Takoma Park/Silver Spring Campus
Catherine and Isiah Leggett Math and Science Building
Stormwater Management Fact Sheet

Our Commitment to Sustainable Site Design and Environmental Stewardship

Montgomery College stands firmly committed to sustainable site design and environmental stewardship. As with past projects, the College intends to earn LEED certification for the project. The project will reduce impervious surfaces and implement stormwater management where none exists today, in the form of micro-bioretention facilities to help filter and slow stormwater runoff. The College will enhance the tree canopy and protect the trees along Takoma Avenue. Taken together, these actions will improve air and water quality through natural stormwater facilities and an environmentally sound, diverse, and lush landscape plan.

The College demonstrates this commitment with the project design and stormwater management plan that reduces impervious surfaces on the campus, implements micro-bioretention facilities and underground piping, decreases the amount of runoff from the site, and exceeds Maryland stormwater management requirements by 50 percent.

Reduction of Impervious Surfaces

Because the College reduced the size of the building during the design process, it reduced impervious surfaces—hard materials that preclude the absorption of stormwater—on the campus. Additionally, the College will eliminate the tennis court and shrink the size of the parking lot on the corner of Takoma Avenue and Fenton Street, further reducing the impervious surfaces.

New Micro-bioretention Facilities

Seven (7) micro-bioretention facilities will provide stormwater management. Most runoff from the site will be captured and piped underground to the stormwater management system.

Three (3) of the micro-bioretention facilities will be installed within concrete planter boxes, directly adjacent to the building, collecting runoff solely from the building's roof. Each of these facilities includes several planter boxes, tied together structurally, to function as one facility. The planters are designed to pond up to 6 inches of water during rain events, cascading into the next planter below, with the lowest planter of each facility containing a stormwater management riser, also set 6 inches above the planter surface, to collect excessive runoff and slow discharge to the storm drain system.

Cascading Concrete Planter Boxes

Rain Garden Style Facilities

Four (4) of the micro bioretention facilities are rain garden style, installed at grade, intended to appear as sunken planting beds. These facilities will pond up to 12 inches of water during rain events—each includes a stormwater management riser to collect excessive runoff to slow and filter the discharge to the storm drain system. Three of these facilities will treat roof water; one will treat the new smaller parking lot along Takoma Avenue.

Most of the new sidewalks proposed, as well as the fire lane and the drop-off loop on Fenton Street, will not receive any stormwater management treatment. Runoff from these areas will be immediately directed to the storm drain system.

All of these plans, detailed further in this fact sheet, are a direct result of the College's commitment to sustainable site design and environmental stewardship.

The Public Process and Background Regarding Stormwater Management

During the design charrette process in 2018, the project team established the initial massing and site design concepts. The mandatory referral process formalized these planning concepts as a design submission to the Maryland National Capital Park and Planning Commission, which included the Stormwater Management Concept plan. The Stormwater Management Concept plan included in the mandatory referral submission was later approved by the City of Takoma Park. Following further design development, the permit drawings received conditional approval from the City of Takoma Park in April 2020. This fact sheet describes the conditionally approved Stormwater Management Plan.

Geotechnical Information

As part of routine standard project design practice, a geotechnical study was conducted on site to better understand the sub-grade conditions. Soil borings were taken at various locations on site and analyzed. The geotechnical study offers several insights regarding the sub-grade conditions and helps guide the design team regarding various aspects of the project.

Soil infiltration information establishes existing conditions to determine how to design the green infrastructure given the site conditions.

Groundwater is considered an existing condition to determine the type of foundation drainage and waterproofing system required to protect the building from water damage. Groundwater volume is not calculated as the conditions below grade are varied and hidden and soil saturation is heavily dependent on rainfall.

Soil composition is determined to establish what type of foundations are required for the project. This geotechnical report is posted on the project website.

Understanding Stormwater Quantity and Quality Management

Stormwater management on the 3.22 acre Leggett Building project site includes best practices of passive, or green, infrastructure to manage and control rain events. When utilizing green infrastructure, stormwater quantity and quality management work together.
Stormwater quantity management results in a reduction of surface water runoff, which in turn reduces the amount of debris, eroded soil, and other pollutants that would otherwise be carried off site.
Stormwater quality management utilizes micro-bioretention facilities on site to naturally collect, filter, and slow the stormwater before the water enters the storm system.

Project Design, Site Characteristics, and Methodology

As noted, the project design reduces impervious surface on the campus, exceeds Maryland stormwater management requirements, and decreases the amount of runoff from the site. The following information shows detailed site characteristics and how the site design addresses the unique characteristics of the site:

General Site Characteristics (Existing Conditions and New):

- Total Project Site (also known as Limits of Disturbance)–3.22 acres
- Existing Impervious Coverage (area surface that will not absorb runoff)–2.37 acres (74% of the Total Project Site)
- New Impervious Coverage–1.96 acres (60% of the Total Project Site)

Maryland Department of the Environment Guidelines

Environmental Site Design (ESD)—Sites with existing conditions of greater than 40 percent impervious coverage are considered redevelopment. Such project sites are required to treat the first 1-inch of any rain event, which means there is a required ESD storage volume of 2,673 cubic feet. **The project exceeds this requirement** as detailed below.

Quantity Control—Downstream study points must exhibit no increase in runoff/flow from a 10-year storm event.

ESD Stormwater Management will be provided through seven (7) micro-bioretention facilities, as noted above. Most runoff from the Leggett Building will be captured and piped underground to the utility's stormwater management system.

- *Micro-bioretention* is a filtration system that treats runoff by passing it through a filter bed mixture of sand, soil, and organic matter. Components of the system include surface planting with woody and herbaceous plant species, a surface 3-inch thick mulch layer, a 2-4 foot thick planting medium, a 6-inch thick sand layer, and a perforated PVC pipe underdrain within a gravel bed.
- *Micro-bioretention facilities* by rule may collect no more than 20,000 square feet of drainage area, and pond no more than 12 inches of water. The facilities are designed to

fully drain within 24-48 hours of a rain event, maintaining a “dry look” the majority of the time.

Stormwater Management Requirements and Planned Improvements

Since the site is classified by the Maryland Department of Environment as redevelopment, runoff flows must only be maintained or reduced, if possible. The project not only meets the requirement but exceeds it.

- Total Storage Volume of Storm Water Captured By Biorention Facilities
    - Current: 0 cubic feet
    - Required: 2,673 cubic feet
    - Planned: 5,946 cubic feet
    - **Improvement of 3,273 cubic feet from the base requirement**
- Total Impervious Area
    - Current Impervious Area: 2.37 acres
    - New Impervious Area: 1.96 acres
    - **Improvement of .41 acres**
    - Area Requiring Treatment: 0.78 acres
    - Planned Area to be Treated: 1.52 acres
    - **Improvement of 0.74 acres from the Maryland State requirement**

As noted above, seven (7) micro bioretention facilities will provide stormwater management to collect excessive water runoff, filter, and slow discharge to the storm drain system. Three (3) of the facilities will be installed as cascading concrete planter boxes, directly adjacent to the building, collecting runoff solely from the building’s roof. Four (4) of the facilities are “rain garden style,” installed at grade, intended to appear as sunken planting beds.

Research and Planning

As part of the design process, three Points of Study (POS-#) were established where concentrated runoff leaves the site. Points of Study also include off-site areas, which are not part of the project, which may drain to the same common point(s).

- POS-1–Majority of the site drains to an existing storm pipe adjacent to Takoma Avenue which travels northwest and meets the larger public storm drain network at the intersection of Takoma Avenue and New York Avenue, flowing east beneath New York Ave.

- POS-2–Northern portions of the site drain over land onto New York Avenue, draining to an existing inlet at the intersection of Takoma Avenue and New York Avenue

- POS-3–Portions of the site to the west and south drain onto Fenton Street, running to an existing storm drain inlet at the intersection of Takoma Avenue and Fenton Street. This is separate from the system beneath New York Avenue.

- Points of Study analyzed historical data for several storm events (rainfall intensity):
    - 1-year (2.57 in/hr)
    - 2-year (3.10 in/hr)
    - 10-year (4.77 in/hr)
    - 100-year (8.23 in/hr)

These calculations represent the amount of water the design needs to accommodate for different levels of storm events as calculated.

The design exceeds the requirements and decreases runoff by the percentages shown.

A detailed analysis of the below information can be found in the Stormwater Management Concept Report. All measurements are in Cubic Feet per Second (CFS):

- POS-# / 10-year Runoff (Existing) / 10-year Runoff (New)
- POS-1 / 19.19 CFS / 16.47 CFS ← The project achieves a 15% reduction from the current condition.
- POS-2 / 32.59 CFS / 32.31 CFS ← The project achieves a 1% reduction from the current condition.
- POS-3 / 23.10 CFS / 22.74 CFS ← The project achieves a 2% reduction from the current condition.

Points of Study Diagrams for Stormwater Management – excerpted from Stormwater Management Concept Report document submitted for permit.

- POS Post Devel From SWM Concept
- POS From SWM Concept Report