SUPREME COURT OF THE STATE OF NEW YORK
COUNTY OF NEW YORK

In the Matter of the Application of	:	
	:	
NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION, CARTER H. STRICKLAND, as Commissioner of the New York City Department of Environmental Protection, and THE CITY OF NEW YORK,	:	
	:	
Petitioners,	:	
	:	No. 400236-2014
for a Judgment Pursuant to Article 78 of the Civil Practice Law and Rules and CPLR Section 3001	:	AFFIDAVIT OF LINDA ALLEN, PH.D.
against	:	
	:	
JOSEPH J. MARTENS, as Commissioners of the New York State Department of Environmental Conservation, and the NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION,	:	
	:	
Respondents.	:	

State of New York)
) ss:
County of Albany)

Linda Allen, being duly sworn, deposes and says:

1. I am employed by the New England Interstate Water Pollution Commission as an Environmental Engineer 3. I am currently assigned to work at respondent New York State Department of Environmental Conservation (collectively with respondent Joseph Martens, "DEC"), within the Division of Water, New York City Municipal Compliance Section.

2. At DEC, my position is Project Director for the New York City CSO Program. In this position, I assist DEC with compliance monitoring of the various consent orders regarding combined sewer overflows ("CSOs") between DEC and the New York City Department of Environmental Protection (collectively, the "New York City CSO Consent Orders"). My

position is funded by the New York City Department of Environmental Protection as required under the New York City CSO Consent Orders. I have worked in the New York City CSO Program since March 2009.

3. I have a Bachelor of Science in Mechanical Engineering from Syracuse University, a graduate certificate in G.I.S. and spatial analysis from the State University of New York at Albany, a Master of Science in Environmental Engineering and Master of Business Administration from University of California at Davis, and a Master of Public Affairs and Ph.D. in public policy from Indiana University. I am a registered professional engineer in mechanical engineering and civil engineering, a Project Management Professional, and a Qualified Environmental Professional. I have approximately 25 years of professional work experience, of which 20 years has involved working on environmental issues, in particular water quality management issues.

4. This action concerns the Article 78 challenge by petitioners (collectively, the "City") to DEC's December 12, 2013, determination to disapprove the City's long-term control plan to address CSOs in the Alley Creek and Little Neck Bay watershed (the "Alley Creek plan").

5. I submit this affidavit in support of DEC's response to the amended verified petition and DEC's counterclaims in this action. In this affidavit, I discuss two of the bases for DEC's disapproval: the failure of the Alley Creek plan to consider and adopt a low-cost disinfection alternative for CSO control, and the failure of the Alley Creek plan to adequately characterize and model CSO and other pollutant discharges.

6. I base this affidavit on my personal knowledge from participating in DEC's analysis and decisionmaking regarding the Alley Creek plan, including discussions between

DEC and the City, my professional training and general professional experience, and my review and analysis of the two Alley Creek plans that the City has submitted and other documents and records relating to those plans and the issues they raised.

I. DEC's Determination Regarding Disinfection Alternatives

A. Background

7. Under the 1994 EPA Combined Sewer Overflow (CSO) Control Policy, 59 Fed. Reg. 18,688 (Apr. 19, 1994) (the "CSO Control Policy"), a long-term control plan ("LTCP" or "plan") must be prepared for a waterbody that is impaired by combined sewer overflows. R1517. The CSO Control Policy states that a LTCP should consider "a reasonable range of alternatives." R1518. A reasonable range of alternatives would include, for example, alternatives that reduce the number or volume of CSOs over a range of percentages, from zero all the way up to 100 percent, in order to meet the requirements of the Clean Water Act. R1518.

8. The analysis of control alternatives for an LTCP should also be "sufficient to make a reasonable assessment of costs and performance" using a knee-of-the-curve analysis. R1518. A knee-of-the-curve analysis is a graphical representation of the relationship between a "comprehensive set of reasonable control alternatives . . . to determine where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs." R1519. More informally, a knee-of-the-curve analysis looks to see if there is a natural breakpoint between lower-cost alternatives and higher-cost alternatives for reducing pollution.

9. The City discharges CSOs into Alley Creek and Little Neck Bay. Under the CSO Consent Orders, it was required to prepare an LTCP for these waterbodies and submit it to DEC by June 2013. R1063.

10. In preparing the Alley Creek plan, the City used a three-step process to evaluate and rank control alternatives for their effectiveness in improving water quality. The evaluation and ranking process consisted of the following steps:

- Step 1: Screening of Potential Control Measures
- Step 2: Development and Ranking of Control Measures
- Step 3: Final Evaluation and Selection of Preferred Watershed-Wide Alternative

R0177-R0181.

11. The City first proposed this three-step process during a CSO technical meeting between DEC and the City on January 16, 2013. R0862-R0866. DEC requested additional information to better understand how the process would work in practice. Specifically, DEC requested that the City "provide hypothetical examples for Alley Creek screening alternatives, [a] memo on development of screening process, and [a] follow-up conference call to discuss." R0846.

12. In response to DEC's request, the City provided a list of possible CSO control measures and preliminary Step 2 weighting factors for illustrative purposes on February 13, 2013. R0827-R0845.

13. The City's list of proposed CSO control measures included "Disinfection in Existing CSO Tank." R0831. This measure referred to a CSO retention tank that the City had built. The purpose of the tank is to capture sewage-laden combined sewer flows during rainstorms or other high water flow events instead of discharging those high flows as CSOs. Then, after the storms have passed and the flows in the sewers have returned to a lower level, the contaminated waters stored in the tank can be sent back into the sewers and to the wastewater treatment plant, thus avoiding CSOs.

14. While the retention tank reduced the CSOs, it did not eliminate them. So this "Disinfection in Existing CSO Tank" measure proposed to disinfect any CSOs from the tank. The reason for disinfection of the CSOs is to reduce or eliminate pathogens. Pathogens, as indicated by levels of fecal coliform or enterococci bacteria, are important pollutants. In particular, the level of pathogens in a waterbody is the water quality issue of most concern for evaluating the appropriate degree of human contact use for that waterbody.

15. During a February 14, 2013 CSO technical meeting, DEC approved the use of the three-step process in principle and requested that the City provide the results from the final screening and analysis of control alternatives no later than March 4, 2013. During a meeting on March 4, 2013, however, the City stated that completion of the analysis of alternatives was delayed due to the City updating of its water quality modeling.

16. No further discussions were conducted between DEC and the City on the evaluation and ranking of alternatives until a CSO technical meeting held on June 5, 2013. At this meeting, the City presented a list of control alternatives considered for the Alley Creek LTCP, which included disinfection of the overflow at the Alley Creek CSO retention tank. R0643.

17. The City submitted its first Alley Creek plan on July 2, 2013 (the "July Alley Creek plan"). The July plan included an analysis of a range of control alternatives for reducing CSO overflows or bacterial loads from the overflows. R0526-R0561. The alternatives included disinfection of the overflow at the Alley Creek CSO retention tank; however, this alternative was eliminated at Step 2 of the evaluation process. R0534 (Table 8-6). The City established a ranking system for control alternatives, and selected the five top-ranked alternatives for full consideration in Step 3. But the disinfection alternative was ranked number six, and thus was

right below the City's cutoff for full consideration. R0532-R0533. The Alley Creek plan did not provide any explicit justification for eliminating disinfection or establishing that particular cutoff point. *See* R0532-R0547.

18. DEC submitted formal comments on the Alley Creek plan in a September 12, 2013, letter to the City. In the letter DEC identified the lack of full consideration of disinfection as a control alternative as a major threshold issue. R0368. DEC informed the City that the Alley Creek plan "must consider disinfection of the CSO storage tank overflow under Step 3 of the evaluation." R0369.

19. The City responded to DEC's comments on November 4, 2013, R0303-R0316, and these responses were discussed during a CSO technical meeting held on November 7, 2013, R0263-R0301. The City's responses included an evaluation of two disinfection alternatives through to Step 3: (1) disinfection of the CSO tank overflows with discharge to Alley Creek ("Disinfection Alternative 1"); and (2) disinfection of CSO tank overflows and construction of new sewer main, outfall, and pump station with discharge to Little Neck Bay ("Disinfection Alternative 2"). R0303; R0308-R0310; R0268.

20. According to the City, the consideration of Disinfection Alternative 2 was needed to address the impacts of residual chlorine toxicity on the receiving waters. R0310. Residual chlorine, more technically referred to as total residual chlorine or TRC, is the amount of chlorine that does not dissipate into the air or otherwise get removed from the water after the chlorine is added in the disinfection process.

21. The City rejected the two disinfection alternatives based on several factors:

1. High levels of attainment with existing CSO controls;
2. Negligible improvement in attainment of future WQS;
3. Total residual chlorine (TRC) toxicity and environmental risk; and
4. Difficulties in operation and maintenance of satellite CSO disinfection facilities.

R0305. Based on its analysis, the City concluded that "disinfection is neither an economically viable nor environmentally favorable alternative." R0310.

22. During the November 7, 2013 meeting, DEC told the City that its justifications for rejection of Disinfection Alternative 1 were insufficient. Specifically, with respect to the residual chlorine issue, which the City emphasized as a key issue, DEC told the City that the TRC impacts would be minimal because the CSO discharges from the Alley Creek retention tank that contained the residual chlorine would be short-term and intermittent, and any excursions of the standards could be handled with a waiver or variance.

23. The City submitted a revised Alley Creek plan on November 12, 2013 (the "final Alley Creek plan"). R0005-R0262. The City again considered two disinfection alternatives: (1) disinfection of the CSO tank overflows with discharge to Alley Creek, and (2) disinfection of CSO tank overflows and construction of new sewer main, outfall, and pump station with discharge to Little Neck Bay. R0201-R0205. Disinfection Alternative 1 was not carried through to the end of the Step 3 in the evaluation process whereas Disinfection Alternative 2 was. R0183 (Table 8-6).

24. The estimated construction cost of Disinfection Alternative 1 is approximately $4.1 million. R0207 (Table 8-14, line captioned "Disinfection System PBC"). The estimated construction cost of Disinfection Alternative 2 is approximately $550 million due to the added expense of the new sewer main, outfall, and pump station, which increased the cost of

disinfection by an estimated $523 million. R0207 (Table 8-14, including line captioned "Disinfection System PBC" and line captioned "Effluent PS and FM").

25. In its analysis of the retained alternatives, the City concluded that Disinfection Alternative 2 was not cost-effective for reducing bacterial contamination from CSOs. R0210-R0211.

B. Technical Basis for DEC's Disapproval of the Plan

26. In DEC's December 12, 2013 disapproval of the final Alley Creek plan, DEC stated that the plan did not consider adequate alternatives, "in particular disinfection of the CSO overflow from the retention facility." R0002. DEC found that the City had not "consider[ed] a full range of the feasible disinfection alternatives," including Disinfection Alternative 1, "which would be a much more cost-effective alternative." R0002.

27. DEC has concluded that Disinfection Alternative 1 is a "reasonable control" alternative that the plan should have considered under the 1994 CSO Policy (18693) because that alternative: (1) is technically feasible, (2) is cost-effective, (3) is likely to have minimal adverse environmental impacts, and (4) is likely to significantly reduce bacterial contamination from the remaining CSOs, and such reductions would be instrumental in determining the highest attainable use for Alley Creek.

28. With respect to the technical feasibility of Disinfection Alternative 1, the City's analysis of this alternative in the Alley Creek LTCP confirmed that the existing CSO tank could be easily retrofitted to accommodate chlorination and dechlorination equipment (which was the only disinfection technology considered) and the existing CSO storage tank was adequately sized to allow for sufficient contact time to achieve high rate disinfection. R0194.

29. The installation the disinfection equipment will entail only minor modifications to the CSO tank because retrofitting the tank for disinfection was envisioned when the tank was originally planned and designed in the 1990s.

30. In September 2000, based on earlier planning as well as subsequent analyses, the City committed to construct the retention tank. R1185. The City also made provisions for disinfection in the future, including ensuring that there would be space available for disinfection facilities. R1185, R1204. Thus, the construction of a disinfection system at the retention tank is both technically feasible and consistent with the parties' understandings for over a decade.

31. The technical feasibility of Disinfection Alternative 1 is further supported by the Alley Creek plan, which indicated the operational and maintenance requirements for the disinfection system presented some challenges but the challenges were manageable. R0195.

32. The technical feasibility of Disinfection Alternative 1 is also supported by the fact that disinfection of CSOs is widely practiced, and chlorine disinfection is a standard technology employed by other municipalities. R1287-R1301; R1302-R1311. Lastly, the technical feasibility of Disinfection Alternative 1 is supported by the fact that DEC has required disinfection of CSOs by other municipalities in the state, including most recently by the Albany Pool municipalities in Albany and Rensselaer Counties, NY. R0322.

33. With respect to the cost-effectiveness of Disinfection Alternative 1, I first note that DEC and the City disagree on whether a cost-effectiveness limitation would apply to situations where the waterbody could not attain full fishable/swimmable use pursuant to the Clean Water Act. DEC says that in that situation, municipalities must go beyond cost-effective controls to incrementally improve attainment toward the fishable/swimmable use goals, while the

City contends that municipalities should only be required to select cost-effective controls and need not go beyond them.

34. Nonetheless, even if the City were correct and a cost-effectiveness limitation applied, Disinfection Alternative 1 meets the City's standard as well as DEC's because it is highly cost effective.

35. The final cost-effectiveness analysis (knee-of-the-curve analysis) in the Alley Creek LTCP did not consider Disinfection Alternative 1 even though this alternative would be the most cost-effective given its minimal construction cost ($4.1 million) and its potential to significantly reduce bacterial contamination from the remaining CSOs from the retention tank.

36. However, I have illustrated the cost-effectiveness of Disinfection Alternative 1 in Figure 1 below. I prepared Figure 1 by taking Figure 8-21 from the Alley Creek LTCP, R0211, adding the colored reference to Disinfection Alternatives 1 (red dot within red oval), and highlighting the colored reference to Disinfection Alternative 2 (blue dot within green oval):

37. Under the knee-of-the curve standard, the cost-effectiveness boundary occurs at the point "where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs." R1519. Disinfection Alternative 1 clearly creates such a point, since as Figure 1 indicates, the City would get the same amount of pollution reduction, expressed as "Total Fecal Coliform Annual Loading Reduction (%)," for the $4.1 million Disinfection Alternative 1 as for the $550 million Disinfection Alternative 2.

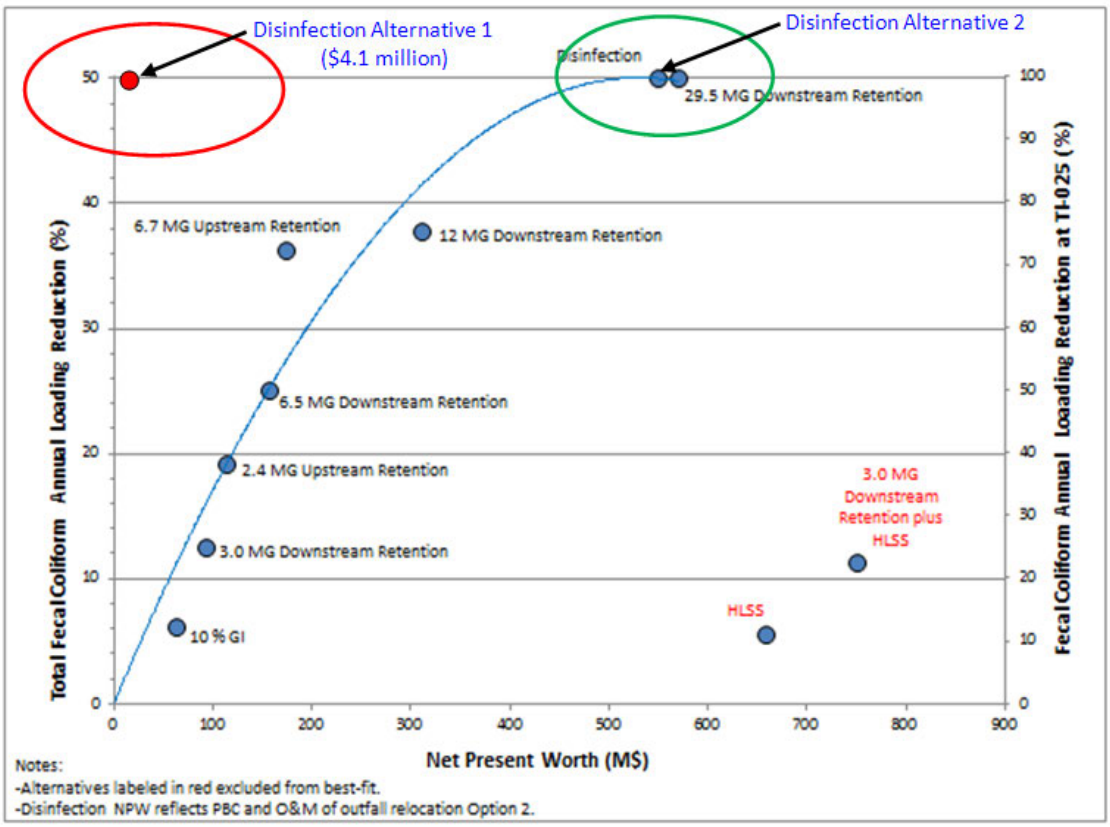

Figure 1: Cost vs. Total Fecal Coliform Loading Reduction (Figure 8-21 as Modified by DEC)

38. For that reason, Disinfection Alternative 1 is highly cost effective relative to Disinfection Alternative 2, as it would produce the same reductions in bacterial contamination to Alley Creek as Disinfection Alternative 2, but at less than 1 percent of the cost.

39. With respect to the potential for Disinfection Alternative 1 to have adverse environmental impacts, the City correctly noted that the use of chlorination for disinfection may result in residual chlorine levels that could be toxic to aquatic species. R0201.

40. Chlorination is a very common and effective technology used for disinfection. But there is a need to control the residual chlorine levels in the discharged water, if the discharge is to a waterbody that supports aquatic life, because chlorine can be toxic to some aquatic species.

41. To minimize adverse impacts to aquatic species, DEC applies certain acute, or short lived (13.0 ug/L), and chronic (7.5 ug/L) TRC toxicity criteria established by the U.S. Environmental Protection Agency. R1615.

42. The City based its decision not to select disinfection in the final Alley Creek plan based on application of both toxicity criteria, but that was an error, because the chronic standard would not be applicable to the CSO discharges. As DEC explained at the November 7, 2013 CSO technical meeting, the TRC toxicity criteria were developed for continuous discharges to receiving waters from wastewater treatment plants, while the retention tank overflows would be short-term, intermittent discharges. As such, the chronic TRC criterion would not apply to the CSO tank overflows, only the acute criterion.

43. Based on the available analyses in the Alley Creek LTCP, DEC estimates that acute impacts from chlorination will likely be minimal given that disinfection will be intermittent, of short duration, and conducted only during the recreational season, which DEC considers to be from May 1 to October 31.

44. Disinfection would only occur when the CSO storage tank overflows, which is typically when there is an intense or long-duration rainfall event. The number of CSO tank overflows will vary by year depending on the actual precipitation, but for illustrative purposes, in 2012, there were 125 rainfall events and the Alley Creek CSO tank overflowed 25 times. R0115-R0118. Of these 25 overflow events, 16 overflows occurred during the recreational season, and the estimated total duration of the overflows was 163 hours, which is less than four (4) percent of the total hours for the recreation season (calculated based on data from R0116-R0117 (Table 4-2)). The duration of the overflow ranged from 6 hours to 20 hours for individual

rainfall events (calculated based on data from R0116-R0117 (Table 4-2). Disinfection, and any problems with limited chlorine, would be thus limited to a small percentage of time.

45. The City's analysis also indicated that there would be some occasions when the TRC levels would exceed the EPA acute standard, but those exceedances would be very limited in area and in time. R0201-R0202.

46. To address this limited water quality issues, DEC informed the City during the November 7, 2013 CSO technical meeting that DEC would consider a variance for the acute residual chlorine water quality standard. Pursuant to 6 N.Y.C.R.R. § 702.17, DEC may grant such variances under certain circumstances to provide regulatory relief to a permittee. Thus, while further analyses of the potential impacts of TRC on aquatic species would be needed to determine an optimal level of chlorination before issuing a waiver, these impacts would not preclude use of chlorination for disinfecting the CSO tank overflows taking into consideration the available information from the Alley Creek LTCP and the regulatory authority available to DEC.

47. In light of the factors discussed above, Disinfection Alternative 1 is a reasonable, very cost-effective alternative available to reduce bacterial contamination in Alley Creek from CSOs. As such, the City should have considered it in evaluating whether Alley Creek could reach full fishable/swimmable use or if not, in evaluating what the highest attainable use for the creek is. Because the City did not fully consider that alternative, let alone select it, DEC's rejection of the plan for that reason was rational.

II. DEC's Determination Regarding Characterization and Modeling

A. Background

48. Under the CSO Control Policy, the permittee must develop "a thorough understanding of [the] sewer system, the response of the system to various precipitation events, the characteristics of the overflows, and the water quality impacts that result from CSOs." R1517. Adequate characterizations of the CSOs and other pollution sources is necessary to understand "their water quality impacts and to facilitate evaluation of control plan alternatives." R1518.

49. Towards that end, the permittee must:

> adequately characterize through monitoring, modeling, and other means as appropriate, for a range of storm events, the response of its sewer system to wet weather events including the number, location and frequency of CSOs, volume, concentration and mass of pollutants discharged and the impacts of the CSOs on the receiving waters and their designated uses. The permittee may need to consider information on the *contribution and importance of other pollution sources* in order to develop a final plan.

R1517 (emphasis added).

50. The City routinely undertakes both long-term and short-term water quality monitoring to assess water quality as well as characterize the impacts of CSOs and other pollutant loads to waterbodies under its jurisdiction. *See, e.g.*, R1748-R1787. The water quality sampling data are used for a variety of purposes including calibration and validation of the models used to develop LTCPs. *See, e.g.*, R0971-R0979.

51. The City uses two computer models for evaluating CSO control alternatives for LTCPs. The City uses a hydrologic/hydraulic model to represent the rainfall and the stormwater runoff from the City's land surfaces into the sewer system and a water quality model to represent the impacts of the polluted water discharges from the combined sewer system into a waterbody.

Combined, these two models are used to project the effects of a particular CSO abatement project on ambient water quality.

52. Adequate calibration and validation are critical to ensuring the reasonableness of the model projections. The City calibrates the models using a variety of data, including flow data from the City's combined sewer system; water quality data from the City's combined sewer system and other possible sources of pollutants, such as stormwater; and ambient water quality data from the waterbody receiving the pollution discharges. R0787-R0807.

53. In earlier years up to 2012, the City had previously collected data for calibration and validation of the model, but more current data were needed for preparation of the Alley Creek plan to ensure the model reflected the current configuration and performance of the combined sewer system and the current water quality conditions of the waterbodies.

54. Thus, from November 2012 to January 2013, the City completed a short-term, intensive water quality sampling program in Alley Creek and Little Neck Bay to better characterize the ambient water quality and sources of pollutant load for these two waterbodies. R0664. The sampling program included ambient water quality sampling in Alley Creek and Little Neck Bay as well as point discharge sampling at CSO and stormwater outfalls and runoff samples at a private community beach on Little Neck Bay. R0933; R0941-R0942. The City used the data collected to recalibrate and revalidate the two computer models used in preparation of the Alley Creek plan.

55. On January 16, 2013, the City provided the preliminary sampling data from the November 2012 to January 2013 sampling effort to DEC during a CSO technical meeting. R0847-R0883.

56. The data included results relating to two pathogen-related indicators, fecal coliform and enterococci. The data indicated levels of fecal coliform comparable to historical levels for Alley Creek and Little Neck Bay, but very high levels of enterococci for Alley Creek. R0847-R0883.

57. By way of attempting to explain the high enterococci levels, the City stated during the January 16, 2013 meeting that it had identified some illicit connections in one of the separate storm sewer outfalls that drained to Alley Creek, TI-024, but that the City had abated those connections as of January 2013. R0671The City also stated that there appeared to be leaking septic tanks near the private community beach. R0664, R0679.

58. Given the presence of non-CSO sources of bacterial contamination, the City committed during the January 16, 2013 meeting to review water quality data for Alley Creek and Little Neck Bay and determine if additional sampling was needed to confirm the presence of other sources of pollutants.

59. On March 20, 2013, the City transmitted the final water quality sampling results in a draft report. R0662-R0777. The sampling results were also presented at CSO technical meetings held on June 5, 2013. R0632-R0649.

60. After recalibrating and revalidating the two models using these data, the City evaluated a series of alternatives using the models and presented the results during a CSO technical meeting on June 17, 2013. R0595-R0631. At the June 17, 2013 meeting, after reviewing the results of the model, DEC questioned the comprehensiveness of the sampling data and requested that the City confirm if there were dry weather discharges into Oakland Lake, which drains into Alley Creek, or commit to identify illicit discharges to Oakland Lake.

61. After the City submitted the July Alley Creek plan, DEC provided formal comments on that plan's characterization and modeling analyses in DEC's September 12, 2013 letter to the City regarding the plan. Referring to the issue of illicit connections, DEC stated that "it is not clear in the LTCP if the projected attainment levels are based on anticipated abatement of the dry weather sources." R0369. DEC also requested that the City provide "additional information on the characterization of these sources and clarify whether the attainment levels presented in the LTCP are based on abatement of all dry weather sources." R0369.

62. DEC based these comments and requests on several inconsistencies in the data presented in the July Alley Creek plan:

> It appears that the projected attainment levels for the alternatives are based on the anticipated abatement of the dry weather sources in the upper Alley Creek, and if this is the case, then it should be clearly stated. Specifically, in Section 2, Table 2-7, the City presented the loading characteristics for the upper Alley Creek sources but in Section 6.2, the City states in that localized sources of non-CSO contamination are assumed to be mitigated for the DMA area and that possible sources of contaminated stormwater into Oakland Lake and other tributaries (e.g. Duck Pond) will be tracked down and eliminated. However, Table 6-1 presents the same pollutant loadings for these sources as was presented for calibration of the model in Section 2. Thus, it appears that the pathogen loadings from these dry weather sources have not been removed for the baseline conditions even though the pathogen loadings presented in Tables 6-3 and 6-4 are very low. The City must provide additional information on the characterization of the dry weather sources, in particular Oakland Lake and Duck Pond, and clarify whether the attainment levels presented in Section 8 of the LTCP are based on abatement of all dry weather sources.

R0372.

63. In addition, with regard to the volumes of retained and discharged water in the retention tank, DEC identified noticeable discrepancies between the recorded data and the volumes calculated in the City's modeling. R0373. DEC also noted inconsistencies in the pollution loadings from a CSO outfall to Alley Creek and a stormwater outfall to the Creek. R0374.

64. DEC made these comments and requests because the lack of clarity in the underlying assumptions, and the discrepancies in the data used, in the City's modeling and the plan more generally raised questions about the adequacy of those assumptions, data and modeling for understanding the water quality and pollution flows in Alley Creek that the plan was intended to address.

65. In its November 4, 2013 response to DEC's comments, the City committed to conducting additional sampling to characterize "the sources of bacteria pollution into Oakland Lake and the Duck Pond." R0314. The City also agreed that it would undertake sampling "of the distinct point discharge locations of the two waterbodies and determination of the sources of dry-weather bacterial loadings." R0314.

66. During the November 7, 2013 CSO technical meeting, DEC and the City further discussed these issues. DEC brought to the City's attention the presence of high levels of fecal coliform in Alley Creek data from more recent sampling under the City's Harbor Survey program, R1655-R1679, which further called into question the adequacy of the model calibration and validation, because the model had projected much lower levels of fecal coliform.

67. In light of these Harbor Survey data, the City committed to "conduct further trackdown for illicit discharges to Alley Creek." R0302.

B. Technical Basis for DEC's Disapproval of the Plan

68. As noted above, under the CSO Control Policy, the City was required to "adequately characterize through monitoring, modeling, and other means as appropriate . . . the response of its sewer system to wet weather events including the number, location and frequency of CSOs, volume, concentration and mass of pollutants discharged and the impacts of the CSOs on the receiving waters and their designated uses." R1517. The City should also have

considered "information on the contribution and importance of other pollution sources," R1517, in developing the Alley Creek plan.

69. These requirements are key. Accurately characterizing the City's combined sewer system, the sources of impairment, and the impact of CSOs and other pollutant sources on the receiving waters is of critical importance to developing a control plan for CSO discharges.

70. Accuracy is so important because the characterization is one of the key bases for the analyses of CSO control alternatives, and the data serves as a key input for the computer modeling used to make projections the impacts of a particular CSO abatement project on ambient water quality. Without accurate characterization and modeling, there is no way to reasonably evaluate what the fundamental pollution issues are or how effective various CSO controls might be in addressing those issues.

71. In its December 12, 2013 letter, DEC disapproved the final Alley Creek plan for failure to meet these requirements. DEC stated that "the City still has not adequately characterized sources of impairment," noting in particular that "[t]here are significant discrepancies between the 2013 Harbor Survey water quality monitoring results and other field sampling the City has conducted and the water quality model estimates presented in the revised LTCP." R0002. DEC also stated that the "City has not completed an adequate track-down of illicit discharges . . . and as a result, it has not completed an adequate waste load analysis under the LTCP. These shortcomings directly undermine the Department's confidence in the analyses presented in the LTCP." R0002-R0003.

72. Although DEC based its disapproval on its own analysis of the discrepancies between the actual data and the modeling results, and other inadequacies in the characterization

analysis, the fact that the City repeatedly agreed that it needed to do further work regarding characterization confirms the reasonableness of DEC's conclusion.

73. As noted above, at the CSO technical meeting held on January 16, 2013, the City agreed to review water quality data for Alley Creek and Little Neck Bay and determine if additional sampling was needed in light of concerns that DEC raised over the adequacy of the characterization. In its November 4, 2013 response letter, the City similarly acknowledged the need for further characterization of sources of impairment. R0314.

74. A further example of the City's inadequate responses to DEC's comments on the July Alley Creek plan relates to DEC's concern that there was a discrepancy between the recorded data and the modeled data for the volumes of the water retained and discharged from the retention tank. In response, the City did not attempt to recalibrate the modeling so that the modeling approximated the recorded data. Instead, the City just deleted the modeling results from the final Alley Creek plan. *Compare* R0476 (July plan Table 4-1) *with* R0116 (final plan Table 4-1).

75. While as a practical matter it may not be possible to have absolute and complete characterization of a combined sewer system and sources of impairment, the characterization in a long-term control plan should present a reasonable and fairly accurate representation of the actual combined sewer system and other sources of pollution and their impacts on the receiving water. DEC highlighted numerous data discrepancies that indicate that the models did not provide that.

76. Based on these discrepancies, DEC reasonably disapproved the final Alley Creek plan on the ground that it did not adequately characterize the pollutant loadings to Alley Creek or

demonstrated the reliability of its modeling of the combined sewer system or other sources of pollution to the creek.

/s/ Linda Allen
Linda Allen

Affirmed under penalty of perjury, this
this 12th day of June, 2014

Michelle Jenkins
NOTARY PUBLIC