Fort Reno Solar Project

Submission by DC Water to the National Capital Planning Commission

October 30, 2026

Project Overview

Project Area

DC Water operates and maintains several facilities at its Fort Reno facility, located at 3900 Donaldson Place NW in Tenleytown. A capped reservoir (Fort Reno Reservoir #1) with a capacity of 5.4 million gallons, an operating pump station, laboratory and office space used by the Water Quality division, and two trailers with temporary office space located at the site are active parts of the DC Water distribution system and operations. The facilities also include decommissioned water tower, and the Watchman's Lodge and Tower. The Washington Aqueduct's Fort Reno Reservoir #2, operated by the US Army Corps of Engineers, is located to the north of DC Water's facilities and is operationally integrated.

DC Water's facilities are bordered by Fort Reno Park, administered by the National Park Service, to the east, south, and west; several other public facilities are also located in Fort Reno Park. The Federal Aviation Administration's Cartwheel Tower and a DC Department of Public Works leaf transfer station are adjacent to DC Water's campus to the west. A DC DPW salt dome is adjacent to the east, and Alice Deal Middle School, part of the District of Columbia Public Schools, is nearby to the northeast.

Proposed Development

The facility has a planned installed capacity of 668.81 kW DC / 560 kW AC of solar PV. The total system capacity will be organized into two systems as follows:

<u>Behind-the-Meter (north of Donaldson Place NW)</u>

A 92.63 kW system (157 modules) will serve DC Water onsite loads to reduce energy costs for the facilities. It consists of:

- Approximately 22 modules roof-mounted on top of the operating pumping station
- Approximately 135 modules ground-mounted in the open area behind the pumping station (ballasted system)
- Pad-mounted 125 kW Battery Energy Storage System (BESS)

<u>Community Solar (south of Donaldson Place NW)</u>

A 576.18 kW system (966 modules total) will interconnect to the Pepco grid, providing electricity to residents of the District, generating savings for residents and revenue for DC Water. It consists of:

- Appx. 644 modules installed above the capped reservoir. The solar array racking will be integrated into the green roofing system that is currently installed on the reservoir. The project includes rehabilitation of the existing green roof.
- Appx. 166 modules on a canopy in the area between the reservoir and DC Water's existing parking lot
- Appx. 166 modules ground-mounted on the east slope of the reservoir (ballasted system)

Schedule and Budget

Construction on the proposed project is anticipated to take place between Q1 and Q3 of 2027. The project has an estimated cost of approximately $3.5 M and is being funded by DC Water.

Outreach and Coordination

Public Engagement

DC Water presented the project to community members during the October 2026 meeting of ANC3E, in which Fort Reno is located. Community members asked questions about construction impacts and whether new transmission lines would be required, and expressed their support for this project, illustrated by the ANC's approval of a resolution in support of the project (attached as Exhibit A).

DC Water also briefed representatives of the Tenleytown Historical Society on the proposed project in September 2026.

Coordination with Federal and District Agencies

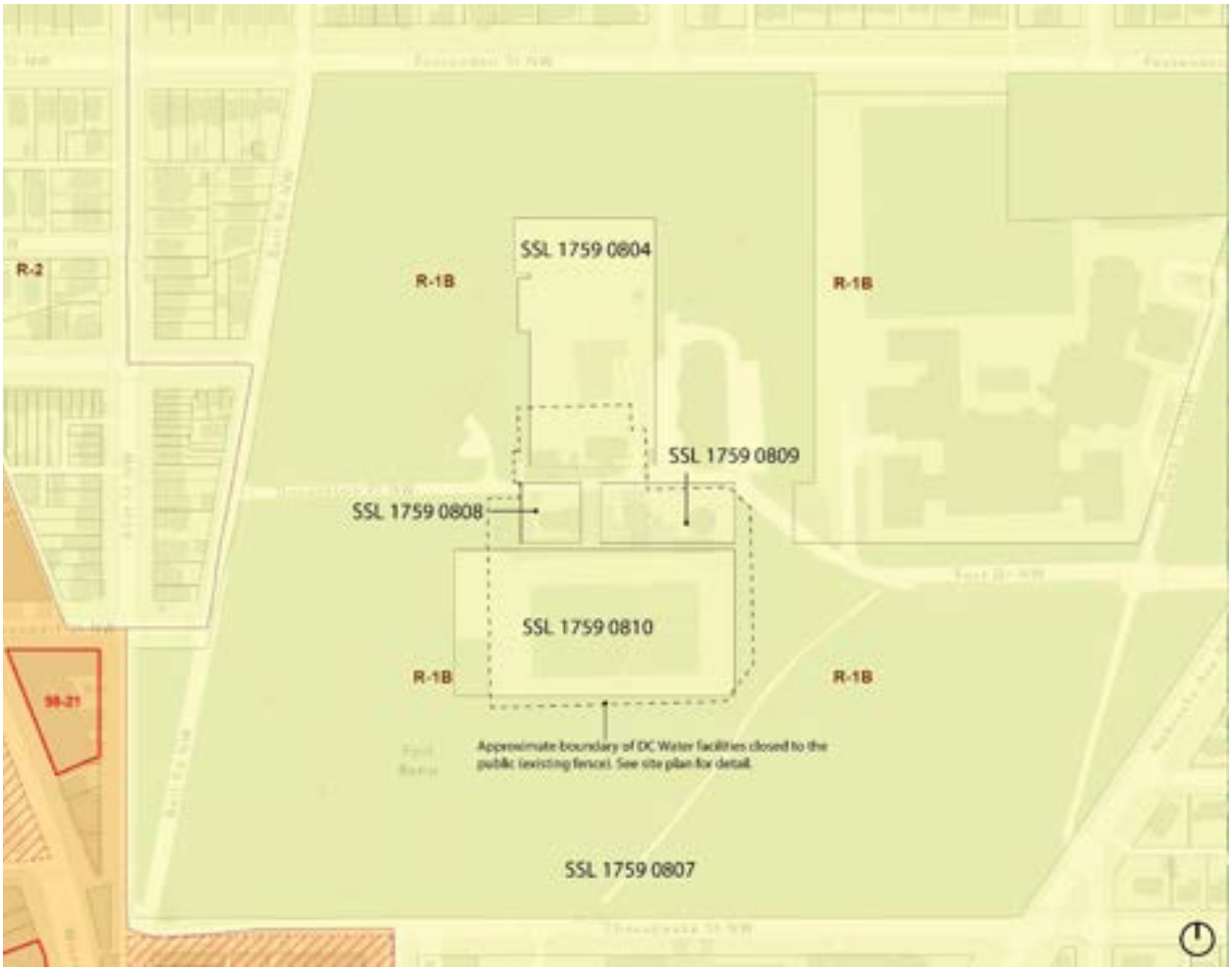
DC Water began consulting with the National Park Service about this project in 2025, before design began, in order to incorporate NPS feedback early. DCW has continued this engagement as design has progressed, and in summer of 2026 also began consulting with NCPC, the Commission on Fine Arts, and the District's State Historical Preservation Office.

Most recently, in October of 2026, DC Water convened NPS, NCPC, CFA, and SHPO for a coordination meeting. During this meeting, DC Water presented updated project plans which incorporate key feedback received over the summer and received an additional round of comments. The plans presented here incorporate these further comments, including removal of a row of panels from the southern edge of the reservoir roof to reduce

visual impact, removal of the fence replacement from the scope of work, and adjustment to the proposed locations of interconnection equipment.

Project Information & Drawings

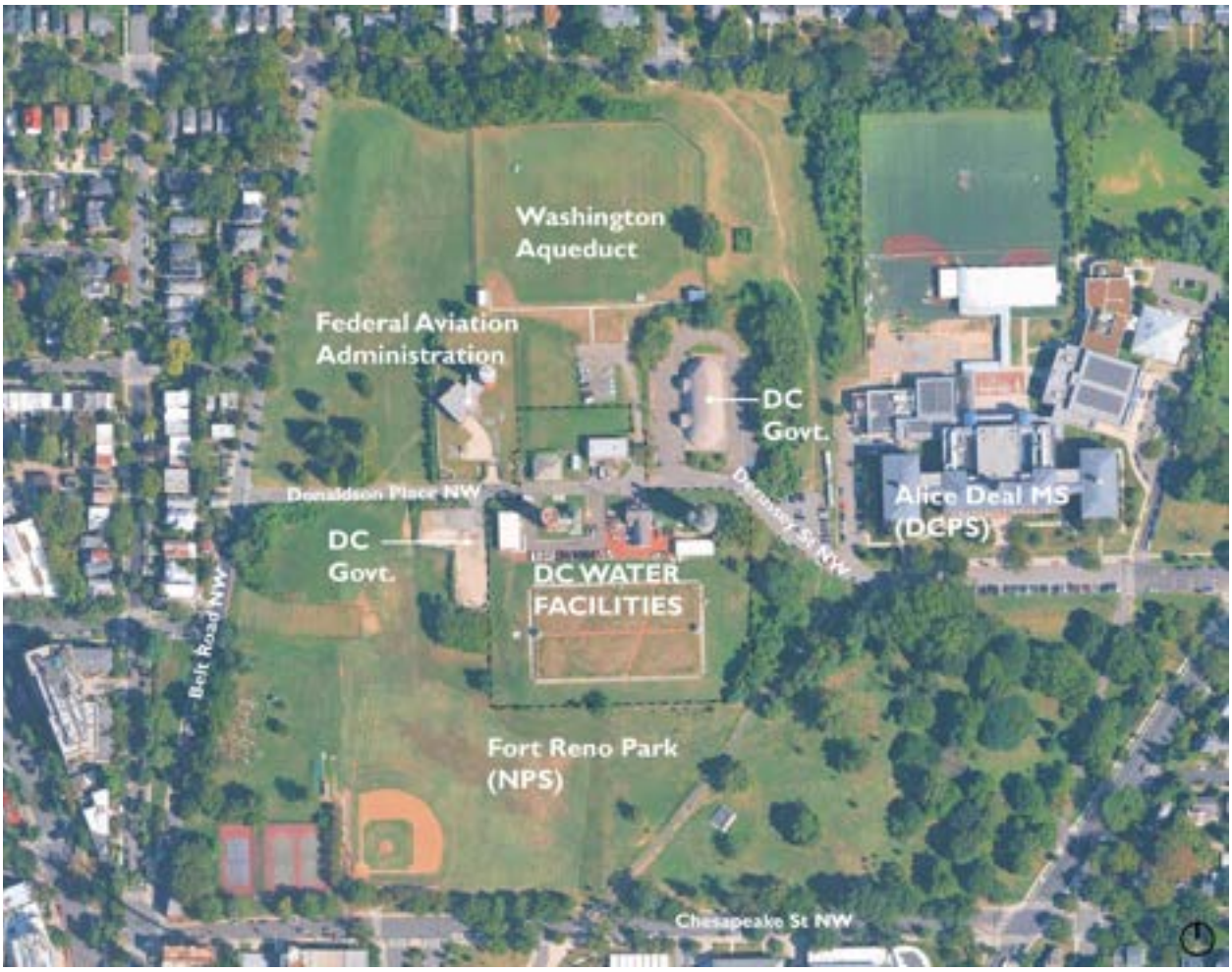
Existing and Proposed Buildings



Zoning Map: *DC Water facilities spanning multiple lots. DC Water's campus and the surrounding areas are zoned R1-B.*

DC Water exclusively manages and controls a fenced campus at Fort Reno with access points via Donaldson Place. As shown on the map above, DC Water's site boundary is defined by its existing fence. This area of exclusive operational control does not precisely align with property lines. DC Water's facilities span four distinct tax lots each with their own SSL. These tax lots include areas outside of DC Water's fence (its effective site

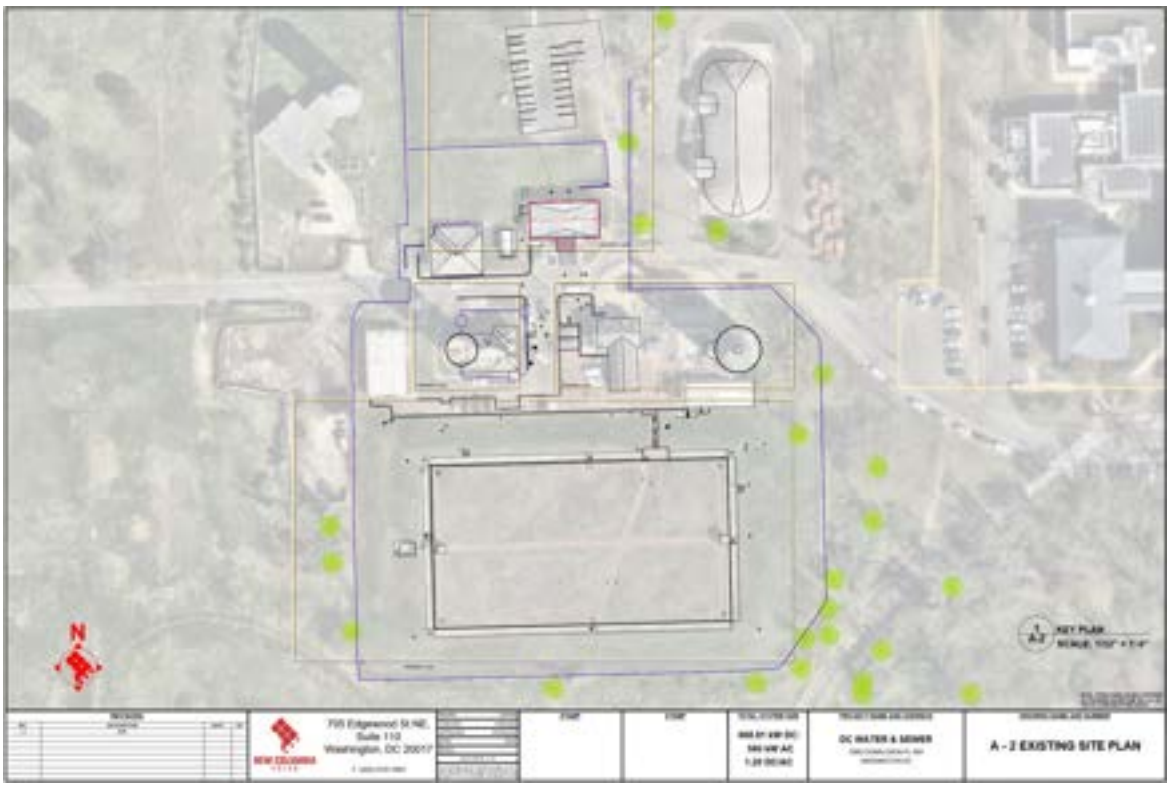
boundary), areas which are currently controlled by the National Park Service and the Washington Aqueduct. The DC Water area of operational control also includes a small portion of land outside of the four tax lots noted above.



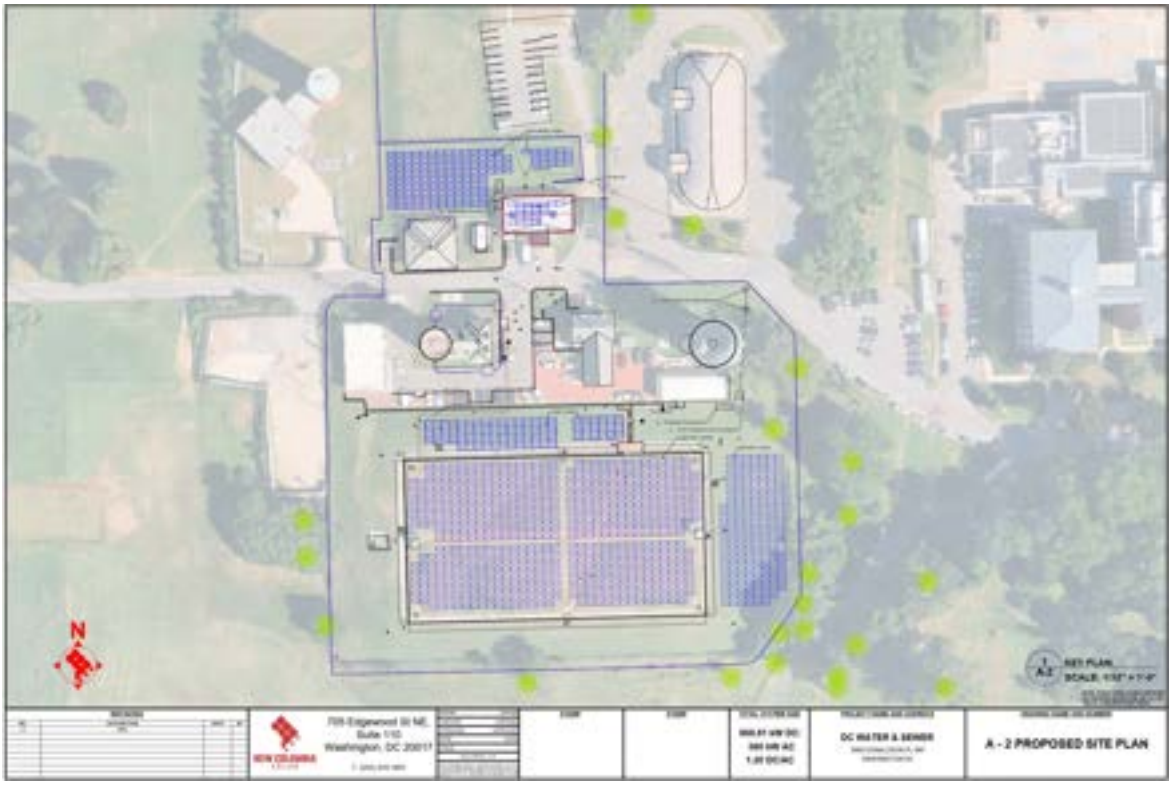
Vicinity Map: *DC Water facilities are bordered by Ft. Reno Park, Washington Aqueduct facilities, DC Department of Public Works facilities, and Alice Deal Middle School.*

There is no through-traffic on Donaldson Place as the portion of the street that crosses through DC Water's campus is closed to the public; DC Water maintains secure gates on the east and west access points. DC Water maintains a fence around the area it controls with 24-hour monitoring. All work will be within DC Water's fenced facilities, which constitute the site boundaries for the purposes of this project.

The site plans (existing conditions and proposed) illustrate the planned project.



A-2: Existing conditions at DC Water's Fort Reno campus.



A-2: *Proposed project at DC Water's Fort Reno campus.*

Please also see larger versions of these plans, along with detailed site plans for each portion of the project and specifications for key equipment, attached as Exhibit B.

Proposed Solar Facility

The facility has a planned installed capacity of 668.81 kW DC / 560 kW AC of solar PV. The total system capacity will be organized into two systems as follows:

Behind-the-Meter (north of Donaldson Place NW)

A 92.63 kW system (157 modules) will serve DC Water onsite loads to reduce energy costs for the facilities. It consists of:

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- Appx. 166 modules on a canopy in the area between the reservoir and DC Water's existing parking lot
- Appx. 166 modules ground-mounted on the east slope of the reservoir (ballasted system)

Tree Preservation and Replacement Plan

No tree removal or pruning is required or planned as part of the proposed project. All construction activities will be managed to protect existing trees on and around the site, including installation of tree protection fencing as needed.

Transportation & Circulation

Construction impacts on transportation and circulation are expected to be minimal. Deliveries and installation team members will access the site via DC Water's main entrance gate on Donaldson Place NW. Donaldson Place has no thru traffic and is

primarily used for access by DC Water. All staging and equipment will remain within DC Water's operational area.

Once the project is complete, additional traffic volume will be limited to occasional visits by system maintenance staff, who will also access the site via Donaldson Place and park in existing DC Water parking areas.

Perimeter Security

DC Water's operations are already enclosed by a continuous fence with two access gates. No additional perimeter security is anticipated.

Photographs

The photographs below illustrate key views of the site from the public areas adjacent to DC Water's facilities.



1: Entry to DC Water facilities at Donaldson Place NW.



2: View from Fort Reno Park.



3: View from Fort Reno Park walking path.



4: View from Derussey Street NW parking.



5: View from Alice Deal Middle School.



Key to visual representations above.

Environmental & Historical Considerations

Historic Preservation

DC Water's campus is part of the site of the former Fort Reno, one of the District's Civil War-era forts. While the Civil War fort has not been preserved, DC Water's facilities do include four historic structures associated with the site's longstanding use as part of the District's water treatment and distribution system: two elevated water storage towers (built 1904 and 1928), the watchman's lodge (built 1912), and a prior pumping station (built 1910). None of these structures are part of DC Water's active operations at the site. Because they are within DC Water's campus, they are not accessible to the public on a day-to-day basis, though DC Water periodically coordinates visits to its campus for interested community members, primarily through the Tenleytown Historical Society. The project has been designed to avoid these historical structures and does not involve any modifications or demolition of the four buildings described. Roof-mounted solar panels will be installed only on the new, operational pumping station (built 1978).

The area within DC Water's fence has been subject to repeated and substantial disturbance beginning in the 1890s, when the first reservoir at the site was constructed in the area north of Donaldson Place NW, across from the current reservoir. This open-air reservoir was replaced by a subsurface one, which was itself taken out of service when the expanded reservoir was built south of Donaldson Place in the 1920s and eventually filled in. The 1920s reservoir has also been the subject of multiple upgrades and rehabilitation

projects since its construction. These projects have required substantial excavation and placement of fills.

Nonetheless, to preserve the opportunity for future archeology, the project is designed to minimize ground disturbance. The majority of the proposed solar panels will be installed with ballasted racking systems, i.e., held firm with ballast rather than attached to pile-driven posts. This includes the panels behind the pumping station, the panels on the roof of the reservoir, and the panels on the east slope of the reservoir. Due to the terrain on the east slope, some portions of the array may require modest ground penetrations (estimated at 4-8", and not to exceed 1' in depth). Ballasted racking systems are not typical for ground-mounted solar arrays; deep foundations with a depth of 4-8' below grade are common. The racking system was selected specifically to minimize ground disturbance and impact on viewsheds (see below). One portion of the project, on the northern slope of the reservoir, will require a deep foundation due to the slope conditions and required tilt. In addition, the electrical interconnection of the system to the Pepco grid via a preexisting feeder line that runs overhead along Donaldson Place. The interconnection facilities will require an estimated 85 feet of underground conduit (at depths of 36") and the installation of two new utility poles. The grid interconnection has been designed to minimize the length of underground conduit required and so that all new infrastructure and ground disturbance is within DC Water's site boundary, where there has been extensive previous disturbance.

Natural Resources

DC Water's campus is surrounded by Fort Reno Park. The park is largely composed of recreational facilities including sports fields and a concert stage. However, it is also home to trees and vegetation, including a mix of native and invasive species, and there is a small grove of trees within the DC Water site itself, just south of Derussey Street NW. This project is not anticipated to require removal of any existing trees either on Park Service land or within DC Water's boundaries. DC Water's campus currently includes an extensive green roof on top of the covered reservoir, intended to reduce runoff and provide ecosystem services. The green roof will be rehabilitated and replanted (with native and pollinator-friendly species, where appropriate) as part of the project.

According to DC's Registry of Aquatic Resources, no streams or wetlands are present on or adjacent to the project site.

Energy and Sustainability

A central goal of this project is to support the District's clean energy goals. The project includes 668.81 total kW of solar PV and a 125 kWh battery storage system. 92.63 kW of solar PV will be installed behind-the-meter (BTM) to serve DC Water's facilities directly,

reducing grid energy usage and, along with the battery, peak electricity demand for site pumping operations. The community solar, or CREF, portion, will export power generated to the grid, offsetting energy usage by subscribers across the District. The project will help reduce electricity bills for an estimated 150 – 250 subscribers (actual number who can be served by the project depends on the electricity use of participating subscribers). Together, the BTM and CREF arrays will generate more than 940,000 kWh of electricity annually. According to the EPA's Greenhouse Has Equivalencies Calculator (accessed October 30, 2026), this clean energy generation is equivalent to the offset of 575 metric tons of CO2 annually, roughly the equivalent of taking 134 gasoline-powered cars off the road for a year.

Public Realm & Viewsheds

While the project site itself is closed to the public, portions of it are visible from Fort Reno Park and adjacent areas. Accordingly, the project has been designed to be minimally visible from adjacent public areas and to have the least possible impact on views of the historic resources. For example, no solar arrays are planned for the southern and western slopes of the reservoir; though panels there would have substantially increased system size and electricity generation, these slopes are the most visible from Fort Reno Park. The array proposed for the eastern slope is partially visible from the walking path to the east of the site and the parking area on Derussey Street but does not impede views of historical or cultural resources. As noted above, a lower-profile racking system was selected to reduce array height and visual impact.

The representations below, in which the proposed solar arrays are simulated on actual site photographs, illustrate the limited visibility of the project from the public realm (key to the views follows).



1: View from SW portion of Fort Reno Park toward DC Water facilities.



2: View from Fort Reno Park baseball field toward DC Water facilities.



3: View from Chesapeake St NW toward DC Water facilities.



4: View from SE of DC Water facilities, approaching the walking path to Alice Deal MS.



5: View from walking path to the east of the site, looking toward DC Water facilities.



6: View from Derussey Street NW toward DC Water facilities.



7: View from SW corner of Alice Deal Middle School toward DC Water facilities.



Key to visual representations above.

Flooding

The project site is not in the 100-year floodplain nor the 500-year floodplain mapped by FEMA.

Stormwater Management

Please see the attached stormwater management plan, which details how stormwater will be managed during construction, with emphasis on underground electrical trenching, and how site drainage will function after construction. It also describes the approach to the vegetated roof (green roof) on the Fort Reno Reservoir cap, on which a ballasted, non-penetrating photovoltaic (PV) array will be installed over a rehabilitated extensive green roof. The governing principle for the reservoir cap is that post-construction roof drainage follows the existing drainage pathways; the project does not add, relocate, or remove roof drains, scuppers, or overflow devices.

DC Water and its contractors will coordinate stormwater management with all applicable permitting agencies, as further described in the plan.

Attachment A

ADVISORY NEIGHBORHOOD COMMISSION 3E

TENLEYTOWN AMERICAN UNIVERSITY PARK FRIENDSHIP HEIGHTS

c/o Lisner-Louise-Dickson-Hurt Home 5425 Western Avenue, NW Washington, DC 20015

www.anc3e.org

October 8, 2026

RE: Letter in Support of DC Water's Solar Proposal at the Fort Reno Reservoir/Pumping Station

Dear Stakeholders,

On behalf of ANC3E, I am writing in support of DC Water's proposal to install a solar project at their Fort Reno Reservoir/Pump Station located on a ~2.5-acre property at De Russey Street and Donaldson Place, NW.

The site is a fully fenced property, occupied by DC Water's Fort Reno Reservoir and associated facilities, and all solar facilities will be installed within the existing fencing.

The proposed solar project would be built above and around the reservoir and surrounding DC Water buildings with some panels installed on the reservoir roof itself and some ground mounted.

DC Water proposes installing approximately 1,200 solar panels which are expected to generate about 640 kW AC (733.37 kW DC) of solar capacity.

A portion of the solar installation will provide electricity to offset DC Water's electricity use at the site, reducing its operating costs and benefiting DC Water ratepayers. The remainder will provide electricity to residents of Washington, DC, through the District's Community Solar Program. If feasible, DC Water also intends to work with the Department of Energy and Environment to make the project a Solar for All Program site serving low-to-moderate income (LMI) households.

The project site is adjacent to the 26-acre Fort Reno Park which is National Park Service (NPS) land; DC Water has been consulting with the NPS regarding the project since late 2025.

The Project also includes rehabilitation of the green roof on top of the reservoir (currently in poor condition) and replacement of the current chain link fence abutting Fort Reno Park with an improved metal slat fence.

In addition to ANC 3E, we understand that DC Water has begun initial consultations regarding the project with the Tenleytown Historical Society, the State Historic Preservation Office, the Commission on Fine Arts, and the National Capital Planning Commission,

Given the importance of generating more of the District's electricity from clean, local resources, the fact that the solar project will reduce DC Water's operations costs to the benefit of DC Water ratepayers, and the potential for community solar energy to reduce the energy burdens of District households, we support this project.

It is also important to note that following a presentation by DC Water representative to introduce the proposal to the community at the properly noticed ANC3E meeting on Thursday, October 8,2026, and a thorough discussion of the proposal, all meeting participants were enthusiastic about the project.

This letter was authorized by a vote of 6-0-0 at a public properly noticed meeting held on October 8, 2026, at which a quorum was present, with Commissioners Bender, Cohen, Gianinno, Hall, Mitchell, and Quinn in attendance.

If you have any questions or I can provide further information, please contact me at jmitchell4400@gmail.com or by phone at 202-680-0445.

Sincerely,

John Mitchell
Commissioner, ANC3E05

Attachment B

N

1
A-2
KEY PLAN
SCALE: 1/32" = 1'-0"

NOTE: STRUCTURAL PLANS CERTIFIED AS PROVIDED IN SECTION 106.1.4.1 OF THE DC CONSTRUCTION CODES.

NEW COLUMBIA SOLAR

TOTAL SYSTEM SIZE

668.81 kW DC:
560 kW AC
1.20 DC/AC

PROJECT NAME AND ADDRESS

DC WATER & SEWER
3900 DONALDSON PL NW
WASHINGTON DC

DRAWING NAME AND NUMBER

A - 2 EXISTING SITE PLAN

7'6"x7'6" Concrete pad for new utility transformer

EAST ARRAY - 97.94kW

N

1
A-2
KEY PLAN
SCALE: 1/32" = 1'-0"

NOTE: STRUCTURAL PLANS CERTIFIED AS PROVIDED IN SECTION 106.1.4.1 OF THE DC CONSTRUCTION CODES.

NEW COLUMBIA SOLAR

TOTAL SYSTEM SIZE

668.81 kW DC:
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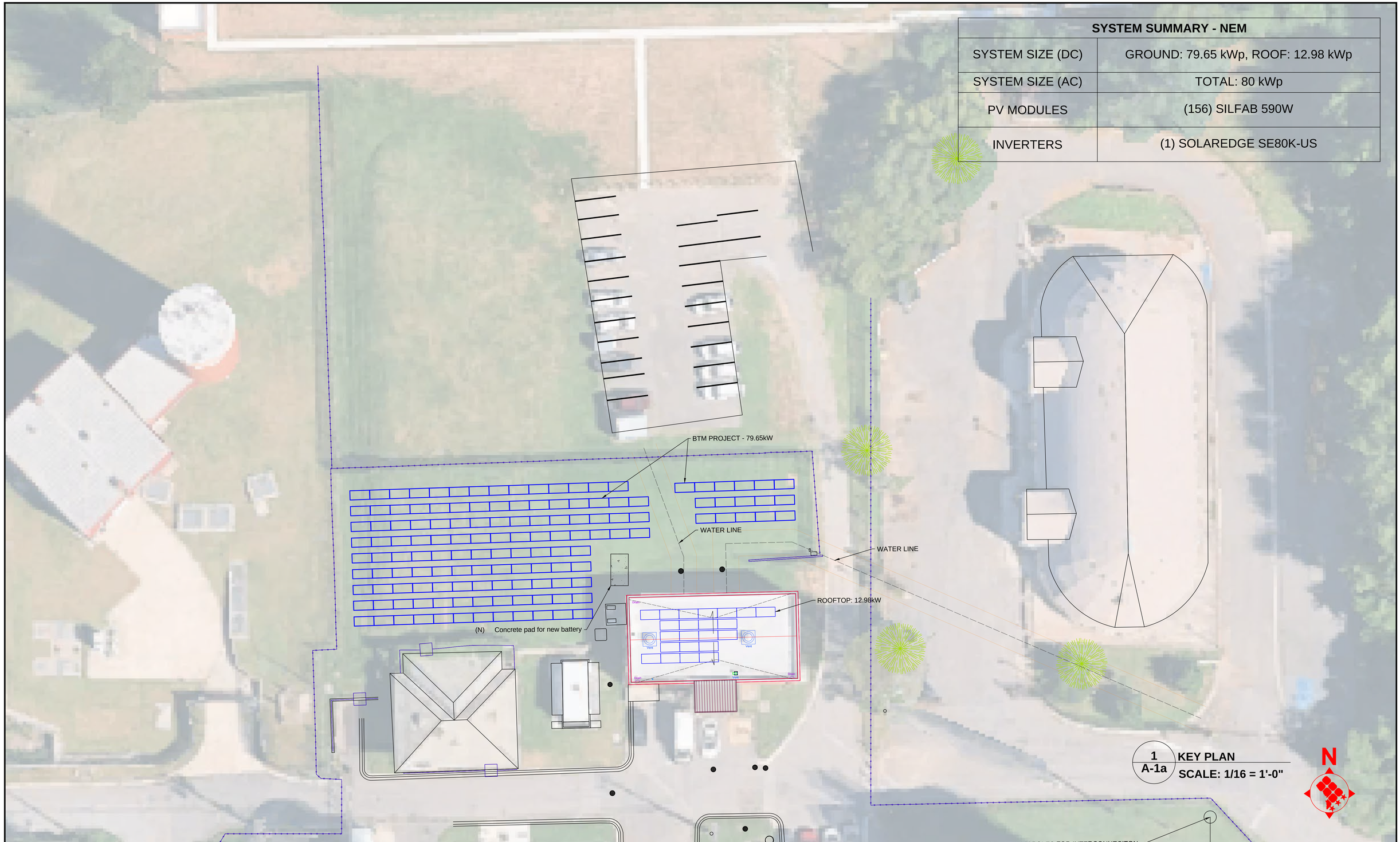
PROJECT NAME AND ADDRESS

DC WATER & SEWER
3900 DONALDSON PL NW
WASHINGTON DC

DRAWING NAME AND NUMBER

A - 2 PROPOSED SITE PLAN

SYSTEM SUMMARY - NEM	
SYSTEM SIZE (DC)	GROUND: 79.65 kWp, ROOF: 12.98 kWp
SYSTEM SIZE (AC)	TOTAL: 80 kWp
PV MODULES	(156) SILFAB 590W
INVERTERS	(1) SOLAREDGE SE80K-US



1 / A-1a KEY PLAN
SCALE: 1/16 = 1'-0"

N

REVISIONS

NO.	DESCRIPTION	DATE	BY
1.1	50%		

NEW COLUMBIA SOLAR

705 Edgewood St NE,
Suite 110
Washington, DC 20017

T: (202) 810-1661

DRAWN:	DRAWN
CHECKED:	CHECKED
APPROVED:	APPROVED
DATE:	DATE
SCALE:	

ORGINAL PAPER SIZE : 24" X 36"

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STAMP

STAMP

TOTAL SYSTEM SIZE

668.81 kW DC:
560 kW AC
1.20 DC/AC

PROJECT NAME AND ADDRESS

DC WATER & SEWER
3900 DONALDSON PL NW
WASHINGTON DC

DRAWING NAME AND NUMBER

A - 1A ARRAY LAYOUT - NEM



SYSTEM SUMMARY - CREF	
SYSTEM SIZE (DC)	GROUND: 477.9 kWp, CANOPY: 98.28 kWp
SYSTEM SIZE (AC)	TOTAL: 480 kWp
PV MODULES	(810) SILFAB 590W & (156) VISION MODEL 630W
INVERTERS	(6) SOLAREDGE SE80K-US

1 / A-1b KEY PLAN
SCALE: 1/16" = 1'-0"

REVISIONS

NO.	DESCRIPTION	DATE	BY
1.1	50%		

NEW COLUMBIA SOLAR
705 Edgewood St NE,
Suite 110
Washington, DC 20017
T: (202) 810-1661

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668.81 kW DC:
560 kW AC
1.20 DC/AC

PROJECT NAME AND ADDRESS

DC WATER & SEWER
3900 DONALDSON PL NW
WASHINGTON DC

DRAWING NAME AND NUMBER

A - 1B ARRAY LAYOUT - CREF

sempergreen® USA

Greenlight Pro
Ballasted Solar Racking
Product Data Sheet



General Description

With over 15 years in the European and US markets, Greenlight Pro (4mm) is a trusted solution for integrating photovoltaic (PV) systems with green roof assemblies.

Ballasted, Penetration-Free Design
Greenlight Pro is secured in place by roofing overburden—such as green roof media or stone aggregate—eliminating the need for welded or bolted connections to the roof structure. This design greatly reduces waterproofing penetrations and flashing requirements compared to traditional systems.

Flexible Installation
The system's HDPE base plate can bend and conform to roof slopes of up to 2% (and up to 5° overall pitch tolerance), making it ideal for new or existing roofs with slight variations or undulations.

Integrated Conduit Management
All electrical conduits and wiring can be run underneath the system within the green roof profile, simplifying maintenance and improving aesthetics.

Material Properties

Base Plate:	High-Density Polyethylene (HDPE)
Dimensions:	78" × 39" × 2.5"
Hardware:	Magnelis®, Aluminum, and Stainless Steel

Technical Data

- Weight: 26.5 lbs. per unit (not incl. PV panels and ballast)
- Maximum Roof Slope: 5°
- Orientation & Tilt Options: Portrait or Landscape orientations at standard inclinations of 10°, 15°, or 20°.
- Water Storage Capacity: 10.5 gal. / 1.4 cubic feet per panel.
- Ballast Requirements: Determined on a per-project basis, guided by wind uplift and layout studies.
- Roof Compatibility: Suitable for new or existing roofs, with multiple layout configurations.
- Minimum Soil Clearance: Most regions require a 12" clearance between the top of soil and the lowest point of the PV panel.
- Complete unit includes: one (1) base plate, one (1) angled bracket, two (2) profile rails (length vary) and hardware.
- PV panels, electrical components and wiring not included.



shown with pv panel in portrait mode



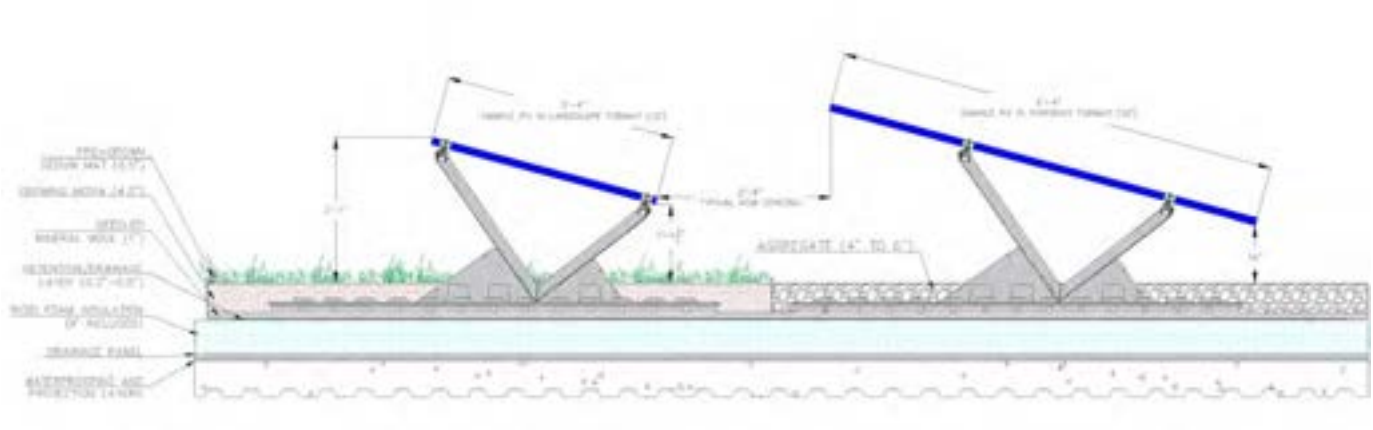
shown with pv panel in landscape mode

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sempergreen® USA

Greenlight Pro Ballasted Solar Racking

Product Data Sheet



contec

Delivery & Installation

Comprehensive Roof Plan
Installers receive a detailed layout indicating the exact position and spacing of each base plate.

Complete Material Shipment
All necessary components—including base plates, angled brackets, profile rails, clips, and endcaps—are delivered to the jobsite, with extra parts to cover typical waste factors.

Convenient Scope of Work
Roofing contractors or green roof landscapers can easily include the installation of this system in their overall project scope, streamlining coordination and scheduling.

Application

PV Panel Angle
A 10° angle is typically preferred, as it requires standard ballast levels that most green roofs can accommodate. Steeper angles (15°, 20°) are possible but may require additional ballast.

Ballast & Panel Orientation
Landscape Orientation: Generally requires 17–24 lbs/ft² of ballast. The center of the array needs less ballast, while perimeter edges and corners need more.
Portrait Orientation: Typically requires slightly higher ballast loads overall.

Wind Uplift Analysis
A detailed wind uplift study is provided by Sempergreen to recommend ballast requirements (lbs./sf) per roof area. The U.S. market requires a minimum 4 mm thick base plate.

Soil-Based Securement
The system relies on the weight of the green roof soil or other overburden (e.g., stone aggregate) to remain firmly in place.

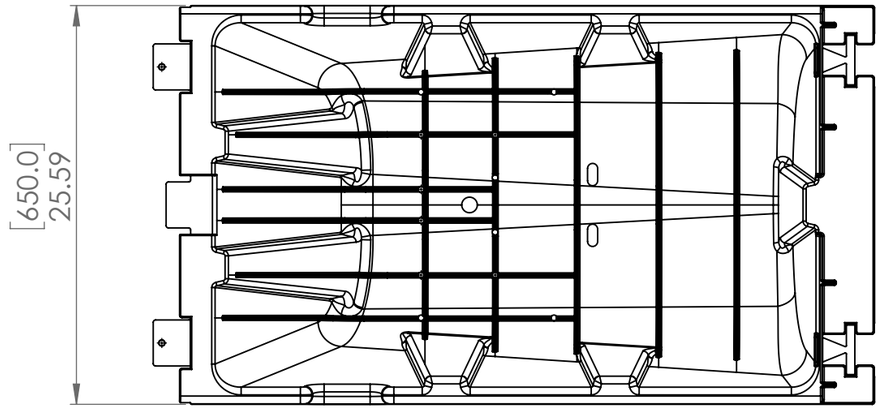
Additional Advantages

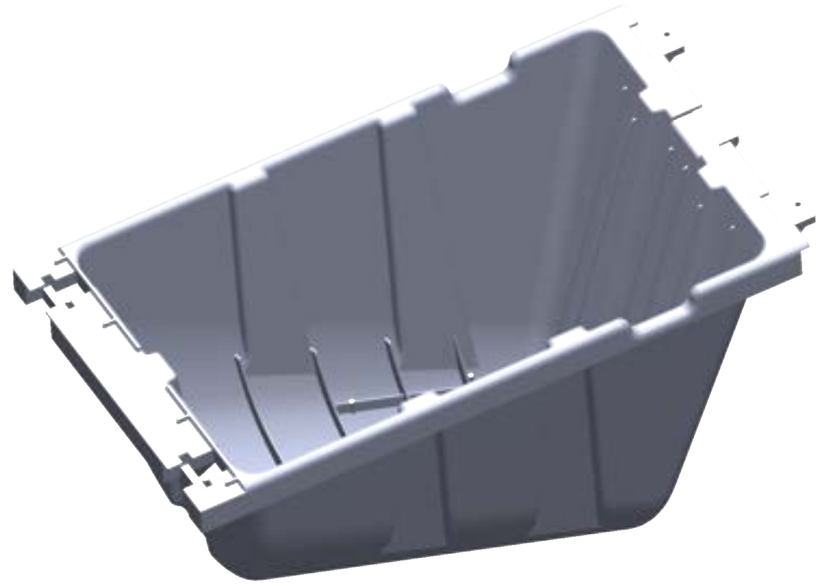
Reduced Structural Impact
By eliminating penetrations and flashing details, Greenlight Pro by Contec reduces long-term maintenance and potential points of water ingress.

Design Flexibility
The V-shaped brackets are custom-cut to match the desired PV panel angles, roof slope, and soil depth. Knowing the exact PV panel item number prior to design ensures the most accurate fit.

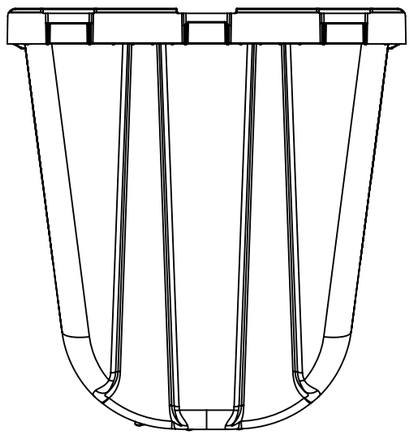
Improved Aesthetics & Function
Combining green roof and solar technologies enhances rooftop aesthetics, maximizes available space, and can improve cooling efficiency by reducing ambient roof temperature.

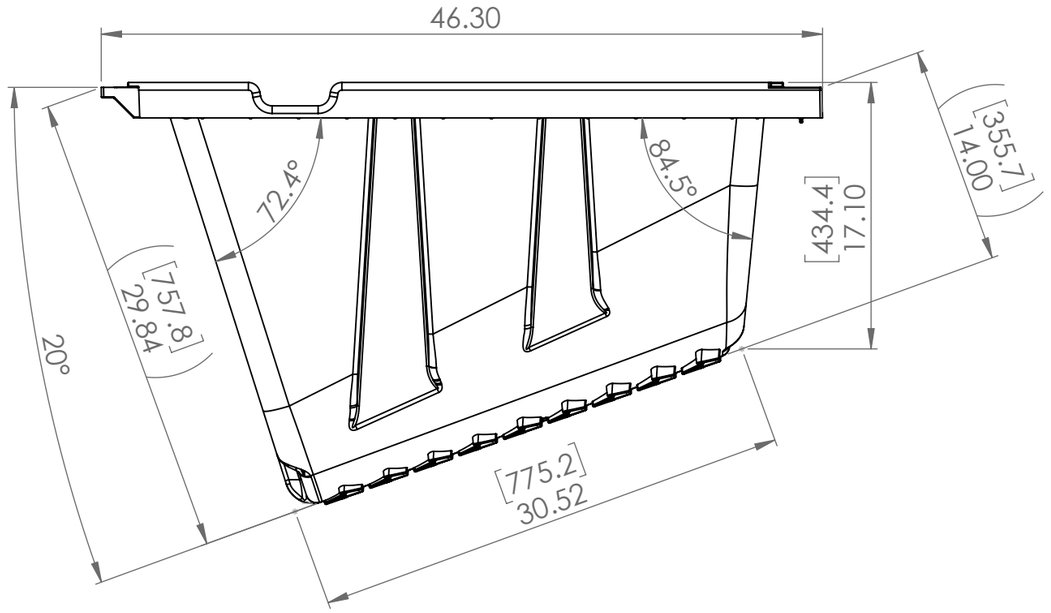
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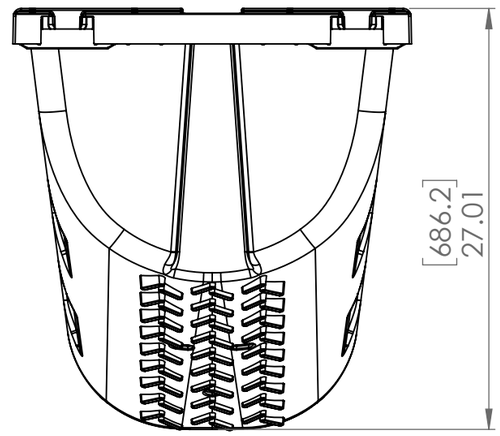




ISOMETRIC VIEW







DRAWING NOTES
1. UNDIMENSIONED FEATURES TO BE MANUFACTURED PER 3D CAD MODEL.

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IT IS NOT TO BE COPIED, USSED OR DISCLOSED WITHOUT EXPRESS WRITTEN PERMISSION.

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TOLERANCES:
LINEAR: .00±.01"; .000±.005"
ANGULAR:±0.5°

FINISH:

DEBURR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING | REVISION

MITECH Systems Ltd.
925 N. 3 B's & K Rd., Sunbury, OH 43074

	NAME	SIGNATURE	DATE
DRAWN	J-CAD		07/24/24
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:
PLASTIC BIN W/ SEGMENTED TOP AND SLOTTED BOTTOM

MATERIAL: PLASTIC, INJECTION MOLDING

DWG NO. PowerRack-1200_20deg-v2

A3

WEIGHT:

SCALE:1:10

SHEET 1 OF 1

SILFAB COMMERCIAL NTC

SIL-590 XM+
BIFACIAL



NEXT-GENERATION N-TYPE CELL TECHNOLOGY

Manufactured exclusively in the USA.

- Improved Shade Tolerance
- Improved Low-Light Performance
- Increased Performance in High Temperatures
- Efficient Bifacial Energy Yield
- Enhanced Durability
- Reduced Degradation Rate
- 25-Year Product Warranty/ 30-Year Performance Warranty

TOP PERFORMER 2025 kiwa PV MODULE RELIABILITY SCORECARD

SILFABSOLAR.COM

ELECTRICAL SPECIFICATIONS		590		
Test Conditions		STC	BSTC	NOCT
Module Power (Pmax)	Wp	590	643.7	435.5
Maximum power voltage (Vpmax)	V	44.79	44.79	41.21
Maximum power current (Ipmax)	A	13.17	14.37	10.57
Open circuit voltage (Voc)	V	52.50	52.56	48.29
Short circuit current (Isc)	A	13.91	15.17	11.17
Module efficiency	%	22.8%		
Maximum system voltage (VDC)	V	1500		
Series fuse rating	A	30		
Power Tolerance	Wp	0 to +10		
Bifaciality Factor	%	80 ± 10		

Performance conditions: Measurement tolerance ≤ 3% • Standard Test Conditions (STC): 1000 W/m², AM 1.5, Temperature 25 °C • Nominal Operating Cell Temperature (NOCT): 800 W/m², AM 1.5 • Bifacial Standard Test Conditions (BSTC): 1000 W/m2 + φ × 135 W/m2 , φ = 80 % , AM 1.5 • Electrical characteristics may vary by ±5%.

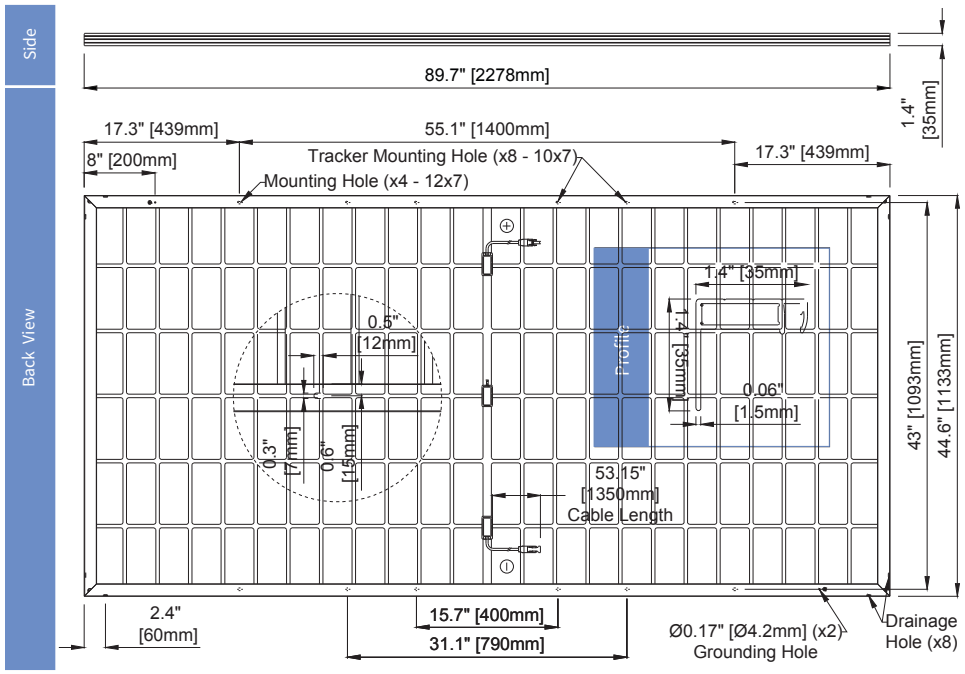
MECHANICAL PROPERTIES / COMPONENTS	METRIC	IMPERIAL
Module weight	28.5 kg ± 0.2 kg	62.8 lbs ± 0.4 lbs
Dimensions (H x L x D)	2278 mm x 1133 mm x 35 mm	89.7 in x 44.6 in x 1.4 in
Maximum surface load (wind/snow)*	2400 Pa rear load / 5400 Pa front load	50.1 lb/ft² rear load / 112.8 lb/ft² front load
Hail impact resistance	ø 25 mm at 83 km/h	ø 1 in at 51.6 mph
Cells	144 Half cells - N-Type Silicon solar cell 182 mm x 91 mm	144 Half cells - N-Type Silicon solar cell 7.16 in x 3.58 in
Glass	3.2 mm high transmittance, tempered, anti-reflective coating	0.126 in high transmittance, tempered, anti-reflective coating
Cables and connectors (refer to installation manual)	1350 mm, ø 5.7 mm, EVO2 from Staubli	53.1 in, ø 0.22 in (12 AWG), EVO2 from Staubli
Backsheet	High durability, superior hydrolysis and UV resistance, multi-layer dielectric film, transparent PV backsheet	
Frame	Anodized Aluminum (Silver)	
Junction Box	UL 3730 Certified, IEC 62790 Certified, IP68 rated, 3 diodes	

TEMPERATURE RATINGS		WARRANTIES	
Temperature Coefficient Isc	0.04 %/°C	Module product workmanship warranty	25 years**
Temperature Coefficient Voc	-0.24 %/°C	Linear power performance guarantee	30 years
Temperature Coefficient Pmax	-0.29 %/°C		≥ 98% end 1st yr ≥ 94.7% end 12th yr ≥ 90.8% end 25th yr ≥ 89.3% end 30th yr
NOCT (± 2°C)	45 °C		
Operating temperature	-40/+85 °C		

CERTIFICATIONS		SHIPPING SPECS	
Product	UL 61215, UL 61730, CSA C22.2#61730, IEC 61215, IEC 61730, IEC 61701 (Salt Mist Corrosion), IEC 62716 (Ammonia Corrosion), CEC Listed, UL Fire Rating: Type 1	Modules Per Pallet:	29
		California (Pallets per load)	21
Factory	ISO9001:2015	Others (Pallets per load)	22

* ⚠ Warning. Read the Safety and Installation Manual for mounting specifications and before handling, installing and operating modules.

** 12 year extendable to 25 years subject to registration and conditions outlined under "Warranty" at silfabsolar.com.
PAN files generated from 3rd party performance data are available for download at: silfabsolar.com/downloads.



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eSpire 306

COMMERCIAL AND INDUSTRIAL BATTERY STORAGE



Microgrid Control Cabinet



306 kWh ESS (battery)



125 kW PCS (inverter)

Supported Applications

- Peak shaving for demand charge management
- Load shifting for time-of-use savings
- Real and reactive power compensation to improve power quality
- Standalone operation in off-grid mode for power backup
- Store excess solar energy during the day and use at another time

Multi-family Homes

Grocery Stores & Convenience Stores

Charging Stations & Service Areas

Schools, Banks, & Hospitals

Product Features

Safe Technology & Multi-level Protection
The solution uses the best-in-class Tier 1 Lithium Iron Phosphate (LFP) chemistry for the highest level of safety, thermal stability, and reliability; An integrated, multi-level Battery Management System (BMS) monitors, optimizes, and balances the system.

Advanced Liquid Cooling for the Extended Battery Lifespan
The unique liquid cooling system optimizes the battery thermal performance by 3 times, which extends the battery lifespan and increases your investment.

Built-in Microgrid Controls with Adaptive EMS / Fleet Management
Ability to integrate with solar, genset, wind, micro-turbines, utility, or other distributed energy resources. Intelligent software to reduce electricity cost, prepare for resiliency, and maximize return on investment. Remote operation & maintenance.

Easy & Flexible to scale (Easy scalability)
This outdoor rated, modular solution can be expanded up to 6.1 MWH capacity easily (Max. 20 units in parallel).

Turnkey System for Fast Install
Fully integrated, pre-configured package system reduces on-site installation time; includes inverter(s), battery trays, racks, BMS, Keystone Micro-Grid, Controller, HVAC, fire detection, and outdoor rated enclosure. Off-grid and Back-up package available.

Excellent Local Support
Our US based technical support team can help you from project design to completion.

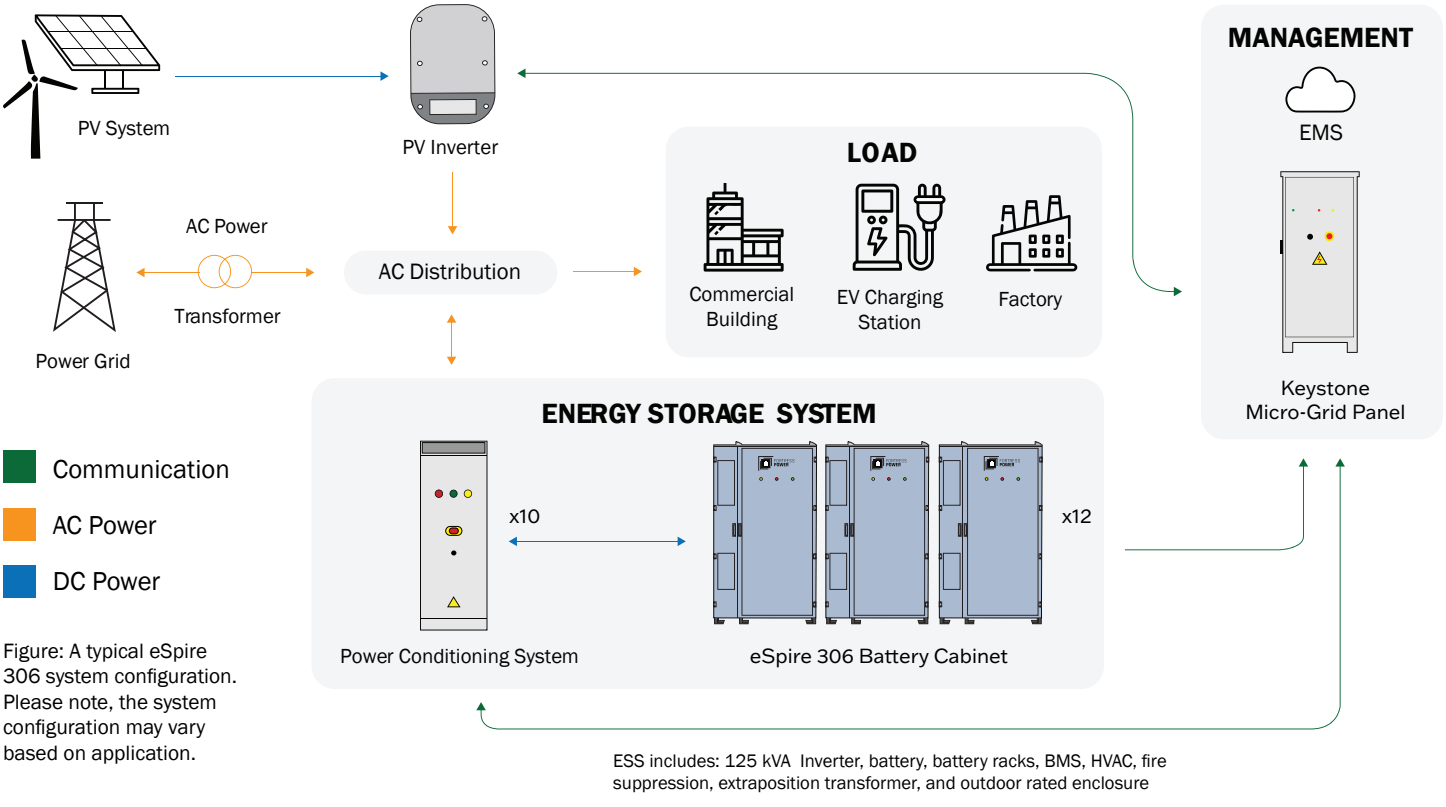


Figure: A typical eSpire 306 system configuration. Please note, the system configuration may vary based on application.

ESS includes: 125 kVA Inverter, battery, battery racks, BMS, HVAC, fire suppression, extraposition transformer, and outdoor rated enclosure

eSpire 306

COMMERCIAL AND INDUSTRIAL BATTERY STORAGE

Battery Specification	
Fortress Power Battery Module	eSpire 306
Chemistry	Lithium Iron Phosphate
Cell Type	Prismatic
Configuration	1P52S
Number of Modules	6
Nominal Capacity	306 Ah
Nominal Energy	305.5 kWh
Nominal Voltage	998.4 Vdc
Operating Voltage Range	873.7 - 1123.2 Vdc
Maximum Continuous Charging/Discharging Current	153 Amps
Communication	Modbus TCP, CAN, Modbus RTU
Cycle Life @ 25C @ 70% Retention	10,000 Cycles
DC DC Round Trip Efficiency	95.5% @0.5C, 25C, 1 Cycle per day
Operating Temperature Range	Charging: 0-55°C & Discharging -20-55°C
Thermal Management System	Integrated Liquid Cooling System (HVAC)
Fire Suppression System	Smoke detector, Heat Detector, Aerosol, Deflagration Panel
IP Class	IP 66 (Battery modules, Control Box) IP56 (Battery Room), NEMA 3R
Battery Bank Scalability	Up to 20 (6.1Mwh)

PCS Specification	
PCS Model	FP-PCS125HV
Rated AC Power	125 KVA/KW
Rated Grid Voltage	3Ph 480Vac + PE
Grid Voltage Range	422 to 528Vac (-12%, +10%) / (3Ph 208Vac) * + PE *
Rated Grid Frequency	60 Hz
Grid Frequency Range	59.3 to 60.5Hz, Adjustable
Rated AC Current	151 Amps
DC Voltage Range	750-1350Vdc
Rated Discharge / Charge Power	128KW/122KW
Max. Discharge/Charge Current	157Amps/151Amps
Current THD	<3%
Power Factor	-1 to 1, continuously adjustable
Peak Efficiency	98%
Standby Loss	<25W @ Cool Mode
Grid Power Factor	-1 (leading) to (Lagging), Continuously Adjustable
Wiring Configuration	3 Phase 4 Wire or 3 Phase 3 Wire (3P4W/3P3W Configuration)
Protection	DC Reverse Protection/OVP/UVP/OCP/DC Insulation Detection

*** For 3Ph 208Vac + PE application, a step-down transformer is required.**

Energy Management Software	
Functional Operation	Real-time Monitoring, daptive Peak Shaving, Demand Response, Net Metering, VPP
Operation Mode	Back-up, Microgrid, Off-grid, Peak Shaving, Demand Response, Time of Use, Net Metering, Zero Export, VPP
Communication Interface	Modbus (TCP and RTU), TCP/IP, CANbus, BACnet, Dry Contactor, External APIs

System Specification	PCS Details	Keystone Microgrid Control Panel	Battery Details
Operating Temperature	-22 to 140°F, De-Rating >113°F (-30 to 60°C, De-Rating >45°C)	-13 to 104°F (-25 to 40°C)	-13 to 131°F (-25 to 55°C)
Storage Temperature Range	-22 to 131°F (-25 to 55°C)	5 to 113°F (-15 to 45°C)	-22 to 140°F (-30 to 60°C)
Dimensions (H*W*D)	78.74 x 23.62 x 19.685 in (2000 x 600 x 500 mm)	77.56 x 35.43 x 33.85 in (1970 x 900 x 860 mm)	92.28 x 54.72 x 52.91 (2344 x 1390 x 1344 mm)
Enclosure Rating	NEMA 3R / IP55	NEMA 3R / IP54	NEMA 3R / IP56
Relative Humidity	<95% No Condensing	<95% No Condensing	<95% No Condensing
Max Altitude	3000m, De-Rating > 2000m	3000m, De-Rating > 2000m	4000m, De-Rating > 2000m
Acoustic Noise	<70 dBA, Max 75dB	<70dB	<70dB, Max 80dB
Cooling System	Forced Air via Speed Control	Air Cool	Liquid Cooling Via HVAC
Net Weight	286.6lbs (230 kg)	690 lbs (313 kg)	6500 ± 220 lbs (2950 ± 100 kg)
Operation Status indicators	Warning, Low Voltage & High Voltage		
Lockage Enclosure	Padlockable Swing Handle		
User Interface	LED, EPO, Ethernet & HMI via Web Access / EMS Web Portal		
Communication Protocol	Ethernet/Modbus TCP		
Certifications and Standards	UL1973, UL9540A, UL9540, NFPA 855, NFPA 68, NEMA 3R, IEC 62477, IEC 62619, IEC 62933-5-2, IEC 61000-6-2, IEC 61000-6-4, UN38.2		

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STORMWATER MANAGEMENT NARRATIVE

Construction-Phase Erosion & Sediment Control, Post-Construction Drainage, and Reservoir-Cap Green Roof

DC Water Fort Reno Solar Project

Prepared by: New Columbia Solar, 1255 Union St NE, 7th Floor, Washington, DC 20002

1. Purpose and Scope of This Narrative

This narrative describes how stormwater will be managed during construction, with emphasis on underground electrical trenching, and how site drainage will function after construction. It also describes the approach to the vegetated roof (green roof) on the Fort Reno Reservoir cap, on which a ballasted, non-penetrating photovoltaic (PV) array will be installed over a rehabilitated extensive green roof. The governing principle for the reservoir cap is that post-construction roof drainage follows the existing drainage pathways; the project does not add, relocate, or remove roof drains, scuppers, or overflow devices.

2. Project Description

The Fort Reno Solar Project is a behind-the-meter and community solar PV installation on the DC Water Fort Reno Reservoir facility, an approximately 2.5-acre fenced property at Derussey Street and Donaldson Place NW adjacent to Fort Reno Park. The reservoir was placed in service in the 1920s and is covered by an at-grade vegetated roof (the “reservoir cap”), that was installed in 2015. All solar facilities are proposed within the existing facility fencing.

Item	Project 1 (NEM)	Project 2 (Community Solar / CREF)
Module placement and racking	Pump-station Roof: Unirac ballasted, 5° tilt. Ground Mount: PowerRack fixed-tilt, 20°	Reservoir cap: Contec GreenLightPro ballasted, 15° landscape Ground Mount: PowerRack fixed-tilt, 20° Canopy: Lumos Snap & Rack, 7°
Inverters	1 × SolarEdge SE80KUS inverter 1x Fortress Power eSpire 280 BESS (125 kW / 279.5 kWh) on new pad	6x SolarEdge SE80KUS inverters on rack
Underground electrical Underground electrical (continued)	Method (bore vs. open cut)	Interconnection: 85 LF total open-cut trench • 76 LF of 2-way 4-in. concrete-encased PVC conduit (customer pole to Pepco transformer) • 9 LF of 8-way 4-in. concrete-encased PVC conduit (transformer to PV equipment pad). All other underground DC/AC collection by directional bore
Access	Existing	Existing facility paving/gravel.

Attachment C

No site grading is proposed. The at-grade land disturbance is limited to the 85-ft interconnection duct bank trench, the solar equipment pads (CREF PV equipment pad; NEM BESS pad), and the Pepco transformer pad.

3. Existing Conditions

3.1 Topography and Drainage

The at-grade portions of the site are within the fenced DC Water facility around the reservoir, with existing paved and gravel access, the pump station and associated buildings, a vent house, a sampling station, elevated tanks, and hatch structures on the reservoir cap. The site features a dense network of existing utilities, including 30-in., 24-in., 20-in., 12-in., and 8-in. water mains, multiple electrical duct banks and manholes, a 12-in. surge relief drain north of the pump station, and 13-in. and 15-in. storm drains along the south side of the facility (underground utilities adjacent to the proposed solar project are shown on the site plan). Proposed finished grades are anticipated to closely match existing topography. The green roof was originally built in 2015 as a DC Clean Rivers Project "Low Impact Development Retrofit" (Division N, Invitation 120140). The green roof rehabilitation portion of this project will maintain the existing drainage routes.

3.2 Soils and Groundwater (LaBella Associates, Project No. 2262961, September 25, 2026)

The geotechnical investigation (two SPT borings, B-1 and B-2, completed August 25, 2026) encountered approximately 6 inches of topsoil over undocumented fill extending from 6.8 to 15 feet below ground surface. Fill in B-1 was medium dense to very dense silty sand and silty sand with gravel; fill in B-2 was medium stiff to stiff sandy lean clay. Residual reddish-brown silt was encountered below the fill in B-2 from 15 to 20 feet. B-1 met auger refusal at 6.8 feet, attributed to a cobble, boulder, or demolition debris within the fill; demolition debris was observed at the surface near B-1. Groundwater was not encountered to the maximum explored depth of 20 feet, but the report cautions that perched or trapped water may be present within the fill and that levels vary seasonally.

Two findings from the report directly shape the construction-phase stormwater approach. First, the site soils are described as moisture sensitive and able to lose strength rapidly with increased moisture content; the geotechnical engineer recommends earthwork in drier months where possible and anticipates additional drying and reworking if work occurs in wet months, which applies here to the trench, pad, and pit excavations and their backfill. Second, the report requires that surface water be diverted away from open excavations by berms or swales to reduce slope failure and water accumulation, and that all backfilling be conducted in the dry on thawed surfaces.

3.3 Existing Vegetated Roof on the Reservoir Cap

The reservoir cap carries an extensive green roof constructed under DC Water Invitation No. 120140, Division N, "Low Impact Development Retrofit," a DC Clean Rivers Project (DCCR) contract. The condition assessment characterizes the green roof as a failed extensive green roof: the original sedum cover has been displaced by grasses, weeds, and volunteer species; irrigation is aging and slated for full replacement; and foam berms create a non-uniform surface. Components include vegetated areas in

four quadrants (NW, NE, SW, SE), growing media, foam berms, brick paver access paths with aggregate and edging, drainage and scupper infrastructure, an irrigation system with controller, rain and moisture sensors, valves and booster pump, and waterproofing with leak detection beneath the assembly. The roof drains entirely to its perimeter through perforated edge segments to concrete trickle ditches at grade; there are no interior roof drains or scuppers.

The as-built assembly is summarized below from the roof surface downward. The roof area is approximately 43,000 square feet.

Layer (top to bottom)	Thickness / basis per Sempergreen (from record drawing App. B)	Stormwater relevance
Plantings	Extensive sedum (original); now grasses/weeds	Evapotranspiration; to be replaced with sedum mat
Growing media	4 inches	Primary retention layer; also the Contec ballast
Filter fabric	—	Keeps fine particles out of drainage layer
Drainage aggregate	1 inch	Drainage layer conveying water to drains/scuppers
Capillary fabric	1/2 inch	Moisture retention / wicking
Layered mounding insulation (foam berms)	4 inches over approx. 66% of roof area, plus 2-inch mounding and tapered insulation where required for slope	Creates the roof topography and local slopes toward drains; partially removed/modified for base plates
Root barrier	—	Membrane protection
Thermoplastic waterproofing membrane with continuous leak detection	—	Primary waterproofing; must not be penetrated
Modified bitumen membrane / 1/4-inch protection board / tapered insulation / vapor barrier	Thickness varies	Sets deck slope to drains

4. Construction-Phase Stormwater Management and Erosion & Sediment Control

4.1 Objectives

The construction-phase plan has three objectives:

1. Keep sediment on site and out of the DC Water facility drainage, the public right-of-way, and any inlets.
2. Keep surface water out of open trenches and excavations, both for erosion control and because the geotechnical engineer has identified the fill soils as moisture sensitive; and

3. Protect the reservoir cap waterproofing, the perimeter perforated edge, and the trickle ditches during media handling and racking installation.

The plan follows DOEE's ESC General Notes and the SWMG, and adopts the control measures, notes, and construction sequence from the original 2012 DOEE-reviewed ESC plan for this facility (DC Clean Rivers Division N sheets ES-01 through ES-12), which covered the same reservoir cap and the same north facility area.

4.2 Control Measures Carried Forward from the 2012 Approved ESC Plan

Sediment and erosion control shall consist of silt fence, curb inlet protection, at-grade inlet protection, sump pits, filter bags, and wash racks.

Measure	Application
Limit of disturbance line	Around the full reservoir cap; around each at-grade excavation (trench corridor, pads, HDD pits, pole); around the laydown area
Stabilized construction entrance	At the facility gate used for construction traffic; mountable berm; maintained by top-dressing with stone as sediment accumulates
Silt fence	Along the downgradient side of each at-grade LOD segment; at the reservoir cap, along the base of the reservoir wall on the downgradient sides so that sediment leaving the perforated edge during media handling is captured before the trickle ditch
At-grade inlet protection	On every CB-FR catch basin fed by the trickle ditches and every storm inlet within or downgradient of the LOD
Curb inlet protection	On curb inlets along the facility drive and at Donaldson Place where construction traffic exits
Sump pit and filter bag	For any water pumped from the trench, pad excavations, or HDD pits; discharge through a filter bag onto a stable vegetated surface, never to an inlet
Wash rack / vehicle wash area	At the construction entrance if vehicles enter unimproved surfaces; wash water directed to a sediment trap or portable sediment removal device
Tree protection fencing	Around the trees on the east side of the reservoir and any trees adjacent to the pole, pad, or trench locations
Safety fence	Around the construction area and excavations; 8-ft chain link where ES-01 note 27 applies
Dust control	Water application at least once per day in dry weather during active media handling on the cap and during excavation
Topsoil stockpile protection	Stockpiles ringed with silt fence; covered with mulch, temporary vegetation, or plastic
Utility trench rules	Miss Utility 48 hours before start; silt fence immediately downstream of the trench before disturbance; spoil on the high side; backfill, compact, and stabilize at the end of each working day
Daily inspection and maintenance	All measures inspected daily and maintained continuously; damaged measures repaired immediately

Measure	Application
Catch basin and drain protection	Any basin or drain clogged by construction cleaned by the contractor, including downstream storm drains
Stabilization timing	Perimeter controls and slopes 3:1 or steeper within 7 days; all other disturbed areas within 14 days of cessation; vegetative stabilization per DC 2003 Standards and Specifications for Soil Erosion and Sediment Control
Clean fill	Imported fill shall be clean fill meeting the project specification and the geotechnical report

4.3 Sequence of Construction

The following sequence will be followed in the field. Steps 1 through 4 occur before any other land disturbance.

1. Notify DOEE Inspection at (202) 535-2977 at least three business days before commencing any land-disturbing activity and hold the pre-construction meeting with the DOEE inspector. Obtain Miss Utility clearance for all trench corridors, bore paths, and foundation locations at least 48 hours before start;
2. Install tree protection fencing with signage and perform only the clearing required to install perimeter controls. Install safety fence around the construction area.
3. Install the stabilized construction entrance and wash rack, silt fence along the downgradient perimeter of each LOD segment and along the base of the reservoir wall, at-grade inlet protection on every CB-FR catch basin and storm inlet within or downgradient of the LOD, and curb inlet protection at the facility exit. Notify the DOEE sediment control inspector and obtain approval before proceeding further.
4. Provide the sump pit and filter bag for dewatering as needed for excavation work (step 5). No stripping or grading is proposed; topsoil removed from the excavations will be stockpiled separately, ringed with silt fence, covered, and reused in restoration.
5. Install PowerRacks for at-grade arrays and fill with ballast material.
6. Excavate equipment pads (BESS pad, inverter rack, switchboard, transformer and Pepco transformer pads), place structural fill, and construct pads. Over-excavated material that does not meet the structural-fill specification will be stockpiled and either reused as common fill outside structure footprints or hauled off.
7. Excavate the 85-ft interconnection duct bank trench, set conduit, pour encasement, cure, backfill, compact, and restore (Section 4.4). Install all other underground electrical by directional bore (Section 4.5).
8. Install HDD entry and exit pits, complete the bores, and close the pits (Section 4.5).

9. Install racking, modules, and above-grade electrical. Conduct reservoir-cap green roof work per Section 6 in parallel, under its own protection measures and quadrant sequencing. Sweep clean the construction area and remove all debris from the site by the end of each day.
10. Restore and permanently stabilize all disturbed at-grade areas: replace topsoil, seed and mulch or sod, and establish vegetation beneath and between array rows. Complete sedum mat establishment on the cap. Maintain silt fence and tree protection around staging areas until final closeout. Once all surrounding areas are fully stabilized, request the DOEE final inspection and remove temporary ESC measures only after approval.

4.4 Trenching: Construction Mitigation Measures

Open-cut trenching is limited to the utility interconnection for the CREF system, an estimated total of 85 linear feet, 76 feet of 2-way 4-inch concrete-encased PVC conduit for the Pepco primary cable, from the customer-installed pole on private property to the new utility-owned 750 kVA dual-ratio pad-mounted transformer, and 9 feet of 8-way 4-inch concrete-encased PVC conduit for the secondary cable from the transformer to the solar PV equipment pad. The primary is fed by an 18-foot overhead slack-span tap from a new Pepco pole on the existing primary line. All other underground electrical, including DC and AC collection from the ground-mount, canopy, and reservoir-cap arrays to the inverters and switchboard, will be installed by horizontal directional drilling (HDD), so that the only other open excavations are HDD entry and exit pits, equipment pad excavations, and ground-screw locations. This approach was chosen specifically to keep open excavation, spoil, and exposed soil to a minimum on a site with undocumented fill, debris, and a dense existing utility network. The following measures apply to the 85-foot interconnection trench.

- **Open trench length and duration.** The two interconnection segments total 100 feet. Each segment will be excavated, conduit and spacers set, encasement placed, inspected, and backfilled on the same working day; the inspection will be scheduled in advance so that the trench is not held open awaiting it. If any portion cannot be backfilled by the end of the day (for example, because the encasement must cure before backfill under the Pepco duct bank specification), that portion will be covered, the perimeter and diversion controls below will remain in place, and the trench will be inspected before work resumes.
- **Concrete encasement.** Concrete for the duct bank will be delivered by chute or pump directly into the trench; no concrete will be placed during rain or into standing water. A lined concrete washout will be provided on site for truck and pump washout, located away from any inlet, drain, or the reservoir cap, and washout water will not be discharged to the ground. Any spilled concrete will be contained and removed before it hardens.
- **Spoil management.** Trench spoil will be placed on the upgradient side of the trench, a minimum of 2 feet from the trench edge (or the greater setback required by OSHA 29 CFR 1926 Subpart P), and will be contained on the downgradient side by silt fence or filter sock. Spoil not reused as backfill within 15 calendar days will be stabilized with mulch, temporary seed, or plastic sheeting. Topsoil will be stockpiled separately from fill.

- **Keep surface water out of the trench.** Where the trench alignment crosses or runs along a slope, a temporary earthen berm or diversion swale will be placed on the upgradient side to divert sheet flow away from the open excavation. Trenches will not be left open ahead of forecast rain. The superintendent will check the forecast daily and close or cover any segment that cannot be completed.
- **Dewatering.** Groundwater is not expected at trench depth (none encountered to 20 feet), but perched water within the fill and rainwater accumulation are possible. Any water pumped from a trench will be discharged through a dewatering bag or portable sediment tank onto a vegetated area, never directly to a storm inlet, roof drain, or the public right-of-way. Discharge will be monitored to ensure it does not cause erosion at the outlet.
- **Backfill and compaction.** Backfill will be placed in maximum 8-inch loose lifts for trenches where walk-behind compaction equipment is used, compacted to 95 percent of maximum dry density (ASTM D1557), at moisture content within +2/−3 percent of optimum.
- **Trench depth and frost.** Duct bank depth and cover will follow the Pepco duct bank standard, cover will be at least 36 inches. Spoil volume for the ESC plan is computed from the duct bank section: the 8-way 4-inch secondary bank is substantially wider and deeper than the 2-way primary bank.
- **Crossing existing utilities.** All existing utilities in the trench corridor will be located by Miss Utility and test-pitted by vacuum excavation before machine excavation; within the tolerance zone of any DC Water main, excavation will be by hand or vacuum only, and crossings will be done per DC Water's requirements. Vacuum-excavation slurry will be contained and hauled off site, not discharged to the ground or an inlet.
- **Restoration.** Once encasement has cured, the trench will be backfilled and compacted (above), restored to match adjacent grade allowing for settlement, topsoil replaced, and seeded and mulched the same day backfill is completed. Where the trench crosses gravel or paved surface it will be restored to the original section. The restored trench will be inspected after the first significant rainfall for settlement or rilling and repaired.

4.5 Horizontal Directional Drilling

HDD is the installation method for all underground electrical other than the 85-foot interconnection duct bank. HDD substitutes a small number of entry and exit pits for continuous open trench, which is the principal reason it was selected on this site. The stormwater risk of HDD is different in kind from open-cut trenching: it is the release of bentonite drilling fluid, either at the pits or through an inadvertent return ("frac-out") to the surface or into an existing drain or utility trench. The following measures apply.

- Bore paths are routed through the proposed array areas so that they avoid the existing 12-in. surge relief drain, the 13-in. and 15-in. storm drains, the water mains, and the existing electrical duct banks. The routing will be shown on the civil/ESC plan with entry and exit pit locations. Pits will be sized to the minimum needed for the drill rig and pipe entry, and will be located away from the reservoir cap, the perimeter trickle ditches, existing drains, and water mains.

- Each pit will be lined or bermed to contain drilling fluid, and a vacuum truck or mud recycling unit will be on site during drilling to recover returns. Drilling fluid and cuttings will be hauled off site; none will be discharged to the ground, a drain, or the sanitary/combined sewer without DC Water and DOEE approval.
- A spotter will walk the bore path during pilot, reaming, and pullback. Although the routing avoids the known utilities, undocumented fill with debris is present across the site (Section 3.2) and inadvertent returns remain possible. If fluid surfaces, drilling stops, the release is contained with berms and absorbent, recovered by vacuum, and DC Water is notified before drilling resumes. Any release reaching a drain or inlet will be reported to DOEE.
- Bore depth and separation from existing utilities will be set from the Miss Utility locate and vacuum test pits at each crossing, per DC Water's crossing requirements. A loose toning wire will be installed in each bored conduit per the electrical notes.
- Pits will be backfilled and compacted within one working day of pullback and restored and seeded the same day. If a pit must remain open overnight it will be covered and the perimeter control maintained.

4.6 Other At-Grade Land Disturbance

Wheel rutting will be repaired and seeded as part of final stabilization. Equipment pad excavations (minimum 24 inches of structural fill under each pad, extending 2 feet beyond the slab edge), the Pepco transformer pad, and the customer pole foundation will be protected by the same spoil, diversion, and dewatering measures as the trench. No access roads will be constructed and no grading is proposed; construction traffic will use the existing paved and gravel surfaces within the facility. Material and module laydown will be on existing paved or gravel surfaces; if laydown on vegetated ground is unavoidable, it will be protected with crane mats or geotextile and restored.

4.7 Stabilization Schedule

Perimeter controls, dikes, swales, ditches, perimeter slopes, and slopes steeper than 3:1 will be stabilized within 7 calendar days of initial disturbance or re-disturbance; all other disturbed or graded areas within 14 calendar days; areas where construction has temporarily or permanently ceased within 14 days of cessation; underground utility work at the end of each workday; and inactive stockpiles within 15 calendar days of last use. Permanent stabilization will be seeding with a DOEE-acceptable seed mix suited to the partially shaded conditions under the arrays, with mulch, or sod where immediate cover is needed. Cut or fill slopes, if any exceed 2 feet, will be no steeper than 2.5H:1V (fill) or 2H:1V (cut).

4.8 Inspection and Record-Keeping During Construction

The Responsible Person will inspect all ESC measures at least once every two weeks and within 24 hours after any rainfall event, maintain a written inspection log on site, and keep the approved plan set on site from start of construction through final stabilization. Deficient measures will be repaired before the end of the next working day. The contractor will contact DOEE Inspection before perimeter controls are removed.

5. Post-Construction Stormwater Management Plan

5.1 Approach

The SWMP for this project rests on one fact: the land disturbance that makes the project a Major Land-Disturbing Activity is the rehabilitation of an existing, approved green roof, and the completed project returns that roof to service as a green roof with the same area, the same or greater media depth, and the same drainage pathway, with a non-penetrating PV array above it. The retention the SWMP must demonstrate is therefore provided principally by the green roof itself, as a BMP under SWMG Section 3.2, with the small at-grade impervious additions (pads and transformer pad) handled by the measures described above.

5.2 Stormwater Retention Volume

For the reservoir cap, the roof deck is impervious cover and the green roof is the BMP that treats it; the SWRv for the 42,390-sq-ft cap area is on the order of 4,000 cubic feet at the 1.2-inch storm and the impervious-cover coefficient. The at-grade SWRv is the sum for the new pads and the restored (compacted) excavation areas and is small by comparison.

5.3 Retention Provided

The rehabilitated green roof provides retention storage per Guidebook Equation 3.1 as a function of green roof area, media depth and media maximum water retention, and drainage layer depth and retention. The 4-inch media and 1-inch drainage aggregate have capacity to store approximately 2,650 cubic feet over 42,390 sq ft. The credited storage increases proportionally, and where the Contec ballast plan requires deeper media in the edge zones the storage increases further.

At-grade impervious additions. The new equipment pads and the Pepco transformer pad are the only new impervious surfaces. Their runoff will be directed to adjacent vegetated ground; if the computed SWRv for these areas cannot be absorbed by the green roof credit, a small vegetated swale or bioretention cell at the pads, or off-site compliance, will make up the difference.

5.4 Drainage Pattern and Detention

The at-grade PV arrays are supported on plastic bucket style mounts with ballast, no concrete foundations and no grading. Rainfall intercepted by modules drips from the lower module edge onto vegetated ground within the row spacing and infiltrates or sheet-flows as it does today. Because the ground beneath and between rows remains vegetated and uncompacted, the module footprint is not treated as new impervious area; the only new impervious surfaces are the equipment pads and the transformer pad.

Existing drainage patterns will be preserved. There is no grading, finished grades are existing grades everywhere except at the pads and the restored trench and pit surfaces, which will be brought back to match adjacent grade. No new discharge points will be created and no flow will be redirected toward the public right-of-way, Fort Reno Park, or adjacent properties.

Equipment pads will be set with the top of slab above adjacent grade and the backfill around each pad finished to drain away from the slab. Where a pad sits in a slight depression, the restored surface around it will be shaped to carry runoff to the existing drainage path without grading beyond the pad excavation. Roof drip lines from the canopy array (98.28 kW DC, Project 2) will discharge to the parking lot through gutters and downspouts and into the existing drainage swale for the green roof. Since the canopy drains to existing paved surfaces, the existing paved-area drainage is unchanged because the canopy sheds to the same surface it covers.

Canopy post foundations, if excavated rather than driven, will be managed during construction under Section 4. Post-construction, the canopy foundations, the 100-foot concrete-encased duct bank, and the pole foundation are the only new below-grade concrete outside the equipment and transformer pads.

The established post-development peak discharge for the Fort Reno Reservoir drainage area (3.52 acres; weighted C = 0.48; 2-year and 15-year peaks per the DC Water Project Design Manual method) does not change the areas or coefficients in that table beyond the small pad additions. Therefore post-project peak discharge is unchanged from the original 2012 post-development condition for practical purposes.

6. Reservoir-Cap Green Roof: Construction Protection and Post-Construction Drainage

6.1 Design Approach

The roof array is a ballasted, non-penetrating system: Contec GreenLightPro HDPE base plates (78 in × 39 in × 2.5 in) set within the green roof profile and held in place by the weight of the growing media, with Knickfix brackets and rails carrying the modules at 15° in landscape orientation. The manufacturer-engineered wind and ballast study for this roof (Contec drawing 2300881_060041_2610465_GL_V3, June 15, 2026) specifies dry substrate weight by wind zone of 111 kg/m² (22.7 psf) in the high-demand zones, 90 kg/m² (18.4 psf) in zones Z2 and Z4, and 58 kg/m² (11.9 psf) in zone Z5, with a minimum substrate installation thickness of 8 cm (approximately 3.1 in) over the base plates. There are no roof penetrations and no attachment to the structure; the waterproofing and leak-detection systems below the assembly are not breached.

The base plate itself is a drainage element: per the Contec product data sheet, each unit stores 10.5 gallons (1.4 ft³) of water and has a drainage capacity of 0.4 L/(m·s) at 1 percent gradient, 0.6 L/(m·s) at 2 percent, and 1.0 L/(m·s) at 5 percent, so the plates convey water laterally beneath the media rather than damming it. Combined with the 3-ft intra-row spacing and the 15° tilt, which lets rainfall reach the media between and beneath the rows, the array does not create a rain shadow that would starve any quadrant of its drainage path.

6.2 Post-Construction Drainage Follows Existing Pathways

The reservoir-cap green roof has no interior roof drains or scuppers. It drains entirely to its perimeter and the PV installation does not alter any element of it. The existing pathway, from the roof surface outward, is as follows.

- **Deck slope.** Tapered insulation beneath the waterproofing membrane forms a ridge at elevation 427.87 running east–west through the center of the cap (sheets C-24 and C-25, Tapered Insulation Plan). From the ridge the deck falls at 1/4 inch per foot north and south to the perimeter, where the edge elevation is 426.04. Cricket valleys at 1/8 inch per foot run along the north and south edges and divert flow laterally to the perforated edge segments; the east and west ends follow the slope of the original concrete slab. Because the tapered insulation is below the root barrier and membrane, it is untouched by the green roof rehabilitation and by the Contec installation, so the deck drainage geometry is preserved by construction.
- **Drainage layer.** A 1-inch drainage aggregate layer over 1/2-inch capillary fabric (2 inches maximum immediately downslope of mounding-insulation) conveys water that has passed through the 4-inch growing media and filter fabric laterally to the edge. The 4-inch layered mounding insulation that creates the surface topography sits above the root barrier and membrane, not within the drainage layer, so the foam berm modifications in the green roof scope do not interrupt subsurface flow and do not expose the membrane.
- **Perimeter edge.** The green roof edge assembly is a wood edge anchored to the slab, finished either as a solid edge or as a perforated stainless steel edge, 7-1/4 inches high by 1/4 inch thick, backed by two layers of filter fabric. Water exits the roof only through the perforated segments. The top of the edge is set 1/2 inch above the adjacent media so that surface flow sheets over the media and into the edge rather than ponding. Positive drainage shall be maintained in all locations and the edge detail installed such that no ponding conditions exist.
- **Reservoir wall and trickle ditch.** Water passing the perforated edge runs over copper flashing down the outside of the reservoir wall into a concrete trickle ditch (6-inch Class A3 concrete with 6×6 welded wire fabric, minimum 2 percent slope) at grade along the wall. The ditch ties into the existing concrete drainage ditch inlet structures and runs around the reservoir perimeter. A 6-inch pipe carries the ditch beneath the viewing platform on the north side. From the ditches, flow enters the facility storm system through the catch basins and storm manholes.
- **Permeable paver paths.** The brick paver walkways on the cap are permeable clay brick pavers on a 1-inch bedding course over the same drainage aggregate and capillary fabric, so they drain into the same layer as the vegetated areas.

Under the PV installation, each of these elements is retained in place and function. The Contec base plates sit within the growing media above the drainage aggregate and filter fabric. Per the Contec data sheet they store water and pass it laterally, and they will not be placed over the perforated edge segments, the paver paths, or the trickle ditch. The rehabilitated media will be regraded to the existing finished grades (426.7 at the edges rising to approximately 428–429 at the mounds), and where mounding insulation is removed the resulting surface will be checked so that no new low point is created away from the perimeter. The perforated edge and its filter fabric will be cleaned, and damaged segments replaced in kind, before the media is reinstalled. The trickle ditches and the catch basins they feed will be cleared of sediment at the end of roof construction. After construction, water falling on the modules drips onto the media, passes through the media and drainage aggregate, exits through the

same perforated edge segments, and reaches the same ditches, inlets, and storm system that serve the roof today.

The 2012 ESC calculations for this site record the pre- and post-development runoff basis that DOEE and DC Water accepted for the green roof. Post-development, the Fort Reno Reservoir drainage area of 3.52 acres comprises 82,193 sq ft pervious (C = 0.30), 8,986 sq ft permeable paver (C = 0.75), 42,390 sq ft green roof (C = 0.60), and 19,800 sq ft impervious (C = 0.90), for a weighted C of 0.48 versus 0.57 pre-development, using the DC Water Project Design Manual coefficients. The PV array does not change any of these areas or coefficients: the modules sit over the green roof area on ballasted plates with open spacing, and the green roof surface beneath remains vegetated media draining as described above.

The perforated edge and its filter fabric serve the function of the drain protection called for in the Guidebook and will be kept clear and extend above the media as designed; the drainage layer will convey flow from under the media directly to the edge without backing water onto the roof or into the media; the roof will continue to drain without 3 inches of ponding above the media, consistent with the no-ponding requirement; and a 2-foot vegetation-free zone will be maintained around rooftop electrical equipment (inverters are at grade; combiner boxes and conduit transitions on the roof will observe the zone).

The existing design growing media depth is 4 inches over a 1-inch aggregate drainage layer (Section 3.3). Growing media depth after rehabilitation will be not less than 4 inches and not less than the Contec minimum of 8 cm (3.15 in) over the base plates. Where the ballast plan calls for heavier substrate in edge zones, the additional depth increases, rather than reduces, the water-holding capacity of the roof.

6.3 Construction-Phase Protection of the Roof, Its Perimeter Edge, and the Trickle Ditches

The reservoir cap sits above active DC Water infrastructure, and the construction period, during which media is removed and handled, is the window of greatest risk to the waterproofing and to drainage function. The following measures apply for the duration of roof work.

- Before any media is disturbed, the perforated edge segments, the concrete trickle ditches at the base of the reservoir wall, and the catch basins they feed will be located, photographed, and protected. Perforated edge segments in the work area will be covered on the roof side with filter fabric held in place without fastening into the edge; the trickle ditches will be lined with filter sock or compost filter sock at intervals and immediately upstream of each inlet; and every catch basin receiving ditch flow will have inlet protection. These controls will be inspected daily and after rain and cleaned when sediment reaches one-third of capacity. The edge openings and ditches will never be plugged or sealed, because the roof has no other outlet.
- Work will proceed quadrant by quadrant (NW, NE, SW, SE) so that the perforated edge segments serving the other quadrants remain fully functional at all times, and so that the area of exposed waterproofing or exposed media at any one time is limited. The green roof rehabilitation scope requires that drainage pathways be maintained during construction.
- Vegetation removal will be done with hand tools or light equipment on protective mats; no tracked or wheeled equipment will operate directly on the waterproofing. Removed vegetation

and unsuitable media will be hauled off the roof the same day and will not be stockpiled against the perimeter edge, the ventilation room, the access hatches, or the viewing platform.

- Salvaged media stockpiled on the roof (where structurally permitted) will be placed in locations approved by the structural engineer, covered with breathable tarps, and kept at least 10 feet from the perimeter edge. Media stockpiled off the roof will be managed as an at-grade stockpile under Section 4.4 and will not be placed in or across a trickle ditch.
- Mounding insulation (foam berms) will be removed or modified only above the root barrier; the root barrier, thermoplastic membrane, leak detection system, and the tapered insulation beneath them (which sets the deck slope) will not be disturbed. Any exposed root barrier or membrane will be protected with mats or geotextile during base-plate installation per the Contec installation manual and inspected before media is reinstalled. Any damage will be reported immediately to DC Water and repaired by the waterproofing contractor before the area is covered.
- Base plates will be temporarily ballasted with sandbags or water bags during installation, and temporary ballast will be replaced with permanent growing media before the area is released, so that no plate can shift and obstruct a drainage path.
- Metal debris, fasteners, and cut-offs will be collected daily so they cannot wash toward drains or puncture the membrane.
- The brick paver paths (approximately 1,200 LF × 3 ft) will be salvaged, stockpiled, and reinstalled with edging restraints and bedding adjusted to maintain the original drainage across the path.
- The replacement irrigation system will be commissioned and adjusted so that overspray does not reach electrical equipment and so that irrigation does not generate runoff to the drains; rain and moisture sensors will be retained in the control logic.
- Sedum mat establishment (120-day establishment maintenance in the green roof rehabilitation scope) is the permanent stabilization of the roof; the roof is not considered stabilized until continuous cover is established and the perforated edge segments, trickle ditches, and downstream catch basins have been inspected and cleared of construction sediment.

7. Post-Construction Inspection and Maintenance

DC Water’s Clean Rivers team will conduct regular inspections and ongoing maintenance of the rehabilitated green roof.