Flood Mitigation Solutions
Increased Stormwater Storage

Significant storm events can drop a large amount of rain in a relatively short period of time, overwhelming the existing storm drain system. With larger storms becoming more frequent, one solution to reduce flooding is to increase below-ground storage, releasing the water into the stormwater system gradually.

Subsurface storage systems temporarily hold stormwater runoff below ground in material like gravel, high strength plastic boxes and arches, large-diameter pipes, and concrete chambers. The stormwater is detained until it either soaks into the soil and/or drains into the County's existing stormwater system, after the storm has passed. These large systems can be placed under other finished surfaces, including pavement, grass, landscaping, and playing fields. The storage systems are fed by storm inlets and pipes, permeable surface treatments (permeable pavement, synthetic turf, or pervious areas with engineered soils), or potentially by pumping from other lower areas.

Figure 1 - Cardinal School storage under construction

Advantages

- Potential to capture large amount of stormwater runoff and reduce localized flooding during storms
- Can be co-located with other amenities like ball fields and parking lots, and with green stormwater practices, such as permeable pavement
- Below ground and out of sight once completed

Figure 2 - Completed Cardinal School storage

Potential Limitations

- Required area can be prohibitively large, limiting potential applicability in an urban environment
- Constructability challenges associated with adjacent buildings, other below ground utilities, contaminated soils, rock materials, and other factors may increase cost
- Pretreatment structures, such as filters and sediment storage chambers, may be needed to capture trash, sediment, and other materials that could clog the storage structure
- Removing stored water may require pumping, which can add noise, gas fumes, and capital and operating costs

Performance		Implementation		Community/ Environmental		Other	
Flood Mitigation	💧💧💧	Capital Cost	💧💧💧	Improved Aesthetics	💧	Climate Change Resilience	💧💧💧
Water Quality	💧💧✻	Maintenance Cost	💧💧	Dual Use	💧💧💧	Safety	💧💧💧
		Scalability	💧	Habitat Creation	💧		
		Constructability	💧	Urban Heat Island Reduction	💧		

✻ When combined with green infrastructure

💧 Low → 💧💧💧 High

ARLINGTON VIRGINIA

Flood Mitigation Solutions
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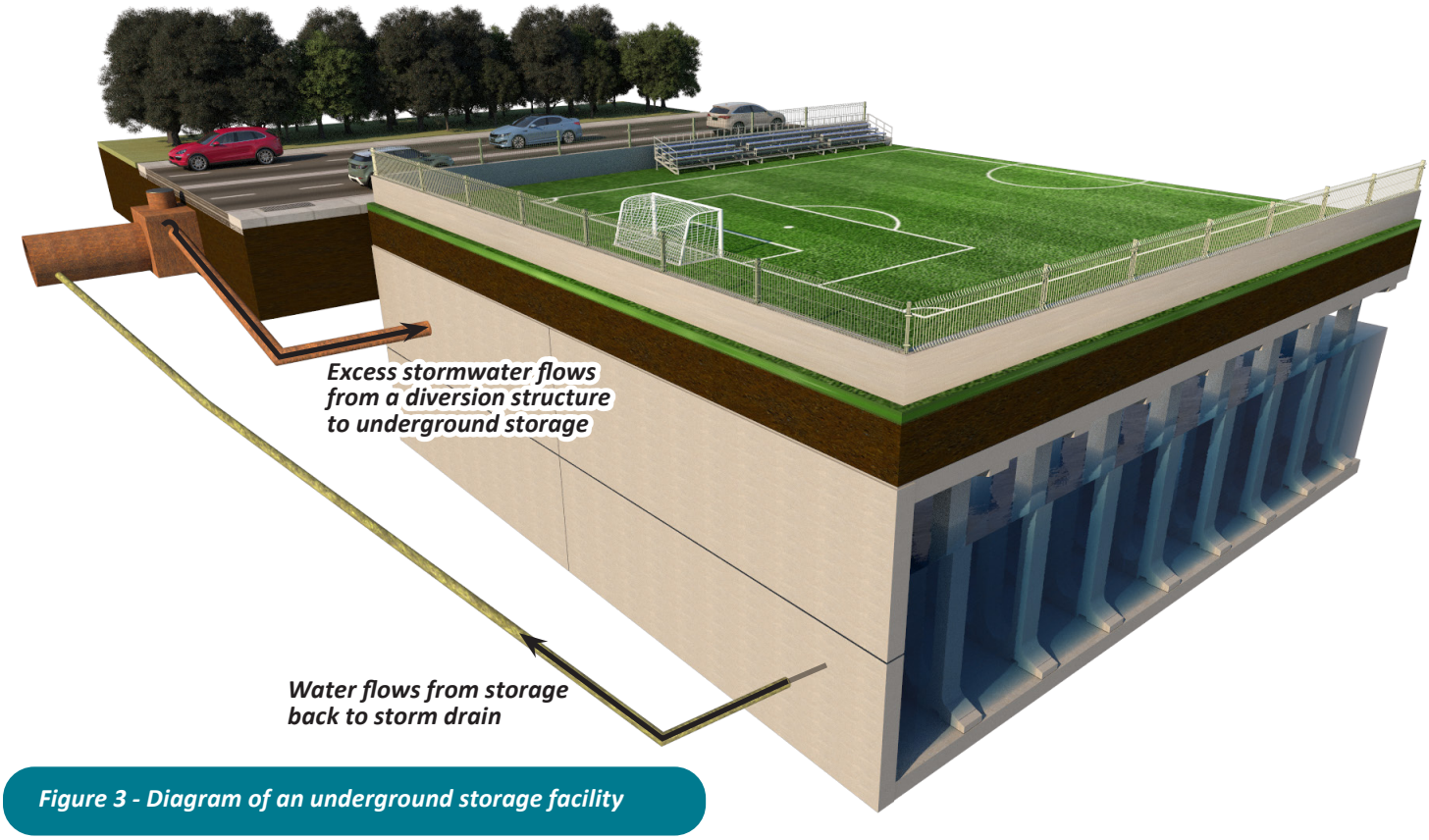

Figure 3 - Diagram of an underground storage facility

Applicability

Generally applicable in public parks, school playing fields, or below large parking lots where sufficient constructable space is available, though they have also been used below landscaped plazas on top of parking structures. These systems are generally most effective in areas where their storage bottom is sufficiently high to allow for gravity drainage back to the storm drain system and/or higher than the water table to allow infiltration of stored water.

Potential Enhancements for Increased Performance

- Real time controls using dynamic, predictive technology can control flow in and out of the system, improving storage efficiency
- Use of modular and high porosity media can increase storage capacity
- Can be combined with other methods such as pumping to optimize stormwater capture
- Can be combined with deeper wells/columns to enhance infiltration rates
- Sand or another filter layer at the bottom can enhance pollutant removal, especially when close to groundwater