JOINT APPLICATION FORM

For Permits/Determinations to undertake activities affecting streams, waterways, waterbodies, wetlands, coastal areas and sources of water withdrawal.

New York State

You must separately apply for and obtain separate Permits/Determinations from each involved agency prior to proceeding with work. Please read all instructions.

US Army Corps of Engineers (USACE)

APPLICATIONS TO

1. NYS Department of Environmental Conservation

Check all permits that apply:

- ☐ Stream Disturbance
- ☐ Excavation and Fill in Navigable Waters
- ☐ Docks, Moorings or Platforms
- ☐ Dams and Impoundment Structures
- ☐ 401 Water Quality Certification
- ☐ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Coastal Erosion Management
- ☐ Wild, Scenic and Recreational Rivers
- ☑ Water Withdrawal
- ☐ Long Island Well
- ☐ Aquatic Vegetation Control
- ☐ Aquatic Insect Control
- ☐ Fish Control
- ☐ Incidental Take of Endangered/Threatened Species

☑ I am sending this application to this agency.

2. US Army Corps of Engineers

Check all permits that apply:

- ☐ Section 404 Clean Water Act
- ☐ Section 10 Rivers and Harbors Act
- ☐ Nationwide Permit(s) - Identify Number(s):

Preconstruction Notification - ☐ Y / ☐ N

☐ I am sending this application to this agency.

3. NYS Office of General Services

Check all permits that apply:

- ☐ State Owned Lands Under Water
- ☐ Utility Easement (pipelines, conduits, cables, etc.)
- ☐ Docks, Moorings or Platforms

☐ I am sending this application to this agency.

4. NYS Department of State

Check if this applies:

- ☐ Coastal Consistency Concurrence

☐ I am sending this application to this agency.

5. Name of Applicant (use full name)

TC Ravenswood LLC

Mailing Address: 38-54 Vernon Blvd

Post Office City: Long Island City

State: NY Zip Code: 11101

Telephone (daytime): 718.706.2702

Email: Kenneth_Yager@transcanada.com

Applicant must be:

- ☑ Owner
- ☐ Operator
- ☐ Lessee

(check all that apply)

Taxpayer ID (If applicant is NOT an individual): 11-3484082

6. Name of Facility or Property Owner (if different than Applicant)

Mailing Address:

Post Office City:

State: Zip Code:

Telephone (daytime):

Email:

7. Contact/Agent Name

Kenneth Yager

Company Name: TC Ravenswood LLC

Mailing Address: 38-54 Vernon Blvd

Post Office City: Long Island City

State: NY Zip Code: 11101

Telephone (daytime): 718 706 2863

Email: Kenneth_Yager@transcanada.com

8. Project / Facility Name

Ravenswood Generating Station

Property Tax Map Section / Block / Lot Number: Block 357 Lot 1

Project Location - Provide directions and distances to roads, bridges and bodies of waters:

Ravenswood cooling water intakes located on the shoreline of the East River North of the Queensboro Bridge and South of the Roosevelt Island Bridge.

Street Address, if applicable: 38-54 Vernon Blvd.

Post Office City: Long Island City State: NY Zip Code: 11101

Town / Village / City: Long Island City

County: Queens

Name of USGS Quadrangle Map: Central Park

Stream/Water Body Name: East River

Location Coordinates: Enter NYTMs in kilometers, **OR** Latitude/Longitude

NYTM-E	NYTM-N	Latitude	Longitude
		40 45' 41"	73 56' 39"

For Agency Use Only DEC Application Number: USACE Number:

9. **Project Description and Purpose:** Provide a complete narrative description of the proposed work and its purpose. Attach additional page(s) if necessary. Include: description of current site conditions and how the site will be modified by the proposed project; structures and fill materials to be installed; type and quantity of materials to be used (i.e , square ft of coverage and cubic yds of fill material and/or structures below ordinary/mean high water) area of excavation or dredging, volumes of material to be removed and location of dredged material disposal or use, work methods and type of equipment to be used; pollution control methods and mitigation activities proposed to compensate for resource impacts; and where applicable, the phasing of activities. **ATTACH PLANS ON SEPARATE PAGES.**

The Ravenswood Power Station has three electric generating units that utilize once through cooling water intake structure Circulating Water Pumps (CWP) take suction from the East River and circulate water through the condensor to condense exausted steam from the low pressure turbine Water withdrawn is then return to the East River via SPDES permit NY 0005193. No modifications or maintenance to the water withdrawal system is proposed.

Proposed Use: ☐ Private ☐ Public ☑ Commercial	Proposed Start Date:	Estimated Completion Date:

Has Work Begun on Project? ☑ Yes ☐ No If Yes, explain

The Ravenswood Generating station has been in operation since 1963

Will Project Occupy Federal, State or Municipal Land? ☐ Yes ☑ No If Yes, please specify.

10. List Previous Permit / Application Numbers (if any) and Dates:

11. Will this project require additional Federal, State, or Local Permits including zoning changes? ☑ Yes ☐ No If yes, please list:

NYCRR Part 601 Water Withdrawal Permit

12. **Signatures.** If applicant is not the owner, both must sign the application.

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

	Printed Name	Title	Date
Signature of Applicant	Kenneth A Yager	Compliance Mgr.	5/31/2013
Signature of Owner			
Signature of Agent			

For Agency Use Only **DETERMINATION OF NO PERMIT REQUIRED**

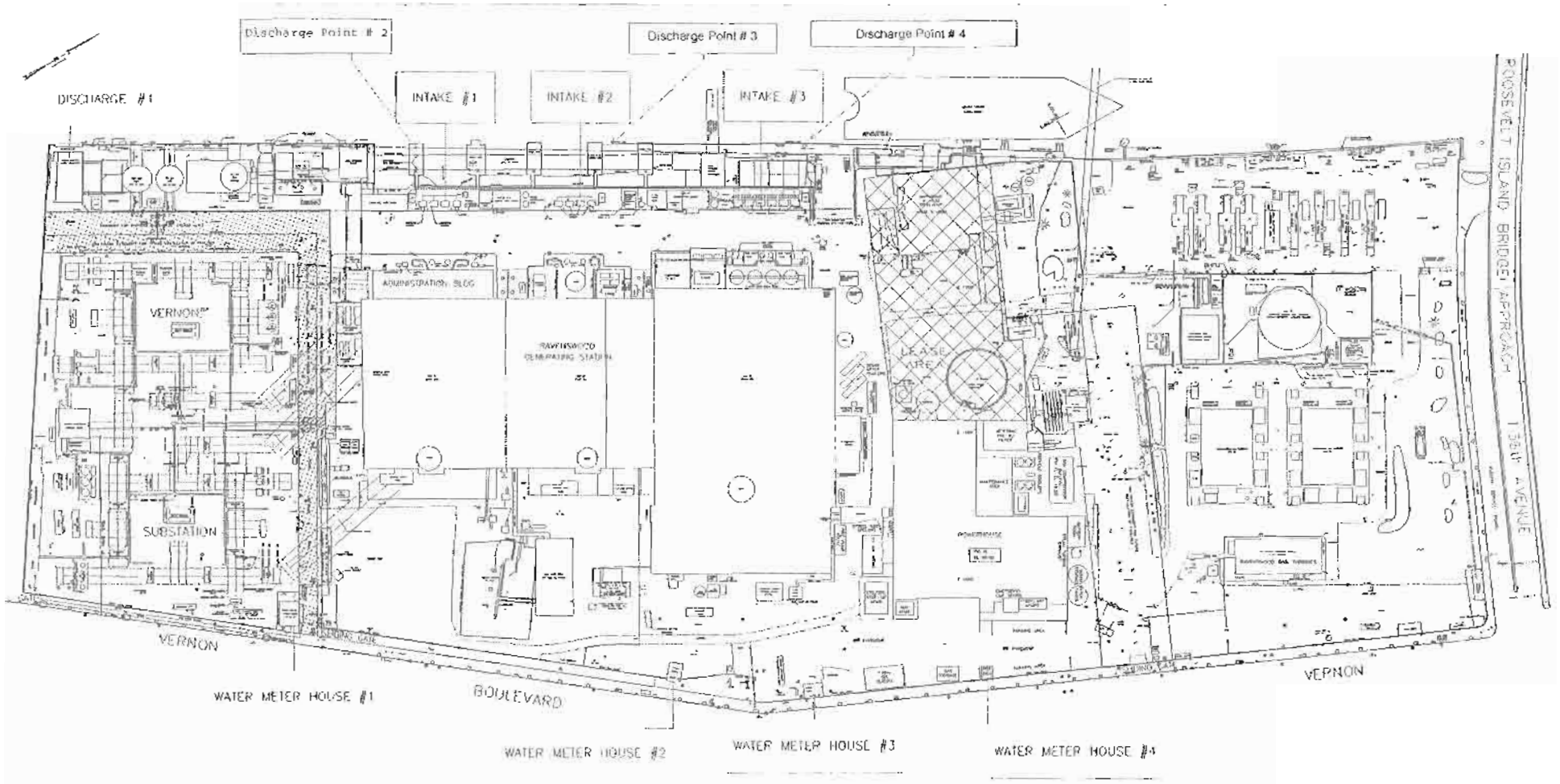
_____ (Agency Name) has determined that No Permit is required from this Agency for the project described in this application. Agency Project Number _____

Agency Representative: Name (printed) _____ Title _____

Signature _____ Date _____

Figure 1

Ravenswood Generating Station
General Map 601.10(b)



Imported	Discharge/Return Points	Withdrawal from East River
Water Meter House # 1-NYC DEP Water Supply	Discharge Point #1-SPDES Outfall 001	Intake # 1- Unit 10 Water Intake
Water Meter House # 2-NYC DEP Water Supply	Discharge Point #2-SPDES Outfall 008	Intake # 2- Unit 20 Water Intake
Water Meter House # 3-NYC DEP Water Supply	Discharge Point #3-SPDES Outfall 009	Intake # 3-Unit 30 Water Intake
Water Meter House #4-NYC DEP Water Supply	Discharge Point #4-SPDES Outfall 010	

Figure 2

Source: USGS Central Park, NY-NJ 2013

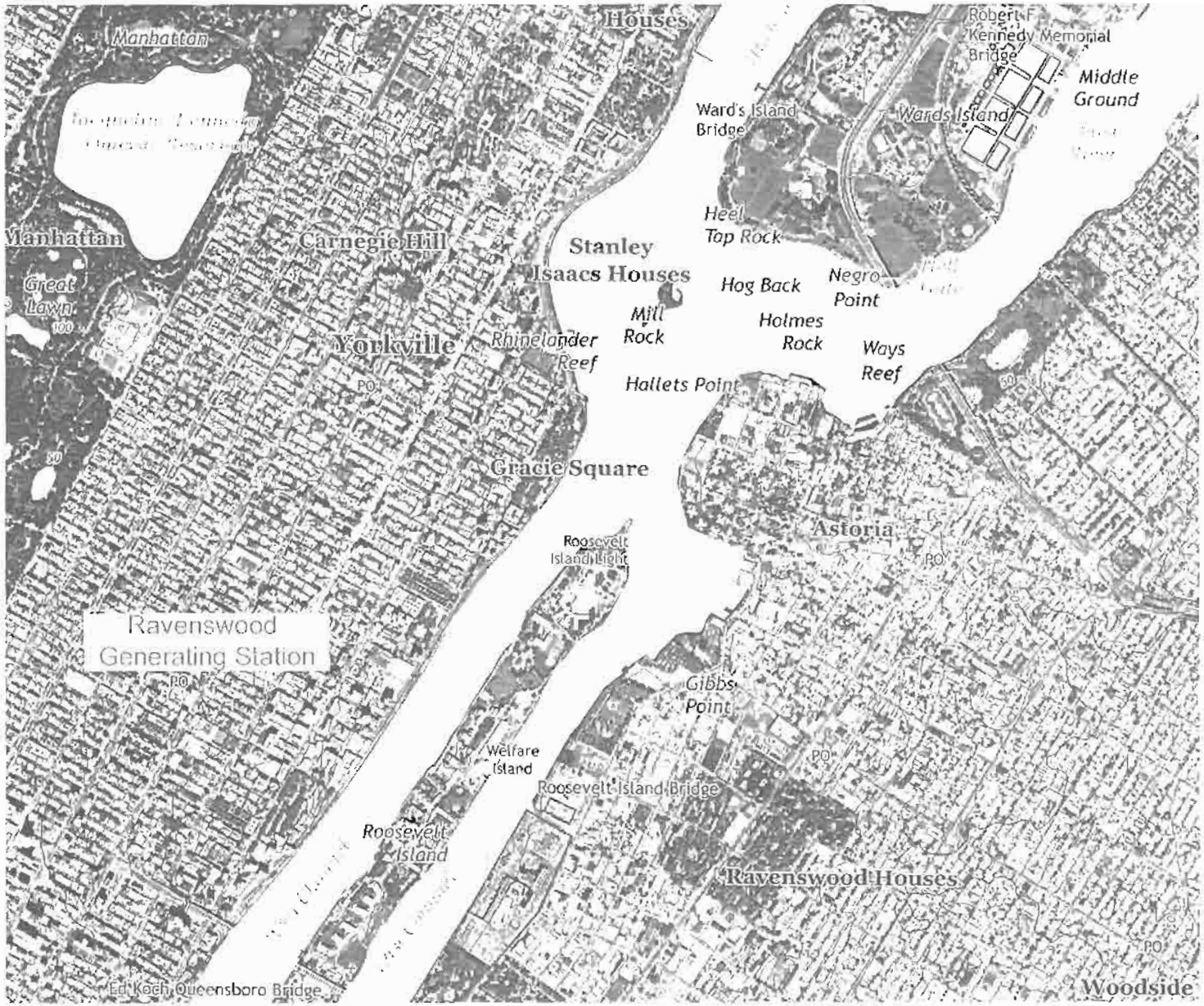

Houses
Manhattan
Robert F Kennedy Memorial Bridge
Middle Ground
Ward's Island Bridge
Wards Island
Heel Tap Rock
Manhattan
Carnegie Hill
Stanley Isaacs Houses
Great Lawn
Hog Back
Negro Point
Mill Rock
Holmes Rock
Yorkville
Rhinelander Reef
Ways Reef
Hallets Point
PO
Gracie Square
Astoria
Roosevelt Island Light
Ravenswood Generating Station
Gibbs Point
Welfare Island
Roosevelt Island Bridge
Roosevelt Island
Ravenswood Houses
Ed Koch Queensboro Bridge
Woodside

Figure 3

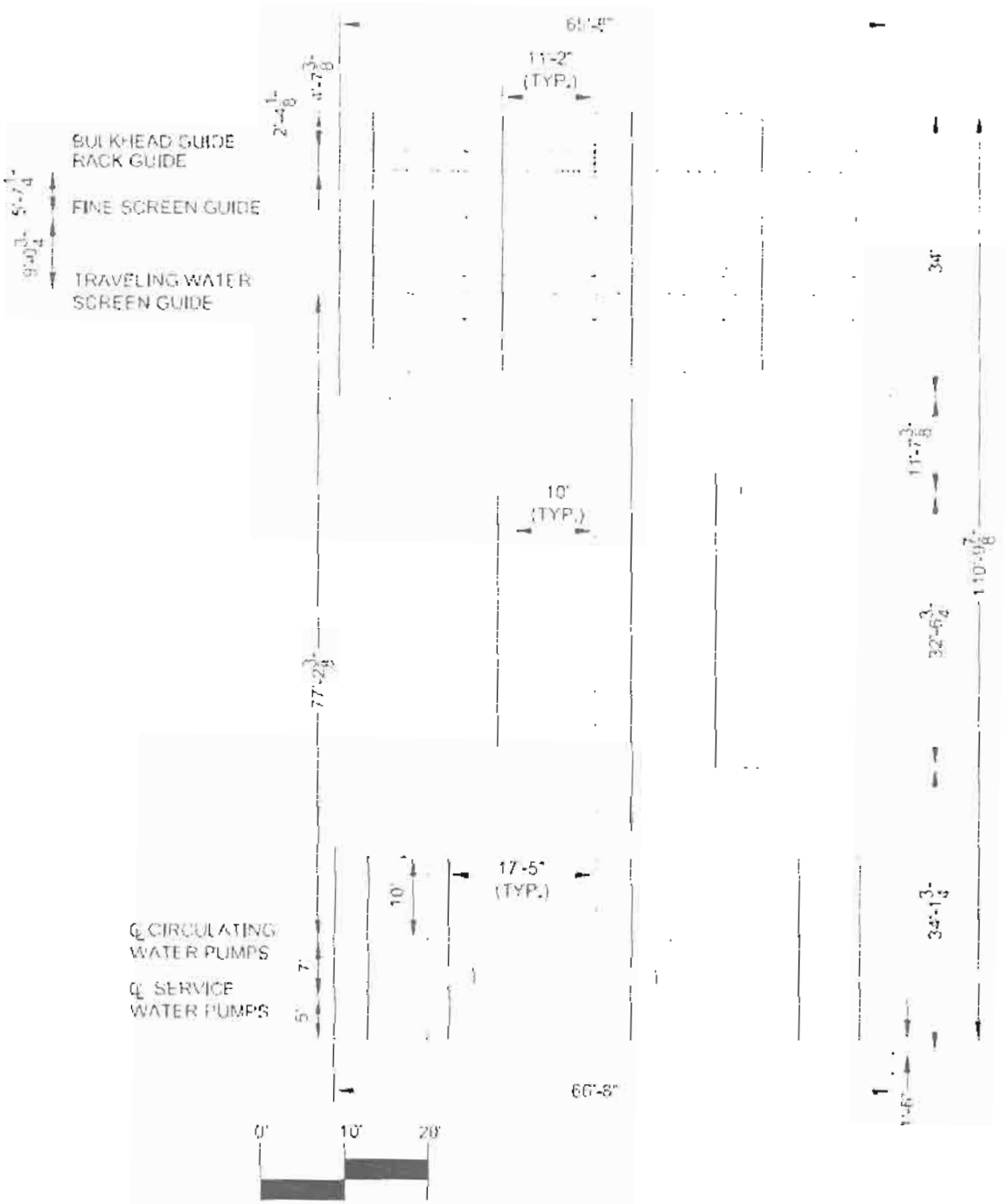


Figure 3 – Ravenswood Generating Station Unit 10 CWIS – Plan (Unit 20 is Identical)

Figure 4

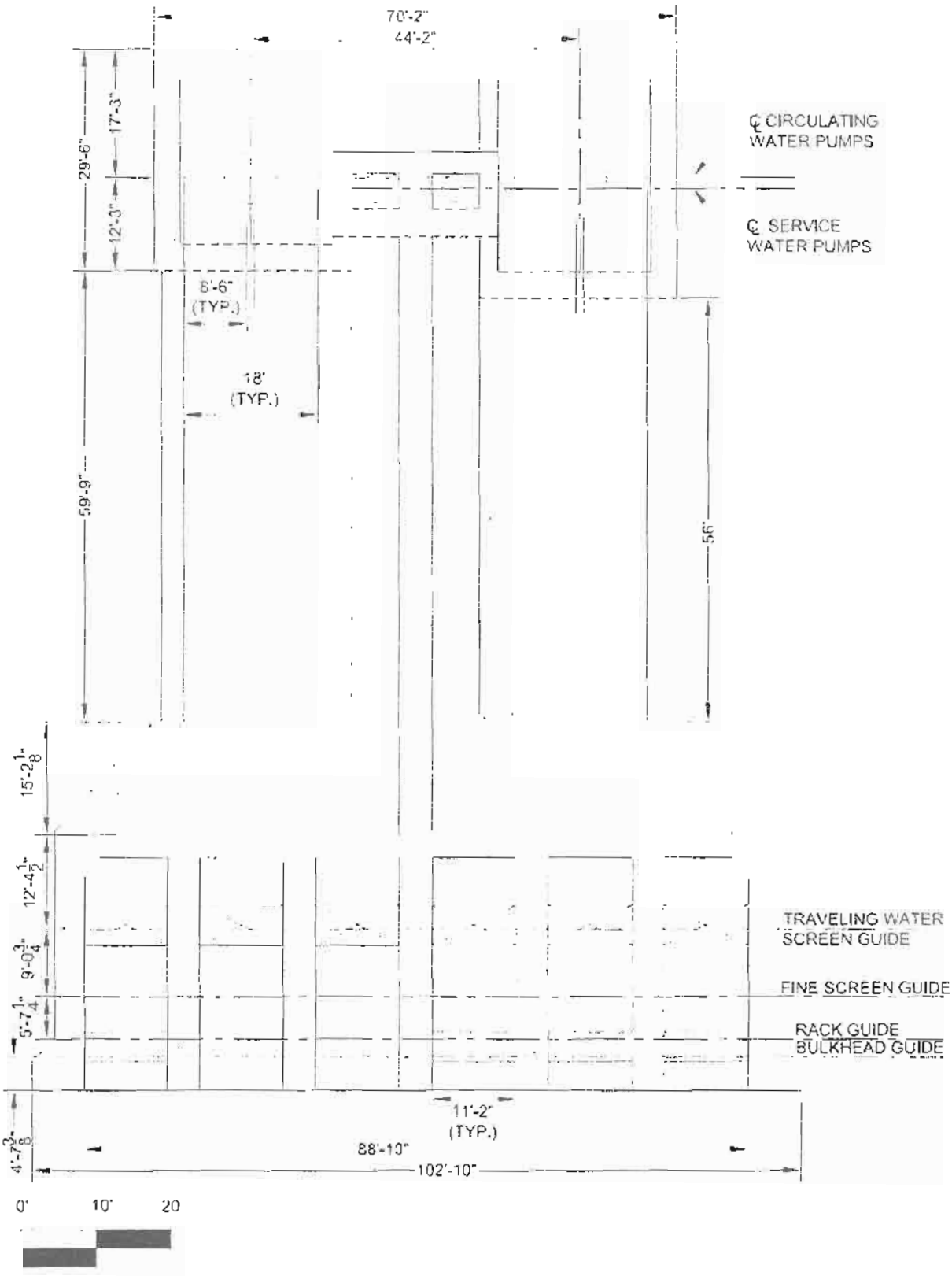


Figure 4 – Ravenswood Generating Station Unit 30 CWIS – Plan

New York State Department of Environmental Conservation

Water Withdrawal Application Supplement WW-1

Pursuant to 6 NYCRR Part 601

READ THE INSTRUCTIONS ON PAGE 2 BEFORE COMPLETING THIS FORM

FOR DEPARTMENT USE ONLY

Application No.

WWA Number

1. APPLICANT NAME: TC Ravenswood LLC

2. FACILITY NAME: Ravenswood Generating Station

3. PROJECT TYPE
- [x] Water Withdrawal
- [ ] New Public Water Supply Service Area or Extension
- [ ] Land Acquisition for Public Water Supply
- [ ] Change in Use of Existing Water Withdrawal

4. WATER USE TYPE
- [ ] Public Water Supply
- [ ] Bottled/Bulk Water
- [ ] Commercial
- [ ] Cooling
- [ ] Industrial
- [ ] Institutional
- [ ] Mine Dewatering
- [ ] Oil/Gas Production
- [x] Power Production
- [ ] Recreational
- [ ] Other:

5. WITHDRAWAL TYPE [x] Existing [ ] New — If this is an existing public water supply, provide the most recent WSA or WWA Number:

If other than public water supply, list other existing or pending related DEC permits (e.g., SPDES, Mining, Dam):

SPDES NY 0005193

6. WATER WITHDRAWAL SOURCE
- [x] Surface Water — Water Body Name(s): East River
- [ ] Groundwater — Nearest Surface Water Body: ____ Distance From Well (in feet): ____

7. WATER SUPPLY TO OTHER STATES Does this project involve the transport of any fresh water of NYS through pipes, conduits, ditches or canals to any other state?

[x] No [ ] Yes, describe:

8. TRANSPORTATION OF WATER BY VESSEL Does this project involve the transport by vessel of more than 10,000 gallons per day of surface water? (Excludes ballast water necessary for normal vessel activity. A vessel is defined as any floating craft propelled by mechanical power.) [ ] Yes [x] No

9. WATER WITHDRAWAL AMOUNTS This project involves the withdrawal of up to: 1,534,752,00 gallons per day Source Name: East River

Does the project include a MAJOR DRAINAGE BASIN TRANSFER of water? See map at http://www.dec.ny.gov/lands/36800.html [x] No [ ] Yes

If yes, [ ] Existing [ ] New From Basin: ____ To Basin: ____

10. *REQUIRED EXHIBITS (6 NYCRR Part 601.10) Provide the names of the required exhibits applicable to this withdrawal:*

601.10(a) PROJECT AUTHORIZATION FOR PUBLIC WATER SUPPLY SYSTEMS (e.g. Resolutions, Ordinances)	Not Applicable	*601.10(h) ACQUISITION MAPS (Map of any lands to be acquired as part of project)*	Not Applicable
601.10(b) GENERAL MAP (e.g. Project Location, For Public Water Supplies - water service area boundary)	See Figure # 1	*601.10(i) WATER ANALYSES (Public Water Supplies should submit chemical & bacterial analysis directly to NYSDOH)*	Not Applicable
601.10(c) WATERSHED MAPS (Topographic map with location of withdrawal and any return flow or interbasin diversions).	See Figure #'s 1 & 2	*601.10(j) TREATMENT METHODS (Public Water Supplies - proposed methods to meet NYSDOH standards)*	Not Applicable
601.10(d) CONTRACT PLANS (Public Water Supplies should submit directly to NYSDOH for review and approval)	Not Applicable	*601.10(k) PROJECT JUSTIFICATION (Provide summary statement of answers to the eight justification questions)*	See Section (K)
601.10(e) ENGINEER'S REPORT (Signed by NYS PE, includes project description, water source yields and demands, etc.)	See Appendix A	*601.10(l) CANAL WITHDRAWAL APPROVALS (If applicable, provide adequate proof of approval from Canal Authority.)*	Not Applicable
601.10(f) WATER CONSERVATION PROGRAM (Completed Water Conservation Program Form)	See Appendix B	*601.10(m) TRANSMITTAL LETTER (Include all contact information for applicant, attorney, engineer, etc.)*	See Section M
601.10(g) ANNUAL REPORTING FORM FOR EXISTING WITHDRAWALS (Most recent submitted annual report)	See Appendix C	*601.10(n) GREAT LAKES-ST. LAWRENCE RIVER WATER RESOURCES COMPACT PROCESS REQUIREMENTS (Only applicable to Public Water Supply diversions from Great Lakes Basin - no other diversion types are allowed).*	Not applicable

Clear Form

Applicant Signature: [signature]

Name: Kenneth Yager

Title: Compliance Manager

Date: 5/31/2013

NYCRR Part 601
Water Withdrawal Permit Application
601.10 Requirements

(a) Project Authorization
The existing water withdrawal system was commissioned in 1963 and is currently used to supply once through cooling water for an electric generating facility. The current facility holds a valid SPDES permit for discharge of cooling and process water from permitted outfalls. The water withdrawal system is not a public supply system and is not applicable to the requirements set forth in subpart (a).

(b) General Map
See Drawing # 1-Ravenswood Generating Station General Map.

(c) Watershed Maps
See Drawing # 2- Watershed maps

(d) Contract Plans
No contract plans exist for the water withdrawal system. The existing water withdrawal system was commissioned in 1963 and is currently used to supply once through cooling water for an electric generating facility.

(e) Engineer's Report
See Appendix A- Engineer's Report

(f) Water Conservation Program
See Appendix B-Water Conservation Form

(g) Annual Water Withdrawal Report
See Appendix C- 2012 Water Withdrawal Report

(h) Acquisition Maps
The water withdrawal system is an existing system that was commissioned in 1963 and is currently used to supply once through cooling water for an electric generating facility. Land acquisition maps are not required for the existing water withdrawal system.

(i) Water Analyses
The water withdrawal system is not a public supply system and chemical and bacteriological analyses are not performed. Therefore, Ravenswood is not applicable to the requirements set forth in subpart (i).

(j) Treatment Methods

The water withdrawal system is not a public supply system required to meet Department of Health standards and is therefore not applicable to the requirements set forth in subpart (j).

(k) Project Justification

The Ravenswood Generating Station is located in Long Island City, New York and is situated along the east bank of the upper East River, directly across from Roosevelt Island. The facility is comprised of three conventional steam electric generating units (Units 10, 20 & 30), a combined cycle unit (unit 40), and simple cycle gas turbine units. Cooling water for Units 10, 20 & 30 is currently withdrawn from the East River through intake structures and is routed through steam surface condensers.. Low pressure steam is exhausted from the low pressure turbines and is directed to the condenser where it passes over the tubes and is condensed to back to water. The cooling water is then returned to a common discharge canal, which is returned to the East River The siting of the electric generating facility along the East River is ideal due to the plentiful surface water supply for once through cooling. The East River's mean tidal flow is about 240,000 cubic feet per second (1.79 million gallons per second) allowing for Ravenswood to adequately and reasonably withdraw and return the necessary water for cooling.

The installation of variable frequency drives (VFD) on the circulating water pumps (CWP) has allowed for vast conservation improvements and an overall reduction in water withdrawn from the East River. The installation of VFDs has reduced electricity consumed by the CWP while in VFD operation due to the slower motor speeds. More importantly, the installation of VFDs has led to a considerable overall reduction in the volume of surface water withdrawn from the East River. The upgrades performed on the CWPS have directly made the water withdrawal system an environmentally sound and economically feasible project. In addition to the conservation of water withdrawn from the East River, the VFDs installed on the CWPs have also helped reduce the overall adverse environmentally impact associated with the impingement and entrainment of marine organisms. The volume of water withdrawn is directly proportional to the number of organisms impinged and entrained. A flow reduction achieved by the use of variable speed pumps has a proportional reduction to impinged and entrained organisms. The installation and implementation of VFDs is projected to reduce impingement mortality and entrainment of organisms by 90% and 65% from baseline, respectively. The current water withdrawal system utilized at Ravenswood complies with the various federal, state, and local laws.

(l) Canal Withdrawal Approval

The water withdrawal system is not located on a canal and is therefore not applicable to the requirements set forth in subpart (l).

(m) Transmittal Letter

(1)

Applicant:
TC Ravenswood LLC
Kenneth Yager
38-54 Vernon Blvd.
Long Island City, NY 11101

Engineer:
Erwin Schaub, P.E.
38-54 Vernon Blvd.
Long Island City, NY 11101

(2) If required, a public venue will be determined at the appropriate time.

(3) Publications in local newspapers for facility permits are published in the 'Daily News'.

(n) Great Lakes-St. Lawrence River Basin
The water withdrawal system is not located within the Great Lakes or St. Lawrence River basin and is therefore not applicable to the requirements set forth in subpart (n).

Appendix A

NYCRR Part 601
Water Withdrawal Permit Application
Engineer's Report

Professional Engineer's Certification

Name: Erwin Schaub
Firm: TC Ravenswood LLC
Address: 38-54 Vernon Blvd
Long Island City, New York 11101

Signature: _____

NYCRR Part 601
Water Withdrawal Permit Application
Engineer's Report

1. **General description of the project and the engineering features of the existing water withdrawal system.**

The Ravenswood Generating Station is located in Long Island City, New York and is situated along the east bank of the upper East River, directly across from Roosevelt Island. The facility is comprised of three conventional steam electric generating units (Units 10, 20 & 30), a combined cycle unit (unit 40), and simple cycle gas turbine units. Cooling water for units 10, 20, and 30 is withdrawn from the East River through intake structures and is routed through steam surface condensers. Low pressure steam is exhausted from the low pressure turbines and is directed to the condenser where it passes over the tubes and is condensed back to water. The cooling water is then returned to a common discharge canal, which is returned to the East River. Unit 40 and the simple cycle gas turbines do not utilize a once through cooling water system.

Condenser cooling water and service water for units 10, 20 and 30 is drawn into a protected embayment and intake structure. Units 10 and 20 each have four water intakes bays; two bays provide water to each circulator. Unit 30 has six intake bays; three bays provide water to each circulator. Wooden debris skimmers (ice breakers) are located at the entrance to each intake bay to prevent floating material from entering the bays. The continuous traveling water screens (3/8 inch square mesh) are equipped with high pressure (screen wash) spray systems to wash off impinged fish, crabs, and debris from the riverside of the screen. The wash water and impinged material is then diverted back to the East River though low stress fish return piping.

Each of the three units is equipped with two motor driven circulating water pumps. At Units 10 and 20; each pump has a rated capacity of 107,000 gallons per minute (GPM). Unit 30 pumps are rated at 268,500 GPM. Each motor has been retrofitted with variable frequency drives (VFD). A VFD is a device that rectifies 60 cycle AC current to direct current. Then using insulated gate bipolar transistors (IGBT's), converts the DC supply to a square wave alternating supply at adjustable frequency. This causes the motor to operate at variable speeds. The VFD allows the facility to decrease the circulating water pump motor speed and consequently proportionately decrease the circulating water flow. Operation at less than full flow capacity directly relates to conservation.

A service water system (Low Pressure Salt Water Pumps) also provides water from the East River for cooling small equipment throughout the facility and

turbine-generator cooling. Units 10 and 20 each have a Low Pressure Salt Water Pump with a shared spare and unit 30 has three Low Pressure Salt Water Pumps.

2. **A listing of all existing sources of water supply, including wells, surface withdrawals, and any purchases sales or transfer of water.**

Existing Source	Water Supply
11 Circulating Water Pump	Surface-East River
12 Circulating Water Pump	Surface-East River
21 Circulating Water Pump	Surface-East River
22 Circulating Water Pump	Surface-East River
31 Circulating Water Pump	Surface-East River
32 Circulating Water Pump	Surface-East River
11 Low Pressure Salt Water Pump	Surface-East River
21 Low Pressure Salt Water Pump	Surface-East River
1-2 Low Pressure Salt Water Pump	Surface-East River
31 Low Pressure Salt Water Pump	Surface-East River
32 Low Pressure Salt Water Pump	Surface-East River
33 Low Pressure Salt Water Pump	Surface-East River
Unit 10, 20, & 30 Screen Wash Pumps (5)	Surface-East River
Water Meter House 1, 2, 3 & 4	Purchase - NYCDEP

3. **Evaluation of a practicable alternative to the proposed source shall include an analysis of increased water conservation measures as a means to reduce or eliminate the need for the proposed source.**

Cooling water is a critical component to the production of electricity at the station. Total elimination of cooling water is not a practical alternative. However, conservation methods are a viable option that has been implemented at the facility in order to reduce cooling water withdrawn from the East River. Circulating Water Pumps (CWP) have been retrofitted with VFDs to allow for reduced surface water withdrawal at reduced generation loading and reduced cooling water temperatures. An analysis of the first ten months of cooling water withdrawal from the East River was performed on the CWPs with VFD operation. The average hourly CWP GPM was calculated by utilizing continuously recorded motor speeds. The hourly CWP GPM was then compared to average CWP GPM if VFDs had not been installed (full flow operation). The difference between the two averages was then used to determine the water conservation directly related to the retrofit of the CWP on a daily basis for all units. Monthly averages are shown below. The overall reduction in surface water withdrawn from the East River is significantly reduced with the use of VFD operation of the CWPs. The conservation methods utilized at Ravenswood have directly led to substantial conservation of surface water and have been adequately implemented.

	Unit 10			Unit 20			Unit 30			
	Unit 10 CWP AVG GPM with VFD Operation	Unit 10 CWP AVG GPM NO VFD	AVG Withdrawal Conservation (GPD)	Unit 20 CWP AVG GPM with VFD Operation	Unit 20 CWP AVG GPM NO VFD	AVG. Withdrawal Conservation (GPD)	Unit 30 CWP AVG GPM with VFD Operation	Unit 30 CWP AVG GPM NO VFD	AVG Withdrawal Conservation (GPD)	AVG. Water Withdrawal Conservation All Units (GPD)
July 2012	151,930	179,484	40,973,475	157,429	189,839	46,670,534	338,158	450,387	161,609,894	249,253,904
August 2012	155,883	202,536	28,956,157	167,411	189,839	32,295,838	165,404	225,194	86,096,285	157,348,281
Sept 2012	121,997	168,290	27,961,262	158,758	175,253	23,753,039	22,658	24,587	2,777,300	54,491,601
October 2012	168,933	193,290	35,074,172	52,196	65,581	19,274,255	364,899	537,000	247,826,058	302,174,485
November 2012	103,902	189,072	8,469,802	131,006	160,890	43,032,785	325,356	389,758	92,738,741	144,241,328
December 2012	214,000	214,000	0	43,808	55,226	16,441,232	0	0	0	16,441,232
January 2013	107,490	214,000	34,087,195	86,162	177,103	114,502,914	0	0	0	148,590,109
February 2013	24,563	34,516	10,485,108	2,779	5,753	3,693,642	77,542	138,581	87,895,382	102,074,132
March 2013	0	0	0	123,081	186,387	91,160,256	0	0	0	91,160,256
April 2013	9,107	20,710	17,264,262	95,504	192,400	139,530,196	0	0	0	156,237,546

4. For public water supply systems, the present and projected population of the water service area and the present and projected consumption rate.

   Not applicable to Ravenswood Generating Station.

5. For public water supply systems, the radius of land owned or controlled for wellhead protection surrounding any proposed groundwater withdrawal, or the water quality classification and a copy of any Department of Health Watershed Rules and Regulations for any proposed surface withdrawal.

   Not applicable to Ravenswood Generating Station.

6. The general character and extent and essential design features of proposed controlling, diverting or regulatory works.

   Implementation of site specific procedures on the operation of the CWPs has been employed at the site. Personnel are trained in the operation of the equipment and are instructed on CWP speeds for maximum conservation of water withdrawal.

7. The proposed instantaneous and maximum daily rates of withdrawal; the existing and projected daily average, daily maximum, and 30 day maximum water demands of the withdrawal system;

2012 Maximum daily withdrawal rate	1,534.75 MGD
2012 Existing Daily Average	486.49 MGD
Projected Daily Average	486.49 MGD
Daily Maximum	1,489.70 MGD
2012 30 Day Maximum Demand	27,933.85 MG30DAY

8. **When applicable, any fire suppression flows which can be supplied, including the duration for which such flows can be maintained.**

   Water for fire suppression is fed from the city water supply (NYC DEP). The city water system supplies the suction to fire pumps which discharge to various fire protection systems located at the facility.

Fire Protection System	Flow
Dock Foam Fire Suppression System	3,000 GPM
GT Foam Fire Suppression System	1,000 GPM
Unit 40 Fire Suppression system	3,000 GPM
10, 20 & 30 Standpipe Booster Pump	750 GPM
06 Tank Foam Fire Suppression System	500 GPM
Rainey Foam Fire Suppression System	1,000 GPM
10/20 Transformer Fire Suppression System	750 GPM

9. **For public water supply systems, the location, extent and character of proposed treatment.**

   Not applicable to Ravenswood Generating Station.

10. **For groundwater sources, well drinking logs, monitoring well locations and pump test data and analyses of results.**

    Not applicable to Ravenswood Generating Station.

11. **For surface water sources, information on rainfall, stream flows and classifications, contributing watershed size, location of nearby USGS stream gauges, other upstream water withdrawals, safe yield analysis or passby flow calculations and proposed withdrawal methods including intake structure design and screening.**

    The Hudson-Raritan Estuary System is a coastal plain estuary dominated by the drowned river valley of the Hudson River estuary. The estuary system extends 170 miles from the dam at Troy, NY to Sandy Hook, NJ. The freshwater tributary to the estuary system drains a total of about 16,300 square miles. Seasonal and inter-annual variation of stream flow of the Hudson River recorded at Green Island, New York, near Troy (USGS gage 0 1358000) is characterized by high flow during March through May, with monthly mean peak flow of 32,719 cubic

feet per second (CFS). The mean oscillating tidal flow in the East River reaches about 240,000 CFS. The estuary system is comprised of all tidally inundated areas within these drainage basins including tidal straights; Harlem and East Rivers. The East River extends 16 miles from the battery to Throgs Neck and Willets Point at the Long Island Sound. The tidal straight is divided into distinct hydrological sections. The East River is narrow and bulk-headed along most of the length, and is divided into east and west channels where it passes Roosevelt Island. The station is located on the east channel from which the station withdraws its cooling water. Maximum river velocities are high, reaching 5.0 ft/sec. The station utilizes a once through cooling water system. The intake structures are recessed 60 feet inside the bulkhead line. Units 10 and 20 each have four water intake bays that measure 11.2 feet wide and by 17 feet deep at mean low water (MLW). Unit 30 has six intake bays that each measure 11.2 feet wide by 24 feet deep (MLW). The existing technology includes 14 vertical continuous traveling screens outfitted with 3/8 inch square mesh and high pressure wash to remove impinged material.

Appendix B

DEPARTMENT OF ENVIRONMENTAL CONSERVATION

WATER CONSERVATION PROGRAM FORM

NON-POTABLE WATER SUPPLIES

TO BE COMPLETED AND SUBMITTED AS PART OF A
NYSDEC WATER WITHDRAWAL PERMIT APPLICATION
*SEE PAGE 6 FOR FURTHER INTRODUCTION AND INSTRUCTION REGARDING THIS FORM

If your water facility already has its own written water conservation program, you may submit it as a supplement to this WCPF. If your system is new, indicate the water conservation measures that will be taken when the system is completed (e.g. All sources of supply will be 100% metered).

I. GENERAL SYSTEM INFORMATION

Facility Name: Ravenswood Generating Station		DEC No.	
Street Address: 38-54 Vernon Blvd		WWA No.	
Post Office Box:	County: Queens	State: New York	ZIP: 11101
Contact Name: Kenneth Yager			
Street Address: 38-54 Vernon Blvd			
Post Office Box:	County:Queens	State: New York	ZIP: 11101
Applicant's Telephone: 7,187,062,702		Contact's Telephone: 7,187,062,702	

II. SOURCES OF WATER SUPPLY

[State capacity and withdrawal in gallons per minute (gpm), gallons per day (gpd), or million gallons per day (mgd).]

Source Type: S = Surface supply, G = Ground supply, P = Purchased supply
Source Status: R = Regular use, S = Standby use, E = Emergency use, I = Inactive, D = Decommissioned

Source Name	Source Type	Source Status	Tested Capacity	Actual Current Withdrawal	Start-up Year
East River	S	R	1,534.75 MGD	486.49 MGD	1963
NYCDEP	P	R		0.455 MGD	

III. WATER SOURCES AND METERING

For unmetered systems, please provide your best estimates for water production and/or consumption.

Are all sources of supply (including major interconnections) equipped with master meters?	No
How often are they read? Service water meters are read monthly	
How often are they calibrated? Meters are not calibrated at this time	
Are there secondary meters located within the facility or system? Yes	If yes, how many? 15
Describe secondary metering system if applicable: All incoming city water is metered by a NYC DEP service water meter. Inside the plant various secondary water meters are installed to determine water usage throughout the site. Surface water is withdrawn from the East River and flow rate is determined by pump speed.	

Water Production for Calendar Year		
Total metered water production:	177,570,461,410	gallons per year
Average day production (total/days of use):	486,494,415	gallons per day
Maximum day production (largest single day):	1,489,700,000	gallons per day

What are your future goals and schedule for water metering?

City water connections from the NYC DEP water system are currently metered to determine the total water purchased. Multiple water meters are installed throughout the facility and are read monthly to determine water usage at different parts of the steam-electric generation process. Currently, primary and secondary water meters are being reviewed to determine the best practice for calibration of these meters.

Best Management Practices:

** 100% metering of all sources of water supply.*

** Source and secondary meters must be tested and calibrated annually.*

IV. WATER AUDITING

The process of conducting an audit of a water system will enable the collection of data on how much and where water enters, leaves and is used within a facility or system. Another goal of a water audit is to estimate unaccounted-for water use, which includes: Losses through leaks, improperly-functioning or inoperative system controls and unmetered sources of water. The water audit provides a system with a baseline against which water-conservation measures can be evaluated.

Do you conduct a water audit at least once each year? No If yes, please submit a copy of your latest audit in addition to completing the following section.

** Water Audit for Calendar Year

Total metered water production (from previous section)		Total	177,570,461,410	
Sources of Water Use	**Metered or Estimated?**			**% of Total**
Process Water	Metered	subtract	166,347,970	0.09
Cooling Water	Estimated	subtract	176,711,185,540	99.52
Wash Water		subtract		
Sanitary		subtract		
Incorporation into Product		subtract		
Irrigation		subtract		
Other HP wash water for screens	Estimated	subtract	692,928,000	0.39
Other		subtract		
TOTAL UNACCOUNTED-FOR WATER		Sub-total	0	0
Unaccounted-for water breakdown	Meter under-registration	subtract	0	0
	Unrepaired leakage	subtract	0	
	Other:	subtract		
** Water measurement and accounting techniques are available in NYSDEC's Water Conservation Manual, http://www.dec.ny.gov/lands/39346.html			0	

What are your future goals for water system auditing?
Continuation of monthly water meter readings by Performance Engineering Group. Water meter readings and site water usage is analyzed and compared to historical data.

Best Management Practices:

** At least once each year, a system water audit must be conducted using metered water production and consumption data to determine unaccounted-for water.*

** Keep accurate estimates of unmetered water use.*

** Quantify all authorized water uses by consumption categories.*

V. LEAK DETECTION AND REPAIR

Do you regularly survey your facility for leakage? No
Are leaks repaired in a timely manner? Yes
If applicable, do you regularly survey underground piping for water leakage? No

Total length of underground piping	Percent of piping surveyed each year	Length of pipe surveyed each year	Listening equipment used	Year of last survey	Number of leaks found	Number of leaks repaired

What are your future goals for water system leak detection and repair?
The site is continuously manned with personnel and water usage data is analyzed monthly. If a leak is detected in underground piping the leak is addressed as soon as possible.

Best Management Practices:

** Check any underground water distribution systems for leaks each year.*

** Fix every detectable leak as soon as possible.*

** Have an on-going system rehabilitation program.*

VI. WATER REUSE, RECYCLING AND DROUGHT PLANNING

Does your facility reuse or recycle primary use water? No If yes, describe process:

Does your facility use reclaimed rainwater, storm water runoff or wastewater? No If yes, describe process:

Describe any equipment or processes that promote the efficient use of water by your facility:
Variable Frequency Drives (VFD) are installed on the Circulating Water Pumps (CWP). The CWPs withdraw surface water from the East River for cooling. VFDs allow for the pumps to operate at less than full speed operation at reduced loads and cooler water temperatures. The reduced speed directly correlates to reduced water withdrawal.

Does your system include storage tanks or ponds to meet short term water demands?
Yes, demineralized water storage tanks are used.

Describe any actions that can be taken to reduce water use during times of drought:
VFD operation of the CWP in order to reduce surface water withdrawal.

What are your future goals for recycling or reducing water usage?
Continuing use of CWPs in VFD to reduce surface water withdrawal at reduced loads.

Best Management Practices:

* *Reuse or recycle water whenever possible.*
* *Employ efficient irrigation techniques*
* *Develop a plan to reduce water use during times of drought.*

VI. SIGNATURE PAGE AND DISCUSSION

Facility Name:	Ravenswood Generating Station	WWA No.

Signature:		Signatory:	
Title:	Compliance Manager	Date:	5/21/2015

DISCUSSION:

Effective February 15, 2011, New York State Environmental Conservation Law (§ECL 15-1501) has required that all applications for a NYSDEC Water Withdrawal Permit include a water conservation program. This Water Conservation Program Form (WCPF) is a required submittal of all such applications.

The WCPF has been set up to cover the following basic elements of a water conservation program: Source Water Inventory, Water Usage and Metering, Water Auditing, Leak Detection/Repair, and Water Use Reduction. The Best Management Practices listed at the bottom of each page represent DEC water conservation policy objectives and should be incorporated into your program development. Additional water conservation measures that are specific to your category of water usage should also be incorporated into your individual program.

Water withdrawal permit applicants can consult the NYSDEC publication entitled "A Survey of Methods for Implementing and Documenting Water Conservation in New York".

The American Water Works Association (AWWA) is also an excellent source of information regarding water conservation practices and procedures. Information ranging from technical manuals to online resources and tools can be found at http://www.awwa.org.

Clear Entire Form

Appendix C

New York State Department of Environmental Conservation

Division of Water, Bureau of Water Resources Management, 625 Broadway, Albany, NY 12233-3508

Water Withdrawal Reporting Form

Due by March 31 each year

Prior to filling out this form please read the instructions on last page

(This form not for Agricultural Facilities)

Section 1

Reporting Year: 2012

Facility Name: Ravenswood Generating Station | Facility Street Address: 38-54 Vernon Boulevard

City: Long Island City | Zip: 11101 | Town: | County: Queens

Contact Name: Gregory Pryor | Email: gregory_pryor@transcanada.com | Telephone: (718) 706-2863

Source Name:	East River	Source Type:	S	Well Depth:	Ft	Max Rate:	1,514.5	Units	MGD
Source Name:	NYC DEP	Source Type:	P	Well Depth:	Ft	Max Rate:		Units	GPM
Source Name:		Source Type:		Well Depth:	Ft	Max Rate:		Units	
Source Name:		Source Type:		Well Depth:	Ft	Max Rate:		Units	
Source Name:		Source Type:		Well Depth:	Ft	Max Rate:		Units	
Source Name:		Source Type:		Well Depth:	Ft	Max Rate:		Units	
Source Name:		Source Type:		Well Depth:	Ft	Max Rate:		Units	
Source Name:		Source Type:		Well Depth:	Ft	Max Rate:		Units	

If an interbasin diversion occurs, check this box ☐ and enter information in Section 3

Average Day Withdrawal: 486 MGD | Maximum Day Withdrawal: 1,489.7 MGD | Permitted Withdrawal: MGD

Submitted by: Gregory Pryor | Title: Environmental Specialist | Date: 1/11/2013

Water Withdrawal Category (check one)

- ☐ Agricultural
- ☐ Bottled / Bulk Water
- ☐ Commercial
- ☐ Environmental
- ☐ Industrial
- ☐ Institutional
- ☐ Mine Dewatering
- ☐ Oil / Gas Production
- Power Production
  - ☒ Fossil Fuel
  - ☐ Nuclear
  - ☐ Other Pwr:
- ☐ Public Water Supply
- Recreation:
  - ☐ Golf Course
  - ☐ Snow Making
  - ☐ Other Rec:
- ☐ Other:

Reset Form | Print Form | Submit by Email

If you do not receive a confirmation email, please contact AWQRSDEC@gw.dec.state.ny.us or 518 402-8086

Section 2

Calculation Method: P M = Metered readings. W = Flow through a weir or flume. P = Flow through a pipe or pump run time E = Estimated.

UNITS: *Must be in gallons per month*	January	February	March	April	May	June
Withdrawn	4,180,896,000	2,783,808,000	11,000,952,000	8,614,800,000	10,453,248,000	14,111,136,720
Transferred / Imported	9,552,777	8,833,832	10,944,208	14,300,667	11,448,093	15,332,096
Consumed	8,160,434	7,446,808	8,048,021	12,381,599	9,174,934	13,485,679
Returned	4,165,584,343	2,778,859,024	10,952,368,187	8,580,431,068	10,412,897,159	14,065,752,035
Diversions In / Out if any	0	0	0	0	0	0

	July	August	September	October	November	December
Withdrawn	29,130,912,720	21,968,064,000	13,070,304,000	26,265,312,000	24,259,392,000	11,556,288,000
Transferred / Imported	19,580,467	15,648,019	10,588,747	18,948,492	19,466,268	11,703,408
Consumed	16,929,661	13,191,527	8,628,313	15,356,435	16,572,638	10,114,834
Returned	29,034,466,581	21,891,608,492	13,027,912,434	26,176,744,057	24,183,433,630	11,516,980,574
Diversions In / Out if any	0	0	0	0	0	0
Describe location of returned water	Water is returned to the East River via SPDES outfalls 001, 008, 009, and 010. These points are annotated as discharges 1-4 respectively on the attached map.					

Section 3

General Map Required

Please submit a map showing location of all withdrawals and any points of return flow. Label all points. **A map is not necessary if one was submitted in a previous year and no changes have occurred.** Precise locations will remain confidential.

A paper copy of a USGS map or other high quality map or an electronically generated map can be faxed, mailed, or emailed. For electronic maps a suggested website is described below:

(1) Go to the USGS National Map site [http://usgs01.srv.mst.edu/store3/digital_download/mapping_ap.jsp].
Type the address of the agricultural facility into the search box.
(2) Zoom in and use any of the map-type choices to best confirm your location.
(3) Designate water withdrawal locations by clicking on the map to add a marker(s).
(4) For surface water withdrawals, use the "Topo" tab.
(5) Add a marker to designate the location of any related dams, weirs, or diversion structures.
(6) Print. Manually label the name of each marked source.

Submit your map to DEC in one of the following ways:

- Print and mail or fax to 518 402-8290.
- Print, scan and email to awgwsdec@gw.dec.state.ny.us.
- Copy electronically and email to awgwsdec@gw.dec.state.ny.us.

NOTE: Precise locations will be kept confidential.

Interbasin Diversions

Fill out this section only if water is being transferred between major drainage basins. To determine basin ID, click the link below, highlighted in blue. Enter basin ID where requested. Use drop down menu. Describe location of originating and receiving sites (e.g. Town water intake at north end of Pleasant Lake to southwestern corner of Stony Reservoir near Route 12).

Originating Major Drainage Basin http://www.dec.ny.gov/lands/56800.html	Receiving Major Drainage Basin http://www.dec.ny.gov/lands/56800.html
Enter Basin ID here:	Enter Basin ID here:
Originating Site Description:	Receiving Site Description:

Section 4

Water Conservation and Efficiencies

All permitted water withdrawal systems must have a Water Conservation Program.

Section A: For Permitted Public Water Supply Facilities Only - All others use Section B

Are all sources of supply including major interconnections equipped with master meters? ☐ Yes ☐ No

What percentage of your system is metered? _____ %. Residential charge per 1000 gallons of water: $ _____

How often were customer meters read this past year (e.g. quarterly, yearly)? _____

Number of water service connections: _____ Total population served: _____

How many customer meters were recalibrated and/or replaced in the past year? _____

Miles of pipe in water distribution system: _____ Length of pipe replaced in the past year: _____ _____

Miles of pipe on which leak detection was performed using sonic listening equipment: _____ Type of equipment used: _____

How many system-wide water audits were performed in the past year? _____

What percentage of the water withdrawn was not billed to customers? _____ %. Lost to distribution system leakage? _____ %

Was information about household water saving devices and ways to reduce water use distributed to residential customers? ☐ Yes ☐ No

Was water conservation information about promoting recycling and reuse distributed to industrial and commercial customers? ☐ Yes ☐ No

Do you have lawn sprinkling time restrictions (e.g. odd/even days) during periods of peak demand? ☐ Yes ☐ No

Do you have a plan that takes progressive steps to further reduce outdoor water use during drought conditions with an ordinance or procedure to assure compliance? ☐ Yes ☐ No

Please review your permit(s) for any specific water conservation conditions and report below on progress made in past year.

Section B: Water Withdrawal Reporting and Registered Facilities (see permitting schedule in NYCRR Part 601.7)

Are all sources of supply including major interconnections equipped with master meters? ☐ Yes ☒ No

How often were master meters read in the past year? Monthly

How often were master meters calibrated in the past year? 0

Are there secondary meters located within the facility or system? ☒ Yes ☐ No

Identify other water conservation and efficiency measures currently used in your system (e.g. Best Management Practices such as recycling process and cooling waters, use of drip irrigation and moisture probes, utilizing storm water runoff and reclaimed wastewater or conducting facility water audits):

The station has conducted major capital upgrades on the circulating water system in order to retrofit circulating water pumps with variable speed drives and vacuum priming systems to allow for variable speed operation. The variable speed operation allows for reductions in water use during periods of reduced load, cool weather conditions, or when full circulating water flow is not required. The circulating water pumps take suction off the East River and provide once through cooling water for the condensers.

Section 5	Instructions / Definitions
Agricultural Purpose	The practice of farming for crops, plants, vines and trees, and the keeping, grazing or feeding of livestock, for sale of livestock or livestock products. Agricultural facilities must use the form titled, "Registration and Water Withdrawal Reporting Form for Agricultural Facilities".
Public Water Supply	Supply water to the public. Examples include: municipality, hotel, apartment, restaurant, church, campground, etc.
Source Name	Name of well or surface water body (e.g., Well No. 1, Alcove Reservoir, etc.) List all sources including unused or back-up wells.
Source Type	S = Stream or River. L = Pond or Lake. R = Reservoir. BW = Bedrock Well. UW = Unconsolidated Well (e.g., sand and gravel). SP = Spring. P = Purchased. Use drop down menu.
Well Depth	Total depth in feet below ground surface. Leave blank for surface sources.
Max Rate	Maximum potential withdrawal rate of the water source. Will be equal or greater than Permitted Rate.
Units (Max Rate)	Gallons per minute (gpm), gallons per day (gpd), or million gallons per day (mgd). Use drop down menu.
Average Day Withdrawal	Total amount withdrawn during reporting year divided by total days withdrawn (e.g., for a public water supply 365 million gallons/365 days = 1 mgd).
Maximum Day Withdrawal	Largest single day withdrawal rate of the source during the reporting year.
Permitted Rate	If unknown, contact NYSDEC at AWORSDEC@gw.dec.state.ny.us or 518-402-8182.
Calculation Method	M = metered readings. W = flow through a weir or flume. P = flow through a pump or pump run time. E = estimated.
Withdrawn	Amount of water removed from all sources.
Transferred/Imported	Amount of water brought in from or sent to another facility, includes bulk sales. For transferred water use a negative sign.
Consumed	Amount of water not returned (e.g. water incorporated into a product or lost through evaporation). Public water suppliers must use metered sales to customers.
Returned	Amount of water discharged to a water treatment system or discharged back to the environment.
Diversions In/Out	Amount of water, if any, diverted from/to another major drainage basin. For Diversions Out, use a negative (-) sign.
Location of Returned Water	State the general area where returned water is discharged. Example: "Hudson River near Poughkeepsie", "Groundwater near Auburn".
Major Drainage Basins	Report only "Major Basin" transfers. Use the internet link available on the form (labeled "Click Here To Determine Basin ID") and enter Basin ID into the box indicated (use drop down menu). Describe the location of originating withdrawal and receiving discharge. Be as specific as possible.
Water Audit	A water audit is a thorough examination of the accuracy of water records and system control equipment to determine water system efficiency and to identify, quantify, and verify water and revenue losses. Water audits are beneficial in identifying the amount of unaccounted-for water.