

CASE STUDY- Charlotte Hornets Performance Enhancement Center Charlotte, NC (to be installed in 2026)

The Charlotte Hornets Performance Enhancement Center, scheduled for installation in 2026, will include a Purple Roof system designed to optimize stormwater management through rooftop retention and detention strategies. This system will be a crucial component of the building's stormwater management plan, providing storage, reducing peak runoff and regulating discharge rates efficiently.

Project Scope and Design

The project features two distinct Purple Roof profiles spanning Levels 6 and 7:

- 4+2+2 Vegetated Profile: 24,911 square feet
- Paver+2+2 Hardscape Profile: 20,635 square feet

The Level 7 roof will manage stormwater for both itself and the upper roof (exposed TPO), ensuring controlled flow and optimized water retention through its layered profile. The Purple Roof system was selected for its ability to integrate stormwater management seamlessly within the architectural design and structural limitations. By incorporating both vegetated and hardscape surfaces, the system offers a flexible approach to balancing aesthetics, functionality, and performance.

Replacing Traditional Stormwater Infrastructure

One of the key advantages of implementing the Purple Roof system was its ability to replace an equally-sized traditional stormwater storage tank (19,000 cf = 7.8 ocean containers), which would have occupied critical square footage within the building's footprint. This alternative not only preserves valuable usable space but also eliminates the need for extensive foundation-stage construction, reducing project complexity and expediting the overall construction timeline. The Purple-Roof system is not a requirement for any preceding trade, therefore it does not significantly impact the critical path of the overall construction schedule.

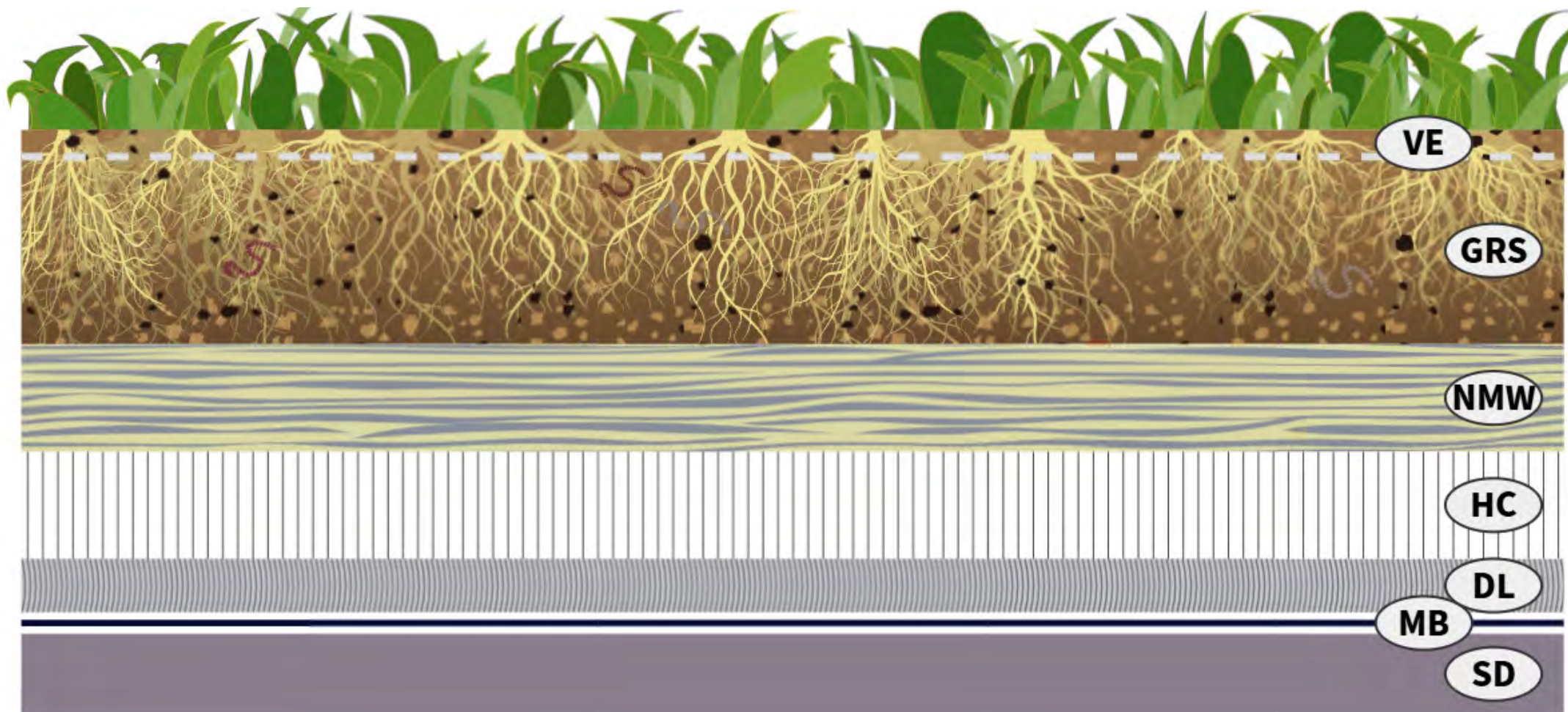
A Model for Green Infrastructure in Sports Facilities

This project represents an advanced application of green roof technology in a high-performance sports facility, demonstrating how stormwater management can be seamlessly integrated into the structural and functional requirements of today's buildings. The Charlotte Hornets Performance Enhancement Center serves as an example of innovative, space-efficient, and sustainable stormwater solutions in large-scale urban developments.





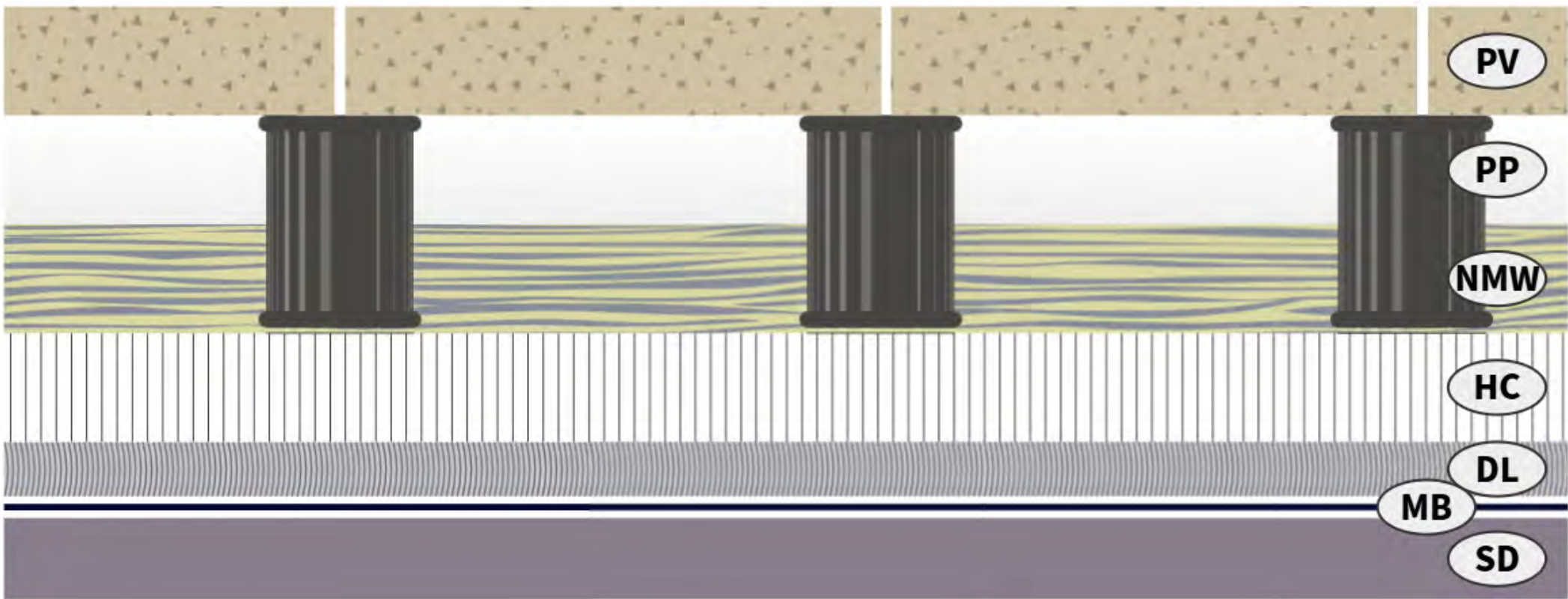
Vegetated 4+2+2 profile



property	value	standard
total thickness	8.49 inches	
dry weight	20.85 lbs/sf	FLL B.2 & ASTM E-2399
max dead load (wet)	41.04 lbs/sf	FLL B.2 & ASTM E-2399
max live load ***	13.26 lbs/sf	FLL B.2 & ASTM E-2399
max combined dead and live load ***	54.3 lbs/sf	FLL B.2 & ASTM E-2399
max retention storage volume	2.4 gals/sf	FLL B.2 & ASTM E2399
	3.85 inches	
max detention storage volume	2.4 gals/sf	GRD 2151
	3.85 inches	
anticipated max flow rate**	0.2 cf/s/acre	ASTM D4716++
typical plant palette	grasses and sedums	



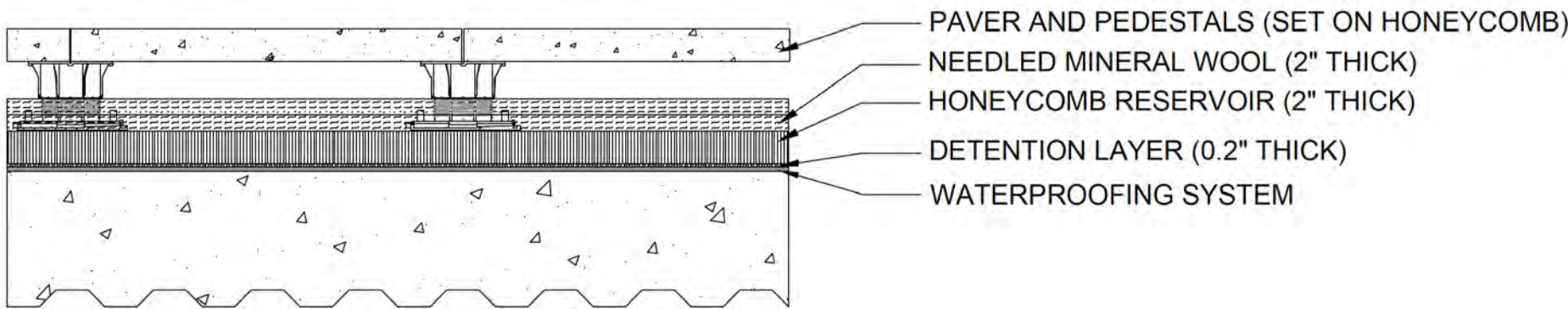
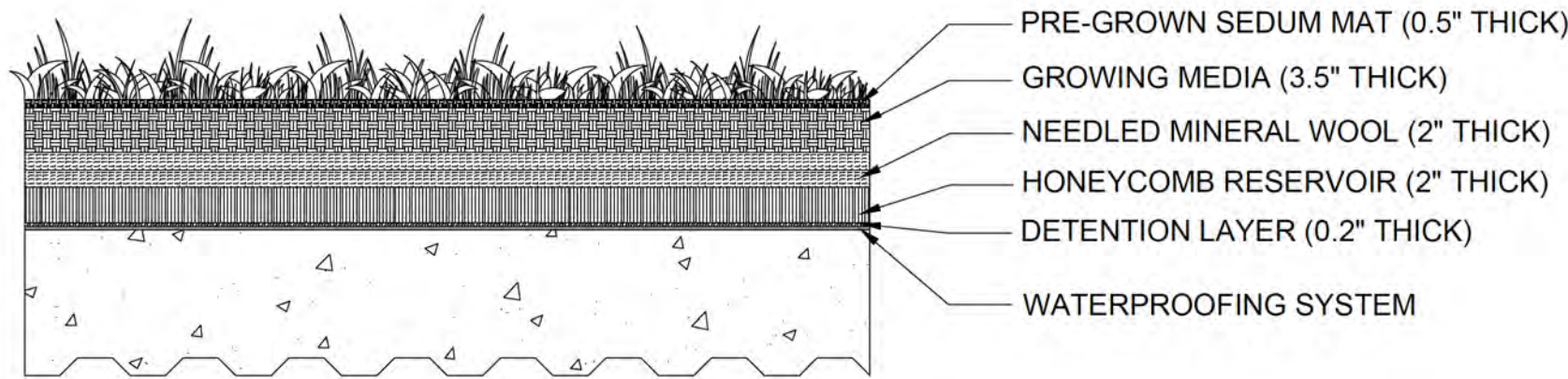
Hardscape Paver+2+2 profile



property	value	standard
total thickness	8.49 inches	
dry weight	24.86 lbs/sf	FLL B.2 & ASTM E-2399
max dead load (wet)	34.39 lbs/sf	FLL B.2 & ASTM E-2399
max live load ***	10.82 lbs/sf	FLL B.2 & ASTM E-2399
max combined dead and live load ***	45.21 lbs/sf	FLL B.2 & ASTM E-2399
max retention storage volume	1.1 gals/sf	FLL B.2 & ASTM E2399
	1.76 inches	
max detention storage volume	1.6 gals/sf	GRD 2151
	2.57 inches	
anticipated max flow rate**	0.2 cf/s/acre	ASTM D4716++



Construction Details



NOTE: ORGANIC MATTER CONTENT OF ALL GROWING MEDIA SHALL BE 10% BY VOLUME MINIMUM.

01 PURPLE ROOF - VEGETATED TYPICAL SECTION

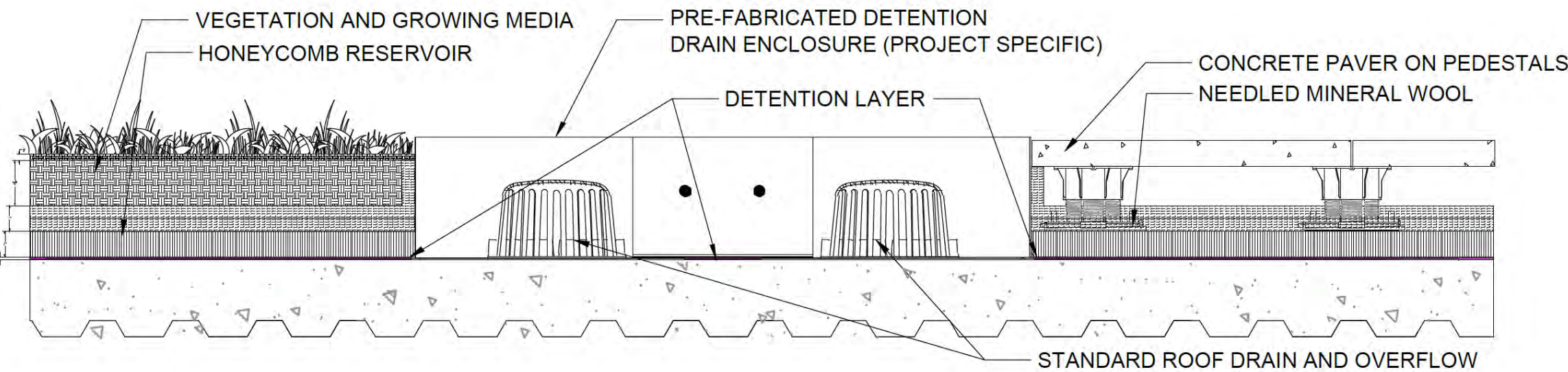
FOR INFORMATION ONLY - SEE ARCHITECTURAL PLANS FOR DETAILS

N.T.S.

02 PURPLE ROOF - PAVER TYPICAL SECTION

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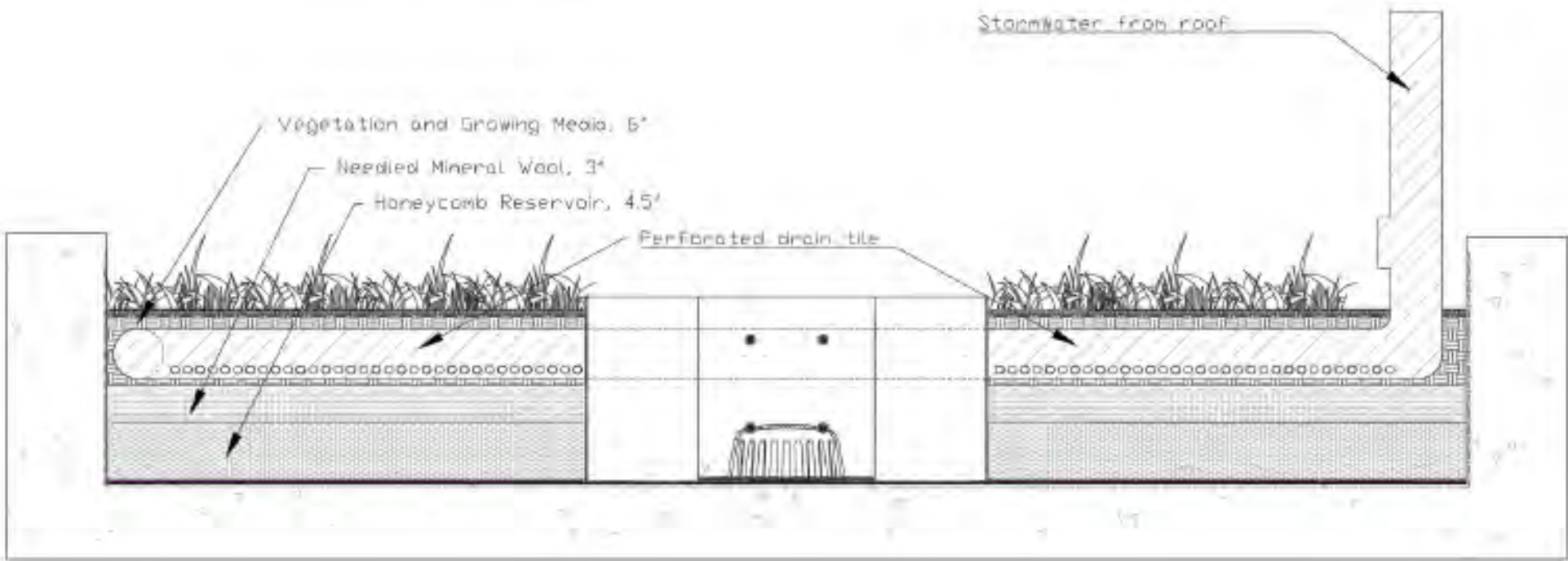
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03 PURPLE ROOF - TYPICAL DRAIN SECTION

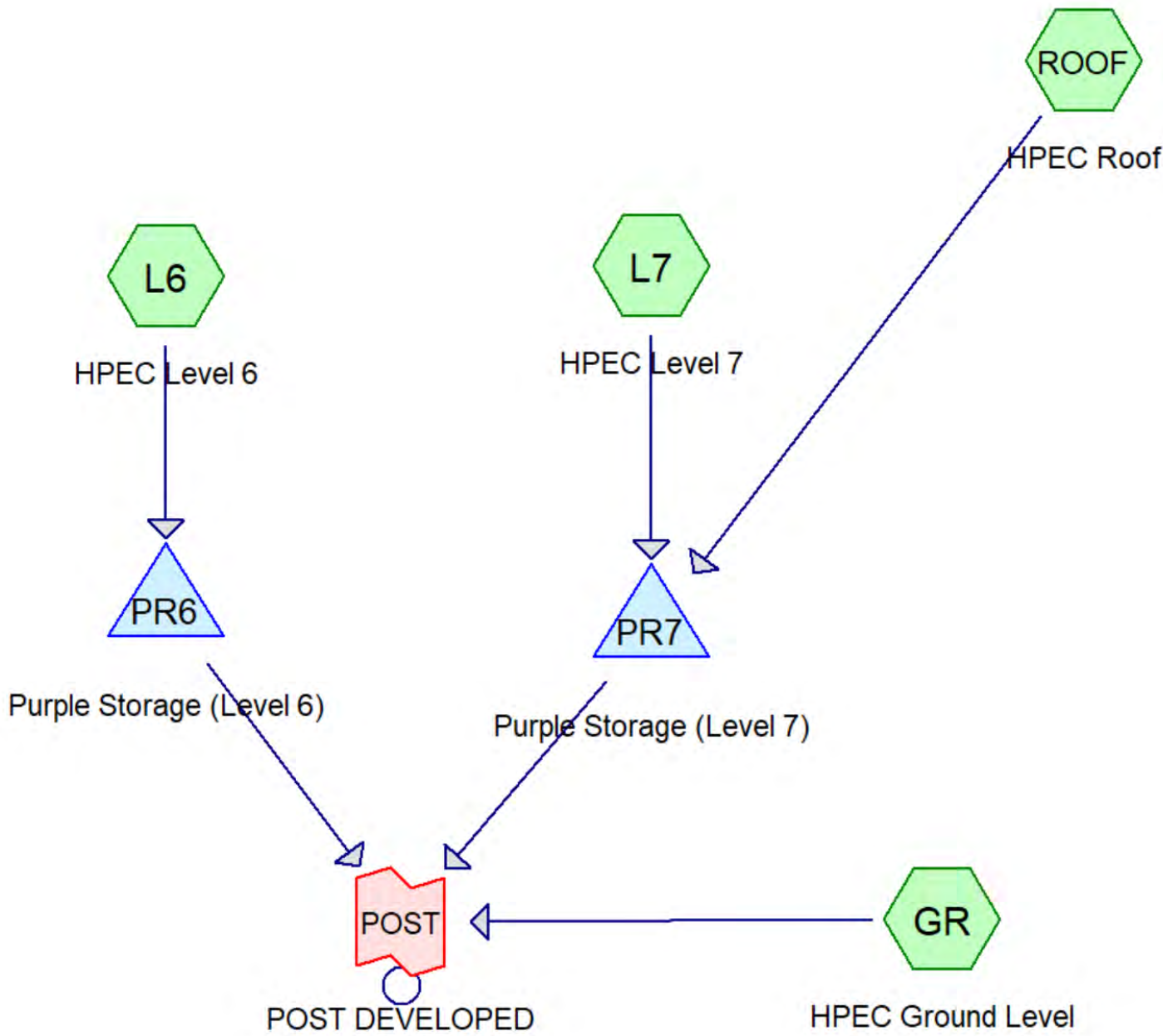
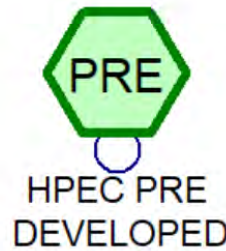
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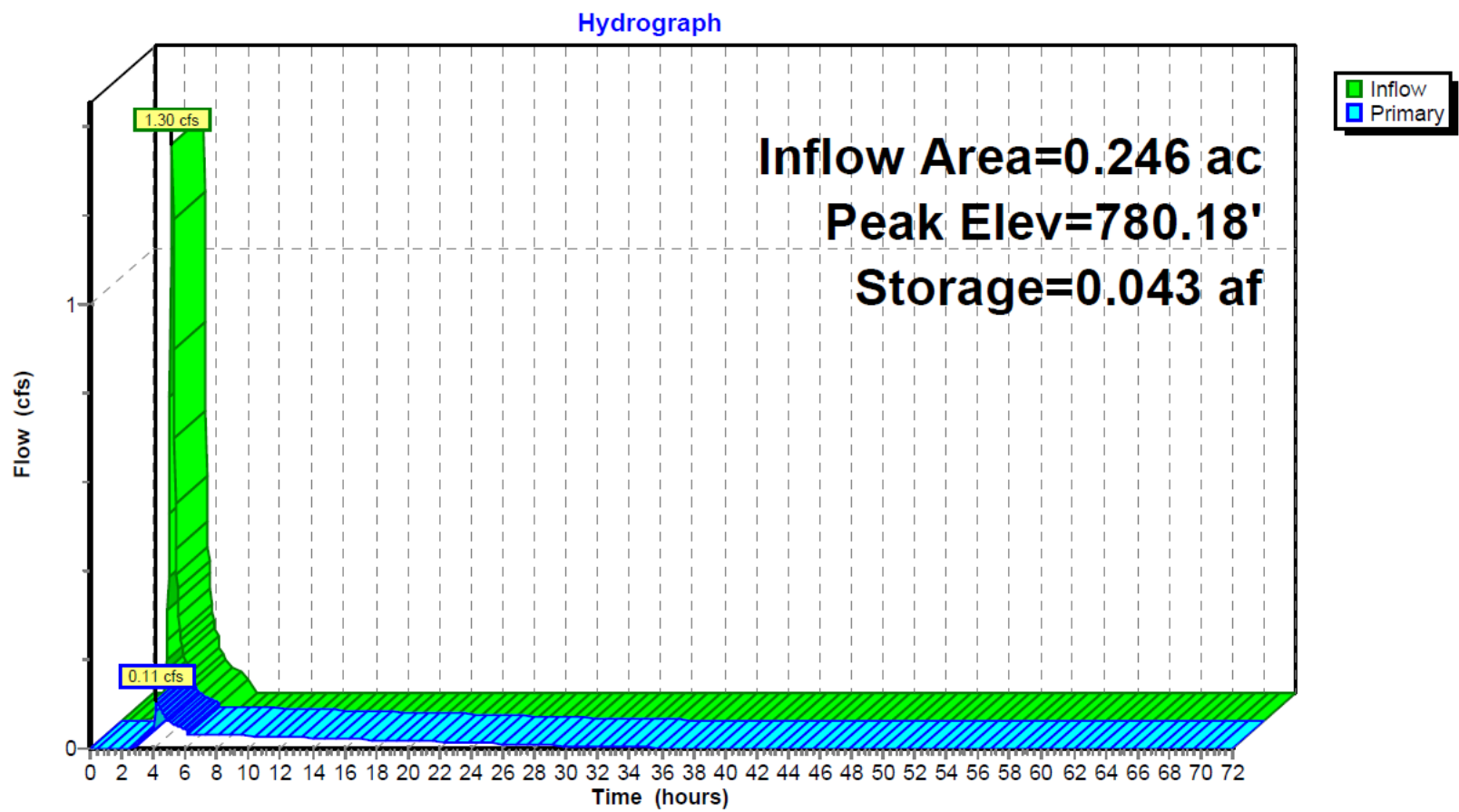


Construction Detail - stormwater leader from upper roof

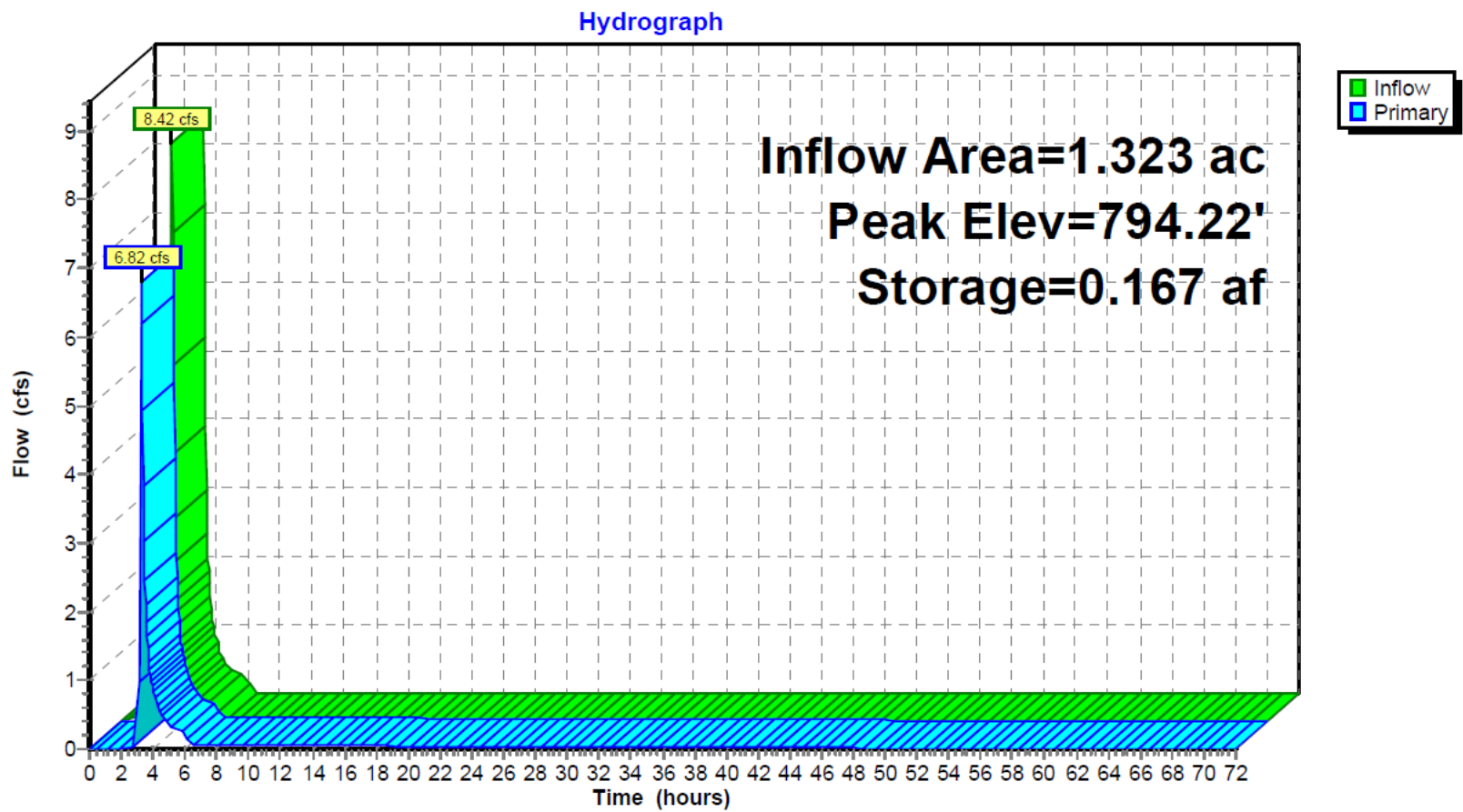
HydroCAD
Calculations & Hydrographs



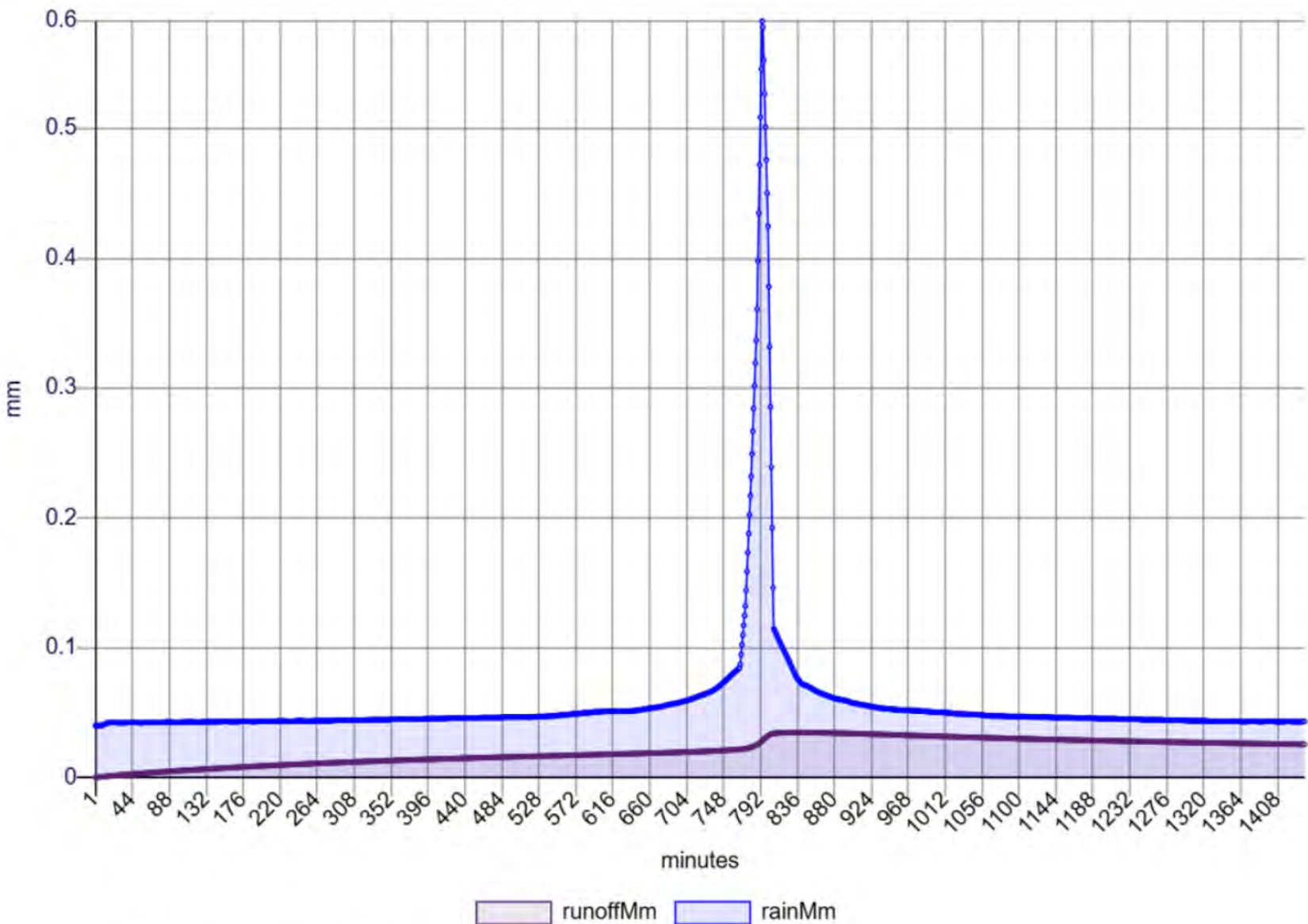
Pond PR6: Purple Storage (Level 6)



Pond PR7: Purple Storage (Level 7)



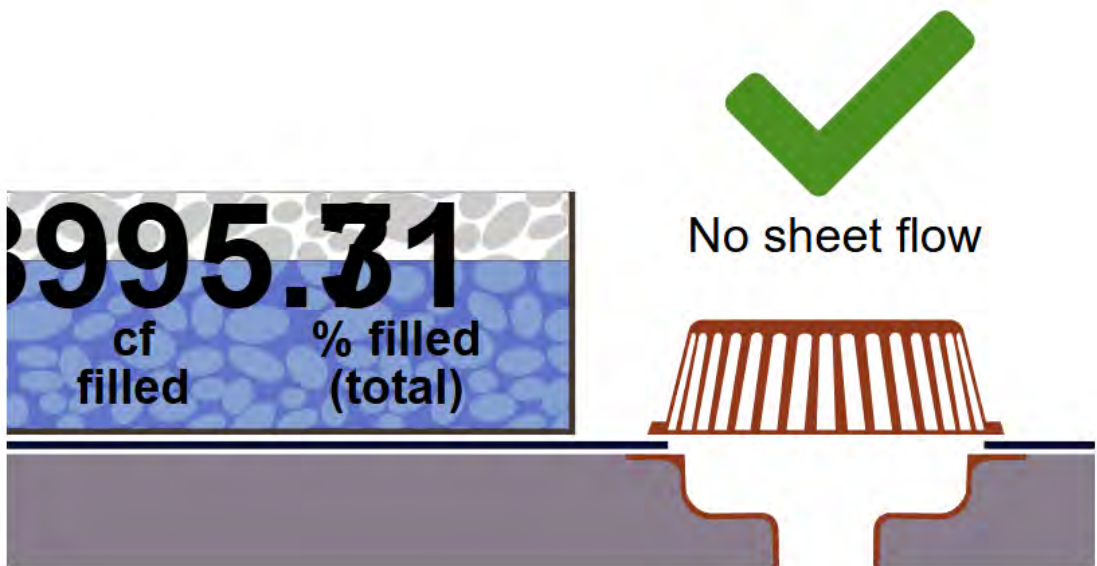
Stormwater Metrics



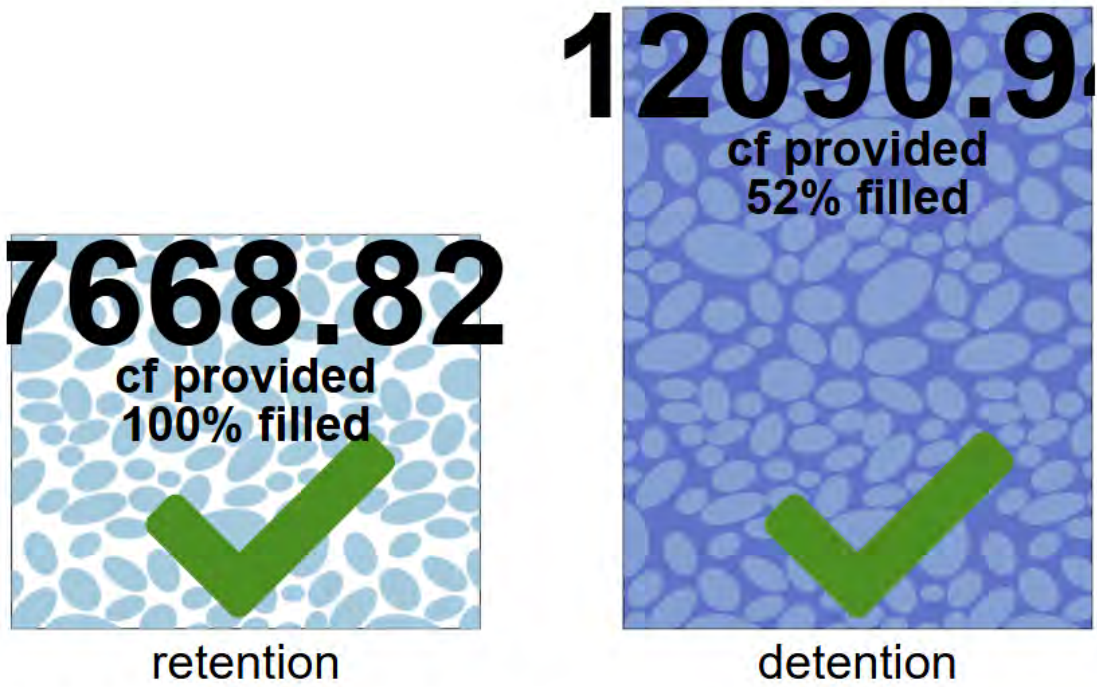
Overall Project Detailed Hydrograph
Design Storm: Type II distribution, 3.2 in total volume, 1440 minutes total duration



7.8 ocean containers of storage provided (19941 cf)



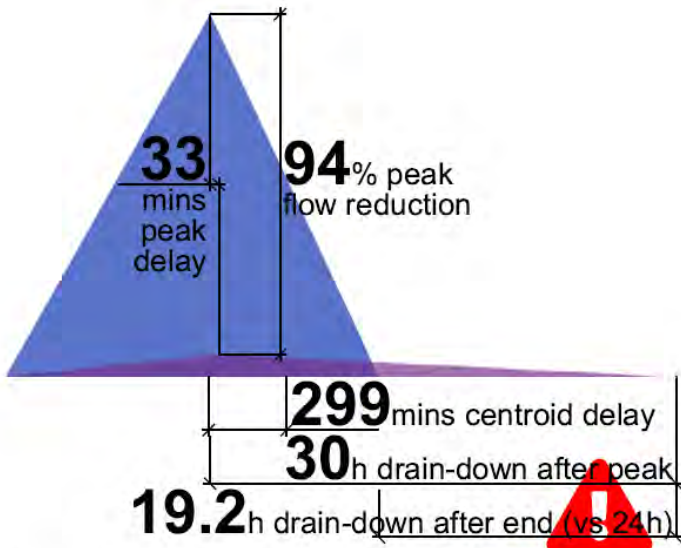
Overall Project Diagrammatic Overflow Compliance
Design Storm: Type II distribution, 3.2 in total volume, 1440 minutes total duration



Hinweis: Retention value is likely (modeled) retention, which is lower than the ASTM E-2399 / FLL B.2 maximum storage volume.
Overall Project Storage Summary (Modeled Values)

	target cf	target in	modeled cf	modeled in	model / target %	% filled
retention storage	N/A	N/A	7811	4	N/A	100%
detention storage	N/A	N/A	12130	6	N/A	52%
combined storage	N/A	N/A	19941	10	N/A	71%

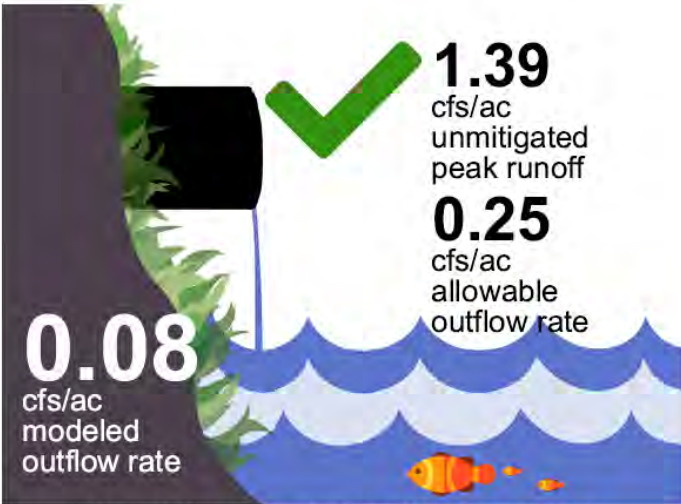
Overall Project Storage Summary Table



Overall Project Diagrammatic Hydrograph
Design Storm: Type II distribution, 3.2 in total volume, 1440 minutes total duration

	target minutes	modeled total hours	modeled total minutes	complies
runoff delay (centroid)	N/A	5	299	YES
runoff delay (peak)	N/A	0.6	33	YES
drain-down after peak	N/A	30	1798	YES
drain down after end	24	19.2	1152	YES

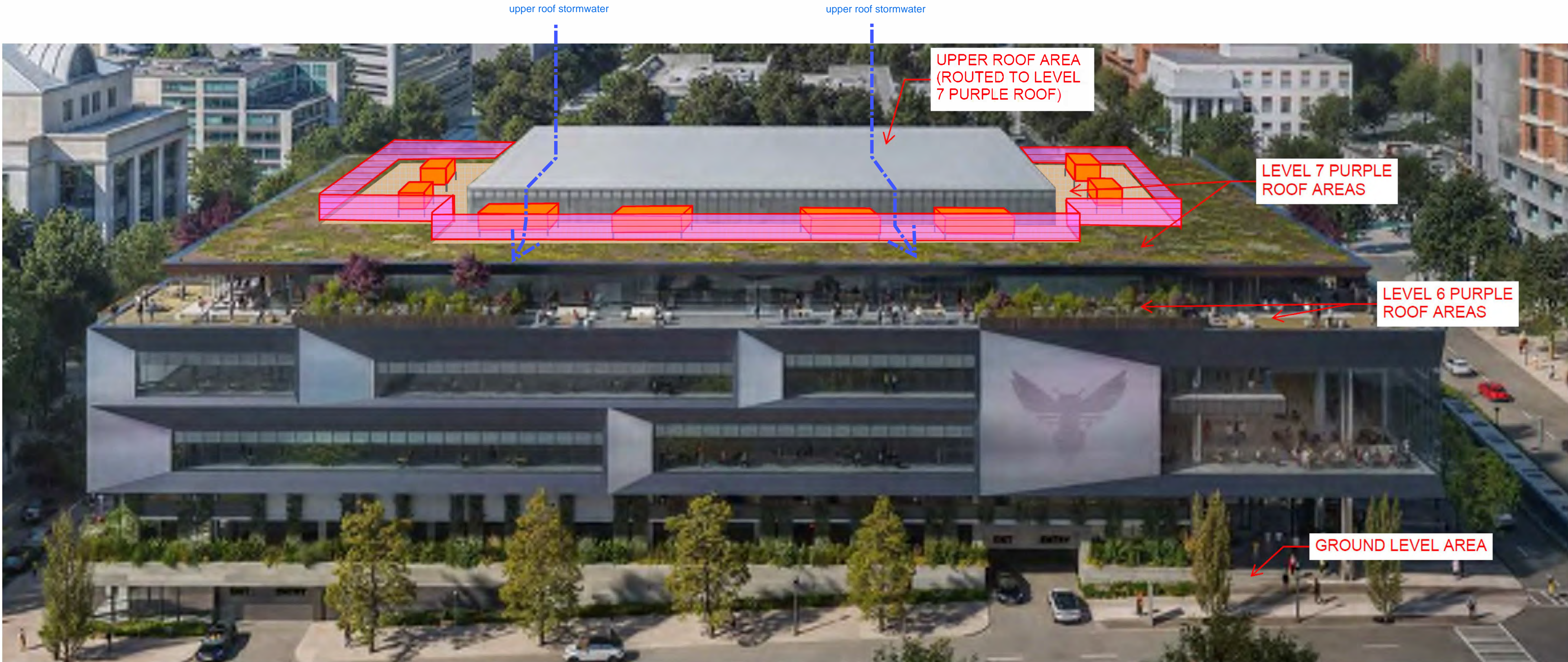
Overall Project Delay Summary Table
Design Storm: Type II distribution, 3.2 in total volume, 1440 minutes total duration



Overall Project Diagrammatic Flow Rate Compliance
Design Storm: Type II distribution, 3.2 in total volume, 1440 minutes total duration

	target cfsAc	modeled cfsAc	model / target %	% reduction
unmitigated runoff	N/A	1.39	N/A	0%
peak flow rate	0.25	0.08	33%	94%

Overall Project Flow Rate Summary Table
Design Storm: Type II distribution, 3.2 in total volume, 1440 minutes total duration



PROJECT TEAM



Civil Engineering

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**Structural
Engineering**

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120 Broadway, Floor 19
New York, NY 10271
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Gilbane

Traditional roof & tank



Purple-Roof

