TUCSON ARIZONA
FLOODPLAIN MANAGEMENT PLAN
5-YEAR UPDATE WORKSHOP #2 OF 2
SETTING CITY OF TUCSON SOFTWARE PARAMETERS
(2025)

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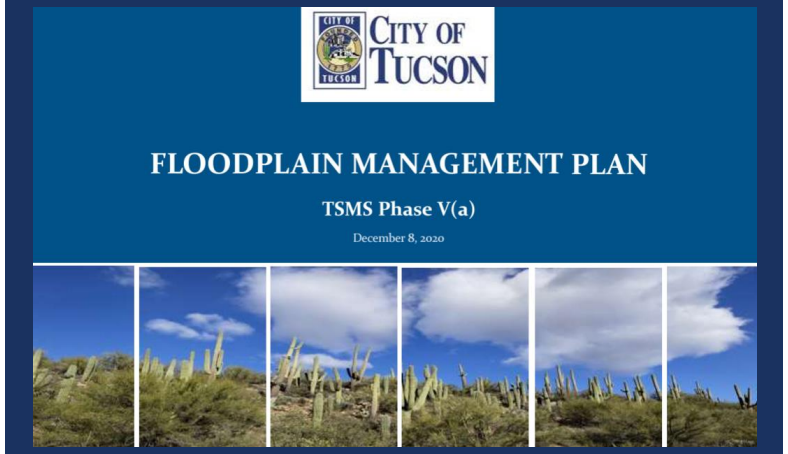
CITY OF TUCSON

DEPARTMENT OF TRANSPORTATION AND MOBILITY

CITY OF TUCSON
TRANSPORTATION & MOBILITY

TUCSON STORMWATER MANAGEMENT STUDY

The Floodplain Management Plan is Phase V of TSMS



Plan Adoption and FMP Updates

ADOPTION BY TUCSON CITY COUNCIL

The Action Plan for the Floodplain Management Plan as adopted by Mayor and Council by formal resolution can serve as a floodplain and erosion hazard management reference tool for all City of Tucson departments and divisions.

FMP UPDATES

The FMP committee will continue to convene on a yearly basis to monitor and assess the action plan implementation process. The committee will continue to prepare an evaluation report to submit with Tucson's annual CRS recertification documentation. Per CRS guidelines, the report "must be submitted to the governing body, released to the media, and made available to the public."

In 2025, the Tucson FMP committee will convene for a formal FMP Update to review the 2020 FMP and to recommend updates by December 8, 2025, or five years after the plan was updated. CRS Cycle Visit by FEMA is scheduled for spring 2021. Following the initial 2020 update, the FMP evaluation and updates are to be scheduled to occur concurrently or before the community's normal 5-year CRS Cycle Visits for the review of the other CRS activities. As the Pima County Regional HMP was updated in 2017 and is expected to be updated in 2022, it would be beneficial if the FMP and CRS Cycle Visits synced up with the Pima County Regional HMP process so that the project lists in the FMP and HMP match. The formal 5-year FMP review cycle tasks should include at a minimum:

1. Convene the same committee that prepared the 2020 plan or one that meets the criteria identified in the CRS manual.
2. Hold a public meeting to review the updated report.
3. Review new studies and information that was completed after the FMP was created.
4. Review the hazard and problem assessments and update if necessary.
5. Review goals and update if necessary.
6. Review the action plan and update to account for actions that were completed, ones that are no longer necessary, and to add in new actions.
7. Prepare formal update for adoption by Tucson Mayor and Council.

Tucson TSMS 5-Year FMP Update

Stakeholder Meetings have been occurring since 2023 to discuss the 2025 5-year Update. Stakeholders identified a need to modernize TSMS. Although rainwater still runs downhill and the TSMS model had always had a conservative approach, there is still a need to modernize the Drainage Manual and improve ease of submittals by defining modeling parameters.

Other action items were identified in prior FMP Stakeholder meetings including sewerline hazards, flow diversion and obstructions, emergency flood/erosion response, and the need for more outreach.

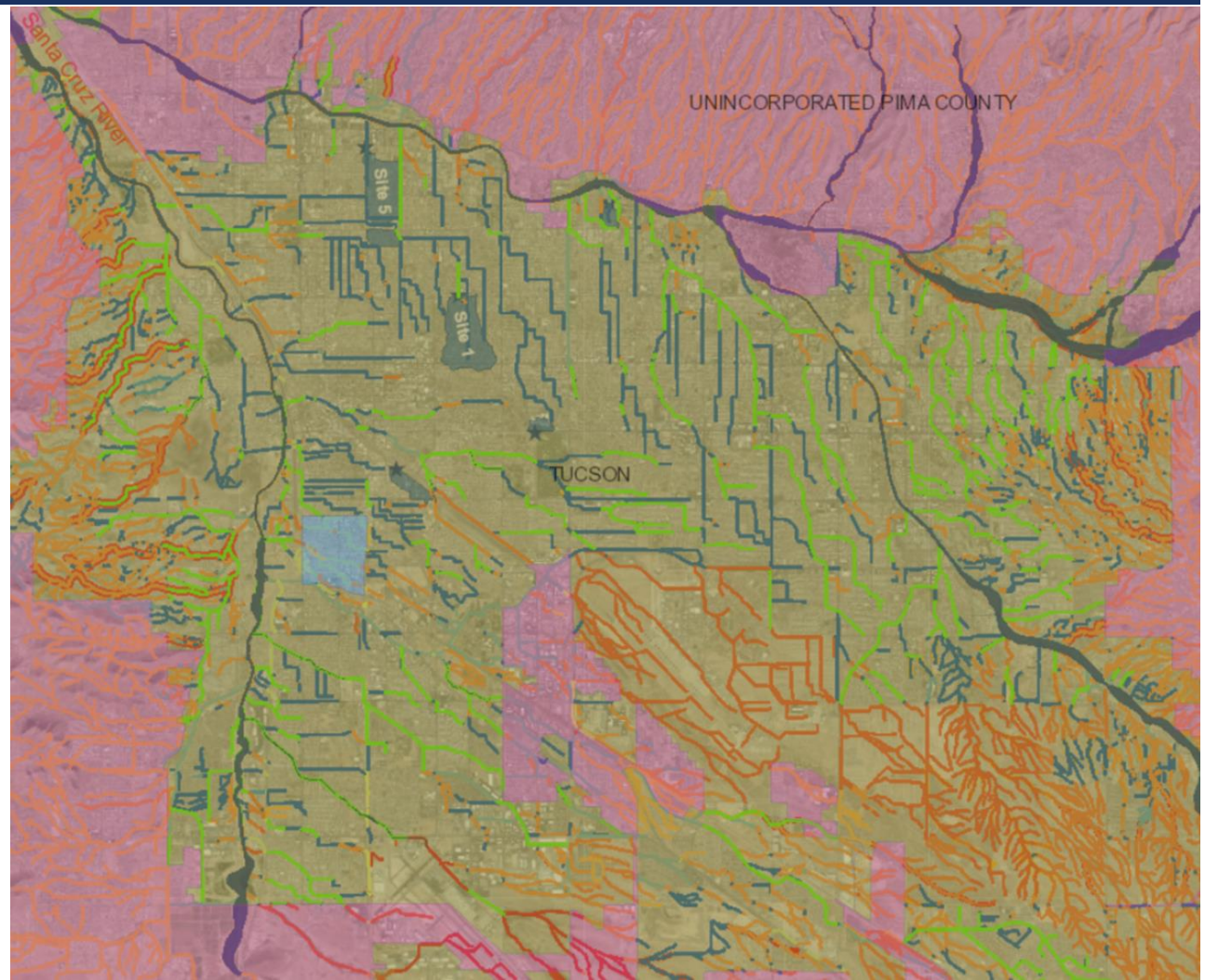


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Table 5. Action Plan

Problem Statement	Recommended Activity
Public Conveyance Infrastructure	Research high-risk dip crossing locations and look into replacing dip crossings with 100-year drainage structures. Areas of interest: 12th Av at Rodeo Watercourse, Betelgeux at Alamo Wash, Noesha dip crossing, and others. Increase public awareness of dip crossings hazards. Working with Tucson Fire Department, map all-weather access routes. Continue to update infrastructure map to track age and condition.
	Provide outreach to changes in Santa Cruz flood levels and erosion hazards.
	Map areas where barricades are used for low water crossing. Assess / expand Operation Splash & Operation Freeze. (DTM Engineer)
	Assure Utilities are obtaining required permits in floodplain and erosion hazard areas.
	Provide 100 yr conveyance structures. Prioritize watercourses based on City defined parameters of importance, w/ safe conveyance of floodwaters as top priority. Educate & implement projects that include sediment transport is a natural function. Consider inlet structure designs that allows flows from frequent storm events to bypass stormdrain so as to continue to feed downstream riparian areas.
Urban High Density	Improve systems for identifying locations along stormwater conveyance systems that are at high risk of erosion, by enhancing analysis of drainage complaint GIS data; routinely monitor at least annually, especially after major flow events. Identify and inventory high value riparian areas for protection, stewardship and enhancement, including those that provide quality habitat, tree canopy, intact ecosystems, functional natural drainage systems, and/or recreational opportunities. Assess & address barriers to GI/LID implementation. Conduct an assessment to review distribution of flood infrastructure efforts for equity of efforts for more vulnerable or low-income communities using the City's new Neighborhood Vulnerability Index or Title Six assessment.
	Improve procedures for routine maintenance to prevent and remove accumulation of debris; and provide public information on how to prevent clogging and obstruction of stormwater conveyance systems. Provide more outreach for flood status and insurance information to public. Incorporate outreach in various outlets (for example: radio in English, Spanish, T'Ohno Odham; billboards, transit stops/benches; wraps on buses; info/ads in buses/streetcar; K-12 school outreach programs). Continue to implement First Flush Retention requirement to keep first 0.3 – 0.6 inch of rainfall onsite of new development.
	Include Stormwater Management Plan policy to update every 5 - 10 yrs or as reasonable to address population migration and annexations.
	Continue to update outreach material to owners of floodprone property & send annually. Outreach should recommend flood insurance, how to protect contents, and promote flood response plan
	Coordinate with ecologist/biologists ramification of standing water in natural resource areas and implement. t acceptable sustainable mitigation practices. Mitigation practices developed with ecologists/biologists should be transparent with information available and accessible on-line; providing teaching/outreach opportunity to inform public of practices. Continue to implement Green Infrastructure Fund to identify & maintain existing LID, & construct new ones.
	Assure procedures comply with MS4 permit requirements. "Only Rain In the Drain". Look at how to lessen clogging or conveyance issues for homeless' blankets. Floodplain Administration will review clogging factors, compare to other arid climate cities.

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Tucson Floodplain Management Plan 5-year Action Item Update for TSMS Subtask - Working Groups:

1) Creating Online App / GUI for the Tucson Drainage Manual

2) Software Parameter Requirements for City of Tucson Drainage Submittals

3) Retrofitting Existing At-Risk Sanitary Lines

4) Human Access Controls for Stormdrain Systems

5) M.E.O.W. - Maintain, Enhance, Outreach for Watercourses

6) Describing Scenarios for Flood & Erosion Emergency Response Exercises

7) Outreach Suggestions for Demystifying Tucson Drainage Regulations

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Setting City of Tucson Software Parameters

Today's Agenda:

- **Discuss how new software needs to provide consistency for review.**
- **Key stakeholders to determine how parameters may be set for drainage software**
- **Proposing an annual update – a guideline issued by Tucson Floodplain Administrator for new software**
- **Proposing to add a new chapter to the City of Tucson Drainage Manual regarding software**
- **Determine next date(s) for follow-up workshop(s)**
- **FMP exercises**
  - **Review of Tucson FMP Goal, Hazards Assessment**
  - **Action Items Identified and Highlighted Subtasks**

Tucson TSMS 5-Year FMP Action Item Update
-
Setting City of Tucson Software Parameters

Workshop 3) Setting City of Tucson Software Parameters

[TSMS Subtask: Phase V.b.ii]

Purpose: provide modernization, accuracy, and better consistency in drainage submittals.

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Tucson TSMS 5-Year FMP Action Item Update
-
Setting City of Tucson Software Parameters

STANDARDS MANUAL FOR DRAINAGE DESIGN AND FLOODPLAIN MANAGEMENT IN TUCSON, ARIZONA

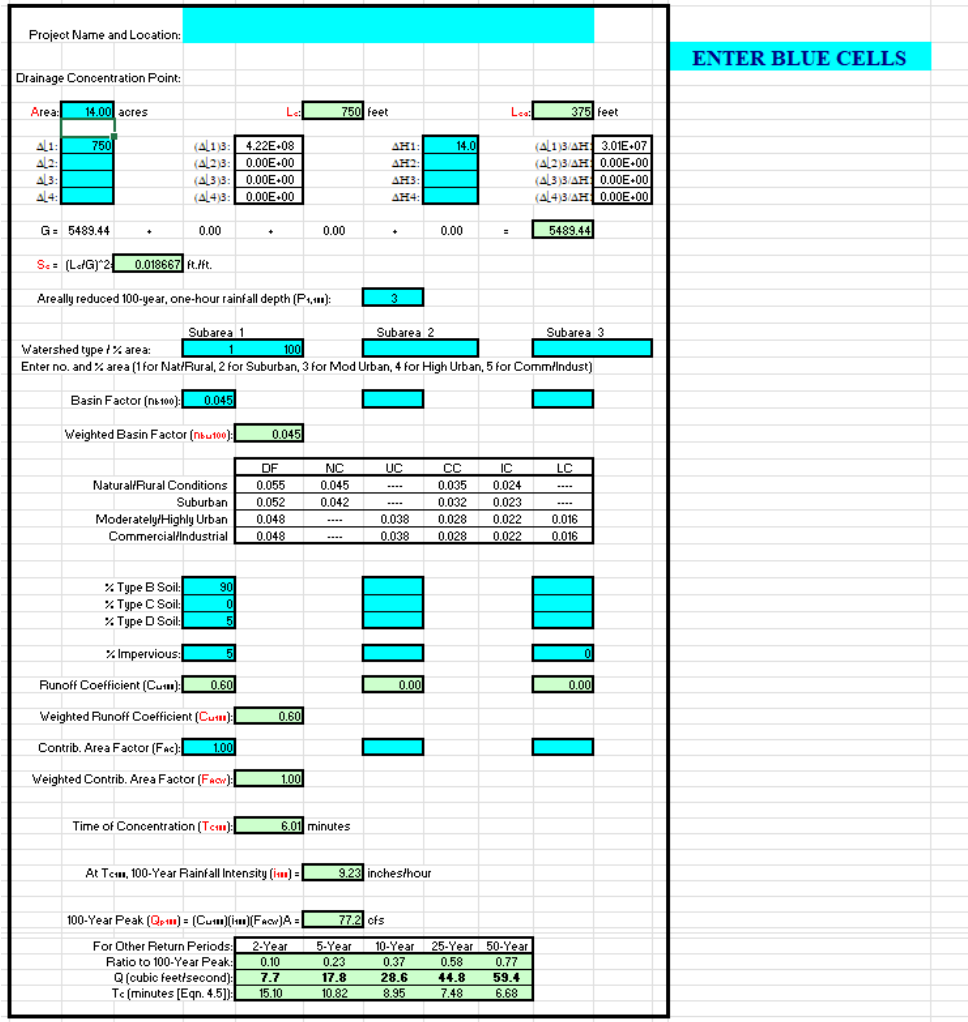
DECEMBER, 1989
(REVISED JULY, 1998)

Prepared for
City of Tucson
Department of Transportation
Engineering Division

Prepared by
Simons, Li & Associates, Inc.

Currently, the regulations require engineering justification for submitting non-City methodology.

City of Tucson will be considering creating an annual software guideline and adding a chapter just for software submittals.



Project Name and Location:

Drainage Concentration Point:

ENTER BLUE CELLS

Area: 14.00 acres Lc: 750 feet Lca: 375 feet

Δl1:	750	(Δl1)3:	4.22E+08	ΔH1:	14.0	(Δl1)3/ΔH1:	3.01E+07
Δl2:		(Δl2)3:	0.00E+00	ΔH2:		(Δl2)3/ΔH2:	0.00E+00
Δl3:		(Δl3)3:	0.00E+00	ΔH3:		(Δl3)3/ΔH3:	0.00E+00
Δl4:		(Δl4)3:	0.00E+00	ΔH4:		(Δl4)3/ΔH4:	0.00E+00

G = 5489.44 + 0.00 + 0.00 + 0.00 = 5489.44

Sc = (Lc/G)^2: 0.018667 ft./ft.

Areally reduced 100-year, one-hour rainfall depth (P1,100): 3

Watershed type / % area:	Subarea 1		Subarea 2		Subarea 3	
Enter no. and % area (1 for Nat/Rural, 2 for Suburban, 3 for Mod Urban, 4 for High Urban, 5 for Comm/Indust)	1	100				
Basin Factor (n5-100):	0.045					

Weighted Basin Factor (n5-100): 0.045

	DF	NC	UC	CC	IC	LC
Natural/Rural Conditions	0.055	0.045	----	0.035	0.024	----
Suburban	0.052	0.042	----	0.032	0.023	----
Moderately/Highly Urban	0.048	----	0.038	0.028	0.022	0.016
Commercial/Industrial	0.048	----	0.038	0.028	0.022	0.016

% Type B Soil:	90		
% Type C Soil:	0		
% Type D Soil:	5		
% Impervious:	5		0
Runoff Coefficient (C100):	0.60	0.00	0.00

Weighted Runoff Coefficient (C100): 0.60

Contrib. Area Factor (Fac): 1.00

Weighted Contrib. Area Factor (Facw): 1.00

Time of Concentration (Tc100): 6.01 minutes

At Tc100, 100-Year Rainfall Intensity (i100) = 9.23 inches/hour

100-Year Peak (Qp100) = (C100)(i100)(Facw)A = 77.2 cfs

For Other Return Periods:	2-Year	5-Year	10-Year	25-Year	50-Year
Ratio to 100-Year Peak:	0.10	0.23	0.37	0.58	0.77
Q (cubic feet/second):	**7.7**	**17.8**	**28.6**	**44.8**	**59.4**
Tc (minutes [Eqn. 4.5]):	15.10	10.82	8.95	7.48	6.68

Tucson TSMS 5-Year FMP Action Item Update
-
Setting City of Tucson Software Parameters

*** Need Engineering Justification in All Cases for Alternative Software ***

Software	Mapping	Grid Cell Size	Depth	Flowrate	Velocity	Topo	Applicability	Notes
Flo-2D		5-ft x 5-ft				latest		
HEC-RAS 2D								
PC Hydro								
SRH-2D								
HEC-HMS								
PondPack								
Spreadsheet								Need validation calculations
SWMM								

hydrologic analysis and floodplain mapping

Tucson TSMS 5-Year FMP Action Item Update
-
Acceptable City of Tucson Software

Hydrologic analysis & Floodplain mapping:

- City Peak Flow Estimator
- HEC-RAS
- Flo-2D
- National Streamflow Statistics

Storm Drain Networks:

- Bentley Storm CAD
- Bentley Civil Storm
- Autodesk Storm Sewers (although my current understanding is that there is a problem with tailwater conditions overtopping the outlet top of pipe, which is a serious limitation if true)
- SWMM

Reservoir routing
(all but the first 2 programs can manage hydraulically interconnected reservoirs):

- HMS
- Bently Pondpack
- Bentley Civil Storm
- PCRoute
- RAS2D
- SWMM

WRAP UP

Thank you for participating in #2 of 2 workshop for the City of Tucson Floodplain Management Plan Working Group (TSMS Phase Vbii - Software Parameters).

Also please attend the 5-yr FMP Open House held at Tucson Association of Realtors on Thursday July 17, 2025.

Raffle prizes every 10 minutes.

TAR
2445 N Tucson Blvd
Thursday
July 17, 2025
4:00-5:30 PM

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