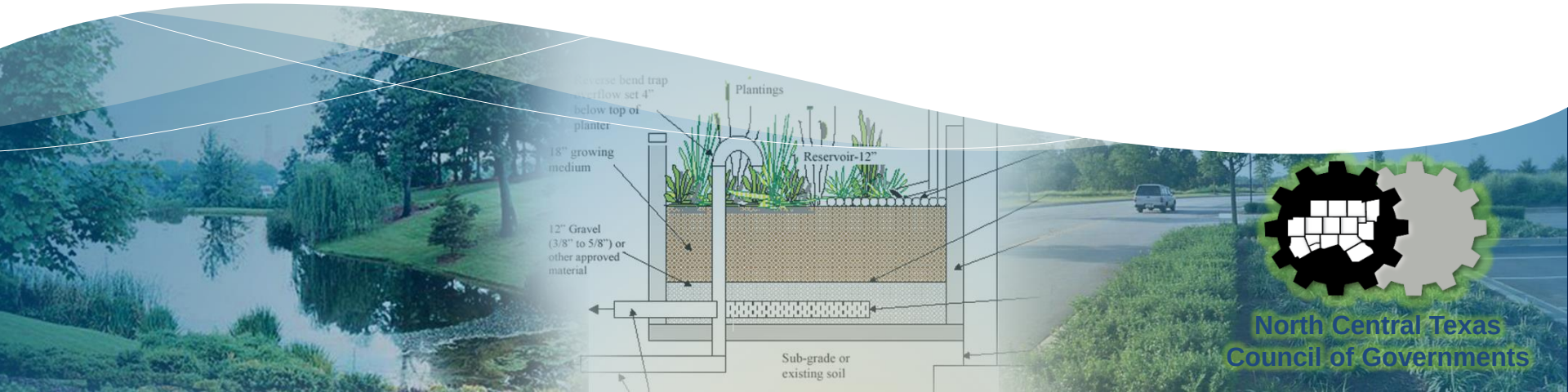
integrated Stormwater Management

iSWM™



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What is iSWM?

- A regional program to assist local governments:
  - Manage stormwater impacts
  - Meet MS4 Permit requirements

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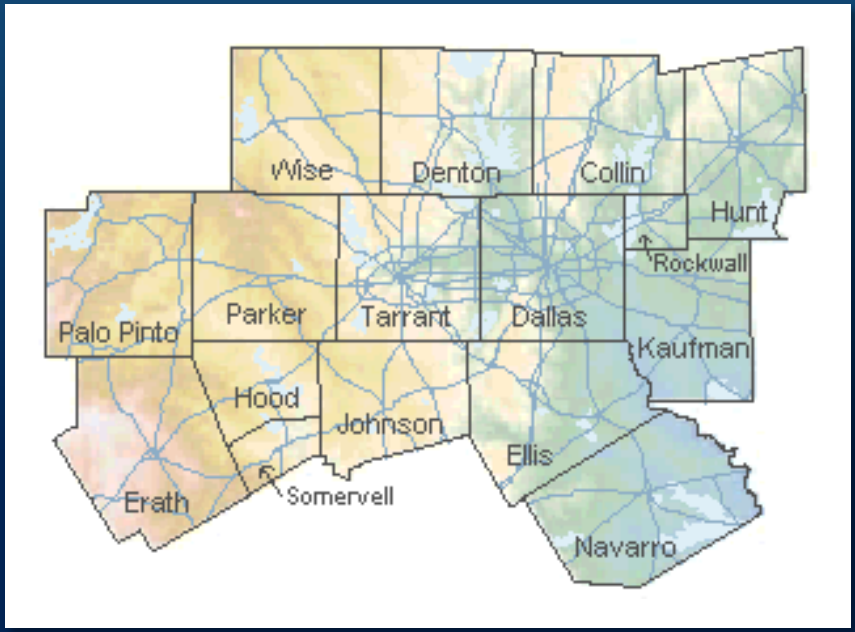
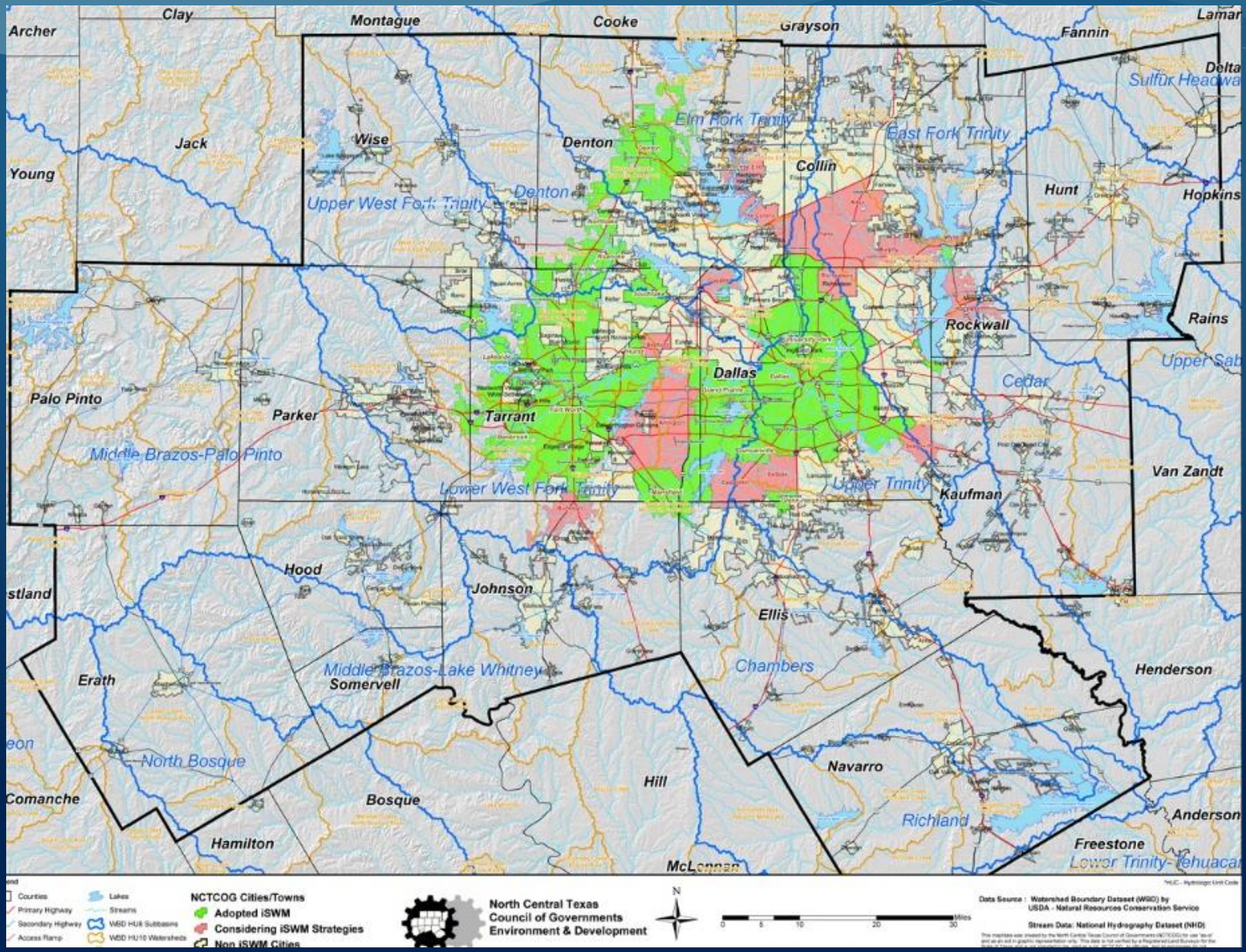


- Collaborative effort between:
  - 60+ local governments
  - iSWM Committee
  - Regional Public Works Council
  - Consultant team led by Freese and Nichols

iSWM in the Dallas Fort Worth Region



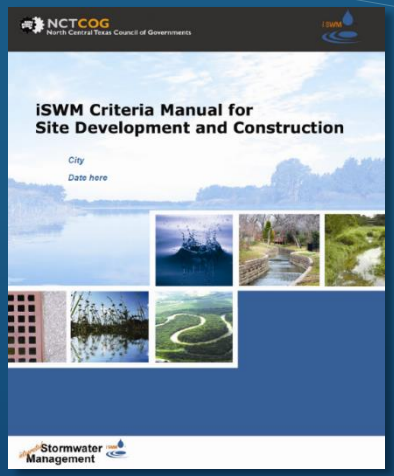
iSWM Criteria Manual

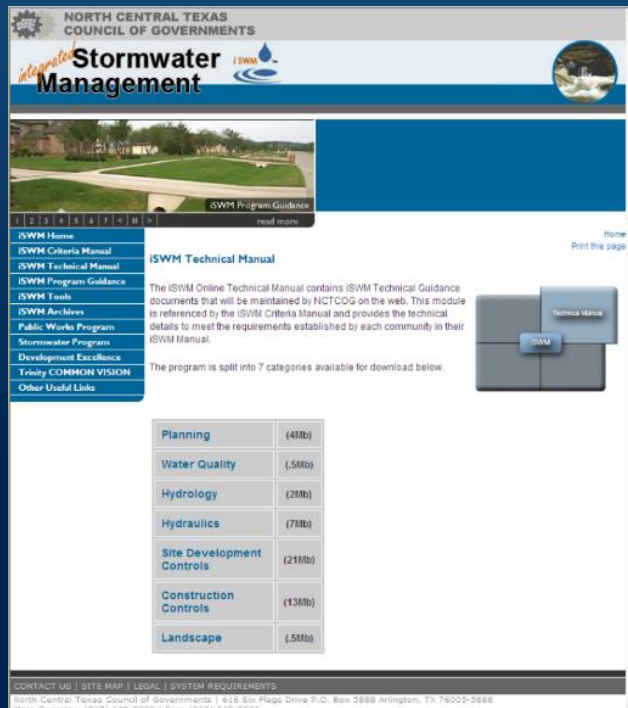
What's in the Criteria Manual?

- **Ch. 1:** Overview of iSWM Criteria Manual
- **Ch. 2:** *integrated* Development Process
- **Ch. 3:** *integrated* Design Criteria
- **Ch. 4:** *integrated* Construction Criteria

Technical Manual:

- Technical and design information
- Online resource for use by local governments and design community
- Separate volumes for easy download and use





Outcome Focused Implementation

North Central Texas Council of Governments
iSWM PROGRAM IMPLEMENTATION TIERED MEASUREMENT

SUBMITTING COMMUNITY:_____

Requirements for Implementation Levels

Outcome Category	Gold	Silver	Bronze
Mandatory	10 full application	10 full or partial application	10 full or partial application
Recommended	7 full application	7 full or partial application	4 full or partial application
Optional	3 full or partial application		

Note: The following outcomes apply to land disturbing activities of 1 acre or more for water quality and streambank protection, and apply to all land disturbing activities for flood mitigation and conveyance.

#	Outcome	CHECK COMMUNITY'S LEVEL OF APPLICATION			Full Application	iSWM Criteria Manual Ref.	Equivalent Local Criteria/Ordinance Reference
		N/A	Partial	Full			
MANDATORY OUTCOMES							
1	Site Plan Review Applicability				Stormwater requirements discussed at a pre-development/pre-application meeting or equivalent (Concept iSWM)	Section 2.2, Step 3	
2	Land Use Conditions				Design stormwater infrastructure to fully-developed (built-out) land use conditions	Section 3.6.1	
3	Hydrologic Methods				Limit Rational Method applicability to drainage areas of 100 acres or less and utilize frequency factors (per TM HO Table 1.4); Limit Modified Rational Method applicability to drainage areas of 200 acres or less; For larger areas, require Unit Hydrograph methodology	Section 3.1 Table 3.2; TM* HO** Section 1.2	
4	Open Channel Velocity Criteria/Energy Dissipation				Require maximum permissible channel velocity criteria be met and/or use erosion control measures for 1-, 25-, and 100-yr or similar storm events to protect receiving drainage element from erosion	Section 3.6.3, Table 3.10 and 3.11	
5	Detention Structure Discharge Criteria				When a detention structure is utilized, design facility for fully-developed 1-, 25-, and 100-yr or similar storm events matching pre-development peak flows and velocities; Provide emergency spillway with 6 inches of freeboard to convey fully-developed 100-yr storm event assuming outlet blockage	Section 3.6.3, Detention Structures	
6	Streambank Protection				Require downstream stabilization to prevent erosive velocities; maintain existing downstream velocity conditions with on-site controls; and/or control fully-developed 1-yr, 24-hr storm event release over 24 hours to prevent erosive velocities	Section 1.3, Table 1.3; Section 3.4	
7	Flood Mitigation				Require adequate downstream conveyance for peak discharges; maintain existing downstream peak discharge conditions with on-site controls; and/or provide detention to pre-development peak discharge conditions	Section 1.3, Table 1.3; Section 3.5.2	
8	Construction Controls				Limit erosion and the discharge of sediment and other pollutants from construction sites by adhering to the integrated Construction Criteria or Construction General Permit	Section 4.0	
9	Operations and Maintenance				Define responsible party and requirements for operation, maintenance, frequency of inspection, and enforcement of temporary and permanent stormwater controls and drainage facilities	Section 2.2, Step 5	
10	Downstream Assessments				Confirm no negative impact or mitigate negative impacts of peak discharges and velocities for 1-, 25-, and 100-yr or similar storm events	Section 3.3; TM* HO** Section 2.4	
	TOTALS						

North Central Texas Council of Governments
iSWM PROGRAM IMPLEMENTATION TIERED MEASUREMENT

RECOMMENDED OUTCOMES							
11	Conveyance Limits				25-yr fully-developed design storm or higher for: streets, roadway gutters, storm drain pipe systems, inlets on-grade and parking lots; 100-yr fully-developed design storm event for: drainage in the right-of-way, drainage easements, and road low points	Section 3.6.2	
12	Storm Drain Velocity Criteria				Limit velocity in pipes with minimum and maximum values to prevent clogging and erosion	Section 3.6.1, Table 3.8	
13	Spread Criteria				Flow spread limits for various street classifications for 25-yr storm event or higher	Section 3.6.2, Table 3.7	
14	Freeboard Criteria				Minimum of 1 foot of freeboard provided for the fully-developed 100-yr storm event for culverts and detention structures; Minimum of 2 feet of freeboard for bridges for fully-developed 100-yr storm event	Section 3.6.3	
15	Finished Floor Elevations				Minimum of 1-foot above fully-developed 100-yr storm event water surface elevation or 2-feet above effective FEMA base flood elevation	Section 3.7	
16	Water Quality Protection				Require integrated site design practices; treat the water quality volume; and/or enact regional water quality programs	Section 1.3, Table 1.3; Section 3.2	
17	Drainage and Floodplain Easements				Required for all drainage systems that convey stormwater runoff across property boundaries and must include sufficient area for operation and maintenance of the public drainage system	Section 3.7	
	TOTALS						
OPTIONAL OUTCOMES							
18	Open Channel Stability Criteria				Design includes low-flow channel	Section 3.6.3	
19	Detention Downstream Timing Analysis				Confirm detention does not exacerbate peak flows in downstream reaches	Section 3.5.2, Option 3	
20	Conservation and Utilization of Natural Features and Resources				Ordinances encourage preservation of natural resources such as riparian buffers and/or natural open space areas and utilization of natural design features for stormwater conveyance	Section 3.2.2; TM* PL*** 2.2.1	
21	Lower Impact Site Design Techniques				Ordinances encourage reducing limits of clearing and grading and limiting impervious cover per integrated site design practices	Section 3.2.2; TM* PL*** 2.2.2	
22	TriSWM				Incorporate practices for improving water quality of runoff from public rights-of-way	Appendix A of the iSWM Criteria Manual	
	TOTALS						

*TM = iSWM Technical Manual **HO = Hydrology Section of the Technical manual ***PL = Planning Section of the Technical manual

Tier Level Applied For: ☐GOLD ☐SILVER ☐BRONZE

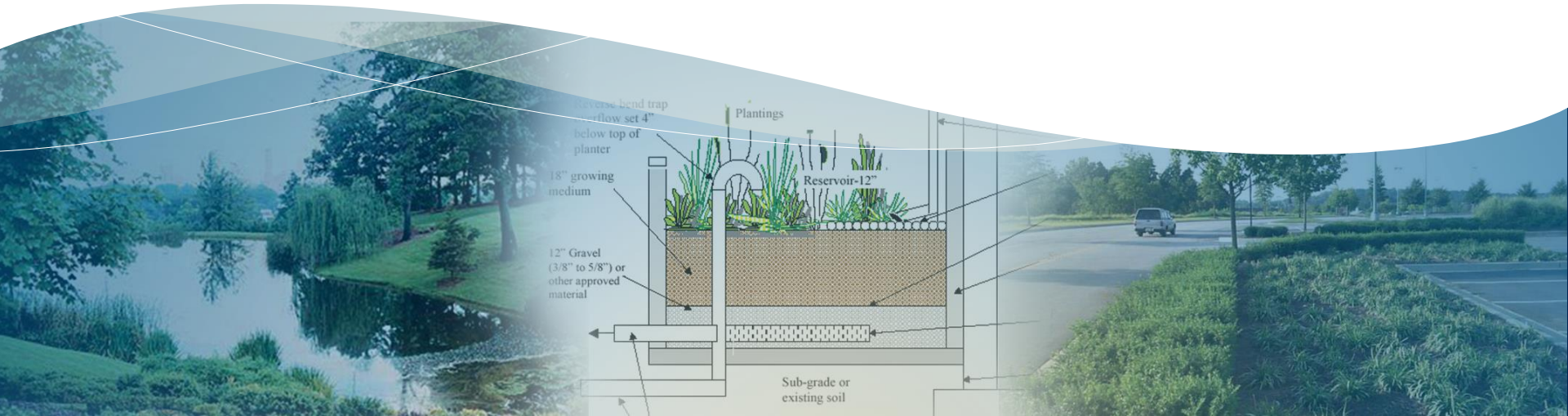
_____ _____
Print Name and Title of Local Stormwater Authority Contact Phone Number and Email

_____ _____
Signature of Local Stormwater Authority Date

For IIS Review Board Use Only:

Date of Submittal:_____ Date of Request for Additional Information:_____
Date of Approval:_____ Date Additional Information Received:_____
Approved Tier Level:_____ Informational Letter Date Sent:_____

iSWM Certified Communities

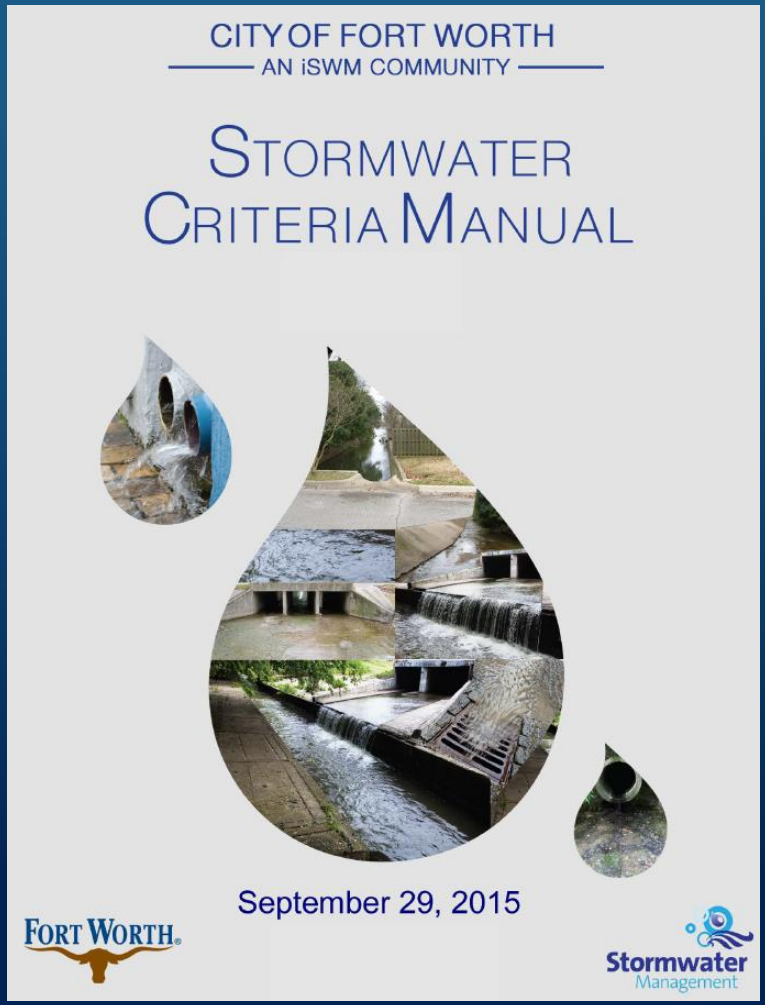


City of Denton

- Founding member
- Silver Status

City of Fort Worth

- Founding member
- Applied for Gold Status
- Application currently under review



City of Kennedale

- Applied for Bronze Status
- Application currently under review

The head loss for each structure shall be computed as:

$$\frac{V_2^2}{2g} - K_j \frac{V_1^2}{2g} = h_j \quad \text{where;}$$

V_2 = Outflow velocity
V_1 = inflow velocity
g = 32.2 ft./sec2
K_j = head loss coefficient
h_j = head loss (minimum = .2 ft.)

Head Loss Coefficients (K_j)

Manhole or Inlet in line	0.50
Manhole or Inlet with lateral	0.25
Lateral Only	0.75
Enlargements or contractions	0.30

h_j for beginning inlet is $\frac{1.25V_2^2}{2g}$

Contacts

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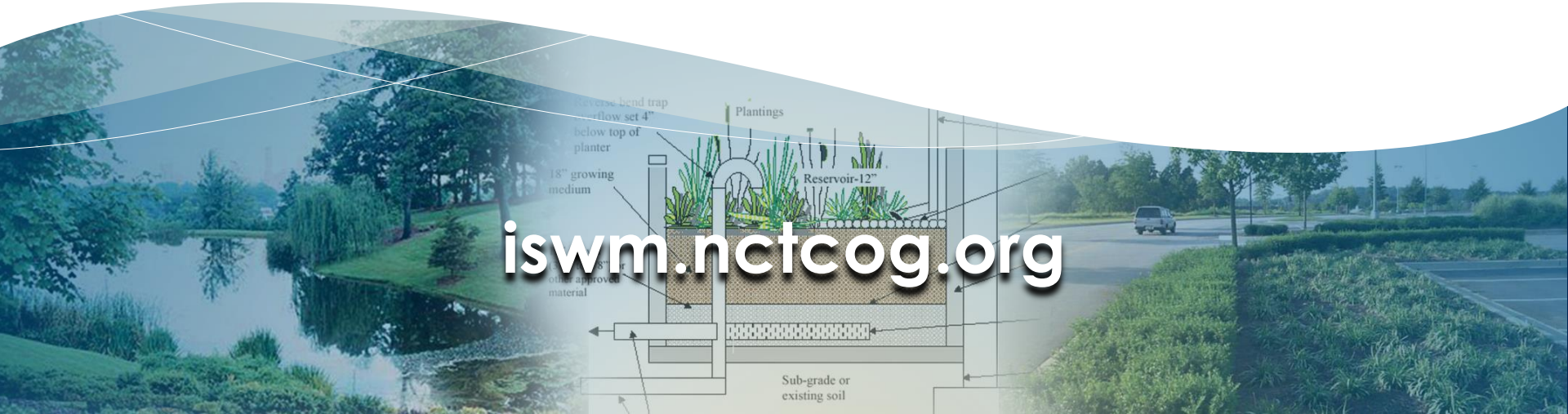

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