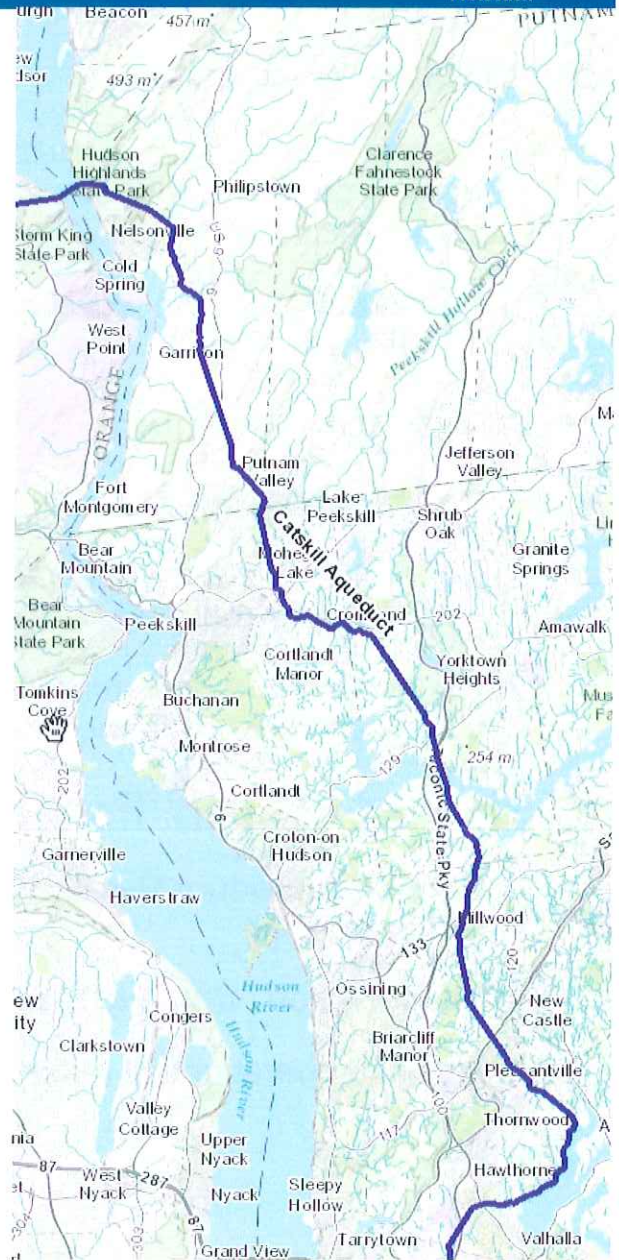
Structural Repair & Chemical Addition

Equipment used during operation of the Aqueduct
Main valves (siphon drains and culvert drains), installation of new valves, installation of new access “boatholes”, and repair of bridge crossings

Removal facility in the existing Ashokan Screen Chamber
Removal facility at the Pleasantville Alum Plant site

Assessment / Biofilm Removal

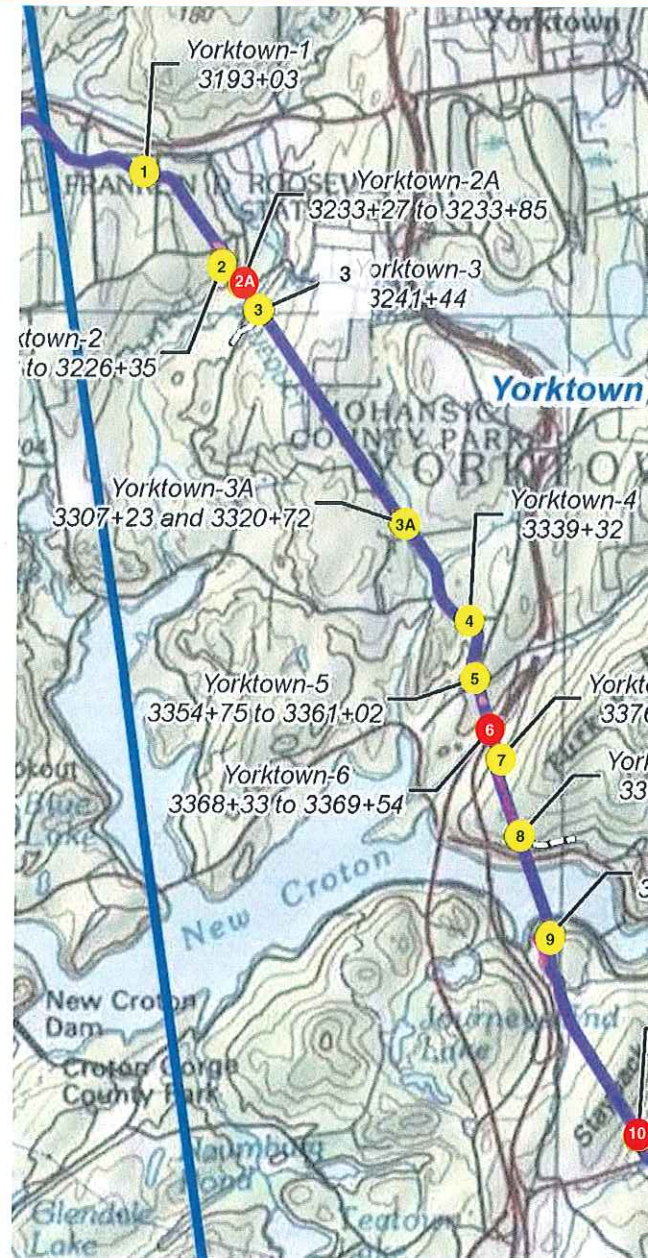
Removal of surface deposits (biofilm) from the inside walls of the Aqueduct to restore its carrying capacity and aid inspections.
Inspections, leaks, or defects will be made from inside the Aqueduct during inspections



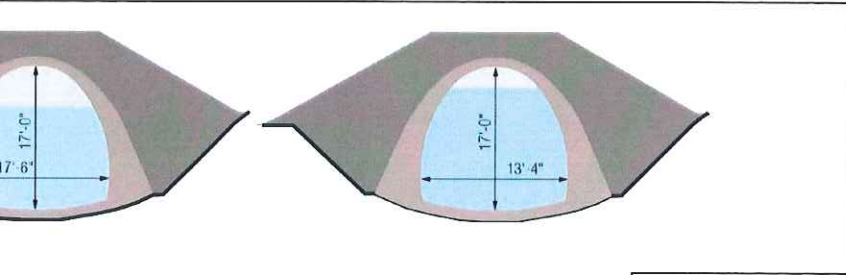
Catskill Aqueduct – “East of Hudson”

Town of Yorktown - Scope

- 13 primary locations where work will occur in Yorktown.
- 4 of the 13 require wetland permits (red circles)
- Project-wide Activities:
- Leak Mitigation
 - 1 Internal Repair location
- Mechanical/Structural Repair & Chemical Addition
 - 6 Siphon Drain Blow-offs replaced (2 locations)
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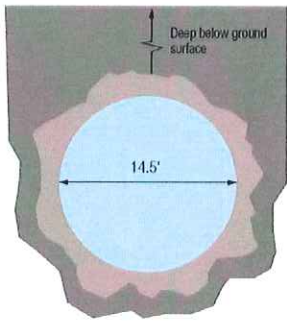


Aqueduct Segment Types

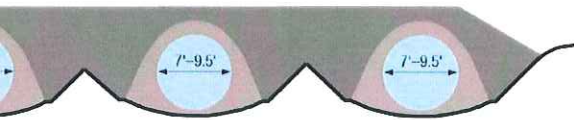


Cover Tunnel

Grade Tunnel



Pressure Tunnel



Steel Pipe Siphon

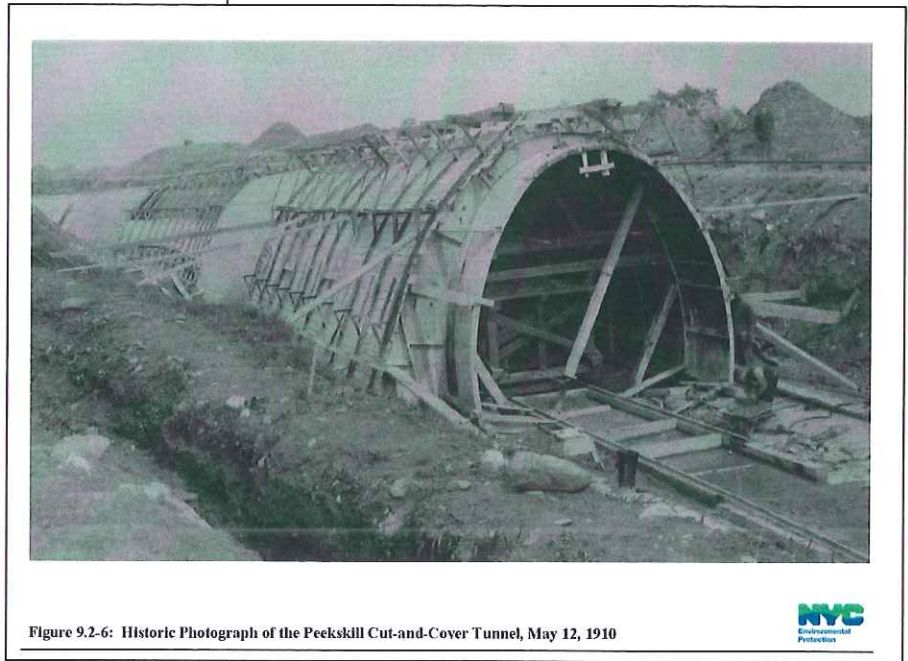


Figure 9.2-6: Historic Photograph of the Peekskill Cut-and-Cover Tunnel, May 12, 1910

of Tunnel Segments along the Upper Catskill Aqueduct

Work Activity – Access and Vents

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/3/13

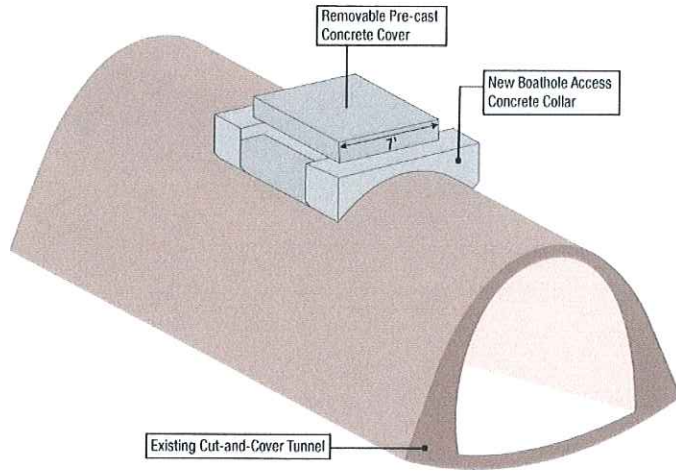


Figure 9.2-15: Boathole Installation

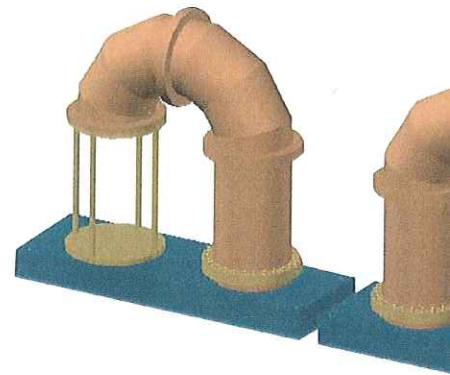
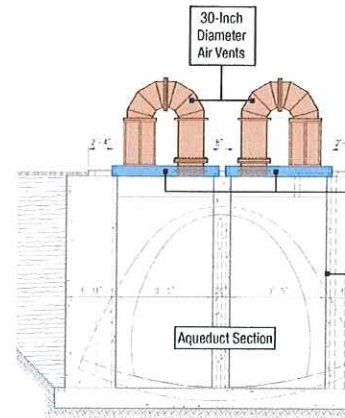
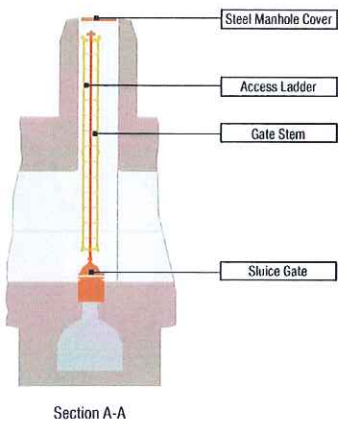
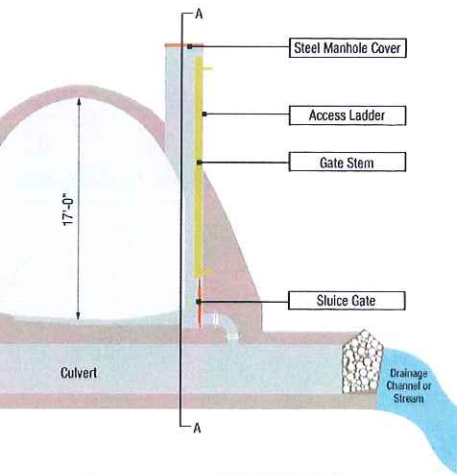


Figure 9.2-16: Air Vent Installation Example

WFP: Update Water Supply Resiliency EIR/EIS

CAT-RR Town of Yorktown
 Permit Coordination Meeting Handout 7/31/18

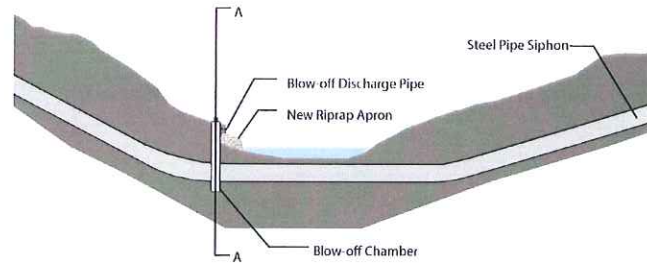


Sluice Gate Repairs



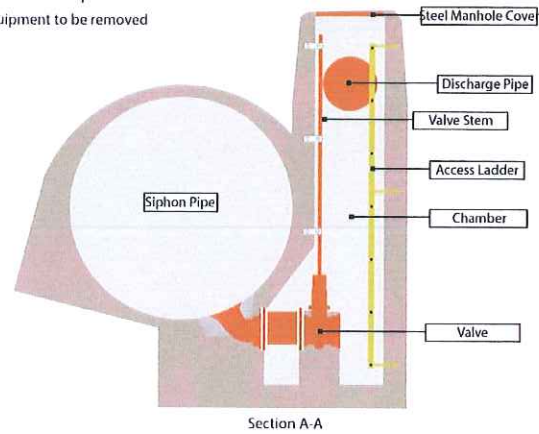
CAT-RR Town of Yorktown
 Permit Coordination Meeting Handout 7/31/18

Project Description



Typical Under-Stream Configuration

- Equipment to be removed and replaced
- Equipment to be removed



Section A-A

Figure 9.2-13: Siphon Drain Blow-off Valve Repairs – Under-stream



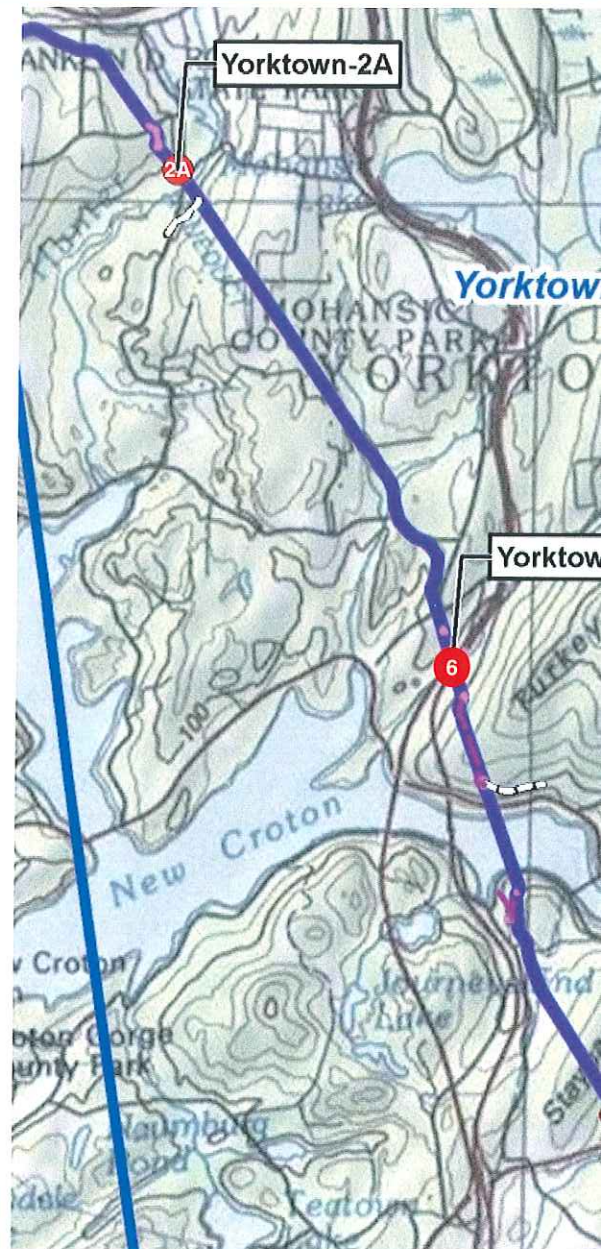
WFF: Update Water Supply Resiliency E-DRIS

9.2-32

Catskill Aqueduct Repair and Rehabilitation

Town of Yorktown – Sites Requiring Wetland Permits

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 - Access: White Hill Road
 - Work:
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CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
Jacob Road Study Area Impact Analysis



Hunters Brook SPS Blow-off Chambers and
Over – Jacob Road Study Area



9.14-13

Catskill Aqueduct Repair and Rehabilitation

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
Jacob Road Study Area Impact Analysis



Photograph 1: Hunters Brook Steel Pipe Siphon east blow-off chamber at
Hunter Brook.



Photograph 2: Hunterbrook Road at White Hill Road intersection. The Blow-off
Chambers would be accessed from the pull-off on the right.

Figure 9.14-3: Photographs – Jacob Road Study Area

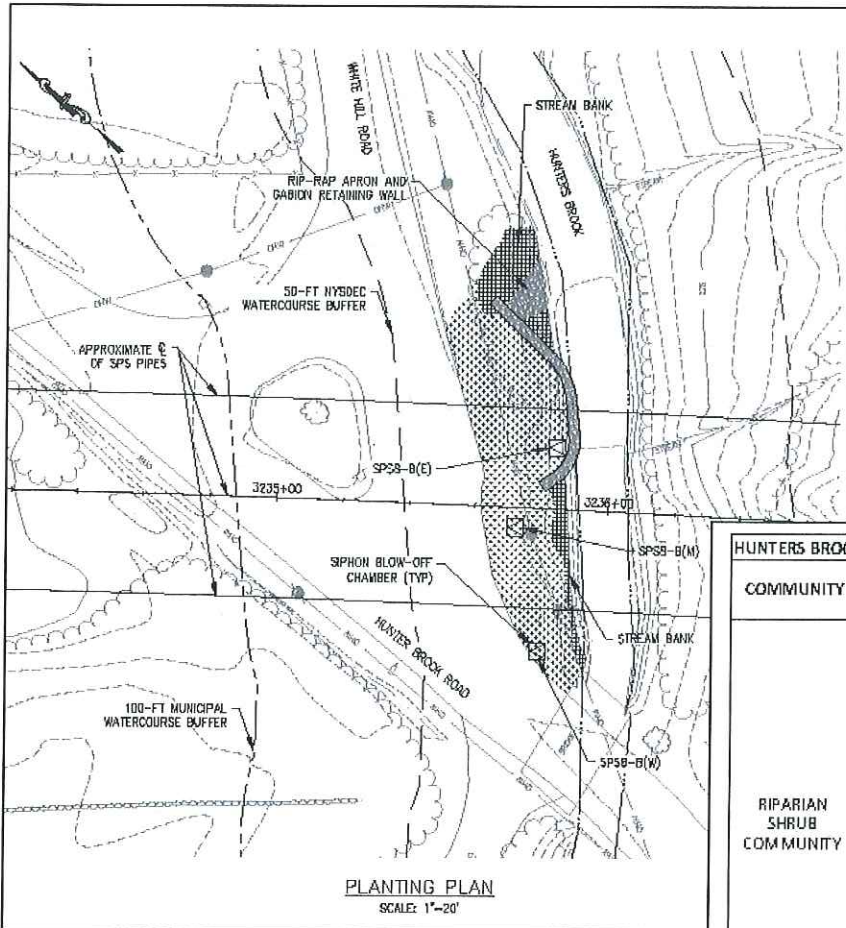


WFF: Upstate Water Supply Resiliency EPES

9.14-8

Catskill Aqueduct Repair and Rehabilitation

Yorktown-2A – Hunters Brook



LEGEND

- RIPARIAN SHRUB COMMUNITY
- RIPARIAN SEEDING AREA

NOTES:

- SEE GI-348 FOR SITE PREPARATION, DEMOLITION, AND RESTORATION WORK.
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HUNTERS BROOK SPS PLANT LIST:

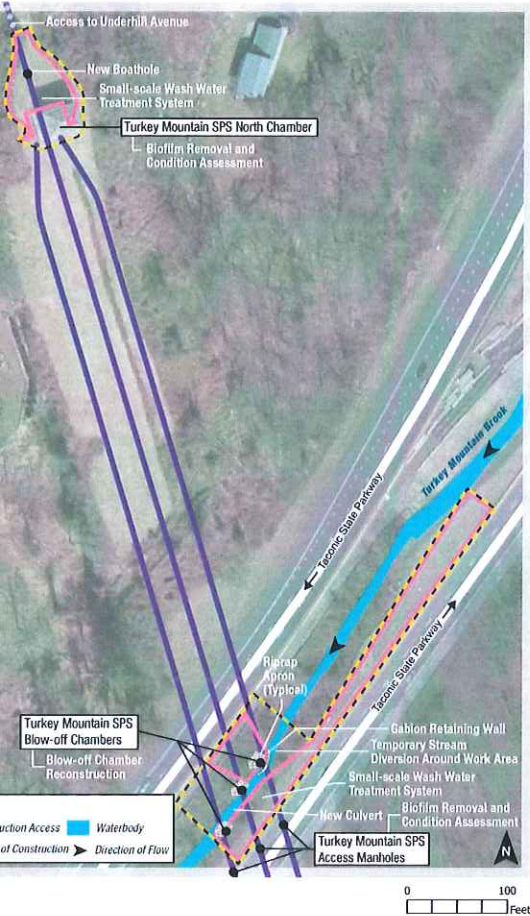
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				STREAM BANK SEED MIX TOTAL (.056 ACRES)= 1.1-1.7 LB/AC	
			SOURCE: PINELANDS NURSERY, INC.; ERNST SEED CO. OR VERMONT WILSON SEED CO. EQUIVALENT.		

PLANT SCHEDULE

Yorktown-6 – Turkey Mountain Brook

CAT-RR Town of Yorktown
Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
Chapman Road Study Area Impact Analysis



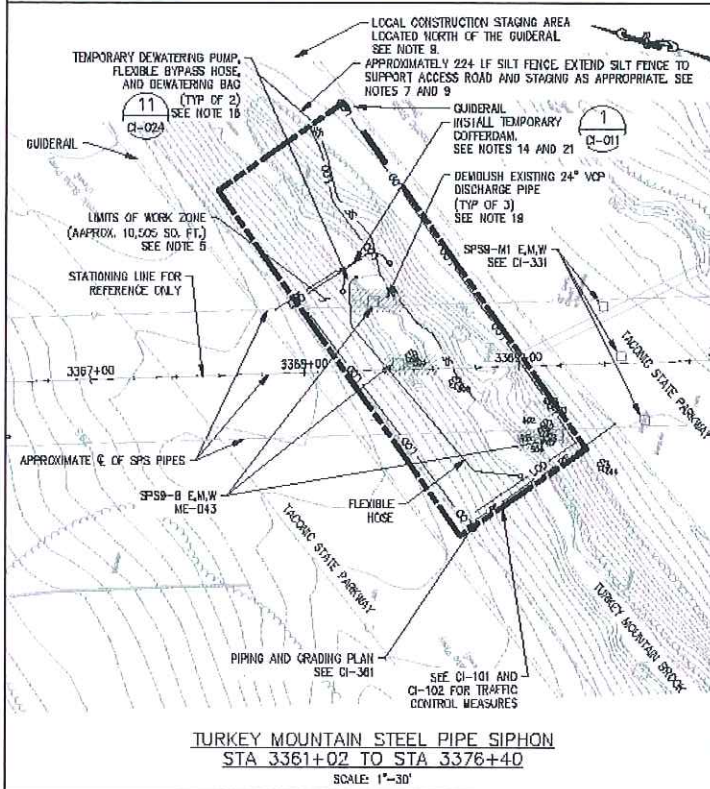
Plan for Turkey Mountain SPS North Chamber and Blow-off Chambers – Chapman Road Study Area



Catskill Aqueduct Repair and Rehabilitation

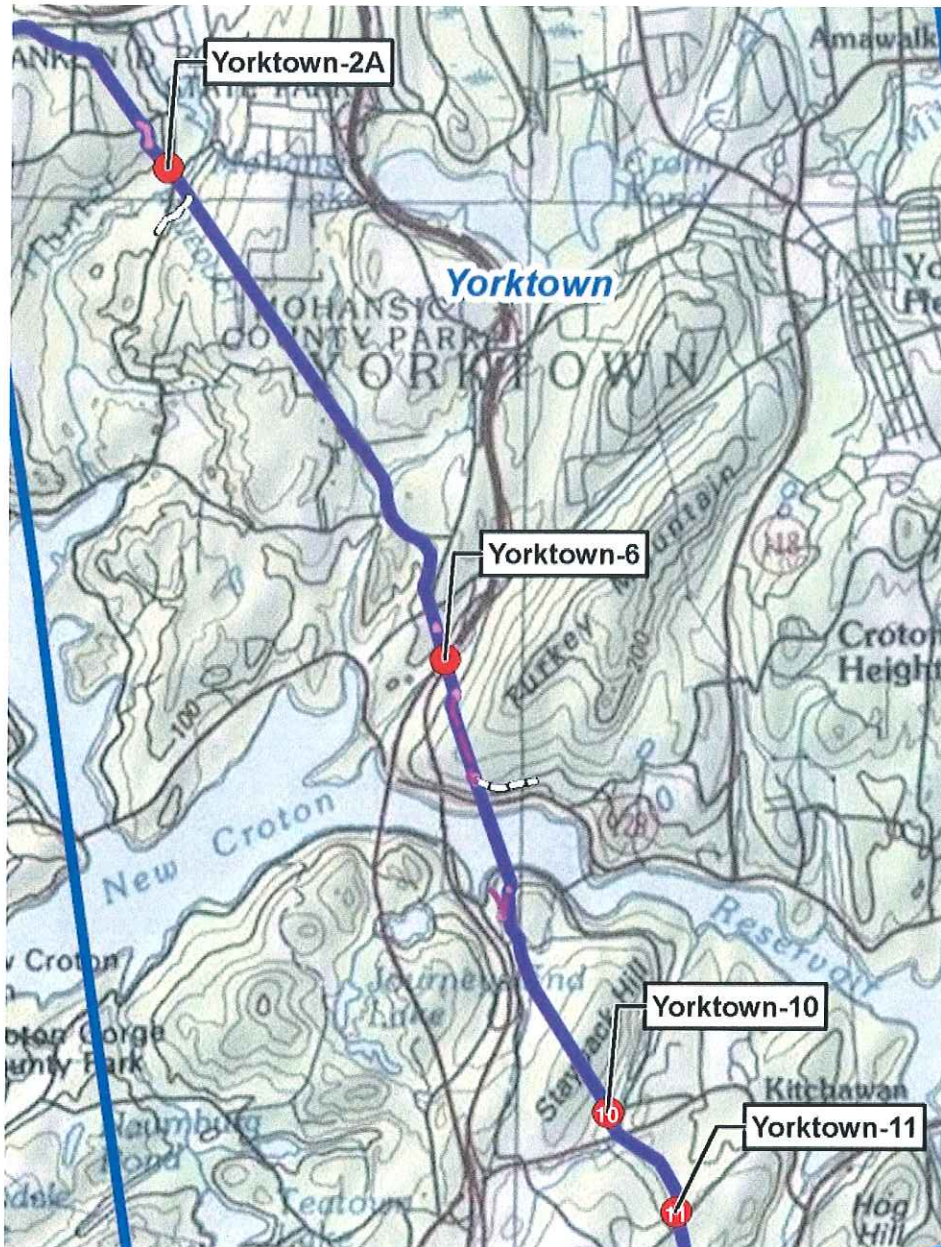
9.14-40

Town of Yorktown
Chapman Road Study Area Impact Analysis



TURKEY MOUNTAIN STEEL PIPE SIPHON
STA 3361+02 TO STA 3376+40
SCALE: 1"=30'

Town of Yorktown – Sites Requiring Wetland Permits



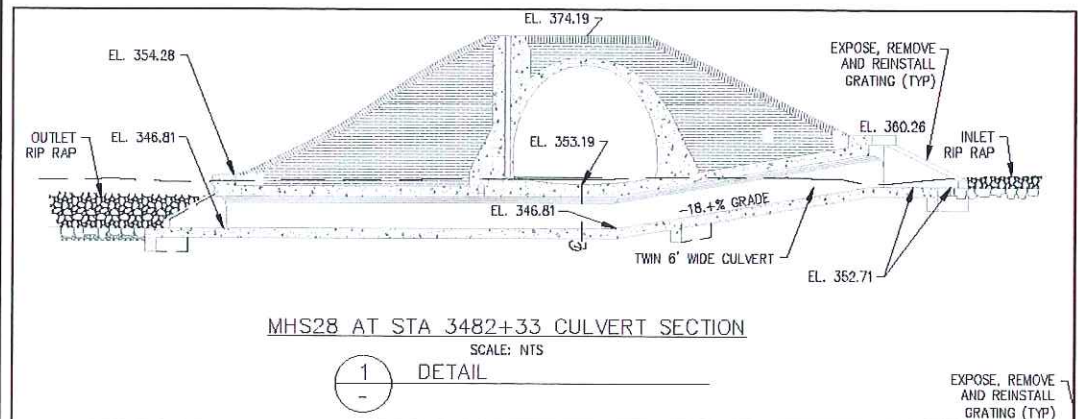
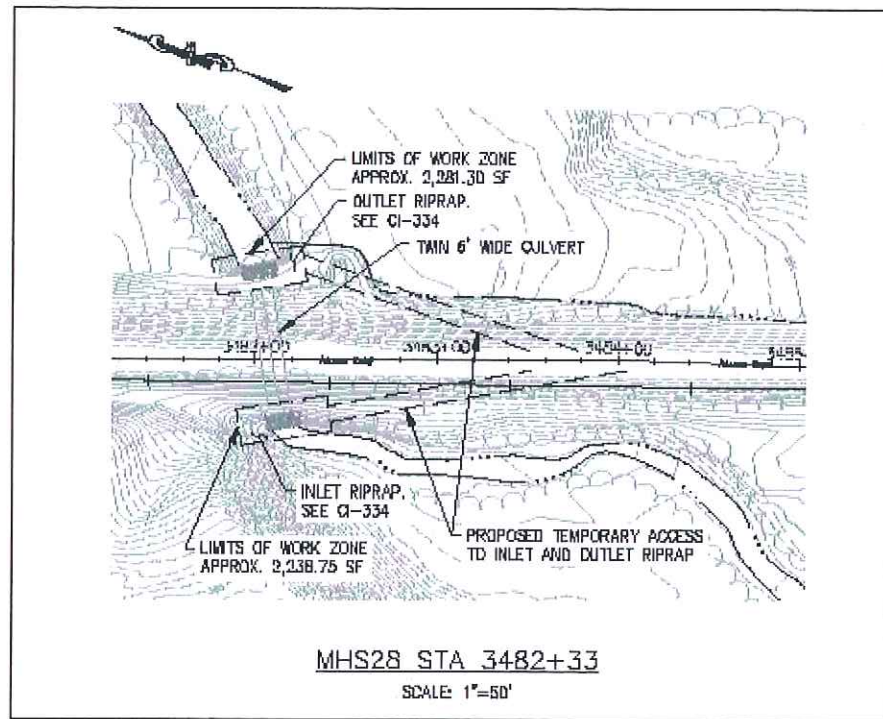
- **Yorktown-10:**
 - Location: North of Kitchawan Reservoir, immediately north of the New Croton Reservoir
 - Access: Kitchawan Reservoir Access Road
 - Work: Kitchawan Cut Access Manhole with
- **Yorktown-11:**
 - Location: Pines Bridge
 - Access: Pines Bridge Access Road
 - Work: Kitchawan Cut Access Manhole

CAT-RR Town of Yorktown
 Permit Coordination Meeting Handout 7/31/18

Town of Yorktown
 Kitchawan Road Study Area Impact Analysis



Study Area
 9,14-116
 NYC Environmental Protection
 Cassill Aqueduct Repair and Rehabilitation



Yorktown-11 – Pines Bridge Rd Access

CAT-RR Town of Yorktown
 Permit Coordination Meeting Handout 7/31/18
 Town of Yorktown
 Pines Bridge Road Study Area Impact Analysis

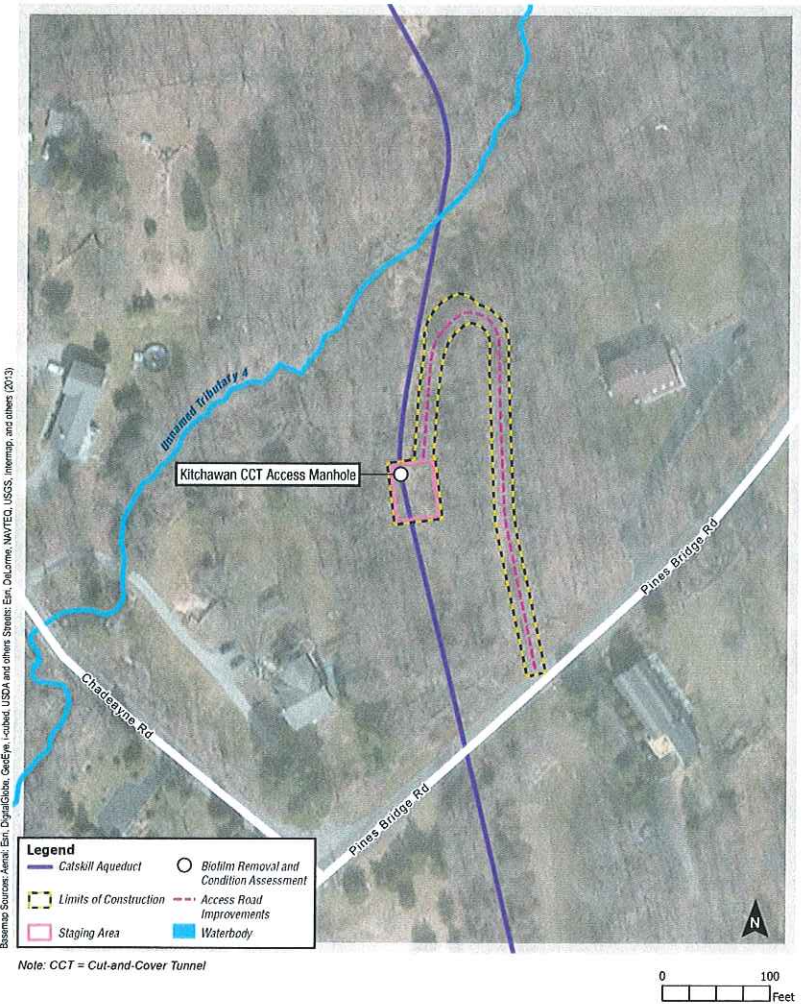


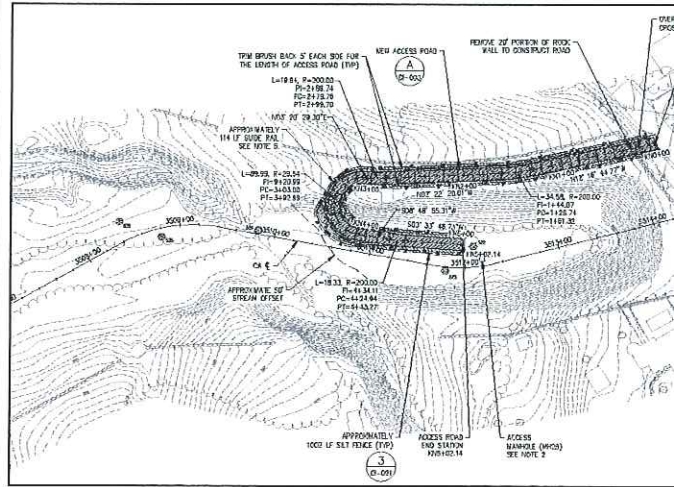
Figure 9.14-47: Site Plan – Pines Bridge Road Study Area



Photograph 1: Looking southwest towards Kitchawan CCT Access Manhole. Photo taken from the berm of the aqueduct where the proposed access road off Pines Bridge Road is proposed.



Photograph 2: Looking north towards location of proposed access road on Pines Bridge Road.



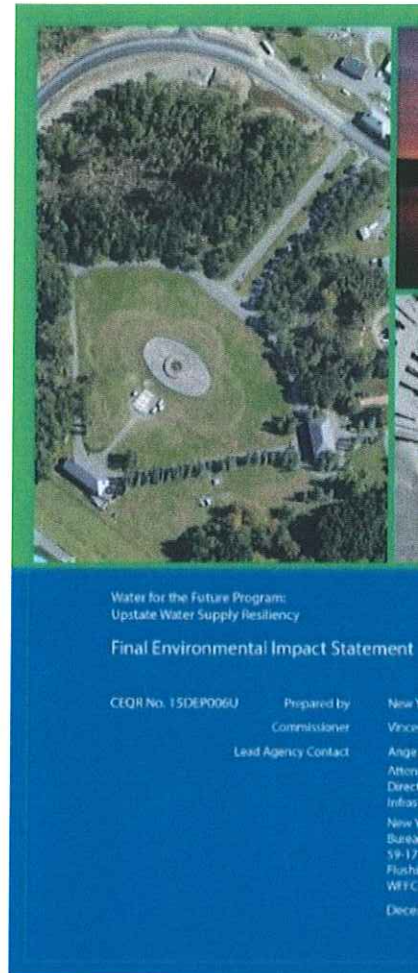
Disturbance

Regulated Water Resources Disturbance

Disturbance Location	Watercourse Below Ordinary High Water (Square Feet)		100-foot Control Area (Square Feet)	
	Temporary	Permanent	Temporary	Permanent
	650	820	4,240	4,600
	950	210	1,600	7,320
	560	0	4,810	0
	0	0	0	2,330
	2,160	1,030	10,650	14,250
Watercourse Disturbance	3,190		NA	
Control Area	NA		24,900	
Distance to Regulated Resources and Control	28,090			
Values have been rounded to the nearest hundredth where applicable				

Anticipated Schedule

- Overall Construction (CAT-RR):
 - Intermittent, short duration work, Fall 2018 through June 2021
 - Fall Shutdowns planned from 2018 through 2020
- Yorktown-specific work:
 - **Regulated wetland areas – Spring/Summer 2019: Yorktown-2A, 6, 10, 11**
 - Other work areas, intermittent, short duration work:
 - Fall 2018 – staging area and site preparation
 - Spring 2019 – mechanical work
 - Fall 2019 – interior aqueduct work
 - Fall 2020 – interior aqueduct work
- Environmental Impact Statement (EIS):
 - Final EIS: December 15, 2017
 - Findings Statement: January 5, 2018



http://www.nyc.gov/html/dep/html/environmental_reviews/upstate_water_supply_resiliency.shtml

Thank you!



NYC Water for the Future
Environmental Protection

