Design Report

For a Trash Cage Interceptor to be installed at Outfall 999, at Gallatin and 14th Street, NE

Revised August 26, 2015

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APPENDICES

1 Introduction

1.1 The Project

This report presents the revised design for a "trash interceptor" cage system at Outfall 999 at 14th Street, NE and Gallatin Street, NE, a major stormwater outfall in the District of Columbia. The original design report was submitted to the District of Columbia Department of Energy and Environment ("DOEE") (formerly the District Department of the Environment) on August 4, 2014. The design report has been further revised in response to additional comments from DOEE.

The trash cage system is designed to capture the substantial debris and street trash that enters the storm sewer system and is washed through the outfall during rain and storm events. Once the trash interceptor cage system is in place, trained crews will routinely empty and remove the trash that is collected in the cages.

Potomac Electric Power Company ("Pepco") is providing $600,000 to fund the design, fabrication, installation and initial operation of the trash cage system (for three years) as a Special Environmental Project in connection with the settlement of an enforcement action, District of Columbia v. Pepco, taken on behalf of DOEE under the District's Water Pollution Control Act. The trash cage project is being implemented by Living Classrooms of the National Capital Region, a subsidiary of Living Classrooms Foundation, Inc., ("Living Classrooms") pursuant to a contract with Pepco.

1.2 Anacostia Watershed and Trash Pollution

The Anacostia River is fed by hundreds of small creeks that merge to form larger tributaries and, ultimately, the northwest and northeast branches of the river. Most of these creeks are stormwater creeks, sourced by rain water that runs off of the many impervious surfaces within the suburban and urban neighborhoods that cover much of the Anacostia Watershed. Underground storm pipes throughout the watershed within DC and Maryland empty into these various creeks and nearby rivers.

The litter and debris that the rain waters carry into the storm drain system ultimately end up miles away in the Anacostia River or caught in the vegetation along the banks of the network of creeks and tributaries that feed it. Given the geographic breadth of the Anacostia Watershed and the huge number of tributaries that comprise it, a very large amount of debris and trash, both organic and inorganic, flows into the Anacostia River every year. This project will help remedy this problem by removing trash at one of the higher volume stormwater outfalls within the District before it can reach the river. Capturing trash at the point at which it otherwise would enter the creek is much more effective and efficient than trying to collect the trash after it has been dissipated over miles of creeks, rivers, and related shorelines.

1.3 Overview of Trash Interceptor Cage System

At the heart of the trash interceptor system are two screened cages that are installed across the downstream culvert openings of the stormwater outfall. When positioned in front of the culvert, these rectangular cages are open on the upstream side that faces the culvert opening, allowing water and the trash it carries to flow freely into the cages. The remaining sides are screened, acting as a sieve or filter, which permits the passage of water through the screening while retaining litter and debris

that is carried in with the water. The screening is progressive in nature, utilizing a smaller mesh near the bottoms of the cages to capture smaller items and larger mesh near the top that allows higher volume flow while capturing larger items such as plastic bags, vehicle tires, and even floating logs.

The system has been designed for maximum safety and ease of servicing. It is comprised of innovative mechanics, durable materials, and energy efficient components. Utilizing electric motors, powered by solar-charged batteries, the cages are conveniently raised to street level for emptying. At their apex, the vertical guide rails that track the cages are curved such that they overhang a service driveway above the culvert on which a pickup truck or similar hauling vehicle will be situated. The rails cause the cages to tilt slightly toward the vehicle bed so that contents of the cages can be emptied easily into the vehicle. (See **Figure 1**.)

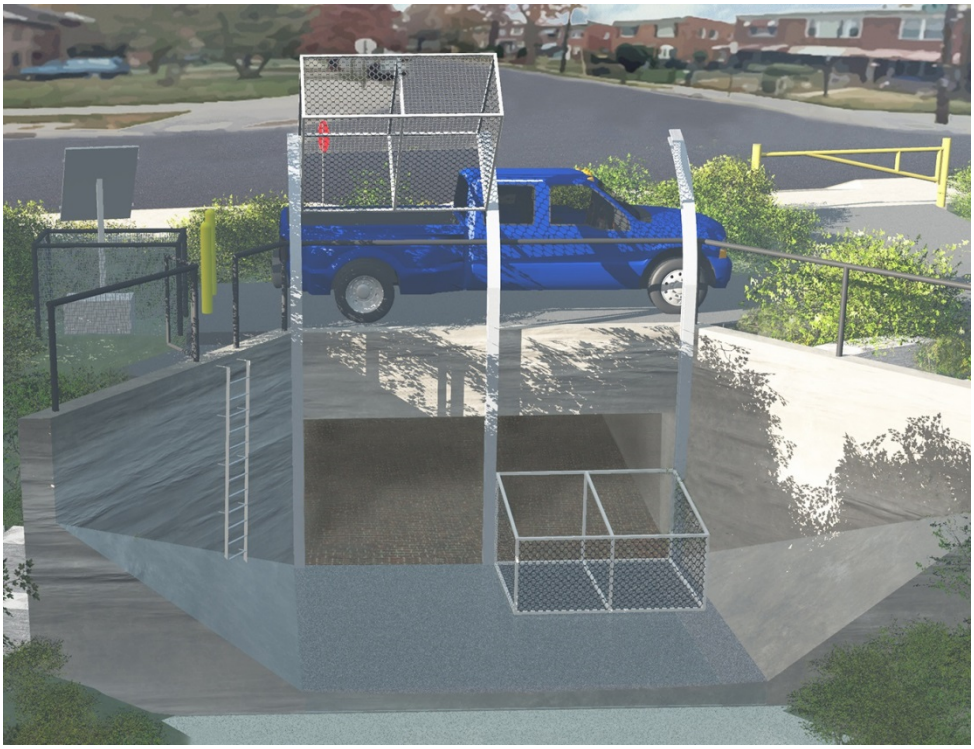


Figure 1 – Hoist-Lifted Trash Cages

1.4 Proposed Site

Outfall 999 is a box culvert that passes under the intersection of Gallatin Street and 14th Street, NE. This culvert is the termination spill-point for a network of city storm pipes that are fed by storm drains (along street curbs and elsewhere) that are spread over approximately 660 acres of urban neighborhoods. Consequently, a large volume of water-borne litter, trash, and street debris flows through this outfall.

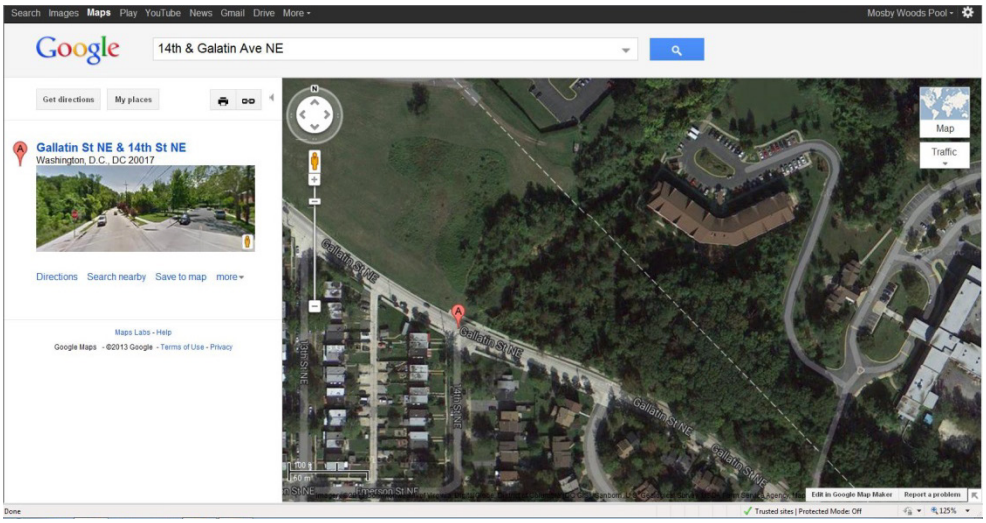


Figure 2 - Gallatin St & 14th St, NE

The site involves a variety of stakeholders. It is located within the DC neighborhood known as North Michigan Park. The street and sidewalks under which the culvert passes are within the jurisdiction of the District Department of Transportation ("DDOT") while the culvert and storm drain system are within the jurisdiction of DC Water. The land above and the creek below the culvert are part of Fort Circle Parks, owned and managed by the National Park Service ("NPS"). The storm creek itself passes into the State of Maryland just a few hundred feet downstream of the culvert spillway, and joins up with other creeks to form the Northwest branch of the Anacostia River. The Anacostia River ultimately flows back across the state line into the District of Columbia, forming a water boundary between Ward 6 and Wards 7 & 8. It terminates into the Potomac River at Haines Point.

Homeowners in the neighborhood of Outfall 999 exhibit nicely kept homes, groomed yards, and tidy streets. Solar panels can be spotted on the roofs of some of the nearby houses.

The chosen site for the trash interceptor is favorable in several respects:

- This outfall carries a high volume of waterborne trash and debris, meaning that the trash capture operation will make a material impact toward improving the downstream waterways.
- Neighborhood residents clearly take pride in their homes and the appearance of the neighborhood. Removing the trash that collects in the nearby storm creek will complement neighborhood pride and sentiment.
- The National Park Service will benefit from the landscape improvements to the site and a reduction in the needed frequency of trash collections in and along the storm creek.
- The location provides an attractive, pedestrian-viewable, environmental education opportunity.
- The box culvert head wall is nearly parallel to and very close to Gallatin Street. This makes for a convenient and unobtrusive site to create an entry ramp and driveway for service vehicles. The entry ramp to be created at the

street curb will essentially form the fourth leg, opposite of 14th Street, at an existing 3-way-stop intersection.

- The project will be a very visible sign to pedestrians and motorists of DC's and Pepco's commitment to a cleaner and more attractive city.

1.5 Anticipated Project Benefits

Because Outfall #999 collects the storm runoff from approximately 660 acres of urban landscape, thousands of cubic feet of trash collectively weighing thousands of pounds are washed through this outfall each year. It is a high volume trash site. Collecting this trash at the outfall, before it enters the network of open-air tributaries, prevents the trash from being deposited in and along the creeks and rivers downstream.

In contrast, removal of "dissipated" trash from the waterways by means of traditional, labor-intensive, manual collection efforts, costs tens of thousands of dollars per year. The vast geographic spread of this dissipation and the high cost of collection mean that much of the trash is never collected once it enters the surface water and ends at the bottom of or along the shores of the Anacostia River, the Potomac River, the Chesapeake Bay, and the Atlantic Ocean.

The voluminous amount of trash and debris that results from urban runoff cannot be quickly degraded by natural processes. It represents a threat to public health, marine life, and wildlife that utilize the waters. It is a public eyesore that discourages outdoor recreation on and around the affected waterways. It tends to encourage apathy and undermine stewardship in the surrounding neighborhoods.

Accordingly, there is much to be achieved by this project:

- effective and efficient capture of trash and debris, before it enters natural waterways
- cost effective, street-side collection operation
- publically viewable site with educational value
- facilitation of data collection and scientific analysis for evaluating residential and street surface wastes
- opportunities to measure effectiveness of upstream neighborhood initiatives
- low cost maintenance
- a model for future solutions at other outfalls

1.6 Summary Budget and Timeline

Pepco is providing $600,000 to fund the design, fabrication, installation, and initial operation of the project.

As part of the detailed design effort documented in this report, revised budgets have been generated, as set forth in Section 5 below. These revised budgets supersede the rough estimates contained in the February 17, 2014 Statement of Work for the project, and update the budget estimates provided in the August 4 design report to reflect changes to the project design and account for additional expenditures for design work.

Based on costs incurred to date, the projected total costs for project design and permitting are $254,184. Costs for the site preparation, fabrication, and installation of the trash interceptor are estimated to be $217,994. Thus, the cumulative costs, from project origination through installation, are projected to be $472,178. This leaves $127,822 to fund the future ongoing operations of the trash cage interceptor system. The annual operating costs are estimated to be $52,000, so funding provided by Pepco is expected to support routine operations for approximately 2.5 years. As provided in its contract with Pepco, Living Classrooms will endeavor in good faith to raise additional funds to cover the cost of ongoing operation and maintenance of the trash interceptor cage after funding from Pepco has been exhausted, and Living Classrooms is committed in any event to raising funds as necessary to ensure that sufficient funding is available to operate and maintain the trash cage for no fewer than three years.

Preliminary discussions with permitting authorities began in early 2015. The Formal permitting process will commence in August of 2015 with the completion of the survey of existing site conditions, and is expected to take 3 to 4 months, provided that the project does not raise major concerns for permitting authorities. Once permits have been received, a detailed construction plan will be prepared and contractors will be engaged. Trash interceptor fabrication and installation are expected to be completed within approximately 4 months from the execution of construction contracts, including testing, training, and pilot operations. Routine weekly and monthly operations, including data collection and reporting, will commence immediately after testing and initial training are concluded.

2 Installation Project Plan

2.1 Overall Project Phases

For effective management and budgeting, the trash interceptor project described in this document is organized into the following phases:

Phase 1A – Pre-permitting Design, Installation Plan, and Review: This phase has been largely completed, as documented in this design report.

Phase 1B – Permitting: The process of obtaining all necessary permits, approvals and agreements**.**

Phase 2 – Fabrication, Site Preparation, and Installation: Construction and installation of the trash interceptor along with site improvements including landscaping and public signage.

Phase 3 – Routine Operations (multi-year): Routine collection of trash from the interceptor, collection and distribution of scientific data and analysis, maintenance of the device, regular training for collection crews, maintenance of safety policies, periodic educational events, etc.

Phase 4 – Retirement and removal (long term): Removal of the trash interceptor system and restoration of the site when the device reaches the end of its useful life (expected to be at least a decade or more after installation).

2.2 Fabrication, Site Preparation, and Installation – Phase 2

The architectural designs, work plans, and budgets contained herein supply the technical details and project control parameters that will guide the physical construction and installation of the proposed trash interceptor system. These same materials also provide information needed to obtain construction permits from relevant regulatory authorities prior to beginning the actual ground breaking and construction.

2.2.1 Project Management

Living Classrooms is serving as General Contractor for this project. In addition to utilizing third party contractors, Living Classrooms intends to use graduates and participants from its own Workforce Development programs in the performance of certain tasks, such as landscaping and installation labor. Compensation for such workers-in-training is typically well below market rates for like services. This approach will allow Living Classrooms to install the trash cage system and complete the associated site improvements at a substantially lower cost than if the entire project were performed by a third party-contractor.

Living Classrooms will manage and control this construction project through comprehensive project management methods and an organization that includes a skilled project executive, project manager, financial accounting support, and an oversight committee. The project executive will be ultimately responsible for ensuring that the project schedule and budget are executed to specification

and completed on time and within budget as well as keeping all stakeholders fully informed of status and progress throughout the project.

Concurrent with the process of obtaining the necessary permits, Living Classrooms will establish a construction management team and prepare a fully detailed, task-level project plan for the construction process, such that construction activity can commence immediately upon receiving all of the necessary permits and approvals. Likewise, subcontractor agreements and negotiations will take place during this period with the proviso that financial obligations for actual construction work shall be contingent upon securing all necessary permits.

Additional information regarding the experience and qualifications of the key project personnel and contractors is provided at **Appendix A**.

2.2.2 Project Safety Plan

A written safety and emergency procedures plan will be put in place for this construction project in accordance with OSHA and District of Columbia regulations as well as Living Classrooms' corporate standards.

2.2.3 Management Oversight

As in the design phase, an executive oversight committee will be formed to supervise the construction phase, comprised of Pepco representatives and the key project executives from Living Classrooms and Clearwater Mills. This committee shall convene regularly to review project status, advise the project team, decide key matters, and resolve any issues that may arise during the construction project.

2.2.4 Project Management Reports

A detailed project schedule shall be maintained and kept up to date at all times. Likewise, financial reports will be generated monthly and tracked against the detailed project budget. Summary status reports will be prepared for the oversight committee to facilitate the efficient conduct of project review meetings.

2.2.5 Final Installation Reports

Upon completion of installation of the trash cage system, a final installation report will be prepared in accordance with contract requirements. This document will include revised engineering diagrams and site plans that reflect any and all modifications to the original designs contained herein. This "as installed" document, containing detailed engineering and site layout information about the installation and the site, will provide an accurate record and baseline reference for current and future parties having an interest in the project.

Additionally, a financial accounting of the project will be generated at the conclusion of the construction phase in accordance with contractual requirements specified by Pepco and DOEE. This report will categorically document the construction-phase expenditures and variances versus budget as well as provide a summary of the total cumulative expenditure of project funding through commencement of operations. The report will also contain a detailed annualized budget for the ongoing clean-outs, maintenance, and data capture that comprise the routine operations for the trash interceptor.

2.3 Permitting

The following table summarizes the anticipated permits, approvals and access arrangements, and associated fees, required for the project:

Permit or Approval	Agency	Projected Fees
Building Permit (including sedimentation and erosion control plan etc.)	DC Department of Consumer and Regulatory Affairs	$4500 (2% of hard costs for construction plus $30 processing charge)
Curb Cut Approval	District Department of Transportation	$705 ($600 fee for one curb cut, $75 inspection fee, and $30 processing charge)
Approval for Work Affecting Culvert	DC Water	$1000 (plus refundable damage deposit of $20,000)
Authorization for Work in Jurisdictional Waters	DOEE/USACOE	$750 (if required)
Right of Entry, Special Use Permit, or Memorandum of Understanding to authorize work and improvements affecting NPS property	National Park Service	TBD

Project diagrams and drawings will be extracted from this design document and submitted with the permit applications as required. Supplemental or clarifying documentation may be prepared during this process as requested by permitting authorities.

Preparation of permit applications and approval of permits are expected to take 3 to 4 months.

A budget for the permitting phase is included in Section 5.2. The budget conservatively includes $10,000 for total permit fees.

2.4 Site Improvements

Site alterations and improvements include:

- Removal and cutting back of vines, trees, and overgrowth, including invasive plant species that have penetrated and damaged the fencing atop the culvert wall
- Grading to establish a level driveway area adjacent to the top of the culvert for trash collection and service vehicles

- Grading to establish an entry ramp to transition from street level to the driveway area (21 inch drop)
- Installation of a recessed curb (also called a "curb ramp" or "curb cut") on Gallatin Street to allow service vehicles to enter the site from the street
- Installation of a locking drop gate at the entry ramp (adjacent to the sidewalk) to prevent entry/parking by unauthorized vehicles
- Grading to create a sloped border bank between the sidewalk and the driveway area, to be sodded and/or planted with native shrubs
- Installation of new chain link fencing along the culvert top (replacing the existing, rusted fencing)
- Installation of bollards at the end of the driveway area as a safety barrier for vehicles
- Installation of asphalt paving on the entry ramp and service vehicle driveway with a perforated underdrain buried along the culvert headwall to improve drainage
- Installation of a bioretention basin to the left of the culvert on the down gradient side of the asphalt driveway to capture runoff
- Placement of imbricated boulders of 2' x 3' x 4' minimum dimension backed with biodegradable coir matting and live stakes near the outside bottom of both culvert sidewalls to retard and halt severe soil erosion which is currently occurring here
- Planting of native plants, perimeter shrubs, and grasses to give the site a naturally attractive, park-like appearance
- Installation of a solar panel mast and lockable battery enclosure adjacent to the driveway area, surrounded by a small security fence for protection
- Installation of camera and web-based transmission hardware for remote monitoring (if determined to be feasible)
- Installation of informational and cautionary signage.

These and other features are depicted and identified in the Site Plan at **Appendix B**. A typical cross-section for the biorention basin is shown at **Appendix C**.

The site improvements will be made in two sub-phases. Site clearing, grading, retention walls, backfills, the curb ramp, entry ramp, and driveway area will be established before the trash cages are installed. Site finishes such as new fencing, landscaping, and signage installation will be performed after the trash cages and solar power elements are in place. (See Sections 2.6 and 2.7 below.)

2.5 Cage Fabrication

The trash interceptor cages will be constructed according to specifications contained herein by Clearwater Mills, the main subcontractor to Living Classrooms for this project. Clearwater has a long reputation for innovative and highly efficient environmental projects.

Fabrication of the cages as well as pre-preparation of other components will be performed at an off-site location to be chosen by Living Classrooms and Clearwater Mills. Fabrication is projected to take 9 weeks to complete.

The cages and other components will be transported to the project site for final assembly and installation after the first phase of site improvements has been completed. (See 2.6 below.)

2.6 Construction of Site Improvements, Cage Installation and Testing

In parallel with the fabrication of the cages and component preparations, the first phase of site improvements will be performed. These include:

- Clearing of invasive plant species and overgrowth around the culvert walls and next to the sidewalk
- Placement of imbricated boulders and coir matting on either side of the culvert
- Placement of a timber retaining wall to create flat area near the wall top, giving service personnel access to a gated service ladder
- Soil back fill of heavily eroded banks on either side of culvert (with boulders and coir matting serving as retention)
- Grading as required for construction of the biorention basin to the left of the culvert on the down gradient side of the driveway
- Grading to create entry ramp, level driveway area adjacent to culvert wall, and a sloped border bank next to sidewalk
- Installation of street-side curb ramp ("curb cut") for vehicle traversal

These site improvements will be performed with sufficient lead time such that their finish date coincides with the conclusion of the cage fabrication, so that installation of the trash cage system can commence without delay as soon as the components have been fabricated.

Installation, mechanical testing, and equipment adjustments will take about four weeks, assuming no abnormally harsh weather conditions. Key steps include:

1. Delivery of materials and components to site
2. Installation of base plates on surface of culvert spillway
3. Attachment of vertical guide rails to culvert wall
4. Lowering of cages to culvert spillway
5. Mounting of a security-caged service ladder to the culvert apron wall
6. Installation of cage rollers and engagement with guide rails
7. Installation of hoist motors (on guide rails)
8. Installation of lift cabling, between hoists and cages
9. Installation of solar panel mast, pad, battery enclosure, camera, and related fencing
10. Installation of conduit and electrical cabling between battery box and hoist motors
11. Replacement of chain link fence on top of the culvert wall and insertion of a ladder-access gate
12. Testing and adjustment of trash cages and hoist mechanisms

Construction equipment required for the installation will include a light tractor or mini-excavator for the grading work and a small hydraulic crane (or temporary boom hoist) to lower the boulders, trash cages, and guide rails into place.

2.7 Site Finishes – Landscaping and Signage

New chain link fence will be installed on the existing fence poles on top of the culvert wall. New fencing will be installed around the solar mast and battery enclosure. A locking gate will be added to the topping fence to give access to the apron access ladder that will be mounted on the culvert wall.

Grasses and shrubbery will be planted around the site to give an attractive, maintained, park-like appearance. Consideration will be given to the possible inclusion of small ornamental trees as part of the final project landscaping. Living Classrooms will confer with DOEE and the National Park Service regarding the final landscape plan.

Appropriate vegetation will be planted within the bioretention feature.

Informational and educational signage will be installed for the benefit of the passing public and educational visitors. Safety signage and property notices will warn against unauthorized entry and tampering. Emergency and maintenance contact information will be provided.

Signage will give recognition to project sponsors and participants. 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 DOEE under the District's Water Pollution Control Act."

2.8 Operating Policies and Procedures

A formal Policy and Procedures manual will be developed to govern the routine operations and maintenance of the trash interceptor system. The manual will reflect the actual equipment and site configuration. The policies will specify not only the safety protocols for routine operations, but also the pre-requisite operator and supervisory training courses that will be implemented and routinely conducted. Certain supervisor training will be conducted prior to completion of the installation, including OSHA requirements, first-aid, safe-handling of trash (for trash collectors), and similar safety related subjects. Operator training on the actual equipment will also occur after the equipment is fully installed and operational.

Clearwater Mills and the liability insurance underwriter will both have a significant involvement in the development of these policies and training requirements.

Policies and procedures development and the requisite training of operation and maintenance crews will occur over a three month period, in parallel with the construction and installation activities. Section 6 of this design document provides a preliminary overview of operating principals and objectives to be addressed in the formal policies and procedures.

3 Detailed Specifications

3.1 Stream Flow Analysis

The watershed that drains Outfall 999 at Gallatin and 14th Street is 660 acres of primarily residential neighborhood. Due to the combination of highly impervious surface and moderate slope, the stream responds quickly to a rainfall event. The stream hydrograph for this type of watershed is termed "flashy" which indicates peak runoff rate shortly after the most intense rainfall.

Flow calculations for this project use a rainfall intensity of 3"/hour which would be an extreme rainfall event. A discharge rate of 997.92 cubic feet/second was derived using the Rational Equation, ***q = 1.008CiA***, which is used to estimate discharge for small watersheds that are ungauged. The single area weighted **C** coefficient was derived from high density land use, rainfall intensity (**i**) at 3"/hour, and area (**A**) at 660 acres. The velocity is based on a tunnel with cross section of 4' x 17', yielding a velocity of 14.7 feet/second.

The estimated load of trash and debris carried through the outfall during a storm event was determined by two methods. First, the outfall was observed during and after 5 storm events during which the floating trash and debris was quantified. Second, data from other urban outfalls with similar land use was used to provide maximum per acre loads for this size watershed. Multiple observations of the stream during dry weather in the course of the project design effort confirm that virtually all of the trash load is associated with storm events. Based on these observations, a high intensity rainfall event is estimated to generate a maximum trash load of 2-3 cubic yards. The trash cage system has a capacity of 8 cubic yards and thus can accommodate approximately three times the expected maximum load per storm event (after which the cage can be emptied in advance of the next storm event).

3.2 Trash Cage Diagrams and Specifications

Engineering blueprints for the cages and mountings are provided at **Appendix D**.

3.3 Trash Cage & Hoist Overview

This trash interceptor system has been designed for maximum convenience, efficiency, and operational safety. Rather than requiring clean-out crews to climb into and manually remove trash from the cages (the "traditional" design), this system utilizes a hoist system that raises the cages to street level, positioning them over a driveway area above the culvert, where crews can dump and rake out the trash directly into the bed of a parked hauling vehicle, such as a pick-up truck.

Two side-by-side cages will be utilized, guided by three vertical guide rails, with the center guide rail being of a dual-sided nature such that it is the interior guide rail for both cages. As a result, the cages can be raised and lowered independently. Four cable hoists will be mounted atop the guide rails and attached to the cages for lifting. The hoists contain integral reduction gearing and operate at very slow speed. The DC voltage motors will be powered by rechargeable vehicle batteries, enclosed on-site and charged by a solar panel mounted atop an 8-12 foot tall vertical mast.

A modular control panel will be utilized to operate the hoists. This panel will plug into the system via a secured outlet located within the lockable battery and electronics enclosure. The panel will be transported to and from the site by the trained clean-out crews. Using an electrical relay or manual switch concealed within the locked enclosure at the base of the solar panel mast described in Section 3.6 below, the power will be physically disconnected from the hoist motors except during active operations, thereby preventing unauthorized tampering or operation by passers-by.

The guide rails are designed with a radius curve at the top such that the cages tilt slightly toward the driveway area when raised to their full apogee. This tilting facilitates the clean-out of the cages which will be emptied into the bed of a pickup-truck or similar vehicle. There will be some manual labor required in the clean-out process, including the use of rakes and other tools to fully clear the cages of debris.

As shown on drawing "S.5" at **Appendix D**, the cages have a hinged chute on the open face, which is in the closed position when the cages are being elevated or lowered on the guide rails. In the open position, the smooth steel chute facilitates both the entry of water borne trash into the cage when in-position on the culvert apron as well as the emptying of the cage when it is in the raised and tilted position. This chute automatically opens when the cage is lowered into position upon the culvert apron. It is opened manually by the service crew when for the cage is being emptied, i.e., at its fully raised position.

3.4 Site and Grounds Plan; Survey of Existing Conditions

A site plan drawing showing the various site improvements and landscape elements is provided at **Appendix B**. A conceptual planting plan is provided at **Appendix E**. The selection of the specific plant species to be used will depend on site specific characteristics, such as soil type and final grading contours, that will be determined in the field during the course of Project construction. The final plant selection will be coordinated with DOEE and NPS. Additionally, an artist's conceptual renderings for the site are included at **Appendix F**. A detailed survey of existing site conditions completed in August 2015 is attached at **Appendix G**.

3.5 Ground Retention Elements and Biorention Basin

Imbricated boulders, backed with coir matting and live stakes, will be placed on either side of the culvert to arrest existing severe erosion the area behind the culvert wing walls (as shown in the photographs at Figures 3-1 and 3-2). The placement of boulders, backed by matting, soils and appropriate vegetation, will stabilize the area around the outfall and halt further wash-out which, if allowed to continue, could threaten collapse of the wing walls and undermine the integrity of the outfall itself, as well as threaten the stability of the service vehicle landing, the bio-retention feature, and native shrubs to be installed as part of the Project. These retention features will be designed and installed in accordance with the 2003 District of Columbia Standards and Specifications for Soil Erosion and Sediment Control. A timber retaining wall will be installed next to one culvert wing wall to create a flat service area next to the ladder access gate to be installed in the fencing. This area will be covered with wood chips.

A biorentention feature will be constructed to the left of the culvert on the down gradient side of the asphalt driveway to collect stormwater runoff. A typical cross section for this bioretention basin is shown at **Appendix C**. A detailed design for the

biorention basin will be prepared in accordance with DDOE's Stormwater Management Guidebook (July 2013).

Figures 3-1 and 3-2: Existing Erosion Areas Behind Culvert Wall

3.6 Solar panel and Battery Enclosure

A solar panel, mounted atop a mast pole, will be situated on the site in a manner to capture maximum sunlight year round. The pole will be 8 to 12 feet tall – high enough to discourage tampering and vandalism. A locking enclosure will be anchored at the base of the mast to contain battery charger electronics, one or more 12 volt lead-acid (vehicle) batteries, and a master disconnect switch or relay. The enclosure will also house the connection socket for the portable control panel that will be used to operate the hoists.

An electrical conduit will protect the cable run from the solar panel mast and battery box to the nearby culvert wall and up to the hoist motors atop the trash cage guiderails.

3.7 Fencing and Service Ladder

New galvanized or vinyl-coated chain link will be installed on the existing fence poles atop the culvert wall to provide a clean and attractive appearance. A locking gate will be installed in this fence at the top of a caged service ladder that will be mounted on the culvert sidewall. The ladder will give the maintenance crew access to the bottom apron when needed. A new protective security fence will also be installed around the location of the solar mast and battery enclosure to deter unauthorized access.

3.8 Vehicle Access

A lockable swing-arm barrier gate will be installed next to the pedestrian sidewalk, across the entrance to the service ramp, to prevent unauthorized vehicles from entering the driveway area.

3.9 Security Measures

As mentioned in section 3.3, a portable control panel will be transported to and from the site by servicing crews and a master disconnect switch will be located inside the battery enclosure, thereby preventing operation of the hoists by unauthorized persons. The interconnect socket for the control panel, the batteries, and all electronics will be housed and concealed inside the locked battery enclosure.

Chain link security fences will prevent pedestrians from falling over the culvert wall (as currently) and a locking gate will control access to the service ladder. The service ladder will be shrouded by a security cage to thwart access by the public. A fence around the battery box and solar mast location will further restrict unauthorized access to these elements.

In addition, if determined to be feasible, a remote camera will be installed to allow for remote monitoring (using an internet connection) of the trash cage and related project infrastructure.

4 Installation Timeline

The following timeline is based upon experience with prior similar projects, and allowance of reasonable time for reviews by the project sponsors and permitting agencies, but it is subject to change if permitting delays are encountered.

Activity / Phase	*Duration (wks)*	*Est. Start*	*Est. Complete*
Review and Approval of Project Design	--	--	complete
Permitting & MOUs	12	Aug 26, 2015	Nov 15, 2015
Preparation of Detailed Project Plan for Construction	12	Oct 15, 2015	Jan 15, 2016
Scheduling & Contracting	8	Jan 15, 2016	March 15, 2016
Fabrication	8	Mar 15, 2016	May 15, 2016
Site Preparation	6	Apr 1, 2016	May 15, 2016
Develop Formal Operational Policy & Procedures	8	Apr 15, 2016	June 15, 2016
Installation & Testing	4	May 15, 2016	June 15, 2016
Site Finishes	2	June 15, 2016	June 30, 2016
Operational Training	4	June 15, 2016	July 15, 2016
Begin routine operations		July 15, 2016	

5 Detailed Project Budget

5.1 Fabrication and Installation Budget

The detailed budget for fabrication and installation is shown below.

Site Work/Access Creation		
Site Clearing/Debris Removal	$	2,500
Grading	$	6,000
Fence Improvements/Gate	$	5,800
Bioretention Feature	$	7,500
Retention, Boulders, Live Stakes & Terracing	$	12,000
Asphalt Paving for Ramp and Driveway	$	5,000
Driveway swing gate (installed)	$	3,200
Sod and Plantings	$	3,000
Curb Cut	$	7,500
Subtotal:	$	52,500
Equipment Fabrication		
Trash Cages	$	22,000
Hoist Guide Rails	$	16,000
Electric Hoist/Lift Cables	$	9,000
Ladder	$	2,000
Solar System (panels, controls, batteries)	$	8,000
Panel Mount	$	1,000
Equipment Housing	$	1,500
Subtotal:	$	59,500
Installation		
Onsite Equipment Assembly	$	6,800
Mechanical/Electrical/Conduit	$	7,600
Mechanism Anchoring and Fastening	$	7,500
Ladder Installation	$	800
Trucking and Delivery	$	2,500
Adjustment and Testing	$	3,800
Site Finishes & Signage	$	9,000
Final Reports (incl "As Installed")	$	12,600
Subtotal:	$	50,600
Initial Gear and Pre-Training		
Initial Gear & Clothing	$	3,960
Formal Policy & Procedure Development	$	14,000
Supervisor Training and Certification	$	9,000
Subtotal:	$	26,960
Subtotal Labor & Materials Costs	**$**	**189,560**
Living Classrooms Project Management 15% of Labor & Materials Costs	$	28,434
Total Installation Project	**$**	**217,994**

5.2 Permitting and Agreements Budget

In addition to permit fees, this phase will also incur management and contractor time for preparing and submitting the applications as well as responding to the permitting authorities throughout the process.

The total budget (maximum) for the permitting phase is as follows:

Permitting and Agreements

Site Survey (complete)	$ 3,600
Permitting Fees (max estimated)	$ 10,000
Agreements & legal	$ 9,200
Management & services labor	$ 24,852
Consulting & engineering revisions	$ 9,000
TOTAL	**$ 56,652**

5.3 Annual Operations Budget

The annual operations budget remains unchanged from the estimate contained in the Statement of Work:

ANNUAL & PERIODIC ACTIVITIES	Annual Cost	Basis
Repairs & Maintenance	7,200	$3,000 materials, $4,200 labor
Annual Reporting	3,570	24 hrs x 3.5 persons x $42.50/hr avg
Insurance	10,000	$10,000 / yr
Training	1,800	$450 x 4 sessions per year
Special tools, protective gear, & supplies	1,500	
MONTHLY RECURRING		
Supervision and oversight	4,320	8.4 hrs / mo @ $42.85 / hr (loaded)
Site Inspections (Management)	1,800	3.5 hr / mo @ $42.85 / hr (loaded)
Clean-outs (6 avg.)	7,500	6 x 2 hrs x 3; 1@$26/hr; 2@$13/hr
Transportation & disposal	8,800	6 x $122.50
Groundskeeping	2,200	
Educational programs coordination	3,200	8 hrs / mo @ $33.40 / hr (loaded)
TOTAL ANNUAL OPERATIONS	**$51,890**	

5.4 Budget Status vs Original SOW Estimates

The following table shows the current allocation of the $600,000 project funding based on revised budgets and actual expenditures as of July 31, 2015.

Phase	Name	Estimate per SOW	Actual (@ 7/31/15)	Actual + Est to Complete	Variance Budget vs SOW
1	**Design & Permitting**				
1A	Design	$128,000			
	Living Classrooms		$74,108	$74,108	
	Subcontractors		$33,424	$33,424	
	LC Gen & Administration[1]	$90,000	$42,332	$90,000	
1B	Permitting & Agreements	$55,000	$18,652	$56,652	
	Total Phase 1	**$273,000**		**$254,184**	($18,816)
2	**Construction & Installation**	**$171,000**		**$217,994**	$46,994
3	**Operations (3 yrs)**	**$156,000**		**$156,000**	-
	TOTALS	**$600,000**		**$628,178**	**$28,178**

[1] Budgeted 100% Phase 1; prorated across all phases in actuality

6 Operational Policies and Procedures

6.1 Operational Crews

Routine clean-outs and maintenance of the trash interceptor system will be performed by Living Classrooms "Green Team" members. The Green Team consists of D.C. Metropolitan area men and women who participate in or have graduated from one of Living Classrooms' workforce development programs. Green Team members are currently employed to do the grounds keeping and maintenance of the public park on Kingman and Heritage Islands in the Anacostia River. Team members are carefully chosen based upon demonstrated personal responsibility, judgment, problem solving, time management, leadership potential and passing of mandatory drug tests. Green Team staff assigned for this project will be trained and certified in advance and supervised by a qualified LC-NCR staff member during all clean-out operations.

6.2 Training

All staff involved with the maintenance and operation of this project will receive training/certifications and refresher courses in:

- CPR/First Aid
- Power tool safety
- Trash cage hoist operation
- Trash cage clean-out safety protocols
- History and design of trash interceptor
- Solar panel maintenance
- Performing scientific counts of the volumes, weights, and types of debris collected

6.3 Authorized Drivers

Living Classrooms will authorize specific supervisory personnel as drivers of its pickup trucks or similar hauling vehicles to be used for trash removals. "Green Team" members will not be authorized as drivers for this project. All authorized drivers will be declared drivers under Living Classrooms' vehicle and liability insurance policy.

6.4 Site Operations Manual

A policy and procedures manual, developed specifically for this trash interceptor and site, will be carried in all vehicles associated with the routine clean-out and servicing of the trash interceptor. The manual will include detailed safety protocols (in which all operators will have been previously trained) and emergency procedures.

6.5 Servicing Frequency

The cages will be visited, inspected, and cleaned out weekly (more frequently during the first month of operations) and the day after any rain or storm event. Data collected over the first six months of operation will be used to refine and align the servicing schedule with actual trash capture volumes. Recordkeeping will also be

used to model labor requirements across the different seasons. In addition, if determined to be feasible, the trash cage will be monitored remotely using a camera to transmit real time images over an internet connection. This could improve system performance by ensuring that the cages are emptied as necessary in advance of storm events and conserve operations and maintenance funds by reducing the frequency of on-site inspections.

6.6 Maintenance Inspections

Staff and crews will be trained to regularly inspect the site and the machinery for need of maintenance. The maintenance checklist for this site will include:

1. General landscaping (grass cutting, weed removal, shrub trimming)
2. Examine culvert spillway for possible cracks and damage
3. Inspect guide rail anchors and culvert walls
4. Confirm proper operation of cage chute and hinge; lubricate routinely
5. Inspection of service ladder attached to culvert wall
6. Inspection of cage rollers
7. Observe normal operation of hoist motors
8. Inspection of solar panel pole and sealed battery box
9. Inspection of chain link and ladder-access gate at top of culvert wall
10. Inspection of signage

6.7 Insurance

Living Classrooms will maintain insurance in accordance with its contract with Pepco as well as internal Living Classrooms policies. Such insurance will include liability coverage with an annual aggregate limit of at least $3 million.

6.8 Educational Intention

The proposed site will be used as a "Living Classroom" to teach school age individuals about urban stormwater run-off, environmental stewardship, solar energy, and clean-up operations.

6.9 Student Staff Ratio

For safety purposes, classes visiting the trash interceptor will be staffed such that the student to staff ratio does not exceed 12:1.

6.10 Data Collection

Crews will routinely sample, sort, type, weigh, measure volume, and record data relative to the trash and debris collected at the site. Most of this activity will occur off-site, after the trash has been transported to its depository site. On occasion, for example, when a school class is being conducted at the site, the sampling and sorting may occur on site. As designed, the driveway area is large enough to provide space for occasional on-site trash analysis and bagging.

6.11 Annual Reporting

A summary report of collection activities and trash statistics will be prepared for the project sponsors annually by Living Classrooms. This report will also 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.

Appendix A

Summary of Experience and Qualifications of Key Project Personnel and Contractors

Key Project Management Personnel and Contractors

A. Overall Project Management – Living Classrooms

Steve Mutschler will be the executive in charge of the project. He is a past CEO (multiple companies) and a retired executive from management consulting in the financial services industry. He led a large-scale program management practice that managed multi-year projects having up to $1 billion budgets. Prior to stepping down from the Living Classrooms board to take on the current management role at Living Classrooms, Mr. Mutschler served as CEO for five years at a commercial contracting and manufacturing company (having left retirement to do so). He is an expert in program/project office management, finance, and corporate operations.

The project manager will be Warees Majeed, Director of Living Classrooms' Workforce Development department, or someone of equal senior experience and skill. Mr. Majeed is an experienced project manager and routinely oversees logistics and budgets for several program areas simultaneously. He has taught adult superintendent training classes in the construction, hospitality, and culinary fields.

B. Primary Design and Construction Contractor – Clearwater Mills LLC

Clearwater Mills LLC will be the primary design and construction contractor for the project. Clearwater Mills is a Maryland based company with a proven track record in improving waterways by designing, constructing, and operating innovative and sustainable technologies for removing trash and debris from stormwater runoff. The company has spent years studying the problem of collecting stormwater debris and has developed many improvements over existing technologies to meet the challenges presented by this problem. The company's products include the highly successful waterwheel powered trash interceptor in Baltimore.

The Clearwater Mills project team is led by John Kellett, principal and founder, and Daniel Chase, partner and operations manager. Mr. Kellett has over 25 years of experience in management of marine, environmental, and alternative energy construction projects. Mr. Kellett is a 1985 graduate of Oberlin College, and has pursued graduate studies in Geo-environmental Science at Shippensburg University. He is the inventor of the patented waterwheel powered trash interceptor. Mr. Chase has 30 years of experience overseeing marine, commercial and residential construction projects. The Clearwater Mills project team also includes Pamela Kellett as an environmental consultant. She has a B.A. in Environmental Studies from Oberlin College and is currently a Masters of Science degree candidate at Johns Hopkins University.

C. Landscape Design Contractor – Biohabitats

Biohabitats, Inc. will be the principal design subcontractor for the project. Biohabitats is a consulting firm focused exclusively on conservation planning, ecological restoration and regenerative design. The company is staffed with an interdisciplinary team of landscape architects, civil engineers, water resource planners, natural resource planners, conservation biologists, landscape ecologists, restoration ecologists, forest ecologists, and GIS analysts to provide integrated solutions that are ecologically sound, realistic to implement and cost-effective to manage.

Biohabitats works with a variety of public and private clients throughout the United States on diverse projects including NPDES permit support, green infrastructure planning and analysis,

stream assessment and restoration, wetland identification and enhancement, ecological master planning and watershed management planning, water quality best management practice (BMP) design, community education and outreach, and large-scale design-build projects.

Biohabitats began working in the Chesapeake Bay watershed over 30 years ago on projects related to delineating and restoring wetlands, preparing stream and riparian protection plans, designing water quality BMPs and implementing aquatic habitat monitoring programs. The company also has considerable capabilities, expertise and experience in watershed management, stormwater retrofitting, low impact development (LID) planning and design, Total Maximum Daily Loads (TMDLs), code and standards analyses, environmental management policy coordination, and public outreach.
Biohabitats was founded in Baltimore, and has seven regional offices throughout the country. This project will be handled out of the Baltimore Chesapeake/Delaware Bay Bioregional office. The Baltimore office has 24 technical staff, including registered Professional Engineers (P.E.); LEED accredited professionals; Registered Landscape Architects (RLA), Certified Professional Wetland Scientists (PWS), Certified Soil Scientists (CSS), and Certified Ecologists (CE).

Biohabitats' work on this project is led by Adam Ganser, a Registered Landscape Architect with more than fifteen years of experience in landscape planning, design and construction. He specializes in designing green infrastructure to provide ecosystem services in complex, high-density, urban environments. He has designed and overseen the implementation of innovative stormwater management and conservation landscaping projects that clean water, enhance habitat, and engage visitors. Mr. Ganser has strong project management experience and a track record of completing project assignments on time, within budget and in accordance with contract requirements.

D. Civil Engineering Contractor – Century Engineering

Century Engineering, Inc., will provide professional engineering services in support of the project. Century is a multi-discipline consulting engineering firm engaged in the planning and design of a variety of projects for the building, transportation, environmental, water and power industries. The company has a staff of approximately 350 technical and support personnel, and serves the entire mid-Atlantic region from multiple offices located throughout the area.

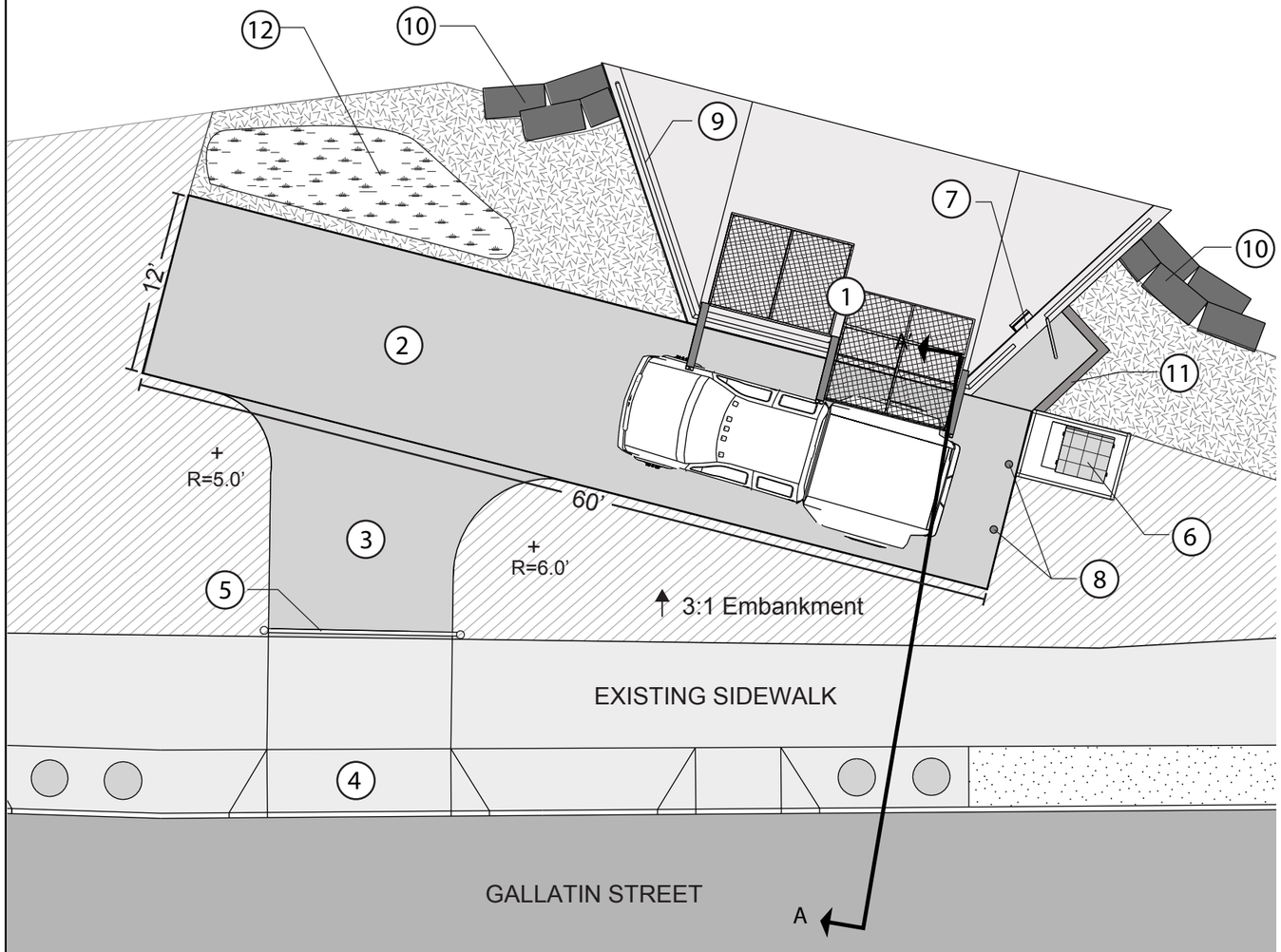
Century's professional staff has a wide range of expertise, including civil engineering, water and water resources, structural engineering, mechanical/electrical/pluming engineering, construction management and inspection, and sustainable design/LEED. Century specializes in the design of material handling facilities, such as loading piers, cargo facilities, and provides structural design services for anything from foundations and retaining walls to roofs and canopies.

Century's work on the project will be led by Matthew E. Pearce. Mr. Pearce has been a licensed Maryland professional engineer since 1997 and a LEED Accredited Professional since 2009. He has 22 years of experience performing a wide variety structural engineering analyses. He has designed steel, concrete, wood and masonry structures, and performed a variety of investigative projects involving capacity evaluations, load ratings, and retrofit design. His specific experience includes serving as structural engineer for a project involving the replacement of a storm drain culvert and outfall system at the Navy's Patuxent Air Station, and as the project manager and lead engineer for the foundation design for a floating water-wheel-powered trash collector in Baltimore's Inner Harbor. He received a B.S. in Civil Engineer from Bucknell University in 1991, and an M.S. in Civil Engineering, with a concentration in Structural Engineering, from Bucknell University in 1993.

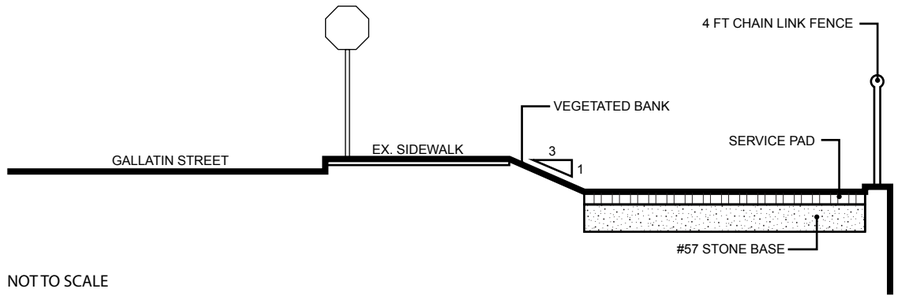
Appendix B

Site Plan

PLAN VIEW



TYPICAL CROSS SECTION A



NOT TO SCALE

SITE FEATURES

1. Trash Interceptor
2. Service Pad with Asphalt Surface
3. Asphalt Service Ramp
4. Curb Ramp
5. Lockable Swing Gate
6. Solar Panel and Battery Bank in Lockable Chain Link Fence Enclosure on Concrete Pad
7. Lockable Access to Outfall
8. Bollards
9. Chain Link Fence (Existing Cut to 4 ft)
10. Imbricated Boulder and Live Stake Bank Protection
11. Timber Retaining Wall
12. Bioretention Basin

Outfall #999 Trash Interceptor Landscape Plan

NOT FOR CONSTRUCTION

LEGEND

- Dense Native Vegetation
- Native Shrubs
- Turf

N

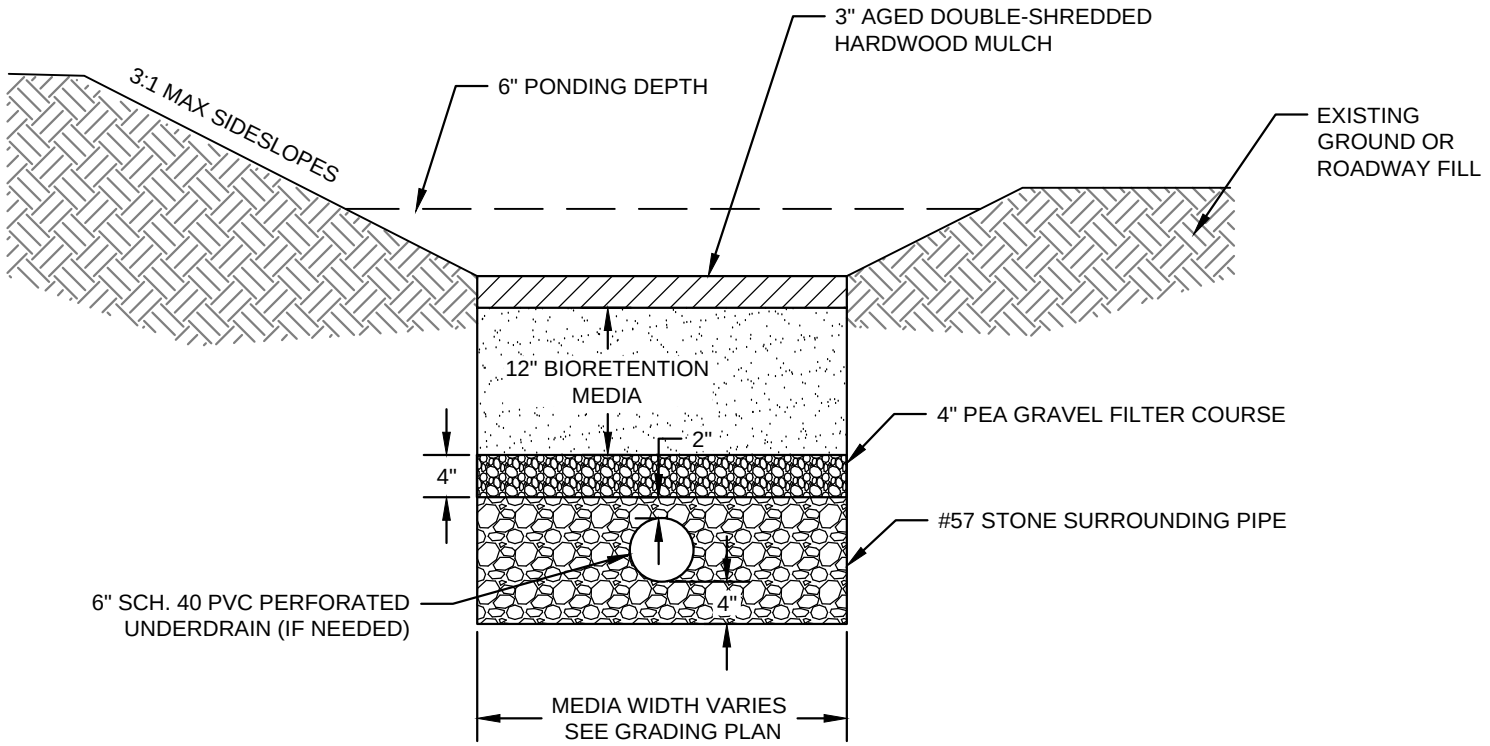
0' 2.5' 5' 10'

Biohabitats

January, 2015

Appendix C

Typical Cross Section for Biorention Basin



BIORETENTION BASIN
TYPICAL CROSS SECTION

NOT TO SCALE

Appendix D

Trash Cage Specifications

General Notes

DESCRIPTION OF WORK
THE WORK INCLUDES INSTALLATION OF TRASH COLLECTION BINS AND HOISTING DEVICES AT THE DOWNSTREA ENDOF A DRAINAGE CULVERT.

DESIGN CRITERIA
1. THE DESIGN IS IN ACCORDANCE WITH IBC 2012.

MISCELLANEOUS
1. CONTRACTOR SHALL VERIFY CONDITIONS IN THE FIELD AND IMMEDIATELY NOTIFY ENGINEER OR ARCHITECT OF ANY CONDITIONS NOT AS SHOWN. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AS REQUIRED.
2. CONTRACTOR SHALL COORDINATE DETAILING, FABRICATION AND ERECTION WITH ALL RELATED TRADES.
3. ALL STRUCTURAL WORK SHALL BE COORDINATED WITH MECHANICAL & ELECTRICAL REQUIREMENTS.
4. NO OPENINGS SHALL BE MADE IN ANY STRUCTURAL MEMBER UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS OR UPON WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER.

EXISTING CONSTRUCTION
ALL DIMENSIONS AND ELEVATIONS OF EXISTING STRUCTURES SHOWN ON THE DRAWINGS ARE OBTAINED FROM AVAILABLE SOURCES. THEY ARE NOT GUARANTEED TO BE TRUE AND EXACT. THE CONTRACTOR SHALL VERIFY THESE DIMENSIONS AND ELEVATIONS BY ACTUAL FIELD MEASUREMENTS PRIOR TO FABRICATION OF ANY MATERIALS AFFECTED AND PRIOR TO START OF WORK. REPORT ANY DISCREPANCIES TO THE ARCHITECT/ENGINEER.

CONCRETE
1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE" AND ACI 318 "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE."
2. CONCRETE SHALL MEET OR EXCEED DDOT CLASS 'E' PAVING CONCRETE MIXTURE (28-DAY STRENGTH = 3,500 PSI; CEMENT = 565 LBS/CY; 57,67 STONE AGGREGATE; 0.49 MAX W/C RATIO; 0-3" SLUMP; 4%-8% AIR CONTENT). AN APPROVED REDI-MIX CONCRETE IN A BAG MAY BE USED.
3. REINFORCING STEEL SHALL BE DEFORMED BARS OF NEW BILLET STEEL CONFORMING TO ASTM A615, GRADE 60, EXCEPT PIER TIES MAY BE GRADE 40. REINFORCING STEEL FOR WELDED APPLICATIONS SHALL BE DEFORMED BARS CONFORMING TO ASTM A706.
4. CONCRETE COVER OVER REINFORCING UNLESS OTHERWISE SHOWN, SHALL BE 2".
5. NO OPENINGS SHALL BE MADE IN ANY STRUCTURAL MEMBER, UNLESS SPECIFICALLY SHOWN ON THE STRUCTURAL DRAWINGS, WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.

STRUCTURAL STEEL
1. STRUCTURAL STEEL WORK SHALL CONFORM TO THE AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS (AISC 360).
2. STRUCTURAL STEEL COLUMNS SHALL CONFORM TO ASTM A992, Fy = 50 KSI
3. STRUCTURAL STEEL PLATE, ANGLES & CHANNELS SHALL CONFORM TO ASTM A36, Fy = 36 KSI.
4. METAL GRATING SHALL HAVE 1 1/4" x 3/16" BEARING BARS SPACED AT 7/16" AT THE BOTTOM 1' OF THE CAGE & SPACED AT 1 3/16" AT THE TOP OF THE CAGE.
5. ALL STEEL SHALL BE GALVANIZED.

POST INSTALLED ANCHORS
1. POST INSTALLED ANCHOR SHALL BE HILTI HIT-HY 200 ADHESIVE ANCHOR SYSTEM.
2. ANCHORS SHALL BE INSTALLED PER CONTRACT DOCUMENTS AND PER MANUFACTURER'S INSTRUCTIONS. WHERE THE PROVISIONS ARE IN CONFLICT, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN.
3. DO NOT DRILL THROUGH EXISTING EMBEDDED REINFORCING STEEL. LOCATE EXISTING REINFORCING STEEL, CREATE TEMPLATES AND ADJUST LOCATIONS OF HOLES IN MEMBERS BEING ATTACHED TO CLEAR EXISTING EMBEDDED REINFORCING.
4. ALL ABANDONED HOLES DRILLED IN THE CONCRETE SHALL BE COMPLETELY FILLED WITH ADHESIVE.

DISTRICT OF COLUMBIA
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PE905403
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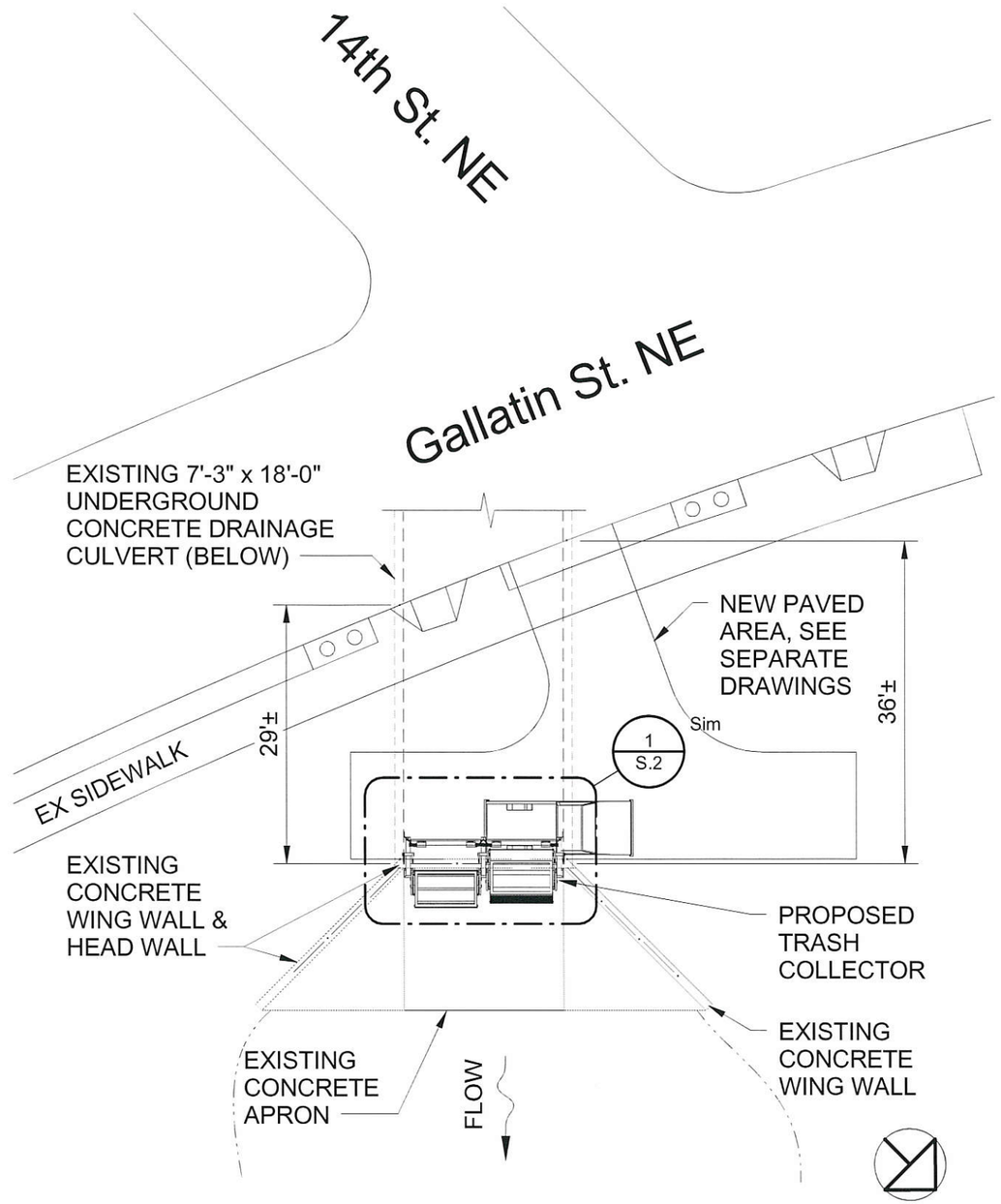
PROFESSIONAL ENGINEER (STRUC)
8-4-14

Steel Quantities				
Count	Type	Material	Volume	Weight
2	Basket Break-Away Gate	Metal - Steel - ASTM A36	0.44 CF	217 lb
2	Basket Chute	Metal - Steel - ASTM A36	1.46 CF	716 lb
2	Basket Frame	Metal - Steel - ASTM A36	1.45 CF	708 lb
2	C8X18.7	Metal - Steel - ASTM A992	0.32 CF	156 lb
3	Curved Rail with Stubs	Metal - Steel - ASTM A992	1.37 CF	671 lb



1 Structural Site Plan
1/16" = 1'-0"

CENTURY ENGINEERING
CONSULTING ENGINEERS - PLANNERS
10710 GILROY ROAD
HUNT VALLEY, MD 21031
Phone: (443) 589-2400 Fax: (443) 589-2401

Outfall 999 Trash Collector

General Notes & Structural Site Plan

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale:As indicated

Project Number
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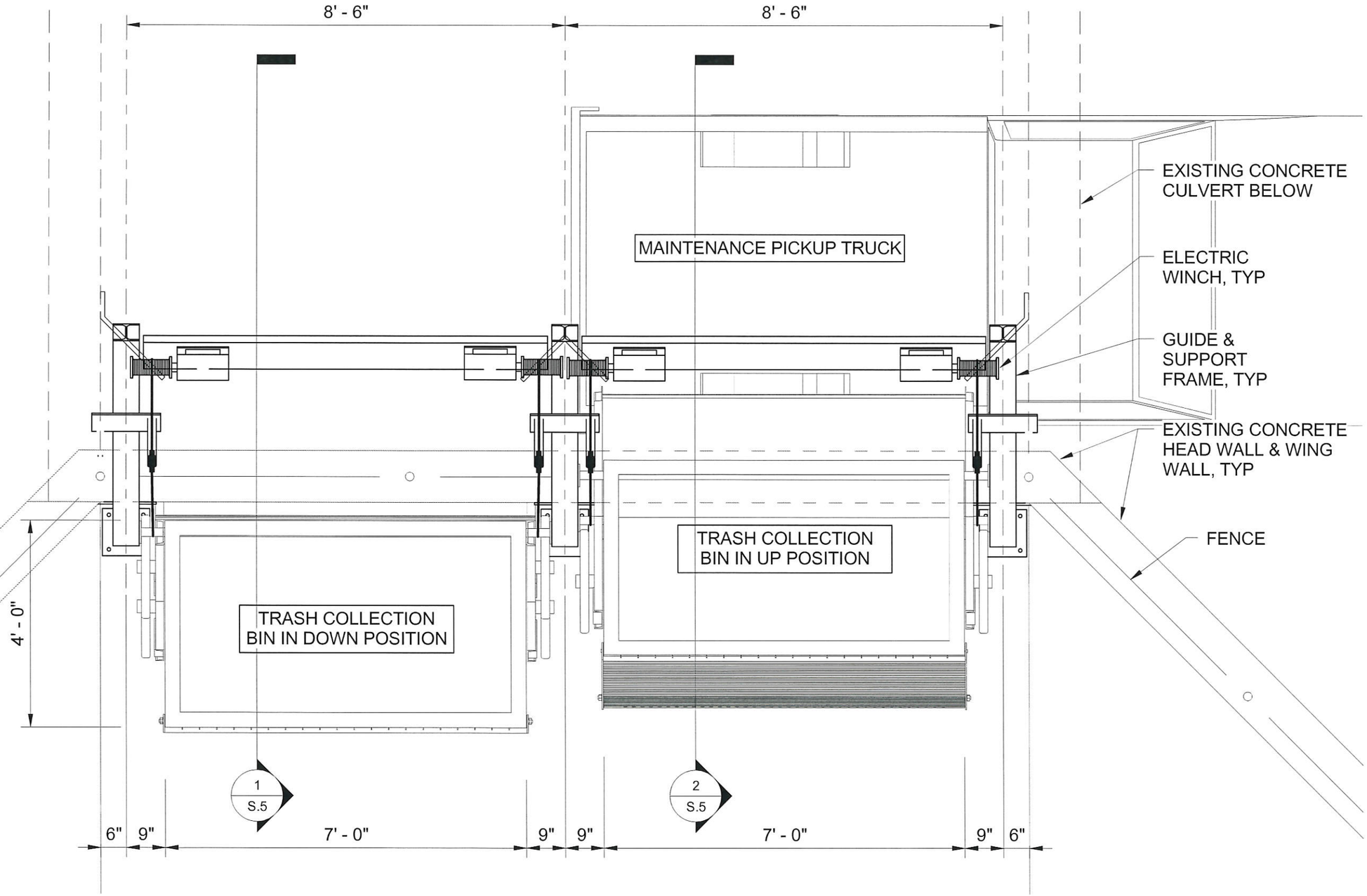

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Outfall 999 Trash Collector

Overhead Plan

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Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale: 1/2" = 1'-0"

Project Number

S.2

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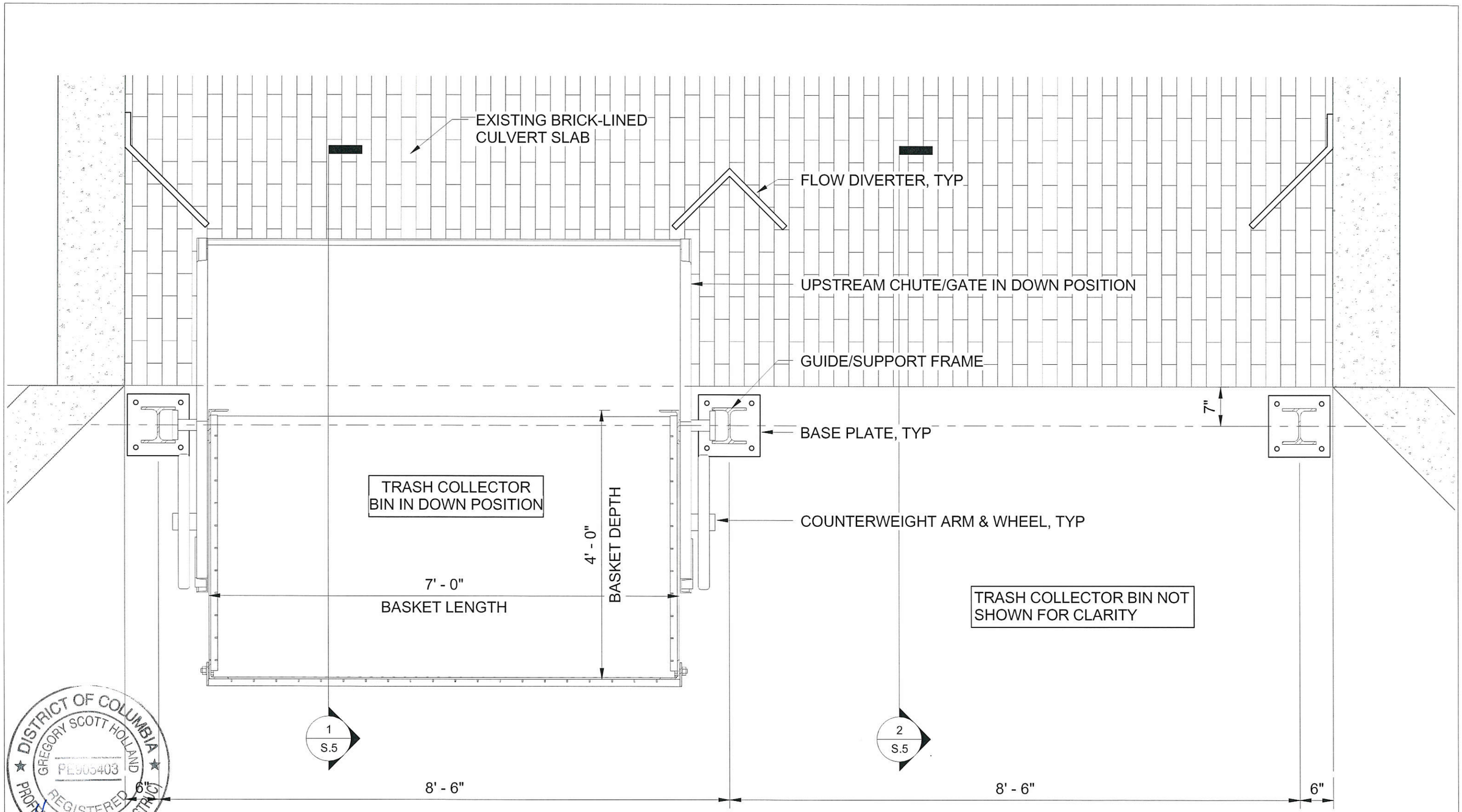

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Outfall 999 Trash Collector

Plan at Base

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale: 3/4" = 1'-0"

Project Number

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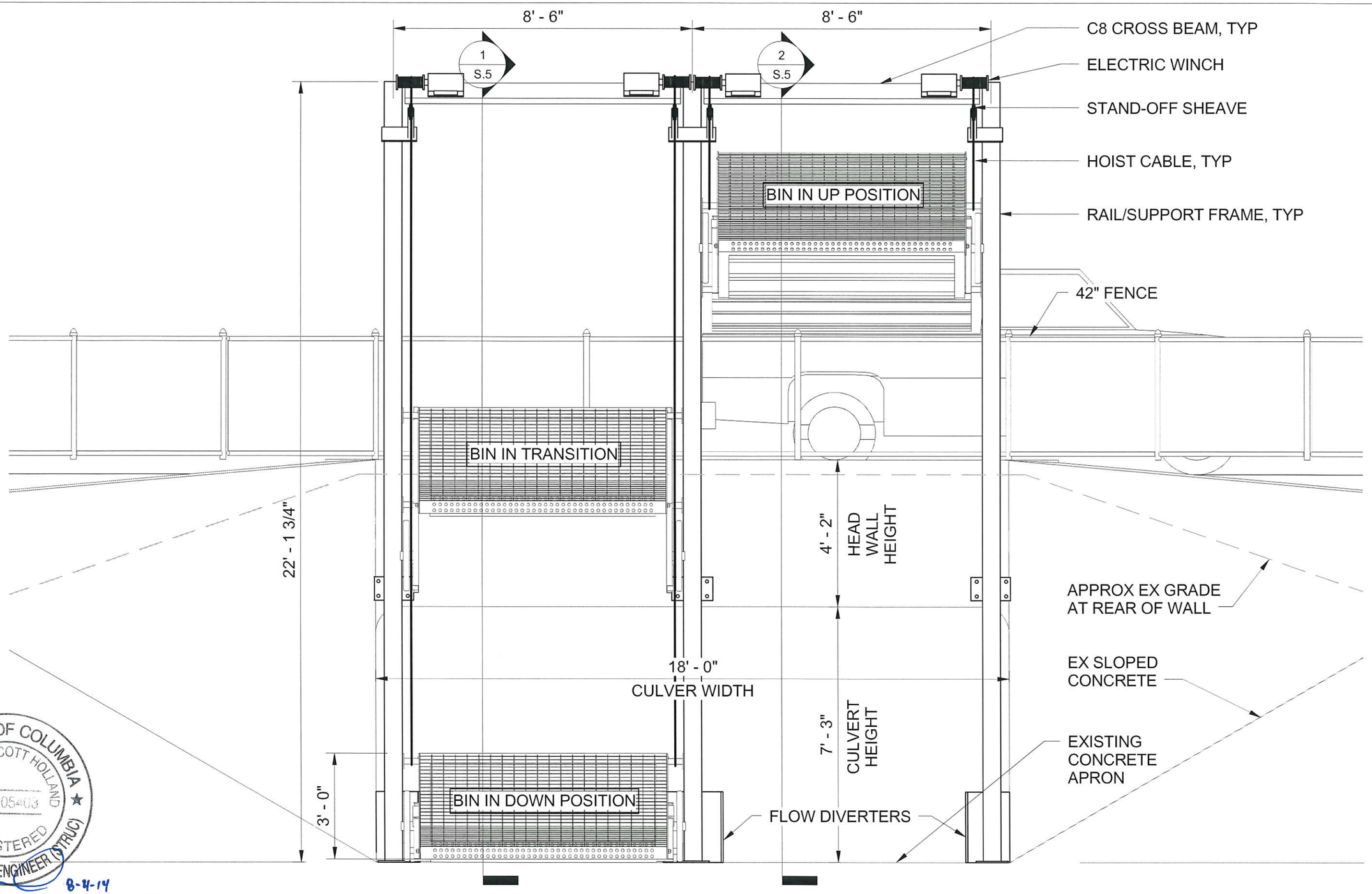

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Outfall 999 Trash Collector

Downstream Elevation

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale: 3/8" = 1'-0"

Project Number

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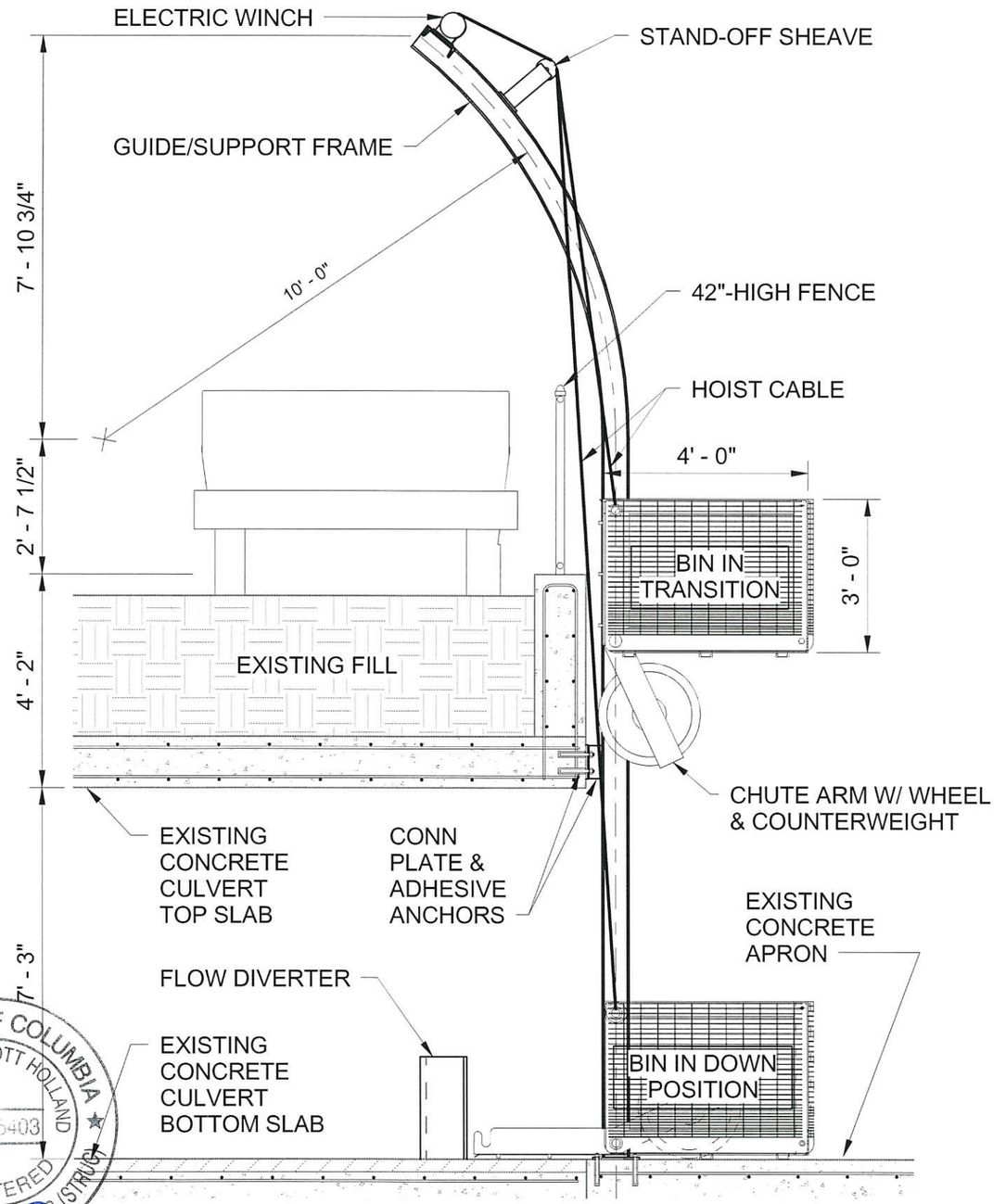
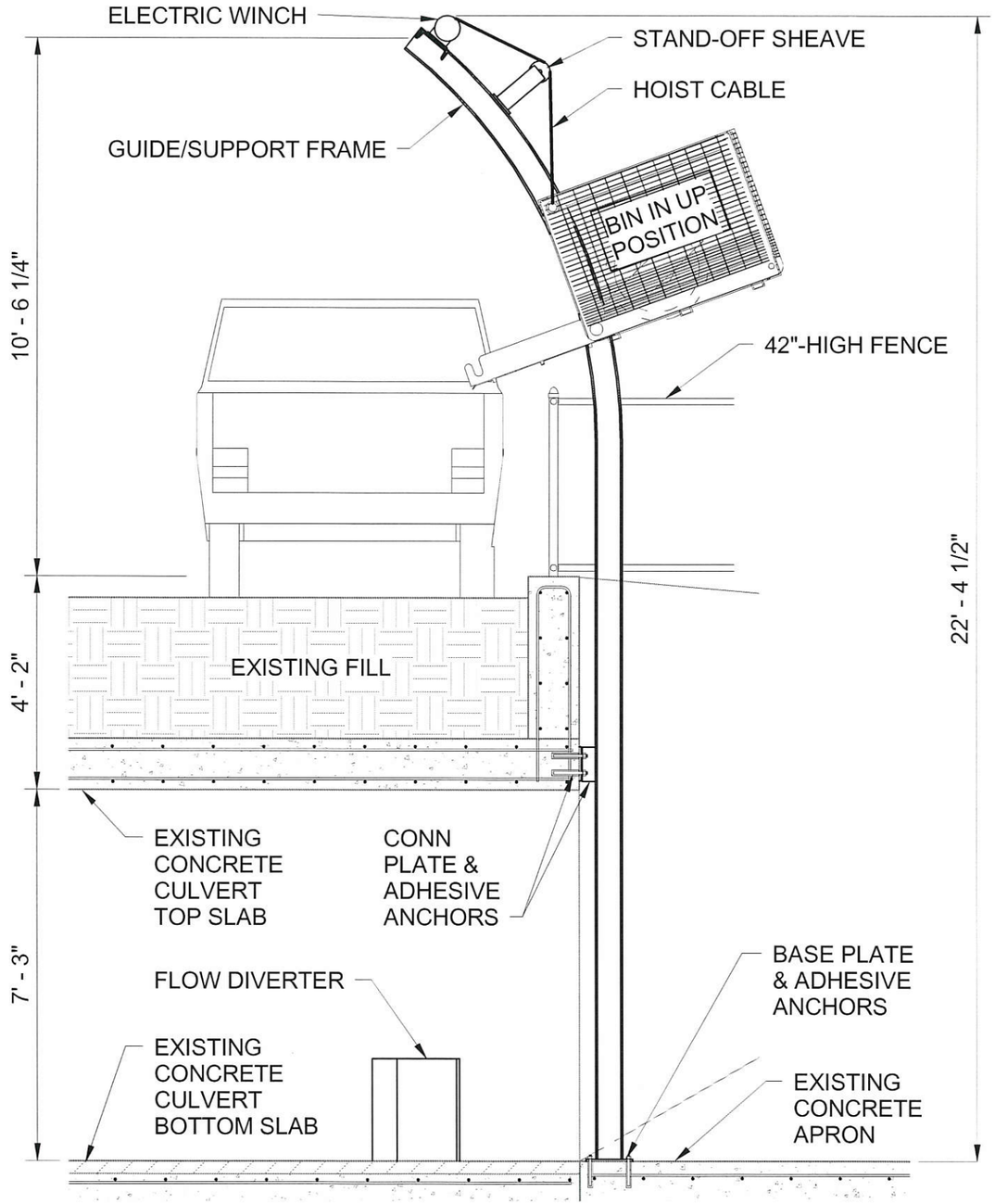


1 Section - Down & Transition Positions
3/8" = 1'-0"



2 Section - Up Position
3/8" = 1'-0"

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Outfall 999 Trash Collector

Sections

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale: 3/8" = 1'-0"

Project Number
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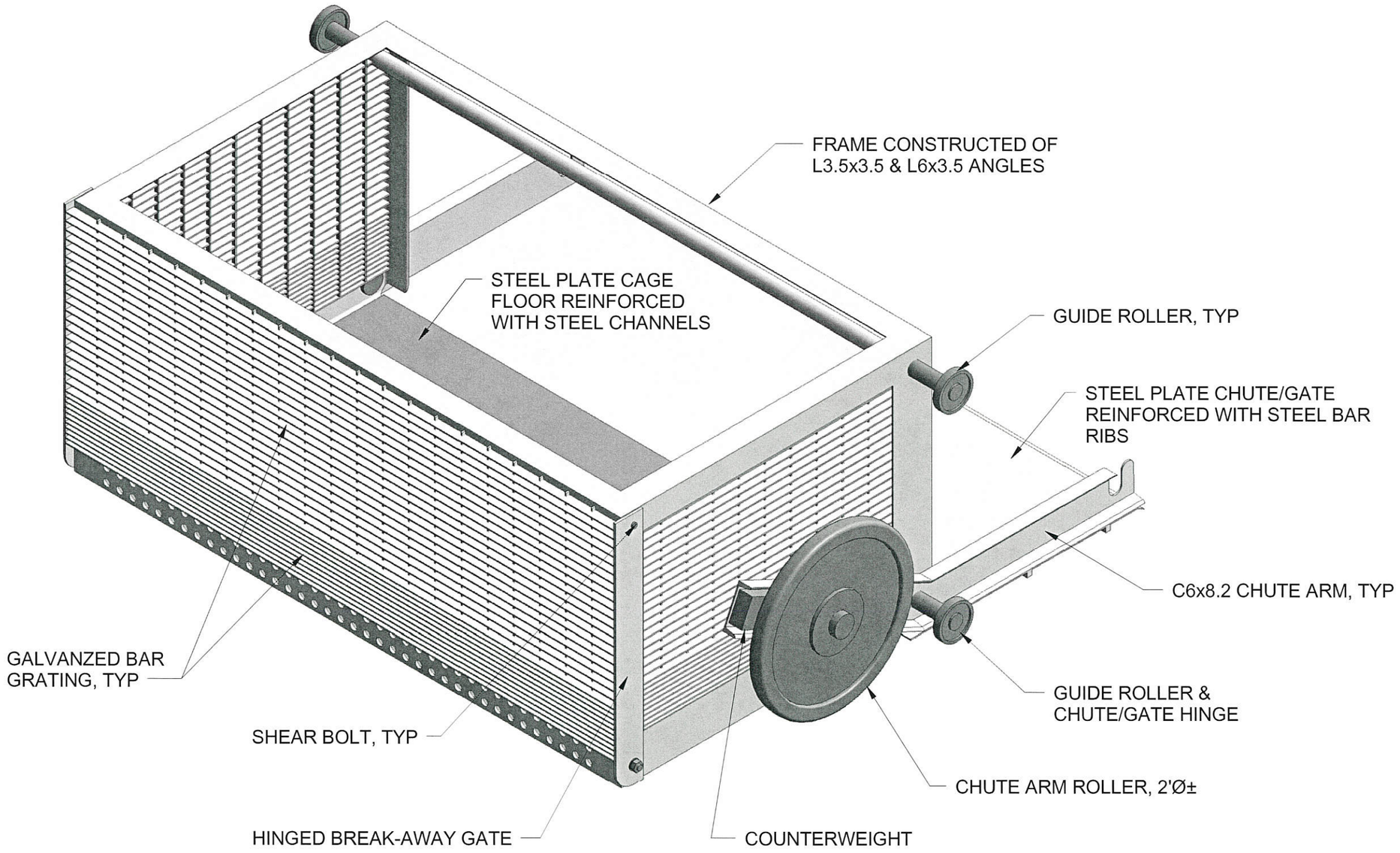

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PROFESSIONAL ENGINEER (STRUC)

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Outfall 999 Trash Collector

Downstream Iso View of Basket - US Chute Down, DS Gate Up

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Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale:

Project Number

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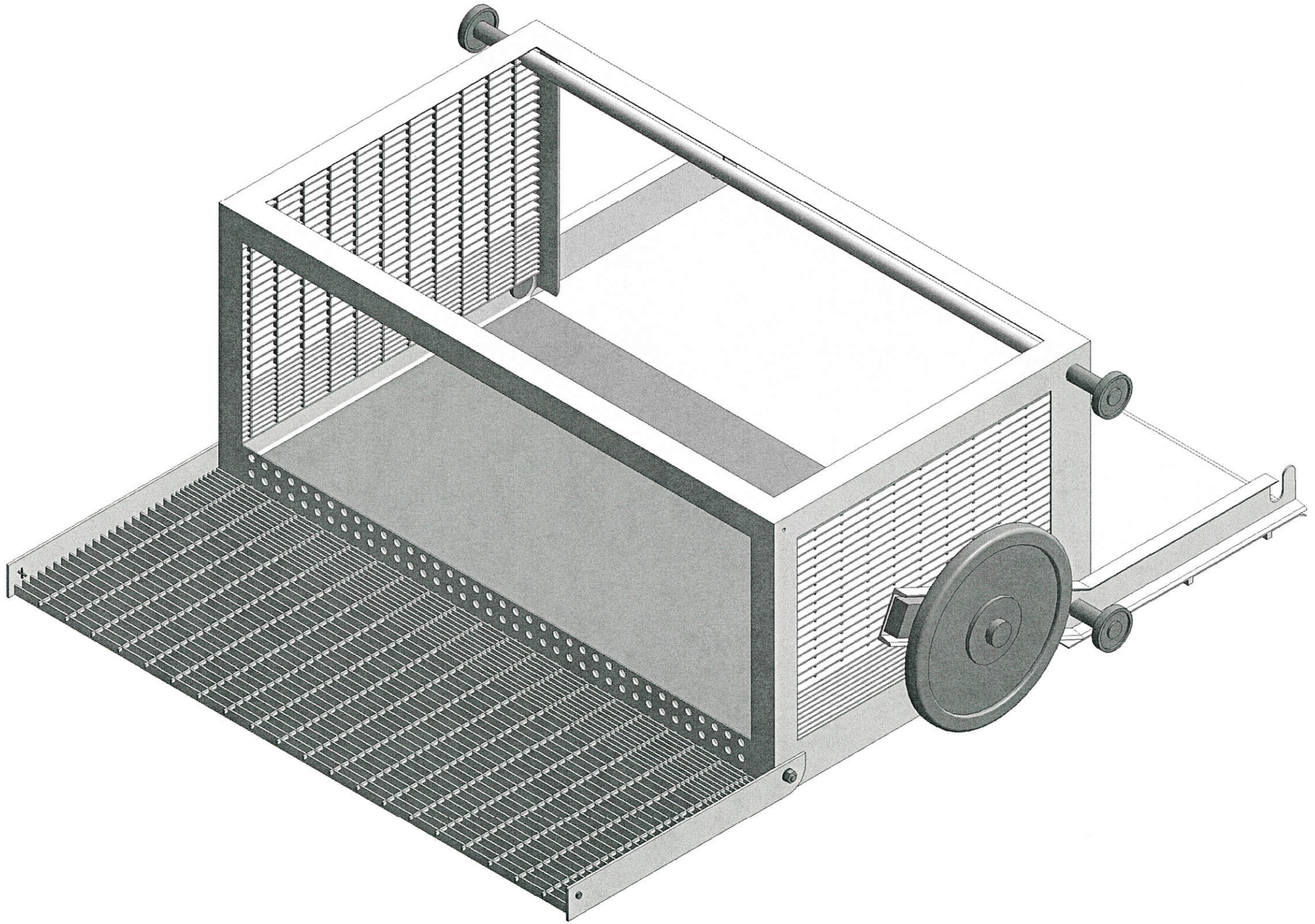

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PROFESSIONAL ENGINEER (STRUC)

8-4-14

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CONSULTING ENGINEERS - PLANNERS
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HUNT VALLEY, MD 21031
Phone: (443) 589-2400 Fax: (443) 589-2401

Outfall 999 Trash Collector

Downstream Iso View of Basket - US Chute Down, DS Gate Down

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale:

Project Number

S.7

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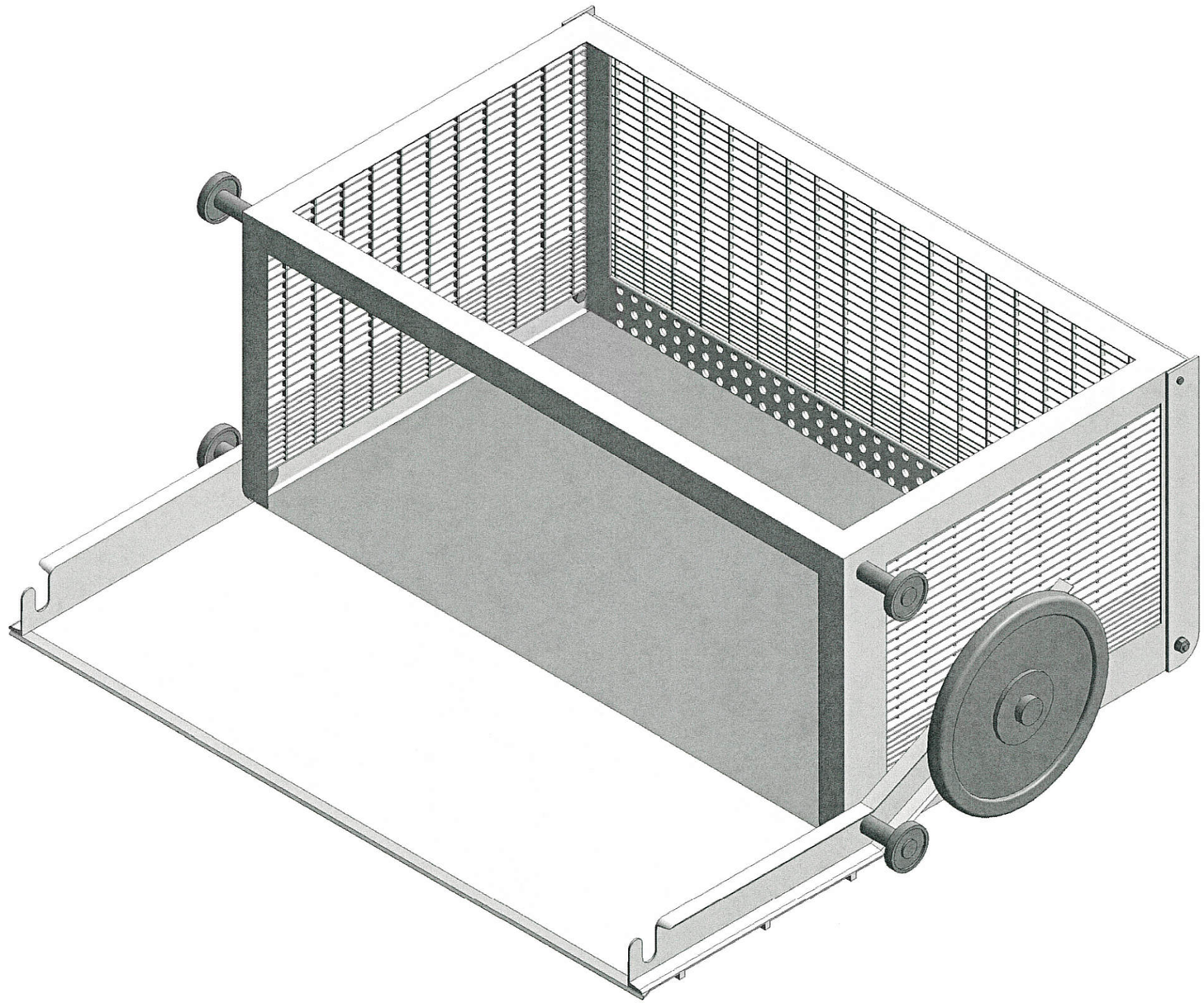

DISTRICT OF COLUMBIA
GREGORY SCOTT HOLLAND
PE905403
REGISTERED
PROFESSIONAL ENGINEER (STRUC)

8-4-14

CENTURY ENGINEERING
CONSULTING ENGINEERS - PLANNERS
10710 GILROY ROAD
HUNT VALLEY, MD 21031
Phone: (443) 589-2400 Fax: (443) 589-2401

Outfall 999 Trash Collector

Upstream Iso View of Basket - US Chute Down, DS Gate Up

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale:

Project Number

S.8

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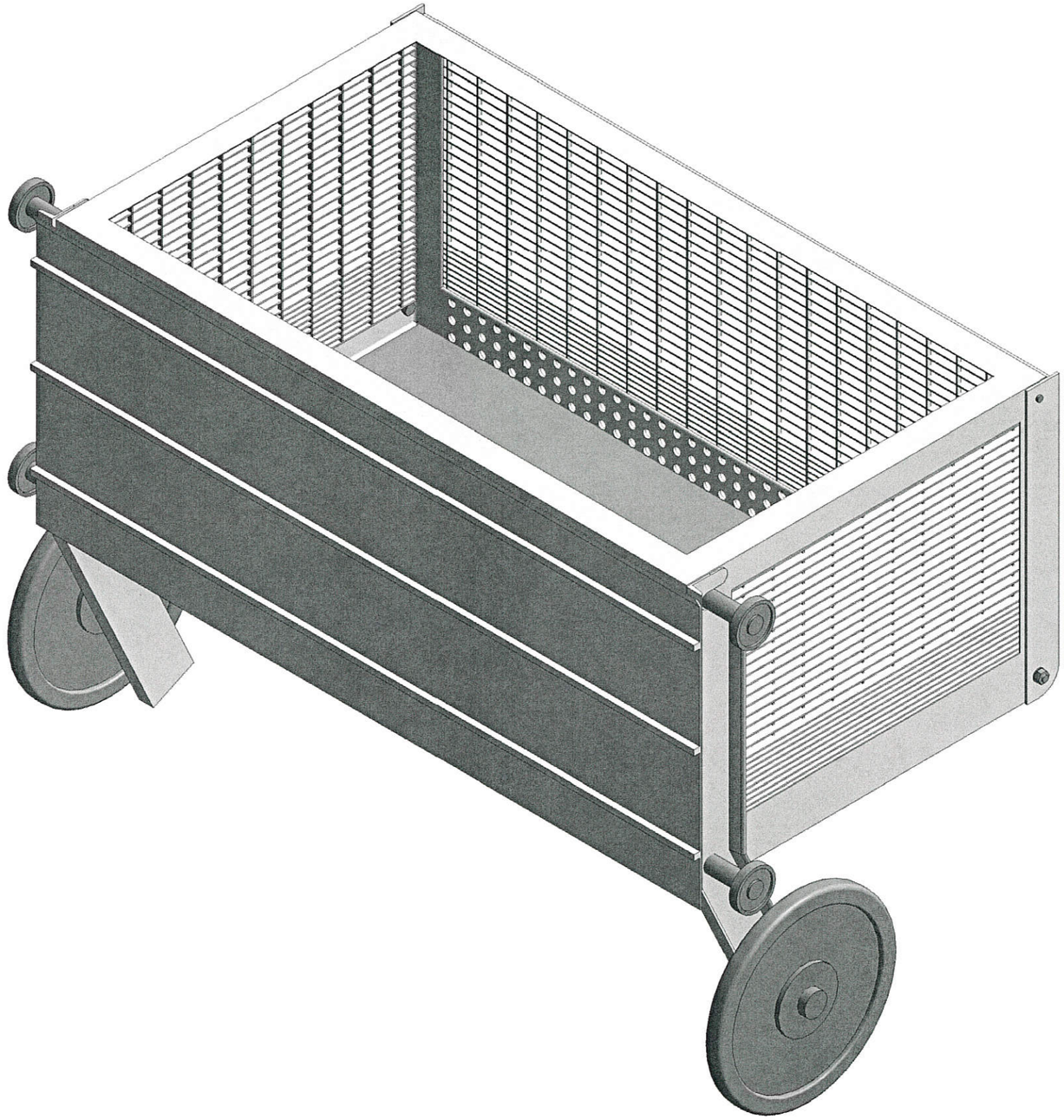

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Outfall 999 Trash Collector

Upstream Iso View of Basket - US Chute Up, DS Gate Up

Des: Designer
Dwn: Author
Chk: Checker
Status: Project Status
Issued: Issue Date
Scale:

Project Number

S.9

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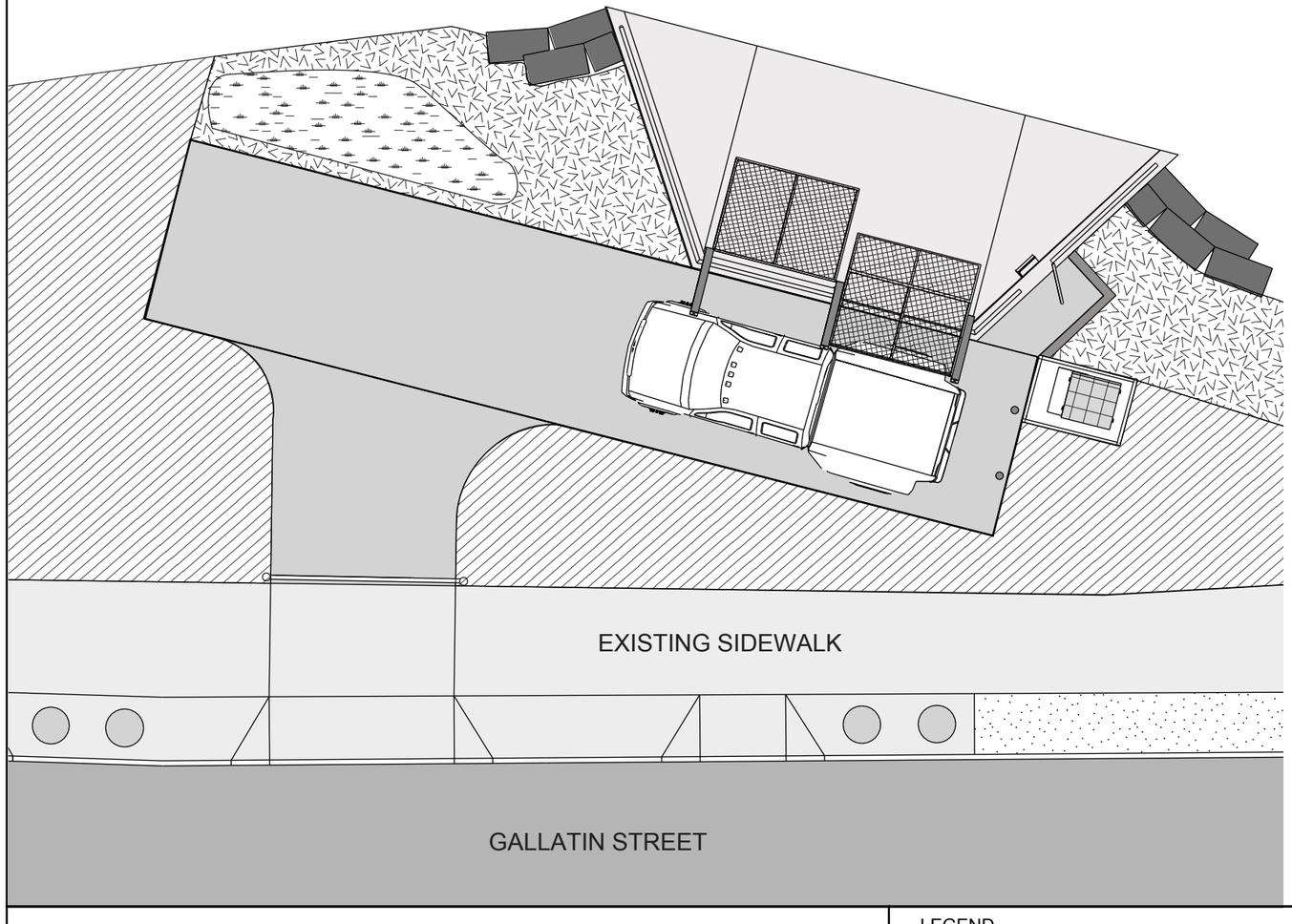
Appendix E

Conceptual Planting Plan

PLANTING PLAN



PLANT LIST

Scientific Name	Common Name
NATIVE HERBACEOUS + SHRUB ZONE	
Cornus stolonifera	Red-twid dogwood
Ilex verticillata	Winterberry holly
Asclepias tuberosa	Butterfly milkweed
Aster leavis 'Bluebird'	Smooth aster
Aster novae-angliae	New England aster
Echinacea purpurea	Purple coneflower
Monarda fistulosa	Wild bergamot
Muhlenbergia capillaris	Pink muhly grass
Penstemon digitalis	Beard tongue
Rudbeckia fulgida var. fulgida	Black eyed susan
Schizachyrium scoparium	Little bluestem
Solidago flexicaulis 'Fireworks'	Fireworks Zig-zag goldenrod
BIORETENTION ZONE	
Eragrostis spectabilis	Purple love grass
Juncus effusus	Soft rush
Lobelia cardinalis	Cardinal flower
Schizachyrium scoparium	Little bluestem
Verbena hastata	Blue vervain
DENSE NATIVE WOODY VEGETATION ZONE	
Aronia arbutifolia	Chokeberry
Alnus serrulata	Tag Alder
Amelanchier laevis	Alleghany Serviceberry
Cercis canadensis	Eastern redbud
Hamamelis virginiana	Witchhazel
Ilex verticillata	Winterberry holly

Outfall #999 Trash Interceptor Landscape Plan

NOT FOR CONSTRUCTION

LEGEND

- Dense Native Woody Vegetation
- Native Herbaceous + Shrubs
- ExistingTurf
- Bioretention

N

0' 2.5' 5' 10'

Biohabitats

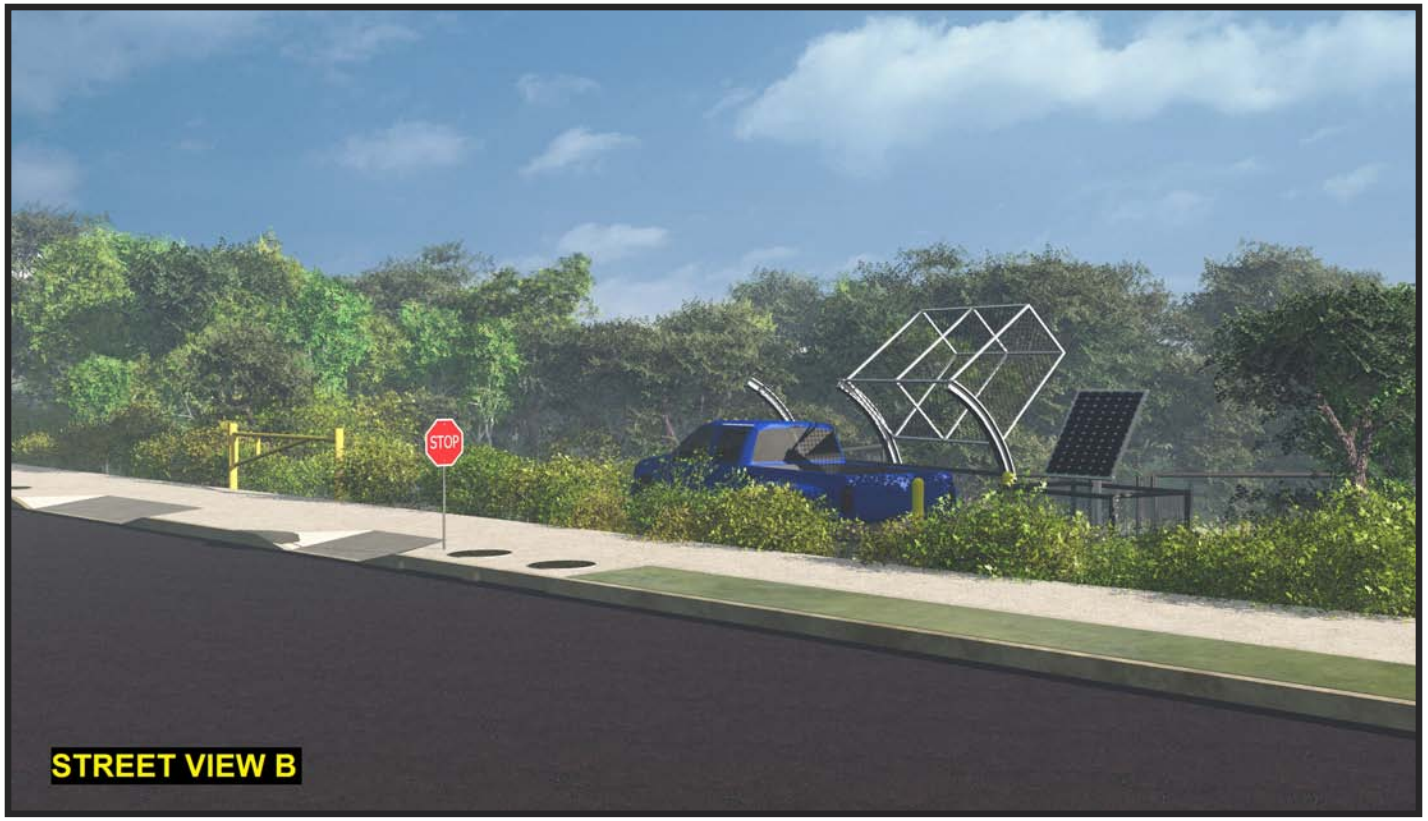
February, 2015

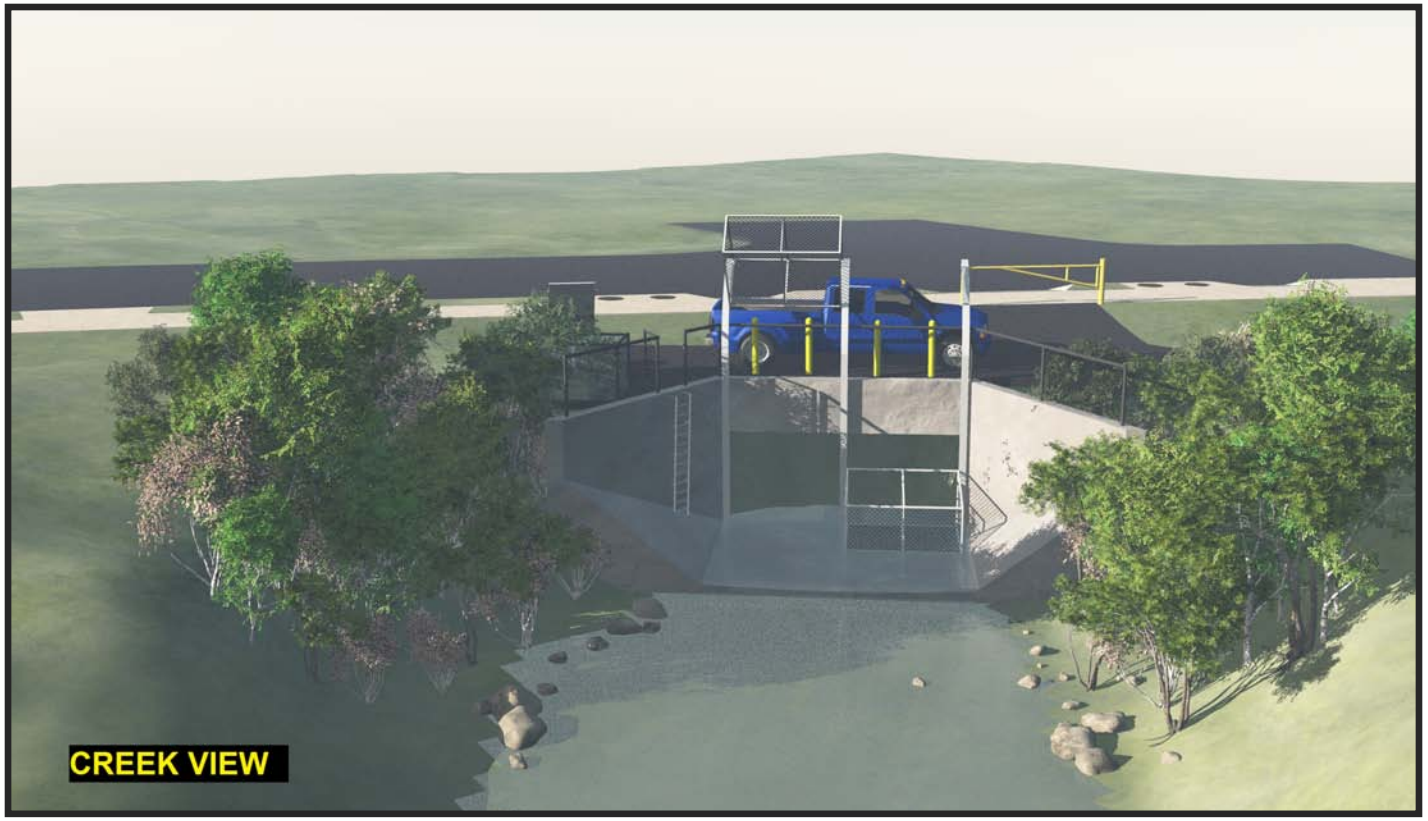
Appendix F

Artist's Conceptual Renderings


AERIAL PLAN VIEW

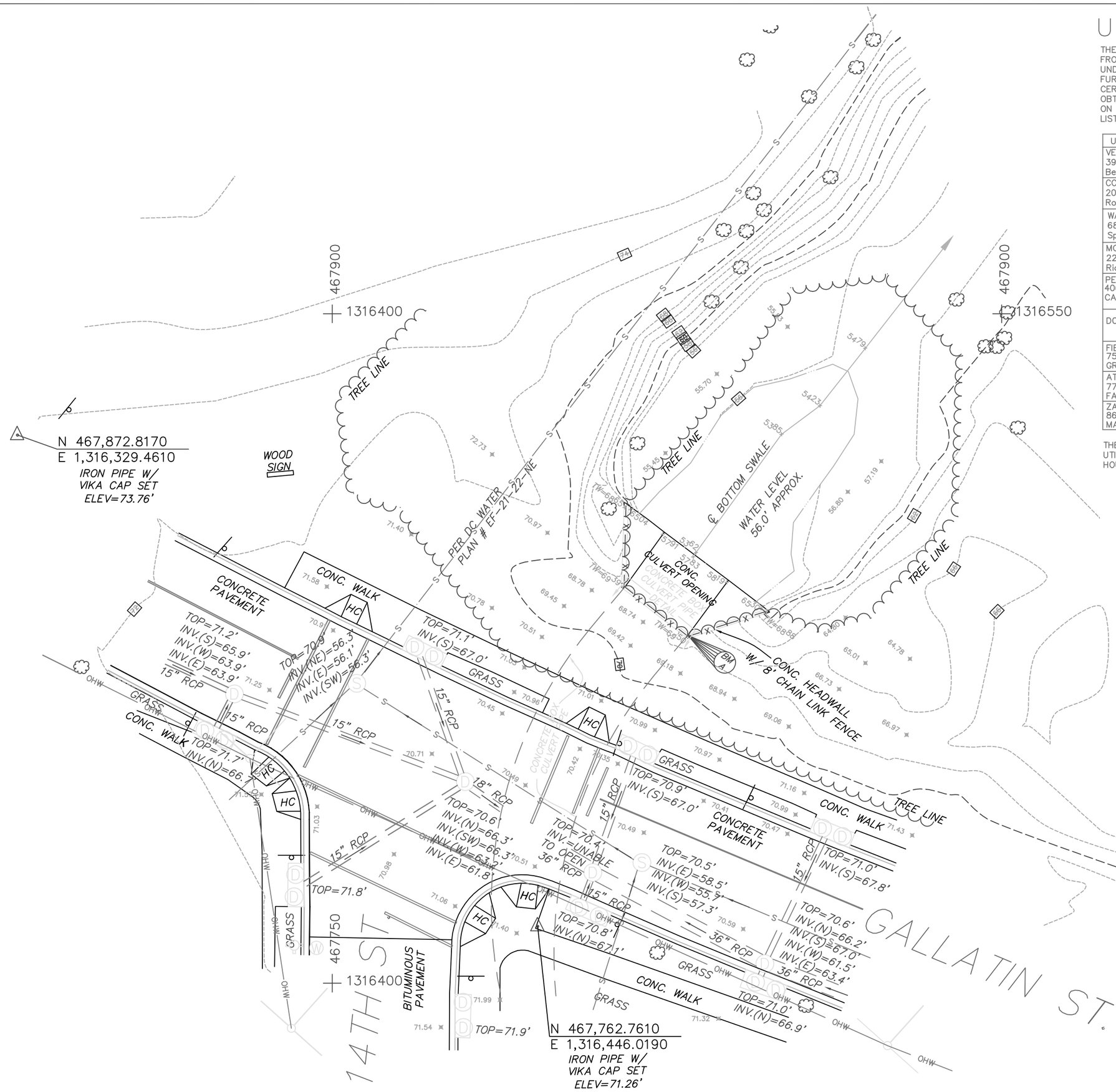

STREET VIEW A


STOP
STREET VIEW B


CREEK VIEW

Appendix G

Outfall 999 Site Survey

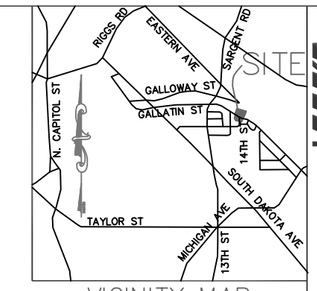


UTILITY NOTE

THE UNDERGROUND UTILITY LOCATIONS SPECIFICALLY NOTED IN THE TABLE BELOW AND GRAPHICALLY SHOWN HEREON HAVE BEEN LOCATED FROM A COMBINATION OF FIELD SURVEY INFORMATION AND/OR EXISTING DRAWINGS. THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN SERVICE OR ABANDONED. THE SURVEYOR FURTHER DOES NOT WARRANT THAT THE UNDERGROUND UTILITIES SHOWN ARE IN THE EXACT LOCATION INDICATED ALTHOUGH HE DOES CERTIFY THAT THEY ARE INDICATED FROM THE INFORMATION NOTED IN THE TABLE BELOW WHICH COMPRISES THE RECORD INFORMATION OBTAINED BY THE SURVEYOR. THE SURVEYOR HAS NOT PHYSICALLY LOCATED THE UNDERGROUND UTILITIES, UNLESS SPECIFICALLY NOTED ON THE DRAWING. THE FOLLOWING UTILITY COMPANIES HAVE BEEN SOLICITED FOR THEIR PLANS AND RECORD UTILITY DRAWINGS, LISTED BELOW ARE SPECIFIC PLAN/SHEET NUMBERS OF DRAWINGS PROVIDED BY THE UTILITY COMPANY OR LACK OF RESPONSE IS NOTED.

UTILITY COMPANY	PLAN # / SHEET #
VERIZON 3901 Calverton Boulevard – 3rd Floor Beltsville, Maryland 20705	NO FACILITIES IN AREA
COMCAST 20 West Gude Drive Rockville, Maryland 20850	PLAN PROVIDED. UNABLE TO DETERMINE EXACT LOCATION, APPEARS TO HAVE FACILITIES ALONG GALLATIN ST AND 14TH ST.
WASHINGTON GAS/MD REPLACEMENT SECTION 6801 Industrial Road Springfield, VA 22151	NO REPLY AT THIS TIME
MCI WORLDCOM 2250 Lakeside Road Richardson, TX 75082	NO REQUEST MADE
PEPCO 4061 POWDERMILL ROAD CALVERTON, MD. 20705	NO REPLY AT THIS TIME
DC WATER	PLANS APRROVED. WATERLINE SHOWN ALONG 14TH ST DOES NOT APPEAR TO AFFECT SUBJECT PROPERTY. SEWER SHOW ON SURVEY IN APPROX. LOCATION
FIBERLIGHT 7500 GREENWAY CENTER DR. GREENBELT, MD 20770	NO FACILITIES IN AREA
AT&T (LOCAL, METRO, TCA) 7777 LEESBURG PIK, SUITE 100N FALLS CHURCH, VA 22043	NO FACILITIES IN AREA
ZAYO GROUP 8684 VIRGINIA MEADOWS DR MANASSAS, VA 20109	NO FACILITIES IN AREA

THE OWNER/DEVELOPER OF THE SUBJECT PROPERTY IS RESPONSIBLE FOR OBTAINING INFORMATION AND COORDINATING WITH ALL OTHER UTILITIES NOT LISTED IN THE TABLE ABOVE. THE OWNER/DEVELOPER IS ALSO RESPONSIBLE FOR CONTACTING "MISS UTILITY" 48 HOURS PRIOR TO CONSTRUCTION.



VICINITY MAP
SCALE: 1" = 1000'

NOTES:

1.) THE HORIZONTAL DATUM IS BASED ON NORTH AMERICA DATUM OF 1983 (NAD83, 2011, EPOCH 2010.00). THE GRID COORDINATES SHOWN HEREON ARE PROJECTED ON THE MARYLAND COORDINATES SYSTEM (MD1900) ALL OF WHICH WERE DERIVED BY OBSERVING THE FOLLOWING THE CONTINUOUSLY OPERATING REFERENCE STATION (NGS–CORS 2011):
- *LOYOLA F CORS ARP (LOYF), PID NO. DK74114*
- *LOYOLA LOYK CORS ARP (LOYK), PID NO. DL3640*
- *LOYOLA 9 COOP CORS ARP (LOY9), PID NO. DH7956*
- *LOYOLA B COOP CORS ARP (LOYB), PID NO. DH7960*

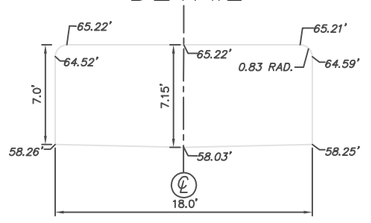
2.) THE VERTICAL DATUM IS BASED ON DISTRICT OF COLUMBIA, DC HIGHWAY DATUM (NAVD88), USING THE FOLLOWING WMATA BENCHMARKS
- *TOT1 – METRO BRASS DISK – EL=194.38'*
- *TOT2 – METRO BRASS DISK – EL=201.77'*
- *BTOT10 – REBAR & CAP – EL=200.47'*

3.) NO TITLE REPORT FURNISHED

4.) ON–SITE BENCHMARKS:
- *BM–A – "X–CUT" SET – SET THE TOP RIGHT CORNER OF CONCRETE HEADWALL, LOCATED APPROXIMATELY 30' NORTH OF THE NORTHERN FACE OF CURB ALONG GALLATIN ST. – ELEVATION = 69.50'*

15.) NO BOUNDARY SURVEY WAS PERFORMED. TOPOGRAPHIC SURVEY ONLY, PERFORMED BY VIKA MARYLAND, LLC, JUNE 23, 2015.

CONCRETE BOX CULVERT PIPE DETAIL



LEGEND

CTV	CABLE TELEVISION CONDUIT
E E E E E	ELECTRICAL CONDUIT
G G	NATURAL GAS CONDUIT
OHW OHW	OVERHEAD WIRES
S S	SANITARY SEWER CONDUIT
	STORM DRAIN CONDUIT
T T T T T	TELEPHONE/COMMUNICATIONS CONDUIT
W W	WATER CONDUIT
	EDGE OF PAVEMENT
X X X X	FENCE LINE
	PROPERTY LINES
	PUBLIC UTILITIES EASEMENTS

	SANITARY CLEANOUT
	STORM DRAIN MANHOLE
	SANITARY MANHOLE
	WATER METER
W	WATER MANHOLE
	WATER VALVE
	FIRE DEPARTMENT CONNECTION
	FIRE HYDRANT
G	GAS MANHOLE
	GAS VALVE
P	PHONE MANHOLE
E	ELECTRICAL MANHOLE
	ELECTRICAL JUNCTION BOX

	GUY WIRE
	UTILITY POLE
TC	TRAFFIC CONTROL BOX
	TRAFFIC SIGNAL POLE
	LIGHT POLE
P	PHONE PEDESTAL
C	CABLE TELEVISION PEDESTAL
T	ELECTRIC TRANSFORMER
MH	UNKNOWN UTILITY MANHOLE
	SIGN POST
	TREE
	BOLLARD
	CATCH BASIN, GRATE, INLETS
	UTILITY POLE WITH LIGHT FIXTURE

CONC.	CONCRETE
C&G	CURB AND GUTTER
ASPH.	ASPHALT
BLDG.	BUILDING
STY.	STORY
TRANS.	ELECTRICAL TRANSFORMER
RCP	REINFORCED CONCRETE PIPE
CMP	CORRUGATED METAL PIPE
HDPE	HIGH–DENSITY POLYETHYLENE PIPE
BRL	BUILDING RESTRICTION LINE
R/W	RIGHT–OF–WAY
IPF	IRON PIPE FOUND
PKF	PK NAIL FOUND
F.F.	FINISH FLOOR
R	RECORD
M	MEASURED
HC	HANDICAP RAMP

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

SURVEYOR'S CERTIFICATION

I, HARRY L. JENKINS, A LICENSED LAND SURVEYOR, DO HEREBY CERTIFY THAT I HAVE SURVEYED AND MAPPED THE ABOVE–DESCRIBED PROJECT AS DESCRIBED IN THIS SCOPE OF WORK AND ATTACHMENT 'B'.

I HEREBY CERTIFY THAT I HAVE BEEN AUTHORIZED, UNDER THE DIRECTION OF LIVING CLASSROOMS OF THE NATIONAL CAPITAL REGION, TO SURVEY, MAP AND DESCRIBE THE LAND SHOWN ON THIS TOPOGRAPHIC SURVEY. LIVING CLASSROOMS CERTIFIES THAT IT HAS THE AUTHORITY AND SUFFICIENT PERMISSIONS FROM THE DISTRICT OF COLUMBIA AND NATIONAL PARK SERVICE TO PROCEED WITH THIS SURVEY.

I FURTHER CERTIFY THAT THIS TOPOGRAPHIC LAND SURVEY, TO THE BEST OF MY PROFESSIONAL KNOWLEDGE AND BELIEF, IS CORRECT REPRESENTATION TO THE PROJECT BOUNDARIES OF THE LAND SURVEYED, AND THAT I HAVE FULLY COMPLIED WITH THE PROVISIONS OF THIS SCOPE OF WORK IN SURVEYING AND MAPPING THE LAND.

6–23–2015
DATE

HARRY L. JENKINS
LICENSED LINE SURVEYOR
DC LICENSE NO. LS900405

VIKA MARYLAND, LLC
ENGINEERS ■ PLANNERS ■ LANDSCAPE ARCHITECTS ■ SURVEYORS ■ 3D LASER SCANNING
20251 CENTURY BOULEVARD ■ SUITE 400 ■ GERMANTOWN, MARYLAND 20874
(301) 916–4100 ■ FAX (301) 916–2262
WWW.VIKA.COM

OUTFALL 999
TRASH CAGE SITE
WASHINGTON, DC

TOPOGRAPHIC SURVEY

VIKA REVISIONS

FIELD SURVEY:
JUNE 16, 2015
JUNE 23, 2015

DATE: JULY 6, 2015
DES. HJ | DWN. MBU
SCALE: 1"=20'
PROJECT/FILE NO. VM1978A
SHEET NO. 1