APPENDIX E

NATURAL RESOURCES

APPENDIX E.1

WATER QUALITY MODELING

Appendix E.1: Water Quality Modeling

A. INTRODUCTION

This appendix (prepared by HydroQual, Inc.) describes existing water quality conditions within the Project Area and evaluates the potential impacts on this resource by the Proposed Actions. In addition to assessing potential impacts from the Proposed Actions for the two analysis years of 2015 and 2030, it also assesses future water quality without the Proposed Actions.

The Proposed Actions would result in new institutional, commercial, and residential development within the Project Area. Potential increased discharges of treated effluent from the North River Water Pollution Control Plant (WPCP) and combined sewer overflows (CSOs) from the Proposed Actions are evaluated to assess potential impacts to water quality.

PRINCIPAL CONCLUSIONS

The Proposed Actions involve activities that may affect water quality in the Hudson River. Potential concerns would be increased discharge of treated effluent from the North River WPCP and increases in the number and intensity of CSOs.

The increased flow of domestic sewage to the North River WPCP from the Proposed Actions in 2015 is expected to be about 0.2 million gallons per day (mgd) and about 0.95 mgd in 2030. These volumes would not affect the ability of the North River WPCP to properly treat sewage and would not be expected to result in adverse impacts to Hudson River water quality.

As part of the Proposed Actions, new separate stormwater sewer lines are proposed for West 130th, West 131st and West 132nd Streets, between Broadway and Twelfth Avenue. This separate stormwater system would be fully operational by 2030. Although it is likely that the stormwater line under West 130th Street would be installed before 2015, a conservative analysis would assume that the installation of all of the stormwater sewer lines would occur after 2015. Therefore, for the 2015 future with the Proposed Actions, two scenarios were analyzed: the Proposed Actions with a partial stormwater system in place in 2015, and the Proposed Actions with no separate stormwater system in place in 2015. As mentioned earlier, the 2030 analysis accounts for a fully operational separate stormwater system.

In 2015, with a partial separate stormwater system in place, the number of CSO events would remain unchanged, and CSO volume would decrease by approximately 0.6 million gallons per year when compared with the 2015 future without the Proposed Actions conditions. The decrease in CSO volume would be a result of the proposed separate stormwater system, which would divert stormwater from the combined sewer system. The mass loadings of pollutants during CSO events would decrease slightly and the water quality in the Hudson and Harlem Rivers would not be adversely affected due to the Proposed Actions.

If by 2015 the separate stormwater system is not installed or operational, the number of CSO events would increase by one, and CSO volume would increase by approximately 0.3 million gallons per year when compared with the 2015 future without the Proposed Actions condition.

The increase in mass loadings of pollutants during CSO events would be extremely small. The water quality in the Hudson and Harlem Rivers would be essentially identical to those projected for 2015 future without the Proposed Actions.

In 2030, the proposed separate stormwater system would be fully operational. The separate stormwater system with the Proposed Actions would result in a decrease of CSO volume of 1.6 million gallons per year and therefore a decrease in associated pollutant loadings. The CSO volume would decrease by approximately 0.4 percent. The number of CSO events would remain unchanged. These changes would not result in significant adverse impacts to water quality in either 2015 or 2030.

B. METHODOLOGY

The methodology outlined in the *City Environmental Quality Review (CEQR) Technical Manual* was used to characterize existing conditions and assess potential impacts to surface water quality. Current water quality conditions were compared with anticipated conditions for the analysis years 2015 and 2030 both with and without the Proposed Actions.

To assess the water quality impacts due to the Proposed Actions, baseline water quality data were obtained from several sources, including the New York City Department of Environmental Protection's (DEP) Harbor Survey, and the U.S. Environmental Protection Agency (EPA, 1991). Harbor Survey data collected in 2004 for stations located in the Hudson and Harlem Rivers within the North River WPCP service area were obtained. Effluent data for wastewater flows and pollutant loadings from the North River WPCP for Fiscal Year 2005 (July 1–June 30) were also obtained from DEP to establish the baseline loadings from the plant. In addition, CSO pollutant loadings were calculated for CSOs in the Hudson and Harlem Rivers within the North River WPCP service area. Loadings for constituents of concern were calculated and the impacts assessed for the average annual flow scenarios for both 2015 and 2030. A new separate stormwater system that would discharge into the Hudson River through an existing CSO outfall at the foot of St. Clair Place (as described in Chapter 14, "Infrastructure") would service the Academic Mixed-Use Area[1]. This separate stormwater system would be fully operational by 2030. Although it is likely that the stormwater line under West 130th Street (between Broadway and Twelfth Avenue) could be installed and operational before 2015, draining an area (encompassing the southern half of the block to the north, and the northern half of the block to

[1] As part of a proposed amended drainage plan (see Chapter 14, "Infrastructure," for details), a separate storm sewer system has been proposed for the blocks between West 130th Street and West 133rd Street between Broadway and Twelfth Avenue, to be completed by 2030. A portion of this separate storm sewer system may be installed and operating on West 130th Street in 2015. The analysis in the DEIS assumed that stormwater collected by this system would be discharged to a newly constructed outfall at the Western terminus of West 125th Street. Since the issuance of the DEIS, further studies have been conducted to determine the feasibility of connecting the stormwater system to an already existing CSO outfall located at the western terminus of St. Clair Place, to avoid the need for construction through the West Harlem Waterfront Park. These studies (submitted to and approved by DEP) determined that the connection to the existing CSO would be feasible, and the FEIS has been revised to reflect this change. The proposed stormwater system would be connected downstream of the regulator for the existing combined sewer, discharging directly into the Hudson River. Therefore, since the same volume of stormwater would be discharched from the same streets in the Project Area, and the only change would be the location of the discharge point into the Hudson River, the results of the analysis in the DEIS have not changed as a result of this revision.

the south) of approximately 3.9 acres, a conservative analysis would assume that the installation of all of the stormwater sewer lines would occur after 2015. Therefore, for the 2015 future with the Proposed Actions, two scenarios were analyzed: the Proposed Actions with a partial stormwater system in place in 2015, and the Proposed Actions with no separate stormwater system in place in 2015. The 2030 analysis accounts for a fully operational separate stormwater system.

The percent imperviousness, infiltration, evaporation, and physical features of the drainage area (slope, sewer layout, and surface roughness) were used to compute the volume of runoff that would be discharged to the new stormwater sewer and that would not reach the combined sewer system. Pollutant loadings from the operation of the new separate stormwater sewer were estimated from historical concentrations of pollutants in stormwater runoff in the New York metropolitan area, and the estimated volume of stormwater diverted to the new stormwater system.

Two flow rates were used for the analyses. The average daily flow was used for the evaluation of the potential impact of proposed changes to the North River WPCP on water quality within the Hudson River. The average daily flow includes sanitary flows and also wet weather flows received by the WPCP. For the analysis of potential effects associated with CSOs within the North River WPCP service area, the average dry weather flow was used. The dry weather flow only includes sanitary flows received under dry weather conditions and was used as a baseline for the analysis of potential CSO effects on the Hudson and Harlem Rivers. Likewise, the assessment of potential effects due to CSOs was also based on the North River WPCP operating at close to 340 mgd during wet weather events. The North River WPCP has been designed to accept two times the 170 mgd dry weather flow, or 340 mgd. Table E.1-1 presents the flows used in the analyses.

Table E.1-1
Average Daily Flow Conditions at North River WPCP Used in Modeling

	Average Daily Flow	Average Daily Dry Weather Flow
Existing Conditions—2005	129.0 mgd	121.0 mgd
2015		
Future Without Proposed Actions	133.0 mgd	125.0 mgd
Future with Proposed Actions	133.2 mgd	125.2 mgd
2030		
Future Without Proposed Actions	140.0 mgd	132.0 mgd
Future with Proposed Actions	141.0 mgd	133.0 mgd

The analysis of potential impacts was based on the effects of the Proposed Actions on the number of CSO events within the North River service area, the CSO volume that could enter the Hudson and Harlem Rivers, and the amount of additional pollutant mass loadings for the 2015 and 2030 future with the Proposed Actions conditions.

WASTEWATER FLOW RATES IN 2015

FLOW RATES USED IN NORTH RIVER WPCP ANALYSIS

The possible water quality impacts with and without the Proposed Actions were calculated for the 2015 analysis year. The 2015 projected North River WPCP effluent flows were calculated based on the DEP projection of future average daily dry weather flow (sanitary flows received under dry weather conditions) for 2015, and wet weather flow estimates (using actual 2005

average daily and average daily dry weather flow data) from DEP's Process Engineering Report (Fiscal Year 2005) (DEP 2005). The dry weather flow projections were developed using New York City Department of City Planning (DCP) population projections for 2015 (DCP 2006). The dry weather flow only includes sanitary flows received under dry weather conditions. DEP projections indicate a future WPCP average dry weather flow of 125 mgd in 2015 due to general background growth within the North River WPCP service area. For the purposes of the water quality analysis, this projected dry weather flow is conservative when used in the assessment of the 2015 future with the Proposed Actions, because it is based on DCP's population projections for 2015 (DCP 2006), which took into consideration the increased population attributable to the Columbia Manhattanville project.

DEP calculates the current average daily flow (see Table E.1-1) as the total volume of wastewater treated at the North River WPCP in a year received during both wet and dry weather periods, divided by the number of days in that year. As presented in DEP's Process Engineering Report (Fiscal Year 2005) (DEP 2005), the difference between the average daily flow and average daily dry weather flow is approximately 8 mgd (the average dry weather flow based on the flows received during days typically preceded by 48 hours of no rainfall). Because the impervious area within the North River WPCP service area is not expected to materially change, this wet weather increment of 8 mgd would not change, and was assumed as the wet weather flow for the future 2015 analysis year.

To calculate projected average daily flow, the projected dry weather flow of 125 mgd was added to the estimated wet weather flow of 8 mgd. Therefore, as shown in Table E.1-1, the projected average daily flow to the North River WPCP in 2015 without the Proposed Actions is 133.0 mgd.

As discussed in Chapter 14, "Infrastructure," the incremental flows due to the Proposed Actions in 2015 would be approximately 0.2 mgd. Therefore, as shown in Table E.1-1, the projected average daily flow to the North River WPCP in 2015 with the Proposed Actions would be 133.2 mgd.

FLOW RATES USED IN CSO ANALYSIS

In addition to an assessment of the potential water quality impacts due to treated effluent from the North River WPCP, potential water quality impacts due to CSOs within the WPCP service area were evaluated with and without the Proposed Actions in 2015. For this analysis, DEP's projected future dry weather flow in 2015 (125 mgd) is used to determine the potential effects associated with CSOs within the North River WPCP service area. As mentioned above, because DEP's projection of future dry weather flows in 2015 is based on DCP's population projections for 2015 (DCP 2006), which took into consideration the increased population attributable to the Columbia Manhattanville project, the 2015 future with the Proposed Actions analysis is conservative.

As discussed in Chapter 14, the incremental flows due to the Proposed Actions would be approximately 0.2 mgd. Therefore, as shown in Table E.1-1, the projected average daily flow to the North River WPCP in 2015 with the Proposed Actions would be approximately 125.2 mgd.

These flow projections were used as inputs to the land-side modeling, which estimates the volume of CSO discharged and the number of CSO events. Details of the land-side modeling are discussed below.

Columbia University proposes to construct a separate stormwater system and discharge the stormwater at the foot of St. Clair Place into the Hudson River through an existing CSO outfall. The flows from the half blocks north and south of West 130th Street may be separated by 2015.

This portion of the new separate stormwater system would remove stormwater discharged into the combined system from 3.9 acres within the Academic Mixed-Use Area. However, a conservative analysis assumes that the system for this area may not be operational by 2015. Therefore, two analyses were prepared, with and without the partial separate stormwater system in 2015. The pollutant and nutrient loadings in urban stormwater runoff are low compared with the loadings in CSOs.

For the case with the partial stormwater system, the percent imperviousness, infiltration, evaporation, and physical features of the drainage area (slope, sewer layout, and surface roughness) were used to compute the volume of runoff that would not reach the combined sewer system. This volume was subtracted from the modeling of CSOs. During an average year, the total runoff volume diverted into the new stormwater system is estimated to be approximately 3.2 million gallons. This diverted volume of stormwater is not expected to significantly decrease the total flows to the North River WPCP over the course of a year. For the case without the partial stormwater system, the stormwater from the 3.9 acres would be conveyed into the combined system.

WASTEWATER FLOW RATES IN 2030

FLOW RATES USED IN NORTH RIVER WPCP ANALYSIS

Potential water quality impacts with and without the Proposed Actions were also calculated for the year 2030. The 2030 projected North River WPCP effluent flows were calculated using DEP's projection of the future average daily dry weather flow (sanitary flows under dry weather conditions) in 2030 (132 mgd), developed on the basis of DCP's population projections for 2030 (DCP 2006), and wet weather flow estimates (using actual 2005 average daily and average daily dry weather flow data) from DEP's Process Engineering Report (Fiscal Year 2005) (DEP 2005). For the purposes of the water quality analysis, this projected dry weather flow is conservative when used in the assessment of the 2030 future with the Proposed Actions, because it is based on DCP's population projections for 2030 (DCP 2006), which took into consideration the increased population attributable to the Columbia Manhattanville project.

DEP calculates the current average daily flow as the total volume of wastewater treated at the North River WPCP in a year received during both wet and dry weather periods, divided by the number of days in that year. As presented in DEP's Process Engineering Report (Fiscal Year 2005) (DEP 2005), the difference between the average daily flow and average daily dry weather flow is approximately 8 mgd (the average dry weather flow based on the flows received during days typically preceded by 48 hours of no rainfall). Because the impervious area in the North River WPCP service area of 6,030 acres is not expected to change materially, this wet weather increment of 8 mgd is not expected to materially change, and was assumed as the wet weather flow for the future 2030 analysis year.

To calculate projected average daily flow, the projected dry weather flow of 132 mgd was added to the estimated wet weather flow of 8 mgd. Therefore, as shown in Table E.1-1, the projected average daily flow to the North River WPCP in 2030 without the Proposed Actions is 140 mgd.

As discussed in Chapter 14, the incremental flows due to the Proposed Actions in 2030 would be approximately 0.95 mgd. Therefore, as shown in Table E.1-1, the projected average daily flow to the North River WPCP in 2030 with the Proposed Actions would be approximately 141 mgd.

FLOW RATES USED IN CSO ANALYSIS

In addition to an assessment of the potential water quality impacts due to treated effluent from the North River WPCP, potential water quality impacts due to CSOs within the WPCP service

area were evaluated with and without the Proposed Actions in 2030. For this analysis, DEP's projected future dry weather flow in 2030 (132 mgd) is used to determine the potential effects associated with CSOs within the North River WPCP service area. For the purposes of the water quality analysis, this projected dry weather flow is conservative, because it is based on DCP's population projections (DCP 2006) within the North River WPCP for 2030, which already include the Proposed Actions.

As discussed in Chapter 14, the incremental flows due to the Proposed Actions in 2030 would be approximately 0.95 mgd. Therefore, as shown in Table E.1-1, the projected average daily flow to the North River WPCP in 2015 with the Proposed Actions would be approximately 133 mgd.

These flow projections were used as inputs to the land-side modeling, which estimates the volume of CSO discharged and the number of CSO events. Details of the land-side modeling are discussed below.

In addition, by 2030, Columbia University proposes to complete the construction of a separate stormwater system for the blocks between West 130th and West 133rd Streets between Broadway and Twelfth Avenue, and discharge the stormwater at the foot of St. Clair Place into the Hudson River through an existing CSO outfall. The new separate stormwater system would remove stormwater discharged into the combined system from 12.36 acres within the Academic Mixed-Use Area. The pollutant and nutrient loadings in urban runoff are low compared with the loadings in CSOs. The percent imperviousness, infiltration, evaporation, and physical features of the drainage area (slope, sewer layout, and surface roughness) were used to compute the volume of runoff that would not reach the combined sewer system. This volume was subtracted from the modeling of CSOs. During an average year, the total runoff volume diverted into the new stormwater system is estimated to be about 9.9 million gallons. This diverted volume of stormwater is not expected to significantly decrease the total flows to the North River WPCP over the course of a year.

POLLUTANT LOADING ESTIMATES

POLLUTANT LOADINGS USED IN NORTH RIVER WPCPANALYSIS

Effluent pollutant loading data to the Hudson River from the North River WPCP for the various flow scenarios and the 2015 and 2030 future with and without the Proposed Actions were estimated to allow for an analysis of potential water quality conditions. The monthly average concentrations from fiscal year 2005, as reported by DEP for the North River WPCP, were used along with the projected WPCP flows for both the 2015 and 2030 future with and without the Proposed Actions to calculate the existing and projected future loadings. Table E.1-2 presents the total nitrogen, total phosphorus, total suspended solids, fecal coliforms, copper, lead, and zinc concentration monthly average loadings. Based on the average concentration for the fiscal year, pollutant loadings were calculated for existing conditions, and for the 2015 and 2030 future with and without the Proposed Actions (see Table E.1-3). These loadings were used as inputs to the surface water modeling, which estimates the potential impacts on water quality in 2015 and 2030 with and without the Proposed Actions.

POLLUTANT LOADINGS USED IN CSO ANALYSIS

Pollutant loading data to the Hudson and Harlem Rivers within the North River WPCP service area were developed for the various flow scenarios and 2015 and 2030 future with and without the Proposed Actions. For the 2015 with the Proposed Actions, two scenarios were analyzed: one with the partial storm sewer system in place, and one without the partial storm sewer system in place. Since CSOs are composed of a mixture of both raw sanitary water and stormwater, the

percentage of sanitary sewage and stormwater were computed for each discharge event and for each individual CSO. The mixture of sanitary sewage and stormwater was used to calculate the total CSO discharge. Copper, lead, and zinc concentrations used were based on the maximum monthly average concentrations measured in the influent of the North River WPCP, and the total nitrogen, phosphorus, and suspended solids concentrations were the yearly averages from 2005.

The incremental changes in CSO event annual mass discharges for the five scenarios are presented in Table E.1-4. The five scenarios are:

- 2015 without the Proposed Actions;
- 2015 with the Proposed Actions and with the partial stormwater system;
- 2015 with the Proposed Actions and without the partial stormwater system;
- 2030 without the Proposed Actions; and
- 2030 with the Proposed Actions.

Table E.1-2
North River WPCP Effluent Parameters

Month	Effluent Concentrations[1]					
	Copper (µg/L)	Lead (µg/L)	Zinc (µg/L)	T-N[2] (mg/L)	T-P[3] (mg/L)	TSS[4] (mg/L)
October	11.7	1.9	79.5	14.9	2.8	9.0
November	10.7	1.1	45.7	14.3	2.3	10.0
December	14.0	1.1	42.1	13.8	1.9	11.0
January	13.2	1.6	42.2	19.7	3.4	11.0
February	13.4	1.3	62.8	19.2	2.8	12.0
March	12.9	1.7	64.9	16.6	2.4	12.0
April	13.0	1.0	78.1	18.2	3.8	12.0
May	13.3	1.4	134.2	18.4	2.7	14.0
June	14.4	1.7	86.1	19.2	2.9	13.0
July	26.8	4.5	84.0	19.9	2.9	19.0
August	17.5	1.5	70.2	20.2	2.9	14.0
September	14.1	2.1	57.2	17.7	3.0	16.0
Average	**14.6**	**1.7**	**70.6**	**17.7**	**2.8**	**12.8**

Notes:
(1)Basis—2005 Simulation Conditions, Non-reactive Substance
(2)Total nitrogen
(3)Total phosphorus
(4)Total suspended solids
µg/L - micrograms per liter
mg/L - milligrams per liter
Source: "Operating Data, Fiscal Year 2005," DEP - Bureau of Wastewater Treatment, Process Engineering Section.

Table E.1-3
2015 and 2030 Future With and Without the Proposed Actions:
Summary of North River WPCP Existing and Projected Future Effluent Discharges

Parameter	Units	Existing Conditions 2005	Future Without the Proposed Actions		Future With the Proposed Actions		SPDES Effluent Permit Limit[3]
			2015	2030	2015	2030	
		Average Effluent[2]	Average Effluent	Average Effluent	Average Effluent	Average Effluent	
Average Daily Flow	Mgd	129	133.0	140.0	133.2	141.0	170
$CBOD_5$	mg/L	9.7	9.7	9.7	9.7	9.7	25
$CBOD_5$	lbs/day	18,358	10.759	11,326	10,776	11,403	35,000
$CBOD_5$ Removal	%	94.3	85	85	85	85	85
Suspended Solids[1]	mg/L	12.8	12.8	12.8	12.8	12.8	30
Suspended Solids	lbs/day	13,771	14,198	14,945	14,219	15,047	43,000
Suspended Solids Removal[4]	%	94.7	85	85	85	85	85
Fecal Coliform	MPN/100ml	62	62	62	62	62	200
Organic Nitrogen	lbs/day	3,012	3,106	3,269	3,111	3,291	-
Ammonia	lbs/day	16,030	16,527	17,397	16,552	17,515	-
TKN	lbs/day	19,043	16,633	20,667	19,663	20,807	-
Nitrate	lbs/day	215	222	234	222	235	-
Nitrite	lbs/day	420	433	455	433	459	-
Total Phosphorus	lbs/day	3,012	3,106	3,269	3,111	3,291	-
PO_4	lbs/day	2.367	2,440	2,569	2,494	2,586	-
Copper	lbs/day	15.7	16.2	17.0	16.2	17.2	-
Zinc	lbs/day	76.0	78.3	82.4	78.4	83.0	-
Lead	lbs/day	1.8	1.9	2.0	1.9	2.0	-

Notes:
(1) 30-day average.
(2) Data from "Operating Data, Fiscal Year 2005," DEP - Bureau of Wastewater Treatment, Process Engineering Section.
(3) Limits set forth in Draft North River WPCP SPDES Permit No. NY-0026247; April, 2006, where a dash (-) appears there are no existing SPDES Effluent Limits.
(4) $CBOD_5$ and Suspended Solids removal percentages for 2015 and 2030 are those required in the existing Draft North River WPCP SPDES Permit No. NY-0026247; April 2006.

Table E.1-4
Incremental Changes CSO Annual Loadings

Water Quality Constituent	Changes From Current Conditions				
	2015 without Proposed Actions	2015 with Proposed Actions and with Partial Stormwater System	2015 with Proposed Actions and without Partial Storm System	2030 without Proposed Actions	2030 with Proposed Actions
Total Suspended Solids - TSS	3,812	4,180	4,290	10,549	13,524
BOD_5	2,286	2,507	2,573	6,326	8,110
Total Nitrogen – TN	514	563	578	1,421	1,822
Total Phosphorus – TP	89	97	100	245	314
Total Coliform Bacteria	1.2 %	1.3 %	1.3 %	3.3 %	4.2 %
Zinc	16	17	17	44	56
Lead	2.7	3.0	3.0	7.5	9.7
Copper	5.3	5.8	5.8	15	19

Note: Numbers represent pounds per year of each constituent except for coliform bacteria.

POLLUTANT LOADINGS USED IN STORMWATER OUTFALL ANALYSIS

Pollutant loadings to the Hudson River from the operation of the new separate storm sewer, and discharge through an existing CSO outfall at the foot of St. Clair Place, were estimated to assess potential water quality impacts with the Proposed Actions in 2015 and 2030. Table E.1-5 presents estimated pollutant concentrations in stormwater developed on the basis of historical concentrations (HydroQual 1991). The estimated pollutant loadings also presented in Table E.1-5 were calculated from these historical concentrations and the estimated total annual volume of stormwater (3.2 million gallons in 2015 and 9.9 million gallons in 2030) that would be diverted to the new storm sewer system during an average year. This annual loading would be discharged throughout the year during rainfall events.

Table E.1-5
New Separate Storm Sewer Annual Loadings

Pollutant	TN	TP	TSS	Copper	Lead	Zinc
Concentration (mg/L)	2.40	0.36	27.0	0.596	0.028	0.154
2105 Load (lbs)	64	9.6	721	15.9	0.75	4.1
2030 Load (lbs)	198	29.7	2,229	49.2	2.3	12.7

Notes: mg/L – milligrams per liter
Concentration Source: HydroQual (1991)

WATER QUALITY MODELING

LAND-SIDE MODELING

InfoWorks is a detailed hydraulic model used to determine runoff flows, water surface elevations, and flows within sewers for the evaluation of sewer conditions, for the evaluation of

CSO events and for developing pollutant loadings for the water quality models. The model is configured with all sewer elements, including regulators, tide gates, outfalls, branch interceptors, and interceptors. The frequency and volume of CSOs in the North River WPCP service area are dependent on both regulator/branch interceptor capacities and on the hydraulic gradient line (HGL) in the interceptors. Sewer separation, therefore, not only results in CSO frequency/volume reductions within the regulator drainage area where separation is implemented, but also causes marginal reductions in the adjacent regulator drainage areas. The InfoWorks model calculates the CSO volumes/frequencies after sewer separation, so that the incremental effects can be assessed.

The projected dry weather flows for 2015 and 2030 were included in the InfoWorks model of the North River WPCP service area. The difference in dry weather flow between existing conditions and the future without the Proposed Actions was distributed uniformly in the entire service area (assuming equal population increases). However, the Proposed Actions' dry weather flows were applied to the specific regulator drainage area where the project is located.

The hydrologic parameters, including the percent imperviousness, are maintained in the future year analyses. A new separate stormwater system is proposed for the Academic Mixed-Use Area. This stormwater system would discharge into the Hudson River through an existing CSO outfall located at the foot of St. Clair Place.

By 2015, part of the full separate stormwater system may be installed and operational on West 130th Street and would drain stormwater from approximately 3.9 acres, with only sanitary sewage from this area being discharged into the combined sewers. If operational, it is estimated that during a typical year, approximately 3.2 million gallons per year would be diverted into the separate stormwater system. This volume of diversion is not expected to lower the total flows to the North River WPCP over the course of a year because the area served by the stormwater system is very small compared with the area served by the North River WPCP.

By 2030, the new separate stormwater system would remove the stormwater discharged into the combined system from 12.36 acres within the Academic Mixed-Use Area with only sanitary sewage from this area being discharged into the combined sewers. During a typical year, it is estimated that the total volume diverted into the new stormwater system would be approximately 9.9 million gallons. Because the diversion of 9.9 million gallons of stormwater is not expected to significantly decrease the total flows to the North River WPCP over the course of a year, this reduction was not considered in projecting the average daily flow to the North River WPCP in the 2030 future with the Proposed Actions. Therefore, the analysis is conservative.

The results of the model simulations were used to estimate the annual overflow volumes and pollutant loadings for the CSOs in the North River WPCP service area for the 2015 and 2030 future with and without the Proposed Actions.

SURFACE WATER MODELING

A modeling framework was also used to evaluate the potential impacts of the North River WPCP and the North River CSOs on water quality for 2015 and 2030 future with and without the Proposed Actions. The System Wide Eutrophication Model (SWEM), a three-dimensional, time-variable, coupled hydrodynamic/eutrophication model of the New York/New Jersey Harbor-New York Bight system, was used for this assessment.

Simulations for all parameters utilized a standardized rainfall condition, specifically 1988. 1988 has been chosen as the base year for DEP's Use and Standards Attainment and the Long Term

CSO Control Plan projects for all of New York City. In addition, 1988 has been used as the base year for the Long Island Sound total daily maximum loads (TMDLs), and is being used as the base year for New York Harbor nutrient and pathogen TMDLs. The New Jersey Department of Environmental Protection requires communities in New Jersey to use 1988 rainfall data to develop their Phase II Long Term CSO Control Plans.

To provide for a conservative analysis, total nitrogen, total phosphorus, total suspended solids, copper, lead, and zinc were considered to be nonreactive substances, and this assumed that their concentrations within the water column would not be reduced by normal chemical, physical, and biological interactions. As discussed later in this appendix, levels of dissolved mercury in the Hudson and Harlem Rivers exceed New York State Department of Environmental Conservation (DEC) guidance values. The Proposed Actions are not expected to change the mercury levels discharged into the sewer system. Columbia University has stringent policies on discharges into the sewers, and these policies are discussed in Chapter 14. The responses for these conservative substances and coliforms were calculated using the pathogen model (PATH), which is a model based on SWEM hydrodynamics, but which has the capability to include coliform kinetics and trace conservative material. Since the conservative substances and coliform bacteria react linearly (i.e., responses are directly proportional to the input pollutant loads), the analysis was performed by inputting a unit load, calculating the receiving water response, and then proportioning the responses based on the projected incremental loads and flows for each scenario. The incremental responses for each scenario were then compared with existing water quality data.

C. EXISTING WATER QUALITY CONDITIONS OF THE HUDSON AND HARLEM RIVERS

CSO outfalls receiving sewage and stormwater runoff within the North River WPCP service area are located along the Hudson and Harlem Rivers (Figure E.1-1). Therefore, sewage and stormwater generated within the Project Area has the potential to be discharged to the Hudson River and/or the Harlem River during a CSO event. The following sections describe the ambient (existing) water quality conditions within both rivers in the vicinity of the CSO outfalls for the North River WPCP.

HUDSON RIVER

The Project Area is located along the Manhattan shoreline of the Hudson River, within the Lower Hudson River Estuary. The Hudson River provides approximately 87 percent of the total riverine flow into New York Harbor. The approximate freshwater flow in the Lower Hudson River is between 19,000 and 20,000 cubic feet per second (cfs), while the average tidal flow of the Hudson River at the Battery is much higher on average, measuring approximately 425,000 cfs. Flushing time, or the length of time it takes for water from the Hudson River to replace water in the estuary, varies from month to month and location to location in the estuary. Based on the ratio of water volume to annual freshwater flow, DEC estimates that flushing time in the Lower Hudson River Estuary ranges from 15 days during the spring to 45 to 60 days during the summer.

Water quality in the Hudson River is monitored by DEP as part of the New York Harbor Water Quality Survey. Several indicators of water quality are used to provide information related to quality, ability to sustain aquatic life, ecosystem productivity, and aesthetics, including levels of dissolved oxygen (DO—the amount of oxygen dissolved in the water column—needed for

respiration of oxygen-based forms of aquatic life), water clarity, coliform bacteria levels (indicative of untreated sewage), plankton concentrations, and the amount of nutrients in the water (e.g., phosphorus and nitrogen). High levels of nutrients have a detrimental effect on water quality, because they result in excess plant growth such as phytoplankton and algal blooms, which adversely affect habitat quality. Illegal connections to the City's sewer system, equipment malfunction, and CSOs during and immediately after periods of heavy, sustained rainfall are the primary regional sources of fecal coliform.

In 2005, the North River WPCP treated an average daily flow of 129 mgd, which included sanitary and stormwater flows received by the WPCP, and an average dry weather flow of 121 mgd. Table E.1-3 includes a summary of the 2005 effluent discharge. In addition, CSOs located within the overall North River WPCP service area discharge to the Hudson River and northern portions of the Harlem River above West 190th Street. The Hudson River has been classified by DEC as a Class I water, which indicates water suitable for secondary contact recreation (e.g., fishing and boating). DEP maintains two sampling stations, N-3B and N-4, in the Hudson River for conventional pollutants and additional water quality data as part of its annual harbor survey. Station N-3B is located at West 125th Street, and Station N-4 is located at West 42nd Street. In addition, during 1991 as part of a U.S. Environmental Protection Agency (EPA) study (the most recent extensive study of heavy metals in the Hudson), samples for ambient concentrations of several heavy metals were collected from stations throughout the harbor complex, including the Hudson River. EPA stations within the Hudson River include H2 at West 42nd Street, H3 at West 125th Street, and H4 at Spuyten Duyvil. The locations of these Hudson River water quality stations are shown in Figure E.1-2. Water quality data for the Hudson River are presented in Table E.1-6. The Harbor Survey data in Table E.1-6 represent average concentrations for sampling conducted during 2004, the most recent data available, unless otherwise specifically noted. The EPA 1991 metals data are also presented in Table E.1-6. DEC Class I water quality standards are also presented for comparison.

The water quality data for the Hudson River indicate that all of the water quality parameters reported were in compliance with DEC Class I water quality standards and guidance values with the exception of the minimum DO at station N-3B for both the bottom and surface, and mercury for EPA stations H2-T, H2-B, H-3T, H-3B, H-4T and H-4B.

HARLEM RIVER

CSOs within the North River WPCP service area are also located within the Harlem River adjacent to the northernmost portions of upper Manhattan. The Harlem River is also a DEC Class I water, which is suitable for secondary contact recreation. DEP maintains one sampling station, H-3, in the Harlem River at East 155th Street for conventional pollutants, and additional water quality data as part of its annual Harbor Survey. In addition, data concerning ambient concentrations of several heavy metals were collected from one station in the Harlem River by EPA in 1991. This station, E3, is also located at East 155th Street. These stations are shown in Figure E.1-2. Water quality data for the Harlem River are presented in Table E.1-7. The Harbor Survey data in Table E.1-7 represents average concentrations for sampling conducted during 2005, unless otherwise specifically noted, and metals data for station E-3 from 1991. DEC Class I water quality standards are also presented for comparison.

Data for the Harlem River indicate that all of the water quality parameters reported were in compliance with DEC Class I water quality standards and guidance values, with the exception of the minimum DO at station H3 from both the bottom and surface, and mercury for Station E-3.

Table E.1-6
Hudson River Water Quality and Metals Data

Average Concentration										
		Station								DEC
Parameter	Units	N-3B[1]	N-4[2]	H-2T[3]	H-2B[4]	H-3T[5]	H-3B[6]	H-4T[7]	H-4B[8]	Class I Standards
Dissolved Oxygen (surface/minimum)	mg/L	6.97[9]/ **3.86**[10]	6.74[9]/ 4.05[10]	--	--	--	--	--	--	> 4.0
Dissolved Oxygen (bottom/minimum)	mg/L	5.22[9]/ **3.73**[10]	5.34[9]/ 4.05[10]	--	--	--	--	--	--	> 4.0
BOD (surface)	mg/L	2.0[11]	1.9[11]	--	--	--	--	--	--	--
BOD (bottom)	mg/L	2.7[11]	2.6[11]	--	--	--	--	--	--	--
Total Coliform (surface)	MPN/100 ml	838[12]	1,495[12]	--	--	--	--	--	--	< 10,000
Total Coliform (bottom)	MPN/100 ml	1,411[12]	1,316[12]	--	--	--	--	--	--	< 10,000
Fecal Coliform (top)	Colonies/100 ml	24	25	--	--	--	--	--	--	< 2,000
Fecal Coliform (bottom)	Colonies/100 ml	35	46	--	--	--	--	--	--	< 2,000
Total Suspended Solids (surface)	mg/L	17.69	14.45	--	--	--	--	--	--	--
Total Suspended Solids (bottom)	mg/L	74.88	67.61	--	--	--	--	--	--	--
Arsenic	µg/L	--	--	--	--	--	--	--	--	< 36 [13,14]
Cadmium	µg/L	--	--	0.08[13]	0.07[13]	0.06[13]	0.07[13]	0.07[13]	0.08[13]	< 7.7[13,14]
Chromium	µg/L	--	--	--	--	--	--	--	--	--
Copper	µg/L	--	--	2.14[13]	1.78[13]	2.00[13]	1.91[13]	1.67[13]	1.86[13]	< 5.6[14,15]
Lead	µg/L	--	--	0.16[13]	0.18[13]	0.13[13]	0.16[13]	0.15[13]	0.21[13]	< 8.0[13,14]
Mercury	µg/L	--	--	**0.0053**[13]	**0.0033**[13]	**0.0027**[13]	**0.0033**[13]	**0.0068**[13]	**0.0064**[13]	< 0.0026[13,14]
Nickel	µg/L	--	--	1.37[13]	1.39[13]	0.98[13]	1.03[13]	0.82[13]	1.14[13]	< 8.2[13,14]
Silver	µg/L	--	--	0.0133[13]	0.0121[13]	.0106[13]	0.0135[13]	0.0178[13]	0.0182[13]	--
Zinc	µg/L	--	--	7.23[13]	7.19[13]	3.76[13]	5.23[13]	5.82[13]	4.89[13]	< 66[13,14]
Cyanide	µg/L	--	--	--	--	--	--	--	--	< 1.0[14]
NH_3-N	mg/L	0.21	0.24	--	--	--	--	--	--	--
(NO_3 + NO_2)	mg/L	0.48	0.46	--	--	--	--	--	--	--
Total Phosphorus	mg/L	0.13	0.14	--	--	--	--	--	--	--
Chlorophyll-a	µg/L	7.97	7.57	--	--	--	--	--	--	--

Notes:
Bold- Does not meet water quality standard or Guidance Values
(1) Average concentrations for 2005 DEP Harbor Survey station N-3B, West 125th Street
(2) Average concentrations for 2005 DEP Harbor Survey station N-4, West 42nd Street
(3) Average concentrations for 1991 EPA Station H-2T, located on the surface at West 42nd Street
(4) Average concentrations for 1991 EPA Station H-2B, located on the bottom at West 42nd Street
(5) Average concentrations for 1991 EPA Station H-3T, located on the surface at West 125th Street
(6) Average concentrations for 1991 EPA Station H-3B, located on the bottom at West 125th Street
(7) Average concentrations for 1991 EPA Station H4-T, located on the surface at Spuyten Duyvil
(8) Average concentrations for 1991 EPA Station H4-B, located on the bottom at Spuyten Duyvil
(9) Represents average between January and December 2005
(10) Minimum between June 1, 2005 and September 30, 2005
(11) Latest available data 1997
(12) Latest available data 1996
(13) Guidance values and data are for dissolved metals
(14) DEC Guidance Value (DEC TOGS 1.1.1, June 1998, errata January 1999 and addendum April 2000)
(15) Site specific chronic and acute criteria for dissolved copper in New York/New Jersey Harbor

Table E.1-7
Harlem River Water Quality and Metals Data

Average Concentration				
		Station		DEC Class I
Parameter	Units	H3[1]	E3[2]	Standards
Dissolved Oxygen (surface/minimum)	mg/L	5.28[3]/ **3.50**[4]	--	> 4.0
Dissolved Oxygen (bottom/minimum)	mg/L	5.31[3]/ **3.25**[4]	--	> 4.0
BOD (surface)	mg/L	2.3[5]	--	--
BOD (bottom)	mg/L	2.1[5]	--	--
Total Coliform (surface)	MPN/100 ml	1,355[6]	--	< 10,000
Total Coliform (bottom)	MPN/100 ml	1,244[6]	--	< 10,000
Fecal Coliform (top)	Colonies/100 ml	51	--	< 2,000
Fecal Coliform (bottom)	Colonies/100 ml	52[7]	--	< 2,000
Total Suspended Solids (surface)	mg/L	19.93	--	--
Total Suspended Solids (bottom)	mg/L	20.65	--	--
Arsenic	µg/L	--	--	< 36 [8,9]
Cadmium	µg/L	--	0.085[8]	< 7.7[8,9]
Chromium	µg/L	--	--	--
Copper	µg/L	--	2.63[8]	< 5.6[9,10]
Lead	µg/L	--	0.265[8]	< 8.0[8,9]
Mercury	µg/L	--	**0.0036**[8]	< 0.0026[8,9]
Nickel	µg/L	--	1.96[8]	< 8.2[8,9]
Silver	µg/L	--	0.0025[8]	--
Zinc	µg/L	--	10.04[8]	< 66[8,9]
Cyanide	µg/L	--	--	< 1.0[9]
NH_3-N	mg/L	0.322	--	--
(NO_3 + NO_2)	mg/L	0.503	--	--
Total Phosphorus	mg/L	0.171	--	--
Chlorophyll-a	µg/L	3.47	--	--

Notes:
Bold - Does not meet water quality standard or Guidance Values
(1) Average concentrations for 2005 DEP Harbor Survey Station H-3, East 155th Street
(2) Average concentrations for 1991 EPA Station E-3, East 155th Street
(3) Represents average between January and December 2005
(4) Minimum between June 1, 2005 and September 30, 2005
(5) Latest available data 1997
(6) Latest available data 1996
(7) Latest available data 1999
(8) Guidance values and data are for dissolved metals
(9) DEC Guidance Value (DEC TOGS 1.1.1, June 1998 er rata January 1999 and addendum April 2000)
(10) Site specific chronic and acute criteria for dissolved copper in New York/New Jersey Harbor

A review of the most recently available DEC and EPA databases and the April 2006 Draft State Pollutant Discharge Elimination System (SPDES) Permit (SPDES Permit No. NY-0026247) for the North River WPCP indicated that there were 41 permitted CSO outfalls and two permitted industrial discharges to the Hudson River in the North River WPCP service area. These are shown in Tables E.1-8 and E.1-9, respectively, and are illustrated in Figure E.1-1. In addition, 13 CSO outfalls are located within that portion of the Harlem River that is also within the North River WPCP service area. There are no industrial discharges to the Harlem River in the North River WPCP service area. The CSOs within the Harlem River are presented in Table E.1-10 and are displayed in Figure E.1-1.

Table E.1-8
North River WPCP Service Area: CSOs Discharging to the Hudson River

Outfall Location	Permit Number	County	Receiving Water Body
West 152nd Street	NY0026247-002	New York	Hudson River
West 158th Street	NY0026247-003	New York	Hudson River
West 171st Street	NY0026247-004	New York	Hudson River
West 190th Street	NY0026247-005	New York	Hudson River
Dyckman Street	NY0026247-006	New York	Hudson River
Dyckman Street	NY0026247-015	New York	Hudson River
Bank Street	NY0026247-019	New York	Hudson River
Jane Street	NY0026247-020	New York	Hudson River
Gansevoort Street	NY0026247-021	New York	Hudson River
s/o West 17th Street	NY0026247-022	New York	Hudson River
West 18th Street	NY0026247-023	New York	Hudson River
West 21st Street	NY0026247-024	New York	Hudson River
West 23rd Street	NY0026247-025	New York	Hudson River
n/o West 26th Street	NY0026247-026	New York	Hudson River
West 30th Street	NY0026247-027	New York	Hudson River
West 36th Street	NY0026247-028	New York	Hudson River
West 40th Street	NY0026247-029	New York	Hudson River
West 43rd Street	NY0026247-030	New York	Hudson River
West 44th Street	NY0026247-031	New York	Hudson River
West 46th Street	NY0026247-032	New York	Hudson River
West 48th Street	NY0026247-033	New York	Hudson River
West 50th Street	NY0026247-034	New York	Hudson River
West 56th Street	NY0026247-035	New York	Hudson River
West 59th Street	NY0026247-036	New York	Hudson River
West 72nd Street	NY0026247-037	New York	Hudson River
West 80th Street	NY0026247-038	New York	Hudson River
West 91st Street	NY0026247-039	New York	Hudson River
West 96th Street	NY0026247-040	New York	Hudson River
West 106th Street	NY0026247-041	New York	Hudson River
West 115th Street	NY0026247-042	New York	Hudson River
St. Clair Place	NY0026247-043	New York	Hudson River
West 138th Street	NY0026247-044	New York	Hudson River
West 66th Street	NY0026247-046	New York	Hudson River
West 47th Street	NY0026247-047	New York	Hudson River
West 42nd Street	NY0026247-048	New York	Hudson River
West 14th Street	NY0026247-049	New York	Hudson River
Bloomfield Street	NY0026247-050	New York	Hudson River
West 49th Street	NY0026247-051	New York	Hudson River
West 34th Street	NY0026247-052	New York	Hudson River
West 35th Street	NY0026247-053	New York	Hudson River
West 33rd Street	NY0026247-054	New York	Hudson River

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Table E.1-9
North River WPCP Service Area: Industrial Discharges to the Hudson River

Point Sources			
Company Name	**Permit Number**	**County**	**Receiving Water Body**
North River WPCP	NY0026247	New York	Hudson River
59th Street Steam Station	NY0005134	New York	Hudson River

Table E.1-10
North River WPCP Service Area: CSOs Discharging to the Harlem River

Outfall Location	Permit Number	County	Receiving Water Body
West 128th Street	NY0026247-007	New York	Harlem River
West 216th Street	NY0026247-008	New York	Harlem River
West 215th Street	NY0026247-009	New York	Harlem River
West 211th Street	NY0026247-010	New York	Harlem River
West 209th Street	NY0026247-011	New York	Harlem River
West 207th Street	NY0026247-012	New York	Harlem River
West 206th Street	NY0026247-013	New York	Harlem River
West 205th Street	NY0026247-014	New York	Harlem River
West 203rd Street	NY0026247-016	New York	Harlem River
West 201st Street	NY0026247-017	New York	Harlem River
Highbridge Park	NY0026247-018	New York	Harlem River
Academy Street	NY0026247-045	New York	Harlem River
West 207th Street	NY0026247-055	New York	Harlem River

D. 2015 FUTURE WITHOUT THE PROPOSED ACTIONS

Chapter 11, "Natural Resources," provides a detailed description of the 2015 future without the Proposed Actions condition.

NORTH RIVER WPCP

In the 2015 future without the Proposed Actions, flows to the North River WPCP would continue to increase due to population increases projected by the DCP. The DEP projected future dry weather flow in 2015 (125.0 mgd) is based upon the DCP projected population for 2015, which considered increases associated with the Proposed Actions. An average daily flow of 133.0 mgd, which includes both sanitary and stormwater flows accepted by the WPCP during wet weather, is projected for the North River WPCP without the Proposed Actions.

The estimated 2015 future without the Proposed Actions condition for the North River WPCP is presented above in Table E.1-3 for the average effluent. As shown in Table E.1-3, the SPDES permit limits would continue to be met for the average effluent month in the 2015 future without the Proposed Actions for those parameters that have a limit under the current SPDES permit.

The potential impact of the increased sewage flows to the North River WPCP on water quality within the Hudson River was evaluated using the projected pollutant loadings from the North River WPCP for the 2015 future without the Proposed Actions and SWEM. The predicted concentrations for the maximum 24-hour condition and the maximum 30-day condition in the Hudson River for the 2015 future without the Proposed Actions are presented in Table E.1-11. The maximum 24-hour condition represents the maximum hourly concentration in the North River WPCP outfall receiving water model segment. The maximum 30-day condition is the

maximum monthly concentration in the North River WPCP outfall receiving water model segment. These maximum values were selected because they present a conservative assessment of the potential effects of the WPCP on surface water quality.

Table E.1-11 shows the incremental change in water quality concentrations and the projected water quality resulting from the projected 2015 future without the Proposed Actions flow of 133.0 mgd. DO levels in both the bottom and surface layers within the Hudson River near the North River WPCP would be predicted to decrease by an extremely small amount, between 0.009 to 0.007 mg/L for the maximum 24-hour condition and the maximum 30-day condition. This would constitute a minimal change in DO. Because the absolute minimum DO for the existing conditions is below the DEC Class I water quality standard of 4.0 mg/L, it would continue to be below the water quality standard for the 2015 future without the Proposed Actions.

The incremental change in total nitrogen, total phosphorus, and total suspended solids concentrations would be minimal. Total nitrogen was calculated to increase by approximately 0.01 mg/L for the maximum 24-hour condition and 0.01 mg/L for the 30-day condition, while total phosphorus and total suspended solids concentrations would remain the same.

In the 2015 future without the Proposed Actions condition, total coliforms were predicted to increase by 1 MPN/100mL for both the maximum 24-hour and the maximum 30-day conditions. Total coliforms would remain below the DEC Class I water quality standard of 10,000 MPN/100ml. Fecal coliforms were predicted to increase by 1 colony per 100 ml for both the maximum 24-hour and maximum 30-day conditions. Fecal coliforms would continue to meet the DEC Class I water quality standard of 2,000 colonies/100 ml.

Incremental changes in copper, lead, and zinc concentrations within the Hudson River were also predicted to be minimal, with incremental changes of 0.05 μg/L or less. Projected copper, lead, and zinc water concentrations would be expected to remain well below the maximum allowable concentrations for DEC Class I water quality standards.

NORTH RIVER WPCP CSO

In addition to an assessment of the potential effect of increased flows to the WPCP in the 2015 future without the Proposed Actions, an evaluation of the potential changes due to CSOs on water quality was calculated. The predicted concentrations for the maximum CSO effects to the Hudson and Harlem Rivers for the 2015 future without the Proposed Actions were calculated through the SWEM and are presented in Table E.1-12. The maximum CSO change was defined as the maximum effect in the Hudson and Harlem Rivers within the North River WPCP service area. All other calculated changes to water quality were less than the value that has been presented in Table E.1-12. The projected additional CSO volumes in the 2015 future without the Proposed Actions would be 1.0 million gallons per year. The number and volume of CSO events varies from outfall to outfall. At regulator NR 43, which includes the Project Area, the number of CSO events is predicted to be 27 and the volume is predicted to be 74.9 million gallons per year, based on the 1988 precipitation conditions. Overall within the North River service area, the volume of CSO is estimated to be 493.7 million gallons per year, again based on the 1988 precipitation conditions. Based on the results of the model analysis, the maximum CSO incremental changes would occur within the Hudson River, and these results are presented in Table E.1-12. Table E.1-12 shows the maximum incremental effects of the CSOs resulting from the projected 2015 CSO volumes, and the projected water quality concentrations based on measured existing conditions.

Table E.1-11
2015 Future Without the Proposed Actions:
Water Quality Predictions in the Hudson River Near the North River WPCP

Parameter	Units	Existing Conditions 2005 (1)	2015 Future Without the Proposed Actions				DEC Standard Class I Waters
			Maximum 24-Hour Change(8)		Maximum 30-Day Change(9)		
			Incremental(7) Change	Projected Water(10) Quality	Incremental(7) Change	Projected Water(10) Quality	
Dissolved Oxygen (surface)(2)							
Summer Average(3)	mg/L	6.69	-	-	-0.007	6.68	> 4.0
Absolute Minimum	mg/L	3.86	-0.009	**3.85**	-	-	> 4.0
Dissolved Oxygen (bottom)(2)							
Summer Average(3)	mg/L	4.65	-	-	-0.007	4.64	> 4.0
Absolute Minimum	mg/L	3.73	-0.009	**3.72**	-	-	> 4.0
Total Nitrogen	mg/L	1.46	0.014	1.47	0.008	1.47	--
Total Phosphorus	mg/L	0.14	0.002	0.14	0.002	0.014	--
Total Suspended Solids	mg/L	75	0.009	75	0.007	75	--
Total Coliform(4)	MPN/100ml	1087	1	1088	1	1088	< 10,000
Fecal Coliform	Colonies/100 ml	29	1	30	1	30	<2,000
Copper(5,6)	µg/L	1.95	0.010	1.96	0.010	1.96	< 5.6
Lead (5,6)	µg/L	0.147	0.001	0.148	0.002	0.149	< 8
Zinc(5,6)	µg/L	4.49	0.046	4.53	0.060	4.55	< 66

Notes:

Bold- Does not meet water quality standard

(1) DEP Harbor Survey Station N-3B - West 125th Street

(2) Dissolved oxygen data for 2005

(3) Summer average - June 1 to September 30

(4) Total coliform data for 1996

(5) EPA Survey Station H3; 1991

(6) Existing conditions and standards for metals for dissolved form

(7) Incremental changes were calculated through the use of SWEM

(8) Maximum 24-hour change represents the maximum hourly change in the North River WPCP outfall receiving water model segment

(9) Maximum 30-day change represents the maximum monthly change in the North River WPCP outfall receiving water model segment

(10) Projected water quality due to incremental change represents the projected water quality concentration derived from the increase or decrease of the calculated incremental change from existing conditions

Table E.1-12

2015 Future Without the Proposed Actions: Water Quality Predictions of the Potential Impact of North River WPCP CSOs

Parameter	Units	2005[1] Existing Conditions	Future Without Proposed Actions				DEC Standard Class I Waters
			Incremental[7] Change	Projected Water[8] Quality			
Dissolved Oxygen (surface)[2]							
Summer Average[3]	mg/L	6.69	-0.001	6.69			> 4.0
Absolute Minimum	mg/L	**3.86**	-0.001	**3.86**			> 4.0
Dissolved Oxygen (bottom)[2]							
Summer Average[3]	mg/L	4.65	-0.001	4.65			> 4.0
Absolute Minimum	mg/L	**3.73**	-0.001	**3.73**			> 4.0
Total Nitrogen	mg/L	1.46	0.002	1.46			--
Total Phosphorus	mg/L	0.14	0.000	0.14			--
Total Suspended Solids	mg/L	75	0.011	75			--
Total Coliform[4]	MPN/100ml	1,087	3	1,090			< 10,000
Fecal Coliform	Colonies/100 ml	29	1	30			<2,000
Copper[5,6]	µg/L	1.95	0.016	1.97			< 5.6
Lead[5,6]	µg/L	0.147	0.008	0.155			< 8
Zinc[5,6]	µg/L	4.49	0.045	4.54			< 66

Notes:
Bold- Does not meet water quality standard
(1) DEP Harbor Survey Station N-3B - West 125th Street
(2) Dissolved oxygen data for 2005
(3) Summer average - June 1 to September 30
(4) Total coliform data for 1996
(5) EPA Survey Station H3; 1991
(6) Existing conditions and standards for metals for dissolved form
(7) Incremental changes were calculated through the use of SWEM
(8) Represents the maximum impact in the Hudson and Harlem Rivers

Projected DO concentrations in the surface layer and bottom layers within the Hudson River would be the same as the ambient (existing) concentration. Projected surface and bottom DO would be above the DEC Class I water quality standard of 4.0 mg/L for the summer averages but below the standard for the absolute minimum due to the existing conditions being below the standard. Similarly, incremental changes in total nitrogen, total phosphorus, and total suspended solids concentrations due to CSOs in the 2015 future without the Proposed Actions would also be minimal. The incremental maximum change in total coliform count was projected to be 3 MPN/100 ml, and the total value would remain below the DEC Class I water quality standard of 10,000 MPN/100ml. The incremental maximum change in fecal coliforms was projected to increase by 1 colony/100 ml. The total projected concentration would continue to meet the DEC Class I water quality standard of 2,000 colonies/100 ml.

The incremental maximum change in the copper concentration was projected to be 0.02 μg/L, 0.01 μg/L for lead, and 0.045 μg/L for zinc. The total copper, lead, and zinc water quality values would remain below the maximum allowable concentrations for DEC Class I water quality standard for the Hudson and Harlem Rivers.

E. 2015 FUTURE WITH THE PROPOSED ACTIONS

NORTH RIVER WPCP

In the 2015 future with the Proposed Actions, the assessment of potential impacts to the North River WPCP considered the increased sewage flow from the Proposed Actions and the increased flows assessed in the 2015 future without the Proposed Actions. Table E.1-3 presents the average effluent flow for the North River WPCP in the 2015 future with the Proposed Actions and the pollutant loadings for constituents of concern associated with this effluent flow. As presented in Table E.1-3, the SPDES permit limits for the North River WPCP would be met for the average effluent flow in the 2015 future with the Proposed Actions.

For the 2015 future with the Proposed Actions, potential impacts to Hudson River water quality from the additional effluent flows and pollutant loadings from the North River WPCP presented in Table E.1-3 were assessed using SWEM. Projected average daily effluent flows for the 2015 future with the Proposed Actions would be 133.2 mgd. This flow includes the DEP projected future WPCP flow of 133.0 mgd developed on the basis of DCP population projections (DCP 2006) which includes population increases due to the Proposed Actions—and the incremental flow of 0.2 mgd calculated for the Proposed Actions in accordance with the CEQR Manual, as presented in Chapter 14, "Infrastructure." Because the projected 133.2 mgd flow for the 2015 future with the Proposed Actions includes the projected flows from the Proposed Actions twice, it is considered conservative. Table E.1-13 presents the projected incremental change in water quality parameter concentrations and projected concentrations of these parameters in the Hudson River for the 2015 future with the Proposed Actions.

The projected decrease in DO in the Hudson River due to the Proposed Actions for both the maximum 24-hour impact and maximum 30-day impact would be extremely small. The decrease would not result in DO concentrations below the DEC Class I water quality standard of 4.0 mg/L with the exception of the absolute minimums, where the existing conditions are below the water quality standard.

Total coliforms were projected to remain constant for both the daily average and maximum month and would be below the DEC Class I water quality standard of 10,000 MPN/100ml. Fecal

coliforms were also projected to remain constant for both the daily average and maximum month and would continue to meet the DEC Class I water quality standard of 2,000 colonies/100 ml.

The incremental changes in total nitrogen, total phosphorus, total suspended solids, copper, lead, and zinc concentrations in the Hudson River due to the Proposed Actions were projected to be minimal. The resulting projected concentrations of these metals in the Hudson River would remain below the maximum allowable concentrations for DEC Class I water quality standards.

NORTH RIVER WPCP CSO

An evaluation of the potential impacts of CSOs within the North River service area for the 2015 future with the Proposed Actions on surface water quality was conducted. The potential effects were calculated through the SWEM and involved the evaluation of the maximum CSO impact on water quality within the Hudson and Harlem Rivers adjacent to the North River WPCP service area. This analysis indicated that the greater change would occur within the Hudson River.

2015 WITH PARTIAL STORMWATER SYSTEM

In 2015, the Proposed Actions with the partial stormwater system would result in a decrease of CSO volumes of 0.6 million gallons per year (mgy) (when compared with future conditions in 2015 without the Proposed Actions) at the regulator servicing the block between West 129th and West 130th Streets (NR 43) and a decrease in the associated pollutant loadings. The resulting incremental additional pollutant mass loadings (see Table E.1-13) would be extremely small and would result in projected concentrations of these water quality parameters essentially identical to those projected for the 2015 future without the Proposed Actions. The number and frequency of CSO events is not expected to change. Overall, the volume of CSO in the North River service area is also expected to decrease by approximately 0.6 million gallons per year with the Proposed Actions and the partial stormwater system. As discussed previously, this decrease in CSO volume would be a result of the proposed partial separate stormwater system, which would divert approximately 3.2 million gallons annually from the combined sewer system. The volume of CSO would decrease by approximately 0.4 percent, and the change in pollutant mass loadings would be minimal. The factors contributing to this smaller reduction in annual CSO volume (0.6 mgy) compared with the volume of stormwater that would be diverted to the new stormwater system (3.2 mgy) are presented below.

- Not all of the stormwater currently discharged to the combined sewer system from the 3.9-acre area is discharged to the Hudson or Harlem Rivers through CSOs. This is because individual regulators can generally divert between 1.5 and 2-times the peak design dry weather flow into the interceptor system. It is only when the flow exceeds this amount that flow is diverted into a CSO outfall. Additionally, the interceptor sewer system in the North River WPCP has the capacity to hold a significant amount of sanitary waste and stormwater runoff and convey this flow to the WPCP.

- Even though the inflow from a small portion of the drainage area is reduced, the regulator receiving the stormwater runoff from the 3.9-acre area is also influenced by other factors (i.e., water level in the interceptor sewers, peak inflow to the regulator with and without the Proposed Actions, etc.) that affect the reduction in CSOs in that regulator by 0.4 percent.

The change in pollutant mass loadings from CSOs would be minimal. The resulting incremental additional pollutant mass loadings (see Table E.1-13) would be extremely small and would result in projected concentrations of these water quality parameters essentially identical to those

projected for the 2015 future without the Proposed Actions. Therefore, water quality in the Hudson and Harlem Rivers would continue to meet the Class I water quality standards in the 2015 future with the Proposed Actions with the exception of the absolute minimum DO as a result of the existing conditions being below the standard. Therefore, the Proposed Actions would not have a significant adverse impact on the water quality of the Hudson and Harlem Rivers.

2015 WITHOUT PARTIAL SEPARATE STORMWATER SYSTEM

For the 2015 future with the Proposed Actions and without the partial stormwater system, the number of CSO events would increase by one at NR 43, and the volume of CSO would increase by approximately 0.3 million gallons per year at regulator NR 43 when compared with future conditions in 2015 without the Proposed Actions. The overall increase of CSO in the North River WPCP service area is predicted to be 0.46 million gallons per year greater than without the Proposed Actions, out of a total CSO volume (at all regulators in the North River WPCP service area) of 493.68 million gallons per year. The resulting incremental additional pollutant mass loadings (see Table E.1-14) would be extremely small and would result in projected concentrations of these water quality parameters essentially identical to those projected for the 2015 future without the Proposed Actions. The differences (nitrogen, fecal coliform, lead, and zinc) are extremely small and are not meaningful. Water quality in the Hudson and Harlem Rivers would continue to meet the Class I water quality standards in the 2015 future with the Proposed Actions without the separate stormwater system except for the absolute minimum DO as a result of the existing conditions being below the standard.

Table E.1-13

2015 Future With the Proposed Actions: Water Quality Predictions in the Hudson River Near the North River WPCP

Parameter	Units	2005[1] Existing Conditions	2015 Future With the Proposed Actions and with Partial Separate Stormwater System					DEC Standard Class I Waters
			Maximum 24-Hour Impact[8]			Maximum 30-Day Impact[9]		
			Incremental[7] Change	Incremental[11] Change Due to Proposed Action	Projected Water[10] Quality	Incremental[11] Change Due to Proposed Action	Projected Water[10] Quality	
Dissolved Oxygen (surface)[2]								
Summer Average[3]	mg/L	6.69	-	-	-	0.000	6.69	> 4.0
Absolute Minimum	mg/L	**3.86**	-0.009	-0.000	**3.86**	-	-	> 4.0
Dissolved Oxygen (bottom)[2]								
Summer Average[3]	mg/L	4.65	-	-	-	-0.001	4.65	> 4.0
Absolute Minimum	mg/L	**3.73**	-0.010	-0.001	**3.73**	-	-	> 4.0
Total Nitrogen	mg/L	1.46	0.015	0.001	1.48	0.000	1.47	--
Total Phosphorus	mg/L	0.14	0.002	0.000	0.14	0.000	0.14	--
Total Suspended Solids	mg/L	75	0.009	0.001	75	0.000	75	--
Total Coliform[4]	MPN/100ml	1087	1	0	1088	0	1088	< 10,000
Fecal Coliform	Colonies/100 ml	29	1	0	30	0	30	<2,000
Copper[5,6]	µg/L	1.95	0.010	0.001	1.96	0.001	1.96	< 5.6
Lead [5,6]	µg/L	0.147	0.001	0.001	0.148	0.000	0.149	< 8
Zinc[5,6]	µg/L	4.49	0.047	0.006	4.54	0.003	4.55	< 66

Notes:

Bold- Does not meet water quality standard

(1) DEP Harbor Survey Station N-3B - West 125th Street

(2) Dissolved oxygen data for 2005

(3) Summer average - June 1 to September 30

(4) Total coliform data for 1996

(5) EPA Survey Station H3; 1991

(6) Existing conditions and standards for metals for dissolved form

(7) Incremental changes were calculated through the use of SWEM

(8) Maximum 24-hour impact represents the maximum hourly impact in the North River WPCP outfall receiving water model segment

(9) Maximum 30-day impact represents the maximum monthly impact in the North River WPCP outfall receiving water model segment

(10) Projected water quality due to incremental change represents the projected water quality concentration derived from the increase or decrease of the calculated incremental change from existing conditions.

(11) Incremental change resulting solely from the implementation of the Proposed Actions in 2015

Table E.1-14

2015 Future With the Proposed Actions: Water Quality Predictions in the Hudson River Near the North River WPCP

Parameter	Units	2005[1] Existing Conditions	2015 Future With the Proposed Actions and Without the Separate Stormwater System					DEC Standard Class I Waters
			Maximum 24-Hour Impact[8]			Maximum 30-Day Impact[9]		
			Incremental[7] Change	Incremental[11] Change Due to Proposed Action	Projected Water[10] Quality	Incremental[11] Change Due to Proposed Action	Projected Water[10] Quality	
Dissolved Oxygen (surface)[2]								
Summer Average[3]	mg/L	6.69	-	-	-	0.000	6.69	> 4.0
Absolute Minimum	mg/L	**3.86**	-0.009	-0.000	**3.86**	-	-	> 4.0
Dissolved Oxygen (bottom)[2]								
Summer Average[3]	mg/L	4.65	-	-	-	-0.001	4.65	> 4.0
Absolute Minimum	mg/L	**3.73**	-0.010	-0.001	**3.73**	-	-	> 4.0
Total Nitrogen	mg/L	1.46	0.015	0.001	1.48	0.001	1.47	--
Total Phosphorus	mg/L	0.14	0.002	0.000	0.14	0.000	0.14	--
Total Suspended Solids	mg/L	75	0.009	0.001	75	0.000	75	--
Total Coliform[4]	MPN/100ml	1087	1	0	1088	0	1088	< 10,000
Fecal Coliform	Colonies/100 ml	29	1	0	30	0	34	<2,000
Copper[5,6]	µg/L	1.95	0.010	0.001	1.96	0.001	1.96	< 5.6
Lead [5,6]	µg/L	0.147	0.001	0.000	0.156	0.000	0.149	< 8
Zinc[5,6]	µg/L	4.49	0.047	0.002	4.55	0.003	4.55	< 66

Notes:

Bold- Does not meet water quality standard

(1) DEP Harbor Survey Station N-3B - West 125th Street

(2) Dissolved oxygen data for 2005

(3) Summer average - June 1 to September 30

(4) Total coliform data for 1996

(5) EPA Survey Station H3; 1991

(6) Existing conditions and standards for metals for dissolved form

(7) Incremental changes were calculated through the use of SWEM

(8) Maximum 24-hour impact represents the maximum hourly impact in the North River WPCP outfall receiving water model segment

(9) Maximum 30-day impact represents the maximum monthly impact in the North River WPCP outfall receiving water model segment

(10) Projected water quality due to incremental change represents the projected water quality concentration derived from the increase or decrease of the calculated incremental change from existing conditions.

(11) Incremental change resulting solely from the implementation of the Proposed Actions in 2015

F. 2030 FUTURE WITHOUT THE PROPOSED ACTIONS

Chapter 11, "Natural Resources," provides a description of the 2030 future without the Proposed Actions.

NORTH RIVER WPCP

In the 2030 future without the Proposed Actions, wastewater flows to the North River WPCP would continue to increase due to DCP projected changes in population and anticipated new developments, including the Proposed Actions, within the WPCP service area. The projected average daily dry weather flow to the WPCP would be 132.0 mgd in the 2030 future without the Proposed Actions. The average daily flow, including wet weather flows, would be 140.0 mgd.

Table E.1-3 presents the projected impact of the 2030 future without the Proposed Actions flows on average effluent pollutant loadings from the North River WPCP, and the SPDES permit limit issued for water quality parameters included in the permit. As presented in Table E.1-3, the average effluent loading for the North River WPCP in the 2030 future without the Proposed Actions would be within the SPDES permit limits.

For the 2030 future without the Proposed Actions, potential impacts to Hudson River water quality from the additional effluent flows and pollutant loadings from the North River WPCP presented in Table E.1-3 were assessed using SWEM. Table E.1-15 presents the projected incremental change and the maximum 24-hour and maximum 30-day concentrations in the Hudson River for the water quality parameters in the 2030 future without the Proposed Actions.

DO concentrations in both the bottom and surface layers within the Hudson River near the North River WPCP in the 2030 future without the Proposed Actions would decrease by a maximum of 0.04 mg/L. This minimal decrease would not result in DO concentrations below the DEC Class I water quality standard of 4.0 mg/L with the exception of the absolute minimum, which is below the water quality standard for existing conditions.

Incremental changes in total nitrogen, total phosphorus, and total suspended solids concentrations from existing conditions would also be minimal. The total nitrogen concentration in the Hudson River was predicted to increase by 0.02 mg/L for both the maximum 24-hour condition and the maximum 30-day condition. Total phosphorus and total suspended solid concentrations within the Hudson River are predicted to remain the same in the 2030 future without the Proposed Actions.

Total coliforms are projected to increase by 1 MPN/100ml, and fecal coliforms by 1 colony/100 ml for both the maximum 24-hour and maximum 30-day concentrations. The projected total and fecal coliform concentrations would continue to meet the DEC Class I water quality standard.

Incremental changes in copper and lead concentrations were projected to be minimal (changes of 0.03 μg/L or less). The zinc concentration was predicted to increase by 0.12 μg/L and 0.16 μg/L for the maximum 24-hour condition and the maximum 30-day condition, respectively. These projected metal concentrations are well below the maximum allowable concentrations for DEC Class I water quality standards.

NORTH RIVER WPCP CSO

Potential changes due to CSOs within the North River WPCP service area on surface water quality were also evaluated in the 2030 future without the Proposed Actions. The potential changes were analyzed with SWEM and evaluated the maximum CSO effect on water quality

within the Hudson and Harlem Rivers. The results of the analysis indicated that the maximum calculated water quality changes would occur in the Hudson River.

Table E.1-16 presents the incremental change in concentrations and projected maximum concentration within the Hudson River that would result from the projected 2030 future without the Proposed Actions CSO volumes. The projected additional CSO volume at regulator NR 43 in the 2030 future without the Proposed Actions would be approximately 2.5 million gallons per year over the 2015 volume without the Proposed Actions, out of an overall CSO volume (at all regulators in the North River WPCP service area) of approximately 512.5 million gallons per year. The number of CSO events at regulator NR 43 is predicted to increase to 29 per year, an increase of 2 events. The projected decrease in DO concentrations in the surface and bottom layers of the Hudson River would be minimal and would not cause DO concentrations to fall below the DEC Class I water quality standard of 4.0 mg/L with the exception of the absolute minimums which were below the water quality standard for the existing conditions.

The projected maximum incremental changes to total nitrogen, total phosphorus, and total suspended solids concentrations presented in Table E.1-16 are also minimal and would result in concentrations within the Hudson River similar to the ambient (existing) concentrations.

The maximum incremental change to total coliforms was projected to increase by approximately 8 MPN/100ml in the 2030 future without the Proposed Actions. The total coliform count would be below the DEC Class I water quality standard of 10,000 MPN/100ml. The maximum incremental change to fecal coliforms was predicted to increase by approximately 2 colonies/100 ml in the 2030 future without the Proposed Actions. The fecal coliform count would continue to meet the DEC Class I water quality standard of 2,000 colonies/100 ml.

The maximum CSO incremental change in copper concentrations was projected to be 0.044 µg/L. The maximum incremental change for lead was predicted to be 0.021 µg/L, and for zinc 0.124 µg/L. The project water quality concentrations for copper, lead, and zinc due to the projected incremental increases in the Hudson River water quality would remain below the maximum allowable concentrations for DEC Class I water quality standards.

G. 2030 FUTURE WITH THE PROPOSED ACTIONS

By 2030, it is assumed that the remaining development generated as a result of the Proposed Actions would be completed.

NORTH RIVER WPCP

In the 2030 future without the Proposed Actions, the projected average daily flow to the WPCP would increase by 0.95 mgd to 141.0 mgd.

Table E.1-3 presents the projected impact of the 2030 future with the Proposed Actions flows on average effluent pollutant loadings from the North River WPCP, and the SPDES permit limit issued for water quality parameters included in the permit. As presented in Table E.1-3, the average effluent loading for the North River WPCP in the 2030 future with the Proposed Actions would be within the SPDES permit limits.

Table E.1-15

2030 Future Without the Proposed Actions: Water Quality Predictions in the Hudson River Near the North River WPCP

Parameter	Units	2005 (1) Existing Conditions	2030 Future Without the Proposed Actions				DEC Standard Class I Waters
			Maximum 24-Hour Change(8)		Maximum 30-Day Change(9)		
			Incremental(7) Change	Projected Water(10) Quality	Incremental(7) Change	Projected Water(10) Quality	
Dissolved Oxygen (surface)(2)							
Summer Average(3)	mg/L	6.69	-	-	-0.019	6.67	> 4.0
Absolute Minimum	mg/L	**3.86**	-0.024	**3.83**	-	-	> 4.0
Dissolved Oxygen (bottom)(2)							
Summer Average(3)	mg/L	4.65	-	-	-0.020	4.63	> 4.0
Absolute Minimum	mg/L	**3.73**	-0.026	**3.70**	-	-	> 4.0
Total Nitrogen	mg/L	1.46	0.015	1.48	0.023	1.48	--
Total Phosphorus	mg/L	0.14	0.002	0.14	0.004	0.144	--
Total Suspended Solids	mg/L	75	0.01	75	0.019	75	--
Total Coliform(4)	MPN/100ml	1087	1	1088	1	1088	< 10,000
Fecal Coliform	Colonies/100 ml	29	1	29	1	29	<2,000
Copper(5,6)	µg/L	1.95	0.026	1.98	0.027	1.98	< 5.6
Lead (5,6)	µg/L	0.147	0.003	0.15	0.005	0.152	< 8
Zinc(5,6)	µg/L	4.49	0.123	4.61	0.164	4.65	< 66

Notes:

Bold- Does not meet water quality standard

(1) DEP Harbor Survey Station N-3B - West 125th Street

(2) Dissolved oxygen data for 2005

(3) Summer average - June 1 to September 30

(4) Total coliform data for 1996

(5) EPA Survey Station H3; 1991

(6) Existing conditions and standards for metals for dissolved form

(7) Incremental changes were calculated through the use of SWEM

(8) Maximum 24-hour change represents the maximum hourly change in the North River WPCP outfall receiving water segment

(9) Maximum 30-day change represents the maximum monthly change in the North River WPCP outfall receiving water segment

(10) Projected water quality due to incremental change represents the projected water quality concentration derived from the increase or decrease of the calculated incremental change from existing conditions.

Table E.1-16
2030 Future Without the Proposed Actions:
Water Quality Predictions of the Potential Changes Due to North River WPCP CSOs

Parameter	Units	2005[1] Existing Conditions	Future Without Proposed Actions				DEC Standard Class I Waters
			Incremental[7] Change	Projected Water[8] Quality			
Dissolved Oxygen (surface)[2]							
Summer Average[3]	mg/L	6.69	-0.002	6.69			> 4.0
Absolute Minimum	mg/L	**3.86**	-0.002	**3.86**			> 4.0
Dissolved Oxygen (bottom)[2]							
Summer Average[3]	mg/L	4.65	-0.003	4.65			> 4.0
Absolute Minimum	mg/L	**3.73**	-0.003	**3.73**			> 4.0
Total Nitrogen	mg/L	1.46	0.004	1.46			--
Total Phosphorus	mg/L	0.14	0.001	0.14			--
Total Suspended Solids	mg/L	75	0.029	75			--
Total Coliform[4]	MPN/100ml	1087	8	1,095			< 10,000
Fecal Coliform	Colonies/100 ml	29	1	30			<2,000
Copper[5,6]	µg/L	1.95	0.044	1.99			< 5.6
Lead[5,6]	µg/L	0.147	0.021	0.168			< 8
Zinc[5,6]	µg/L	4.49	0.124	4.61			< 66

Notes:
Bold- Does not meet water quality standard
(1) DEP Harbor Survey Station N-3B - West 125th Street
(2 Dissolved oxygen data for 2005
(3) Summer average - June 1 to September 30
(4) Total coliform data for 1996
(5) EPA Survey Station H3; 1991
(6) Existing conditions and standards for metals for dissolved form
(7) Incremental changes were calculated through the use of SWEM
(8) Represents the maximum impact in the Hudson and Harlem Rivers

The WPCP effluent pollutant loadings for the 2030 future with the Proposed Actions were used to assess potential impacts to water quality within the Hudson River. Table E.1-17 presents the projected incremental changes in the selected water quality parameters and resulting maximum 24-hour and 30-day concentrations in the Hudson River for the 2030 future with the Proposed Actions.

The projected incremental decrease in DO in the Hudson River due to the Proposed Actions for both the maximum 24-hour and 30-day impacts would be extremely small, approximately 0.003 mg/L or less. This minimal change in DO concentration would not result in DO concentrations below the DEC Class I water quality standard of 4.0 mg/L. The absolute minimum DO would remain below the water quality standard as it is in the 2005 existing conditions.

Total coliforms and fecal coliforms were also projected to remain the same as the current ambient condition for the maximum 24-hour impact and for the maximum 30-day impact, and would continue to meet the DEC Class I water quality standard of 10,000 MPN/100ml and 2,000 colonies/100 ml, respectively.

As shown in Table E.1-17 total nitrogen concentrations in the 2030 future with the Proposed Actions for the maximum 24-hour and maximum 30-day impact were predicted to increase by 0.003 mg/L or less from the 2030 future without the Proposed Actions incremental change. The total phosphorus concentrations within the Hudson River were projected to increase by 0.004 mg/L or less than the 2030 future without the Proposed Actions incremental change. The total suspended solids within the Hudson River are expected to remain the same as the ambient (existing) condition.

Predicted incremental increases in copper concentrations within the Hudson River for the 2030 future with the Proposed Actions would be 0.002 μg/L for both the maximum 24-hour and the maximum 30-day impact. Lead concentrations were predicted to remain constant for the maximum 24-hour impact and for the maximum 30-day impact. The increase in zinc concentration due to the Proposed Actions was predicted to be 0.011 μg/L for the maximum 24-hour period and 0.014 μg/L for the maximum 30-day period. The projected water quality concentrations for copper, lead, and zinc due to the projected incremental increases in Hudson River water quality would remain below the maximum allowable concentrations for DEC Class I water quality standards.

NORTH RIVER WPCP CSO

The Proposed Actions would result in a decrease of CSO volumes of 1.6 million gallons per year at regulator (mgy) NR 43 and associated pollutant loadings, compared with the 2030 conditions without the Proposed Actions. The frequency of CSO events is not expected to change. Overall, the volume of CSO in the North River service area is expected to decrease by about 1.8 million gallons per year with the Proposed Actions. As discussed previously, this decrease in CSO volume be would a result of the proposed separate stormwater system, which would divert approximately 9.9 million gallons annually from the combined sewer system. The factors contributing to this smaller reduction in annual CSO volume (1.8 mgy) compared to the volume of stormwater that would be diverted to the new stormwater system (9.9 mgy) are as presented below.

- Not all of the stormwater currently discharged to the combined sewer system from the 12.36-acre area is discharged to the Hudson or Harlem Rivers through CS0s. This is because individual regulators can generally divert between 1.5 and 2-times the peak design dry weather flow into the interceptor system. It is only when the flow exceeds this amount that flow is diverted into a CSO outfall. Additionally, the interceptor sewer system in the North River WPCP has the capacity to hold a significant amount of sanitary waste and stormwater runoff and convey this flow to the WPCP.

- Even though the inflow from a small portion of the drainage area is reduced, the regulator receiving the stormwater runoff from the 12.36-acre area is also influenced by other factors (i.e., water level in the interceptor sewers, peak inflow to the regulator with and without the Proposed Actions, etc.) that affect the reduction in CSOs in that regulator.

The change in pollutant mass loadings from CSOs would be minimal, The resulting incremental change for the water quality parameters described below would be minimal, and would not result in significant adverse impacts to water quality.

Table E.1-16 presents the projected incremental changes from the existing conditions and the maximum impact of the CSOs in the Hudson River for the 2030 future with the Proposed Actions. Although CSOs within the North River WPCP service area are located within the Hudson and Harlem Rivers, the maximum CSO impact was projected to occur within the Hudson River.

Table E.1-17

2030 Future With the Proposed Actions: Water Quality Predictions in the Hudson River Near the North River WPCP

Parameter	Units	2005[1] Existing Conditions	2030 Future With the Proposed Actions					DEC Standard Class I Waters
			Maximum 24-Hour Impact[8]			Maximum 30-Day Impact[9]		
			Incremental[7] Change	Incremental[11] Change Due to Proposed Action	Projected Water[10] Quality	Incremental[11] Change Due to Proposed Action	Projected Water[10] Quality	
Dissolved Oxygen (surface)[2]								
Summer Average[3]	mg/L	6.69	-	-	-	-0.002	6.69	4.0
Absolute Minimum	mg/L	**3.86**	-0.027	-0.002	**3.83**	-	-	4.0
Dissolved Oxygen (bottom)[2]								
Summer Average[3]	mg/L	4.65	-	-	-	-0.002	4.65	4.0
Absolute Minimum	mg/L	**3.73**	-0.028	-0.002	**3.70**	-	-	4.0
Total Nitrogen	mg/L	1.46	0.041	0.022	1.50	0.002	1.48	--
Total Phosphorus	mg/L	0.14	0.006	0.004	0.15	0.000	0.144	--
Total Suspended Solids	mg/L	75	0.026	0.011	75	0.002	75	--
Total Coliform[4]	MPN/100ml	1087	1	0	1088	0	1088	10,000
Fecal Coliform	Colonies/ 100 ml	29	1	0	29	0	29	<2,000
Copper[5,6]	µg/L	1.95	0.028	0.002	1.98	0.002	1.98	5.6
Lead [5,6]	µg/L	0.147	0.003	0.000	0.150	0.000	0.152	8
Zinc[5,6]	µg/L	4.49	0.133	0.011	4.62	0.014	4.66	66

Notes:
Bold- Does not meet water quality standard
(1) DEP Harbor Survey Station N-3B - West 125th Street
(2) Dissolved oxygen data for 2005
(3) Summer average - June 1 to September 30
(4) Total coliform data for 1996
(5) EPA Survey Station H3; 1991
(6) Existing conditions and standards for metals for dissolved form
(7) Incremental changes were calculated through the use of SWEM
(8) Maximum 24-hour impact represents the maximum hourly impact in the North River WPCP outfall receiving water segment
(9) Maximum 30-day impact represents the maximum monthly impact in the North River WPCP outfall receiving water segment
(10) Projected water quality due to incremental change represents the projected water quality concentration derived from the increase or decrease of the calculated incremental change from existing conditions.
(11) Incremental change resulting solely from the implementation of the Proposed Actions in 2030

DO within the Hudson River due to the Proposed Actions as a result of the maximum CSO impact were projected not to be impacted. The DO in the Hudson River would not result in DO

concentrations below the DEC Class I water quality standard of 4.0 mg/L with the exception of the absolute minimums, which were below the standards for the existing conditions.

For the 2030 future with the Proposed Actions, total coliform and fecal coliforms were predicted to remain unchanged. The predicted incremental increase in total coliforms would not result in concentrations above the DEC Class I water quality standard of 10,000 MPN/100 ml. For the 2030 future with the Proposed Actions, fecal coliforms would remain unchanged. The projected fecal coliforms would continue to meet the DEC Class I water quality standard of 2,000 colonies/100 ml.

The incremental changes in the total nitrogen, total phosphorus, and total suspended solids concentrations in the Hudson River due to the Proposed Actions were projected to be extremely small and would not affect the existing concentrations within the Hudson River.

The incremental change in the concentration of copper in the Hudson River in the 2030 future with the Proposed Actions was projected to increase by 0.003 µg/L. Lead concentrations were projected to increase by 0.003 µg/L and zinc was projected to increase by 0.016 µg/L. The incremental changes in the concentrations of copper, lead, and zinc and the projected water quality within the Hudson River would not result in concentrations above the maximum allowable concentrations for DEC Class I water quality standard.

STORMWATER OUTFALL

The estimated annual pollutant loads from the operation of the new storm sewer system are small, particularly in comparison to the daily loadings currently discharged and projected to be discharged from the North River WPCP (Table E.1-3) in 2030 with or without the Proposed Actions which would not be expected to result in significant adverse impacts to water quality. Additionally, with the exception of zinc, the estimated annual loadings from the stormwater outfall presented in Table E.1-5 are less than the incremental changes in CSO annual loadings in 2015 and 2030 with or without the Proposed Actions, which would also not be expected to result in significant adverse impacts to water quality. Therefore, the discharge of stormwater from the new storm sewer would not be expected to result in adverse impacts to water quality of the Hudson River.

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APPENDIX E.2

NATURAL RESOURCES CORRESPONDENCE

National Marine Fisheries Service
Habitat Conservation Division
Milford Field Office, 212 Rogers Avenue
Milford, Connecticut 06460

DATE: 6 October 2004

TO: Ms. Sandra Collins
AKRF
7250 Parkway Drive, Suite 210
Hanover, Maryland 21076

SUBJECT: **Information Request for Manhattanville, West Harlem, New York County, New York**

Diane Rusanowsky
(Reviewing Biologist)

We have reviewed the information provided to us regarding the above subject project. We offer the following preliminary comments pursuant to the Endangered Species Act, the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act:

Endangered and Threatened Species

There are no endangered or threatened species in the project area.

XX The following endangered or threatened species may be present in the general project vicinity as transients:

XX shortnose sturgeon (*Acipenser brevirostrum*) occur in the Hudson River

Sea turtles: loggerhead (*Caretta caretta*)
green (*Chelonia mydas*)
Kemp's ridley (*Lepidochelys kempii*)
leatherback (*Dermochelys coriacea)*

&

Note: Any necessary ESA consultation should be initiated by the involved federal action agency(ies). Correspondence should be directed to Ms. Mary Colligan, ARA for Protected Resources, NOAA/F, Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298.

Fish and Wildlife Coordination Act Species

XX The following may be present in the project vicinity: Resident fish, forage and benthic species

Please contact the appropriate Regional Office of the New York State Department of Environmental Conservation to confirm the presence of anadromous or resident aquatic populations. Habitat use by some species or life stages may be seasonal (e.g. over-wintering juvenile striped bass)

Essential Fish Habitat

Upper New York Bay and adjacent waters have been designated as Essential Fish Habitat (EFH) for one or more species. When details of the project are made available and permit applications have been made, conservation recommendations may be given. For a listing of EFH designations and further information, please go to our website at:

http://www.nero.noaa.gov/hcd/

F/NER3 Crocker

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.

Erin M. Crotty
Commissioner

August 24, 2004

Sandra Collins
A K R F Environmental
7250 Parkway Dr, Suite 210
Hanover, MD 21076

Dear Ms. Collins:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed 35-acre Rezoning of Manhattanville in West Harlem, area as indicated on the map you provided, located in Manhattan.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

The presence of rare species may result in this project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information

Sincerely,

Betty Ketcham gp

Betty A. Ketcham, Information Services
NY Natural Heritage Program

cc Reg. 2, Wildlife Mgr.
Peter Nye, Endangered Species Unit, Albany
Shaun Keeler, Bureau of Fisheries, Albany

Natural Heritage Report on Rare Species and Ecological Communities

Prepared 23 August 2004 by NY Natural Heritage Program, NYS DEC, Albany, New York

This report contains SENSITIVE information that should be treated in a sensitive manner -- Please see cover letter. Refer to the Users' Guide for explanations of codes, ranks, and fields.
We do not always provide maps of locations of species most vulnerable to disturbance, nor of some records whose locations and/or extents are not precisely known or are too large to display.

* County
** Town

Scientifc Name, COMMON NAME, & Group Name	NY Legal Status, Heritage Ranks, & Federal Status	EO Rank & Last Seen	Detailed Location	General Habitat and Quality	Office Use
* COLUMBIA, PUTNAM, RENSSELAER, ROCKLAND, ORANGE, NEW YORK, DU					
** MOUNT PLEASANT, SAUGERTIES, BETHLEHEM, CITY OF RENSSELAER, CITY OF NEW YORK, FISHKILL, CITY OF NEW Y					
Acipenser brevirostrum SHORTNOSE STURGEON Fish	ENDANGERED G3 S1 LE		HUDSON RIVER The lower Hudson River from The Battery in New York City at its junction with Upper New York Bay, upstream to the Federal Dam in Troy and a portion of Schodack Creek.	A long tidal river representing the Lower Hudson River. The river constitutes the lower part of a 315 mile stream system. It is fed upstream by two large main channel streams, which provide 80% of the freshwater input, and numerous other smaller stre	4107368 BOF
* NEW YORK					
** CITY OF NEW YORK					
Falco peregrinus PEREGRINE FALCON Bird	ENDANGERED G4 S3B,SZN (PS:LE)		[redacted]	For information on the population at this location and management considerations, please contact the NYS DEC Regional Wildlife Manager or NYS DEC Endangered Species Unit at 518-402-8859.	4007378 S ESU

2 Records Processed

USERS GUIDE TO NY NATURAL HERITAGE DATA

New York Natural Heritage Program, 625 Broadway, Albany, NY, 12233-4757 (518) 402-8935

NATURAL HERITAGE PROGRAM: The Natural Heritage Program is an ongoing, systematic, scientific inventory whose goal is to compile and maintain data on the rare plants and animals native to New York State, and significant ecological communities. The data provided in the report facilitate sound planning, conservation, and natural resource management and help to conserve the plants, animals and ecological communities that represent New York's natural heritage.

DATA SENSITIVITY: The data provided in the report are ecologically sensitive and should be treated in a sensitive manner. The report is for your in-house use and should not be released, distributed or incorporated in a public document without prior permission from the Natural Heritage Program.

NATURAL HERITAGE REPORTS (may contain any of the following types of data):

COUNTY NAME: County where the occurrence of a rare species or significant ecological community is located.
TOWN NAME: Town where the occurrence of a rare species or significant ecological community is located.
USGS 7 ½' TOPOGRAPHIC MAP: Name of 7.5 minute US Geological Survey (USGS) quadrangle map (scale 1:24,000).

SIZE (acres): Approximate acres occupied by the rare species or significant ecological community at this location. A blank indicates unknown size.
SCIENTIFIC NAME: Scientific name of the occurrence of a rare species or significant ecological community.
COMMON NAME: Common name of the occurrence of a rare species or significant ecological community.
ELEMENT TYPE: Type of element (i.e. plant, animal, significant ecological community, other, etc.)

LAST SEEN: Year rare species or significant ecological community last observed extant at this location.

EO RANK: Comparative evaluation summarizing the quality, condition, viability and defensibility of this occurrence. Use with LAST SEEN.
A-E = Extant: A=excellent, B=good, C=fair, D=poor, E=extant but with insufficient data to assign a rank of A - D.
F = Failed to find. Did not locate species, but habitat is still there and further field work is justified.
H = Historical. Historical occurrence without any recent field information.
X = Extirpated. Field/other data indicates element/habitat is destroyed and the element no longer exists at this location.
? = Unknown.
Blank = Not assigned.

NEW YORK STATE STATUS (animals): Categories of Endangered and Threatened species are defined in New York State Environmental Conservation Law section 11-0535. Endangered, Threatened, and Special Concern species are listed in regulation 6NYCRR 182.5.

E = Endangered Species: any species which meet one of the following criteria:
1) Any native species in imminent danger of extirpation or extinction in New York.
2) Any species listed as endangered by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11.

T = Threatened Species: any species which meet one of the following criteria:
1) Any native species likely to become an endangered species within the foreseeable future in NY.
2) Any species listed as threatened by the U.S. Department of the Interior, as enumerated in the Code of the Federal Regulations 50 CFR 17.11.

SC = Special Concern Species: those species which are not yet recognized as endangered or threatened, but for which documented concern exists for their continued welfare in New York. Unlike the first two categories, species of special concern receive no additional legal protection under Environmental Conservation Law section 11-0535 (Endangered and Threatened Species).

P = Protected Wildlife (defined in Environmental Conservation Law section 11-0103): wild game, protected wild birds, and endangered species of wildlife.

U = Unprotected (defined in Environmental Conservation Law section 11-0103): the species may be taken at any time without limit; however a license to take may be required.

G = Game (defined in Environmental Conservation Law section 11-0103): any of a variety of big game or small game species as stated in the Environmental Conservation Law; many normally have an open season for at least part of the year, and are protected at other times.

NEW YORK STATE STATUS (plants): The following categories are defined in regulation 6NYCRR part 193.3 and apply to NYS Environmental Conservation Law section 9-1503.

E = Endangered Species: listed species are those with:
1) 5 or fewer extant sites, or
2) fewer than 1,000 individuals, or
3) restricted to fewer than 4 U.S.G.S. 7 ½ minute topographical maps, or
4) species listed as endangered by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

T = Threatened: listed species are those with:
1) 6 to fewer than 20 extant sites, or
2) 1,000 to fewer than 3,000 individuals, or
3) restricted to not less than 4 or more than 7 U.S.G.S. 7 and ½ minute topographical maps, or
4) listed as threatened by U.S. Department of Interior, as enumerated in Code of Federal Regulations 50 CFR 17.11.

R = Rare: listed species have:
1) 20 to 35 extant sites, or
2) 3,000 to 5,000 individuals statewide.

V = Exploitably vulnerable: listed species are likely to become threatened in the near future throughout all or a significant portion of their range within the state if causal factors continue unchecked.

U = Unprotected; no state status.

continued on next page

NEW YORK STATE STATUS (communities): At this time there are no categories defined for communities.

FEDERAL STATUS (plants and animals): The categories of federal status are defined by the United States Department of the Interior as part of the 1974 Endangered Species Act (see Code of Federal Regulations 50 CFR 17). The species listed under this law are enumerated in the Federal Register vol. 50, no. 188, pp. 39526 - 39527.

(blank) = No Federal Endangered Species Act status.
LE = The element is formally listed as endangered.
LT = The element is formally listed as threatened.
E/SA = The element is treated as endangered because of similarity of appearance to other endangered species or subspecies.
PE = The element is proposed as endangered.
PT = The element is proposed as threatened.
C= The element is a candidate for listing.
(LE) = If the element is a full species, all subspecies or varieties are listed as endangered; if the element is a subspecies, the full species is listed as endangered.
(LE-LT) = The species is formally listed as endangered in part of its range, and as threatened in the other part; or, one or more subspecies or varieties is listed as endangered, and the others are listed as threatened.
(LT-C) = The species is formally listed as threatened in part of its range, and as a candidate for listing in the other part; or, one or more subspecies or varieties is listed as threatened, and the others are candidates for listing.
(LT-(T/SA)) = One or more subspecies or populations of the species is formally listed as threatened, and the others are treated as threatened because of similarity of appearance to the listed threatened subspecies or populations.
(PS) = Partial status: the species is listed in parts of its range and not in others; or, one or more subspecies or varieties is listed, while the others are not listed.

GLOBAL AND STATE RANKS (animals, plants, ecological communities and others): Each element has a global and state rank as determined by the NY Natural Heritage Program. These ranks carry no legal weight. The global rank reflects the rarity of the element throughout the world and the state rank reflects the rarity within New York State. Infraspecific taxa are also assigned a taxon rank to reflect the infraspecific taxon's rank throughout the world. ? = Indicates a question exists about the rank. Range ranks, e.g. S1S2, indicate not enough information is available to distinguish between two ranks.

GLOBAL RANK:

G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or very few remaining acres, or miles of stream) or especially vulnerable to extinction because of some factor of its biology.
G2 = Imperiled globally because of rarity (6 - 20 occurrences, or few remaining acres, or miles of stream) or very vulnerable to extinction throughout its range because of other factors.
G3 = Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because of other factors.
G4 = Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5 = Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GH = Historically known, with the expectation that it might be rediscovered.
GX = Species believed to be extinct.

STATE RANK:

S1 = Typically 5 or fewer occurrences, very few remaining individuals, acres, or miles of stream, or some factor of its biology making it especially vulnerable in New York State.
S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.
S3 = Typically 21 to 100 occurrences, limited acreage, or miles of stream in New York State.
S4 = Apparently secure in New York State.
S5 = Demonstrably secure in New York State.
SH = Historically known from New York State, but not seen in the past 15 years.
SX = Apparently extirpated from New York State.
SZ = Present in New York State only as a transient migrant.

SxB and SxN, where Sx is one of the codes above, are used for migratory animals, and refer to the rarity within New York State of the breeding (B) populations and the non-breeding populations (N), respectively, of the species.

TAXON (T) RANK: The T-ranks (T1 - T5) are defined the same way as the Global ranks (G1 - G5), but the T-rank refers only to the rarity of the subspecific taxon.
T1 through T5 = See Global Rank definitions above.
Q = Indicates a question exists whether or not the taxon is a good taxonomic entity.

OFFICE USE: Information for use by the Natural Heritage Program.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

3817 Luker Road
Cortland, NY 13045

August 13, 2004

Ms. Sandra Collins
Senior Scientist
AKRF Environmental Planning Consultants
7250 Parkway Drive, Suite 210
Hanover, MD 21076

Dear Ms. Collins:

This responds to your letter of August 4, 2004, requesting information on the presence of Federally listed or proposed endangered or threatened species in the vicinity of the proposed rezoning of 35 acres associated with Columbia University in Manhattan, New York County, New York.

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Therefore, no further Endangered Species Act coordination or consultation with the U.S. Fish and Wildlife Service (Service) is required. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally listed and proposed endangered and threatened species in New York* is available for your information.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the Endangered Species Act. This response does not preclude additional Service comments under other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate New York State Department of Environmental Conservation regional office(s),* and:

New York State Department of Environmental Conservation
New York Natural Heritage Program Information Services
625 Broadway
Albany, NY 12233-4757
(518) 402-8935

Since wetlands may be present, you are advised that National Wetlands Inventory (NWI) maps may or may not be available for the project area. However, while the NWI maps are reasonably accurate, they should not be used in lieu of field surveys for determining the presence of wetlands or delineating wetland boundaries for Federal regulatory purposes. Copies of specific NWI maps can be obtained from:

Cornell Institute for Resource Information Systems
302 Rice Hall
Cornell University
Ithaca, NY 14853-5601
(607) 255-6520
web: http://iris.css.cornell.edu
email: cornell-iris@cornell.edu

Work in certain waters of the United States, including wetlands, may require a permit from the U.S. Army Corps of Engineers (Corps). If a permit is required, in reviewing the application pursuant to the Fish and Wildlife Coordination Act, the Service may concur, with or without recommending additional permit conditions, or recommend denial of the permit depending upon potential adverse impacts on fish and wildlife resources associated with project construction or implementation. The need for a Corps permit may be determined by contacting the appropriate Corps office(s).*

If you require additional information or assistance please contact Michael Stoll at (607) 753-9334.

Sincerely,

Mark W. Clough
Acting For

David A. Stilwell
Field Supervisor

*Additional information referred to above may be found on our website at http://nyfo.fws.gov/es/esdesc.htm.

cc NYSDEC, Long Island City, NY (Environmental Permits)
NYSDEC, Albany, NY (Natural Heritage Program)
COE, New York, NY

APPENDIX E.3

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Appendix E.3: Natural Resources References

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