

Stormwater Quality Site Review Spreadsheet Tool

Michael Daniel, City of Denton



Stormwater Quality Site Review Spreadsheet Tool

Purpose

- To evaluate expected stormwater runoff quality from a proposed site design (post-construction)
- Easily perform hypothetical analyses using different design scenarios (structural and nonstructural)
- Facilitates preparing a stormwater management system that achieves City's goals of pollutant reduction

Stormwater Quality Site Review Spreadsheet Tool

Goals

- To streamline the process for development site review
- User-friendly tool for the developer
- To make available to other entities for adaptation to their specific needs

Tool is composed of four main components:

Section 1: Loadings and Targets

- Loadings from individual land uses
- Pollutant Reduction Targets (New Development/Re-Development=80%; Restoration=40%)

Section 2: Main Form

City of Denton
Stormwater Quality Site Review Tool

General Project Information

Name of Developer: John Smith	Date Submitted: 6/5/2016
Development Name:	Permit Number: 123456
Site Location/Address: 123 Denton Drive Denton, TX	Developer Contact: John Smith
	Phone Number: 940-555-1234
Development Type: Commercial/Retail	Name of Engineer(s): Jan Jones
Existing Development Type: Pastureland	Engineering Firm/Contact: ABC Engineering, Jan Jones
Total Area of Development (acres): 76.00	Maintenance Responsibility: Bob Johnson, 940-5554321
	Project Type: New Development or Re-Development

Land Use Distribution Summary

Number of Drainage Areas:	2
Sum of Drainage Areas (ac):	76.00
Total (IA) Impervious Area (ac):	27.60
Total (DP) Disturbed Pervious Area (ac):	34.40
Total (NC) Natural Conservation Area (ac):	14.00
Percent Imperviousness (%):	36.00%

IA	36%
DP	45%
NC	19%

TSS Load Reduction Summary

Total TSS Load Reduction (%): 92%

--- Reduction Target 80%

DA	TSS Reduction (%)
DA1	88.16%
DA2	93.05%
DA3	0.00%
DA4	0.00%
DA5	0.00%
DA6	0.00%
DA7	0.00%
DA8	0.00%
DA9	0.00%
DA10	0.00%

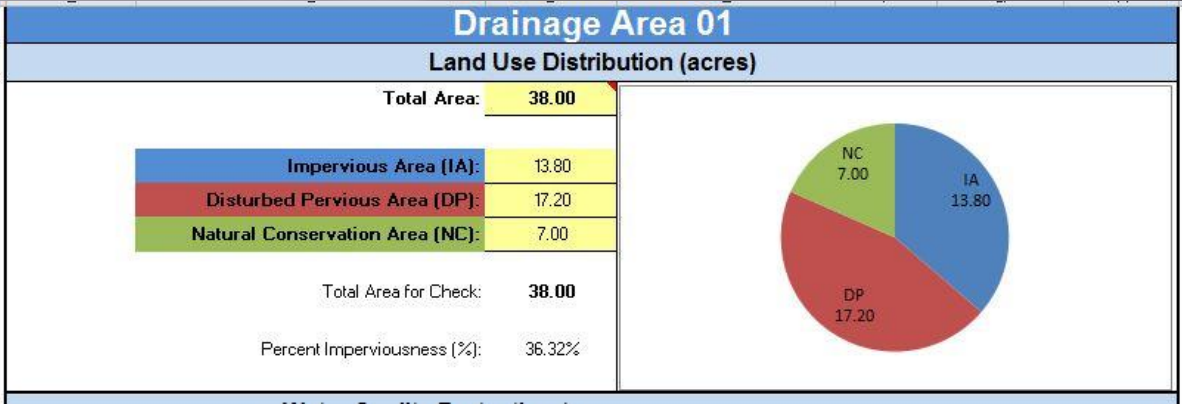
Load Comparison

Category	TSS (lbs/yr)
Load w/o BMPs	22,268
Load w/ BMPs	2,092

Water Quality Volume (WQv) Summary

DA	WQv w/o Credits	WQv w/ Non-Struc. Credits
DA1	1.81	1.47
DA2	1.81	1.47
DA3	0	0.00
DA4	0	0.00
DA5	0	0.00
DA6	0	0.00
DA7	0	0.00
DA8	0	0.00
DA9	0	0.00
DA10	0	0.00

Section 3: Drainage Area Worksheets



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Water Quality Protection (Choose either Option 1 or Option 2)				
<input type="checkbox"/> Option 1: integrated Site Design Practices and Credits				
Percentage of Site (by Area) with Natural Features Prior to Proposed Development		Minimum Required Points for Water Quality Protection (WQP)	Additional Points Above WQP for Development Incentives	
0.00%		20	10 points each	
For Redevelopment Sites, Enter % Reduction in Imperviousness from Existing Site Conditions:		0.00%		
iSWM Practice No.	Practice	Percent Eligible Area Using	Maximum Points(% practice used)	Actual Points Earned
Conservation of Natural Features and Resources:				
1	Preserve/Create Undisturbed Natural Areas	0.00%	8	0
2	Preserve or Create Riparian Buffers Where Applicable	0.00%	8	0
3	Avoid Existing Floodplains or Provide Dedicated Natural Drainage Easements	0.00%	8	0
4	Avoid Steep Slopes	0.00%	3	0
5	Minimize Site on Porous or Erodible Soils	0.00%	3	0
Lower Impact Design:				
6	Fit Design to the Terrain	0.00%	4	0
7	Locate Development in Less Sensitive Areas	0.00%	4	0
8	Reduce Limits of Clearing and Grading	0.00%	6	0
9	Utilize Open Space Development	0.00%	8	0
10	Incorporate Creative Design (e.g. Smart Growth, LEED Design, Form Based Zoning)	0.00%	8	0
Reduction of Impervious Cover:				
11	Reduce Roadway Lengths and Widths	0.00%	4	0
12	Reduce Building Footprints	0.00%	4	0
13	Reduce Parking Footprint	0.00%	5	0
14	Reduce Setbacks and Frontages	0.00%	4	0
15	Use Fewer or Alternative Cul-de-Sacs	0.00%	3	0
16	Create Parking Lot Stormwater "Islands"	0.00%	5	0
Utilization of Natural Features				
17	Use Buffers and Undisturbed Areas	0.00%	4	0
18	Use Natural Drainageways Instead of Storm Sewers	0.00%	4	0
19	Use Vegetated Swale Design	0.00%	3	0
20	Drain Runoff to Pervious Areas	0.00%	4	0
Subtotal - Actual Site Points Earned				0
Subtract minimum points required -				20
Points available for development incentives				-20
Add 1 point for each 1% reduction of impervious surface +				0
Total Points for Development Incentives				-20

Section 3: Drainage Area Worksheets

<input checked="" type="checkbox"/> Option 2: Water Quality Protection Volume Treatment								
Non-Structural Controls (Site Design Credits)		Water Quality Volume (WQv)						
Area (acres) treated by (if applicable): Preserved Environmentally Sensitive Area: 0.00 Preserved Stream Buffer: 0.00 Vegetated Channels: 0.00 Overland Flow/Infiltration Zones: 7.00 Total Area Receiving Credits (acres): 7.00		WQv (ac-ft) w/o Credits = 1.81 WQv (ac-ft) w/ Non-Struc. Credits = 1.47						
Check here if requesting an exemption for Environmentally Sensitive Large Lot Subdivisions: <input type="checkbox"/>		<table border="1"> <caption>WQv (ac-ft) Comparison</caption> <thead> <tr> <th>Scenario</th> <th>WQv (ac-ft)</th> </tr> </thead> <tbody> <tr> <td>w/o credits</td> <td>1.81</td> </tr> <tr> <td>w/ credits</td> <td>1.47</td> </tr> </tbody> </table>	Scenario	WQv (ac-ft)	w/o credits	1.81	w/ credits	1.47
Scenario	WQv (ac-ft)							
w/o credits	1.81							
w/ credits	1.47							
Structural Controls								
Select Structural Control(s)	*A SELECTION MUST BE MADE IN ALL CELLS BELOW*							
Control ID								
Control 1	Filter Strip	FS-01- 1						
Control 2	Bioretention Area	BA-01- 2						
Control 3	None	None						
Control 4	None	None						
Control 5	None	None						
Control 6	None	None						
Control 7	None	None						
Control 8	None	None						
Control 9	None	None						
Control 10	None	None						

Section 3: Drainage Area Worksheets

TSS Reduction Chart

Cumulative TSS Reduction from Structural Controls: **90.00%**
Reduction Target: **80%**

Control Number	Cumulative Reduction Efficiency	Adjusted BMP Efficiency
1	50.00%	50.00%
2	90.00%	40.00%
3	90.00%	0.00%
4	90.00%	0.00%
5	90.00%	0.00%
6	90.00%	0.00%
7	90.00%	0.00%
8	90.00%	0.00%
9	90.00%	0.00%
10	90.00%	0.00%

Additional Downstream Treatment

If the runoff leaving this drainage area is treated by one or more additional structural controls downstream, please specify the appropriate drainage area(s) below:

DA2
 DA3
 DA4
 DA5
 DA6
 DA7
 DA8
 DA9
 DA10

Total TSS Reduction Using Non-Structural Control (Site Design Credits), Structural Controls, and Additional Downstream Treatment (if applicable): 88.16%

Pollutant Summary

	Total Reduction Efficiency	Load w/o Treatment (lbs/yr)	Load w/ Treatment (lbs/yr)
TSS	88.16%	11134	1319

Section 4: Structural Stormwater Control Removal Efficiencies

Structural Stormwater Control Removal Efficiency for TSS			
Structural Control	TSS Removal (%)	Code	Water Quality Protection
Bioretention Area	80	BA	Primary
Grass Channel	50	GC	Secondary
Enhanced Dry Swale	80	EDS	Primary
Enhanced Wet Swale	80	EWS	Primary
Alum Treatment	80	AT	Primary
Filter Strip	50	FS	Secondary
Dry Detention	65	DD	Secondary
Organic Filter	80	OF	Primary
Planter Boxes	80	PB	Primary
Sand Filter	80	SF	Primary
Underground Sand Filter	80	USF	Primary
Gravity (Oil-Grit) Separator	40	GS	Secondary
Downspout Drywell	80	DDW	Primary
Infiltration Trench	80	IT	Primary
Soakage Trench	80	ST	Primary
Stormwater Pond	80	SwP	Primary
Green Roof	85	GR	Primary
Modular Porous Paver Systems with Infiltration	0	MPPS	
Porous Concrete with Infiltration	0	PC	
Proprietary System			
Rain Harvesting	0	RH	Primary
Stormwater Wetland	80	SwW	Primary
Submerged Gravel Wetland	80	SGW	Primary
Removal efficiencies must be provided by the manufacturer and should be verified by independent third-party sources and data.			

Ultimate Goals:

- Nutrients, pathogens and metals
- Streambank protection
- Cost

Thank you!

