Outfall #999
(at Gallatin St. and 14th St. NE)
Stormwater Trash Interceptor

Statement of Work

Plan for Construction, Maintenance, and Operation
of a Trash Interceptor Cage
at Stormwater Outfall #999, District of Columbia

February 17, 2014

Living Classrooms of the National Capital Region
in partnership with

Potomac Electric Power Company
District Department of the Environment

with technology by
Clearwater Mills, LLC

Appendix A

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Exhibits

I. Overview

Living Classrooms of the National Capital Region ("Living Classrooms") is pleased to present this Statement of Work for a water quality improvement project for capturing and removing trash and debris from storm water entering the Anacostia River via the outfall located adjacent to the north side of the intersection of Gallatin St. NE and 14th St. NE, Washington, DC. This outfall is referred to as "Outfall #999" for purposes of this proposal and related project.

This project brings together the collective expertise of multiple organizations within the District of Columbia with the common goal of improving the waterways of our nation's capital while supporting job training, employment opportunities, and sustainable technologies. This proposal builds upon Living Classrooms' extensive experience leading Anacostia environmental projects in Washington, DC, as well as components of the Healthy Harbors Initiative in Baltimore, Maryland, where Living Classrooms is a key partner.

Funded by a contribution of $600,000 from Pepco, this project spans the design, fabrication, installation, and ongoing operation of a new technology for trash interception at small-to-medium sized stormwater outfalls. This project will reduce the amount of refuse entering the Anacostia River, while also providing a "learning by doing" site where researchers, teachers, students, and job trainees alike can study the operation and environmental impact of this remedial technology. This multi-purpose program – combining environmental improvement, community engagement, education, and "learning by doing" opportunities, is a hallmark of Living Classrooms' success in stemming the tide of poverty and limited opportunity for inner city youth while improving the environments and communities in which we live.

A. Project Goals

The project proposed herein by Living Classrooms encompasses the installation of a "mechanized-lift trash cage" device and the subsequent ongoing removal and disposal of refuse collected in the cage. This project will make a positive change in the City's rivers, particularly the Anacostia River, and will expand the local base of data, knowledge, and experience around the subjects of stormwater management, urban runoff, green community initiatives, environmental improvement methodologies, and water quality.

This project will create measurable debris removal and watershed improvements, and will be backed by ongoing data collection, monitoring, and impact assessment. In addition, the project will engage Living Classrooms' workforce development participants in meaningful work experience while providing an opportunity for DC students, teachers, researchers, and the public to witness and learn from the restoration, conservation, and data collection exercises that this project encompasses.

The project will be long term in impact and duration, and all systems and structures will be designed and built to have a useful life of at least 10 years. The trash trap is expected to be constructed and installed during 2014 with operational service beginning by 2015. It is foreseeable that the trash collection site can continue operating beyond 2024 with adequate operational funding, proper maintenance, appropriate public relations and communications, and responsible leadership.

Pepco's $600,000 contribution is projected to cover the installation costs plus three years of operation and maintenance. As described further below, Living Classrooms will use its best efforts to identify and secure additional annual funding for continued operation beyond this period.

B. Project Description

This project will create a measurable and visible reduction in the amount of trash and debris in the unnamed Anacostia River tributary below Outfall #999 and its downstream waterways including the Anacostia River, the Potomac River, and the Chesapeake Bay. This reduction will be accomplished by capturing debris "at the source", through the use of a "Cage Type Trash Interceptor" installed at the outlet of the box culvert that passes under Gallatin St. NE, at the intersection with 14th St. NE, and which empties into the aforementioned tributary.

This system utilizes interception-and-containment cages through which stormwater flows, trapping trash and debris. This device will be designed and constructed to withstand flood conditions at the site as well as provide containment of a large portion of the debris emanating from the sewer system, at flow rates of up to a 10-year major storm event. Benefits of this system include:

- Improved appearance of outfall creek bed and side banks
- Accretive water quality improvement in the Anacostia River and other downstream water bodies
- Powered by renewable, solar energy
- Cost effective approach to trash clean up, near the source
- Continuous, 24/7 trash removal
- Educational and environmental point of interest
- An attractive demonstration of a commitment to improve the environment

Clearwater Mills, LLC ("Clearwater Mills") will be Living Classrooms' primary subcontractor for site assessment, engineering, design, fabrication, and installation. Clearwater Mills will also provide consultation and assistance in the development of essential training procedures for crew and supervisory staff.

Living Classrooms plans to use graduates and students from its workforce development programs (including those employed by its "Green Team" landscaping and environmental caretakers business) to help service the Trash Cage, performing routine clean-outs several times per month as dictated by storm water volumes.

C. Project Partners

1. Living Classrooms of the National Capital Region

Living Classrooms of the National Capital Region ("Living Classrooms") is the division of Living Classrooms Foundation that serves Washington, DC and surrounding suburbs. Living Classrooms Foundation (and its subsidiaries) is a registered 501(c) nonprofit corporation. With campuses in the District of Columbia and in Baltimore, Maryland, Living Classrooms Foundation has been a regional leader in environmental education, job training and workforce development for nearly three decades. The foundation has a proven track record of successful leadership and management in diverse fields, but with a particular emphasis on "green" projects. Living Classrooms of the National Capital Region will be responsible for overall project management, coordination of project partner efforts and the ongoing operation and maintenance of the equipment.

2. Potomac Electric Power Company

Pepco: As one of the largest energy suppliers in the region, Pepco seeks opportunities to support organizations and efforts to improve our environment and our community through meaningful projects like the one outlined in this work plan. This project is being sponsored by Pepco and completed as part of a settlement agreement with the District Department of the Environment.

3. DDOE

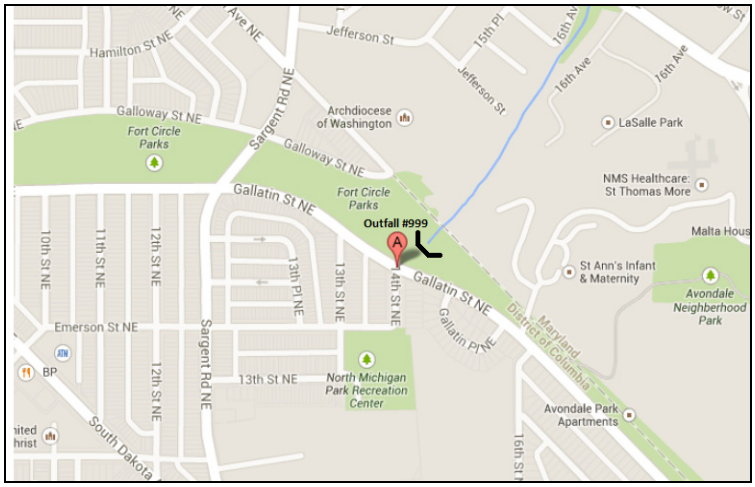
District Department of the Environment ("DDOE") is the leading authority on energy and environmental issues affecting the District of Columbia. DDOE was involved in selecting the site for this Project as part of the settlement of an action brought against Pepco. DDOE will provide regulatory and technical oversight for Project design, installation and operation.

4. Clearwater Mills

Clearwater Mills, LLC is a Maryland based company with a proven track record in improving waterways by designing, constructing and operating innovative, sustainable technologies for removing trash and debris from stormwater runoff. It will be Living Classrooms' primary subcontractor for the design and fabrication stages of this project. Clearwater Mills will also consult on the development of measures and metrics as well as conduct an annual review of operating procedures and data collection methods. Clearwater Mills has many years of experience studying and creating solutions for the collection of stormwater debris. The company has developed systems that offer notable improvements over competing technologies to meet the unique challenges presented by this problem.

D. Planned Location

The planned location for this project is at District Municipal separate storm sewer system (MS4) outfall #999 which drains into an unnamed tributary to the northwest branch of the Anacostia River. As shown in the following figure, this outfall is situated on the north side of the intersection of Gallatin Street NE and 14th Street NE in the North Michigan Park neighborhood of Washington, DC.



Outfall #999, Gallatin & 14th Streets, NE

The equipment will be placed at the downstream opening of the box culvert that passes under Gallatin Street (shown in the photo below). The structure and configuration of the outfall are well suited for the type of interception equipment proposed. The trash cage and its related structures will span the opening and rest close to the concrete face of the box culvert. This not only ensures full capture of debris during both light and heavy rain events, but also serves to block unwitting or adventurous persons from climbing around and into the cage when it is set in normal operating position.

DC Outfall #999

1. Watershed Characteristics

As described earlier, this outfall is part of the District MS4 stormwater system. It receives runoff from a watershed of approximately 660 acres. The land use in the watershed is an urban mixture of residential, transportation, open green space, and public facilities (i.e., schools and a hospital). The combination of somewhat steep terrain, impervious surfaces, and the lack of stormwater retention infrastructure results in high velocity runoff during and following storm events.

2. Current Site Conditions

The box culvert that comprises Outfall #999 passes under Gallatin Street NE with its outlet end located on the north side of the street opposite the intersection with 14th Street. The unnamed tributary into which the outfall drains runs north through a wooded area for about 500 feet before crossing the District line into Maryland. There, it is fed by at least one other stormwater creek and ultimately empties into the Northwest branch of the Anacostia River.

Above the outfall, four-foot wide sidewalks run along both sides of Gallatin Street. The north-side sidewalk is bordered by a grass strip and a more heavily vegetated area beyond. This vegetated area slopes gradually downward, away from the sidewalk, and adjoins the top edge of the retaining wall that forms the outlet end of the box culvert. This wall is roughly 18 feet away from the sidewalk and rises about 15 feet above the culvert shelf. The culvert retaining wall is topped by a chain link fence intended to prevent people from falling over the edge and onto the culvert shelf below.

The grounds above the outfall and the chain link fence are currently overgrown with grasses and vines. Vegetation is also encroaching on the outflow side of the retaining wall. The following photographs show current conditions (*photos taken 10/28/2013*).

Curbside view above DC Outfall #999 (facing north)

Outflow view of DC Outfall #999

The curb and sidewalk above the outfall contain two wide storm drains, each having two manhole covers, as well as two pedestrian "curb-cuts" to accommodate transition from street-to-sidewalk for bicycles, baby strollers, wheelchairs, and the like.

The project scope includes the requisite modifications and improvements to the curbside area, including clearing of vegetation from the fencing and immediate grounds, installation of new fencing and rails as needed, a wider curb-cut and parking area for the trash collection vehicle, and minor landscaping after installation to give the site an overall attractive appearance.

The existing concrete box culvert includes the aforementioned retention wall and a sloped-side bottom shelf that empties into the creek. This concrete structure provides an ideal foundation for the trash cage to rest upon as well as a solid anchoring point for vertical guide rails and lift cables. The ground above the outfall is well packed soil, judged capable of securing a post or piling to which will be attached the hoist, solar panel, battery cabinet, and operator panel.

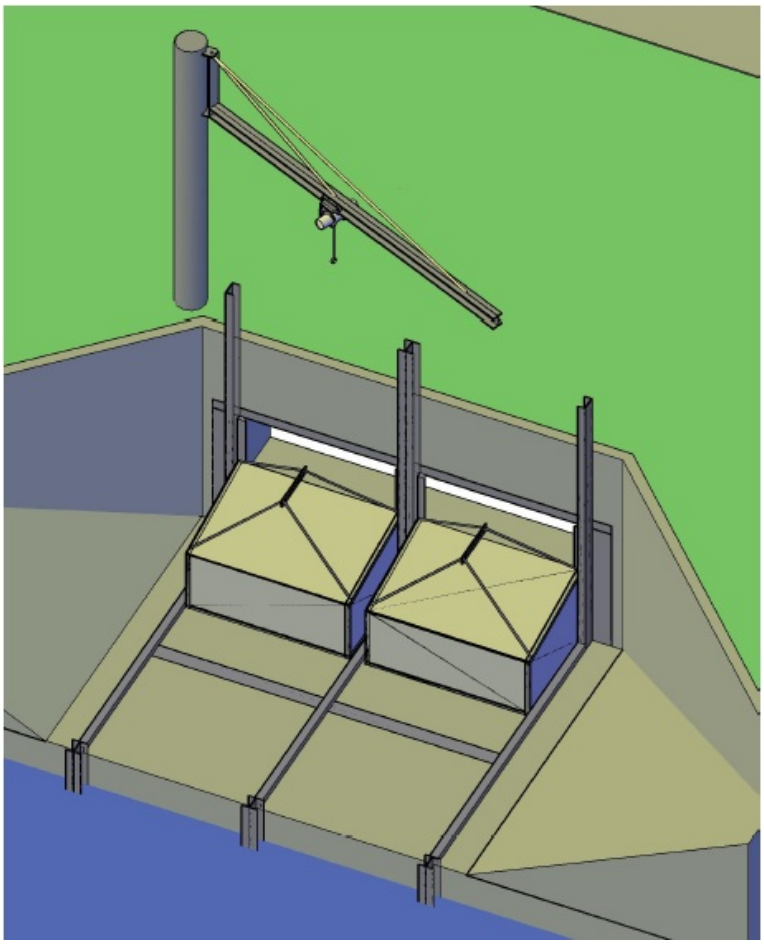
E. Trash Cage Technology

The technology utilized in this system was developed to meet the challenges of removing gross refuse and trash pollutants from stormwater runoff in outfalls of this size while addressing certain drawbacks associated with other available systems. The cage system is heavy duty and strong. The proposed design allows for the cage to be raised to street level during clean-out, making for a more convenient and safe operation.

The solar powered electrical components that will be used for this system eliminate the need for external connections to the city power grid while having the added benefit of being compatible with a motor vehicle's 12 volt electrical systems. The motorized hoist can be powered by the service vehicle using standard jumper cables in the event of a low-charged battery, such as can occur during extended cloudy periods.

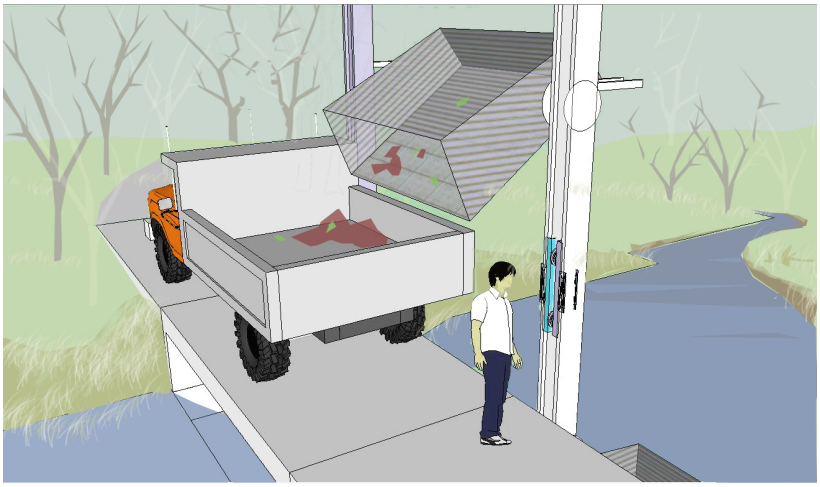
Clearwater Mills has conducted a preliminary survey of Outfall #999 and has rendered an opinion that the location is well suited for a trash cage type interceptor, offering an ideal installation site as well as sufficient space and ease of access for routine trash collections.

The trash interceptor would be very similar in design, appearance and operation to the dual-cage example shown in the figure below (although it is anticipated that the system for Outfall #999 likely will utilize a single-cage installation). Multi-cage installations like the one depicted are used in extra-wide culverts and/or high-mass debris situations to keep loaded cage weights within manageable limits. The actual configuration will be chosen based upon a detailed analysis conducted during the design-phase of this project.



Culvert-mounted trash cage and gantry crane

The trash cage interceptor will be positioned at the downstream opening of the concrete box culvert. This opening measures 16 feet wide by 7 feet high. The interceptor cage(s) will be sized for this opening and with a volume adequate to contain trash and debris from storm events. The cage is held in place at the opening of the outfall on slide anchors attached to vertical guide rails, permitting easy lifting and emptying at street level by way of a fixed gantry (see example below). The gantry will utilize a solar powered electric hoist.



Street-level lift system

The trash cage interceptor system includes three major components:

1. Containment "cages": The cages will be constructed of galvanized steel grating on the sides, top, and downstream end. The upstream end is open to allow for filling and emptying of the container. The bottom is a solid galvanized plate to facilitate dumping. The top is held down by a spring loaded hinge to prevent a damming effect in extreme high flow conditions. The cage will be sized according to a pre-design analysis of water and trash flows at the site.

2. Mounting structure: The containment cage is held in place by a mounting structure consisting of steel guide rails with corrosion resistant coatings. Based on the initial evaluation of the site, it is expected that the guide rail structure will be attached directly to the outfall face wall and bottom apron with concrete anchors and bolts. The final anchoring method for this project will be based upon design-phase analyses and consultation with the agencies and partners involved.

3. Hoist system: When being cleaned out, the containment cage is lifted to street level above the culvert and emptied into a truck using the hoist system. This simple gantry type crane, powered by solar electric panels and a

rechargeable battery, is mounted to a separate piling or pole erected at street level above the culvert. This pole is extended high out of arms reach to provide a safe and unshaded mounting point for the solar panel. The single-pole installation makes for a minimalist and unobtrusive street-side appearance. The operator controls and battery are protected and secured behind a locked panel. (The pole and hoist assembly are further secured against unauthorized access by fencing and a locked gate; see "Site Improvements" section.)

F. System Benefits

- effective containment of trash and debris
- cost effective, street-level operation
- publically viewable site with educational opportunities
- facilitates data collection and analysis for evaluating residential and street surface wastes as well as the effectiveness of any upstream efforts
- no disposable containment equipment (i.e. nets, floats, etc.)
- does not require wading, intermediate transport/hauling to loading point, nor heavy equipment during trash collections
- requires only basic training for operators
- maintenance requirements are simple and inexpensive

II. Project Implementation

A. Project Organization

This project will be managed by Living Classrooms which will contract with Clearwater Mills for the design, construction, and installation of the system. Clearwater Mills will also provide technical assistance during the development of operational procedures, particularly in the areas of data collection and analysis. Clearwater Mills will utilize its own subcontractors and engineering specialists for site analysis, design input, and specialty services (e.g., a pile driving firm), during installation.

Post-installation, the routine emptying and operation of the trash collection system will be managed by Living Classrooms supervisory staff using crews drawn from Living Classrooms "Green Team" (graduates of Workforce Development programs) and its most capable Workforce Development students.

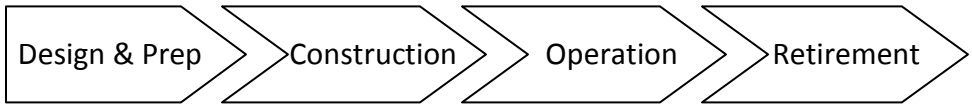
Having implemented a similar project in Baltimore with Clearwater Mills, Living Classrooms has the technical experience and know-how to successfully implement and manage this project.

B. Timeline and Budget

The project timeline is comprised of four stages:

1) Pre-construction planning, design, and permitting
2) Construction, site-preparation, and installation
3) Routine operations: Clean-out, measurement, reporting, and servicing
4) Retirement and de-installation (long term)

These stages and the types of activities involved in each are shown below along a notional timeframe. A detailed project plan and schedule of critical milestones will be created early in the project and updated throughout:



2013 - 2014	*2014*	*2015 ~ 2024*	*???*
• Site Assessment • Engineering • Permitting • Scheduling • Agreements • Policy/Procedure • Budgeting	• Purchasing • Fabrication • Site Excavation • Installation • Signage/Finishes	• Training • Policy/Procedure • Scheduling • Servicing • Maintenance • Reporting • Re-funding	• Planning • Permitting • De-installation • Site Restoration

The following subsections further describe the four project stages and provide preliminary budget projections. These budgets projections are intended as order of magnitude estimates for high level planning purposes only. Detailed budgets will be refined and documented as part of the design phase of work. The preliminary budget projections presented below indicate that the total cost to design, permit, procure, and install the system and then operate the system for three years will be approximately $550,000 to $600,000. To the extent that the actual cost for these activities is less than Pepco's $600,000 contribution, the remaining funds will be used to cover operations beyond the initial three-year period included in this cost projection.

1. Design & Prep

Estimated Duration	**8 months**
Estimated Cost	**$273,000**

The preconstruction phase of the project will generate the detailed plans for construction and operation of the system, associated approvals, required permitting, and all necessary side agreements between the various counterparties. There are no alterations to the planned site nor any capital equipment expenses incurred during this phase.

During Stage 1, the conceptual design envisioned throughout this proposal will be refined into a preliminary design document, a detailed design, and a detailed system specification based on a site survey, stream flow analysis, and agency input. These designs will be submitted for review, modification and approval by DDOE and other project partners and necessary counterparties. Once the final design is approved, Living Classrooms and Clearwater Mills will prepare final pricing and scheduling for the installation of the trash interceptor system.

A workup of the Stage 1 costs is attached as Exhibit 1.

Activities and deliverables in Stage 1 include:

- Site Assessment – Clearwater Mills and its subcontractors will conduct a site survey and a stream flow analysis as well as consultations with DDOE, DDOT, DC Water, and NPS to determine and quantify all current conditions impacting design. The assessment will include analysis of the site grounds and existing structures (vegetation, soils, creek bed, sidewalks, drains, culvert, etc.) to ascertain the scope of required preparations and modifications, prior to construction and installation. Outputs include drawings, site plan, and ground assessment.
- Engineering – Creation of detailed specifications relative to the site preparation and construction work, trash cage, hoist, power source, and overall configuration. Site layout plan will show curbside and culvert alterations, vehicular access, anchoring slabs, pilings, posts, and signage.

- Permitting – Upon DDOE's approval of the final design, securing of required permits from the various authorities including, DC Water, DC Department of Transportation, DC Department of the Environment, National Park Service, and the Army Corp of Engineers.
- Scheduling – Development of a detailed timeline and project plan for the construction and installation phase of the project.
- Budgeting – Development of a detailed budget for the procurement, fabrication and installation of the trash cage (including contingencies) and for the annual operation of the system.
- Agreements – In addition to subcontractor and supplier agreements, Living Classrooms will establish service agreements and/or letters of understanding with those organizations having authority over the site, for routine operation and servicing of the trash cage and immediate grounds. Agreements shall clarify ownership titles, responsibilities, authorities, change order procedures, and liability.
- Preliminary Policy/Procedure – Development of preliminary policy objectives and procedure documents related to the routine operations, safety protocols, uses, and accessibility of the equipment and the site. Additionally, preliminary plans and objectives for operator training programs will be developed. Once reviewed and vetted, these preliminary policies and procedures will be further refined into formal documents and training programs during the next stage of the project.

2. Construction & Installation

Estimated Duration	**4 – 6 months**
Estimated Cost	**$126,000 to $178,000**

The second stage of the project involves preparation of the physical site, procurement and fabrication of equipment, installation of the system, refinement of operating procedures and associated training programs, and site finishes. The trash cage, support members, and lift-related cabling will be fabricated offsite by Clearwater Mills. The electric hoist, solar power components, and operator interface components will be procured from reputable suppliers and integrated by Clearwater Mills. All components will be delivered to the site for final integration and installation.

A workup of Stage 2 estimated costs is presented in Exhibit 2. A detailed cost schedule for Stage 2 is an output of Stage 1.

Activities and deliverables in Stage 2 include:

- Procurement – Living Classrooms, Clearwater Mills and its subcontractors will procure necessary components and materials per the detailed

specifications generated during Stage 1. In addition to the system components, site finish materials will include fencing, railing, and signage.

- Fabrication – Offsite fabrication of the trash cage, built to specified dimensions, will be conducted by Clearwater Mills and its subcontractors. Certain preparation, modification, and integration of procured system elements, such as power system and operator interface, will also take place offsite prior to delivery of the system components to the site.
- Inspections and Oversight – All site work will be coordinated in advance with DDOE and other project partners to allow opportunity for oversight and inspection of work as it occurs.
- Site & Grounds Alterations – The main site modifications include a curb-cut (installing a beveled, driveway entry curb) and creation of an off-street parking space above the outfall to allow vehicle access for routine clean-outs of the trash cage. Guide beams will be attached and secured to the concrete culvert (or to pilings driven into the creek bed, depending on the final design) to support and guide the cages. A mounting pole or piling will also be installed at street level to support the gantry lift mechanisms (hoist motor, boom, and cabling), solar panel, and operator station. This work is anticipated to take less than two weeks.
- Component Installation – The trash cage and lifting mechanisms will be installed at the outfall. Enclosures mounted to the upper piling will house and protect a rechargeable battery and operator panel. Electrical components and cabling will be appropriately protected from weather and vandalism. This work too, is anticipated to take less than two weeks. Thus, the site prep and equipment installation will likely take less than one month combined (not including site finishes – see below).
- Formal Policies/Procedures & Training Programs – Preliminary policies and procedure developed during Stage 1 will be refined and formalized to reflect the actual equipment and site configuration. Operator training requirements, certification categories, and training programs will be specifically identified and formalized. Certain supervisor training can be conducted prior to complete installation, including OSHA requirements, first-aid, safe-handling for trash collectors, and similar safety related subjects. Operational training on the actual equipment will also occur in this Stage, after the equipment is fully installed and operational.
- Site Finishes – On-site protection and safety elements will be installed at the site including fencing, railings, equipment guards, security locks, and warning signs. The existing pathway leading around and down to the bottom of the culvert will be improved (adding such things as railroad-tie steps, gravel, etc.) to allow safe access for inspection and maintenance of the trash cage, while preventing public access by means of a locked gate and obstructive vegetation at the top. A gravel bed will be installed on the vehicle drive and/or parking space as deemed appropriate for attractiveness and navigability. Impervious surfacing will be avoided, to maintain existing drainage patterns, although

sediment and erosion control features may be added to the site and path if prudent or required. Minor landscaping and trimming will be conducted to give the site an overall attractive appearance.

- Public Signage –Attractive signage will be placed at the site to provide information to the passing public and educational visitors, including appropriate safety warnings and a telephone number to report problems or concerns about the system. Signage will give recognition to project sponsors and participants including Pepco, Living Classrooms, Clearwater Mills, and DDOE. Other parties, such as DC Water and the National Park Service may also wish to be recognized and/or to provide secondary signage. Public signage will include the following statement: "This project was undertaken in connection with the settlement of an enforcement action, District of Columbia v. Pepco, taken on behalf of DDOE under the District's Water Pollution Control Act."
- Installation Report and Site Tour – Once the system has been installed and has commenced operation Living Classrooms will prepare and distribute a report to project partners providing details about the as-built system, including before and after photos, list of site alterations, final site plan, list of actual equipment, warranties, the actual costs to design and install the system, and a description of the environmental and public health benefits anticipated from the operation. Examples of the final operators' guides and training program outlines will be included as well. Living Classrooms will host an on-site "walkthrough" tour and demonstration for all project partners and involved parties soon after this report is complete.

3. Operation (Routine collection and maintenance)

Estimated Duration	**Minimum of 3 years**
Estimated Cost	**$156,000 ($52,000 / yr)**

Stage 3 is the results realization period of the project during which trash and debris are removed from storm water at the outfall before it enters the storm creek, the Anacostia River, and subsequent down-river water bodies. It is hoped that the demonstrated efficacy of the system may motivate other sponsorships and installation of similar technology at other outfalls around the District, its creeks, and its rivers.

A breakdown of estimated annual operating costs is presented in Exhibit 3. Accordingly, it is estimated that funds remaining from Pepco's $600,000 contribution after installation of the system will cover a minimum of 3 years of operations by Living Classrooms. Living Classrooms will use best efforts to seek additional funding for operation and maintenance of the system beyond the period covered by the initial funding. However, if such supplemental funding is not available, the system will be shut down and

removed or, with DDOE's approval, transferred to another third party operator (who will be responsible for finding the requisite funding).

For the routine clean-out operations related to this system, Living Classrooms intends to primarily utilize graduates and senior students, both paid and volunteer, from its Workforce Development programs. For example, the Living Classrooms "Green Team" is a group of prior graduates that are paid to perform landscaping and maintenance service on Kingman Island in the Anacostia River. This team, and others like it, will be the kinds of teams employed to service the trash cage.

The exact scheduling interval for clean-outs of the trash cage will evolve as actual evidence and trash volumes are collected in the early weeks of operation. It is estimated that weekly clean-outs, with additional post-storm clean-outs, will be an appropriate schedule to keep the trash cage from over filling.

4. Retirement

Estimated Duration	**2 months**
Estimated Cost	**$25,000**

If funding for ongoing operations and maintenance cannot be obtained, or the system otherwise reaches the end of its useful life, the system will be removed and the site restored to its original conditions (except to the extent that DDOE elects to retain any of the site improvements).

The projected $25,000 retirement cost is a rough estimate based on information available at this time. Also, there is likely to be some salvage value for components of the system which can offset some of the retirement costs.

Because the site modifications are relatively minor in terms of physical alterations, the de-installation can be conducted within a couple of weeks, subsequent to obtaining the necessary permits and approvals.

III. Site Improvements

Existing site conditions are described earlier in this document in section I.D.2. Certain site modifications and improvements will be made to accommodate the installation of the trash interceptor, routine trash collection and maintenance, and safe viewing by passing pedestrians and organized student groups.

Because the trash cage sits at the bottom of the culvert wall, it is hidden from street-side view. Only the parking area, hoist, and solar panel will be immediately evident to passers by. The following drawing depicts one possible site layout and highlights the small footprint of the street-side alterations relative to the surrounding area:

The street-side area above the outfall will be upgraded in the following ways:

- Cut-back and removal of invasive (and obstructive) vegetation
- Minor landscaping and plantings to replace any disturbed native vegetation and to provide a finished official appearance to the site
- Added fencing and secured gating to restrict access to all equipment
- Base and pole (or piling) erected to anchor the hoist mechanism and operator controls
- Mounting of a solar panel (likely atop hoist pole) high enough to minimize vandalism

- Creation of a beveled driveway curb and a level parking area for backing in and parking of the trash collection vehicle (typically, a pick-up truck)

- Installation of informational, educational, and safety signage that includes recognition of the sponsoring organizations and partners.

The culvert and its retaining wall will also be cleared of overgrowth vegetation prior to system installation and periodically trimmed thereafter to prevent interference with the normal operations of the trash cage.

The following subsections provide some additional points about safety and access.

A. Safety Features

The creek and the culvert that form Outfall #999 are currently accessible by foot on the downstream side and will remain so. The Fort Circles Park that borders the creek has a mowed strip along the wooded areas above the creek that allows walkers and hikers to venture up to the edge of the cliff-like banks that overlook the creek below. It is a natural area that has been left to nature – with eroded creek banks that are steep and overgrown with vegetation.

Given the open nature of the creek and surrounding woods, there is no feasible way to prevent unauthorized access to the creek bed and, therefore, the culvert and the trash cage that will be installed there. Nonetheless, we can create some impediments to discourage pedestrians from climbing down to the creek directly from the street-side site above the Outfall. This would include leaving certain thick vegetation that is already in place plus slightly extending the fencing on one side and adding a locked gate positioned at the top of the improved access path described above.

Accordingly, the fencing atop the outfall retaining wall will be repaired and/or replaced as needed as part of this project. The west side of the culvert is sufficiently thick with vegetation and a cliff-like bank to provide a natural impediment. On the opposite side, fencing will be extended to allow the addition of a secured gate to block the access path to the bottom of the culvert. This will allow service personnel necessary access when needed, but force would-be adventurers to find a more indirect route to the creek bed.

The power supply and control panel will be secured within a locked cabinet. This cabinet, the solar panel post, and the hoist will be further isolated by specific fencing and a locked gate. The solar panel will be mounted sufficiently high above the ground to be out of reach.

No-trespassing and lawful conduct signs will warn against unauthorized entry. Emergency and maintenance contact information will be provided.

B. Vehicle Access

A service vehicle will need to be able to park above the outfall for routine trash cage clean-outs. Best practices will be researched and followed relative to locating the drive-in entry and the associated recessed curb (a "curb-cut"). The entry and ground preparations will allow a light truck (the collection vehicle) to cross the sidewalk from Gallatin Street and park upon a prepared landing area above the outfall. It is also anticipated that the approved site plan will include a street-side, locking barrier arm gate across the entry to prohibit unauthorized parking on this space by the public. If deemed desirable, access to the parking area could be further restricted by a low-height, unobtrusive perimeter fence.

IV. Operation and Maintenance

The trash cage operation involves routine clean-outs, some periodic lubrication and maintenance, and the occasional repair. Serviceable and wearing components, such as the rechargeable battery, lifting flanges, and pulleys hoist cables, will require periodic repair or replacement, although all typically have a multi-year service life. Damage from rough handling or vandalism may also necessitate repairs or replacement of specific parts. To the extent possible, the equipment will be protected from the elements as well as vandalism. Operational crews will be thoroughly trained to understand and avoid damage that can be caused through improper operation.

A vehicle, typically an extended-cab pick-up truck, is required to transport the crew to and from the site as well as to haul the collected trash and debris to an offsite disposal location. Living Classrooms will use its own vehicles and/or rental vehicles for this project and will charge the project internally for such vehicle use by way of a pro rated wear and tear charge or use of a standard mileage fee.

In addition to the heavy duty fabricated trash cage, high quality third party components will be specified and procured for the system. Standard manufacturer warranties will apply. Living Classrooms possesses the resident skills and tools to conduct routine repairs and welding on the cage and its lift mechanisms if and when necessary.

A. Crew

Living Classrooms operates multiple job placement training programs, known as Fresh Start and our Workforce Development Center. These programs train unemployed or underemployed men and women for job placements and support them in job retention. In association with these programs, Living Classrooms has created several fee-based service businesses to serve as employment, training, and career advancement vehicles for individuals who have completed the programs and have expressed an interest in outdoor work, landscaping, green technologies, or community service projects. Individuals are employed and paid through the program, and are engaged in meaningful projects teaching them about successful workplace comportment, with a specific focus on landscaping, green technology projects, and the technical skills needed in these fields. One such group, the Living Classrooms Green Team, maintains and improves the property and shoreline of Kingman Island. They and others also work on other projects, including large scale improvements we are making at Camp Fraser in Great Falls, VA, a facility that is managed and operated by Living Classrooms.

Routine operations and maintenance of the trash cage system will be carried out primarily by members of the Living Classrooms Green Team. All crews include a manager who has been formally certified by Living Classrooms in specific operational procedures and who has demonstrated the supervisory skills required for the assignment. Additionally, each crew is supervised by a Living Classrooms staff member who provides additional oversight and assistance.

For the trash trap operation, a 2 or 3 person crew will be utilized to conduct each routine clean-out, with at least one member of that crew being a certified supervisor per the policy and training requirements developed by Living Classrooms for this trash trap collection operation.

B. Special Equipment

Crews will be supplied with and trained on the use of requisite safety equipment and apparel including boots, gloves, safety glasses, hard hats, long-reach grabbers, basic mechanic's tools, and a first aid kit.

C. Clean-Out Procedures

The routine clean-out of the trash cage will be performed by crew members who have received pre-training and certification in compliance with the policies and procedures developed specifically for this operation. Routine collections will be conducted by the crew who will travel to the site in an extended-cab pick-up truck or other hauling vehicle appropriate for the service. In addition to removing and hauling away the trash, the crew will be responsible for basic measurements and sampling of the collected waste materials in order to weigh and document the various categories of trash intercepted by the cage. Standardized forms and spreadsheets will be used to record and capture data for each site visit, including trash data, weather data, and system maintenance inspections. An example of a trash data capture form is shown in Exhibit 4. A protocol for trash sampling and measurement will be developed as part of the project design, along with appropriate project-specific data collection forms.

Trash will be bagged and hauled away for disposal at an off-site dumpster. Prior to disposal, some types of trash may be further examined, photographed, and/or used for environmental education purposes.

Additionally, supervisory personnel and researchers will capture rainfall and storm event statistics to create an overlay of these events relative to the types and volumes of trash collected. Other environmental data captured through unrelated programs also may be included in the trash analysis to the extent it is relevant or analytically insightful.

D. Scheduling

Living Classrooms supervisory staff will be responsible for overseeing the staffing, scheduling, and performance of the clean-out crews. Periodic site inspections will also be conducted by Living Classrooms staff. When necessary, Living Classrooms will schedule and dispatch skilled personnel to conduct maintenance and repair tasks.

The initial schedule set up for periodic clean-outs will be based on the analysis of outfall water and trash flows that was conducted during Stage 1 of this project. It is planned that weekly clean-outs will be conducted in the early months of operation, with additional clean-outs conducted immediately after storm events.

As evidence and actual statistics are gathered, the servicing schedule will be adjusted to the appropriate frequency to prevent the trash cage from over filling. At a minimum, the site will be visited at least twice per month, even during extended dry periods, to monitor the site for damage, vandalism, or any other irregularity that may require action.

Living Classrooms welcomes site visits by the project partners and others during trash collection events. Monthly collection schedules (which are subject to change with the weather) will always be prepared in advance and the partners can request to receive these automatically when generated. Pepco and DDOE will be given phone and email contact information for various persons at Living Classrooms, including who to contact to get an up-to-date schedule of upcoming collections (always recommended, since the schedule is subject to change). In addition, Living Classrooms will notify the designated contacts at DDOE and Pepco when and if a particularly interesting set of collection(s) is about to take place (for example, sending out a reminder prior to a forecasted major storm event, a "community engagement" event, or a site visit by a notable dignitary).

V. Monitoring and Reporting

As described in section II.B.2 earlier, an Installation Report describing the as-installed system and site will be prepared once the system has been installed and has commenced operation.

Living Classrooms will provide a summary report of collection activities and trash statistics will be prepared for the project sponsors annually. This report will include an itemized accounting of the system operating costs for the prior year, as well as a description of environmental and public health benefits resulting from the operation of the system. Interim reports showing trash collection data can be provided upon request.

The desired outcome of this project is to reduce trash and debris in the drainage creek below the targeted outfall. The improvement in appearance will benefit the neighborhood, the nearby park, and the public view from the sidewalk above the outfall. The reduction in downstream trash will directly improve the water quality of the Anacostia River and its connected waterways within the District of Columbia, through the removal of floating and inorganic debris.

Monitoring and impact assessment are a key part of this project in quantifying the impact and providing insight for refining similar projects in the future. While debris removal at a single outfall will not create a measurable change in water quality as measured in the Potomac River, it could make a noticeable and visible reduction in trash in and along the banks of the Anacostia River. Since Living Classrooms regularly operates its educational vessels (near daily) on the Anacostia and conducts several debris collection events a year on Kingman and Heritage Islands (Living Classrooms is the official caretaker and operator the islands), it will seek to capture informal evidence of such improvements, through periodic photographs, measurements of trash collected during events, and examination of information gathered from partner organizations.

Formally, Living Classrooms will undertake ongoing monitoring at the project site to create a data set as well as a learning experience for educational and workforce development purposes. Living Classrooms will utilize a variety of technologies and tracking systems in this effort. All data will be input in simple tracking spreadsheets to create a simple data storage system, but may also be entered into web-based, GIS enabled systems. A summary of the trash collection data will be presented in each annual operating report, and raw data will be available, given a reasonable lead-time, if requested.

Monitoring will focus on documenting the types of debris collected, volumes, and weights. Typical scientific sampling will be used to compile these data and extrapolated to meaningful intervals, gross measures, and event references, such as total annual collections, quarterly averages, monthly rainfall, and major storm rainfalls.

To the extent reasonably feasible, Living Classrooms will also collect storm and water flow event data such as the depth of water exiting the outfall and estimates of the volume of water passing through the outfall during various collection and weather events.

Additionally, as part of educational programming, Living Classrooms may also occasionally take measurements of water temperature, pH, fecal coliform, phosphates, and total suspended solids. Living Classrooms may use a variety of wet chemistry activities with students and Green Team members to collect such variables. For information purposes only, Living Classrooms will inform the sponsors about the types and frequency of ancillary educational activities as may be conducted at the site. Likewise, when and if pertinent insights are discovered through these activities relative to the environmental impact of the trash cage system, Living Classrooms will share such information in the annual operating report.

Living Classrooms' main technical subcontractor for this project, Clearwater Mills, has significant expertise in measuring the impact of its systems and will be involved in the design of the data collection and impact assessment procedures.

Exhibit 1

Stage 1 - Design & Prep
Cost Estimate Breakdown

ADMINISTRATION AND GEN MGMT	Amount
Administration	90,000
Project & Contract Management	10,000
Signage Development	10,000
Insurance	11,000
ENGINEERING, DESIGN, PERMIT	
Site Assessment	12,000
Engineering	50,000
Permitting	45,000
Scheduling & Stage 2 Project Plan	20,000
Agreements	10,000
Preliminary Policy & Procedure	7,500
Training & Program Development	7,500
TOTAL ONE-TIME COSTS	**$ 273,000**

Exhibit 2

Stage 2 – Construction & Installation Cost Estimate Breakdown

(Note: Wide range in possible Stage 2 costs reflects contingency reserve, due to uncertainty in certain timings, site and engineering mandates, grounds assessment, and possible legal stipulations.)

Management, Training, Signage	**Amount**
Project & Contract Management	18,000
Signage & install	12,000
Initial Gear & Clothing	3,960
Formalize Procedures & Training	15,000
Supervisor Certification	4,000
OSHA & First Aid Training	4,000
Train the Trainers	3,000
Subtotal	**59,960**
Site Prep, Fabrication, Installation	66,000 - 118,000
Total Stage 2	**125,960 - 177,960**

Exhibit 3

Stage 3 - Operations
Annual Operating Costs Estimate Breakdown

ANNUAL & PERIODIC ACTIVITIES	Annual Cost
Repairs & Maintenance	7,200
Annual Reporting	3,570
Insurances and Training	11,800
Special tools, protective gear, & supplies	1,500
MONTHLY RECURRING	
Supervision and oversight	4,320
Site Inspections (Management)	1,800
Clean-outs (6 avg.)	7,500
Transportation & disposal	8,800
Groundskeeping	2,200
Programming coordination	3,200
TOTAL ANNUAL OPERATIONS	**$ 51,890**

Exhibit 4

Example
Trash Cage Data Collection Form

Trash Collection Data Capture

Date:	
Person Recording:	

For Office Use Only	
Entry Date:	
By:	

Type	*Weight (lb)*	*Volume (ft^3)*	*Piece Count*
Bottles/Cans			
Plastic Bags			
Papers			
Styrofoam			
Lumber			
Cloth/Textiles			
Toys/Balls			
Organics			
Other			

DESCRIBE "OTHER", IF ANY:	

HEAVY ITEMS > 5 Lbs. (Tires, Logs, Appliances, etc.):

Type or Description	*Weight (lb)*	*Volume (ft^3)*	*Max Dim (in)*	*#*

Photographs? ❑ YES ❑ NO

Weather: ❑ CLEAR ❑ RAIN ❑ SNOW ❑ POST-STORM

Detailed Water/Weather Form? ❑ YES ❑ NO