

Medina River Watershed Protection Plan

Medina River Below Diversion Dam

Watershed Protection Plan Stakeholder Meeting

St. Louis Braden Keller Community Center, Castroville March 4, 2025

> Tina Hendon, Program Specialist Lucas Gregory, Associate Director Texas A&M AgriLife, Texas Water Resources Institute







Welcome!

Introductions & Overview of WPP

Low Impact Development and Nature Based Solutions for Watershed Protection

Roundtable Discussion – Stormwater Management

Next Steps and Upcoming Events

Potential dates for next meeting



Chapters 1 - 5

Chapter 1 Introduction to Watershed Management

Chapter 2 Watershed Characterization Chapter 3 Water Quality CHAPTER 4 POTENTIAL SOURCES CHAPTER 5 POLLUTANT SOURCE ASSESSMENT.







Medina River Below Diversion Lake; Dec. 1, 2015 - Nov. 30, 2022



Chapters 6 - 10

Chapter 6 Recommended Implementation Strategies

Reduce SSOs and Unauthorized Discharges
Address Failing On-Site Sewage Systems
Manage Pet Waste
Manage Stormwater Runoff
Implement Water Quality Management Plans and Conservation Plans.
Reduce Feral Hog Population
Reduce Illicit Dumping
Restore Degraded Streams and Riparian Areas
Conserve Land
Management Measure – Manage Abandoned Wells

Chapter 7 Education and Outreach

Chapter 8: Plan Implementation.....

Chapter 9: Resources.....

Chapter 10: Measuring Success.....









Portion of Load Reductions by Source Through implementation of Management Measures in the WPP



Water Quality Targets

Year	Medina R Station 12814	Medio Crk Station 12916				
2022*	223	175				
Year 0	223	175				
Year 5	175	151				
Year 10	126	126				
E. Coli targets are expressed as cfu/100mL						



Why Stormwater?

Population Trends





Estimated population increase of 240% 2020 - 2035

Existing and Proposed Subdivisions as of May 2025 (~ 52k acres, ~20%)



Potential Load from identified sources

Estimated change w/o management measures







Managing Urban Stormwater Existing Programs

✓ Regulatory Tools

- ✓ Bexar County MS4 Program
- ✓ CoSA/SAWS MS4 Program
- ✓ JBSA-Lackland MS4 Program
- ✓ TxDOT MS4 Program
- ✓ Local county, municipal rules

(MS4 = Municipal Separate Storm Sewer System)



- SARA Stream Restoration Program
 Demonstration projects
 - ✓ Technical and design resources
 - ✓ Allows for inclusion of Green
 Infrastructure features
 - ✓ Restoration potential screening has been conducted for the watershed



East Salitrillo Creek before and after stream restoration construction

Managing Urban Stormwater Existing Programs

Low Impact Development Green Infrastructure

- ✓ Regional detention facilities
- ✓ Stormwater cisterns
- ✓ Bioretention features
- ✓ Permeable parking stalls
- ✓ Native landscaping
- ✓ Effective pollutant reduction tools

SARA Green Infrastructure Master Plan

- Demonstration projects
- Technical resources for
 - Public & homeowners
 - Commercial site developers
 - Construction professionals
 - Construction Inspectors
 - Maintenance providers









Low Impact Development and Nature Based Solutions for Watershed Protection

San Antonio River Authority staff:

Mikel Wilkins, PE, ENV-SP – Senior Engineer Lee Marlowe – Sustainable Landscape Ecologist



Low Impact Development and Nature Based Solutions for Watershed Protection

Presented to Medina River Below Medina Diversion Lake Watershed Protection Plan Stakeholder Meeting

March 4, 2025





Stormwater Runoff





Common Pollutants in Runoff



Trash Sediment Bacteria Nutrients Oils, Grease Metals Heat







Stormwater Runoff

Where does it go?





Stormwater Solutions: Green Infrastructure (GI) and Low Impact Development (LID)

Land planning & engineering design approaches that:

- Attempt to match pre-development hydrology
- Protect, conserve, restore, and/or mimic natural hydrological & ecological processes
- Value stormwater as a resource
- Address stormwater quantity & quality





Benefits:

- Provide water quality improvements
- Reduce pollutant transport
- Reduce flow volumes & peak flows
- Provide habitat & landscape resiliency







How?

Slow it down

Spread it out

Soak it in



Rainwater Harvesting: slow, temporarily capture & use rainwater





Permeable Pavement: slow, temporarily capture & filter rainwater





Bioretention: slow, temporarily capture & filter rainwater







Extended Detention: control high volumes, filter 'first flush'







Stormwater Treatment Train





Stormwater Treatment Train





Inspiring Action By Demonstration







- EPA 319(h) Clean Water Act Grant
- 2016-2017
- Implemented BMPs of the Upper SA River Watershed Protection Plan
- Local demonstration of urban retrofit permanent on-site stormwater management practices



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Stormwater Treatment Train





Stormwater Treatment Train





Main Office





Main Office



BEFORE BMPs:

- 1. roof \implies storm sewer \implies river
- 2. parking lot \implies storm sewer \implies river

AFTER BMPs:

- temporary storage
- treatment trains
- filtration practices
- reduced runoff rate & volume
- overflow/outflow to BMPs & storm sewer

- **5** stormwater cisterns
- 9 bioretention features
- 22 permeable parking stalls





Volume Treated 118,145 cubic ft/year

Sediment Removed

lb/year

Bacteria Removed

2 Billion

colonies/year





Benefits of LID

Reduce flooding
Improve water & air quality
Meet regulatory requirements
Prevent erosion
Preserve biological integrity
Protect riparian areas
Improve aesthetics
Increase property values
Educate the community
Reduce infrastructure & maintenance costs
Reduce heat
Allow for recreational multibenefits



















Data Collection

Contributing Drainage Area:	200 acres
Bioretention BMP Surface Area:	1,653 sf
Bioretention BMP Media Depth:	3 ft
Bioretention BMP Storage Volume (30% Void Space):	1,488 cf, 11,129 gallons
Bioswale BMP Surface Area:	9,888 sf
Bioswale BMP Media Depth:	3 ft
Bioswale BMP Storage Volume (30% Void Space):	8,899 cf, 66,571 gallons
Total BMP Storage Volume:	10,387 cf, 77,700 gallons
SCS Hydrologic Soil Types:	Class B
Approximate 100 year Peak Flow:	150 - 200 cfs

















EPA Recovery Potential Screening (RPS)



Recovery Potential Screening (RPS) – Comparing Watershed Condition and Restorability





EPA Recovery Potential Screening (RPS)

- A method for comparing watersheds based on characteristics that influence the likelihood of successful watershed restoration or protection.
 - ∘ Excel
 - o Publicly Available
 - o Flexible
 - \circ Customizable



Ecological Indicators

Measure the capacity to maintain or reestablish natural structure and processes

Stressor Indicators

Measure the extent of anthropogenic sources of impaired water quality Social Indicators

Measure relevant community, regulatory, economic, or behavioral factors



RPS Indicators

Ecological (75)

Aquatic Life and Habitat

Forest cover

Integrated Watershed Health Index

Natural Land Cover

Soil Attributes

Stream Order

Wetlands Cover

Stressor (170)

Impervious Cover

Flood Inundation Risk

Culvert Intensity

Hydrologic Alteration

Pollutant Loading Severity

Impaired Waters

Roads & Railways

Water Use Intensity

Social (38)

Community Context

Drinking Water Protection

Jurisdictional/ Landowner Complexity

> Participation in Conservation Programs

Protected Lands & Waters



RPS Example



- Projected change in developed cover in HUC 12
- Shared Socio-Economic Pathway
 5 Scenario 2010 -2050







LID Resources

LID Manual

Creek Book

SAN ANTONIO RIVER AUTHORITY San Antonio River Basin Low Impact Development TECHNICAL DESIGN GUIDANCE MANUAL

THIRD EDITION, JUNE 2023



Stream Restoration Potential







Thank You!



Roundtable Discussion

Goal: Facilitate adoption of stormwater programs and practices that benefit water quality.

- Learn about tools and programs in the watershed.
- Discuss strategies to engage the development community, HOAs, and residents.
- Identify potential resources and needs of planning, development, regulator, and other groups.

ROUNDTABLE PANEL

Larry Sittre Pct 1 Commissioner, Medina County

Breana Soto Director of Community Development, Castroville

Valerie Naff

City Administrator, Von Ormy

Jim Welch, PE, ENV-SP Vice President, Pape Dawson Engineering





Roundtable Take-Aways?

- Tools and programs
- Engagement strategies
- Resources and needs
- Other?





Project Timeline

Stakeholder and WPP Development

Education & Outreach Begin Implementation

Implementation of Recommended Measures and E&O Activities

Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	
٨	lov '22 – Oct '2.	5	Nov '25 – Oct '26	Nov '26 – Oct '29			
WPP	Development (Grant	1-year Extension	Potential Implementation Grant			
	We (I	are HERE Mar 2025)					

Next Steps

CURRENT FUNDING (through 10/25)

- ✓ WPP Review & Acceptance
- Develop ideas for demonstration projects (e.g. riparian restoration, LID/GI, conservation planning, etc)
- ✓ Continue E&O events (new or existing programs)
- Continue stakeholder facilitation & communication

1-Yr EXTENSION (through 10/26)

- ? Demonstration project development, planning
- ? Expand E&O opportunities, (e.g. workshops, trainings, field days, etc)
- ? Begin Implementation of Priority Measures (Handout) (OSSF Mgmt, Pet Waste Mgmt, Stormwater Mgmt, Riparian/Stream Restoration, Conservation Planning, Feral Hog Mgmt, Illicit Dumping Mgmt)

Upcoming Events

MARCH						
Мо	Tu	We	Th	Fr	Sa	Su
24	25	26	27	28	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

San Antonio River Basin BIOBLITZ



SAVE THE DATE FOR THE 2ND ANNUAL San Antonio River BASIN BIOBLITZ

Join scientists from the San Antonio River Authority and partners to assist with biological surveys, observe flora and fauna, and get a peek of this new park!

March 20 - 22, 2025 • Open to the Public!

HENDRICK ARNOLD PARK 8950 Fitzhugh Rd, San Antonio, TX 78252



Opportunities in Subdivision Regulation

Greater Edwards Aquifer Alliance webinar

"what groundwater conservation districts, counties, cities and residents can do to protect groundwater in the region"

March 26th 3:30 – 4:30 pm https://aquiferalliance.org/



Upcoming Events

Texas Riparian & Stream Ecosystem Education Program

May 22nd 8am – 4:30pm Braden Keller Community Center

MAY							
Мо	Tu	We	Th	Fr	Sa	Su	
28	29	30	1	2	3	4	
5	6	7	8	9	10	11	
12	13	14	15	16	17	18	
19	20	21	22	23	24	25	
26	27	28	29	30	31	1	

Continuing Education Units Available

- TDA Pesticide Applicators License
- Texas Nutrient Management Planning Specialists International Society of Arboriculture
- Texas Forestry Association
- Society of American Foresters
- Certified Crop Advisor
- Texas Board of Architectural Examiners "Acceptable for HSW credit"
- Texas Floodplain Management Association
- Society for Range Management
- Professional Engineers
- Master Naturalist and Master Gardeners

 by Chapter
- Approved for Texas Waters Specialist certification

Ongoing Opportunity

Camp Bullis Sentinel Landscape Land Management Funding

Priority areas include

- water quality and conservation
- plant health
- restoring native plant communities
- soil quality,
- habitat improvement for wildlife, native pollinators, and grazing species.

Practices include protecting water quality and riparian health through

- vegetative buffers
- prescribed grazing
- brush management
- native plant restoration & establishment



Contacts

George Clendenin, Project Coordinator Erin Davis, Project Specialist <u>CampBullisRCPP@ag.tamu.edu</u> <u>http://CampBullisRCPP.nri.tamu.edu</u>

Applications are open and accepted on a rolling basis, starting in January 2025

Thank You!

Tina Hendon

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https://medina.twri.tamu.edu/



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AGENDA:

- Introductions and WPP Recap
- LID & Nature Based Solutions for Watershed Protection SARA staff
- Roundtable Discussion
- Next Steps for WPP
- Upcoming Events

Introductions and WPP Recap

- Planning Process Recap
 - Been a while since we met
 - o Draft WPP Document is completed
- Review WPP contents
 - Chapters: Intro, Characterization, Water Quality, Potential Sources, Source Assessment, Management Recommendations, Education & Outreach Needs, Plan Implementation, Resources Needed, Measures of Success
 - \circ $\;$ Load Reductions by Source with recommended management measures:
 - Dogs 47%
 - Livestock 31%
 - OSSF 22%
 - Feral Hogs <1%
 - Deer & WWTFs 0
 - Goal is to meet State Primary Contact water quality standards by yr 10.
- Stormwater Conversations
 - Population growth driving increase in stormwater generation
 - Watershed population estimate based on MVISD student projections indicates ~240% growth by 2036
 - May be an over projection of actual numbers, due to coverage of MVISD area located in fastest growing areas of watershed.
 - Based on population changes:
 - Ag-based sources would decrease due to habitat loss (deer, hogs, livestock)
 - Human associated sources would increase w/ population (dogs, OSSFs, WWTFs)
 - Total projected load is projected to increase by 140% by 2036.
 - Areas of greatest bacteria load increase corresponds to areas in watershed where development is likely to increase the most.
 - Existing programs for stormwater management include
 - Bexar Co, COSA/SAWS, JBSA, TxDOT MS4s
 - Local rules
 - SARA stream restoration program
 - SARA LID and Green Infrastructure master plan and programs





LID & Nature Based Solutions for Watershed Protection

- o Presented by Lee Marlowe & Mikel Wilkins, San Antonio River Authority
- Medina River is the upper end of the larger San Antonio River Basin
 - Discussed hydrological impacts of impervious surfaces vs. natural landscapes
 - o Runoff pollutants: trash, sediment, nutrients, bacteria, metals, oil & grease, heat
- Runoff eventually ends up in streams & rivers without being cleaned in any capacity
- GSI & LID use naturally mimicked systems to keep more water onsite and provide some treatment. Benefits include
 - Improved water quality
 - o Wildlife and aquatic habitat
 - Reduced stormwater runoff flow volume and pollutant load
 - Slows flow, filters, provides aesthetic value
- Rainwater harvesting
 - o Slows flow, captures and uses rainwater for landscape irrigation
- Permeable Pavement
 - o Slows flow, temporary hold of water, filters rainwater
- Bioretention
 - o Slows flow, temporary capture water, filters, supports aesthetic plantings
- Extended Detention
 - Manages high volume of flow, can have permanent pool for wetland filtering; effectively filters the first flush of pollutants
- Practices can be combined to maximize the water quality and stormwater flow benefits

Benefits

- Reduced flooding
- Improved air & water quality
- Prevent erosion
- Protect riparian areas
- Improve aesthetics/increase property values
- Education opportunities
- Reduce heat
- Reduce maintenance needs
- SARA is looking at Leon Creek, Upper San Antonio River, Salado Creek watersheds for open space to retrofit with nature based solutions for stormwater management
 - Public areas, city properties, schools, etc.
 - Identifying high impact areas and design projects to positively impact water quality and the community





- SARA is incorporating EPA Recovery Potential Screening Tool in areas throughout the basin
 - Rough scale tool to help prioritize areas with potentially high value restoration areas/needs
 - Does have a projected development metric
 - Helps to identify subwatersheds with higher potential for restoration success
- SARA has multiple resources for stakeholders and planners to use
 - LID Manual technical design guidance
 - o Creek Book natural history and current conditions of waterbodies
 - \circ Stream Restoration Potential online tool highlighting issues such as erosion, poor vegetation, etc.

Round Table Discussion

- Jim Welch, PE, ENV SP Pape Dawson Engineers Development Consultant
- Larry Sittre Medina County Commissioner
- Breana Soto City of Castroville Community Development Director
- Mikel Wilkins, PE San Antonio River Authority

Larry Sittre – was in construction & quarry business prior to Commissioner role

- Medina Co. will have one of the fastest growing roadway intersection in nation w/in 3 years
- Public Improvement Districts (PID)
 - o Residents living in subdivisions pay for improvements
 - Fire stations, schools, parks, green spaces
- Potranco Ranch is on full wastewater reuse
 - Not enough wastewater to meet current irrigation needs
 - o Microsoft HVAC generates 250k gal condensate daily
- Commissioners faced with 30 day approval turn around on subdivision requests
 - No options include: wrong lot size, insufficient water supplies
 - o If they don't approve them then development proceeds without them
 - Asks for development improvements and concessions
 - County is essentially being overrun with development and doing their best to mitigate impacts

Breana Soto - Community Development Director, City of Castroville

- Department supports other staff who receive and review development plans
- City can be proactive in protecting natural resources with good planning
- City doesn't have much leverage unless development occurs within their jurisdiction
- Making sure that zoning, ordinances, master plans, comprehensive plans are updated
 - Allow folks to develop but still meet stormwater management requirements
 - Hoping to have new rule updates completed within a couple months
 - Website houses all this info and updates



Jim Welch, PE, ENV SP - Pape Dawson Engineers

- Also a resident of the Medina watershed
- Does a lot of work relative to development and works closely with Medina County, Castroville, and other municipalities in the watershed.
- Personally and professionally a proponent of good development. Stopping development isn't an option.
- County does a good job of working with developers partners with them to encourage efforts to be better stewards of land/water resources
 - Need to look at a combination of rules and incentives to encourage/compel implementation of stormwater management approaches by developers
- SARA is a great leader for this type of development with the resources they've created

Question for Panel: How do you handle difficult decisions when working with developers on considerations for economic development?

Breana

- We work to them to the extent possible to incorporate LID and address community concerns
 - This is not commonly the big concern though usually more about home density or materials.

Jim

- Different types of development
 - Master planned high end provide amenities
 - o Other spectrum is get it built quickly and by the book
- Can suggest some design elements to incentivize stormwater management, such as
 - o Detention pond that doubles as soccer field
 - o Borrow pit converted to a fishing pond

Mikel

- Need to promote the value of amenities to developers
- SARA looks at future projections for green space; plans them out; developers see that and can see the value of connected subdivisions
 - Suggest to focus on the bigger impact areas as opposed to very specific requirements for site specific features

Larry

- PID is encouraged to incentivize positive development
 - County can't require PIDs though
 - PID allows developers to recoup some costs for developing above and beyond what is required in the County's rules.
 - People in the subdivisions pay for the costs
 - Amenities are the draw: walking trails, parks, natural areas, gated communities

Like any business, developers strive to minimize expenses that don't provide a real or perceived value in their product.

• A goal would be to provide incentives to encourage them to do the right thing from a stormwater management perspective by demonstrating the value it can add.





Mikel: An example SARA has seen is an old subdivision where drainage flowed to a trapezoidal channel

- The channel was retrofitted with LID to connect to greenways and provide amenities
- New Development can get ahead of this by incorporating these type features into new development

Question from audience: With development around Potranco Ranch; what are options for permeable transportation options?

- Medina County is in discussions with TxDOT on the subject of stormwater
- TxDOT has promised funding to develop 5 lane divided road, but not likely to be permeable pavement
- Research on permeable pavement exists
 - TxDOT standards don't currently support permeable pavement use
 - Changing those standards at the state level would be like an act of congress
 - Highly unlikely for TxDOT to every fully integrate permeable pavement into roads due to durability and maintenance requirements
- TxDOT is open to enhancing stormwater management in their right-of-way to mitigate impacts elsewhere
 - Hope is there, but more conversations to advance several related topics: erosion, trash, pollutants, etc.

Question from Audience: What kind of engineering requirements are in place to protect downstream creeks?

- Engineering is required for each development to keep stormwater onsite, up to a design storm
- Detention drainage analysis of the site is done to quantify the change in stormwater generation to design the detention pond size
- Developers must consider upstream and adjacent flow volumes when designing
- Also consider the need to capture even small storm runoff and provide water quality treatment for all size rain events; not just big ones

Question for Panel: What would you do to advance LID and stormwater management if you had unlimited resources?

- Prevent tiny lot size: As small as 35' has been proposed in Bexar County; not done yet in Medina County
- Need legislation that gives the city, county, and others the authority to require good practices
 - Even legislation that stays the same for more than a couple years would be helpful
- Develop clear ordinances/rules that leave no doubt about what is required
- Limitations on MUDs (Municipal Utility Districts) in the county; they can currently go around county requirements
 - TCEQ can also create MUDs directly
 - With no/little public participation or public meetings
 - Route often taken if county pushes back or is too aggressive in their requirements
 - o If lot sizes are 10 acres or larger, developers don't have to get approval by the County
- Require PIDs (Public Improvement Districts) where developers fund all the infrastructure not the counties or cities





- Need funding to expand SARA models across entire watershed to identify and provide the most support and guidance for high leverage restoration areas. The SA River, Leon, and Salado watersheds have been well investigated; would like to extend to entire basin.
 - SARA does monitor Medina Basin through the CRP program
 - Will continue to monitor water quality across the entire basin
 - Will continue to prioritize sites discussed in the WPP; especially the downstream sites on Medina and Medio
 - Data is posted online
 - Can add additional sites if there is an identified need AND if resources are available
- Need to have a strong multiprong approach to working with developers incentives and rules
 - Ultimately all things revolve around the dollar: PIDS, TERS, etc. adds value for the developers and it definitely helps the community.
- Stronger city authority in the ETJ (Extraterritorial Jurisdiction) due to developer's ability to just go to the county if they don't like the city's rules.

Question from audience: Why do some developers balk at incentives to build subdivisions with better stormwater management?

- Many do, but some have their standard approach that they're comfortable with
- Many focus on price point of homes in subdivisions rather than the value stormwater features can bring in the long run

Question from audience: Does Castroville have a SWMP (Storm Water Management Plan)?

- No, but each development is required to have a site specific SWMP
- The town itself has a street & drainage program that has evaluated stormwater issues across town and does have a plan online to provide some options for managing that stormwater.

Next Steps in the Medina WPP Project

- State agencies (TCEQ and TSSWCB) are reviewing the WPP document now
- Hopeful to have EPA acceptance by May
- In the coming months, we'll work to develop ideas for initial implementation activities
- Will continue E&O events; engagement; etc.
- Will look for a date for the next stakeholder meeting, on or close to the Riparian workshop date. Watch your email for more information.

Upcoming Events

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- SARA Bio blitz March 20-22
- GEAA webinar "Opportunities in Subdivision Regulation" March 26
 - Texas Riparian and Stream Ecosystem Restoration workshop: May 22 from 8-4:30
 - o Classroom session plus walk along river to look at stream features, functions, vegetation
- Camp Bullis Sentinel Landscape RCPP funds available for land management