

# Level Spreader

Figure 3. Typical Orientation of Level Spreader with Surface Discharge

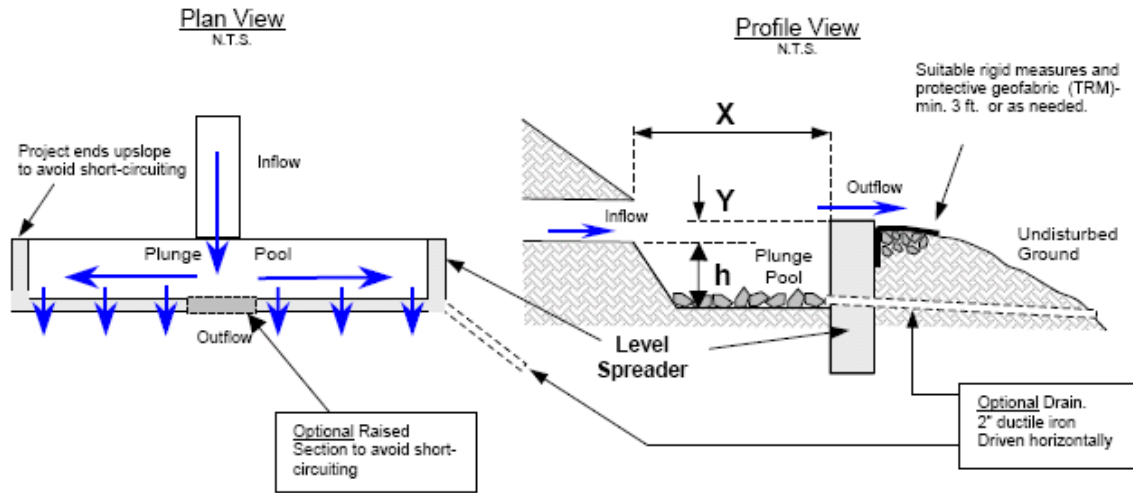
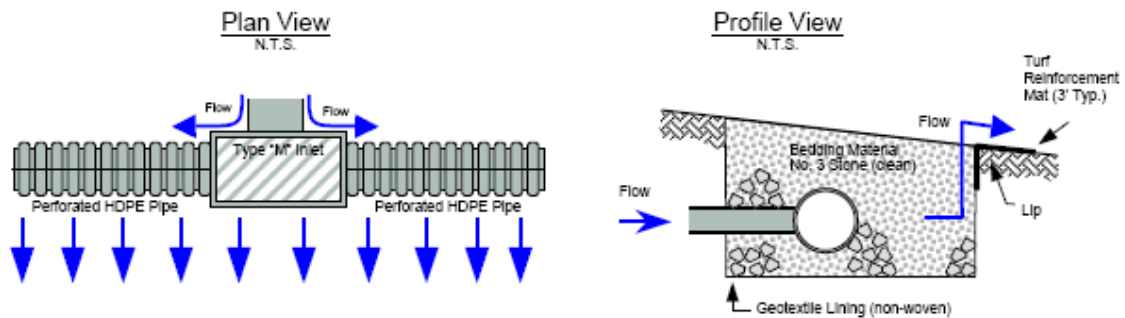


Figure 5. Typical Orientation of Level Spreader with Subsurface Discharge



## Stormwater Management Goals Achieved Acceptable Sizing Methodologies

- ✓ Pollution Reduction..... PRES<sup>1</sup>
- ✓ Flow Control..... NA<sup>1</sup>
- ✓ Destination..... NA<sup>1</sup>

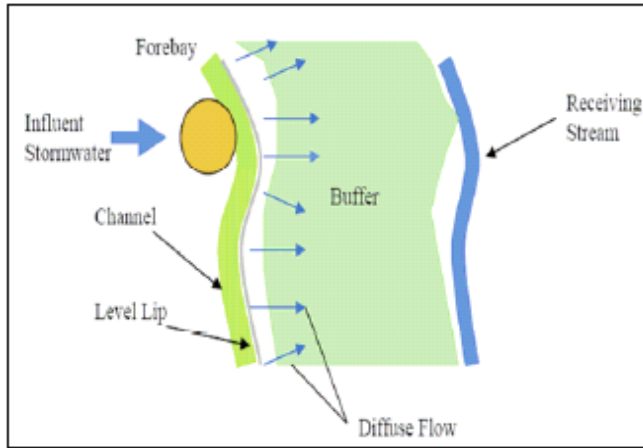
This facility is **may be** classified as an Underground Injection Control structure (UIC).

SIM=Simplified Approach, PRES= Presumptive Approach, PERF= Performance Approach

**Notes:** Level spreaders can be used to manage stormwater from rooftops, pathways, parking lots, and driveways, provided the runoff is less than 5 cfs and used in conjunction with other stormwater management facilities.

- 1) To be approved as a stand-alone management facility, it must be demonstrated that no infiltration or public stormwater system is available. The level spreader facility design must include a minimum 10 foot wide vegetated buffer between the level spreader and property line and/or receiving water feature. The runoff from the facility shall mimic pre-development sheet flow and quantity.

# Level Spreader



Source: *Evaluation of Level Spreaders in the Piedmont of North Carolina*



**Description:** Level spreaders are facilities that are designed to uniformly distribute a concentrated flow over a larger area, mimicking sheet flow. Level spreaders are constructed at a virtually zero percent (0%) grade across the slope consisting of a permanent linear structure that is used to spread and disperse a concentrated flow thinly over a vegetated or forested riparian buffer or filter strip. Level spreaders effectively filter and slow runoff as it reverses concentrated flow into sheet flow. Pollutants are removed through filtration and sedimentation. There are an infinite number of ways to fit this concept into site designs and designers are encouraged to use the site landscape areas for this purpose. Level spreaders can also be designed as approved destination facility provided post-construction sheet flow the facility is less than pre-construction sheet flow.

**Design Considerations:** Level Spreaders may not be used in NRCS soil types A or B. When designing level spreaders, the concentrated flow out must be spread and released simultaneously across the same elevation. Ground contours must be parallel to the level spreader lip. The designer's main goal in designing level spreaders is to ensure the appropriate length - a length that ensures the sheet flow depth is less than 2 inches and it does not allow for erosive velocities down slope. The level spreader must safely pass the Flood Control Design Storm intensity without failing or causing erosion, gullies, or rills. Maximum velocities of flow across level spreader are dependent on the down slope ground cover and provided below. Lengths of level spreaders are dependent on the down-slope ground cover within the protected buffer or vegetated filter strip.

Down Slope Ground Cover	Velocity (fps)
Vegetated (grass, shrubs)	1.33
Mulch	0.67
Gravel (rock)	1.5

**Construction Considerations:** Level spreader areas should be constructed on native soils and protected from construction activities not related to the level spreader construction. The receiving area below the level spreader should also be protected from disturbance during construction. Disturbed areas shall be stabilized with vegetated measures. Level spreaders must be constructed perfectly level to distribute flows evenly across the filter. Public facilities must be surveyed after construction.

# Level Spreader

## Design Requirements:

**Soil Suitability:** Level spreaders are not appropriate for NRCS soil types A or B.

**Dimensions and Slopes:** The maximum slope allowable for fully planted down-slope buffer or vegetated filter strips is 10%. Terraces may be used to decrease ground slopes.

**Setbacks:** Required setback is a minimum 10 feet from property lines and receiving water features. Sheet flow depth at property lines shall be consistent with pre-development flow.

**Sizing:** Level spreaders shall be a minimum of length of 13 feet per cfs of flow for grassy down-slope buffers and 65 feet per cfs of flow for forested areas with little or no cover on down-slope buffer.

**Landscaping:** Vegetation helps improve infiltration functions, protects from rain and wind erosion, and enhances aesthetic conditions. Although the level spreader does not require plantings, the natural buffer area vegetation must be protected from disturbance during construction. The native vegetation may be enhanced as part of the design proposal.

Wildflowers, native grasses, and ground covers used for City-maintained facilities shall be designed not to require mowing. Where mowing cannot be avoided, facilities shall be designed to require mowing no more than once annually. Turf and lawn areas are not allowed for City-maintained facilities; any exceptions will require City approval.

**Trees:** The following evergreen or deciduous trees shall be retained or planted to shade discharge from the spreader (approximately 30 feet on center):

Evergreen trees:	Minimum height: 6 feet
Deciduous trees:	Minimum caliper: 1 ½ inches at 6 inches above base.

## **Checklist of minimal information to be shown on the permit drawings:**

- 1) Facility dimensions and setbacks from property lines and structures
- 2) Profile view of facility, including typical cross-sections with dimensions
- 3) All stormwater piping associated with the facility, including pipe materials, sizes, slopes, and invert elevations at every bend or connection
- 4) Native landscaping or proposed landscaping in buffer area
- 5) Flow spreader details and specifications
- 6) Check dam or terrace details and specifications (if needed)

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**Inspection requirements and schedule:** The following table shall be used to determine which stormwater facility components require City inspection, and when the inspection shall be requested. Please note that, while not all facility components may require an inspection call, inspectors will inspect for all required components in the field.

<b>Facility Component</b>	<b>Inspection Requirement</b>
Filter grading (if applicable)	
Terraces (if applicable)	
Piping & flow spreader	Call for inspection
Growing medium (if applicable)	
Plantings	Call for inspection

**Operations and Maintenance requirements:** See Chapter 3.0.