

# City of New York

## OFFICE OF THE COMPTROLLER

Scott M. Stringer  
COMPTROLLER



## FINANCIAL AUDIT

**Marjorie Landa**

Deputy Comptroller for Audit

Audit Report on the Department of  
Design and Construction's Oversight of  
Maintenance of Rain Gardens during  
the Guarantee Periods

SE20-101A

December 22, 2021

<http://comptroller.nyc.gov>



THE CITY OF NEW YORK  
OFFICE OF THE COMPTROLLER  
SCOTT M. STRINGER

December 22, 2021

To the Residents of the City of New York:

My office audited the New York City (NYC) Department of Design and Construction's (DDC's) oversight of newly constructed rain gardens to determine whether DDC ensured that they were properly maintained during contractual guarantee periods. We perform audits such as these to help ensure that government operations are effectively managed and to identify and prevent potential waste of public funds and other assets.

The audit found three broad deficiencies in DDC's performance: (1) failure to enforce contractual maintenance requirements for the full duration of the applicable guarantee periods; (2) ineffective oversight of contractors' maintenance of the rain gardens; and (3) weaknesses in managing and following-up on consultants' inspections of the rain gardens. Improvements in DDC's performance are needed to enable the City to reduce Combined Sewer Overflows (CSOs) into its waterbodies cost-effectively, under its Green Infrastructure Plan, while delivering related benefits to its neighborhoods and residents.

Specifically, the audit found that DDC shortened, eliminated, or otherwise failed to enforce contractual guarantees for the rain gardens it developed, thereby waiving associated maintenance work valued at \$608,000 to \$821,000 for which the City had already paid and shifting those expenses and associated risks from DDC's construction contractors to the City. Weaknesses in DDC's oversight put rain-garden landscaping valued at \$6.8 million at risk and may have reduced the rain gardens' functionality.

The audit also found that DDC did not ensure that its third-party consultants properly inspected and documented the condition of their assigned rain gardens. Moreover, DDC did not sufficiently follow up on the inspection reports its consultants provided to ensure that the maintenance problems they identified were addressed.

To address these issues, the audit recommends 19 measures to DDC. They include ensuring that DDC's contractors complete their maintenance obligations; itemizing guarantee period maintenance as a separate cost item to enable the City to deduct the value of omitted maintenance work from its contract payments; establishing and enforcing record keeping requirements for DDC's third-party consultants; and ensuring that DDC consistently reviews its consultants' inspection reports and requires its construction contractors to correct the maintenance problems they identify.

The results of the audit have been discussed with DDC officials, and their comments have been considered in preparing this report. Their complete written response is attached to this report. If you have any questions concerning this report, please e-mail my Audit Bureau at [audit@comptroller.nyc.gov](mailto:audit@comptroller.nyc.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Scott M. Stringer".

Scott M. Stringer

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# THE CITY OF NEW YORK OFFICE OF THE COMPTROLLER AUDITS AND SPECIAL REPORTS

## Audit Report on the Department of Design and Construction's Oversight of Maintenance of Rain Gardens during the Guarantee Periods

SE20-101A

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### EXECUTIVE SUMMARY

The New York City (the City) Department of Design and Construction (DDC) contracts for the construction of rain gardens as part of the City's Green Infrastructure (GI) Plan. Under the GI Plan, the New York City Department of Environmental Protection (DEP) is charged with leading a citywide effort to reduce combined sewer overflows (CSOs) into New York Harbor and other waterbodies.

Rain gardens reduce the amount of stormwater going to the City's wastewater treatment plants during heavy rains by absorbing rainwater into their plant beds and the ground below. They thereby help reduce the CSOs that enter the local waterbodies. Rain gardens need regular maintenance to ensure that they function properly and retain their appearance. Since the GI Plan's inception up to early 2020, the City has spent \$800 million in connection with it, and an additional \$850 million is budgeted for the program through Fiscal Year 2030. Rain gardens are one component of the GI Plan.

DDC is responsible for administering its construction contracts, including for rain gardens, to ensure that the City receives full value for its contract spending. After each rain garden's installation, the construction contractor is responsible for maintaining its trees, landscaping, and hardscape<sup>1</sup> during contractually stipulated guarantee periods of 18 and 24 months to ensure the trees and landscaping become established and that the rain garden functions as intended and retains its appearance.<sup>2</sup> This audit focused on DDC's oversight of its construction contractors' maintenance of 545 rain gardens during the applicable guarantee periods.

During our audit scope, DDC used two different processes for overseeing the rain gardens' contractually required maintenance. For 233 of the 545 rain gardens this audit covered (43 percent) DDC relied on its contracted Resident Engineer Inspection (REI) consultants who oversaw the rain gardens' construction to oversee the construction contractors' performance of their maintenance obligations. The REI consultants reported to DDC's in-house Engineers in Charge (EICs). DDC's EICs in turn were responsible for managing follow-up activities, including coordinating with construction contractors and with other City agencies to address maintenance issues the REI

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<sup>1</sup> "Hardscape" items include sidewalks, curbs and tree guards surrounding a rain garden.

<sup>2</sup> The guarantee periods are 24 months for planted trees and 18 months for landscape and hardscape.

consultants identified. In addition, starting in October 2019, DDC instituted a pilot program to improve oversight of rain garden maintenance by issuing Green Infrastructure Monitor (GIM) tasks to GIM consultants that was utilized with the remaining 312 rain gardens in our audit. DDC oversaw the GIM consultants' work by having them report to DDC's Design Project Managers, who in turn reported deficiencies to the EICs.

DEP assists DDC with oversight and management of various milestones in the construction of rain gardens. According to DDC, DEP frequently takes ownership and control of rain gardens prior to the end of their contract guarantee periods, effectively releasing the construction contractors from their contractual maintenance responsibilities and, in practice, ending DDC's oversight of those rain gardens' contractual maintenance.

This audit reviewed DDC's oversight of the maintenance of 545 rain gardens that were under contract guarantee—and therefore subject to contractual maintenance provisions—during Fiscal Years (FYs) 2020 and 2021 as of July 24, 2020. The average cost to DDC for construction of a rain garden was approximately \$44,600, totaling \$24.3 million for the 545 rain gardens. According to DDC, the landscape portion of a rain garden's construction, which includes engineered soil, plantings, and trees, can cost between \$10,000 to \$15,000 per site—about  $\frac{1}{4}$  to  $\frac{1}{3}$  of their cost—totaling between \$5.5 and \$8.2 million for the 545 rain gardens this audit covered. We determined the value of contractual maintenance for those rain gardens to be between \$800,000 and \$1.1 million. DDC also spent \$114,000 for its GIM consultants to inspect some of the rain gardens.

## Audit Findings and Conclusion

Our audit found deficiencies in DDC's oversight of rain garden maintenance during the contractual guarantee periods. Specifically, we found that DDC needs to improve its performance in three respects: (1) enforcement of contract requirements for the full duration of the guarantee periods; (2) oversight of contractors' performance of the required maintenance work; and (3) management of, and follow-up on, the inspections by the consultants DDC retains to oversee the rain gardens' maintenance. Those improvements by DDC could help the City better attain the goals set forth in the GI Plan, specifically, reducing CSOs in the City's waterbodies in a cost-effective way, while also benefiting the City's neighborhoods and residents through the construction of rain gardens. We determined that although DDC took certain steps to improve its oversight of the rain gardens' maintenance while the audit was in process, its efforts were inconsistent, which diminished their effectiveness.

In particular, our audit found that:

- The contractual guarantee periods for DDC's rain gardens were shortened, eliminated, or otherwise not enforced, which resulted in the waiver of maintenance work that had already been paid for valued between \$608,000 to \$821,000;
- DDC's records were inconsistent in reflecting the start dates of the contractual guarantee periods, which potentially shortened those periods and made the start dates for DDC's responsibility to oversee the rain gardens' maintenance unclear, including during critical periods when their most recent plantings particularly required such maintenance;
- DDC did not ensure that its consultants performed the required number of inspections during the shortened timeframes in which DDC remained responsible for overseeing the rain gardens' maintenance;

- DDC did not require its REI consultants to maintain appropriate records of their oversight of the maintenance of the 233 rain gardens assigned to them during the audit period (43 percent of the 545 rain gardens this audit covered);
- DDC did not ensure that its GIM consultants who were responsible for 312 of the rain gardens covered by our audit consistently provided complete and accurate inspection reports based on the checklists DDC directed them to use; and
- DDC did not sufficiently follow up on the inspection reports its GIM consultants provided to ensure that deficiencies in the rain gardens were addressed during the periods in which DDC remained responsible for their oversight.

## Audit Recommendations

This report recommends 19 measures to DDC to address the findings of this audit, including that DDC:

- Ensure that construction contractors perform their contractual tree planting and landscaping guarantees and maintenance responsibilities for rain gardens throughout the contractual guarantee periods.
- Coordinate with DEP to ensure that DDC transfers the rain gardens it develops to DEP only after the construction contractors satisfactorily complete their maintenance responsibilities throughout the contractual guarantee periods.
- Itemize guarantee period maintenance as a separate bid item and a performance pay item in DDC's contracts and revise the contract terms to provide that the City can obtain a credit in any instance in which the contractor does not perform its maintenance obligations during that period, including but not limited to cases where another City agency assumes that responsibility.
- Accurately track planting dates for all rain gardens to ensure proper maintenance of the rain gardens and the plants they contain.
- Establish and enforce record-keeping requirements for the proper oversight of rain garden maintenance throughout the relevant guarantee periods.
- Designate and require Design Project Managers/EICs or other qualified DDC staff to review GIM consultants' inspection reports, including photographs, regularly to determine whether they (a) are complete and internally consistent, and (b) properly document all unsatisfactory conditions requiring correction by the construction contractors.
- Ensure that all GIM consultants prepare the inspection reports in accordance with the format specified in the task orders and that they contain all information necessary to facilitate proper oversight and timely follow-up.
- Ensure that DDC's designated EICs or other qualified staff regularly follow up with construction contractors to remedy deficient conditions promptly and maintain documentation in the relevant project files reflecting all pertinent communications and any follow-up and corrective action taken.
- Develop and distribute policies and procedures for oversight of rain gardens during the guarantee periods that detail Design Project Managers', EICs', and consultants' oversight responsibilities, including for maintaining documentation of all actions taken that bear on DDC's enforcement of the pertinent construction and oversight contracts.

## Agency Response

In its response, DDC did not explicitly state whether it agreed with or disagreed with any of the 19 audit recommendations. However, DDC stated that 12 of the 19 recommendations were “already in place.” Based on our review of DDC’s written responses, it appears that out of the remaining seven recommendations, DDC agreed with five (#s 10, 14, 17, 18, and 19), disagreed with one (#3), and is taking one under consideration (#4).

DDC’s comments on the recommendations are further discussed in the Discussion of Audit Results section of this report.

# AUDIT REPORT

## Background

Rain gardens are landscaped depressions designed with a layer of engineered soil that can hold a large volume of water and absorb stormwater runoff into the underlying soil as the plants and soil naturally help remove pollutants from the runoff. We conducted this audit to determine whether DDC ensured that the rain gardens it developed for the City were properly maintained after installation as specified in DDC's contracts with private construction companies for their installation.

DDC contracts for construction of rain gardens as part of the City's GI Plan.<sup>3</sup> Under that plan, the DEP is charged with leading a citywide effort to reduce CSOs into New York Harbor and other waterbodies. DDC's rain gardens are designed in consultation with DEP to help the City meet the GI Plan's commitment to control stormwater runoff from 10 percent of the City's impervious surfaces. Since its inception, up to early 2020, the City has spent \$800 million for the GI Plan, and an additional \$850 million is budgeted through Fiscal Year 2030.

For the most part, the City is served by a combined sewer system in which both stormwater and wastewater flow through the same pipes. The City's wastewater treatment plants treat and disinfect the wastewater. However, during heavy storms, the volume of water can exceed the City's wastewater treatment plants' capacity and potentially damage the equipment. To prevent such damage, when the volume of water exceeds the City's wastewater treatment plants' capacity, a CSO is released into the City's surrounding waterbodies. CSO events can create unhealthy conditions in the surrounding waterbodies and pose risks to human health and aquatic habitats.<sup>4</sup>

DDC and other City agencies, in partnership with DEP design, construct, and maintain a variety of sustainable green infrastructure systems and components, including rain gardens and green roofs, on City-owned property such as streets, sidewalks, schools, and public housing.<sup>5</sup> These structures and devices help the City manage stormwater. Although the GI Plan's primary goal is the cost-effective reduction of CSOs into waterbodies surrounding the City, GI projects are also designed to provide community and environmental benefits to the City's neighborhoods and residents. These "co-benefits" include increased urban greening, urban heat island reduction, improved air quality, and habitat for birds and pollinators around the City.

### How Rain Gardens Work and Their Benefits

Rain gardens reduce the amount of stormwater going to the City's wastewater treatment plants during heavy rains by absorbing rainwater into their plant beds, and thereby reduce the amount of CSOs that enter the local waterbodies. Rain gardens need regular maintenance to ensure that they are functioning properly to effectively capture stormwater runoff and to retain their appearance.

A typical rain garden (15' long, 5' wide, and 4.5' deep) will hold on average over 1,600 gallons of rainwater, the equivalent of about 40 bathtubs.<sup>6</sup> See *Appendix I* for DEP standard design for a 15'x5'

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<sup>3</sup> The GI Plan, issued in 2010, is a component of the City's response to an Order on Consent that it entered into with the New York State Department of Environmental Conservation (NYSDEC) in 2005 in connection with litigation that, among other things, required the City to reduce CSOs. The 2005 Order has been modified several times since then.

<sup>4</sup> Additional information can be found on DEP's website. See: *Combined Sewer Overflows*, <https://www1.nyc.gov/site/dep/water/combined-sewer-overflows.page>, and *Waterbody Advisories*, <https://www1.nyc.gov/site/dep/water/waterbody-advisories.page> (accessed May 13, 2021).

<sup>5</sup> Other City agencies include the Department of Transportation and the Department of Parks and Recreation.

<sup>6</sup> The reported capacity of the 15'x5' standard rain garden is 225 Cubic Feet or 1683 gallons. A standard bathtub holds 42 gallons. Therefore, a standard rain garden can hold the equivalent of about 40 bathtubs (1683/42 = 40).



Type 2 rain garden. See below for a rendering of how a curbside rain garden functions and a photograph of rain gardens in Rego Park (Queens) DEP posted on its website.

### GREEN INFRASTRUCTURE RAIN GARDEN RENDERING



## Rain Garden Construction Guarantee and Maintenance Requirements

This audit focuses on DDC's oversight of the maintenance of rain gardens by construction contractors for the periods specified by their contracts during which they are responsible for guaranteeing their work, and for maintaining the rain gardens. The contractually mandated guarantee periods generally spanned 18 to 24 months, as stipulated in the individual contracts, including, specifically:

- A 24-month tree planting guarantee period.
- An 18-month landscaping and hardscaping guarantee period.
- A 24-month maintenance guarantee period (including during the winter months, November-April) for horticultural and green infrastructure maintenance, including a total of 54 waterings.<sup>7</sup>

The horticultural and green infrastructure maintenance typically involves a minimum of work once per month and as needed following significant rainfall events. Proper maintenance of rain gardens should ensure that their plantings are established, that the rain gardens function as intended, and that they provide their intended community and environmental benefits to the City's neighborhoods and residents.

In two prior audits the Comptroller's Office found that rain gardens constructed under the GI Program were not properly maintained by DEP and the City Department of Parks and Recreation (DPR), respectively.<sup>8</sup>

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<sup>7</sup> *Horticultural Maintenance* consists of weeding, removal of litter and general maintenance and replacement of plant material. *Green Infrastructure Maintenance* consists of cleaning out and disposal of sediment from inlet and outlet structures and weep holes (if any) to allow water to move freely in and out of the site.

<sup>8</sup> *Audit Report on the Department of Environmental Protection's Maintenance of Rain Gardens* (Audit # SE18-086A), issued December 16, 2019; and *Audit Report on the Department of Parks and Recreation's Oversight of Construction Management Consultants* (Audit #SE16-062A), issued on June 15, 2018.

## DDC Oversight Structure

The audit scope includes all DDC-built rain gardens that were under contract guarantee during FYs 2020 and 2021 (July 1, 2019-June 30, 2020 and July 1, 2020-June 30, 2021) as of July 24, 2020, a total of 545 rain gardens. During our audit scope, DDC relied on two different processes for overseeing the rain gardens' maintenance. First, DDC oversaw the maintenance of 233 (43 percent) of the rain gardens through contracts with REI consultants who reported to DDC's in-house EICs. DDC's EICs in turn were responsible for managing follow-up activities, including coordinating with construction contractors and with other City agencies to address maintenance issues the REI consultants identified at rain garden sites. In addition, starting in October 2019, DDC instituted a pilot program to improve rain garden maintenance oversight by issuing GIM tasks to GIM consultants, which was utilized for the remaining 312 rain gardens included in the audit.<sup>9</sup> These task orders specify the scope of work required of the GIM consultants and generally included (1) an initial inspection, also known as the initial inventory, (2) monthly oversight inspections, and (3) an inspection before the end of the guarantee period. DDC oversaw the work of the GIM consultants by having them report to DDC's Design Project Managers who in turn reported deficiencies to the EICs.<sup>10</sup>

DEP assists DDC with oversight and management of various milestones in the construction of rain gardens, particularly during the period between the initial inspections conducted jointly by DDC and DEP, until the contractors' guarantee periods have ended.<sup>11</sup> In accordance with DDC's practice, DEP frequently takes ownership and control of the rain gardens prior to the end of the contractors' guarantee periods at which point the construction contractors are released from their maintenance responsibilities for rain gardens. DDC's responsibility to oversee the rain garden's maintenance also ceases at this time.

DDC data indicated that, as of July 24, 2020, 545 rain gardens were under "guarantee," meaning that the maintenance of their landscaping and hardscaping was the responsibility of individual construction contractors pursuant to the terms of their contracts. The average cost to DDC for construction of a rain garden was approximately \$44,600, totaling \$24.3 million for the 545 rain gardens that were under guarantee as of July 2020. According to DDC, the landscape portion of a rain garden's construction, which includes engineered soil, plantings, and trees, can cost between \$10,000 to \$15,000 per site—about  $\frac{1}{4}$  to  $\frac{1}{3}$  of their total cost—totaling between \$5.5 and \$8.2 million for the 545 above-mentioned rain gardens.

These rain gardens were constructed by three construction contractors in connection with four separate projects; one of the contractors managed two projects under two contracts. For these four projects, DDC retained three GIM consultants and three REI consultants to oversee maintenance of the 545 rain gardens during their guarantee periods. DDC's oversight in connection with all three guarantee periods—for tree planting, landscaping and hardscaping, and maintenance—are considered in this audit.

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<sup>9</sup> Additional contracts were awarded to project designers to act as GIM consultants and oversee guarantee period maintenance by construction contractors. The project designers in turn hired landscape architectural firms as subcontractors to oversee the guarantee maintenance work. Those GIM consultants also provided consulting services during the design phase.

<sup>10</sup> DDC informed us at the exit conference that the Design Project Managers, who manage design consultants, were also involved in GIM oversight.

<sup>11</sup> NYC Department of Parks and Recreation approves tree plantings.

## Objective

To determine whether the Department of Design and Construction (DDC) ensured that rain gardens were properly maintained during the guarantee periods.

## Scope and Methodology Statement

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the audit evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The scope of this audit included rain gardens that were in the guarantee period during FYs 2020 and 2021. Please refer to the Detailed Scope and Methodology at the end of this report for the specific procedures and tests that were conducted.

## Discussion of Audit Results

The matters covered in this report were discussed with DDC officials during and at the conclusion of this audit. A preliminary draft report was sent to DDC and was discussed with DDC officials at an exit conference held on August 20, 2021. On September 23, 2021, we submitted a draft report to DDC with a request for written comments. We received a written response from DDC on October 7, 2021.

In its response, DDC did not explicitly state whether it agreed with or disagreed with any of the 19 audit recommendations. However, DDC stated that 12 of the 19 recommendations (#s 1, 2, 5, 6, 7, 8, 9, 11, 12, 13, 15, and 16) were “already in place.” Based on our review of DDC’s written responses, it appears that out of the remaining 7 recommendations, DDC agreed with five (#s 10, 14, 17, 18, and 19), disagreed with one (#3), and is taking one under consideration (#4).

DDC also referred to its charter mandated responsibilities for capital construction, stating, “DDC is the Capital Construction Agency for the City of New York” and that its responsibility for overseeing maintenance of the 545 rain gardens this audit covered was therefore limited in comparison with that of the other City agencies engaged in these projects. Specifically, DDC stated, “DDC is limited to work that is funded with Capital Funding and that maintenance of the City’s assets falls under the purview of other City agencies such as DEP and DPR and has a different funding source (‘expense funding’).” However, this point is not material to the audit scope and findings which concern DDC’s oversight of their maintenance of the rain gardens only during the specific timeframes established by the agency’s own capital construction contracts, for which DDC was both funded and directly responsible.

In the same vein, DDC implied that several of the audit’s findings were wholly attributable to decisions made by a separate City agency, DEP, for which it bore no responsibility, and that DDC’s ability to implement the audit’s recommendations would continue to be limited by DEP’s decisions. Specifically, DDC stated, “The delineation of scope of work and funding sources is critical here as it pertains to the limits of what DDC can do in relation to the recommendations contained in the Draft Audit.” DDC essentially disavowed responsibility for enforcing provisions in the contracts it (not DEP)

entered into that require DDC's construction contractors to maintain and guarantee their work for specific periods.

In making this argument, DDC disregards the responsibility it has as the City's capital construction agency to require its contractors to perform contractual obligations for which the City, through DDC, is paying them. DDC's neglect of its contract enforcement responsibilities facilitates shifting the associated expense and financial risk from the contractor to the City for contractually required maintenance. Moreover, while DDC asserts that *DEP* determined that the premature transfers of the rain gardens were in the City's best interest, DDC produced no evidence during the audit or in its response to indicate that it informed *DEP*, or that DDC and *DEP* even considered—rather than overlooked—the fact that the premature turnovers resulted in the City's gratuitously absorbing expenses and assuming risks that it had already paid DDC's contractors to bear. In effect, DDC's contractors received a windfall at the City's expense, a consequence that DDC made no known effort to avoid or address. The agency provided no evidence that the costs and benefits of prematurely releasing DDC's contractors were considered in what it claims were *DEP*'s determinations of the City's best interest.

As noted in the audit report, in addition to waiving contractors' maintenance tasks valued at between \$608,000 and \$821,000, DDC's ineffective oversight of the rain gardens it was responsible for put landscaping valued at \$6.8 million at risk of deterioration and may have reduced rain garden functionality. As stated in the Background section of this report, an additional \$850 million is budgeted through Fiscal Year 2030. To protect the City's substantial investment in the Green Infrastructure assets and ensure that the City's expenditures to maintain them produce the intended results, we urge DDC to confront and purposefully address the multiple areas of weakness the audit identified and implement the audit recommendations, regardless of which Green Infrastructure assets it constructs or will construct.

The full text of DDC's response is included as an addendum to this report.

## FINDINGS AND RECOMMENDATIONS

Our audit found deficiencies in DDC's oversight of rain garden maintenance during the contractual guarantee periods. Specifically, we found that DDC needs to improve its performance in three respects: (1) enforcement of contract requirements for the full duration of each of the guarantee periods; (2) oversight of contractors' performance of the required maintenance work; and (3) management of, and follow-up on, the inspections by the consultants DDC retains to oversee the rain gardens' maintenance. Those improvements by DDC could help the City better attain the goals set forth in the GI Plan, specifically, reducing CSOs in the City's waterbodies in a cost-effective way, while also benefiting the City's neighborhoods and residents through the construction of rain gardens. We determined that although DDC took certain steps to improve its oversight of the rain gardens' maintenance while the audit was in process, its efforts were inconsistent which diminished their effectiveness.

In particular, our audit found that:

- The contractual guarantee periods for DDC's rain gardens were shortened, eliminated, or otherwise not enforced, which resulted in the waiver of maintenance work valued between \$608,000 to \$821,000;
- DDC's records were inconsistent in reflecting the start dates of the contractual guarantee periods, which potentially shortened those periods and made the start dates for DDC's responsibility to oversee the rain gardens' maintenance unclear, including during critical periods when their most recent plantings particularly required such maintenance;
- DDC did not ensure that its consultants performed the required number of inspections during the shortened timeframes in which DDC remained responsible for overseeing the rain gardens' maintenance;
- DDC did not require its REI consultants to maintain appropriate records of their oversight of the construction contractors' maintenance of the 233 rain gardens assigned to them during the audit period (43 percent of the 545 rain gardens this audit covered);
- DDC did not ensure that its GIM consultants who were responsible for 312 of the rain gardens covered by our audit consistently provided complete and accurate inspection reports based on the checklists DDC directed them to use; and
- DDC did not sufficiently follow up on the inspection reports its GIM consultants provided to ensure that deficiencies in the rain gardens were addressed during the periods in which DDC remained responsible for their oversight.

Overall, the audit determined that in addition to the waived maintenance valued between \$608,000 and \$821,000, DDC's weak oversight of the rain gardens it constructed put landscaping valued at \$6.8 million at risk of deterioration and reduced rain garden functionality. Additionally, we found that DDC may not have received appropriate value from the \$114,837 it spent on inspection services.

These matters are discussed in greater detail in the following sections of this report.

## DDC Did Not Enforce Contractual Guarantee Periods Resulting in Relinquished Maintenance Valued at up to \$821,000

As noted, DDC's rain garden construction contract Schedule A, *General Conditions to Construction Contract*, Article 24, *Period of Guarantee*, specifies a 24-month guarantee period for tree planting, and an 18-month guarantee period for landscaping and hardscaping. In addition, Section GI-5.09, *Watering and Weeding During Maintenance Period*, of DDC's contracts with its construction contractors stipulates a 24-month guarantee period during which contractors are required to perform a total of 54 waterings as well as horticultural and green infrastructure maintenance, including the winter months (November through April).

However, DDC, following directions from DEP, effectively transferred the contractors' maintenance obligations and the associated costs for the rain gardens to the City when it turned them over to DEP prior to the end of their guarantee periods. Specifically, DDC's rain garden data shows that DDC turned over 195 of the 545 rain gardens (36 percent) that were subject to the 18-month and 24-month maintenance guarantee periods during the audit scope to DEP for management and maintenance *before* those contractual guarantee periods had even begun. For the remaining 350 rain gardens (64 percent), DDC effectively shortened their guarantee periods by *prematurely* transferring full maintenance responsibility to DEP. While the contractors had responsibility for some period of time, we found that, for those 350 rain gardens, 5 contractors had responsibility under the contractual guarantee period for only 7 days, 147 had responsibility under the guarantee period for 7½ months, and 198 had responsibility under the guarantee periods for between 11 and 13 months.

Overall, the guarantee periods—and the associated maintenance obligations of the contractors—averaged 6 months per rain garden rather than the contractually required 24 months.<sup>12</sup> Therefore, on average, DDC did not enforce the contractors' maintenance obligations for 18 of the required 24 months, ¾ of the contractual maintenance guarantee period.

As a result of the premature turnovers of all 545 rain gardens by DDC to DEP, the City paid for work that was not done and thereby lost the value of maintenance services and potentially of some of the plants for which it had paid. The cost of maintaining the rain gardens during the contract guarantee period was included in the overall contract price for the rain gardens' construction and was not itemized in the contracts as a separate expense. Thus, the contracts did not establish a predetermined price for the guarantees and maintenance obligations that DDC could have deducted as a credit against the contract price when it eliminated or shortened the periods in which it required the contractors to maintain the rain gardens. However, we estimate that between \$608,000 and \$821,000 in maintenance services DDC paid to the contractors for these services have been waived.<sup>13</sup>

DDC officials informed us that it is up to DEP, as the lead agency for the GI Plan, to decide when it takes over rain garden maintenance responsibilities from DDC. DDC officials stated that DDC considered DEP's acceptance of a rain garden as the point at which DDC's responsibility for its maintenance ended, without regard to whether the date of DEP's acceptance preceded the end of the contractual guarantee period.

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<sup>12</sup> According to DDC, the contractors are always held responsible for hardscape guarantee for the full 18 months.

<sup>13</sup> We based the maintenance value on the contractually specified 54 watering/maintenance trips and 12 maintenance only (winter) trips over two years. We estimate the total cost to be approximately \$2,000 per rain garden for 66 trips or \$30 per trip per rain garden. Based on these estimates, we calculated the total maintenance value of the contracts to be between \$811,839 and \$1,095,983. Three fourths of those amounts are approximately \$608,000 to \$821,000.

According to DDC, DEP issues acceptance memos in connection with each rain garden project that include the dates it assumed all landscaping maintenance responsibilities. However, even with the turnover of responsibility of the rain gardens to DEP, the contractors remain obligated to provide their 18-month hardscaping guarantees. In addition, these dates were approximately reflected in the minutes of DDC's monthly project progress meetings minutes from September and October 2019, which included approximate schedules for DEP takeovers that had been made known to DDC's construction contractors and DDC's oversight representatives. Although nothing in the records DDC provided shows that the construction contractors were informed in writing that DEP's acceptance of the rain gardens they had constructed relieved them of their contractual maintenance responsibilities, DDC officials acknowledged that was the effect of the transfer of responsibility for the rain gardens to DEP.

In response to questions from the auditors, DDC officials did not provide an explanation for why DEP took over maintenance responsibilities for the rain gardens prior to the end of, and in some instances, before the beginning of, the contractual guarantee periods in our audit scope. Notwithstanding DEP's lead-agency role in implementing the City's GI Plan, DDC, as the contracting agency, was responsible for enforcing the terms of its contracts, including the contractors' maintenance and guarantee obligations.

We note that in addition to the financial cost associated with paying for services the City never received, DDC's waiver of the contractors' maintenance responsibilities and guarantees prematurely shifted the risk—from the contractors to the City—that the rain gardens' plants might not be successfully established and thereby potentially diminished their effectiveness as part of the GI Plan.

Furthermore, as stated earlier in this report, we found in a previous audit that DEP had not properly maintained the majority of the rain gardens for which it was already responsible. Therefore, transferring additional maintenance responsibility for the rain gardens to DEP did not necessarily assure their proper maintenance. If the rain gardens that DDC turned over to DEP prematurely were not properly maintained, the City may incur additional expenses to remediate issues stemming from their inadequate maintenance, which would jeopardize the GI Plan's goals of reducing CSOs in a cost-effective manner while providing additional environmental benefits to its neighborhoods and residents.

## Recommendations

DDC Should:

1. Ensure that construction contractors perform their contractual tree planting and landscaping guarantees and maintenance responsibilities for rain gardens throughout the contractual guarantee periods.

**DDC Response:** "This is already in place. DDC will continue to ensure that contractors perform their contractual tree planting and landscaping guarantees and maintenance responsibilities up until the time the guarantee period ends, or the rain garden is transferred to DEP. DEP, as the owner of the rain garden, in certain instances has determined it is in the best interest to take over tree planting and landscaping guarantees before the end of the contractual guarantee period."

**Auditor Comment:** Although DDC states that this recommendation is already in place, it also states, inconsistently, that DEP has determined that it is in "the best interest" (of an unspecified person or entity) to take over the contractor's obligations before the end of the contractual guarantee period. In effect, by referring to DEP as



the “owner of the rain garden” and implying that DEP is solely responsible for the decisions in question, DDC disregards its responsibility under its contracts and as the City’s capital construction agency to require its contractors to perform contractual obligations for which the City, through DDC, is paying them. By neglecting that responsibility, DDC in effect shifts the associated expense and financial risk from the contractor to the City. We urge DDC to reexamine its position and implement the recommendation.

2. Coordinate with DEP to ensure that DDC transfers the rain gardens it develops to DEP only after the construction contractors satisfactorily complete their maintenance responsibilities throughout the contractual guarantee periods.

**DDC Response** “This is already in place. DDC will continue to coordinate with DEP throughout the life cycle of all green infrastructure projects managed by DDC. If DEP makes an internal judgement that it is in the best interest of the City to take over the maintenance of their asset before the completion of the contractual guarantee period, then it is appropriate for DDC to transfer the rain garden to DEP.”

**Auditor Comment:** The audit found that DDC’s practice of *prematurely* transferring tree planting and landscaping guarantees before the end of the contractual guarantee period resulted in shortened guarantee periods that averaged 6 months per rain garden rather than the contractually required 24 months for which the City has paid. Moreover, while DDC asserts that DEP determined that the premature transfers of the rain gardens were in the City’s best interest, DDC produced no evidence during the audit or in its response that it informed DEP, or that DEP or DDC even considered—rather than overlooked—the fact that the premature turnovers released the contractors from paid maintenance obligations and shifted risk of failure of plantings, soil, and other rain garden components to the City without compensating the City for assuming those expenses and risks. By transferring rain garden maintenance responsibilities to DEP without also transferring responsibility for overseeing the uncompleted contractual maintenance by the construction contractors for the balance of the guarantee and maintenance periods to DEP, DDC will continue to neglect its responsibility to ensure that the City receives appropriate value for the contractual services for which it has paid. We urge DDC to reexamine the finding and implement the recommendation.

3. Alternatively, if a rain garden is transferred to DEP prior to the end of the guarantee period, coordinate with DEP and the contractor to ensure that the contractor’s maintenance responsibilities and guarantees up to the time of transfer have been satisfactorily completed; and that a City agency is designated to be responsible for monitoring the contractor’s performance and enforcing the City’s contractual rights for the balance of the contract.

**DDC Response:** “As explained above in the Response to Recommendation 2, DEP may request that DDC transfer a rain garden asset prior to the end of the contractual guarantee period and DDC will transfer the rain garden when requested by DEP. If a rain garden is transferred to DEP prior to the end of the guarantee period, DDC will continue to coordinate with DEP and the Contractor to ensure the responsibilities and guaranties have been satisfied up to the point of transfer. However, it is important to note that by transferring the greenscape of the rain garden, the responsibilities of the Contractor cease in regard to maintaining the greenscape. The responsibilities

of the Contractor would not cease on the hardscape until the guarantee period concludes. As such, DDC would be responsible for monitoring the contractor's performance and enforcing the City's contractual rights for the entire guarantee period."

**Auditor Comment:** DDC's response disregards the point of the audit recommendation, which is to ensure that the City's contractual rights and the contractor's contractual obligations to maintain and guarantee its work, including the greenscape do **not** merely "cease" when one City agency—DDC—prematurely transfers rain gardens to another City agency—DEP. DDC is responsible for enforcing guarantees for the entire duration of the contractually stipulated 24 months. However, our audit found, and DDC acknowledges, that DDC's practice of prematurely turning over rain gardens to DEP without transferring contractual oversight responsibilities for the balance of the guarantee periods released the contractor of its maintenance obligations. That practice resulted in (1) shortened guarantee periods that averaged 6 months per rain garden rather than the contractually required 24 months; (2) the City's not receiving maintenance valued at up to \$821,000 for which it paid; and (3) placing rain garden landscaping valued at \$6.8 million at risk of deterioration. DDC does not explain in its response why it does not assign its rights to enforcement of the contract (for which the contractor has already been paid) to the City agency to which it is transferring the rain gardens during the contract term.

We again urge DDC to reconsider the recommendation to ensure that the City's contractual rights are enforced throughout the entire guarantee periods, that the City receives appropriate value for the services it has paid for, and that public funds are not wasted.

4. Itemize guarantee period maintenance as a separate bid item and a performance pay item in its contracts and revise the contract terms to provide that the City can obtain a credit in any instance in which the contractor does not perform its maintenance obligations during that period, including but not limited to cases where another City agency assumes that responsibility.

**DDC Response:** "This is a recommendation for DDC to consider and [DDC] will consult with DEP and the Office of Management and Budget."

**Auditor Comment:** We are pleased that DDC recognizes that the recommended revisions to the contract terms warrant consideration. We believe they may help ensure that the City does not pay for services it does not receive and thereby prevent waste of public funds. Accordingly, we continue to urge DDC to implement this recommendation.

## **DDC's Inconsistent Assignment of Guarantee Period Start Dates Weakened Accountability**

DDC designated guarantee period start dates for the 545 rain gardens it developed during our audit scope period that were inconsistent with the terms of its contracts. While pursuant to the contracts, the guarantee periods should start on the "planting dates," DDC records do not consistently reflect this to be the case. Those inconsistencies potentially shortened or, in some cases, effectively eliminated the contract guarantee periods, and thereby relieved the construction contractors from

their contracted work guarantees and maintenance obligations. Further, the failure to establish start dates for the guarantee periods in accordance with the terms of the contracts undercut the effectiveness of the oversight consultants DDC contracted with to oversee the maintenance of DDC's rain gardens during the periods in which the rain gardens should have been under their various guarantees.

The standard contract DDC used for the rain gardens during our audit scope period calls for the contractors' guarantees of planting and structures and maintenance obligations to coincide with the periods in which new plantings require particular care to ensure that they become established. Consequently, DDC's inadequate and inconsistent records relating to the dates on which those contract obligations began and ended blur what should have been clear lines of responsibility for critical tasks and increase the risk that some or all of the City's investment in rain garden landscaping valued at \$6.8 million will be wasted.<sup>14</sup> The details of this finding follow.

According to the construction contract, Section PM-11.C, *Landscape Guarantee and Replacement*, the start date for the 18-month landscape guarantee period is supposed to be the "planting date" which is the date that planting is completed. However, when requested, DDC was unable to provide a complete list of the planting dates for the rain gardens under guarantee during our audit scope. Notwithstanding DDC's failure to provide those essential records, we were able to determine the relevant planting dates by using the records DDC provided of its initial inspection dates.<sup>15</sup> Our comparison of DDC's reported guarantee start dates and the planting dates (derived from DDC's initial inspection dates), showed that *none* of the guarantee start dates matched the planting dates as they all should have. Moreover, the discrepancies between the start of the DDC recorded guarantee periods and the planting dates ranged from a few days to more than a year. See Table I below for a summary of our analysis.

**Table I**

Guarantee Start Dates Analysis Summary

Project #	# of Rain Gardens	Planting Date	Guarantee Start Date	Guarantee Started Late or Early
		A	B	C = B - A
GCJA03-3A	157	11/27/2019	6/29/2020	7 months late
GCTI11-02	147	11/1/2019	10/21/2019	few days early
	5		5/15/2020	6 months late
GNCB14-1A	38	10/25/2019	10/28/2020	12 months late
GQBB09-01	81	11/8/2019	7/10/2019	4 months early
	117		9/5/2019	2 months early
<i>Total</i>	<i>545</i>			

<sup>14</sup> 545 rain gardens with landscape valued at \$12,500 each equals \$6,812,500.

<sup>15</sup> DDC and DEP conduct initial inspections together. Because the dates of DDC's initial inspections correspond to the dates of DEP's "initial establishment" inspections, we used DEP dates as a proxy for planting dates. An "initial establishment" inspection is an inspection that, according to the contract, determines whether a rain garden's landscaping is planted correctly.

As a result of the inconsistencies between planting and guarantee period start dates, the contractors' responsibility to maintain the sites during the guarantee periods was potentially diminished. In the instances where the guarantee periods started late, the contractors' guarantees were eliminated for omitted critical timeframes when new plantings particularly need regular watering and other maintenance. Conversely, in those instances where the guarantee periods started before the planting dates, the period in which the contractor was required to maintain the plantings before turning responsibility over to the City was potentially shortened.

### **Guarantee Periods Started Late for 200 Rain Gardens, Weakening Accountability for Maintenance in the Meantime**

With respect to the 200 rain gardens (37 percent) with guarantee periods that started between 6 to 12 months late, DDC's delays raised the question of who bore responsibility for maintaining and guaranteeing the rain gardens' landscaping, valued at approximately \$2,500,000, between the planting and guarantee period start dates.<sup>16</sup> DDC's records contain no clear answer to that question. In fact, the uncertainty was compounded by the fact that the transfer of maintenance responsibility for most of the 200 rain gardens to DEP was made before the guarantee periods established by its starting dates had run their course, and in many cases before they had even begun.

For example, for the 157 rain gardens created under Project #GCJA03-3A, for Jamaica Bay CSO Tributary Areas, shown in the table, plantings were completed on November 27, 2019. Accordingly, the guarantee period should have begun on that date. However, DDC's records state that the guarantee period did not start until seven months later, on June 29, 2020, which casts doubt on whether the construction contractor was obligated to maintain the rain gardens throughout the seven-month period following the planting date. Additionally, because DEP took over the maintenance responsibilities for those rain gardens on May 22, 2020, one month *prior* to the delayed start of the guarantee period, DDC's records suggest that DDC effectively eliminated the contractual guarantee period. On the other hand, DDC retained GIM consultants to inspect these rain gardens starting in November 2019, i.e., contemporaneous with the planting dates, an indication that DDC expected the construction contractors to maintain the rain gardens pursuant to the contractual guarantee as of that month.<sup>17</sup> In that case, however, the guarantee period maintenance would have covered only 7 of the contractually stipulated 24 months before DEP took over the rain gardens. In either case, the inconsistent dates evidenced in DDC's records weakened accountability for the 157 rain gardens' maintenance.

In another example, for the 38 rain gardens under Project #GNCB14-1A, for the East River/Open Waters outfalls area, plantings were completed on October 25, 2019, but according to DDC data, the guarantee period did not begin until October 28, 2020, almost a year later. Additionally, we noted that the maintenance responsibilities were turned over to DEP on May 22, 2020, six months *prior* to the delayed start of the guarantee period, effectively eliminating the contractual guarantee period maintenance requirements. On the other hand, DDC's first oversight inspection report indicated that the guarantee period may have started in November 2019 or just one month after plantings were completed. In that case, however, based on the reported DEP takeover in May 2020, the actual period in which DDC monitored the contractor's maintenance of the rain gardens may have been only 7 months instead of the contractually stipulated 24 months.

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<sup>16</sup> 200 x \$12,500 (average cost of landscaping) = \$2,500,000.

<sup>17</sup> GIM consultants are supposed to inspect their assigned rain gardens monthly during the guarantee periods to verify that the construction contractors perform the contractually required maintenance work. The GIM consultants are required to prepare what DDC refers to as monthly "oversight inspection reports" after each inspection. A GIM's first oversight inspection should signify the beginning of the GIM's oversight of maintenance during the guarantee period.

## Guarantee Periods Started Prematurely for 345 Rain Gardens, Potentially Shortening the Time New Plants Were Under Guarantee

As reflected in Table I above, DDC's reported guarantee start dates preceded the relevant planting dates for 345 (63 percent) of the 545 DDC rain gardens in our audit. The discrepancies in those cases potentially shortened the periods in which the contractors were responsible for maintaining their plantings by periods that range from a few days to approximately four months. For example:

- For the 81 rain gardens under Project #GQBB09-01, for the Flushing Bay and Newtown Creek outfalls areas, plantings were completed on November 8, 2019, the date the guarantee period should have begun. However, the start date of the guarantee period was reported as July 10, 2019, which indicates that the guarantee period started four months earlier than the planting was completed. That July date coincided with DDC's substantial completion inspections. On the other hand, DDC's first oversight inspection report indicated that its monitoring started as it should have in November 2019, with the completion of plantings. Thus, DDC's records were inconsistent, making it difficult to reconcile different events that should have occurred contemporaneously. Moreover, DEP took over these rain gardens in July 2020, effectively shortening the guarantee period from 24 to between 8 and 12 months. In either case, the guarantee period did not cover several months in which the rain gardens' plantings required regular maintenance to ensure that they became established and help keep the rain gardens functioning and appearing as intended.
- For the remaining 117 rain gardens under Project #GQBB09-01, plantings were completed on November 8, 2019, the date the guarantee period should have begun. However, DDC records indicate the guarantee period started two months earlier, on September 5, 2019, which coincides with the completion of hardscape work rather than plantings. DEP's acceptance of these 117 rain gardens in July 2020 meant that the guarantee period effectively ended only 8 to 9 months after the planting date, rather than the contractually stipulated 24 months.

Overall, the inconsistencies in DDC's records related to the start dates of the rain garden contract guarantee periods weaken DDC's ability to ensure that the contractors were accountable for their maintenance. DDC's inconsistent records obscured the factual issue of who bore responsibility for their maintenance and replacement of trees, landscaping, and hardscaping at times when their plants, soils, and other components needed ongoing attention. In the absence of the required maintenance during the guarantee periods, the rain gardens' plant establishment and ability to properly function would have been at risk.

### Recommendations

DDC Should:

5. Accurately track planting dates for all rain gardens to ensure proper maintenance of the rain gardens and the plants they contain.

**DDC Response:** "In general, this is already in place as DDC already tracks planting dates. While DDC diligently tracked the planting of trees for the projects evaluated in the audit, DDC was not as rigorous in noting which of the particular shrubs or flowers were planted per the green infrastructure design standards. DDC has begun tracking the particular type of planting and will continue to do so."

**Auditor Comment:** We are pleased that DDC acknowledges the need for improved tracking of planting dates and compliance with contract standards for specific plants

to ensure proper functioning and appearance of the rain gardens. Although DDC has not provided evidence that would enable us to independently verify the steps it reports it has begun to take, we encourage DDC to continue to work toward implementing this recommendation.

6. Establish clear guarantee periods for all rain gardens measured from accurately recorded planting dates in accordance with contract terms.

**DDC Response:** “This is already in place. DDC will continue to execute the Articles outlined in the Standard Construction Contract where it clearly states that the Guarantee Period begins either at Substantial Completion (Article 14), or prior to completion if Article 16, which pertains to occupation or use prior to completion, is declared.”

**Auditor Comment:** Contrary to DDC’s assertion, the agency did not establish clear guarantee periods in accordance with contract terms and should therefore revisit the finding and its response. Of the total 545 rain gardens, we found that guarantee periods started late for 200 rain gardens and started prematurely for 345 rain gardens, weakening the accountability for maintenance. We urge DDC to reexamine the issues noted in the finding and to implement the recommendation.<sup>18</sup>

7. Maintain accurate records of all events that affect contractual obligations for maintenance and guarantees of rain gardens.

**DDC Response:** “This is already in place. DDC has already established a Standard Operating Procedure for Green Infrastructure Monitoring (GIM), which requires the Construction Management Engineer-In-Charge to ensure that responses to the GIM Immediate Action Items are sent to the GIM, DDC Design, and BEPA GI, and are documented with photos to show the corrected action.”

**Auditor Comment:** Although we are encouraged by DDC’s statement that it has established a standard procedure specifying the EIC’s responsibilities to ensure that unsatisfactory conditions are corrected, DDC provided no evidence that the procedure it cites reflects current practice. Notably, the audit found that DDC’s inconsistent records obscured the factual issue of who bore responsibility for maintenance and replacement of trees, landscaping, and hardscaping at critical times when the rain gardens’ plants, soils, and other components needed ongoing attention. Therefore, we urge DDC to ensure that it fully implements this recommendation.

8. Formally notify construction contractors of the start of the guarantee periods and their associated contractual obligations.

**DDC Response:** “This is already in place. DDC already formally notifies the Construction Contractor that the guarantee period has begun by either exercising Article 16 of the Standard Construction Contract or by declaring the project Substantially Completed (Article 14). Substantial Completion walkthroughs develop a ‘Punch List’ where unresolved contractual obligations are identified and itemized. Final payment is not issued until all identified issues are corrected.”

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<sup>18</sup> Articles 14 and 16 are contractual provisions in the rain garden construction contracts that enable DDC to establish substantial completion and final acceptance of the rain garden work, which in turn is supposed to trigger start of the guarantees. However, we found that none of the substantial completion dates (Article 14) matched with reported guarantee start dates. In addition, Article 16 was not cited or used as a basis for the start dates DDC listed for the guarantee periods.

**Auditor Comment:** DDC did not provide evidence that the measures it describes reflect the agency’s current practice or whether they effectively address the issues the audit identified. Notably, the audit found that of the total 545 rain gardens, guarantee periods started late for 200 rain gardens and started early for 345 rain gardens. Those findings show that DDC’s then-existing system for establishing and notifying contractors of guarantee start and end dates was not adequate or effective during the audit scope period. Therefore, we urge DDC to fully implement this recommendation.

## **DDC Lacks Adequate Oversight of Rain Garden Maintenance**

Our detailed review of the oversight records related to 50 randomly selected sampled rain gardens revealed areas of weakness in DDC’s oversight of their maintenance during the guarantee periods. Those weaknesses included: (1) DDC’s failure to establish a record-keeping system to document and track the oversight activities of its contracted REI consultants; (2) the absence of certain required inspection reports and completed checklists by GIM consultants that should have documented plant inventories, recommendations for plant replacement, and photographs of site conditions at specified intervals and key milestone dates; and (3) deficient conditions in rain gardens overseen by GIM consultants that went uncorrected for varying periods. These findings are described in detail below.

### **DDC Maintained No Records of Its Oversight of Rain Gardens through Its Contracted REI Consultants**

As stated above, DDC contracted with two different categories of consultants—REI and GIM consultants—both reporting to the agency’s EICs and Design Project Managers, respectively, to oversee maintenance of rain gardens by the responsible construction contractors during the guarantee periods. DDC assigned 24 to REI consultants and 26 to GIM consultants of the 50 rain gardens we sampled.

In response to our request for all maintenance oversight records for the 50 sampled rain gardens, DDC only provided records for the 26 sampled rain gardens overseen by GIM consultants but did not provide any records for the 24 rain gardens overseen by REI consultants. When we inquired about this absence of records, DDC informed us that it did not convey specific record-keeping requirements for the oversight of the rain gardens’ maintenance during the guarantee periods to the REI consultants when it engaged them. In addition, DDC’s contracts with the REI consultants did not cover the full guarantee periods. Moreover, DDC stated that the REI consultants oversaw rain garden maintenance as part of their general construction oversight responsibility and did not actively note the condition of the plants or other rain garden elements in standalone reports. Further, according to DDC, after substantial completion of the rain gardens’ construction, and during the winter months, when concrete work, caulking, and planting cannot be performed, the REI consultants’ on-site inspections and related activities decreased, and consequently they had few activities to report. According to DDC, when issues were observed, the REI consultants and DDC’s in-house EICs communicated through e-mails and phone calls, and no other records of the REI consultants’ oversight of the rain gardens exist.<sup>19</sup>

DDC’s stated practice of not requiring formal oversight records applied not only to the 24 sampled rain gardens but also to the remaining 209 rain gardens in the audit population that were assigned to the REI consultants. The absence of such records reflects a significant control weakness.

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<sup>19</sup> DDC provided a few sample emails to support its statement. DDC had no structured system of documenting its oversight of the sampled rain gardens’ maintenance during the guarantee periods covered by our audit.

Comptroller's Directive #1, *Principles of Internal Control*, Section 4.3, *Control Activities*, requires agencies to maintain records of their verifications and reviews:

Control activities should exist at all levels and functions of an agency. They include a wide range of diverse activities such as approvals, authorizations, verifications, record reconciliations, open items aging, transaction analyses, performance reviews, security evaluations, *and the creation and maintenance of related records that provide evidence of the execution of these activities.* [Emphasis added.]

Based on DDC's response to our inquiry, we conclude that no records that provide evidence of DDC's oversight of its contractors' compliance with maintenance requirements for 233 (24 + 209) of the 545 rain gardens (43 percent) exist. As a result, DDC cannot establish with reasonable assurance that those rain gardens, with landscaping valued at \$2,912,500, were maintained as required.<sup>20</sup> Furthermore, in the absence of any substantiating records, DDC cannot properly evaluate the adequacy of its contracted REI consultants' oversight activities, and the agency cannot determine whether those activities were effective to ensure that plantings were established and that the rain gardens functioned properly.

When we brought this concern to the attention of DDC officials, they informed us that the agency had recognized the limitations of the REI consultants' oversight and that it had initiated a pilot program (detailed in the following section of this report) in an effort to improve oversight of rain garden construction and maintenance.

See *Appendix II* for an interactive map that shows locations and details of the 233 rain gardens.

## Recommendations

DDC should:

9. Issue contractually binding written instructions to all consultants whose responsibilities include oversight of rain garden maintenance, including the specific oversight, follow-up, and reporting activities required, to enable DDC to obtain reasonable assurance that its construction contractors properly maintain the rain gardens they build for DDC throughout the relevant guarantee periods.

**DDC Response:** "This is already in place. DDC already provides instructions to consultants through the 'Request for Construction Support Services,' which outlines the oversight and reporting responsibilities for consultants. This document is contractually binding."

**Auditor Comment:** Although DDC states that the recommended actions are already in place, DDC previously informed us that it did not convey specific record-keeping requirements for the oversight of the rain gardens' maintenance during the guarantee periods to its REI consultants when it engaged them. In addition, the reports DDC obtained thereafter from its GIM consultants, whom it began to engage as an alternative to the REI consultants, were not consistently complete or accurate. Therefore, we urge DDC to fully implement this recommendation by ensuring that it gives its consultants instructions that are not only contractually binding but are also sufficiently specific and adequately enforced in relation to the various tasks required to give DDC reasonable assurance that its consultants, and by extension DDC, will

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<sup>20</sup> These 233 rain gardens are associated with project #s GCT111-02 and QQBB09-01.



be able to effectively monitor, and require the relevant construction contractors to properly maintain, the rain gardens DDC develops throughout the contractual guarantee periods.

10. Establish and enforce record-keeping requirements for the proper oversight of rain garden maintenance throughout the relevant guarantee periods.

**DDC Response:** DDC appears to agree with the recommendation, stating, “DDC developed and expanded the role of GIM services in order to better support the Construction Management team. Their role includes oversight and record keeping throughout the guarantee periods.”

**Auditor Comment:** Although DDC engaged GIM consultants to perform oversight responsibilities that were previously assigned to REI consultants, those efforts were already underway during the audit scope period, and we nevertheless found deficiencies in GIM consultants’ oversight and record keeping. Accordingly, we encourage DDC to ensure that the record-keeping requirements are clear and that DDC enforces them in practice.

11. Track, review, and maintain the required records of its consultants’ oversight activities to help ensure those activities are sufficient and effective.

**DDC Response:** “This is already in place. DDC currently tracks, reviews and maintains the required records of its consultants’ oversight activities. GIM reports document and track rain gardens that require corrective action.”

**Auditor Comment:** As noted in our comment regarding DDC’s response to the preceding recommendation, we found uncorrected deficiencies in GIM consultants’ oversight and record keeping regarding their assigned construction contractors’ maintenance of rain gardens during the audit. Accordingly, we urge DDC to track, review, and maintain required records of its GIM consultants’ work to ensure the GIM consultants’ work is sufficient and effective.

### Weaknesses in GIM Consultant Oversight

Under the pilot program it initiated in October 2019, DDC issued task orders to GIM consultants (GIM tasks) for oversight services.<sup>21</sup> GIM tasks specify the scope of work for GIM consultants, which includes: (1) conducting monthly inspections; (2) preparing monthly inspection reports in accordance with DDC’s approved GIM Checklist; (3) documenting site conditions in detail, including (a) an initial inventory of plantings, and (b) determination of compliance with the approved planting plan; (4) inspecting rain gardens at the end of their guarantee periods; and (5) recommending replacement plants if and as required for the rain gardens’ compliance with the approved planting plan.<sup>22</sup>

However, our assessment of the monthly inspection reports for the 26 sampled rain gardens overseen by GIM consultants revealed gaps in the GIM consultants’ inspections that hindered DDC’s ability to ensure that rain gardens were properly maintained during the guarantee periods. These matters are discussed in detail below.

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<sup>21</sup> DDC prepared GIM tasks for three of the four projects in our audit, i.e., #GCJA03-3A, #GNCB14-1A, and #GQBB09-01. DDC did not issue a task order for project # GCT111-02 but used REI consultants for the oversight.

<sup>22</sup> The GIM Checklist is used by GIM consultants to document rain garden site conditions such as any accumulation of trash, debris, litter, or sediment; accumulation, any erosion or scouring of soil; any soil of improper grade; plant health; plant coverage; tree condition; moisture conditions; and replacement recommendations. Additionally, each item has a list of predetermined conditions and corresponding action items, and a space for additional notes. Moreover, the checklist includes space for recording the rain garden’s ID#, the date and time of the inspection; weather conditions; and the date of the most recent scheduled maintenance.

## GIM Consultants' Inspections Did Not Cover the Full Periods in which DDC Was Responsible for Overseeing Construction Contractors' Maintenance of Rain Gardens

DDC's GIM consultants began monthly inspections as part of their oversight responsibilities for DDC's rain gardens in November 2019. However, as shown below in Table II, the consultants did not perform all required monthly inspections.<sup>23</sup>

**Table II**

### GIM Monthly Inspections Not Performed

Project #	# of Sampled Rain Gardens	GIM Consultant	GIM Consultant's		DEP Maintenance Takeover Date	# of Monthly Inspections (per Rain Garden)		
			First Inspection Date	Last Inspection Date		Required	Performed	Not Performed
			A	B		C	D = (C - A)	E
GCJA03-3A	9	AECOM	11/20/2019	5/14/2020	5/22/2020	7	5	2
GNCB14-1A	2	AKRF Engineering	11/5/2019	3/5/2020	5/22/2020	7	5	2
GQBB09-01	15	Michael Baker	11/1/2019	3/5/2020	7/22/2020	9	3	6
<b>Total</b>	<b>26</b>	<b>Total # of Inspections for the 26 sampled rain gardens</b>				<b>212</b>	<b>100</b>	<b>112</b>

Notes: The number of required inspections reflects the number between the first inspection date and the DEP maintenance takeover date. DDC provided additional inspection reports after the wrap-up meeting and the exit conference.

As shown above, DDC's GIM consultants did not inspect 17 of the 26 sampled rain gardens after March—two to four months before DEP assumed responsibility for their maintenance.<sup>24</sup> Consequently, for those periods between the consultants' last inspections and DEP's takeovers, DDC had no mechanism in place to determine and document whether the construction contractors were maintaining the sampled rain gardens at all or whether the maintenance they performed, if any, was adequate.

In addition, DDC provided no evidence of the required final inspections by its GIM consultants prior to DEP's acceptance of the rain gardens. Therefore, in the absence of records documenting the rain gardens' conditions when DEP accepted them, DDC has no evidence to establish whether any conditions required correction by the construction contractors and, if so, whether DDC or anyone representing the City directed them to correct those conditions.

### GIM Consultant Inspection Reporting Was Ineffective

Our assessment of all 100 monthly inspection reports prepared by GIM consultants (or their subcontractors) for the 26 sampled rain gardens revealed various deficiencies in the consultants' reporting and inspections and a lack of follow-up action by DDC to require the responsible

<sup>23</sup> According to statements made by DDC officials during the audit, the monthly inspections were considered essential construction services during the COVID-19 pandemic, and consultants were required to perform them. However, at the exit conference, a DDC official stated that, based on a March 2020 oral directive from OMB made in response to the COVID-19 pandemic, the GIM consultants were ordered to suspend inspection services.

<sup>24</sup> For project #s GCJA03-3A and GNCB14-1A, DEP took over the maintenance before the guarantee period start dates, and for project # GQBB09-01, DEP took over the maintenance during the guarantee period.

construction contractors to address deficiencies. In 32 instances, the same deficient conditions were continually reported for several months without evidence of follow-up by DDC or of remediation.<sup>25</sup> In addition, for 20 of the 26 sampled rain gardens, we found substantial variations between unsatisfactory conditions recorded on the GIMs' inspection reports and those recorded on punch lists prepared by DDC's EICs within a few weeks before or after the GIMs' final inspections.<sup>26</sup>

### **Deficient Conditions at Rain Garden Site #2-710A, 237 Rutledge Street Brooklyn Went Unaddressed**

As an example of ineffective oversight and follow-up by DDC, five consecutive monthly inspection reports prepared by GIM consultant AKRF Engineering for rain garden #2-710A in Brooklyn (photos below) show that the consultant continually reported the same deficient conditions without evidence of DDC follow-up or remediation. Specifically, the inspection reports noted conditions such as "Leaf/trash/debris in excess and the health of the other plants is suffering," "Missing plants," and "Sediment accumulation at inlet & outlet" on all five GIM inspection reports—indications that the conditions persisted and apparently remained unaddressed.



*December 2019*



*January 2020*



*February 2020*



*March 2020*

Unsatisfactory conditions and a discarded dead plant noted during monthly inspections over four months at Rain Garden Site #2-710A, 237 Rutledge Street in Brooklyn  
(Source: GIM inspection reports)

In addition, some of the consultants' reports for the abovementioned rain garden reflect conditions that not only went uncorrected but that worsened over time. Specifically, the same GIM consultant, AKRF Engineering, reported on November 5, 2019, that plant roots were exposed and that the rain garden's planting mesh was visible, an indication of a low soil level. Subsequently, during the second inspection on December 10, 2019, and through the fifth inspection on March 5, 2020, the GIM consultant reported excessive trash and sediment and that a small evergreen plant had been discarded in the rain garden. Based on the conditions shown in the photographs above, including the continued presence of the dead, discarded evergreen that was tossed around in the rain garden, it appears that at least until March 5, 2020, or for over four months, the contractor did not address the rain garden's deficient conditions. The photographs above show the progression of deteriorating conditions AKRF observed during the four monthly inspections conducted from December 2019 to March 2020.

<sup>25</sup> At the exit conference, we were informed by DDC that plants and trees in poor condition cannot be replaced outside of the planting seasons (April to May and August to October for herbaceous plants). Therefore, 4 of the 36 repeated conditions we found documented in GIM inspection reports, which involved landscape plantings at 3 rain gardens and 1 tree, could not have been corrected as of March 2020, the date of the last GIM inspection reports that DDC provided to us for this audit.

<sup>26</sup> A punch list is a document created by construction management in the final stages of a construction project to provide a list of items that must be addressed before construction is considered complete and final payment is issued.

## **GIM Consultant Failed to Report Unsatisfactory Conditions at Rain Garden Site #1053A, 128-05 Hawtree Creek Road in Queens**

In another example, our review of four monthly inspection reports for rain garden #1053A located in Queens, prepared by AECOM's subconsultant Matrix New World Engineering, found that the reports were incomplete and did not contain adequate descriptions of observed conditions. Specifically, the report dated February 14, 2020, only mentioned light trash. However, the photo taken by the subconsultant at that inspection, shown below, shows excess sediment and mud that may have been affecting the plants' health. The photo also shows dead plants near the railing that appear to have been alive three months prior as shown in the November 2019 photo.

Moreover, the punch list dated March 27, 2020 (six weeks after the final GIM inspection report), included items such as "clean inlet and outlet, replace sediment control device, 1 Cornus Sericea 'Kelsey's Dwarf', 4 Iris Versicolor, [and] 4 Acorus Americana." Based on this evidence, it appears that the GIM inspection reports were incomplete and did not document unsatisfactory conditions that required corrections by the construction contractor as part of the guarantee period maintenance.



*November 2019*



Unreported deficiencies, including dead plants depicted during the monthly inspection on February 14, 2020, at Rain Garden Site #1053A, 128-05 Hawtree Creek Road in Queens  
(Source: GIM inspection reports)

After our wrap-up meeting, DDC provided an additional inspection report for rain garden site #1053A, dated May 7, 2020. The comments in the report were similar to comments in the prior reports, but the photos showed much improved conditions. However, DDC did not provide any inspection reports for the months of March and April 2020. Therefore, we cannot determine when replacement plants were planted by the construction contractor, potentially in response to the punch list issued on March 27, 2020.

## **GIM Consultants' Reports for 20 of 26 Sampled Rain Gardens Omitted Deficient Conditions**

We compared GIM consultants' inspection reports for the 26 sampled rain gardens with corresponding punch lists that DDC's EICs prepared during their final inspections of those rain gardens in advance of their turnovers to DEP. We found that the punch lists prepared by DDC EICs at final inspections for 20 of the 26 sampled rain gardens identified more unsatisfactory conditions and needs for replacement items than those listed in the GIM inspection reports for the same rain gardens, even though the inspections were conducted only a few weeks apart.

Specifically, we found that for 12 of the 26 sampled rain gardens (46 percent), the EIC's punch lists were far more thorough, recommending correction of a significantly greater number of unsatisfactory conditions than the corresponding GIM inspection reports. The punch lists showed, for example, that

in all 12 cases, the EICs identified landscaping needs, including replacement of plants that the GIM consultants had not identified. Although, based on the EIC's recommendations, plants should have been replaced by the construction contractors in accordance with their contractual guarantees, the replacement of plants shortly before the guarantee period ends (and effectively excusing the construction contractor from its maintenance obligations) defeats one of the purposes of the guarantee period—requiring the contractor to maintain the plants until they have sufficient time to become established and viable for a longer term. Assuming the plants in the 12 abovementioned rain gardens were replaced immediately after the punch list inspections in March 2020, the plants would have been in the ground for only two to five months prior to DEP's acceptance during May and July 2020. Therefore, it is very unlikely that those plants would have been established by the time DEP accepted them and in effect released the contractors from their contractual obligations.

For the remaining 14 rain gardens: the punch lists for 8 included more deficiencies than noted in the GIM inspection reports; 2 did not have a landscape punch list issued; and 4 had a punch list that was consistent with the GIM inspection report.

Furthermore, GIM inspection reports for 19 of the 26 rain gardens overseen by GIM consultants (73 percent) indicated that repeated unsatisfactory conditions went uncorrected, an indication that rain gardens were not adequately maintained during the guarantee period and were at risk. Given the proportion of the rain gardens in our sample where such deficiencies went uncorrected, we are concerned that the maintenance for 228 of the 312 rain gardens that GIM consultants oversaw (73 percent), with landscaping investment by the City totaling \$2,850,000, may have been inadequately performed during the relevant guarantee periods.

Our assessment also revealed that two of the three GIM consultants did not document the initial plant inventories in the rain gardens they inspected, noting discrepancies between actual plantings and the approved planting plans, as directed by the scope of work provisions of DDC's GIM task orders. In addition, key information, such as the date of the most recent scheduled maintenance, was not recorded.

Moreover, we noted that most GIM inspection reports provided insufficient information regarding the location of the rain gardens, which could make it difficult for a DDC employee or a construction contractor's representative to identify rain gardens with conditions requiring correction without referring to additional documents. Although all the sampled inspection reports included site ID#s for the rain gardens they concerned, they did not always include a street address or the rain garden's GPS coordinates. Any error or uncertainty in identifying a rain garden's location may allow any deficiencies in that rain garden to go unaddressed and potentially worsen to the point of requiring replacement of plants and other components that otherwise could have been preserved. Where the City is also assuming early responsibility for the rain garden, it might bear the increased cost of any such replacements.

Overall, the absence of key information in the GIM inspection reports reduces their usefulness.

In addition, the ineffective oversight our audit identified indicates that DDC may not have received appropriate value from the \$114,837 the agency reported having spent on the GIM inspection services for the 312 rain gardens our audit covered.

DDC's ability to obtain reasonable assurance of the effectiveness of its pilot program of engaging GIM consultants to oversee rain garden maintenance will be diminished unless it improves its oversight.

## Recommendations

DDC should take the following actions to strengthen its oversight of the rain gardens it builds for the City:

12. Ensure that its contracted GIM consultants perform all required monthly and other inspections, such as final inspections, of their assigned rain gardens as tasked throughout the relevant guarantee periods.

**DDC Response:** “This is already in place. GIM services are performed on as needed basis, which is typically monthly, and all inspection reports for requested services are reviewed by DDC EICs and other qualified DDC staff.”

**Auditor Comment:** With respect to DDC’s assertion that the recommendation is already in place and that all inspection reports are reviewed, we found that 112 of the total 212 required inspections at the 26 sampled rain gardens were not performed, that deficient conditions were omitted from the inspection reports for 20 of the 26 sampled rain gardens, and that unsatisfactory conditions that were repeatedly depicted in photos or inspection reports went uncorrected at 19 of 26 sampled rain gardens (73 percent). We therefore urge DDC to reexamine the adequacy of current measures in relation the specific issues reported in the audit finding.

13. Designate and require Design Project Managers/EICs or other qualified DDC staff to review GIM consultants’ inspection reports, including photographs, regularly to determine whether they (a) are complete and internally consistent, and (b) properly document all unsatisfactory conditions requiring correction by the construction contractors.

**DDC Response:** “This is already in place. DDC EICs and other qualified DDC staff currently review GIM Inspection Reports. These reports require photographs and indicate unsatisfactory conditions for the sole purpose of communicating to the Contractor that an issue needs to be addressed. The Contractor, in turn, provides photo documentation that the issue has been satisfactorily resolved.”

**Auditor Comment:** Although DDC states that the recommendation is already in place, the audit revealed that DDC’s reviews of its consultants’ inspection reports were ineffective during the audit scope period. Specifically, GIM inspection reports were not consistently complete, accurate, and consistent with the conditions displayed in the photographs. Moreover, DDC provided no evidence that its current practice differs from the practices the audit revealed. Nevertheless, we encourage DDC to ensure that the practice it describes in its response is in fact followed and is sustained going forward.

14. Ensure that all GIM consultants prepare the inspection reports in accordance with the format specified in the task orders and that they contain all information necessary to facilitate proper oversight and timely follow-up. In that regard, format the standard inspection report to include at a minimum the following critical information:
  - a. the initial inventory and current quantities of plantings as shown on and compared with the approved plans, noting any variance;
  - b. identification of specific plants requiring replacement or additional care and recommended replacements;
  - c. the date of the most recent scheduled maintenance performed by the contractor; and

- d. all information needed to accurately identify the rain garden's location without referring to other records, including, in addition to the ID#, the street address and GPS coordinates, to enable users to readily locate the rain garden based only on the inspection report and thereby facilitate timely follow-up to correct any deficient conditions the report identifies.

**DDC Response:** DDC appears to agree with the recommendation and proposed alternative methods to capture the recommended information on the inspection reports, stating, "DDC agrees that the items listed are important items to capture, however, the GIM may not necessarily be the ideal method of documenting them in each case. Specifically:

- a. The Resident Engineer and their staff are responsible for recording the initial inventory and current quantities of plantings as shown on and compared to the approved plans, noting any variance.
- b. At Final Inspection, specific plants requiring replacement or additional care are identified and included in the punch list.
- c. The Resident Engineer is responsible for maintaining these records and the information can be included in GIM Reports.
- d. Going forward, information needed to accurately identify the rain garden's location without referring to other records, including the ID#, the street address and GPS will be reflected in the GIM checklist."

**Auditor Comment:** We are encouraged that DDC recognizes the need for consistent formatting, including in fully identifying each rain garden in each inspection report. Moreover, we urge DDC, as it implements this recommendation, to ensure that the tasks assigned to all participants, including GIMs, are clearly specified and monitored to ensure they are adequately performed.

15. Ensure that DDC's designated EICs or other qualified staff regularly follow up with construction contractors to remedy deficient conditions promptly and maintain documentation in the relevant project files reflecting all pertinent communications and any follow-up and corrective action taken.

**DDC Response:** "This is already in place. DDC will continue to ensure that follow up is regular and consistent in order to remediate deficiencies. Enhanced documentation tracking is intended by utilizing GIM more aggressively than was the case under the projects that were audited."

**Auditor Comment:** We are pleased that DDC intends to enhance its documentation-tracking. We are concerned, however, that the first part of DDC's statement—that this recommendation is "already in place" and that DDC will "continue" to ensure regular and consistent follow up—fails to account for the deficiencies and need for improvement found during the audit. As noted previously, the audit found that GIM inspection reports for 19 of the 26 sampled rain gardens showed repeated unsatisfactory conditions that went uncorrected. We urge DDC to improve its follow-up actions to ensure that construction contractors rectify deficient conditions promptly.

16. Ensure that the responsible construction contractors are directed to correct unsatisfactory conditions during the guarantee periods and that DDC invokes appropriate contractual remedies as needed to enforce the City's rights and provide assurance that the rain gardens for which the City pays meet relevant contractual standards.

**DDC Response:** “This is already in place. DDC will continue to enforce corrective actions to ensure unsatisfactory conditions are corrected and rain gardens meet contractual standards.”

**Auditor Comment:** Contrary to DDC’s assertion, its enforcement of the contracts with respect to requiring corrective action by contractors was not sufficient or effective during the audit scope period. The audit found that repeated unsatisfactory conditions went uncorrected at 19 of the 26 sampled rain gardens, an indication that those rain gardens were not adequately maintained during the guarantee period and were at risk. We urge DDC to adopt the recommendation by consistently enforcing contractual requirements.

17. Develop and distribute policies and procedures for oversight of rain gardens during the guarantee periods that detail Design Project Managers’, EICs’, and consultants’ oversight responsibilities, including for maintaining documentation of all actions taken that bear on DDC’s enforcement of the pertinent construction and oversight contracts.

**DDC Response:** DDC appears to agree with the recommendation, stating, “As part of DDC’s overall approach, the agency is reviewing current Standard Operating Procedures (SOPs) and the need for additional SOPs. SOPs are regularly being developed, updated and issued, including those that relate to oversight responsibilities of rain gardens during the guarantee periods.”

**Auditor Comment:** We are pleased that DDC is implementing the recommendation to ensure accountability of all stakeholders in the entire oversight process.

18. Incorporate the maintenance requirements stipulated in the relevant contract sections in the policies and procedures DDC develops and distribute for oversight of rain gardens during the guarantee period.

**DDC Response:** In conjunction with DDC’s response to Recommendation 17 regarding the agency’s practice of reviewing and updating its Standard Operating Procedures, DDC appears to agree with the recommendation, stating, “Stipulations have been revised to better meet the needs in establishing the Rain Gardens in the newly published NYCDEP Standard Green Infrastructure Specifications. DDC believes the NYCDEP specifications are sufficient guidance.”

**Auditor Comment:** We are pleased that DDC is implementing the recommendation. However, DDC did not provide the new NYCDEP Standard Green Infrastructure Specifications with its response, so we are unable to comment on their adequacy. In addition, DDC did not state whether *its* new policies and procedures incorporate the new NYCDEP specifications. Accordingly, we urge DDC to ensure that the maintenance standards it adopts are both adequate and consistent across all documents that its contracts reference and incorporate.

19. Refer to and incorporate relevant portions of DEP’s *Rain Gardens Maintenance Manual* in DDC’s contracts and in the policies and procedures it develops and distributes for the proper maintenance and oversight of rain gardens during the guarantee period by construction contractors, consultants, and in-house Design Project Managers and EICs.

**DDC Response:** “DDC believes that the current guidance is sufficient. The DOT OCMC (Office of Construction Mitigation and Coordination) Stipulations require compliance with The DEP Rain Garden Maintenance Manual. OCMC Stipulations are required before a Contractor can begin work in the public right of way.



Additionally, there are specifications incorporated into DDC Contracts where Maintenance of Site for Green Infrastructure is expanded on as well as the new NYCDEP Standard Green Infrastructure Specification that has been published.”

**Auditor Comment:** We reiterate our comment concerning DDC’s response to Recommendation #17.

## DETAILED SCOPE AND METHODOLOGY

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This audit was conducted in accordance with the audit responsibilities of the City Comptroller as set forth in Chapter 5, §93, of the New York City Charter.

The scope of this audit included all rain gardens that were in guarantee during Fiscal Years 2020 and 2021, for which DDC was responsible for the oversight of maintenance during the guarantee period.

We obtained background information about DDC from their website. Also, we obtained background information on the GI Plan from DEP's website, including how combined sewers function, the impact of combined sewer overflows (CSOs) on water quality in the waterbodies surrounding the City, and how implementing GI measures detailed in the GI Program will reduce stormwater entering the combined sewers, reduce CSO, and thereby improve water quality in local waterbodies. Further, we obtained DEP's Standard Designs and Guidelines for GI Practices, which are referenced in the construction contracts under audit. We also obtained detailed information about rain gardens including how they work and their benefits.

Further, we reviewed two prior audits issued by our office, entitled *Audit Report on the Department of Environmental Protection's Maintenance of Rain Gardens* (Audit #SE18-086A) issued on December 16, 2019, and the *Audit Report on the Department of Parks and Recreation's Oversight of Construction Management Consultants* (Audit #SE16-062A) issued on June 15, 2018, and noted findings and conditions relevant to this current audit.

To understand DDC's policies, procedures, and existing governing structure for the oversight of maintenance of rain gardens during the guarantee period, we obtained and reviewed:

- DDC Organization Charts;
- A list of rain gardens under guarantee in our audit scope (FY 2020 through FY 2021);
- Construction contracts and identified relevant sections, such as
  - Sections GI-5.09 - Watering and Weeding During Maintenance Period and PM-11 - Landscape Guarantee and Replacement
  - Schedules A - General Conditions to Construction Contracts
  - Article 24 - Maintenance and Guaranty;
- DDC Standard Operating Procedure (SOP C-060) - Green Infrastructure Procedures for Guarantee Period and Asset Transfer;
- Requirements Contracts for Engineering and Design Related Services and relevant Task Orders; and
- Estimated Contingency Releases for Construction Support Services issued to consultants to perform oversight of rain gardens maintenance during the guarantee period.

We researched contracts data on the Comptroller's Checkbook system to determine potential contracts that were relevant to construction of GI projects or oversight of the GI projects.

To understand DDC's internal controls for administering the rain garden maintenance oversight, we interviewed appropriate key DDC officials, including the Program Coordinator of Infrastructure Division and the Program Director of Sustainable Infrastructure Division. We also interviewed EICs to understand their roles and practices. We followed up with DDC to obtain any clarifications or additional information, when required.

We obtained and analyzed the DDC's rain garden data (list of GI Assets) to assess the durations of guarantee enforcement by DDC and importance of various tracking dates. We conducted direct tests of the DDC provided information for completeness and accuracy; we found the data to be accurate but could not confirm completeness. Subsequently, during fieldwork, we validated the variation between the listed rain gardens and the rain gardens on the construction drawing lists.

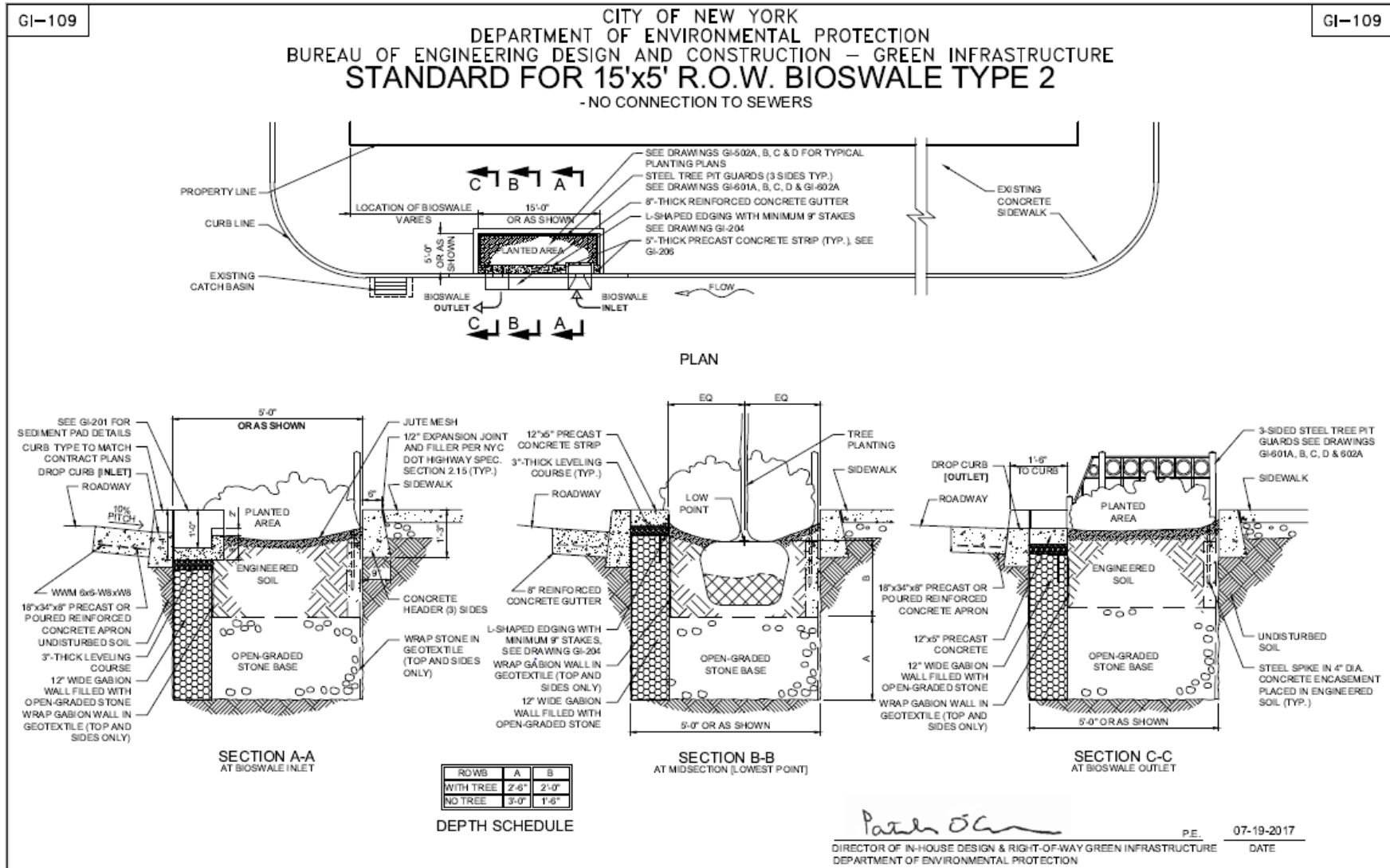
For the audit sample, we sampled 50 random rain gardens out of the audit population of 545 rain gardens to assess DDC's oversight of rain garden maintenance during the guarantee period (we used ACL to select our audit sample).

We obtained and reviewed the construction contracts for the projects/contractors in our audit sample and abstracted the pertinent sections with respect to maintenance requirements. We evaluated the Estimated Contingency Releases to determine requirements and contents of scope of work assigned to the oversight consultants.

Subsequently, we requested DDC to provide all relevant oversight documentation. We performed detailed reviews of all oversight documentation including various spreadsheet analyses to assess DDC's oversight efforts. We analyzed and summarized the monthly GIM inspection reports and used relevant information such as site inspection photographs and punch lists prepared by the EICs to assess the effectiveness of the oversight of rain gardens during the guarantee period. We also evaluated effectiveness of the oversight records to determine whether the GIM inspections were sufficient, adequate and ensuing actions were adequate to ensure that rain gardens under guarantee received required horticultural and green infrastructure maintenance. We requested additional information, clarifications, and documents from DDC as needed during the audit and at the end of our fieldwork to ensure that DDC submitted all substantiating oversight documentation.

The results of the above procedures and tests, although not projectable to their respective populations, provided a reasonable basis for us to evaluate DDC's controls over the oversight of rain garden maintenance during the guarantee period.

**A Standard DEP Rain Garden Design (15' x 5' Type 2)**

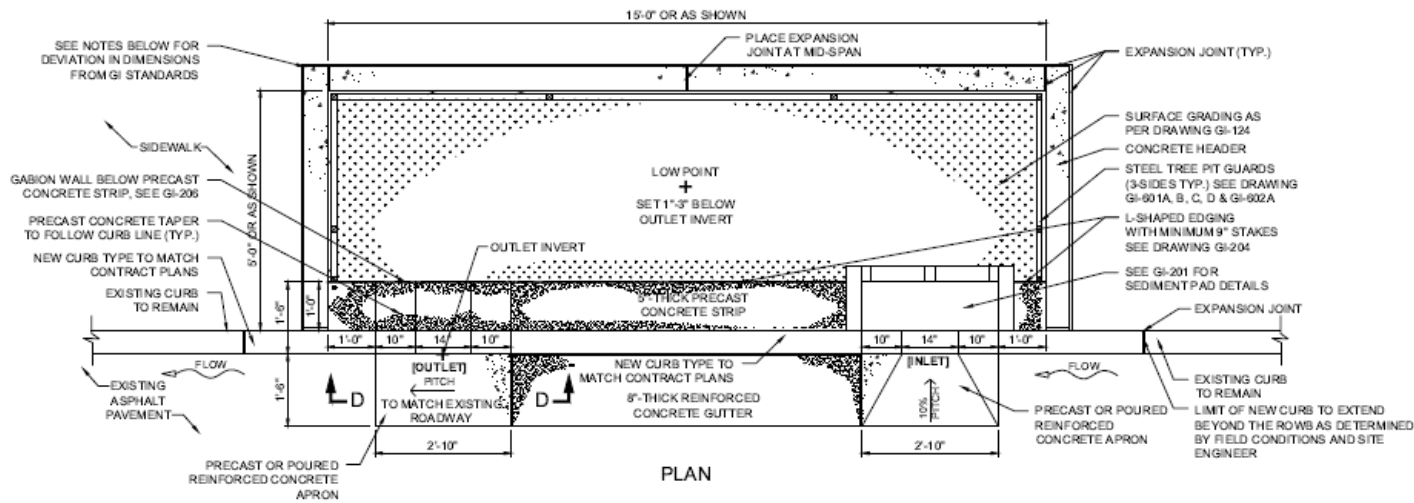


**(Cont.) A Standard DEP Rain Garden Design (15' x 5' Type 2)**

GI-110

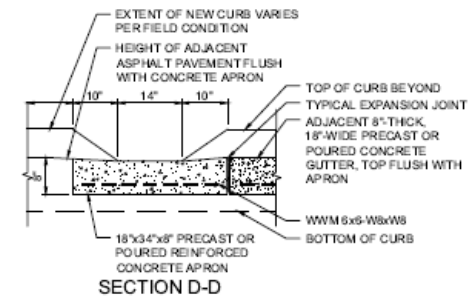
GI-110

CITY OF NEW YORK  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 BUREAU OF ENGINEERING DESIGN AND CONSTRUCTION – GREEN INFRASTRUCTURE  
**STANDARD FOR 15'x5' R.O.W. BIOSWALE TYPE 2**  
 - NO CONNECTION TO SEWERS



**NOTES:**

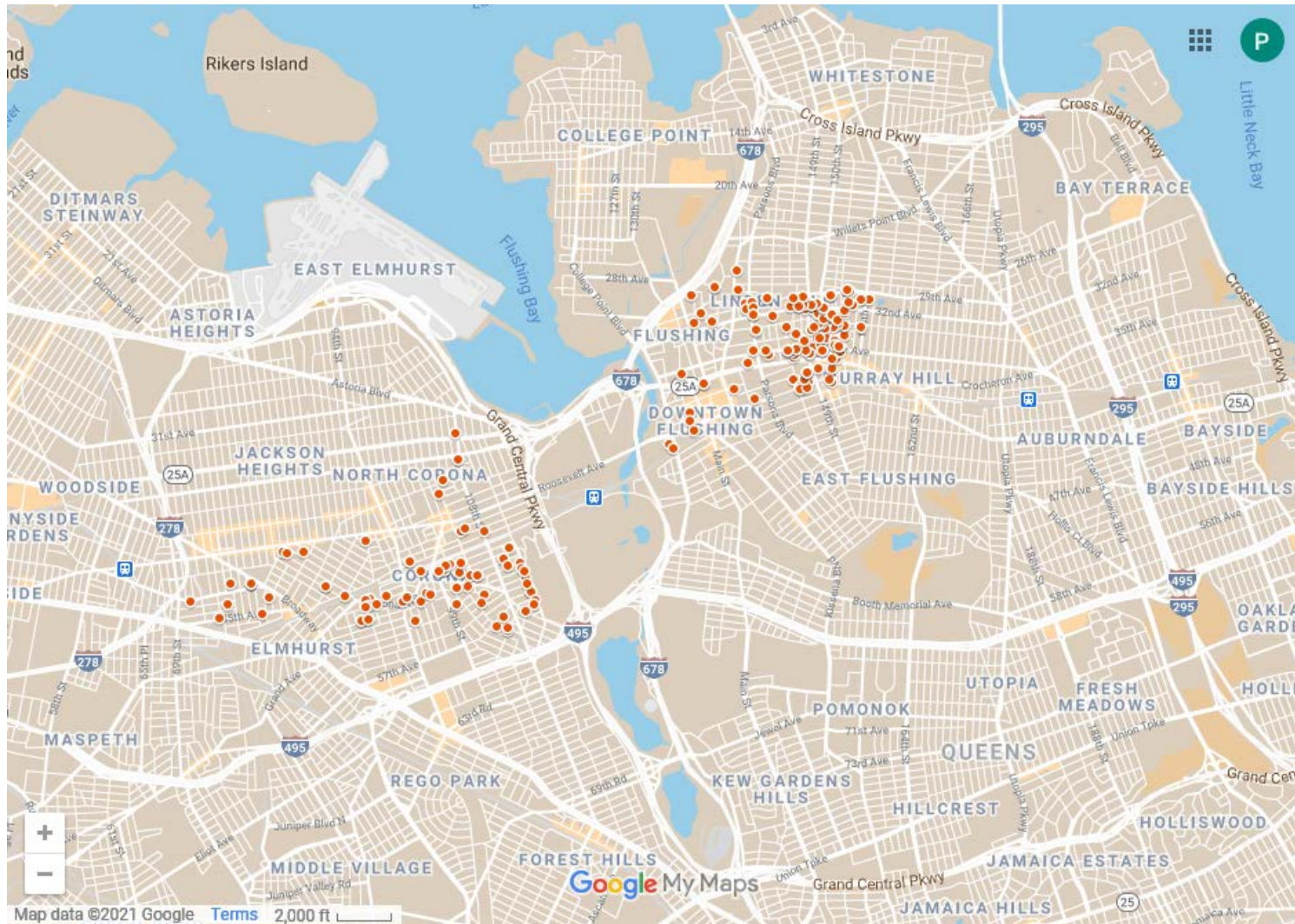
1. THE CONTRACTOR SHALL BE REQUIRED TO REMOVE AND REPLACE ALL EXISTING FULL SIDEWALK FLAGS ADJACENT TO THE GI PRACTICE WITH A MINIMUM WIDTH OF 36". ANY ADDITIONAL FLAGS DISTURBED BY THIS REPLACEMENT SHALL ALSO BE REPLACED. THE CONTRACTOR SHALL REPLACE THE SIDEWALK IN FULL COMPLIANCE WITH THE APPLICABLE SECTIONS OF THE STANDARD HIGHWAY SPECIFICATIONS.
2. THE CONTRACTOR SHALL REMOVE AND RESTORE ONE-AND-A-HALF (1 1/2) FOOT WIDTH OF THE WEARING COURSE AND ONE-AND-A-HALF (1 1/2) FOOT WIDTH OF ROADWAY CONCRETE PAVEMENT BASE ALONG THE CURB LINE AND ADJACENT TO THE CONCRETE APRONS, WHERE REQUIRED. ALL WORK MUST BE COMPLETED IN FULL COMPLIANCE WITH THE APPLICABLE SECTIONS OF THE STANDARD HIGHWAY SPECIFICATIONS.
3. THE CONTRACTOR SHALL OBTAIN THE NECESSARY TREE PLANTING PERMIT FROM THE NYC DEPARTMENT OF PARKS AND RECREATION (DPR) PRIOR TO THE START OF WORK. ALL NECESSARY TREE PLANTING SHALL BE SUPERVISED BY CERTIFIED ARBORISTS.
4. NO TREE SHALL BE REMOVED BY THE CONTRACTOR UNTIL SPECIFICALLY ORDERED IN WRITING TO DO SO BY THE ENGINEER AND WITH APPROVAL FROM DPR.
5. TREES SHALL BE STAKED AS PER DOT STANDARD DETAILS OF CONSTRUCTION. TREE STAKES ARE TO BE REMOVED BY THE CONTRACTOR NOT LESS THAN ONE YEAR AFTER PLANTING.
6. THE CONTRACTOR SHALL NOT BE PERMITTED TO OPERATE AUXILIARY EQUIPMENT WHICH GENERATES EXHAUST OR OTHER HEAT UPWARD (E.G. GENERATORS AND COMPRESSORS), UNDER THE BRANCHES OF TREES WHERE THE BRANCHES ARE LESS THAN 20' ABOVE THE GROUND, UNLESS APPROVED BY THE ENGINEER IN CONSULTATION WITH THE CERTIFIED ARBORIST.
7. THE CONTRACTOR SHALL NOT BE PERMITTED TO STORE, STOCKPILE, OR LAY DOWN ANY CONSTRUCTION MATERIAL INCLUDING, BUT NOT LIMITED TO, LUMBER, FUEL AND OIL CONTAINERS, PIPES, AND/OR PIPE FITTINGS, BARRICADES, HAND TOOLS, HOSES, RECEPTACLES, AND ASPHALT WITHIN ANY EXISTING TREE PIT OR R.O.W. BIOSWALE.
8. REPLACEMENT TREES SHALL BE PLANTED WITHIN THE PROJECT AS DIRECTED BY THE ENGINEER IN ACCORDANCE WITH STANDARD HIGHWAY SPECIFICATIONS.
9. FOR R.O.W. GI PRACTICES WITH DIMENSIONS THAT DEVIATE FROM THE GI STANDARDS AS SHOWN ON CONTRACT PLANS DUE TO FIELD CONDITIONS, REFER TO THE DIMENSION SCHEDULE ON GI-122 AND SPECIFICATIONS.



*Paul O'Connell*  
 P.E. 07-19-2017  
 DIRECTOR OF IN-HOUSE DESIGN & RIGHT-OF-WAY GREEN INFRASTRUCTURE DATE  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION

**233 Rain Garden Locations (●) for which No Oversight Records Exist**

*[Click on the map to launch an interactive map  
and  
then click on the individual rain gardens to see associated site ID and street address]*



October 7, 2021

Ms. Marjorie Landa  
Deputy Comptroller for Audit  
Office of the NYC Comptroller  
1 Centre St. Room 1100 North  
NY, NY 10007

Re: Audit Report on the New York City Department of Design and Construction's Oversight of Rain Garden Maintenance During the Guarantee Periods - SE20-101A.

Dear Deputy Comptroller Landa,

The Department of Design and Construction ("DDC") appreciates the opportunity to review and respond to the *Audit Report on the New York City Department of Design and Construction's Oversight of Rain Garden Maintenance During the Guarantee Periods* (the "Draft Audit")

Prior to addressing the Draft Audit, DDC would like to take this opportunity to provide context regarding the Charter-role of DDC, which may require further consideration regarding the proposed recommendations contained in the Draft Audit. DDC was created in 1995 by the City Council and Chapter 55 of the New York City Charter established the agency (See Section 1200, Chapter 55, NYC Charter). DDC is the Capital Construction Agency for the City of New York. Section 1202 further provides that DDC's Commissioner:

"...shall exercise powers of the city relating to city construction projects. Such projects shall include but not be limited to the design, construction and alteration of streets and highways, bridges and tunnels, parks and recreational facilities, sewers and sewage disposal plants, water supply and distribution structures, waste management facilities, correctional facilities and all other public buildings, structures and facilities."

And as such, DDC is limited to work that is funded with Capital Funding and "shall exercise powers of the city relating to city construction projects" (See Section 1202, Chapter 55, NYC Charter). Maintenance of the City's Assets are under the purview of other Agencies. In the case of Rain Gardens, the Agencies are the New York City Departments of Environmental Protection ("DEP") and the New York City Department of Parks and Recreation ("DPR"). Maintenance work has a different funding source as well - expense funding. The delineation of scope of work and funding sources is critical here as it pertains to the limits of what DDC can do in relation to the recommendations contained in the Draft Audit.

Moreover, the City, through DEP, has altered its approach in capturing storm waters. DEP's current hierarchy for Green Infrastructure is 1) precast porous concrete panel, 2) infiltration basins, 3) type D rain gardens, which are flush with the sidewalk and connect to a catch basin, and 4) standard rain gardens. The vast majority of Green Infrastructure Assets that would have historically been rain gardens have been converted to infiltration basins, which do not have tree plantings or landscaping. To quantify the shift, in FY22 there are 2 projects that will install approximately 960 green infrastructure assets. Of those 960 assets, less than 10% are intended to be rain gardens. Moving forward, projects slated for FY23 and FY24 will solely utilize precast porous concrete panels.

The following will list each audit recommendation contained in the Draft Audit and DDC's responses:

**Recommendation 1:** Ensure that construction contractors perform their contractual tree planting and landscaping guarantees and maintenance responsibilities for rain gardens throughout the contractual guarantee periods.

**Response:** This is already in place. DDC will continue to ensure that contractors perform their contractual tree planting and landscaping guarantees and maintenance responsibilities up until the time the guarantee period ends, or the rain garden is transferred to DEP. DEP, as the owner of the rain garden, in certain instances has determined it is in the best interest to take over tree planting and landscaping guarantees before the end of the contractual guarantee period.

**Recommendation 2:** Coordinate with DEP to ensure that DDC transfers the rain gardens it develops to DEP only after construction contractors satisfactorily complete their maintenance responsibilities throughout the contractual guarantee periods.

**Response:** This is already in place. DDC will continue to coordinate with DEP throughout the life cycle of all green infrastructure projects managed by DDC. If DEP makes an internal judgement that it is in the best interest of the City to take over the maintenance of their asset before the completion of the contractual guarantee period, then it is appropriate for DDC to transfer the rain garden to DEP.

**Recommendation 3:** Alternatively, if a rain garden is transferred to DEP prior to the end of the guarantee period, coordinate with DEP and the contractor to ensure that the contractor's maintenance responsibilities and guarantees up to the time of transfer have been satisfactorily completed; and that a City agency is designated to be responsible for monitoring the contractor's performance and enforcing the City's contractual rights for the balance of the contract.

**Response:** As explained above in the Response to Recommendation 2, DEP may request that DDC transfer a rain garden asset prior to the end of the contractual guarantee period and DDC will transfer the rain garden when requested by DEP. If a rain garden is transferred to DEP prior to the end of the guarantee period, DDC will continue to coordinate with DEP and the Contractor



to ensure the responsibilities and guaranties have been satisfied up to the point of transfer. However, it is important to note that by transferring the greenscape of the rain garden, the responsibilities of the Contractor cease in regard to maintaining the greenscape. The responsibilities of the Contractor would not cease on the hardscape until the guarantee period concludes. As such, DDC would be responsible for monitoring the contractor's performance and enforcing the City's contractual rights for the entire guarantee period.

**Recommendation 4:** Itemize guarantee period maintenance as a separate bid item and a performance pay item in its contracts and revise the contract terms to provide that the City can obtain a credit in any instance in which the contractor does not perform its maintenance obligations during that period, including but not limited to cases where another City agency assumes that responsibility.

**Response:** Here, the Auditors are recommending a contractual change – specifically, a separate bid item in the procurement document and a separate payment item in the awarded contract. This is a recommendation for DDC to consider and it will consult with DEP and the Office of Management and Budget regarding this proposed contractual change, including on the question of whether services may be credited after a project is declared substantially complete. This would be the most significant hurdle in implementing an itemization of maintenance work that would functionally be utilized after substantial completion.

**Recommendation 5:** Accurately track planting dates for all rain gardens to ensure proper maintenance of the rain gardens and the plants they contain.

**Response:** In general, this is already in place as DDC already tracks planting dates. While DDC diligently tracked the planting of trees for the projects evaluated in the audit, DDC was not as rigorous in noting which of the particular shrubs or flowers were planted per the green infrastructure design standards. DDC has begun tracking the particular type of planting and will continue to do so.

**Recommendation 6:** Establish clear guarantee periods for all rain gardens measured from accurately recorded planting dates in accordance with contract terms.

**Response:** This is already in place. DDC will continue to execute the Articles outlined in the Standard Construction Contract where it clearly states that the Guarantee Period begins either at Substantial Completion (Article 14), or prior to completion if Article 16, which pertains to occupation or use prior to completion, is declared.

**Recommendation 7:** Maintain accurate records for all events that affect contractual obligations for maintenance and guarantees of rain gardens.

**Response:** This is already in place. DDC has already established a Standard Operating Procedure for Green Infrastructure Monitoring (GIM), which requires the Construction Management Engineer-In-Charge to ensure that responses to the GIM Immediate Action Items

are sent to the GIM, DDC Design, and BEPA GI, and are documented with photos to show the corrected action.

**Recommendation 8:** Formally notify construction contractors of the start of the guarantee periods and their associated contractual obligations.

**Response:** This is already in place. DDC already formally notifies the Construction Contractor that the guarantee period has begun by either exercising Article 16 of the Standard Construction Contract or by declaring the project Substantially Completed (Article 14). Substantial Completion walkthroughs develop a "Punch List" where unresolved contractual obligations are identified and itemized. Final payment is not issued until all identified issues are corrected.

**Recommendation 9:** Issue contractually binding written instructions to all consultants whose responsibilities include oversight of rain garden maintenance, including the specific oversight, follow-up, and reporting activities required to enable DDC to obtain reasonable assurance that its construction contractors properly maintain the rain gardens they build for DDC throughout the relevant guarantee periods.

**Response:** This is already in place. DDC already provides instructions to consultants through the "Request for Construction Support Services," which outlines the oversight and reporting responsibilities for consultants. This document is contractually binding.

**Recommendation 10:** Establish and enforce record-keeping requirements for the proper oversight of rain garden maintenance throughout the relevant guarantee periods.

**Response:** DDC developed and expanded the role of GIM services in order to better support the Construction Management team. Their role includes oversight and record keeping throughout the guarantee periods.

**Recommendation 11:** Track, review, and maintain the required records of its consultants' oversight activities to help ensure those activities are sufficient and effective.

**Response:** This is already in place. DDC currently tracks, reviews and maintains the required records of its consultants' oversight activities. GIM reports document and track rain gardens that require corrective action.

**Recommendation 12:** Ensure that its contracted GIM consultants perform all required monthly and other inspections, such as final inspections, of their assigned rain gardens as tasked throughout the relevant guarantee periods.

**Response:** This is already in place. GIM services are performed on as needed basis, which is typically monthly, and all inspection reports for requested services are reviewed by DDC EICs and other qualified DDC staff.

**Recommendation 13:** Designate and require Design Project Managers/EICs or other qualified DDC staff to review GIM consultants' inspection reports, including photographs, regularly to determine whether they (a) are complete and internally consistent, and (b) properly document all unsatisfactory conditions requiring correction by the construction contractors.

**Response:** This is already in place. DDC EICs and other qualified DDC staff currently review GIM Inspection Reports. These reports require photographs and indicate unsatisfactory conditions for the sole purpose of communicating to the Contractor that an issue needs to be addressed. The Contractor, in turn, provides photo documentation that the issue has been satisfactorily resolved.

**Recommendation 14:** Ensure that all GIM consultants prepare the inspection reports in accordance with the format specified in the task orders and that they contain all information necessary to facilitate proper oversight and timely follow up. In that regard, format the standard inspection report to include at a minimum the following critical information.

- a. the initial inventory and current quantities of plantings as shown on and compared to the approved plans, noting any variance;
- b. identification of specific plants requiring replacement or additional care and recommended replacements; the date of the most recent scheduled maintenance performed by the contractor and;
- c. all information needed to accurately identify the rain garden's location without referring to other records, including, in addition to the ID#, the street address and GPS coordinates, to enable users to readily locate the rain garden based only on the inspection report and thereby facilitate timely follow-up to correct any deficient conditions the report identifies.

**Response:** DDC agrees that the items listed are important items to capture, however, the GIM may not necessarily be the ideal method of documenting them in each case. Specifically:

- a. The Resident Engineer and their staff are responsible for recording the initial inventory and current quantities of plantings as shown on and compared to the approved plans, noting any variance.
- b. At Final Inspection, specific plants requiring replacement or additional care are identified and included in the punch list.
- c. The Resident Engineer is responsible for maintaining these records and the information can be included in GIM Reports.
- d. Going forward, information needed to accurately identify the rain garden's location without referring to other records, including the ID#, the street address and GPS will be reflected in the GIM checklist.

**Recommendation 15:** Ensure that DDC's designated EICs or other qualified staff regularly follow up with construction contractors to remedy deficient conditions promptly and maintain documentation in the relevant project files reflecting all pertinent communications and any follow-up and corrective action taken.

**Response:** This is already in place. DDC will continue to ensure that follow up is regular and consistent in order to remediate deficiencies. Enhanced documentation tracking is intended by utilizing GIM more aggressively than was the case under the projects that were audited.

**Recommendation 16:** Ensure that the responsible construction contractors are directed to correct unsatisfactory conditions during the guarantee periods and that DDC invokes appropriate contractual remedies as needed to enforce the City's rights and provide assurance that the rain gardens for which the City pays meet relevant contractual standards.

**Response:** This is already in place. DDC will continue to enforce corrective actions to ensure unsatisfactory conditions are corrected and rain gardens meet contractual standards.

**Recommendation 17:** Develop and distribute policies and procedures for oversight of rain gardens during the guarantee periods that detail Design Project Managers, EICs' and consultants' oversight responsibilities, including for maintaining documentation of all actions taken that bear on DDC's enforcement of the pertinent construction and oversight contracts.

**Response:** As part of DDC's overall approach, the agency is reviewing current Standard Operating Procedures (SOPs) and the need for additional SOPs. SOPs are regularly being developed, updated and issued, including those that relate to oversight responsibilities of rain gardens during the guarantee periods.

**Recommendation 18:** Incorporate the maintenance requirements stipulated in the relevant contract sections in the policies and procedures DDC develops and distributes for oversight of rain garden maintenance during the guarantee period.

**Response:** Stipulations have been revised to better meet the needs in establishing the Rain Gardens in the newly published NYCDEP Standard Green Infrastructure Specifications. DDC believes the NYCDEP specifications are sufficient guidance.

**Recommendation 19:** Refer to and incorporate relevant portions of DEP's Rain Gardens Maintenance Manual in DDC's contracts and in the policies and procedures it develops and distributes for the proper maintenance and oversight of rain gardens during the guarantee period by construction contractors, consultants, and in-house Design Project Managers and EICs.

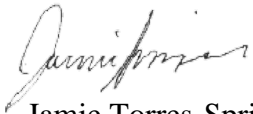
**Response:** DDC believes that the current guidance is sufficient. The DOT OCMC (Office of Construction Mitigation and Coordination) Stipulations require compliance with The DEP Rain

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Garden Maintenance Manual. OCMC Stipulations are required before a Contractor can begin work in the public right of way. Additionally, there are specifications incorporated into DDC Contracts where Maintenance of Site for Green Infrastructure is expanded on as well as the a new NYCDEP Standard Green Infrastructure Specification that has been published.

Sincerely,



Jamie Torres-Springer  
Commissioner