Capital Project No. WP-169
Long Term Control Plan II

Combined Sewer Overflow Long Term Control Plan for Hutchinson River

Appendix E: Supplemental Documentation April 2015

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Department of Environmental Protection
Bureau of Wastewater Treatment

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1. INTRODUCTION

1. **Purpose**

   This Supplemental Documentation, contains DEP's responses to DEC's comment letter, dated January 14, 2015, on the September 2014 Combined Sewer Overflow (CSO) Long Term Control Plan (LTCP) for the Hutchinson River. The Supplemental Documentation is now made part of the referenced LTCP as Appendix E.

   The LTCP, as supplemented herein, summarizes DEP's plans for managing the CSO discharges into the Hutchinson River including the findings and recommendations to advance the waterbody's level of compliance with applicable Water Quality Standards.

2. **Format**

   This Supplemental Documentation is divided into sections reflecting specific areas of concern, such as General Comments, Executive Summary, and the various sections of the LTCP about which DEC comments were received.

   In addition, the Supplemental Documentation also includes a revised Executive Summary as Attachment 1 and a revised Appendix D, Use Attainability Analysis as Attachment 2. Collectively, the Supplemental Documentation and attachments, plus the original September 2014 submittal, constitute the overall revised Hutchinson River LTCP.

   The following conventions were used with respect to the numbering of figures and tables:

   - When revisions were made to existing tables from the September 2014 LTCP, both the original and the revised tables are included in the response along with their original numbering (e.g., **Table 6-4. "Title"**) plus the revised numbering (e.g., **Table 6-4. "Title" (Revised)).**

   - When revisions were made to existing figures from the September 2014 LTCP, the original figures were not included and only the revised figure is shown in the Supplemental Documentation (e.g., **Figure 9-1. "Title" (Revised)**).

   - When an entire new table or figure was added, it was numbered using the prefix E denoting Appendix E and a prefix identifying them as new added material (e.g., **New Table E-4. "Title"**).

2. RESPONSE TO COMMENTS

2.1 GENERAL COMMENT

The single General Comment from DEC and the DEP's response follows:

DEC Comment:
As the City is aware, the Hutchinson River is a Class SB waterbody, and as such, the best usages for this waterbody are primary and secondary contact recreation and fishing, which are consistent with the fishable/swimmable goal of the federal Clean Water Act. Although the waterbody is currently not used extensively for these uses, the Department emphasizes that achieving the water quality standards to support these uses is the long-term goal of CSO abatement efforts. The Department recognizes that there are non-CSO sources of impairment outside of New York City, but efforts are being undertaken to address these sources. Therefore, the City must focus its efforts on reducing the impacts from CSOs.

DEP Response:
The City concurs with the Department's concerns raised above. The City will continue to strive to reduce the impact of CSO discharges to the Hutchinson River.

2.2 SPECIFIC COMMENTS

2.2.1 EXECUTIVE SUMMARY

DEP responses to DEC comments on the Executive Summary have been addressed in two ways: responses to specific comments, presented below, and the development of revised Executive Summary, Attachment 1 to this Supplemental Documentation.

DEC Comment No. 1
Table ES-2 indicates that there is an increase in fecal coliform during dry weather between sampling Stations HR-06 and HR-03, which seems counterintuitive given that the waterbody at the lower sampling station has a greater assimilative capacity than at the upper sampling station. The Department recommends that the City conduct trackdown of illicit discharges in this vicinity as required under its SPDES permit. It is important to note that the Sentinel Monitoring station for the Hutchinson River is located near sampling point HR-02, which is downstream of the reach where the increase in fecal coliform is observed. Thus, the Sentinel Monitoring Program is unlikely to identify this type of water quality variation.

***DEP Response*:**
The fecal coliform bacteria concentrations measured between in-stream LTCP Stations HR-06 and HR-03 increase progressively in the downstream direction. In terms of geometric means, the fecal coliform levels increase from 140 cfu/100mL at Station HR-06 to 670 cfu/100mL at Station HR-03. This trend, however, is not observed for the corresponding enterococci levels. Typically, human waste discharged at a source-point along a stream leads to in-stream increases in both fecal coliform and enterococci bacteria. As the data do not show an increase in the enterococci data, DEP does not plan to initiate additional trackdown programs in this area at this time. DEP notes that the Harbor Survey Program has been collecting bacteria data at multiple stations along the Hutchinson River since November 2014 and capturing dry weather bacteria levels upstream and downstream of Station HR-03 periodically. The resulting dataset would allow the identification of the type of water quality variation mentioned in DEC's comment, should it occur. The Sentinel Monitoring Program will also continue to provide illicit connection trackdown, if warranted.

DEC Comment No. 2
In Tables ES-4 and ES-5, the percent attainment appears wrong for some of the months, in particular the months where the maximum geometric mean (GM) is 200 or less but the percent attainment is shown as less than 100 percent.

***DEP Response*:-**
A few of the values had typographic errors. Tables 6-4 and 6-5 presented in the response to comment #12 below provides the replacement tables. These are also included in the revised Executive Summary, Attachment 1 to this document.

DEC Comment No. 3
The Executive Summary should provide information on attainment levels for the dissolved oxygen water quality standard under baseline conditions and for the selected alternative.

***DEP Response*:**
A new Executive Summary is provided as Attachment 1 to this document, which contains the requested dissolved oxygen information.

DEC Comment No. 4
Table ES-15 should include a footnote to explain the meaning of the * for some of the recovery times.

***DEP Response*:**
Table ES-15 in the revised Executive Summary no longer mentions the rainfall bins for the time to recovery analysis. Thus, the footnote is no longer required.

2.2.2 SECTION 1.0 - INTRODUCTION

DEC Comment No. 5
In Section 1.3a, the City should clarify that the Hutchinson River WWFP submitted in June 2007 was never approved by the Department and that the requirement to submit an approvable WWFP was deleted from the CSO Consent Order with the 2012 Order amendments. The narrative in this section gives the impression that the WWFP confirmed that CSO storage tanks were not needed and thus were deleted for that reason, when in fact the Department never accepted the analysis presented in the 2007 WWFP.

DEP Response:
Language has been edited to clarify the deletion of the tanks and that the WWFP was not approved by DEC. The second paragraph in Section 1.3.a. will be replaced as described below.

Current Language: "In June 2007, DEP issued the Hutchinson River WWFP. The WWFP, which was prepared pursuant to the 2005 CSO Order on Consent, includes an analysis and presentation of operational and structure modifications targeting the reduction of CSOs and improvement of the overall performance of the collection and treatment system within the watershed. The 2012 CSO Order on Consent includes milestones for conducting water quality sampling and developing a report on the water quality and sewer system for the Hutchinson River. In addition, the 2012 CSO Order on Consent deleted the requirement for construction of these CSO tanks and required a waste load allocation to better quantify the need for CSO controls. As such, no grey infrastructure projects were planned or implemented in the Hutchinson River as a result of the previous CSO facilities planning or the Order on Consent. The field sampling and sampling report were completed in 2012, and the Water Quality and Sewer System Report were submitted on July 1, 2013 in accordance with the 2012 CSO Order on Consent milestones, and the revised submittal dated September 2014.

Proposed Language: "In June 2007, DEP submitted the Hutchinson River WWFP to DEC. The WWFP, which was prepared pursuant to the 2005 CSO Order on Consent, includes an analysis and presentation of operational and structure modifications targeting the reduction of CSOs and improvement of the overall performance of the collection and treatment system within the watershed. The WWFP proposed eliminating these tanks because DEP's analysis indicated that storage alternatives were not cost-effective. However, the WWFP was not approved by DEC. The requirement to submit an approvable WWFP was later deleted from the 2012 CSO Order on Consent along with the requirement for construction of the CSO tanks. These requirements were replaced with a waste load allocation analysis. Thus, no grey infrastructure projects were implemented in the Hutchinson River as a result of the previous CSO facilities planning or the 2012 CSO Order on Consent. The field sampling and analysis report was completed in 2012, and the Water Quality and Sewer System Report were submitted on July 1, 2013, in accordance with the 2012 CSO Order on Consent milestones, and the revised submittal dated September 2014."

2.2.3 SECTION 2.0 – WATERSHED/WATERBODY CHARACTERISTCS

DEC Comment No. 6

Table 2-3 (and Table 6-1) provide the pollutant concentrations for sanitary and stormwater discharges, and the storm water concentration is based on the 2012 sampling conducted by the City (as reflected in Table 2-11). In Section 6.1 on p. 6-3, the City states that the illicit dry weather loadings observed in Westchester County were not included in the baseline conditions. Based on these statements, it appears that the storm water concentrations for Westchester County shown in Tables 2-3 and 6-1 included illicit discharges during wet weather, but the total pollutant loads shown in Table 6-2 do not include illicit discharges during wet weather. In other words, the illicit discharges that occur during both dry and wet weather were eliminated from stormwater pollutant loads estimated for Westchester County under both wet and dry weather conditions. Confirm that the loads shown in Table 6-2 do not include any illicit discharges during dry or wet weather for Westchester County.

DEP Response:

The loads shown in Table 6-2 do not include any illicit discharges during dry weather for Westchester County. Since the Westchester County stormwater concentrations were based on measured data, there is the potential for stormwater concentrations to be overestimated due to illicit discharges. Footnotes have been added to the revised Tables 2-3, 6-1 and 6-2 below, which further clarify the approach taken in quantifying the wet weather loadings from Westchester County.

Current Tables and Footnotes:

Table 2-3. Sanitary and Stormwater Discharge Concentrations, Baseline Condition

Constituent	Sanitary Concentration(1)	Stormwater Concentration(2,3)	
CBOD (mg/L)	110	15	
TSS (mg/L)	110	15	
Total Coliform Bacteria (cfu/100mL)(4)	$25x10^6$	300,000	
Fecal Coliform Bacteria (cfu/100mL)(4)	$4x10^6$	NYC(5)	Westchester County(5)
		35,000	100,000
Enterococci (cfu/100mL)(4)	$1x10^6$	NYC(5)	Westchester County(5)
		50,000	50,000

Notes:
(1) NYCDEP, 2002.
(2) NYCDEP, 1994.
(3) HydroQual, 2005.
(4) Bacterial Concentrations expressed as “colony forming units” per 100mL.
(5) NYCDEP, 2012.

Table 6-1. Pollutant Concentrations for Various Sources in the Hutchinson River

Pollutant Source		Enterococci (cfu/100mL)	Fecal Coliform (cfu/100mL)	BOD5[1] (mg/L)
Stormwater NYC[1]		50,000	35,000	15
Stormwater Westchester County[1]		50,000	100,000	15
Direct Drainage[3]		6,000	4,000	15
Sanitary Sewage[2]		1,000,000	4,000,000	110
Pelham Lake Outflow	Dry[1]	190[4]	500[4]	2.7[5]
	Wet[1]	1,300[4]	3,300[4]	

Notes:

(1) Hutchinson River CSO Waste Load Allocation Water Quality and Sewer System Report, 2014.
(2) HydroQual Memo to DEP, 2005a.
(3) Basis – NYS Stormwater Manual, Charles River LTCP, National Stormwater Data Base for commercial and industrial land uses.
(4) GM of sampling data – modeled using Monte-Carlo techniques.
(5) Average concentration.

Table 6-2. Annual CSO, Stormwater and Direct Drainage Volumes and Loads (2008 Rainfall)

Location	Outfall Type	Inflow		Enterococci		Fecal Coliform	
		(MG)	Percent	(Organisms) x 10^{13}	Percent	(Organisms) x 10^{13}	Percent
NYC	CSO	323	8.8	173	42.7	512	54.8
	Storm Outfall	176	4.8	33	8.1	23	2.5
	Direct Drainage	198	5.4	4.4	1.1	3	0.3
Westchester County	Storm Outfall	923	25.4	175	42.2	350	37.4
	Pelham Lake Outflow	2,018	55.5	20	4.9	47	5.0

Proposed Tables and Footnotes:

Table 2-3. Sanitary and Stormwater Discharge Concentrations, Baseline Condition (Revised)

Constituent	Sanitary Concentration[1]	Stormwater Concentration[2,3]	
CBOD (mg/L)	110	15	
TSS (mg/L)	110	15	
Total Coliform Bacteria (cfu/100mL)[4]	$25x10^6$	300,000	
Fecal Coliform Bacteria (cfu/100mL)[4]	$4x10^6$	NYC[5]	Westchester County[5,6]
		35,000	100,000
Enterococci (cfu/100mL)[4]	$1x10^6$	NYC[5]	Westchester County[5,6]
		50,000	50,000

Notes:
(1) NYCDEP, 2002.
(2) NYCDEP, 1994.
(3) HydroQual, 2005.
(4) Bacterial Concentrations expressed as "colony forming units" per 100mL.
(5) NYCDEP, 2012.
(6) Westchester County stormwater concentrations are based on field measurements that have the potential to contain illicit discharges.

Table 6-1. Pollutant Concentrations for Various Sources in the Hutchinson River (Revised)

Pollutant Source		Enterococci (cfu/100mL)	Fecal Coliform (cfu/100mL)	BOD_5[1] (mg/L)
Stormwater NYC[1]		50,000	35,000	15
Stormwater Westchester County[1,6]		50,000	100,000	15
Direct Drainage[3]		6,000	4,000	15
Sanitary Sewage[2]		1,000,000	4,000,000	110
Pelham Lake Outflow	Dry[1]	190[4]	500[4]	2.7[5]
	Wet[1]	1,300[4]	3,300[4]	

Notes:
(1) Hutchinson River CSO Waste Load Allocation Water Quality and Sewer System Report, 2014
(2) HydroQual Memo to DEP, 2005a.
(3) Basis – NYS Stormwater Manual, Charles River LTCP, National Stormwater Data Base for commercial and industrial land uses.
(4) GM of sampling data – modeled using Monte-Carlo techniques.
(5) Average concentration.
(6) Westchester County stormwater concentrations are based on field measurements that have the potential to contain illicit discharges.

Table 6-2. Annual CSO, Stormwater and Direct Drainage Volumes and Loads (2008 Rainfall) (Revised)

Location	Outfall Type	Inflow		Enterococci		Fecal Coliform	
		(MG)	Percent	(Organisms) x 10^{13}	Percent	(Organisms) x 10^{13}	Percent
NYC	CSO	323	8.8	173	42.7	512	54.8
	Storm Outfall	176	4.8	33	8.1	23	2.5
	Direct Drainage	198	5.4	4.4	1.1	3	0.3
Westchester County	Storm Outfall(1)	923	25.4	175	42.2	350	37.4
	Pelham Lake Outflow	2,018	55.5	20	4.9	47	5.0

Notes
(1) Westchester County stormwater loadings based on measured stormwater concentrations that have the potential to contain illicit discharges.

DEC Comment No. 7
Table 2-3 indicates there should be a foot note 6, but it is not provided below the table.

DEP Response:
This is not a footnote, this is an exponent; therefore, no change has been made to the September 2014 Hutchinson River LTCP.

DEC Comment No. 8
Similar to comment 1 above, Table 2-10 indicates that there is an increase in fecal coliform during dry weather between HR-06 and HR-03, which seems counterintuitive given that the waterbody at the lower sampling points has a greater assimilative capacity than at the upper sampling points. The LTCP should explain possible reasons why this increase is occurring.

DEP Response:
A paragraph is added to the text below Table 2-10.

Current Language: "As indicated in Table 2-10, significantly elevated concentrations of Enterococci and fecal coliform bacteria were found in the dry weather samples at in-stream Stations HR-08 and HR-07. These concentrations were consistent with elevated bacteria counts found in dry weather samples from storm drain HR-08 in Westchester County, and suggest the presence of sanitary sewage connections to that storm drain. Dry weather flow with elevated bacterial concentrations was also observed at storm drain HR-06 in Westchester County. These stormwater outfalls are shown in Figure 2-12. The bacteria concentrations obtained for stormwater outfalls HR-06 and HR-08 are shown in Table 2-11. However, in-stream dry weather bacteria concentrations at stream sampling location HR-06 were significantly lower than at Stations HR-07 and HR-08. The lower impact may be due to somewhat lower concentrations in the dry weather flow

at storm drain HR-06, greater dilution due to the greater width and depth of the river at Station HR-06, as well as increased tidal flushing, as compared to the upstream stations."

Proposed Language: "As indicated in Table 2-10, significantly elevated concentrations of enterococci and fecal coliform bacteria were found in the dry weather samples at in-stream Stations HR-08 and HR-07. These concentrations were consistent with elevated bacteria counts found in dry weather samples from storm drain HR-08 in Westchester County, and suggest the presence of sanitary sewage connections to that storm drain. Dry weather flow with elevated bacterial concentrations was also observed at storm drain HR-06 in Westchester County. These stormwater outfalls are shown in Figure 2-12. The bacteria concentrations obtained for stormwater outfalls HR-06 and HR-08 are shown in Table 2-11. However, in-stream dry weather bacteria concentrations at Station HR-06 were significantly lower than at Stations HR-07 and HR-08. The lower impact may be due to somewhat lower concentrations in the dry weather flow at storm drain HR-06, greater dilution due to the greater width and depth of the river at Station HR-06, as well as increased tidal flushing, as compared to the upstream stations.

The fecal coliform bacteria concentrations measured between in-stream LTCP Stations HR-06 and HR-03 increase progressively in the downstream direction. In terms of geometric means, the fecal coliform levels increase from 140 cfu/100mL at Station HR-06 to 670 cfu/100mL at Station HR-03. This trend, however, is not observed for the corresponding enterococci levels. Typically, human waste discharged at a source-point along a stream leads to in-stream increases in both fecal coliform and enterococci bacteria. This anomaly in in-stream fecal coliform and enterococci concentrations observed can only be resolved following the collection and analysis of additional ambient bacteria data. As the data do not show an increase in the enterococci concentration, DEP does not plan to initiate additional trackdown programs in this area at this time. DEP notes that the Harbor Survey Program has been collecting bacteria data at multiple stations along the Hutchinson River since November 2014 and capturing dry weather bacteria levels upstream and downstream of Station HR-03 periodically. The resulting dataset would allow the identification of the type of bacteria concentration increase mentioned above, should it occur. The Sentinel Monitoring Program will also continue to provide illicit connection trackdown, if warranted.

2.2.4 SECTION 4.0 – GREY INFRASTRUCTURE

DEC Comment No. 9

For Section 4.1, see comment 5 above on Section 1.3a above with respect to narrative on the WWFP and deletion other CSO storage tanks.

DEP Response:

The text has been edited to clarify the deletion of the tanks and lack of approval of the WWFP. The first paragraph in Section 4.1 should be replaced. See below.

Current Language: "Combined sewer overflow (CSO) facility planning in Hutchinson River began under the East River CSO Facility Planning Project, which focused on quantifying and assessing the impacts of CSO discharges to the Upper East River, Western Long Island Sound and their tributaries, including the Hutchinson River, Westchester Creek, and the Bronx River. The initial recommendation for Hutchinson River was made in the mid-1990s, and featured 7 million gallons (MG) of off-line storage. The proposed configuration of the storage facilities evolved over time, and a revised CSO Facilities Plan for the Hutchinson River prepared in 2005 identified a 3 MG storage tank at Outfall HP-024, and 4 MG storage tank at Outfall HP-023. The 2012 CSO Order on Consent included milestones for conducting water quality sampling and developing a report on the water quality and sewer system for the Hutchinson River. In addition, the 2012 CSO Order on Consent deleted the requirement for construction of these CSO tanks and required a waste load allocation analysis to better quantify the need for CSO controls. As such, no grey infrastructure projects were planned or implemented in the Hutchinson River as a result of the previous CSO facilities planning or the 2012 CSO Order on Consent. The field sampling and sampling report were completed in 2012, and the Water Quality and Sewer System Report were submitted on July 1, 2013 in accordance with the 2012 CSO Order on Consent milestones, and the revised submittal dated September 2014."

Proposed Language: "Combined sewer overflow (CSO) facility planning in Hutchinson River began under the East River CSO Facility Planning Project, which focused on quantifying and assessing the impacts of CSO discharges to the Upper East River, Western Long Island Sound and their tributaries, including the Hutchinson River, Westchester Creek, and the Bronx River. The initial recommendation for Hutchinson River was made in the mid-1990s, and featured 7 million gallons (MG) of off-line storage. The proposed configuration of the storage facilities evolved over time, and a revised CSO Facilities Plan for the Hutchinson River prepared in 2005 identified a 3 MG storage tank at Outfall HP-024, and 4 MG storage tank at Outfall HP-023. The Hutchinson River WWFP that DEP submitted in June 2007 proposed eliminating these tanks; DEC did not accept this analysis and the WWFP was not approved. The requirement to submit an approvable WWFP was later deleted from the 2012 CSO Order on Consent along with the requirement for construction of the CSO tanks. These requirements were replaced with a waste load allocation analysis. Thus, no grey infrastructure projects were implemented in the Hutchinson River as a result of the previous CSO facilities planning or the 2012 CSO Order on Consent. The field sampling and sampling report were completed in 2012, and the Water Quality and Sewer System

Report were submitted on July 1, 2013, in accordance with the 2012 CSO Order on Consent milestones, and the revised LTCP submittal dated September 2014."

2.2.5 SECTION 5.0 – GREEN INFRASTRUCTURE

DEC Comment No. 10
The statement provided in Section 5.4.b makes no sense.

DEP Response:
The statement has been revised. The sentence in Section 5.4.b should be replaced. See below.

Current Language: "There were no GI-related cost-effective opportunities for CSO reduction to report in this section."

Proposed Language: "For each LTCP, the citywide target for managing one inch of rain on 10 percent impervious area in combined sewered areas has been broken out into estimated targets for each waterbody and used to calculate the baseline CSO reductions from green infrastructure projects. The estimated targets for each waterbody are the best information available because the green infrastructure implementation is being carried out simultaneously as the LTCPs are developed. At this time, there are no additional green infrastructure projects identified in the watershed that would exceed the baseline target rate (as described above and below). The Green Infrastructure Program will be implemented through 2030 and the final penetration rate will be reassessed as part of the adaptive management approach."

2.2.6 SECTION 6.0 – BASELINE CONDITIONS AND PERFORMANCE GAP

DEC Comment No. 11
Section 6.3.a states that the freshwater reach of the Hutchinson River does not attain the existing Class SB criterion for fecal coliform, however, the freshwater section would need to meet the Class B criterion.

DEP Response:
Table 6-3 should be revised as follows.

Current Language and Table:

Table 6-3. Classifications and Standards Applied

Analysis	Numerical Criteria Applied
Existing WQ Criteria – Primary Contact	SB: Fecal Monthly GM ≤ 200 cfu/100mL
Future Primary Contact WQ Criteria(1)	Entero: rolling 30-d GM – 30 cfu/ 100mL Entero: STV – 110 cfu/100mL

Notes:
GM = Geometric Mean; STV = 90 Percent Statistical Threshold Value.
(1) This Future Primary Contact WQ Criteria has not yet been proposed by DEC. For such criteria to take effect, DEC must first adopt the criteria in accordance with rulemaking and environmental review requirements. DEP reserves all rights with respect to any administrative and/or rule making process that DEC may engage in to revise WQS.

On Page 6-9 first paragraph – "It shows the existing Class SB criterion (monthly GM of 200 org/100mL) is not met at any location in the Westchester County freshwater section of the river (Stations HR-09 to HR-07 shading)."

On Page 6-11 2nd paragraph – "The Hutchinson River is already classified as Class SB by the DEC, and is thus classified for Swimmable/Fishable Uses."

Proposed Language and Table:

Table 6-3. Classifications and Standards Applied (Revised)

Analysis	Numerical Criteria Applied
Existing WQ Criteria – Primary Contact	Freshwater Section – Class B: Fecal Monthly GM ≤ 200 cfu/100mL Tidal Section – Class SB: Fecal Monthly GM ≤ 200 cfu/100mL
Potential Future Primary Contact WQ Criteria(1)	Entero: rolling 30-d GM – 30 cfu/ 100mL Entero: STV – 110 cfu/100mL

Notes:
GM = Geometric Mean; STV = 90 Percent Statistical Threshold Value.
(1) The Potential Future Primary Contact WQ Criteria have not yet been adopted by DEC.

On Page 6-9 first paragraph – "It shows the existing freshwater Class B criterion (monthly GM of 200 org/100mL) is not met at any location in the Westchester County freshwater section of the river (Stations HR-09 to HR-07 shading)."

On Page 6-11 2nd paragraph – "The Hutchinson River is already classified as Class B in the freshwater section and Class SB in the tidal section by the DEC, and is thus classified for Swimmable/Fishable Uses."

DEC Comment No. 12

In Table 6-5, the percent attainment appears wrong for some of the months, in particular the months where the maximum GM is 200 or less but the percent attainment is shown as less than 100 percent.

DEP Response:

Tables 6-4 and 6-5 concentrations and percent attainment have been revised as follows.

Current Tables:

Table 6-4. Calculated 10-Year Baseline Fecal Coliform Maximum Monthly GM and Attainment of Existing WQ Criteria

Station		(a) Monthly Maximum Fecal Coliform Geometric Mean (cfu/100mL)									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
		March	March	March	October	January	December	February	June	February	August
HR-09	Fresh Water	1,077	1,068	1,074	1,516	1,289	1,347	1,247	2,236	1,148	1,830
HR-08		1,243	1,199	1,396	1,765	1,561	1,794	1,639	3,178	1,302	2,060
HR-07		1,307	1,449	1,853	1,592	1,652	2,252	2,038	3,847	1,255	2,069
HR-06	Tidal	301	297	170	260	387	751	623	587	281	439
HR-05		257	249	119	214	311	640	506	499	223	442
HR-04		200	193	79	156	244	485	399	348	165	345
HR-03		197	176	70	149	243	457	367	335	152	319
HR-02		151	130	52	118	186	310	277	236	116	243
HR-01		40	40	11	45	55	69	80	51	34	77
Station		**(b) Fecal Coliform - Annual Attainment (Percent of Months)**									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
HR-09	Fresh water	0	0	0	0	0	0	0	0	0	0
HR-08		0	0	0	0	0	0	0	0	0	0
HR-07		0	0	0	0	0	0	0	0	0	0
HR-06	Tidal	83	58	83	75	75	83	75	67	83	58
HR-05		83	75	92	83	83	83	83	75	83	67
HR-04		100	83	100	92	83	83	83	83	100	83
HR-03		100	83	100	92	83	83	83	83	100	83
HR-02		100	100	100	92	100	83	92	83	100	83
HR-01		100	100	100	100	100	100	100	100	100	100

Table 6-5. Calculated 10-Year Fecal Coliform Maximum Monthly GM and Attainment of Existing Water Quality Criteria with 100% CSO Control

Station		(a) Monthly Maximum Fecal Coliform Geometric Mean (cfu/100mL)									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
		March	March	March	October	January	December	February	June	February	August
HR-09	Fresh water	1,077	1,068	1,074	1,516	1,289	1,347	1,247	2,236	1,148	1,830
HR-08		1,243	1,199	1,396	1,765	1,561	1,794	1,639	3,178	1,302	2,060
HR-07		1,307	1,449	1,853	1,592	1,652	2,252	2,038	3,847	1,255	2,069
HR-06	Tidal	225	238	170	192	313	557	464	468	245	283
HR-05		178	184	116	135	234	415	345	333	188	222
HR-04		130	131	76	88	173	284	257	207	133	162
HR-03		124	118	67	76	162	253	233	181	115	151
HR-02		99	91	51	64	131	184	184	142	88	118
HR-01		28	29	11	26	40	44	55	31	27	36
Station		**(b) Fecal Coliform - Annual Attainment (Percent of Months)**									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
HR-09	Fresh water	0	0	0	0	0	0	0	0	0	0
HR-08		0	0	0	0	0	0	0	0	0	0
HR-07		0	0	0	0	0	0	0	0	0	0
HR-06	Tidal	83	67	92	92	75	83	83	75	92	67
HR-05		100	100	100	92	92	92	83	83	100	83
HR-04		100	100	100	100	100	92	92	83	100	100
HR-03		100	100	100	100	100	92	92	92	100	100
HR-02		100	100	100	100	100	100	100	92	100	100
HR-01		100	100	100	100	100	100	100	100	100	100

Proposed Tables:

Table 6-4. Calculated 10-Year Fecal Coliform Maximum Monthly GM and Attainment of Existing WQ Criteria (Class SB/B) for Baseline (Revised)

Station	(a) Monthly Maximum Fecal Coliform Geometric Mean (cfu/100mL)									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	November	June	November	December	November	December	February	December	February	March
HR-09	1,077	1,068	1,074	1,516	1,289	1,347	1,247	2,236	1,148	1,830
HR-08	1,243	1,199	1,396	1,765	1,561	1,794	1,639	3,178	1,302	2,060
HR-07	1,307	1,449	1,853	1,592	1,652	2,252	2,038	3,847	1,255	2069
HR-06	289	507	257	571	390	704	624	965	278	484
HR-05	226	432	210	511	338	601	507	898	218	465
HR-04	178	309	156	415	264	458	400	711	166	363
HR-03	173	275	148	383	248	431	368	692	158	336
HR-02	132	206	103	285	193	294	278	526	132	255
HR-01	37	64	26	82	56	67	80	150	68	84
Location	**(b) Fecal Coliform - Annual Attainment (Percent of Months)**									
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
HR-09	0	0	0	0	0	0	0	0	0	0
HR-08	0	0	0	0	0	0	0	0	0	0
HR-07	0	0	0	0	0	0	0	0	0	0
HR-06	83	58	83	75	67	83	75	75	83	58
HR-05	83	75	92	83	83	83	83	75	83	67
HR-04	100	83	100	92	83	83	83	83	100	83
HR-03	100	83	100	92	83	83	83	83	100	83
HR-02	100	100	100	92	100	92	92	83	100	83
HR-01	100	100	100	100	100	100	100	100	100	100

Table 6-5. Calculated 10-Year Fecal Coliform Maximum Monthly GM and Attainment of Existing Water Quality Criteria (Class SB/B) with 100% CSO Control (Revised)										
Location	(a) Monthly Maximum Fecal Coliform Geometric Mean (cfu/100mL)									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	November	June	November	December	January	December	February	December	February	March
HR-09	1,077	1,068	1,074	1,516	1,289	1,347	1,247	2,236	1,148	1,830
HR-08	1,243	1,199	1,396	1,765	1,561	1,794	1,639	3,178	1,302	2,060
HR-07	13,07	1,449	1,853	1,592	1,652	2,252	2,038	3,847	1,255	2,069
HR-06	246	351	208	346	312	517	465	613	246	357
HR-05	181	238	156	270	234	388	346	495	187	294
HR-04	129	152	107	197	172	267	257	359	131	218
HR-03	116	129	95	172	162	238	233	326	113	190
HR-02	87	105	67	133	131	174	185	263	86	149
HR-01	26	34	18	43	40	42	55	81	40	54
Location	(b) Fecal Coliform - Annual Attainment (Percent of Months)									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
HR-09	0	0	0	0	0	0	0	0	0	0
HR-08	0	0	0	0	0	0	0	0	0	0
HR-07	0	0	0	0	0	0	0	0	0	0
HR-06	92	67	92	83	75	83	83	75	92	67
HR-05	100	92	100	92	83	92	83	83	100	83
HR-04	100	100	100	100	100	92	92	92	100	92
HR-03	100	100	100	100	100	92	92	92	100	100
HR-02	100	100	100	100	100	100	100	92	100	100
HR-01	100	100	100	100	100	100	100	100	100	100

DEC Comment No. 13

The LTCP should better clarify the meaning of the data presented in Tables 6-15 and 6-16.

DEP Response:

DEP is providing the following change in the text to clarify the issues raised by DEC.

Current Language: "As shown in Table 6-15, reductions in the concentrations of enterococci at the outflow from Pelham Lake and from the wet weather sources in Westchester County, to bring the freshwater Hutchinson River into attainment at the boundary with the tidal zone, do not result in attainment of the RWQC in the tidal section for the critical 2011 period. The reductions applied to both freshwater sources for 2011 were 88.4 percent and 98.7 percent for Pelham Lake and Westchester County wet weather flow, respectively.

With those reductions in place, an additional reduction of 69 percent was applied to the concentrations of Westchester County wet weather, NYC stormwater and CSOs

discharged into the tidal section of the river to reach the calculated enterococci concentrations that attained the 30-day rolling GM component of the standards (Table 6-16) during the selected WLA period of 2011. No reduction was applied to direct drainage sources into the tidal portion of the river for this analysis.

In summary, to attain the future enterococci recreational season criterion in the tidal portion of the Hutchinson River (the area impacted by NYC sources) for the 2011 period, enterococci concentrations from sources to the freshwater section river would need to be reduced by 88.4 (Pelham Lake) and 98.7 percent (Westchester wet weather). The Westchester County and NYC sources to the tidal section of the river would have to be reduced by 69 percent, with the exception of direct drainage. These wet weather load reductions are higher than the reductions needed to attain the Existing WQ Criteria. Even higher reductions would be required to fully attain a future criterion enterococci STV concentration of 110 cfu/100mL."

<u>Proposed Language</u>: "As shown in Table 6-15, reductions from the wet weather sources in Westchester County, to bring the freshwater Hutchinson River into attainment at the boundary with the tidal zone, do not result in attainment of the potential future RWQC within the tidal section during the August 2011 period. The reductions applied to the freshwater sources during 2011 were 88.4 percent and 98.7 percent for Pelham Lake and Westchester County wet weather discharges, respectively.

With the freshwater Hutchinson River load reductions in place, an additional reduction of 69 percent in wet weather loadings would be needed in the tidal portion of the Hutchinson River, excluding direct drainage loading, to attain the 30-day rolling GM component of the standards (Table 6-16) during the selected WLA period of August 2011. The resulting maximum 30-day rolling GM and 90th percentile STV concentrations are presented in Table 6-16. The table shows that the 30-day rolling GM criterion would be attained, but there would still be periods when the 90th percentile STV concentration of 110 cfu/100mL is not attained. No reduction was applied to direct drainage sources into the tidal portion of the river for this analysis.

DEC Comment No. 14

Table 6-20 should include a footnote to explain the meaning of the * for some of the recovery times.

<u>DEP Response:</u>

DEP offers the following clarification related to the footnote. DEP also proposes the addition of a new time to recovery table based on the August 2008 storm event for consistency with information DEC has requested to be added to Section 8.

Current Table and Footnote:

Table 6-20. Time to Recover – Tidal Section of River

Rain Event Size (in.)	Station	Time to Recover (hours)			
		Fecal Threshold (1000 cfu/100mL)		Enterococci Threshold (110 cfu/100mL)	
		Baseline	100% CSO Control	Baseline	100% CSO Control
<0.1	HR-06	-	-	-	-
0.1-0.4	HR-06	-	-	-	-
0.4-0.8	HR-06	27	20	50	46
0.8-1.0	HR-06	32	25	57	51
1.0-1.5	HR-06	36	32	61	58
>1.5	HR-06	36*	32	61*	58*
<0.1	HR-05	-	-	-	-
0.1-0.4	HR-05	-	-	-	-
0.4-0.8	HR-05	25	15	49	43
0.8-1.0	HR-05	29	20	55	47
1.0-1.5	HR-05	38	29	60	55
>1.5	HR-05	38*	31	60*	55*
<0.1	HR-04	-	-	-	-
0.1-0.4	HR-04	-	-	-	-
0.4-0.8	HR-04	19	-	45	29
0.8-1.0	HR-04	27	12	53	41
1.0-1.5	HR-04	31	21	55	51
>1.5	HR-04	31	26	58	52
<0.1	HR-03	-	-	-	-
0.1-0.4	HR-03	-	-	-	-
0.4-0.8	HR-03	17	-	41	33
0.8-1.0	HR-03	24	5	552	40
1.0-1.5	HR-03	30	16	55	51
>1.5	HR-03	30	21	56	51(1)
<0.1	HR-02	-	-	-	-
0.1-0.4	HR-02	-	-	3	3
0.4-0.8	HR-02	6	-	30	18
0.8-1.0	HR-02	15	3	43	30
1.0-1.5	HR-02	23	6	52	42
>1.5	HR-02	29	17	53	42
<0.1	HR-01	-	-	-	-
0.1-0.4	HR-01	-	-	-	-
0.4-0.8	HR-01	-	-	-	-
0.8-1.0	HR-01	-	-	-	-
1.0-1.5	HR-01	-	-	-	-
>1.5	HR-01	8	-	35	20

Notes:

(1) In a few cases the time to recover was calculated to be less than the next smaller rain event bin. In those cases, both bins were set equal to the higher time to recover.

Proposed Table and Footnote:

Table 6-20. Time to Recovery – Tidal Section of River (Revised)

Rain Event Size (in.)	Station	Time to Recovery (hours)			
		Fecal Threshold (1000 cfu/100mL)		Enterococci Threshold (110 cfu/100mL)	
		Baseline	100% CSO Control	Baseline	100% CSO Control
<0.1	HR-06	-	-	-	-
0.1-0.4	HR-06	-	-	-	-
0.4-0.8	HR-06	27	20	50	46
0.8-1.0	HR-06	32	25	57	51
1.0-1.5	HR-06	36	32	61	58
>1.5	HR-06	36(1)	32	61(1)	58(1)
<0.1	HR-05	-	-	-	-
0.1-0.4	HR-05	-	-	-	-
0.4-0.8	HR-05	25	15	49	43
0.8-1.0	HR-05	29	20	55	47
1.0-1.5	HR-05	38	29	60	55
>1.5	HR-05	38(1)	31	60(1)	55(1)
<0.1	HR-04	-	-	-	-
0.1-0.4	HR-04	-	-	-	-
0.4-0.8	HR-04	19	-	45	29
0.8-1.0	HR-04	27	12	53	41
1.0-1.5	HR-04	31	21	55	51
>1.5	HR-04	31	26	58	52
<0.1	HR-03	-	-	-	-
0.1-0.4	HR-03	-	-	-	-
0.4-0.8	HR-03	17	-	41	33
0.8-1.0	HR-03	24	5	552	40
1.0-1.5	HR-03	30	16	55	51
>1.5	HR-03	30	21	56	51(1)
<0.1	HR-02	-	-	-	-
0.1-0.4	HR-02	-	-	3	3
0.4-0.8	HR-02	6	-	30	18
0.8-1.0	HR-02	15	3	43	30
1.0-1.5	HR-02	23	6	52	42
>1.5	HR-02	29	17	53	42
<0.1	HR-01	-	-	-	-
0.1-0.4	HR-01	-	-	-	-
0.4-0.8	HR-01	-	-	-	-
0.8-1.0	HR-01	-	-	-	-
1.0-1.5	HR-01	-	-	-	-
>1.5	HR-01	8	-	35	20

Notes:

(1) Time to recovery was calculated to be less than the next smaller rain event bin. Both bins were set equal to the higher time to recovery.

New Table 6-21 provides a summary of the calculated time to recovery for a single storm event of approximately 1-inch that occurred on August 14-15, 2008.

New Table 6-21. Time to Recovery in Tidal Section for August 14-15, 2008 1-inch storm event.

	Time to Recovery (hrs) Fecal Coliform Target (1,000 cfu/100mL)	
Station	**Baseline**	**100% Control**
HR-06	20	9
HR-05	20	10
HR-04	20	9
HR-03	19	9
HR-02	17	8
HR-01	-	-

2.2.7 SECTION 8.0 – EVALUATION OF ALTERNATIVES

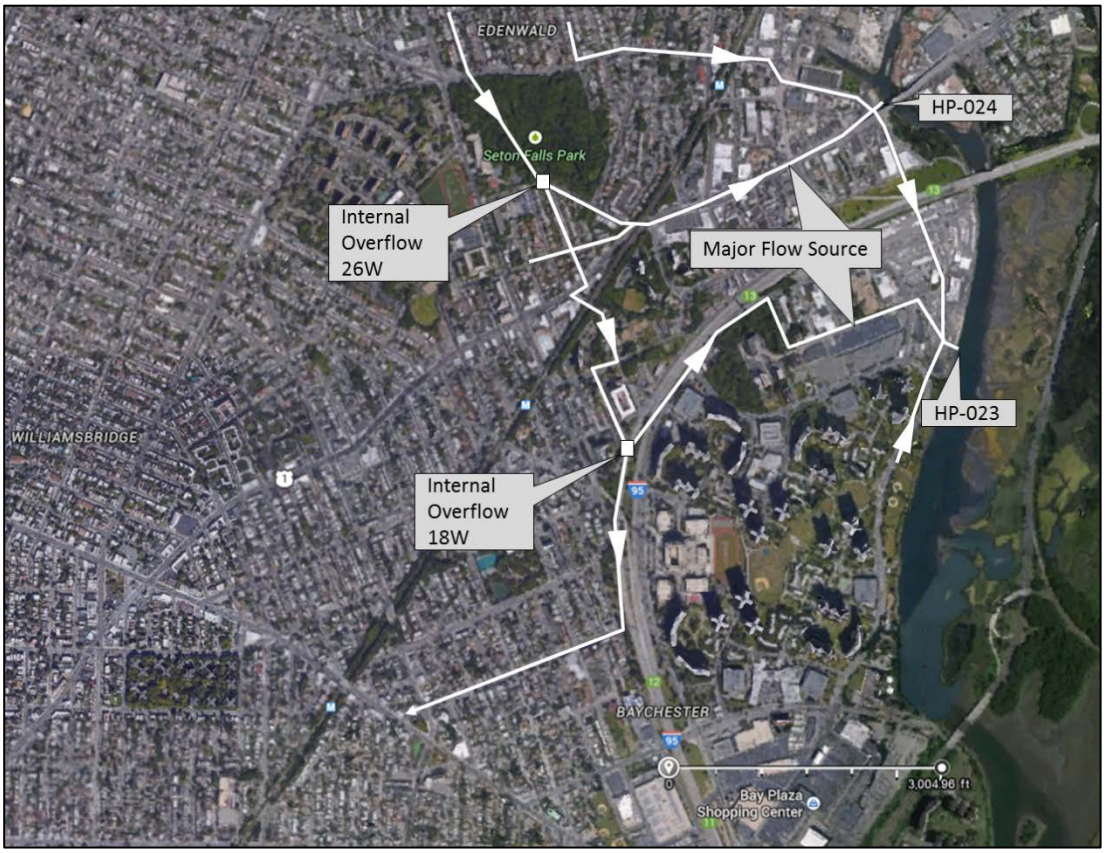
DEC Comment No. 15
Section 8.7.a indicates that the Hutchinson River will not attain bacterial water quality standards even if all CSOs were eliminated because of non-CSO discharges. However, attaining water quality standards in the Hutchinson River should be viewed as a long-term goal, so the LTCP should commit to principles of adaptive management as described in 9.1.

DEP Response:
Agreed: as noted in Section 9.1, DEP considers the attainment of water quality standards as a long term process that takes into account multiple sources of pollution. This long term commitment to attaining WQS is reaffirmed in the revised Executive Summary and Revised Use and Attainability Analysis, Attachments 1 and 2 to this Supplemental Documentation, respectively.

DEC Comment No. 16
In Section 8.2.a.3, the City eliminated from consideration upstream equalization storage tanks (which would significantly reduce CSOs from HP-024 and HP-023) because acquisition of the park land site was unlikely, however, the City did not reasonably identify other sites that could be used. The City shall retain for full consideration the upstream equalization storage tanks for Outfalls HP-024 and HP-023 located at sites that may require demolition of existing buildings.

DEP Response:
Whereas the storage tank alternatives previously described in Section 8.2.a.3 involved storing flows diverted from the outfalls downstream of the CSO regulators, another storage option that was considered included diverting flow to equalization storage tanks at locations upstream of the CSO regulators. These options were investigated in areas upstream of Outfalls HP-024 and HP-023 and were included in the September 30, 2014 LTCP submittal. The following contains a more detailed evaluation of the previously described evaluation for parkland and non-parkland sites.

Based on this comment, upstream equalization was re-evaluated by DEP for the conduits that contributed the highest percentage of flow to the regulators at HP-024 and HP-023, respectively. In each case, the most significant source of flow was a conduit originating at an internal overflow structure on the main trunk interceptor. For Outfall HP-024, this conduit started at internal overflow structure 26W as a 138 x 120 inch conduit, increasing to 144 x 120 inch conduit feeding into the HP-024 regulator 15A. At Outfall HP-023, the conduit contributing the highest percentage of flow originates at internal overflow structure 18W as a 54-inch conduit, increasing to 144 x 78 inch conduit feeding into the HP-023 Regulator 15. New Figure E-8-1 presents the location of the major conduits tributary to Outfalls HP-024 and HP-023.



New Figure E-8-1. Major Conduits Tributary to HP-024 and HP-023

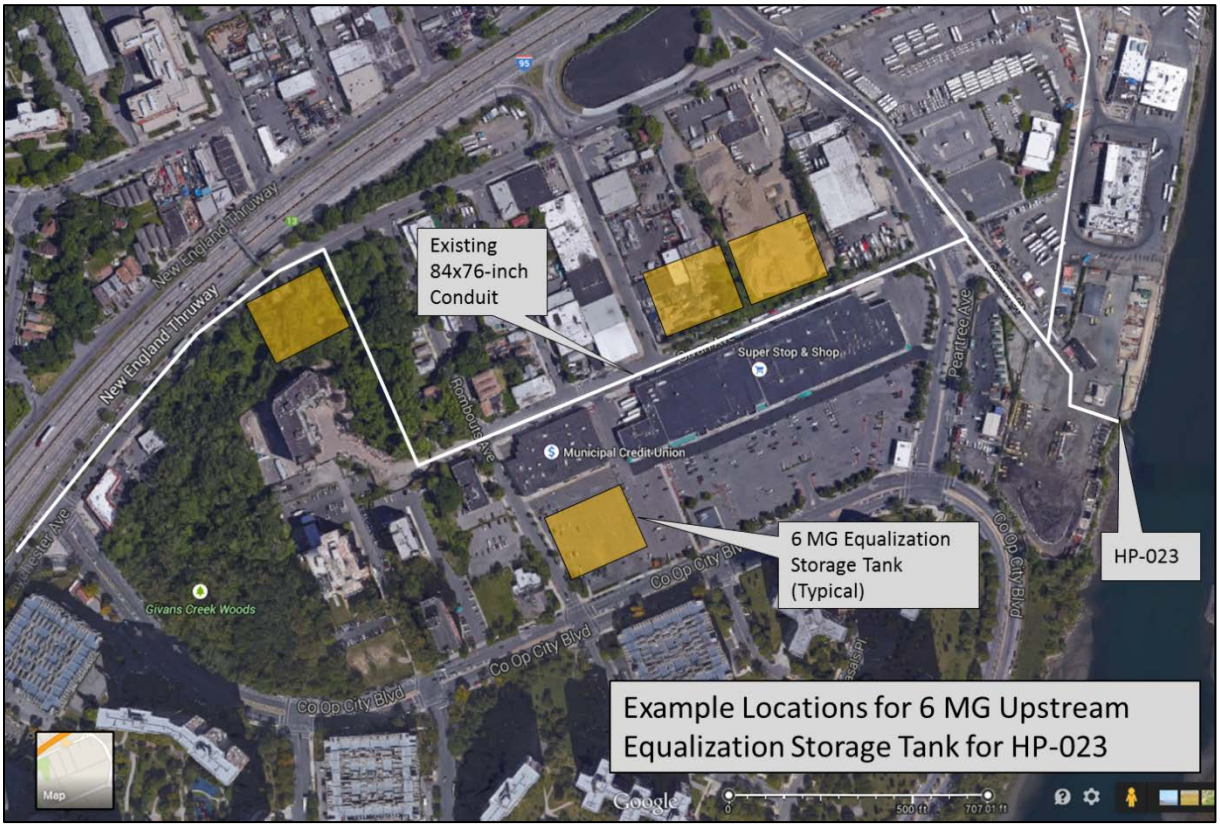
A key factor in the viability of upstream storage is the availability of land in the vicinity of the major conduit(s) tributary to the outfall. For Outfall HP-024, an evaluation of land use along the route of the major conduit between internal overflow structure 26W and Regulator 15A revealed that there were limited available sites for equalization storage tanks. In fact, the only site of sufficient size that would not require demolition of existing buildings was the parkland adjacent to Marolla Place. A 20 MG equalization basin located in this heavily-wooded parkland site was predicted to reduce annual CSO volume at Outfall HP-024 by 80 percent. That sizing and level of performance was based on diverting all wet weather flow in the 138 x 120 inch conduit along Marolla Place into the equalization basin, and represents the maximum level of performance achievable for an equalization basin at that location. New Figure E-8-2 shows the footprint of the 20 MG storage tank in the parkland. Because of current restrictions of such activities in parklands in NYS, it was concluded that it would not be feasible to acquire this site for construction of an equalization tank of that size, or even a smaller size tank.

Non-parkland upstream sites were also considered. New Figure E-8-3 shows the footprint of a 20 MG storage tank at other potential sites along Boston Road. As indicated in the figure, each of the sites along Boston Road would require acquisition of private property and demolition of existing buildings.

New Figure E-8-2. Siting Option for Upstream Equalization Storage Tank for HP-024- Parkland

New Figure E-8-3. Siting Options for Upstream Equalization Storage Tank for HP-024- Along Boston Rd.

For Outfall HP-023, limited sites for an equalization storage basin were identified along the conduit between internal overflow structure W-18 and Regulator 15. The only site of sufficient size that would not require taking private property and/or demolition of existing buildings was the parkland adjacent to Rombouts Avenue. A 6 MG equalization tank located at this site was predicted to reduce annual CSO volume at Outfall HP-023 by 40 percent. That sizing and level of performance was based on diverting all wet weather flow in the 78 x 78 inch conduit adjacent to Rombouts Avenue into the equalization basin, and represents the maximum level of performance achievable for an equalization basin at that location. However, as with the parkland along Marolla Place, even if a smaller tank were constructed to provide a lower level of control, it was considered unlikely that this heavily-wooded parkland site could feasibly be acquired for construction of an equalization tank. New Figure E-8-4 shows the footprint of a 6 MG storage tank in the parkland next to Rombouts Avenue, as well as three other potential locations. The three other potential locations would each require the taking of actively-used private property.



New Figure E-8-4. Siting Options for Upstream Equalization Storage Tank for HP-023

The equalization storage tank alternatives would involve constructing a diversion structure on the existing combined sewer adjacent to the storage tank site. A connecting pipe would be constructed from the diversion structure to the storage tank. The tank would have mechanically-cleaned influent bar screens, and dewatering pumps sized to dewater the tank in approximately one to two days. The dewatering pump force main would discharge back into the adjacent combined sewer. The storage tanks would be below grade, with above-grade buildings housing a screenings room, odor control equipment, and electrical equipment.

The storage volumes and characteristics of the tank layouts for the upstream equalization storage alternatives for Outfalls HP-024 and HP-023 are shown in New Table E-8-1.

New Table E-8-1. Upstream Storage Tank Dimensions

Outfall	CSO Volume Reduction (%)	Tank Volume (MG)	Below Grade Footprint [W x L (ft.)]	Tank Side Water Depth (ft.)
HP-024	80%	20	325 x 360	30
HP-023	40%	6	180 x 225	30

A summary of the benefits and challenges associated with upstream equalization storage tanks are presented below. Because of the significant siting challenges, costs were not developed for these alternatives.

<u>Benefits</u>
Upstream equalization storage tanks can be:

- *An effective technology for volumetric capture, particularly for short duration, high peak flow applications*
- *Compatible with DEP operations*

<u>Challenges</u>
Challenges generally associated with upstream equalization storage tanks include the following:

- *Larger storage volume typically required to achieve similar level of control compared to capture of overflow downstream of CSO regulator*
- *Diversion into storage needs to occur before the downstream CSO activates; therefore, an upstream storage facility would activate more often than a downstream storage facility sized for a similar level of control*
- *As a result of the first two bullets, the capital and annual O&M costs for upstream equalization storage are typically higher than for storage facilities that capture the overflow downstream of the CSO regulator*
- *Large permanent footprint for the tank, conduits and access*
- *Screening (to reduce large debris in tank) creates residual to be disposed*
- *Pumping (for tank dewatering) required*
- *Odor control may be required*
- *Post-event cleanup*
- *Time required for post-event dewatering*
- *Monitoring requirements*
- *Risks of unforeseen geotechnical conditions*

Site-specific challenges for the HP-024 and HP-023 upstream equalization storage tanks include the following:

- *Site acquisition. Potential sites are in parkland, which would require the parkland alienation process, or would require private property acquisition with demolition of existing structures including active businesses, or take-over of actively-used lots.*

- *Long term siting impacts. The potential sites would require permanent change of use in parkland, or permanent loss of use of commercial property.*

- *Cost-effectiveness. Lower-cost alternatives were identified that would provide similar or higher levels of control without the siting issues associated with the upstream equalization storage alternatives.*

Discussion

For Outfall HP-023, a 6 MG upstream equalization storage tank would be required to achieve a 40 percent reduction in annual CSO volume. However, as indicated in Section 8 of the LTCP, a 2.9 MG storage tank capturing flow downstream of the HP-023 regulator would provide a 45 percent reduction in annual CSO volume. The site proposed for the 2.9 MG storage alternative in Section 8 is an open lot owned by the City, and would not require taking of private property and/or demolition of existing privately-owned buildings, nor would it require taking of parkland. Therefore, the upstream equalization storage alternative offers no advantages in terms of cost, performance, site acquisition, or construction-period or long term siting impacts. In fact, the upstream equalization storage alternative would specifically be considered less advantageous for each of those issues.

For Outfall HP-024, the level of performance achievable with the upstream equalization storage alternative was relatively high, at 80 percent. However, in Section 8 of the LTCP, the preferred outfall disinfection alternative was demonstrated to be significantly more cost-effective than storage in terms of bacterial load reduction. Compared with the preferred outfall disinfection alternative, the upstream equalization storage alternative for HP-024 also may be less favorable in terms of site acquisition, construction-period and long term siting impacts.

Given the significant siting issues associated with the upstream equalization storage alternatives, and the identification of other viable alternatives that would provide equivalent or greater level of control with fewer siting impacts, upstream equalization storage for Outfalls HP-023 and HP-024 was not evaluated further as downstream storage alternatives are preferred.

DEC Comment No. 17

The selected alternative includes disinfection and floatables control for the new Outfall HP-024 only. The Department requests that the selected alternative include floatables control for HP-023 as well.

DEP Response:

An initial list of alternatives for providing floatables control at Outfall HP-023 would include in-line nets, end-of-pipe nets, mechanically-cleaned horizontal screens, and underflow baffles. End-of-pipe nets would not be a suitable alternative due to the aesthetic impacts of the screening installation. Horizontal, mechanically-cleaned screens would also not be appropriate for this location. During wet weather, backwater conditions are created when flow exceeds the capacity of the Connor Street PS. These backwater conditions may limit the ability of the flow to carry the retained solids away from the face of the screens, and may contribute to blinding of the screens. An underflow baffle does not appear to be practical at this location, due to the limited space between the overflow elevation and the invert elevation of the 12 x 6 foot influent conduit. Expanding the width of the regulator chamber to avoid significant headloss around the baffle would result in very low flow velocities during dry weather, leading to solids deposition and odors.

In-line netting appears to be a feasible alternative at HP-023. Based on a peak flow in the typical year of 183 MGD (283 cfs), and a unit design flow rate of 60 cfs/net, a minimum of five nets would be required. Since in-line netting installations typically feature nets in sets of two, then three sets of two nets would provide a margin of safety above the design flow rate. The layout of the in-line netting facility at HP-023 would be generally similar to the layout of the existing in-line netting facility at Outfall HP-009 in the Bronx River. That installation features four sets of two nets, so the installation at HP-023 would be slightly smaller in footprint size.

New Figure E-8-5 presents a layout for an in-line netting facility for Outfall HP-023. The overall below grade footprint of the facility would be approximately 31 feet wide by 48 feet long. The netting facility effluent channel would include a tide gate. The existing tide gate chamber would be modified to serve as a bypass chamber for the nets, similar to the configuration at Outfall HP-009.

A summary of the benefits, costs and challenges associated with in-line netting include:

Benefits

Benefits of in-line netting facilities include:

- *Passive system; no power requirements*
- *Netting system is below grade, out of site from the public*

Cost

The estimated NPW for the in-line netting alternative is $7.2M.

Challenges

The challenges generally associated with in-line netting facilities include:

- *Replacement of the nets is a labor-intensive activity.*
- *Nets can be compromised by rodents chewing the nets.*
- *Nets can be blinded by heavy loads (such as leaves in the fall), causing the bypass around the nets to activate.*

Site-specific challenges for the HP-023 in-line nets include:

- *Coordination with DOT operations at HP-023 site.*
- *Potential for encountering contaminated soil.*
- *Unforeseen geotechnical conditions.*

New Figure E-8-5. In-line Netting Facility at HP-023

Discussion

There is currently no record of a floatables issue in the Hutchinson River. The CSO outfalls along the Hutchinson River do not have floatables control facilities associated with them, nor is there a containment boom in the Hutchinson River. Based on DEP's Annual BMP Report, the Hutchinson River is not included in the zones covered by the skimmer vessel. Compared to other waterbodies covered by the BMP program where active floatables control approaches have been implemented to address identified issues, the lack of floatables control measures in the Hutchinson River supports the contention that floatables are not adversely affecting the aesthetics of water quality in the Hutchinson River.

While the analysis above has identified in-line nets as a potentially feasible floatables control technology for Outfall HP-023, it is not clear that such a facility would measurably improve the aesthetic quality of the Hutchinson River. Such a facility would require a significant capital investment that could be more effectively applied elsewhere in the City's LTCP program, and would add to the annual O&M costs and DEP staff deployment logistics associated with wet weather events. In summary, because CSO-related floatables have not been identified as a significant problem in the Hutchinson River, implementation of the in-line netting facility at Outfall HP-023 is not recommended at this time.

DEC Comment No. 18

Per the discussion between the Department and City on January 12, 2015, the Time to Recovery analysis should be conducted for the August 15 design storm for the point of compliance of HR05 for all retained alternatives using the fecal coliform single sample standard of 1000 cfu/100ml only. The results from this analysis are already provided in Figure 8-20 and no further analysis is required. Table 8-22 can be deleted from the LTCP.

DEP Response:

DEP acknowledges that no further analysis is required. Table 8-22, however, will remain in the original LTCP as supplemented herein and a new Table 8-22 has been prepared based on the August 14-15 storm.

Current language and Table 8-22: "*The analyses consisted of examining the water quality model calculated Hutchinson River bacteria concentrations for recreational periods (May 1st through October 31st) extracted from 10 years of model simulations. The time to return (or "time to recover") to 1,000 or 110 was then calculated for each storm with the various size categories and the median time after the end of rainfall was then calculated for each rainfall category.*

The results of these analyses are summarized in Table 8-22 for the stations in the NYC portion of the tidal section of the Hutchinson River. As noted, the duration of time within which bacteria concentrations are expected to be higher than NYSDOH considers safe for primary contact varies with location and with rainfall event size. Recovery times are generally less than 60 hours for enterococci and less than 36 hours for fecal coliform during the recreational season."

Table 8-22. Tidal Section Time to Recover (hours) To Fecal = 1,000 cfu/100mL and Entero = 110 cfu/100mL

	HR-05		HR-04		HR-03		HR-02		HR-01	
Rain Event Size (in)	Fecal	Entero	Fecal	Entero	Fecal	Entero	Fecal	Entero	Fecal	Entero
<0.1	-	-	-	-	-	-	-	-	-	-
0.1-0.4	-	-	-	-	-	-	-	-	-	-
0.4-0.8	20	46	11	41	14	38	5	28	-	-
0.8-1.0	27	54	25	49	23	49	14	41	-	-
1.0-1.5	36	60	30	55	25	54	21	49	-	-
>1.5	36(1)	60(1)	29	55	28	54	28	52	7	31

Notes:

(1) In a few cases the time to recover was calculated to be less than the next smaller rain event bin. In those cases, both bins were set equal to the higher time to recover.

Proposed Language and Table 8-22: "The analyses consisted of examining the water quality model calculated for Hutchinson River bacteria concentrations for the August 14-15, 2008 storm (approximately 1 inch total). The time to recovery to a fecal coliform concentration of 1,000 cfu/100mL was then calculated for each WQ station within the tidal section of the Hutchinson River.

The results of this analysis are summarized in Table 8-22 for the stations in the NYC portion of the tidal section of the Hutchinson River. As noted, the duration of time within which fecal coliform bacteria concentrations are expected to be higher than NYSDOH considers safe for primary contact varies with location. Recovery times are generally less than 24 hours during the recreational season."

Table 8-22. Time to Recovery for Preferred Alternative in Tidal Section for August 14-15, 2008 Storm (1-inch storm event). (Revised)

Station	Time to Recovery (hrs) Fecal Coliform Target (1,000 cfu/100mL)
	Preferred Alternative
HR-06	20
HR-05	19
HR-04	19
HR-03	15
HR-02	16
HR-01	-

DEC Comment No. 19
Per the discussion between the Department and City on January 8, 2015, eliminate the site-specific standards from the LTCP but include a general discussion on the spatial and temporal extent of non-attainment with water quality standards within the waterbody during period of analysis.

DEP Response:
As with the above response on Time to Recovery, the site-specific standards will remain in the existing UAA (LTCP Appendix D) as originally submitted but will be removed from both the revised Executive Summary and revised UAA, both included as Attachments 1 and 2 to this Supplemental Documentation, respectively. A modification to the text in page 8-50 is included as follows:

Current language: "Examination of projected attainment in the Hutchinson River presented in the two tables show that the criteria are not attained for the annual or recreational periods for either the Existing WQ Criteria (Class SB) or with the Future Primary Contact WQ Criteria in the freshwater section of the river."

Proposed language: "Spatial and temporal examination of projected attainment in the Hutchinson River presented in the two tables show that the criteria are not attained for the annual or recreational periods for either the Existing WQ Criteria (Class SB) or with the Potential Future Primary Contact WQ Criteria in the freshwater section of the river."

DEC Comment No. 20
In Section 8.6 and Appendix D, the City shall include an evaluation of attainment of the dissolved oxygen standard for the Use Attainability Analysis.

DEP Response:
DEP proposes that the additional language below be added to Section 8.6 in response to DEC's comment to include an evaluation of dissolved oxygen in the UAA. Because compliance with Existing DO WQ criteria was projected to be unattainable, the issue of DO non-compliance was also addressed in the revised UAA. It should be noted that the UAA has also been revised to remove the recommended interim water quality targets in response to DEC's comment #19.

Current Language: "The current language in Section 8.6 should remain and the following added at the end of Section 8.6."

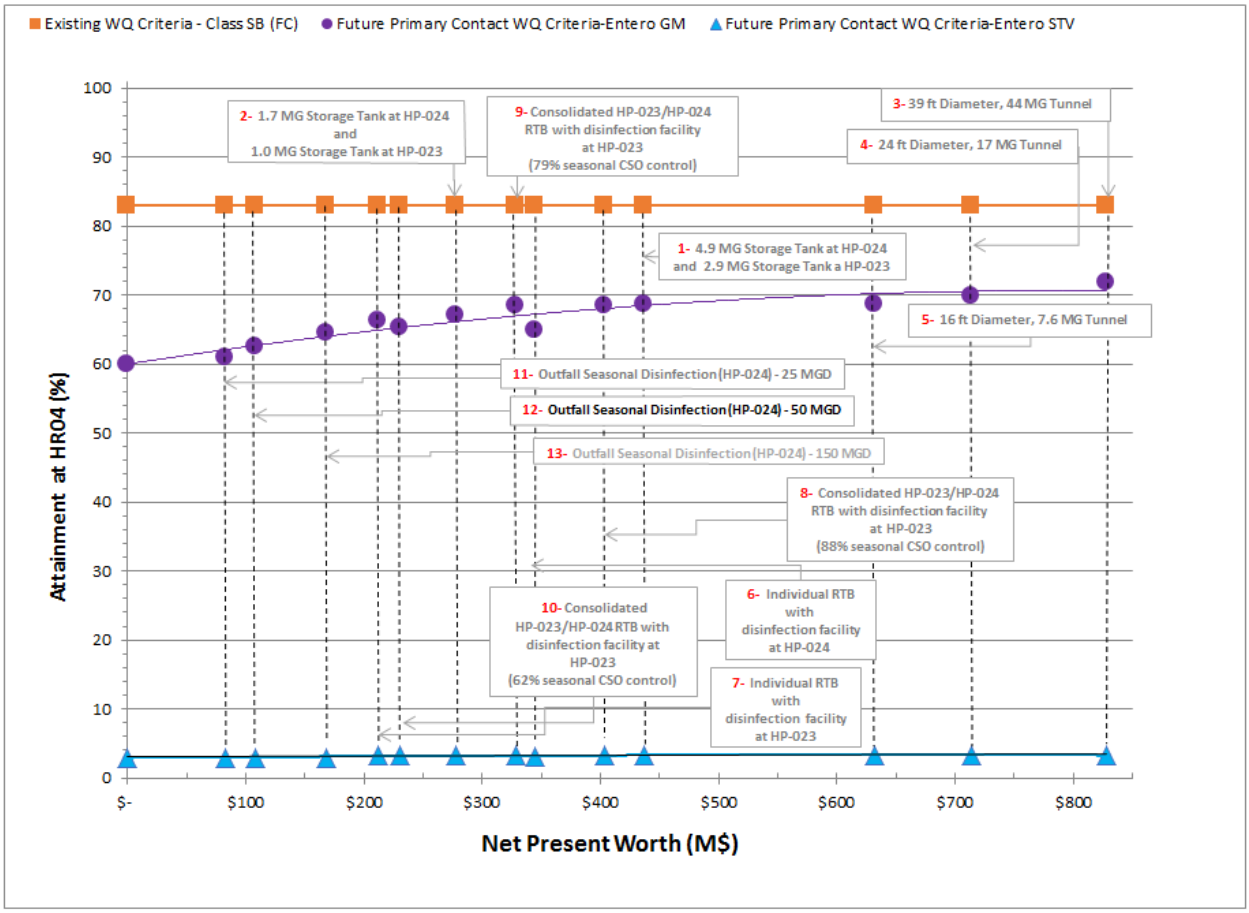
Proposed Language: "Water quality analyses also indicate (Table 8-19) that dissolved oxygen concentrations for the proposed alternative will meet the DEC target of 95 percent attainment with the acute portion of the Class SB dissolved oxygen criterion. However, the water quality modeling results indicate that the chronic portion of the criterion, which requires the DO concentrations to be greater than 4.8 mg/L, will not be in compliance with the criterion at least 95 percent of the time.

Since the Existing WQ Criteria (Class SB) are projected to be unattainable a UAA is required at this time for the Hutchinson River. Although 100 percent CSO removal is projected to result in slightly higher levels of attainment with the chronic component of

the standard, full compliance is still not attained. The UAA contains a discussion of key factors affecting the inability to fully comply with the existing DO standards."

The information below has been included to provide further clarification for LTCP Section 8.0 Evaluation of Alternatives:

The September LTCP did not include a cost versus WQ attainment plot at Station HR-04. The figure shown below should be inserted between Figures 8-18 and 8-19 in the September 2014 LTCP.



The table below shows there are no changes in attainment levels for Existing WQ Criteria except for at HR-05. Note this table is consistent with Figure 8-15 through Figure 8-19 shown in the September 2014 LTCP.

Station ID	Baseline	100% Control	Baseline	100% Control	Baseline	100% Control	Baseline	100% Control	Change in Attainment (%)
	February		March		November		December		
HR-06	1096	904	268	248	315	266	1020	898	0
HR-05	872	693	205	186	243	198	852	721	17
HR-04	643	487	150	134	173	137	653	534	0
HR-03	559	406	133	117	150	120	574	451	0
HR-02	379	283	93	83	103	83	410	318	0
HR-01	98	75	27	24	23	19	105	82	0

Discussion

Fecal coliform GM changes can only occur in 8.3 percent increments because there are only 12 monthly 30-day calendar GM averaging periods during the 2008 year, while enterococci changes are on a more refined scale since there are 365 30-GM rolling average periods during the same 12 month period. The table above shows the results of the fecal coliform monthly GMs for the baseline and 100 percent control scenarios for the 4 months during which attainment is not made at one or more locations. The reason why location HR-05 differs from the other locations is because the fecal coliform GMs at this location are closer to the standard of 200 cfu/100mL in the baseline for two of the months (March and November) than they are at the other locations. As such, removal of CSOs results in a change in attainment.

It should be noted that the results for attainment levels shown in Section 8.0 of the September 2014 LTCP reflect the assumption that the freshwater portion of the Hutchinson River is in attainment.

As noted on page 8-2, paragraph 1 of the September 2014 LTCP: "To be consistent with the approach taken in other LTCPs produced under this program, cost-effectiveness was assessed based on the 2008 typical year rainfall, with non-CSO loads included. For the Hutchinson River, these loads included current loads in the freshwater reach with the exception that known dry weather flow sources were removed."

2.2.8 SECTION 9.0 – LONG TERM CSO CONTROL PLAN IMPLEMENTATION

DEC Comment No. 21
Figure 9-1 indicates that implementation of the selected alternative will take fourteen years; however, this is too long a period before the benefits of the facilities can be realized. The City has developed a very conservative schedule, with two years to procure consultants and 3.5 to 4 years for designs, and the five year gap between completion of construction for phases 1 and 2 is also unacceptable. The City shall reconsider the overall approach for construction of this project to either combine the two phases into one or implement the two phases in parallel, while retaining the construction start date for phase 1.

DEP Response:
The schedule proposed in the LTCP has been revised and is shown in the revised Figure 9-1 below. The schedule has been revised with the consultant procurement period reduced to 18 months and the "design" phase on the schedule has been relabeled as "design/permitting/ site acquisition" to better reflect the efforts that will occur over the period shown for this task. It is anticipated that non-City owned sites will be have to be acquired for both phases, therefore the schedule provided by DEP is realistic and not conservative. Also, Phase II work cannot progress until the outfall sewer design is established. To develop the design drawings for Phase II work, the alignment of the outfall sewer will need to be finalized. The Phase II disinfection and floatables facilities are appurtenances to the outfall sewer, therefore, the design of these facilities cannot be initiated until the outfall design is established.

The preferred Alternative 12 will include hydraulic structures, floatables control and disinfection. A provision for a potential future dechlorination facility will also be included in Alternative 12. The location of the disinfection facilities and chlorination application points will be coordinated with the floatables control technology. Generally, the preferred floatables technology is an underflow baffle at the regulator structure. However, site-specific conditions may require another technology due to limited space and hydraulic considerations.

The DEP has installed several CSO floatables technologies and is familiar with their operation, including baffles, netting systems, horizontal mechanical screens and vertical mechanical screens. This experience will be used to site and choose the technology for final design. The floatables control technology will be evaluated with consideration of the site requirements, future uses and the new outfall route and structure locations. The floatables technology selection will be coordinated with the disinfection system design and will include:

- *Hydraulic evaluation of the new outfall, Regulator HP-024 and upstream sewers, head losses in the new outfall during high and low tide and future control structures.*
- *An evaluation of the location of the floatables structure for removal of floatables considering equipment access, location of the chlorination application points and a potential future dechlorination facility.*

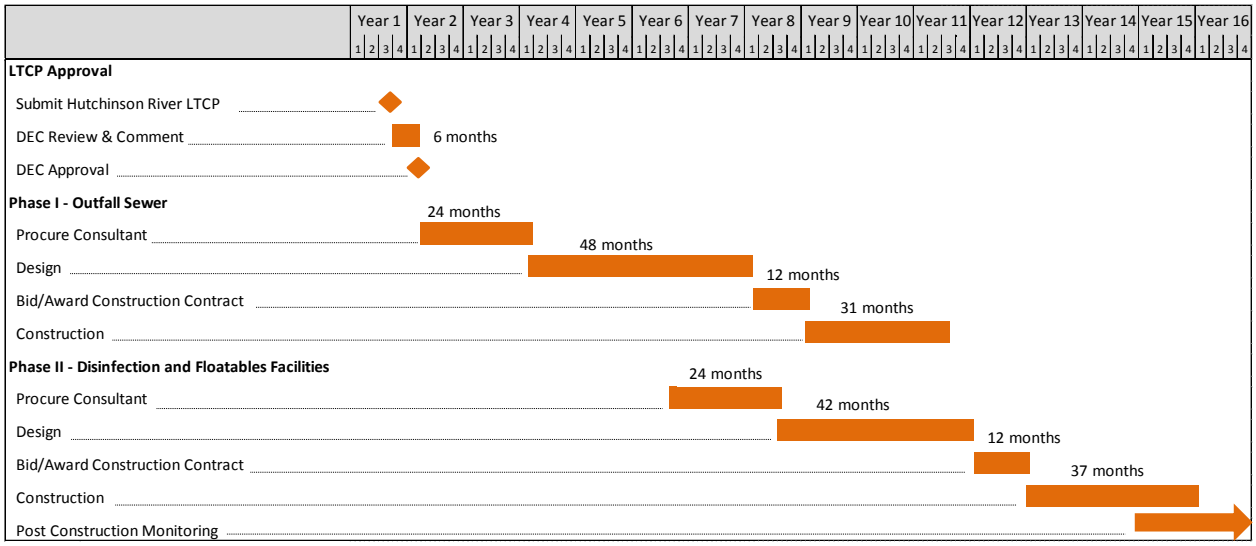
- *The DEP design process will finalize the floatables technology, disinfection facilities, efficiency of disinfection and chlorination, a TRC evaluation, site acquisition and location, site layouts, hydraulics, routing of the outfall as well as the requirements of any buildings or facilities needed for the operation and maintenance of Alternative 12.*

- *The DEP design process will include legal and technical reviews for all elements of the design such as land acquisition, public input and impacts on existing facilities.*

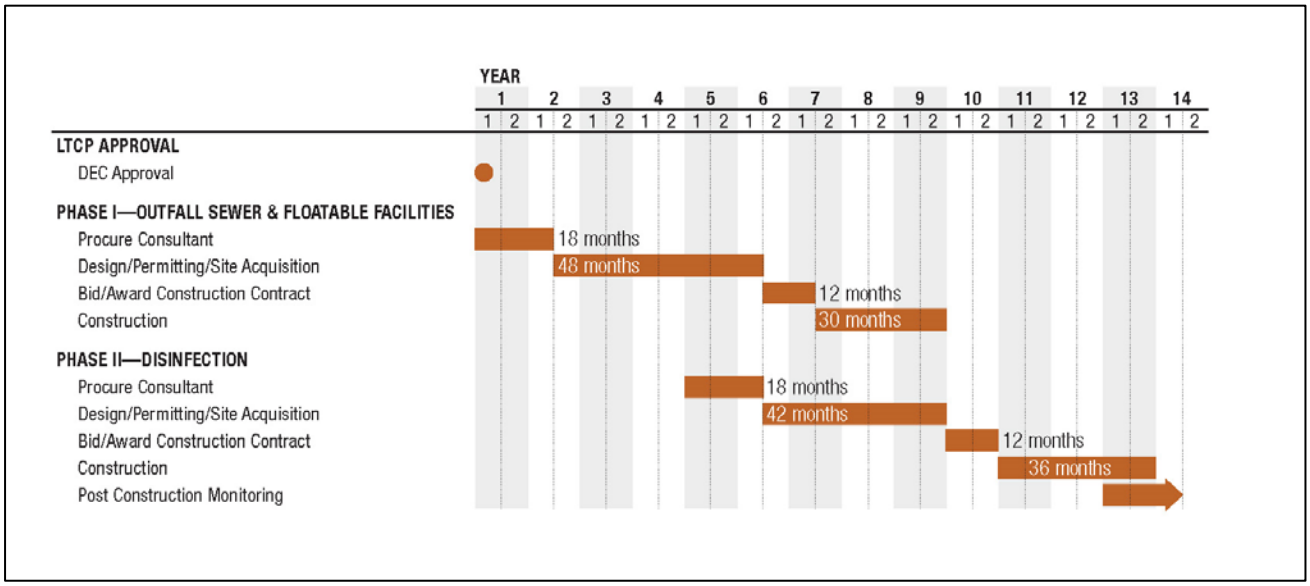
- *DEC review and approval of the design.*

The preferred Alternative 12 is described in the Executive Summary and shown in Figure ES-4.

Current Figure:



Proposed Figure:



ATTACHMENT 1

Revised Executive Summary

This revised Executive Summary is organized as follows:

1. Background — An overview of the regulations, approach and existing waterbody information.

2. Findings — A summary of the key findings of the water quality data analyses, the water quality modeling simulations and the alternatives analysis.

3. Recommendations — A listing of recommendations that are consistent with the Federal Combined Sewer Overflow (CSO) Control Policy and the Clean Water Act (CWA). In addition, recommendations regarding suggested site-specific targets for the Hutchinson River waterbody are provided.

1. BACKGROUND

This Long Term Control Plan (LTCP) for Hutchinson River was prepared pursuant to the Combined Sewer Overflow (CSO) Order on Consent (DEC Case No. CO2-20110512-25), dated March 8, 2012 (2012 CSO Order on Consent). The 2012 CSO Order on Consent is a modification of the 2005 CSO Order on Consent (DEC Case No. CO2-20000107-8). Under the 2012 CSO Order on Consent, the New York City Department of Environmental Protection (DEP) is required to submit 11 waterbody-specific LTCPs to the New York State Department of Environmental Conservation (DEC) by December 2017. The Hutchinson River LTCP is the third of the LTCPs under the 2012 CSO Order on Consent to be completed.

The goal of each LTCP, as described in the LTCP Goal Statement in the 2012 CSO Order on Consent, is to identify, with public input, appropriate CSO controls necessary to achieve waterbody-specific water quality standards (WQS) consistent with the Federal CSO Control Policy and related guidance. In addition, the Goal Statement provides: *"Where existing water quality standards do not meet the Section 101(a)(2) goals of the Clean Water Act, or where the proposed alternative set forth in the LTCP will not achieve existing water quality standards or the Section 101(a)(2) goals, the LTCP will include a Use Attainability Analysis examining whether applicable waterbody classifications, criteria, or standards should be adjusted by the State."* DEP conducted water quality assessments where the data is represented by percent attainment with pathogen targets and associated recovery times. For this LTCP, in accordance with guidance from DEC, 95 percent attainment of applicable water quality criteria constitutes compliance with the existing water quality standards or the Section 101(a)(2) goals conditioned on verification through rigorous post-construction compliance monitoring (PCM). The PCM will be reviewed for the Citywide LTCP and the percent attainment targets will be reviewed and, based upon the PCM results, possibly modified.

Regulatory Requirements

The waters of the City of New York are subject to Federal and New York State laws and regulations. Particularly relevant to this LTCP is the U.S. Environmental Protection Agency (EPA) CSO Control Policy, which provides guidance on the development and implementation of LTCPs and the setting of WQS. In New York State (NYS), CWA regulatory and permitting authority has been delegated to the DEC.

DEC has designated the tidal Hutchinson River as a Class SB waterbody, defined as "suitable for fish, shellfish and wildlife propagation and survival." The best usages of Class SB waters are primary and secondary contact recreation and fishing. Class SB waters include bacteria indicator criteria (fecal coliform) that are currently in the DEC WQS.

DEC has advised DEP that it plans to adopt the 30-day rolling Geometric Mean (GM) for enterococci of 30 cfu/100mL, with a not-to-exceed the 90th percentile statistical threshold value (STV) of 110 cfu/100mL, which is the EPA Recommended Recreational Water Quality Criteria (2012 EPA RWQC).

The criteria assessed in this LTCP include the applicable Existing WQ Criteria (Class SB – Primary Contact) (referred to hereinafter as Existing WQ Criteria) for Hutchinson River. It should also be noted that enterococci criteria do not apply to the tidal or freshwater sections of the Hutchinson River. They will apply to the tidal section of the river when adopted. As described above, the 2012 EPA RWQC recommended certain changes to the bacterial water quality criteria for primary contact. DEC has indicated that NYS will seek to adopt those more stringent standards for both primary and secondary contact waterbodies. As such, this LTCP includes attainment analysis both for Existing WQ Criteria and for the proposed 2012 EPA RWQC hereinafter referred to as the "Potential Future Primary Contact WQ Criteria" or "Future Primary Contact WQ Criteria" as referred to in the *CSO LTCP for Hutchinson River – September 2014*. Table ES-1 summarizes the Existing WQ Criteria and Potential Future Primary Contact WQ Criteria applied in this LTCP.

Table ES-1. Classifications and Standards Applied

Analysis	Numerical Criteria Applied
Existing WQ Criteria – Primary Contact	Freshwater Section – Class B: Fecal Monthly GM ≤ 200 cfu/100mL Tidal Section – Class SB: Fecal Monthly GM ≤ 200 cfu/100mL
Potential Future Primary Contact WQ Criteria(1)	Entero: rolling 30-d GM – 30 cfu/ 100mL Entero: STV – 110 cfu/100mL

Notes:
GM = Geometric Mean; STV = 90 Percent Statistical Threshold Value.
(1) The Potential Future Primary Contact WQ Criteria have not yet been adopted by DEC.

Through analyses described in this LTCP, DEP has determined that full attainment of both the Existing WQ Criteria and the Potential Future Primary Contact WQ Criteria cannot be achieved in the Hutchinson River with 100 percent CSO control, due to the impact of non-CSO sources of bacteria, including sources which are not controlled by NYC in Westchester County. Therefore, a gap analysis was also conducted using a waste load allocation (WLA) approach, as required by the 2012 CSO Order on Consent, which examined the reductions needed from all sources in both Westchester County and NYC (CSO, separate stormwater system and direct drainage) to achieve attainment of WQS. The WLA analysis is described further below. Because the preferred alternative would not result in attainment of bacteria WQS, a Use Attainability Analysis (UAA) is recommended for the New York City (NYC) tidal section.

Hutchinson River Watershed

Hutchinson River watershed characteristics and the NYC CSO outfalls are as shown in Figure ES-1. The NYC Municipal Stormwater Sewer Systems (MS4) outfalls are shown on Figure ES-2. Hutchinson River is a tributary of the Upper East River and is located in the eastern section of the Bronx. As further described below, the Hutchinson River LTCP Study Area comprises portions of Westchester County and NYC.

The NYC section of the watershed is bounded on the east by the Pelham Bay Park and on the west by industrial and residential areas. Industrial, manufacturing, transportation and utility uses exist along the western shore.

The Hutchinson River watershed includes portions of Westchester County and the Borough of the Bronx in NYC. The watershed in Westchester County is 5,770 acres. In NYC, the topographical watershed is 3,370 acres. Due to sewer system construction, urban development and other alterations to the watershed, the resulting watershed within NYC is now 2,552 acres with approximately 640 acres within Pelham Park. The Hutchinson River watershed has a total combined sewer impervious area of 1,128 acres out of a total NYC drainage area of 2,552 acres. This LTCP focuses on the portion of the river within NYC.

The majority of the NYC Hutchinson River watershed is served by the Hunts Point (HP) Waste Water Treatment Plant (WWTP). Sanitary flows and a portion of combined sanitary and stormwater flows are conveyed to the Hunts Point WWTP for treatment. Flows that exceed the capacity of the conveyance and treatment system are discharged into the waterbodies via permitted CSO outfalls. Limited portions of the drainage area along the shorelines discharge runoff directly to the Hutchinson River.

Green Infrastructure

DEP is planning to make significant investments in Green Infrastructure (GI) in the Hutchinson River watershed. DEP projects the following GI application rates by 2030:

- 111 acres (10 percent) to be managed using GI right-of-way-bioswales (ROWBs) and Stormwater Greenstreets;
- 32 acres (3 percent) to be managed in on-site private properties in Hutchinson River through new development and compliance with the Stormwater Performance Standard; and
- 15 acres (1 percent) to be managed in on-site public properties.

This acreage represents 14 percent of the total combined sewer impervious area in the watershed.

DEP conservatively estimated new development trends based on New York City Department of Buildings (DOB) building permit data from 2000 to 2011 and has projected that data for the 2012 to 2030 period to account for compliance with the stormwater performance standard.

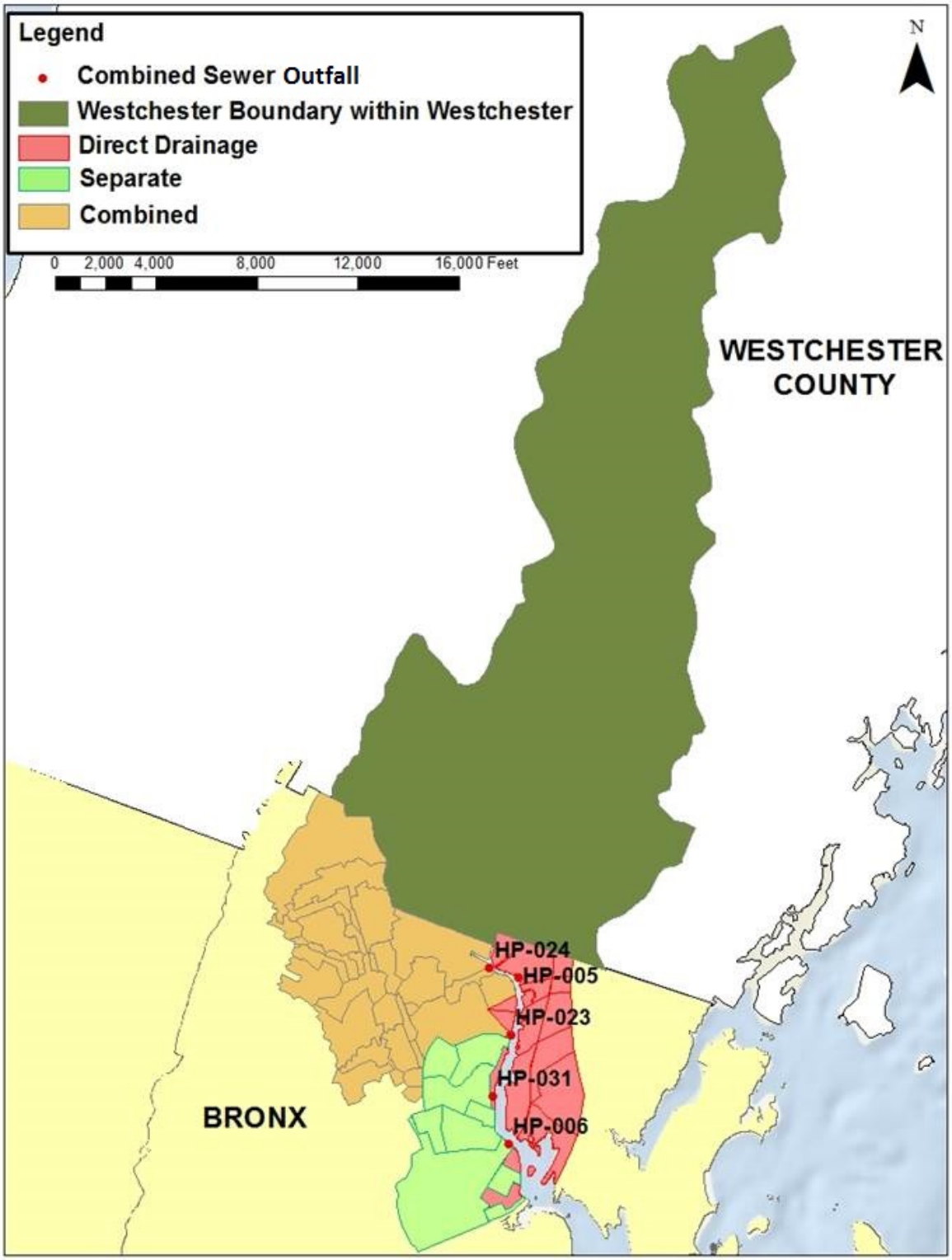


Figure ES-1. Hutchinson River Watershed Characteristics

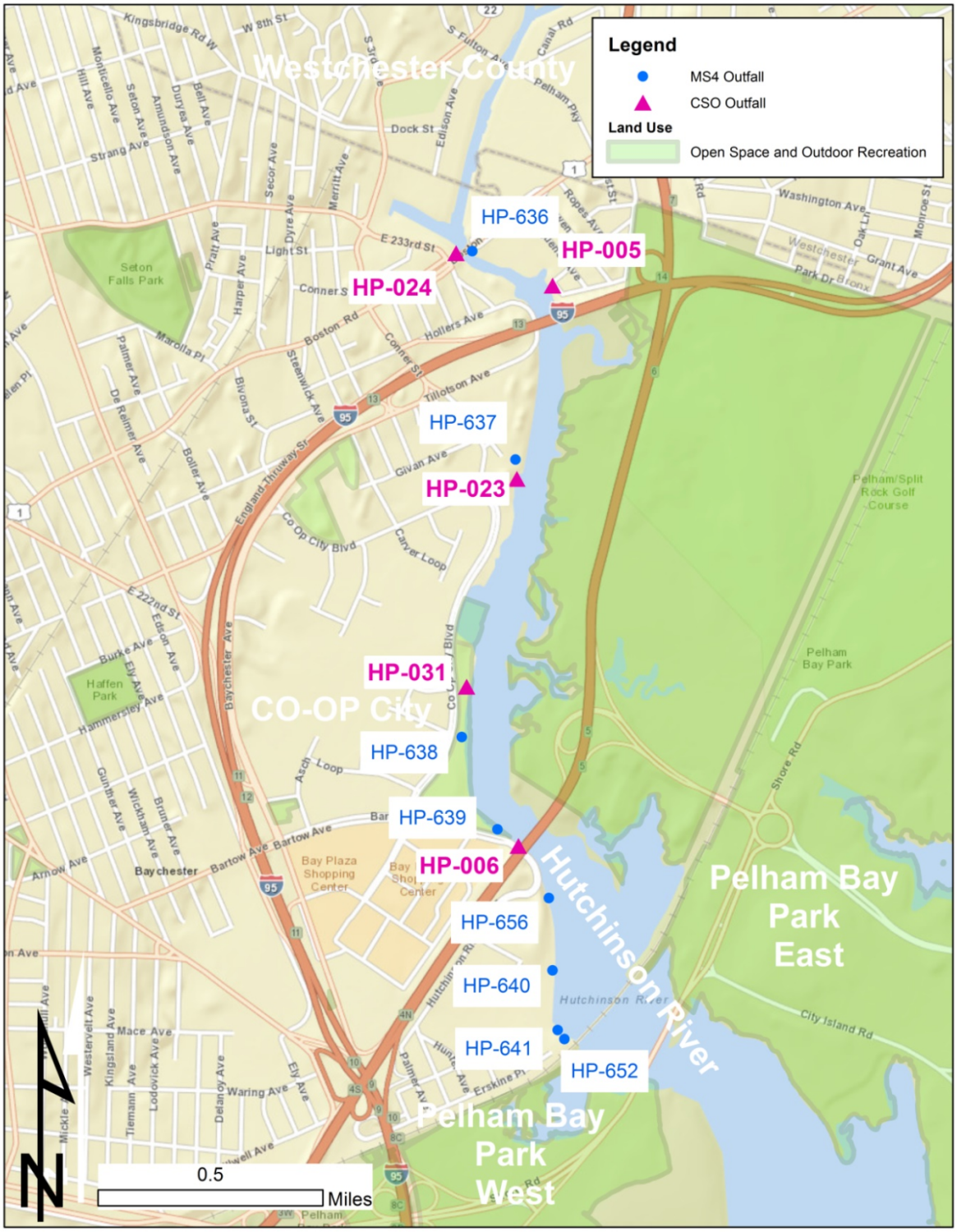


Figure ES-2. Hutchinson River CSO and DEP MS4 Discharge Locations

2. FINDINGS

Current Water Quality Conditions

Analysis of water quality in Hutchinson River was based on data collected from May 2012 to September 2012. The data was submitted to DEC in December 2012. Table ES-2 presents fecal coliform bacteria data collected at Stations HR-01, HR-02, HR-03, HR-04, HR-05, HR-06, HR-07, HR-08 and HR-09 in Hutchinson River. The data in Table ES-2 shows the bacteria levels from the upstream (HR-09) to downstream (HR-01) locations. The Existing WQ Criteria for fecal coliform is exceeded at all locations except the most downstream location (HR-01). The Potential Future Primary Contact WQ Criteria for enterococci is exceeded at all locations except HR-01.

Table ES-2. Geometric Means of In-stream Bacteria Samples

River Station	*Enterococci* (cfu/100mL)		Fecal Coliform (cfu/100mL)	
	Dry	Wet	Dry	Wet
HR-09	179	618	589	1,495
HR-08	7,606	4,964	12,253	10,132
HR-07	1,010	2,264	3,973	5,377
HR-06	55	313	140	1,134
HR-05	31	207	184	684
HR-04	34	112	467	521
HR-03	38	92	670	773
HR-02	26	58	381	516
HR-01	17	26	53	95

River Stations HR-09 to HR-07 are in the freshwater reach of the river, while the stations below HR-07 are in the saltwater section. The boundary between Westchester County and NYC runs between river Stations HR-06 and HR-05. Thus, the upstream freshwater section sources are primarily from Westchester County. The highest values for enterococci bacteria and fecal coliform were found in the freshwater section of the river and the lower values were observed in the tidal section. The fecal coliform bacteria concentrations measured between in-stream Stations HR-06 and HR-03 increase progressively in the downstream direction. In terms of geometric means, the fecal coliform levels increase from 140 cfu/100mL at Station HR-06 to 670 cfu/100mL at Station HR-03. This trend, however, is not observed for the corresponding enterococci levels. Typically, human waste discharged at a source-point along a stream leads to in-stream increases in both fecal coliform and enterococci bacteria. As the data do not show an increase in the enterococci concentration, DEP does not plan to initiate additional trackdown programs in this area at this time. DEP notes that the Harbor Survey Program has been collecting bacteria data at multiple stations along the Hutchinson River since November 2014 and capturing dry weather bacteria levels upstream and downstream of WQ Station HR-03 periodically. The resulting dataset would allow the identification of the type of water quality variation mentioned in DEC's comment, should it occur. The Sentinel Monitoring Program will also continue to provide illicit connection trackdown if warranted.

Baseline Conditions, 100 Percent CSO Control and Performance Gap

Analyses utilizing computer models were conducted as part of this LTCP to assess attainment with Existing WQ Criteria (Class SB) and Potential Future Primary Contact WQ Criteria for the Hutchinson River freshwater and tidal sections. The analyses focused on two primary objectives:

1. Determine the future baseline levels of compliance with water quality criteria with all sources being discharged at existing levels to the waterbody. These sources would primarily be direct drainage runoff, stormwater, CSO and Pelham Lake outflow. This analysis is presented for Existing WQ Criteria and Potential Future Primary Contact WQ Criteria.

2. Determine attainment levels with 100 percent of CSO controlled or no discharge of CSO to the waterbody, keeping the remaining non-CSO sources. This analysis is presented for the standards and bacteria criteria shown in Table ES-1.

DEP assessed water quality using the East River Tributary Model (ERTM). This model was updated and recalibrated using data from the 2012 sampling program in the Hutchinson River. Model outputs for fecal and enterococci bacteria as well as dissolved oxygen (DO) were compared with various monitored data sets during calibration in order to improve the accuracy and robustness of the models to adopt them for LTCP evaluations. The water quality model was then used to calculate ambient pathogen concentrations within the waterbody for a set of baseline conditions.

Baseline conditions were established in accordance with the guidance provided by DEC to represent future conditions. These included the following assumptions: the design year was established as 2040; Hunts Point Wastewater Treatment Plant (WWTP) would receive peak flows at two times design dry weather flow (2xDDWF); and waterbody-specific GI application rates would be based on the best available information. In the case of Hutchinson River, GI was assumed to have 14 percent coverage as noted above. Known dry weather sources of bacteria to the Hutchinson River in Westchester County were removed from the baseline conditions.

The water quality assessments were conducted using continuous water quality simulations – a one-year (2008 rainfall) simulation for bacteria and DO assessment to support alternatives evaluation, and a 10-year (2002 to 2011 rainfall) simulation for bacteria for attainment analysis for baseline, 100 percent CSO control and the preferred alternative.

The annual baseline loadings for 2008 are presented in Table ES-3.

Table ES-3. Annual CSO, Stormwater and Direct Drainage Volumes and Loads (2008 Rainfall)

Location	Outfall Type	Inflow (MG)	Enterococci (Organisms) x 10^{13}	Fecal Coliform (Organisms) x 10^{13}
NYC	CSO	322	173	512
	DEP Storm Outfall	176	33	23
	Direct Drainage	198	4.4	3
Westchester County	Wet Weather(1)	923	175	350
	Pelham Lake Outflow	2,018	20	47

Notes:
(1) Westchester County wet weather loadings based on measured stormwater concentrations that have the potential to contain illicit discharges.

Tables ES-4 and ES-5 show the simulation results for the maximum monthly geometric mean for fecal coliform using a 10-year model simulation for the baseline and 100 percent CSO control. The tables present both the value of the maximum monthly geometric mean and the percent attainment by year. The percent attainment improves from the NYC section (HR-05) to the East River (HR-01). Table ES-6 presents the 100 percent CSO control scenario for the Potential Future Primary Contact WQ Criteria.

Table ES-4. Calculated 10-Year Fecal Coliform Maximum Monthly GM and Attainment of Existing WQ Criteria (Class SB/B) for Baseline

Station	(a) Monthly Maximum Fecal Coliform Geometric Mean (cfu/100mL)									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	March	March	March	October	January	December	February	June	February	August
HR-09	1,077	1,068	1,074	1,516	1,289	1,347	1,247	2,236	1,148	1,830
HR-08	1,243	1,199	1,396	1,765	1,561	1,794	1,639	3,178	1,302	2,060
HR-07	1,307	1,449	1,853	1,592	1,652	2,252	2,038	3,847	1,255	2069
HR-06	289	507	257	571	390	704	624	965	278	484
HR-05	226	432	210	511	338	601	507	898	218	465
HR-04	178	309	156	415	264	458	400	711	166	363
HR-03	173	275	148	383	248	431	368	692	158	336
HR-02	132	206	103	285	193	294	278	526	132	255
HR-01	37	64	26	82	56	67	80	150	68	84
Station	**(b) Fecal Coliform - Annual Attainment (Percent of Months)**									
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
HR-09	0	0	0	0	0	0	0	0	0	0
HR-08	0	0	0	0	0	0	0	0	0	0
HR-07	0	0	0	0	0	0	0	0	0	0
HR-06	83	58	83	75	67	83	75	75	83	58
HR-05	83	75	92	83	83	83	83	75	83	67
HR-04	100	83	100	92	83	83	83	83	100	83
HR-03	100	83	100	92	83	83	83	83	100	83
HR-02	100	100	100	92	100	92	92	83	100	83
HR-01	100	100	100	100	100	100	100	100	100	100

Table ES-5. Calculated 10-Year Fecal Coliform Maximum Monthly GM and Attainment of Existing Water Quality Criteria (Class SB/B) with 100% CSO Control

Station	(a) Monthly Maximum Fecal Coliform Geometric Mean (cfu/100mL)									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	March	March	March	October	January	December	February	June	February	August
HR-09	1,077	1,068	1,074	1,516	1,289	1,347	1,247	2,236	1,148	1,830
HR-08	1,243	1,199	1,396	1,765	1,561	1,794	1,639	3,178	1,302	2,060
HR-07	13,07	1,449	1,853	1,592	1,652	2,252	2,038	3,847	1,255	2,069
HR-06	246	351	208	346	312	517	465	613	246	357
HR-05	181	238	156	270	234	388	346	495	187	294
HR-04	129	152	107	197	172	267	257	359	131	218
HR-03	116	129	95	172	162	238	233	326	113	190
HR-02	87	105	67	133	131	174	185	263	86	149
HR-01	26	34	18	43	40	42	55	81	40	54
Station	**(b) Fecal Coliform - Annual Attainment (Percent of Months)**									
	2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
HR-09	0	0	0	0	0	0	0	0	0	0
HR-08	0	0	0	0	0	0	0	0	0	0
HR-07	0	0	0	0	0	0	0	0	0	0
HR-06	92	67	92	83	75	83	83	75	92	67
HR-05	100	92	100	92	83	92	83	83	100	83
HR-04	100	100	100	100	100	92	92	92	100	92
HR-03	100	100	100	100	100	92	92	92	100	100
HR-02	100	100	100	100	100	100	100	92	100	100
HR-01	100	100	100	100	100	100	100	100	100	100

Table ES-6. Calculated 10-Year Enterococci Maximum Monthly GM and Attainment of Potential Future Primary Contact Water Quality Criteria (Class SB/B) with 100% CSO Control

Station		(a)Maximum 30-Day Enterococci Geometric Mean (cfu/100mL)									
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
HR-09	Fresh water	562	1,069	426	734	815	492	391	914	530	829
HR-08		724	1,555	538	940	1,034	508	464	1455	604	1,033
HR-07		909	2,118	678	1,030	1,445	561	526	2,185	705	1,334
HR-06	Tidal	165	533	90	156	313	183	78	405	85	246
HR-05		145	469	75	122	272	177	64	343	72	226
HR-04		105	335	53	87	197	144	48	230	50	163
HR-03		97	302	50	81	180	135	45	201	44	144
HR-02		75	215	39	62	124	107	35	135	35	105
HR-01		19	53	11	20	29	36	9	29	12	29
Station		**(b) Enterococci - Recreational Season Attainment (Percent)**									
		2002	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
HR-09	Fresh water	0	0	0	0	0	0	0	0	0	0
HR-08		0	0	0	0	0	0	0	0	0	0
HR-07		0	0	0	0	0	0	0	0	0	0
HR-06	Tidal	44	39	24	65	17	39	55	28	69	19
HR-05		62	54	30	79	29	46	66	36	72	38
HR-04		75	63	52	90	46	58	80	44	84	59
HR-03		81	68	59	91	55	64	83	46	89	62
HR-02		89	76	73	92	73	78	96	66	93	67
HR-01		100	92	100	100	100	97	100	100	100	90

As shown in Table ES-5, even with 100 percent CSO control, full attainment of the existing fecal coliform standard would not be achieved in the 10-year period at river Stations HR-09 to HR-06, while attainment would not be consistently achieved at river Stations HR-05 to HR-02. For the Potential Future Primary Contact WQ Criteria, the percent attainment with 100 percent CSO control is even less. The impact of non-CSO sources on attainment of WQS is evident in the data in Tables ES-5 and ES-6. Accordingly, the performance gap was assessed using a WLA process, as described below.

Waste Load Allocation Approach

The 2012 CSO Order on Consent requires a WLA approach to be used for this LTCP. As noted above, the Hutchinson River has a freshwater and tidal water section. The freshwater section is primarily influenced by Westchester County loads and the tidal section is primarily influenced by NYC loads with some Westchester County loads included. Consistent with direction from DEC, DEP made the following major assumptions in the WLA:

1. The freshwater section will meet the Existing WQ Criteria as it flows into the tidal section

2. The tidal section bacteria loads are based on concentrations derived from sampling data, and CSO and stormwater flows from the InfoWorks CS™ (IW) collection system model

3. WLA scenarios were evaluated for the tidal section to illustrate the bacteria load reductions needed to meet WQS assuming the freshwater section of the river was in compliance.

Freshwater Section Findings Using WLA

The load reductions needed to meet the Existing WQ Criteria in the freshwater section of the Hutchinson River range from 93 to 98 percent over the 10-year period of analysis are summarized in Table ES-7. The scope of work and timeline needed for Westchester County to meet the Existing WQ Criteria is unknown and not within DEP's control.

Table ES-7. Required Load Reductions to Attain Existing Fecal Coliform Criterion at End of Freshwater Section (Station HR-07)

Year	Pelham Lake Outflow	Westchester County Wet Weather
	Reduction %	Reduction %
2002	70.6	93.0
2003	74.9	95.2
2004	74.9	96.8
2005	67.0	96.0
2006	72.9	94.6
2007	73.5	97.4
2008	74.9	96.8
2009	75.4	98.0
2010	64.2	93.5
2011	73.7	95.1
Average	72.2	95.6

Tidal Section Findings Using WLA

Table ES-8 presents the maximum monthly fecal coliform concentrations for each year in the 10-year period, assuming the freshwater reach of the river is in compliance. As shown in Table ES-8, August 2011 represents the fourth highest month within the 10-year assessment period and, as such it was selected as the reference month to assess the WLA. Assuming the bacteria loads could be reduced such that the bacteria concentration at HR-05 could be reduced from 229 cfu/100mL to the Existing WQ Criteria, only three of 120 months in the 10-year period would remain out of compliance. The resulting percent attainment over the 10-year period would be 97.5 percent (117 out of 120 months). As noted above, in accordance with guidance from DEC, 95 percent attainment of applicable water quality criteria constitutes compliance with the Existing WQ Criteria. This level of protection for the WLA analysis in the tidal (salt water) reach of the Hutchinson River is consistent with the level of protection on other LTCPs. The 97.5 percent attainment level also provides a reasonable margin of safety which is commonly used in WLA assessments. Bringing August 2011 into compliance would also result in 100 percent compliance in the recreational season for the 10-year period, since the three months remaining out of compliance do not occur during the recreational season.

Table ES-8. Monthly Fecal Coliform Geometric Mean Concentrations at Station HR-05 during 2002-2011 with the Baseline and Freshwater Section in Attainment

Year	HR-05 Monthly Geo-Mean, with "HR-07" in Compliance											
ID	January	February	March	April	May	June	July	August	September	October	November	December
2002	35	10	124	40	27	39	6	8	16	27	87	55
2003	11	47	108	46	20	156	6	19	39	16	60	160
2004	15	30	27	68	62	19	53	13	19	7	80	69
2005	61	32	30	85	4	12	7	4	2	102	37	267
2006	128	53	8	58	37	52	31	11	9	73	147	41
2007	51	34	52	200	17	23	52	25	5	28	37	257
2008	51	196	64	27	31	24	6	22	25	14	58	137
2009	26	17	18	73	26	160	79	23	4	42	16	470
2010	18	74	131	23	18	7	7	4	8	23	19	44
2011	67	53	164	114	24	20	8	229	21	43	32	78

Table ES-9 summarizes the load reductions needed in the freshwater section to bring the freshwater section into compliance, and the load reductions in the tidal section needed to bring Station HR-05 into compliance, assuming the freshwater load reductions are in place, for August 2011.

Table ES-9. Summary of WLA Reduction Requirements

Location	Load Sources	Existing Primary Contact Criteria - Fecal Coliform Load Reductions from Baseline Conditions (%)	Potential Future Primary Contact Recreation Criteria – Enterococci Load Reductions from Baseline Conditions (%)
Freshwater Section	Pelham Lake Westchester County Wet Weather	73.7 95.1	88.4 98.7
Tidal Section	NYC CSO and Stormwater plus Westchester County Stormwater	14	69

Table ES-10 illustrates the reduction levels needed to meet the standards with different stormwater reduction scenarios. For example, in the tidal section a 14 percent CSO load reduction and 14 percent stormwater load reduction would be needed to achieve compliance for the August 2011 period. Alternatively, a 17 percent CSO load reduction is needed in the tidal section if zero percent reduction in stormwater loading (tidal Westchester County and NYC) is assumed.

Table ES-10. Summary of Tidal Section WLA Reduction Alternatives

Location	Criteria	WLA Reduction Requirement (%)	Source	Reduction Scenarios (%)		
Tidal Section	Existing Primary Contact Criteria - Fecal Coliform Load Reductions from Baseline Conditions	14	Municipal Stormwater	0	10	14
			CSO	17	15	14
	Potential Future Primary Contact Recreation Criteria – Enterococci Load Reductions from Baseline Conditions	69	Municipal Stormwater	0	10	15
			CSO	94	90	88

In summary, achieving 97.5 percent annual compliance would provide a margin of safety above the 95 percent compliance level that has previously been accepted by DEC as equivalent to full attainment. 97.5 percent attainment would be achieved by bringing August 2011 into compliance with the Existing WQ Criteria assuming the freshwater reach is in compliance. CSO control alternatives that would achieve 17 percent CSO load reduction for the August 2011 period would bring August 2011 into compliance with the Existing WQ Criteria without any additional stormwater loading removal in the tidal section of the river. These parameters defined the compliance target for CSO control alternatives under the WLA scenario.

Public Outreach

DEP followed a comprehensive public participation plan in ensuring engagement of interested stakeholders in the LTCP process. Stakeholders included local residents, citywide and regional groups, a number of whom offered comments at two public meetings held for this LTCP. DEP will continue to gather public feedback on waterbody uses and will provide the public UAA-related information at the third Hutchinson River Public Meeting. The third meeting will present the final identified preferred alternative to the public after DEC's review of the LTCP.

The public indicated there were some uses of the river for canoeing and kayaking. Those uses of the river are at sites that are not designated as launching locations.

Additional information on the public outreach activities is presented in Section 7 and Appendices B and C, Public Meeting Summaries and Appendix D, the UAA.

Evaluation of Alternatives

A multi-step process was used to evaluate control measures and CSO control alternatives. The evaluation process considered factors related to environmental benefits, community and societal impacts, and considerations related to implementation and Operation and Maintenance (O&M). Following the comments from technical workshops, the retained alternatives were subjected to cost performance and cost attainment evaluations where economic factors were introduced. Alternatives were also assessed against the WLA performance targets identified above. Table ES-11 presents the retained alternatives.

The Hutchinson River alternatives vary significantly in cost ranging in net present worth value from approximately $80M to over $800M. DEP's preferred alternative, Alternative 12 - 50 MGD Seasonal Disinfection in New Outfall HP-024, is valued at a construction cost of $90M and a present worth of $108M. The annual O&M costs for this alternative were estimated to be $1.25M. The LTCP cost estimates are considered Association for the Advancement of Cost Engineering (AACE) Class 5 estimates (accuracy range of -50% to +100%), which is typical and appropriate for this type of planning evaluation. Therefore, the construction cost of the preferred alternative could range from $45M to $180M. This alternative would achieve a fecal coliform load reduction of 23 percent for August 2011, which exceeds the WLA target for fecal coliform removal of 17 percent for August 2011, assuming no further stormwater load removals.

The cost-effectiveness of the alternatives was assessed by determining percent attainment of WQ criteria for 2008, assuming existing wet weather bacteria loads entering the freshwater section of the river. Figure ES-3 presents an example bacteria loading reduction cost-performance curve at river Station HR-05. The plot presents net present worth versus percent attainment for the Existing WQ Criteria, and the Potential Future Primary Contact WQ Criteria. Alternative 12 is the third data point from the left axis. As indicated in Figure ES-3, alternatives with higher costs than Alternative 12 would not result in significant gains in attainment of bacteria WQ criteria. It should be noted that the percent attainment indicated in Figure ES-3 is lower than the 97.5 percent attainment referenced above under the WLA scenario because the values in Figure ES-3 include the impacts of baseline wet weather loads entering the freshwater section for 2008, while the 97.5 percent attainment was based on the WLA condition of the freshwater section being in attainment specifically for the August 2011 period.

Table ES-11. Summary of Retained Alternatives

Alternative	Description
1. Storage Tanks at HP-023 and HP-024 to provide 45% annual CSO control	2.9 MG storage tank at Outfall HP-023 and 4.9 MG storage tank at Outfall HP-024. Includes influent coarse screening, and facilities capable of dewatering the tanks in one day.
2. Storage Tanks at HP-023 and HP-024 to provide 25% annual CSO control	1.0 MG storage tank at Outfall HP-023 and 1.7 MG storage tank at Outfall HP-024. Includes influent coarse screening, and facilities capable of dewatering the tanks in one day.
3. Storage Tunnel for HP-023, HP-024 and HP-031 to provide 100% annual CSO control	39-ft. dia., 5,400 LF tunnel to capture CSO from Outfalls HP-023, HP-024 and HP-031. Includes 22 MGD dewatering PS.
4. Storage Tunnel for HP-023, HP-024 and HP-031 to provide 76% annual CSO control	24-ft. dia., 5,400 LF tunnel to capture CSO from Outfalls HP-023, HP-024 and HP-031. Includes 17 MGD dewatering PS.
5. Storage Tunnel for HP-023, HP-024 and HP-031 to provide 48% annual CSO control	16-ft. dia., 5,400 LF tunnel to capture CSO from Outfalls HP-023, HP-024 and HP-031. Includes 8 MGD dewatering PS.
6. Individual RTB with disinfection facility at HP-024 to provide 40% seasonal CSO control	1.6 MG contact tank, with influent screens, 150 MGD effluent pumping, 1.6 MGD dewatering pumping, and disinfection chemical storage and feed equipment. Facilities located at Outfall HP-024.
7. Individual RTB with disinfection facility at HP-023 to provide 50% seasonal CSO control	0.73 MG contact tank, with influent screens, 70 MGD effluent pumping, 0.73 MGD dewatering pumping, and disinfection chemical storage and feed equipment. Facilities located at Outfall HP-023.
8. Consolidated HP-023/HP-024 RTB with disinfection facility at HP-023 to provide 88% seasonal CSO control	2.1 MG contact tank, with influent screens, 203 MGD effluent pumping, 2.1 MGD dewatering pumping, and disinfection chemical storage and feed equipment. Facilities sized for flows from Outfalls HP-023 and HP-024, with consolidation conduit to carry flows from Outfall HP-024 to facility located at Outfall HP-023.
9. Consolidated HP-023/HP-024 RTB with disinfection facility at HP-023 to provide 78% seasonal CSO control	1.3 MG contact tank, with influent screens, 123 MGD effluent pumping, 1.3 MGD dewatering pumping, and disinfection chemical storage and feed equipment. Facilities sized for flows from Outfalls HP-023 and HP-024, with consolidation conduit to carry flows from Outfall HP-024 to facility located at Outfall HP-023.
10. Consolidated HP-023/HP-024 RTB with disinfection facility at HP-023 to provide 62% seasonal CSO control	0.64 MG contact tank, with influent screens, 62 MGD effluent pumping, 0.64 MGD dewatering pumping, and disinfection chemical storage and feed equipment. Facilities sized for flows from Outfalls HP-023 and HP-024, with consolidation conduit to carry flows from Outfall HP-024 to facility located at Outfall HP-023.
11. 25 MGD Seasonal Disinfection in New Outfall HP-024	New 10-ft. diameter, 600 LF outfall pipe with 25 MGD disinfection facility for Outfall HP-024. New outfall configured to provide 15 minutes detention time at 25 MGD. Floatables control to be provided for new outfall.
12. 50 MGD Seasonal Disinfection in New Outfall HP-024	New 10-ft. diameter, 1,200 LF outfall pipe with 50 MGD disinfection facility for Outfall HP-024. New outfall configured to provide 15 minutes detention time at 50 MGD. Floatables control to be provided for new outfall.
13. 150 MGD Seasonal Disinfection in New Outfall HP-024	New 10-ft. diameter, 3,000 LF outfall pipe with 150 MGD disinfection facility for Outfall HP-024. New outfall configured to provide 15 minutes detention time at 150 MGD. Floatables control to be provided for new outfall.

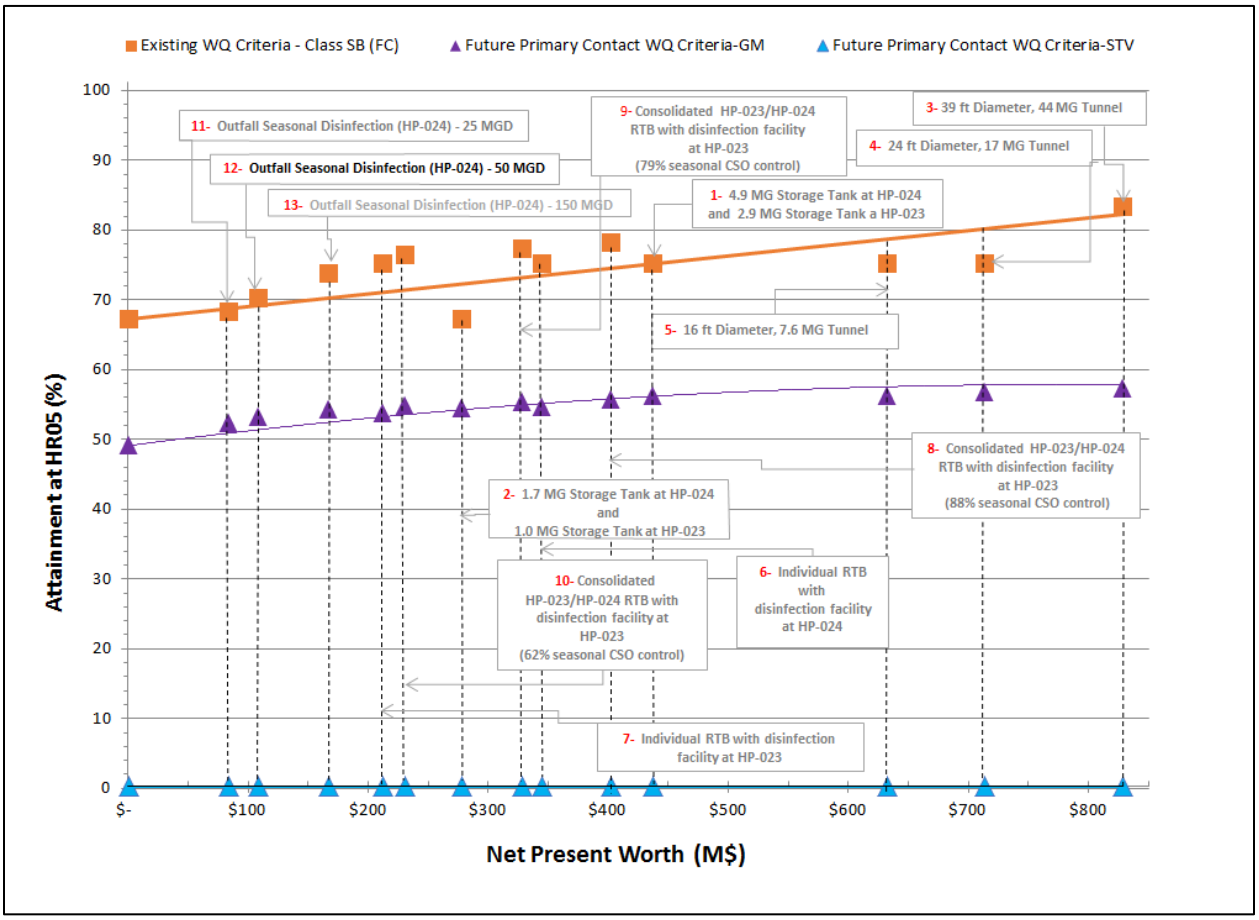


Figure ES-3. Cost vs. Bacteria Water Quality Attainment at Station HR-05 (2008 Rainfall)

The preferred Alternative 12 consists of the following:

1. Disinfection of 50 MGD in a new 1200 foot, 10 foot diameter, pipe discharging to the river.
2. A 2-log kill (99 percent) is planned for the alternative for the recreational season (May 1st to October 31st).
3. Floatables control measures for the new outfall.
4. The estimated construction cost is $90M (Class 5 range $45M to $180M) and the present worth is $108M.
5. A preliminary site layout is shown in Figure ES-4 below.

Figure ES-4. Preferred Alternative – 50 MGD Seasonal Disinfection in New Outfall HP-024

3. RECOMMENDATIONS

Long Term CSO Control Plan Implementation, UAA and Summary of Recommendations

The LTCP analyses and recommendations for Hutchinson River LTCP are summarized below for the following items:

1. Water Quality Modeling Results
2. UAA, WQ Compliance and Time to Recovery
3. Summary of Recommendations

Water Quality Modeling Results

The calculated percent attainment during the recreational season for the Existing WQ Criteria and Potential Future Primary Contact WQ Criteria for the preferred alternative is shown in Table ES-12. Annual attainment for the Existing WQ Criteria is shown in Table ES-13. The model runs that generated these results included baseline wet weather loads to the freshwater section of the river which result in the freshwater section being out of compliance. This non-compliance is the result of loadings tributary to the Hutchinson River within Westchester County. During the recreational season, the results show attainment that approaches (tidal section of the river) the DEC goal of 95 percent attainment for the Existing WQ Criteria but would be well below Potential Future Primary Contact WQ Criteria.

Table ES-12. Calculated 10-year Bacteria Attainment for the Preferred Alternative - Recreational Season Only

Station	Existing WQ Criteria		Potential Future Primary Contact WQ Criteria	
	Criterion	Attainment (%)	Criterion	Attainment (%)
HR-09	Fecal <= 200	0	Entero <=30	0
			STV <= 110	0
HR-08	Fecal <= 200	0	Entero <=30	0
			STV <= 110	0
HR-07	Fecal <= 200	0	Entero <=30	0
			STV <= 110	0
HR-06	Fecal <= 200	92	Entero <=30	41
			STV <= 110	3
HR-05	Fecal <= 200	95	Entero <=30	55
			STV <= 110	4
HR-04	Fecal <= 200	95	Entero <=30	68
			STV <= 110	8
HR-03	Fecal <= 200	97	Entero <=30	72
			STV <= 110	8
HR-02	Fecal <= 200	97	Entero <=30	83
			STV <= 110	13
HR-01	Fecal <= 200	100	Entero <=30	99
			STV <= 110	60

Table ES-13. Calculated 10-year Bacteria Attainment for the Identified Preferred Alternative-Annual Period

Station	Existing WQ Criteria	
	Criterion	Attainment (%)
HR-09	Fecal <=200	0
HR-08	Fecal <=200	0
HR-07	Fecal <=200	0
HR-06	Fecal <=200	77
HR-05	Fecal <=200	84
HR-04	Fecal <=200	90
HR-03	Fecal <=200	91
HR-02	Fecal <=200	94
HR-01	Fecal <=200	100

As demonstrated in Table ES-13, attainment levels for the Existing WQ Criteria across the year are below the 95 percent attainment goal. Therefore a UAA will be required in all locations except HR-01. It should be noted that these levels of attainment differ from the 97.5 percent level of attainment discussed above for the WLA approach. This is because the WLA approach reduced the fecal coliform loads to bring the freshwater section into compliance.

Attainment of the STV upper 90th percentile values contained in the Potential Future Primary Contact WQ Criteria is difficult if not impossible to achieve. Maximum enterococci concentrations achieved with the preferred alternative will not meet the EPA recommended Future Contact WQ Criteria STV concentration of 110 cfu/100mL.

The Hutchinson River does not attain the chronic portion of the Class SB dissolved oxygen standard. Water quality analyses also indicate (Table ES-14) that dissolved oxygen concentrations for the proposed alternative will meet the DEC target of 95 percent attainment with the acute portion of the Class SB dissolved oxygen criterion. However, the water quality modeling results indicate that the chronic portion of the criterion, which requires the DO concentrations to be greater than 4.8 mg/L, will not be in compliance with the criterion at least 95 percent of the time.

Table ES-14. Calculated Dissolved Oxygen Attainment for the Preferred Alternative

Station	Calculated 2008 Dissolved Oxygen -- Annual Period	
	Hourly Attainment, % >= 3.0 mg/L	Daily Attainment, % >= 4.8 mg/L
	Existing WQ Criteria	
	Attainment (%)	Attainment (%)
HR-09	100	100
HR-08	100	100
HR-07	100	98
HR-06	95	73
HR-05	97	78
HR-04	99	90
HR-03	100	97
HR-02	100	98
HR-01	100	98

UAA, WQ Compliance and Time to Recovery

Given that the identified preferred alternative will not result in full compliance with the Existing WQ Criteria in the Hutchinson River, due to sources which are beyond DEP's jurisdiction to control, DEP has prepared a UAA for the Hutchinson River.

A Time to Recovery analysis was also done for the tidal section of the river. Estimated time to recovery to the fecal coliform target of 1000 cfu/100mL under the Aug 14-15, 2008 storm (approximately 1 inch total) for baseline conditions, 100 percent CSO control and the preferred alternative, are presented in Table ES-15 and described in Sections 6 and 8. In general, the time to recovery decreases with proximity to the mouth of the Hutchinson River.

Table ES-15. Summary of Estimated Time To Recovery for Hutchinson River

	Time to Recovery (hrs) Fecal Coliform Target (1,000 cfu/100mL)		
Station	Baseline	100% Control	Preferred Alternative
HR-06	20	9	20
HR-05	20	10	19
HR-04	20	9	19
HR-03	19	9	15
HR-02	17	8	16
HR-01	-	-	-

Summary of Recommendations

Water quality in Hutchinson River will be improved with the preferred alternative set forth below and the implementation of the planned GI projects and recommendations made herein.

The actions identified in this LTCP include:

1. Alternative 12 - Disinfection of 50 MGD of CSO in a 1,200 foot long, 10 foot diameter pipe, including a new outfall to the river, has been identified as the preferred alternative. Appropriate floatables control measures for the new outfall will be evaluated during design; however the DEP preferred floatables technology is an underflow baffle at the regulator structure. The estimated construction cost is $90M (Class 5 range $45M to $180M) and the annual O&M cost is $1.25M. The net present worth for the $90M construction cost and annual O&M costs is $108M. The new disinfection facility would be operational during the recreational season (May 1st to October 31st), and would provide a 23 percent reduction in CSO bacteria loadings to the tidal section for the August 2011 period. Under the WLA approach, which assumes freshwater in compliance, a 17 percent CSO reduction with no stormwater reductions for the August 2011 model run would result in 97.5 percent attainment over the 10-year period of analysis. Therefore, no future stormwater reductions from NYC are required to meet the WLA load reduction target with this identified preferred alternative. Although this LTCP concerns CSOs, DEP believes this alternative is the most cost-effective solution for both CSO and stormwater and is therefore going beyond the focus of this LTCP to address both wet weather sources.

2. A UAA addressing non-compliance with designated bacteria and DO WQ criteria; identifying a time to recovery and wet weather advisory for protection of the designated uses. (See attachment 2 to this Supplemental Documentation).

3. DEP will continue to invest in water quality improvements through the Green Infrastructure program.

Section 9.0 presents the implementation of the identified elements in detail. Significant coordination, funding approvals, land acquisitions and permitting will be required for the design and construction. The implementation phasing and scheduling are depicted in Figure ES-5.

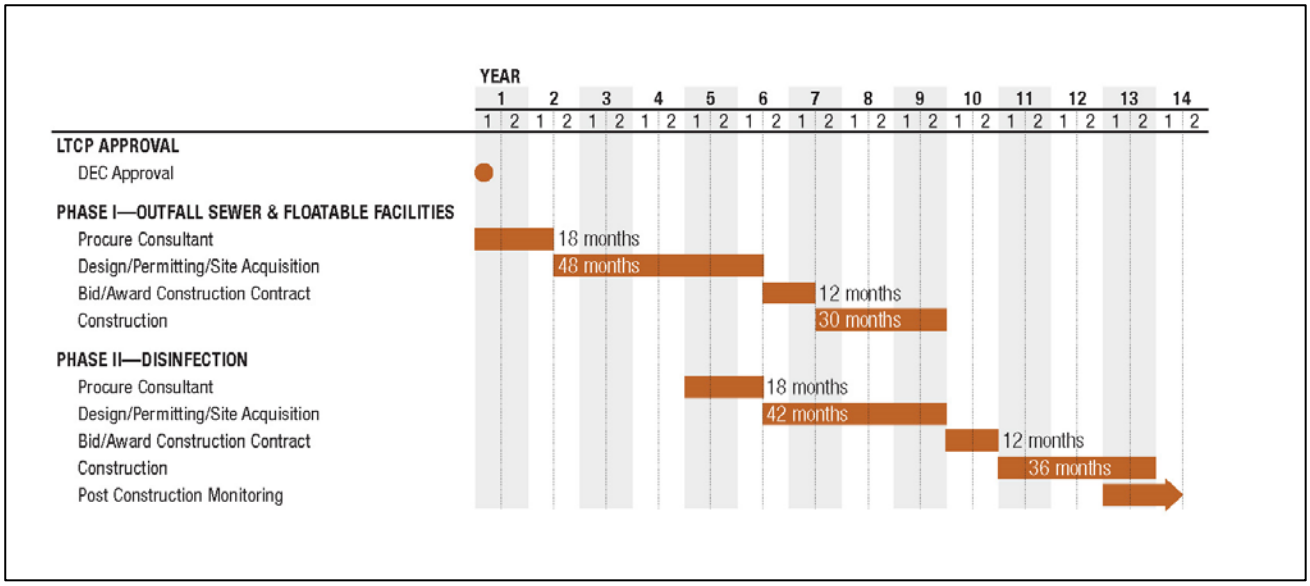


Figure ES-5. Implementation Schedule

DEP is committed to improving water quality in this waterbody, which will be advanced by the improvements and recommendations presented in this plan. These identified actions have been balanced with input from the public and awareness of the cost to the citizens of New York City.

ATTACHMENT 2

Revised Appendix D: Hutchinson River Use Attainability Analysis (UAA)

EXECUTIVE SUMMARY

The New York City Department of Environmental Protection (DEP) has performed a Use Attainability Analysis (UAA) for the Hutchinson River in accordance with the 2012 CSO Order on Consent for the Hutchinson River. The Hutchinson River is a tributary of the Upper East River, currently designated as a Class SB waterbody along its tidal or marine reach downstream of the East Colonial Avenue Bridge. The river is designated as Class B along the upstream freshwater reach, from the East Colonial Avenue Bridge up to Pelham Lake, which is considered for purposes of this LTCP to be the upstream limit of the study area. The Hutchinson River then flows in a southerly direction toward the Upper East River (Figure 1). The Pelham Lake outflow, the stormwater from Westchester County and New York City (NYC), as well as the combined sewer overflows (CSOs) from NYC, constitute the major source of freshwater flows into the Hutchinson River. The inter-jurisdictional character of the Hutchinson River waters, the various sources of pollutant loadings from both NYC and Westchester County, as well as their impacts on the water quality (WQ) conditions of the freshwater and tidal portions of the river, make this a complex waterbody with specific intricacies that were analyzed within the LTCP framework and which support this UAA.

According to Title 6 NYCRR, Chapter X, Part 935, the Hutchinson River saltwater front is at the East Colonial Avenue Bridge, also known as Pelham Bridge, in Westchester County. Therefore, this UAA refers exclusively to the tidal or marine portion of the Hutchinson River, which is within the jurisdiction of NYC.

Detailed analyses performed during the Hutchinson River LTCP concluded that the standards for the designated Class SB primary contact recreational uses in the Hutchinson River are not attained for both the fecal coliform and dissolved oxygen criteria and will not be attained even with the implementation of 100 percent CSO control. Each crierion is discussed below:

Fecal Coliform

Based on a technical assessment, the non-attainment of the 200 cfu/100mL fecal coliform criterion is due, in part, to the bacteria loadings originating in Westchester County and carried downstream to the tidal reach of the Hutchinson River. However, it was found that the downstream-most portion of the tidal Hutchinson River close to the Upper East River complies with the Existing Primary Contact WQ Criteria. The inability to meet the primary contact standard throughout the majority of its extension is due to the loadings from stormwater discharges and direct drainage, as well as physical and hydrological characteristics of the River.

Dissolved Oxygen

Based on the technical assessment, the non-attainment of the dissolved oxygen criterion of ≥ 5 mg/L can be associated with some of these same man-made sources described above for fecal coliform, as well as to the configuration of the waterbody. Unlike for fecal coliform, the implementation of the projects listed in this LTCP will not impact DO concentrations in the Hutchinson River.

On the basis of these findings, DEP is requesting, through the UAA process, that the New York State Department of Environmental Conservation (DEC) consider allowing wet weather advisory notifications as appropriate in the tidal sections of the Hutchinson River.

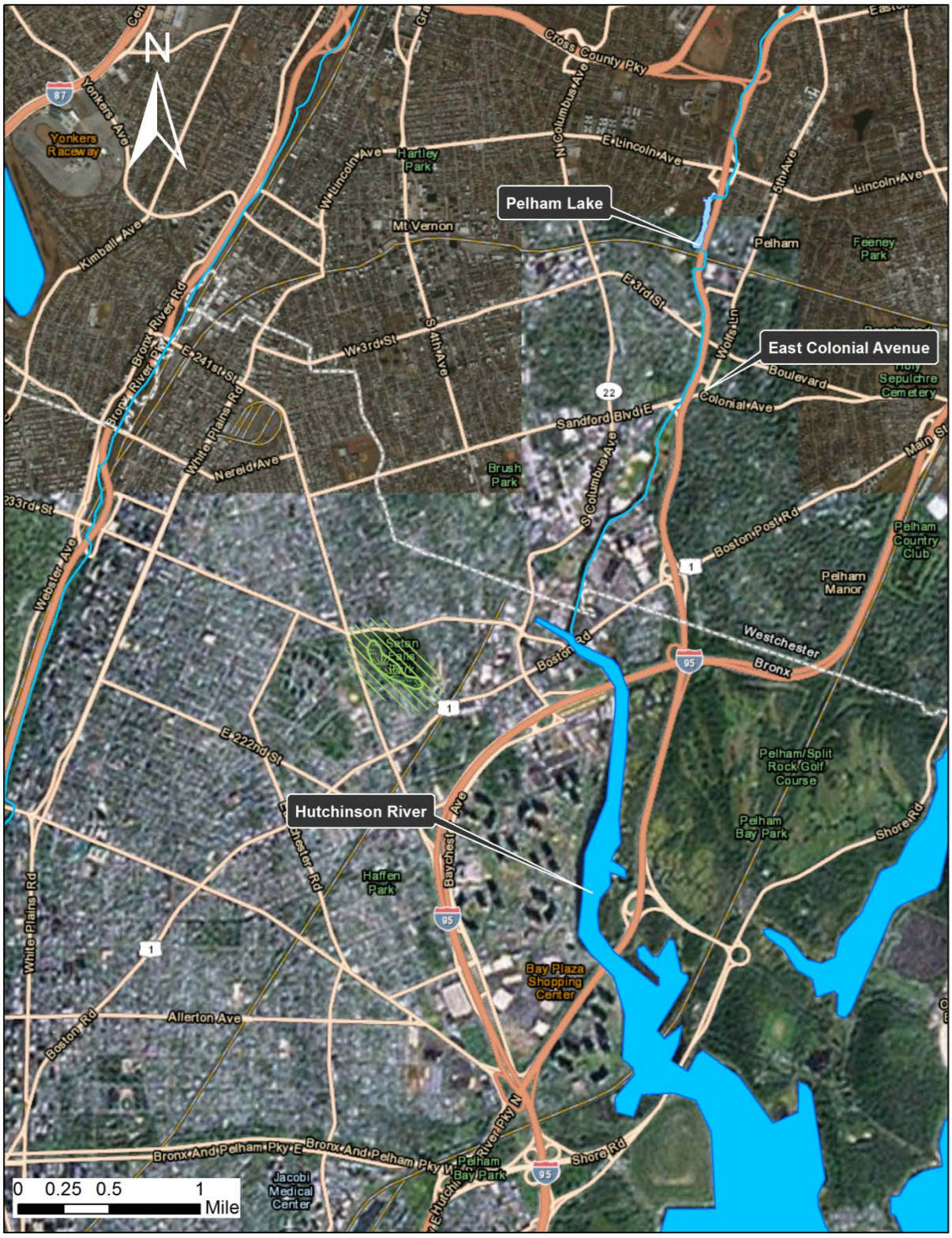


Figure 5. Aerial View of the Hutchinson River

INTRODUCTION

Regulatory Considerations

DEC has designated the tidal or marine portion of the Hutchinson River as a Class SB waterbody. The best usages of Class SB waters are *"primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival"* (6 NYCRR 701.11). DEC has indicated that the SB classification is equivalent to attaining the fishable and swimmable goals of the Clean Water Act (CWA).

Federal policy recognizes that the uses designated for a waterbody may not be attainable, and the UAA has been established as the mechanism to modify the water quality standards (WQS) in such a case. Here, the Hutchinson River does not meet the existing designated use classification. Furthermore, complete elimination of CSO discharges will not result in attainment of the designated classification of SB.

This UAA identifies the attainable and existing uses of the Hutchinson River and compares them to those designated by DEC, in order to provide data to establish appropriate WQ targets for this waterway. An examination of several factors related to the physical condition of the waterbody and the actual and possible uses suggests that the uses listed in the SB classification may not be attainable.

Under federal regulations (40 CFR 131.10), six factors may be considered in conducting a UAA:

1. Naturally occurring pollutant concentrations prevent the attainment of the use; or

2. Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or

3. Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

4. Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original conditions or to operate such modification in a way that would result in the attainment of the use; or

5. Physical conditions related to the natural features of the waterbody, such as the lack of proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

6. Controls more stringent than those required by Sections 301(b) and 306 of the Act [CWA] would result in substantial and widespread economic and social impact.

Identification of Existing Uses

The waterfront area surrounding the Hutchinson River is dominated by industry to the north and natural undeveloped parkland in the central and southern reaches of the eastern shore. No formal river access facilities exist along the Hutchinson River. Informal areas of access to the waterfront are shown in Figure 2. The two principal areas are near Co-op City North and Co-op City South. At Co-op City North, the section of the River north of Bellamy Loop South is part of the park area for Co-op City North. The park includes walking paths and two ball fields just north of Bellamy Loop North. Although the Hutchinson River is accessible here, bathing or canoe/kayak launching would be difficult due to rip-rap along the shoreline as illustrated in Figure 3a.

Figure 2. Hutchinson River Access Areas

Figure 3a. Hutchinson River Shoreline (Western)

The Hutchinson River is not suitable for bathing and as such there are no NYC Department of Health and Mental Hygiene (DOHMH) certified bathing beaches anywhere within the waterbody. However, because of the parkland partially surrounding the western shoreline of the waterbody, composed primarily of marshlands, there are opportunities for fishing and kayaking (see Figure 3b). There are no areas designated for wading or bathing, although, at a public meeting, comment was provided that at an area upstream of Interstate 95 there have been reported instances of body immersion (Figure 4). Other uses identified by the public included fishing and wading. The bulk of the waterbody is not conducive to primary contact uses.

Figure 3b. Hutchinson River Shoreline (Eastern)

The upper portions of the tidal Hutchinson River within New York City have been highly altered. Over the years the upper portion of the tidal river has been dredged and channelized up to approximately Canal Street in the City of Mt Vernon. In this process, natural occurring wetlands (still observed further downstream in the tidal section of the river) were removed and bulkheads added to stabilize the shoreline and provide access to industrial waterside uses of the land. In that process the tidal river was dredged to allow access to barges and tugs that still access these upper waters north of Interstate 95.

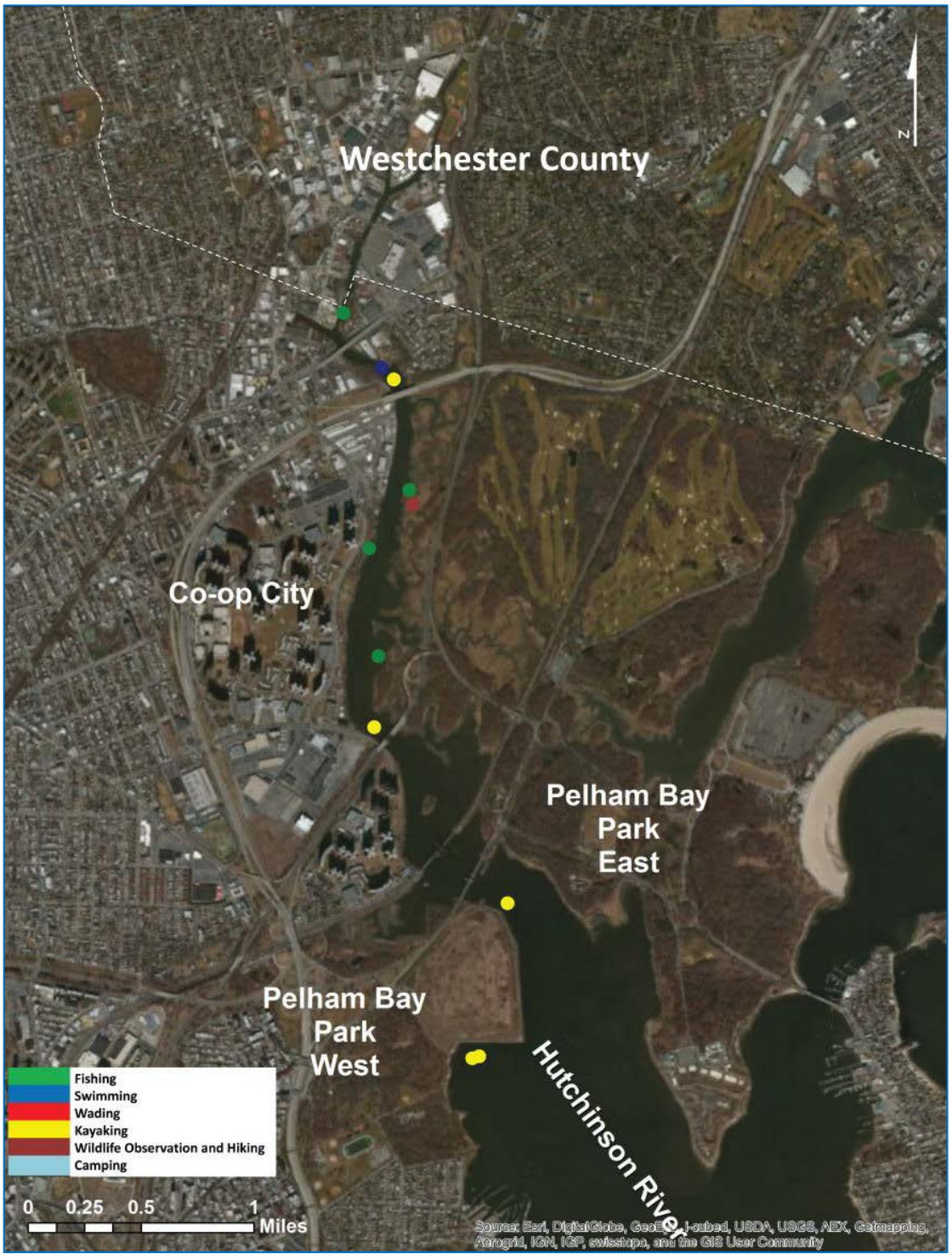


Figure 4. Uses Identified by the Public

ATTAINMENT OF DESIGNATED USES

The tidal or marine portion of the Hutchinson River is a Class SB waterbody. This classification is suitable for primary contact recreation. As noted previously, the Hutchinson River is not suitable for primary contact recreation, and although at the public meeting there were reports of limited full body immersion, primary contact is not a frequent common or supported use.

Water quality modeling and observed data indicate that the existing Class SB bacteria criterion is not being achieved. With respect to the Class SB WQS, the attainment of the fecal coliform numeric criterion throughout the entirety of Hutchinson River is not possible 100 percent of the time primarily due to non-CSO sources of bacteria contamination, namely, the Pelham Lake outflows, direct drainage and urban stormwater. With complete removal of CSOs, attainment is still not possible due to these non-CSO sources of bacteria contamination. The analyses also indicate that the waterbody would not fully attain the SB fecal coliform (monthly median) numeric criteria during the recreational season.

Furthermore, an analysis was conducted during the development of the LTCP to predict the time to recovery in the Hutchinson River following a rain event, an approach consistent with DEC direction. As primary contact uses during the recreational season require attainment a high percent of the time, DEP used a primary contact fecal coliform target of 1,000 counts/100mL from the New York State Department of Health (DOH) guidelines. The result of the analysis is summarized in Section 8 of the Hutchinson River LTCP report. As noted, the duration of time after a rainfall event within which bacteria concentrations are expected to be higher than DOH considers safe for primary contact varies based on the size of the rainfall event. Generally, a value of around 24 hours after rainfall appears to be the length of time for the Hutchinson River waterbody within NYC to recover from the influence of the rainfall.

DEP has been using model projections in various waterbodies and near beaches to assist with advisories that are typically issued twice a day. The time to recovery is essentially the timeline that the waterbody will not support primary contact. It is intended to advise the water users of the potential health risk associated with this use during the recovery period.

CONCLUSIONS

The conclusion drawn from this analysis for fecal coliform and dissolved oxygen are presented below.

Fecal Coliform

The Hutchinson River does not attain existing Class SB WQS based on fecal coliform on an annual or recreational season basis. However, the analyses show that primary contact water quality criteria can be attained throughout portions of the recreational season with the caveat that during and after rain events, bacteria levels will be elevated for a period of time. As indicated by the public, the Hutchinson River is not commonly used for primary contact recreation, so the non-attainment of fishable/swimmable standards during and after rainfall or during the non-recreational season would not significantly impact existing waterbody uses. Non-attainment of primary contact water quality criteria are attributable to the following UAA factors:

- Human caused conditions (direct drainage and urban runoff) create high bacteria levels that prevent the attainment of the use and that cannot be fully remedied for large storms (UAA factor #3).

- Naturally occurring (tidal) low water levels in the receiving water at the majority of the marshland along the eastern shoreline (UAA factor #2).

- Changes to the shoreline to channelize it and protect it created bulkheads and steep rip-rap lined banks limiting access to the Hutchinson River along the majority of the western shoreline (UAA factor #4).

Dissolved Oxygen

The Hutchinson River does not attain the chronic portion of the Class SB dissolved oxygen standard. However, the analyses show that acute dissolved oxygen conditions will be protected against, thereby providing protection of both juvenile and adult fish against severe events such as fish kills. The result of non-attainment of the chronic portion of the standard could be a limitation of the growth of fish. As noted previously, the portion of the river where this limitation would occur has limited access along the shoreline for public fishing as the waterway is generally limited due to private lands or wetlands. In addition, fish are migratory species and spend much of their time out of this zone of the river. As such, the overall public uses associated with recreation should not be harmed by not fully attaining the dissolved oxygen criterion. Non-attainment of the Class SB chronic dissolved oxygen criterion is associated with the following UAA factors.

- Dams, diversions or other types of hydrologic modifications preclude the attainment of the use and it is not feasible to restore the waterbody to its original conditions or to operate such modification in a way that would result in attainment of the use (UAA factor #4).

- Physical conditions related to the natural features of the waterbody, such as the lack of proper substrate, cover, flow, depth, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses (UAA factor #5).

RECOMMENDATIONS

The Hutchinson River does not attain the existing Class SB criterion for fecal coliform bacteria or dissolved oxygen. Protecting primary contact water quality criteria in the Hutchinson River is possible on a limited basis, hence DEP has identified periods after rain events, as set forth below, where wet weather advisory notifications should be considered.

With anticipated reductions in CSO overflows resulting from grey and green infrastructure, the Hutchinson River could be protective of infrequent primary contact during the recreational season should it occur, as long as it did not occur during or following rainfall events. Toward that end, DEP believes that a wet weather advisory would be appropriate for the waterbody:

- 24 hours for rainfall up to 1 inch; and
- 36 hours for rainfall greater than 1 inch.