

Flood Mitigation Solutions

Increased Storm Pipe Capacity (Conveyance Capacity)

In most urban areas, stormwater is managed through a system of storm drains in low spots on the street that direct stormwater runoff to pipes under the street. The inlets and pipes were designed for storms of certain size, typically a 10-year storm. A 10-year storm is defined as one having a 10% chance of happening each year, and represents about 5.2 inches of rain in 24 hours in Arlington County. With larger storms becoming more frequent, one solution to reduce flooding on the surface is to increase the size or number of storm drains on the street and drainage pipes below the surface.

Advantages

- Very effective for storms up to design capacity
- Below ground and out of sight once completed
- Proven, reliable technology

Potential Limitations

- Space constraints with other below-ground utilities may make it infeasible or require relocation of other utilities
- May be infeasible where adjacent buildings are too close and limit constructability
- Contaminated soils and/or rock materials may increase cost

Applicability

- Generally applicable under roadways or in public parks where existing easements are available, or where such easements can be readily obtained
- Can be accomplished by either replacing existing drains with larger storm drains or adding parallel pipes

Potential Enhancements for Increased Performance

- In certain circumstances, may be accomplished with deeper storm pipes using directional drilling or tunneling construction methods
- Can be combined with other methods such as storage and pumping to optimize sizing of pipes
- Can be combined with green stormwater infrastructure systems, such as bioswales and tree boxes, which can provide water quality treatment, reduce heat island effects, and improve aesthetics



Figure 1 - Increasing capacity by installing a “box culvert” storm pipe



Figure 2 - Example street cross-section showing stormwater inlets, pipes, other utilities, and a larger conveyance pipe

Performance		Implementation		Community/ Environmental		Other	
Flood Mitigation	3 water droplets	Capital Cost	3 water droplets	Improved Aesthetics	1 water droplet*	Climate Change Resilience	2 water droplets
Water Quality	1 water droplet*	Maintenance Cost	1 water droplet	Dual Use	3 water droplets	Safety	2 water droplets
		Scalability	2 water droplets	Habitat Creation	1 water droplet		
		Constructability	2 water droplets	Urban Heat Island Reduction	1 water droplet*		

* When combined with green infrastructure

1 water droplet → 3 water droplets
Low → High