MARANA AZ
CELEBRATING 45 YEARS

MARANA TOWN COUNCIL
REGULAR COUNCIL MEETING
NOTICE AND AGENDA

11555 W. Civic Center Drive, Marana, Arizona 85653
Council Chambers, November 1, 2022, at or after 6:00 PM

Ed Honea, Mayor
Jon Post, Vice Mayor
Patti Comerford, Council Member
Jackie Craig, Council Member
Herb Kai, Council Member
John Officer, Council Member
Roxanne Ziegler, Council Member

Pursuant to A.R.S. §38-431.02, notice is hereby given to the members of the Marana Town Council and to the general public that the Town Council will hold a meeting open to the public on November 1, 2022, at or after 6:00 PM located in the Council Chambers of the Marana Municipal Complex, 11555 W. Civic Center Drive, Marana, Arizona.

ACTION MAY BE TAKEN BY THE COUNCIL ON ANY ITEM LISTED ON THIS AGENDA. Revisions to the agenda can occur up to 24 hours prior to the meeting. Revised agenda items appear in *italics*.

As a courtesy to others, please turn off or put in silent mode all electronic devices.

Meeting Times

Welcome to this Marana Town Council meeting. Regular Council meetings are usually held the first and third Tuesday of each month at 6:00 PM at the Marana Municipal Complex, although the date or time may change and additional meetings may be called at other times and/or places. Contact the Town Clerk or watch for posted agendas for other meetings. This agenda may be revised up to 24 hours prior to the meeting. In such a case a new agenda will be posted in place of this agenda.

Speaking at Meetings

If you are interested in speaking to the Council during the Call to the Public or Public Hearings, you must fill out a speaker card (located in the lobby outside the Council Chambers) and deliver it to the Town Clerk prior to the convening of the meeting.

All persons attending the Council meeting, whether speaking to the Council or not, are expected to observe the Council rules, as well as the rules of politeness, propriety, decorum and good conduct. Any person interfering with the meeting in any way, or acting rudely or loudly will be removed from the meeting and will not be allowed to return.

Accessibility
To better serve the citizens of Marana and others attending our meetings, the Council Chambers are wheelchair and handicapped accessible. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting the Town Clerk at (520) 382-1999. Requests should be made as early as possible to arrange the accommodation.

Agendas
Copies of the agenda are available the day of the meeting in the lobby outside the Council Chambers or online at www.maranaaz.gov under Agendas and Minutes. For questions about the Council meetings, special services or procedures, please contact the Town Clerk, at (520) 382-1999, Monday through Friday from 8:00 AM to 5:00 PM.

This Notice and Agenda Posted no later than 24 hours prior to the meeting, at the Marana Municipal Complex, 11555 W. Civic Center Drive, the Marana Operations Center, 5100 W. Ina Road, and at www.maranaaz.gov under Agendas and Minutes.

REGULAR COUNCIL MEETING

CALL TO ORDER AND ROLL CALL

PLEDGE OF ALLEGIANCE/INVOCATION/MOMENT OF SILENCE

APPROVAL OF AGENDA

CALL TO THE PUBLIC
At this time any member of the public is allowed to address the Town Council on any issue within the jurisdiction of the Town Council, except for items scheduled for a Public Hearing at this meeting. The speaker may have up to three minutes to speak. Any persons wishing to address the Council must complete a speaker card located outside the Council Chambers and deliver it to the Town Clerk prior to the commencement of the meeting. Individuals addressing a meeting at the Call to the Public will not be provided with electronic technology capabilities beyond the existing voice amplification and recording capabilities in the facilities. Pursuant to the Arizona Open Meeting Law, at the conclusion of Call to the Public, individual members of the Council may respond to criticism made by those who have addressed the Council, and may ask staff to review the matter, or may ask that the matter be placed on a future

agenda.

PROCLAMATIONS

MAYOR AND COUNCIL REPORTS: SUMMARY OF CURRENT EVENTS

MANAGER'S REPORT: SUMMARY OF CURRENT EVENTS

PRESENTATIONS

CONSENT AGENDA

The Consent Agenda contains items requiring action by the Council which are generally routine items not requiring Council discussion. A single motion and affirmative vote will approve all items on the Consent Agenda, including any resolutions or ordinances. Prior to a motion to approve the Consent Agenda, any Council member may remove any item from the Consent Agenda and that item will be discussed and voted upon separately.

C1 Resolution No. 2022-109: Relating to Development; approving the final plat for Stack Self-Storage, Lots 1 and 2 located north of Silverbell Road and west of Coachline Boulevard within Section 28, Township 12 South and Range 12 East (Brian D. Varney)

C2 Resolution No. 2022-110: Relating to Development; approving and authorizing the Mayor to execute the Termination of Development Agreement between Old Lobo Villagio, LLC and the Town of Marana acknowledging termination of the Tangerine/Thornydale Development Agreement (Jane Fairall)

C3 Resolution No. 2022-111: Relating to Public Works; approving and authorizing the Mayor to execute a termination agreement between the Regional Transportation Authority of Pima County and the Town of Marana to terminate the Wildlife Linkages Amendment to Intergovernmental Transportation Funding Agreement for construction of improvements to Tangerine Road – Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive (Jane Fairall)

C4 Resolution No. 2022-112: Relating to Utilities; approving and authorizing the Mayor to sign agreements for construction of water and sewer facilities under private contract with Southern Arizona Logistics Center, LLC (David L. Udall)

C5 Resolution No. 2022-113: Relating to Utilities; approving and authorizing the Mayor to sign an amendment to the Intergovernmental Agreement, effective December 1, 2022, between the Town of Marana and Pima County for provision of water consumption data and sewer user account billing services (Jing Luo)

C6 Resolution No. 2022-114: Relating to Real Estate; approving and authorizing the Town Engineer to execute a Temporary Construction Easement granting Pima County the right to enter upon and to construct underground force main sewer pipelines through Town owned properties in the vicinity of the Santa Cruz River Park and El Rio Preserve (George Cardieri)

C7 Approval of the Regular Council Meeting Summary Minutes of October 18, 2022 (David L. Udall)

LIQUOR LICENSES

BOARDS, COMMISSIONS AND COMMITTEES

COUNCIL ACTION

A1 PUBLIC HEARING: Ordinance No. 2022.024: Relating to Development; approving an amendment to the Sanders Grove Specific Plan, including comprehensive revisions to the Land Use Plan, an increase in the maximum number of residences permitted, and a change of the name of the plan to Ranch House Specific Plan, for the 841-acre specific plan area located north of Marana Road, east of Wentz Road, and west of Sanders Road; and approving a minor amendment to the Marana General Plan to amend the Future Circulation Map as it applies to the specific plan area (Brian D. Varney)

Resolution No. 2022-115: Relating to Development; declaring as a public record filed with the Town Clerk the Ranch House Specific Plan Amendment adopted by Ordinance No. 2022.024 (Brian D. Varney)

A2 PUBLIC HEARING: Relating to Development; public hearing regarding the intent to assess development impact fees for street facilities, park facilities, water facilities, water reclamation facilities, and water resources, pursuant to Arizona Revised Statutes section 9-463.05 (Fausto Burruel, Jim Conroy, Jing Luo)

A3 Resolution No. 2022-116: Relating to Emergency Management; approving and authorizing implementation of the 2022 Pima County Multi-Jurisdictional Hazard Mitigation Plan (Curry C. Hale)

ITEMS FOR DISCUSSION / POSSIBLE ACTION

D1 Relating to Development and Public Works; update, discussion, and possible direction regarding public and private projects and development applications on the Town's Marana Current and Proposed Projects internet site (Jason Angell)

EXECUTIVE SESSIONS

Pursuant to A.R.S. § 38-431.03, the Town Council may vote to go into executive session, which will not be open to the public, to discuss certain matters.

E1 Executive Session pursuant to A.R.S. §38-431.03 (A), Council may ask for discussion or consideration, or consultation with designated Town representatives, or consultation for legal advice with the Town Attorney, concerning any matter listed on this agenda for any of the reasons listed in A.R.S. §38-431.03 (A).

E2 Executive session pursuant to A.R.S. §38-431.03 (A)(4) for discussion and consultation with and instructions to the Town's attorneys regarding the pending litigation entitled Town of Marana v Pulte Home Company, LLC, Pima County Superior Court Case No. C20205095.

FUTURE AGENDA ITEMS

Notwithstanding the Mayor's discretion regarding the items to be placed on the agenda, if three or more Council members request that an item be placed on the agenda, it must be placed on the agenda for the second regular Town Council meeting after the date of the request, pursuant to Marana Town Code Section 2-4-2(B).

ADJOURNMENT

Council-Regular Meeting **C1**

Meeting Date: 11/01/2022

To: Mayor and Council

From: Brian Varney, Senior Planner

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: Resolution No. 2022-109: Relating to Development; approving the final plat for Stack Self-Storage, Lots 1 and 2 located north of Silverbell Road and west of Coachline Boulevard within Section 28, Township 12 South and Range 12 East (Brian D. Varney)

Discussion:

Request
Rick Engineering Company, representing Stack - Marana & Silverbell, LLC is requesting approval of a final plat consisting of two commercial lots on approximately 5.54 acres of land within the Continental Ranch Specific Plan.

Location
The property proposed to be subdivided is located at the northwest corner of Silverbell Road and Coachline Boulevard.

Zoning
The zoning of the property is "SP" Continental Ranch Specific Plan with a land use designation of Commercial "C". Pursuant to Chapter 17-19 (Silverbell Road Corridor Overlay District), Section 17-19-11D (Conditional Uses), of the Marana Town Code, the development of a self-storage facility within the SRCOD shall only be permitted with a Conditional Use Permit (CUP) granted by the Marana Planning Commission, subject to the provisions of Section 17-3-2 (Conditional Use Permits) of the Marana Town Code. On April 27, 2022, the Planning Commission granted a CUP for the for a self-storage facility on the property.

Land Use
The final plat proposes two commercial lots. Lot 1 is proposed at 53,871 square feet and is planned to be developed with a general commercial retail use. Lot 2 is proposed at 187,512 square feet and planned to be developed as a self-storage facility.

Access and Traffic Circulation
The subdivision will be directly accessed from both Silverbell Road and Coachline Boulevard.

Utilities
Water service will be provided to the subdivision by Tucson Water. Wastewater service will be provided by Pima County Regional Wastewater.

Staff Recommendation:

Staff has reviewed the request against the requirements of the Continental Ranch Specific Plan, the Marana Town Code, and the Marana General Plan. This final plat is in substantial conformance with all required development regulations, and staff recommends approval.

Suggested Motion:

I move to adopt Resolution No. 2022-109, approving a final plat for Stack Self-Storage, Lots 1 & 2.

Attachments

Resolution No. 2022-109
Stack Self-Storage Final Plat
PRV2208-001 SSS Map
PRV2208-001 SSS App

MARANA RESOLUTION NO. 2022-109

RELATING TO DEVELOPMENT; APPROVING THE FINAL PLAT FOR STACK SELF-STORAGE, LOTS 1 AND 2 LOCATED NORTH OF SILVERBELL ROAD AND WEST OF COACHLINE BOULEVARD WITHIN SECTION 28, TOWNSHIP 12 SOUTH AND RANGE 12 EAST

WHEREAS, on April 5, 1988, the Town Council adopted Ordinance No. 88.09, adopting the Continental Ranch Specific Plan which has been amended from time to time by ordinance; and

WHEREAS Rick Engineering Company, representing Stack – Marana & Silverbell, LLC has applied for approval of the final plat for Stack Self-Storage, Lots 1 and 2 located north of Silverbell Road and west of Coachline Boulevard; and

WHEREAS the property that is the subject of the Stack Self-Storage final plat is located within the Continental Ranch Specific Plan, with a land use designation of Commercial (C); and

WHEREAS the property that is the subject of the Stack Self-Storage final plat is located within the Silverbell Road Corridor Overlay District (SRCOD) established pursuant to Chapter 17-19 of the Marana Town Code; and

WHEREAS Section 17-19-11(D) (Conditional Uses) of the Marana Town Code provides that the development of a self-storage facility within the SRCOD shall only be permitted with a Conditional Use Permit (CUP) granted by the Marana Planning Commission; and

WHEREAS, on April 27, 2022, the Marana Planning Commission granted a CUP for the development of a self-storage facility located on the property that is the subject of the Stack Self-Storage final plat; and

WHEREAS the Mayor and Town Council, at its November 1, 2022 meeting, determined that the final plat for Stack Self-Storage should be approved.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA that the final plat for Stack Self-Storage is hereby approved.

PASSED AND ADOPTED by the Mayor and Council of the Town of Marana, Arizona, this 1st day of November, 2022.

_____
Mayor Ed Honea

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

BASIS OF BEARING

PIMA COUNTY COORDINATE SYSTEM (PCCS) ZONE 1 EAST.

THE OBSERVED BEARING BETWEEN 3.5" BRASS DISC IN STREETWELL, STAMPED TOWN OF MARANA, AT THE CENTERLINE INTERSECTION OF SILVERBELL ROAD AND COACHLINE BOULEVARD AND A 3.5" BRASS DISC IN STREETWELL, STAMPED TOWN OF MARANA, AT THE INTERSECTION OF SILVERBELL ROAD AND SILVER MOON WAY. SAID BEARING BEING N65° 41' 40" W.

GENERAL NOTES

1. THE GROSS AREA OF THIS DEVELOPMENT PLAN: 5.54 AC; 241,383 SF.

2. THE EXISTING ZONING IS SP (SPECIFIC PLAN - CONTINENTAL RANCH) PER MARANA ORDINANCE NO. 88.09. THE LAND USE DESIGNATION IS COMMERCIAL (C) PER MARANA ORDINANCE NO. 2006.02.

3. THE TOTAL NUMBER OF LOTS: 2

4. MINIMUM ALLOWABLE LOT SIZE: NONE
   MINIMUM LOT SIZE: 53,871 SF.
   MAXIMUM LOT SIZE: 187,512 SF.
   AVERAGE LOT SIZE: 120,691.5 SF.
   MAXIMUM LOT COVERAGE ALLOWED: 70% AT GROUND LEVEL

5. MAXIMUM BUILDING HEIGHT: 39 FT, 3 STORIES

6. BUILDING SETBACKS: A DISTANCE EQUAL TO 60% OF BUILDING HEIGHT, BUT NOT LESS THAN 15 FEET.

7. TOTAL MILES OF NEW PRIVATE STREET: 0
   TOTAL MILES OF NEW PUBLIC STREET: 0

8. NO FURTHER LOT SPLITTING SHALL BE DONE WITHOUT THE WRITTEN APPROVAL OF THE TOWN OF MARANA.

9. APPROVAL OF THIS PLAT DOES NOT AFFIRM, CERTIFY, OR APPROVE ANY LAND DIVISION THAT MAY BE CONTRARY TO STATE LAW, NOR DOES IT CERTIFY THE EXISTENCE OF, OR COMPLIANCE WITH, ANY DEED RESTRICTIONS OR EASEMENTS.

10. ALL NEW AND EXISTING UTILITIES WITHIN OR CONTIGUOUS TO THE SITE SHALL BE PLACED UNDERGROUND EXCEPT ELECTRICAL TRANSMISSION LINES CARRYING 48KV OR GREATER, AND THOSE LINES WHICH CAN BE SHOWN TO EXIST IN CURRENT OR FUTURE ELECTRICAL TRANSMISSION CORRIDORS.

11. OBJECTS AND MATERIALS WITHIN THE SIGHT VISIBILITY EASEMENT SHALL BE PLACED SO AS NOT TO INTERFERE WITH A VISIBILITY PLANE DESCRIBED BY TWO HORIZONTAL LINES LOCATED 30-INCHES AND 72-INCHES ABOVE FINISHED GRADE OF THE ROADWAY SURFACE, AND SHALL CONFORM TO THE TOWN OF MARANA SUBDIVISION STREET STANDARDS.

12. A PROFESSIONAL ENGINEER SHALL CERTIFY AS TO FORM, LINE, AND FUNCTION OF ALL PUBLIC AND PRIVATE ROADWAYS AND DRAINAGE STRUCTURES BEFORE THE RELEASE OF ASSURANCES.

13. INSTALLATION OF ITEMS SUCH AS LANDSCAPE, IRRIGATION, SIGNAGE, MONUMENTS, WALLS AND DRAINAGE IMPROVEMENTS IN THE PUBLIC RIGHT-OF-WAY SHALL REQUIRE A PERPETUAL LICENSE AGREEMENT FOR INSTALLATION, MAINTENANCE AND INDEMNIFICATION. THIS LICENSE AGREEMENT SHALL BE EXECUTED AND APPROVED BY THE TOWN OF MARANA PRIOR TO APPROVAL OF THE CLOSEOUT PACKAGE FOR THIS PROJECT.

14. THIS SUBDIVISION IS LOCATED WITHIN THE CITY OF TUCSON SERVICE AREA, WHICH HAS BEEN DESIGNATED AS HAVING AN ASSURED WATER SUPPLY UNDER A.R.S. 45-576.

15. ALL WEATHER PAVED FIRE DEPARTMENT ACCESS ROADS AND REQUIRED FIRE HYDRANTS SHALL BE APPROVED, INSTALLED, TESTED, AND SERVICEABLE PRIOR TO THE INTRODUCTION OF COMBUSTIBLE CONSTRUCTION MATERIAL ON THE SITE.

16. INTERIOR PROPERTY CORNERS SHALL BE MONUMENTED AS SOON AS COMPLETION OF THE INFRASTRUCTURE AND IMPROVEMENTS MAKE IT PRACTICAL TO DO SO. IF SUCH MONUMENTS SHOULD DIFFER FROM THE TYPE DESCRIBED ON THE FINAL PLAT, A RECORD OF SURVEY SHALL BE FILED SHOWING THOSE DIFFERENCES. ALL MONUMENTS SET SHALL BE UNDER THE DIRECT SUPERVISION OF THE SURVEYOR OF RECORD. IF FOR ANY REASON THE SURVEYOR OF RECORD IS NOT AVAILABLE TO SUPERVISE THE SETTING OF THE INTERIOR CORNER MONUMENTS, SUBSEQUENT TO THE RECORDING OF THE FINAL PLAT, THE REPLACEMENT SURVEYOR SHALL SET MONUMENTS WITH HIS/HER IDENTIFYING NUMBER AND A RECORD OF SURVEY SHALL BE RECORDED IN ACCORDANCE WITH ARIZONA STATE STATUTES.

17. AN ACCESS AND UTILITY EASEMENT, AND MONUMENT SIGN AGREEMENT FOR LOTS 1 AND 2 HAS BEEN RECORDED IN SEQ #_____IN THE OFFICE OF THE PIMA COUNTY RECORDED.

CERTIFICATION OF SURVEY

I HEREBY CERTIFY THAT THE BOUNDARY SURVEY AS SHOWN ON THIS PLAT WAS PERFORMED UNDER MY DIRECTION AND THAT ALL EXISTING AND PROPOSED SURVEY MONUMENTS AND MARKERS SHOWN ARE CORRECTLY DESCRIBED. I FURTHER CERTIFY THAT THIS PLAT WAS PREPARED UNDER MY DIRECTION.

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
17479
DOUGLAS E. SCHNEIDER
10/13/22
Date Signed
ARIZONA U.S.A.

DEDICATION

WE, THE UNDERSIGNED, HEREBY WARRANT THAT WE ARE THE ONLY PARTIES HAVING ANY FEE TITLE INTEREST IN THE LAND SHOWN ON THIS PLAT, AND WE CONSENT TO THE SUBDIVISION OF THIS LAND IN THE MANNER SHOWN ON THIS PLAT.

UTILITY EASEMENTS AS SHOWN ON THIS PLAT ARE DEDICATED TO THE TOWN OF MARANA, PIMA COUNTY, AND ALL PUBLIC AND PRIVATE UTILITY COMPANIES FOR THE PURPOSE OF INSTALLATION AND MAINTENANCE OF, AND ACCESS TO, PUBLIC AND PRIVATE UTILITIES AND PUBLIC SEWERS.

WE, THE UNDERSIGNED, OUR SUCCESSORS AND ASSIGNS, DO HEREBY HOLD THE TOWN OF MARANA, ITS EMPLOYEES, OFFICERS, AND AGENTS HARMLESS FROM ANY AND ALL CLAIMS FOR DAMAGES RELATED TO THE USE OF THESE LANDS NOW AND IN THE FUTURE BY REASON OF FLOODING, FLOWAGE, EROSION, OR DAMAGE CAUSED BY WATER, WHETHER SURFACE FLOOD, OR RAINFALL. NATURAL DRAINAGE SHALL NOT BE ALTERED, DISTURBED, OR OBSTRUCTED WITHOUT THE APPROVAL OF THE TOWN OF MARANA.

STACK - MARANA & SILVERBELL, LLC, A UTAH LIMITED LIABILITY COMPANY
BY: STACK STORAGE, LLC, A UTAH LIMITED LIABILITY COMPANY, ITS MEMBER

BY: ANDREW BYBEE, MANAGER DATE

BY: NACHE NIELSON, MANAGER DATE

ACKNOWLEDGEMENT

STATE OF _____ }
COUNTY OF_____ } SS.

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____DAY OF _____, 2022 BY ANDREW BYBEE, MANAGER OF STACK STORAGE, LLC, A UTAH LIMITED LIABILITY COMPANY, AS MEMBER OF STACK- MARANA & SILVERBELL, LLC, A UTAH LIMITED LIABILITY COMPANY, ON BEHALF OF THE LLC.

MY COMMISSION EXPIRES NOTARY PUBLIC

STATE OF _____ }
COUNTY OF_____ } SS.

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME THIS _____DAY OF _____, 2022 BY NACHE NIELSON, MANAGER OF STACK STORAGE LLC, A UTAH LIMITED LIABILITY COMPANY, AS MEMBER OF STACK - MARANA & SILVERBELL, LLC, A UTAH LIMITED LIABILITY COMPANY, ON BEHALF OF THE LLC.

MY COMMISSION EXPIRES NOTARY PUBLIC

ASSURANCES

THE TOWN OF MARANA DOES NOT REQUIRE THE SUBDIVIDER TO PROVIDE SUBDIVISION ASSURANCES FOR THIS SUBDIVISION. ANY SUBDIVISION IMPROVEMENTS REQUIRED BY ARIZONA REVISED STATUTES SECTION 9-463.01(C)(8) AND MARANA TOWN CODE SECTION 17-5-4 HAVE BEEN PROVIDED

BY:
TOWN OF MARANA DATE

RECORDING

SEQ: #2022_____

FEE: _____

STATE OF ARIZONA }
COUNTY OF PIMA } SS.

I HEREBY CERTIFY THAT THE INSTRUMENT WAS FILED FOR RECORD AT THE REQUEST OF RICK ENGINEERING COMPANY, INC.

DATE_____

TIME_____

WITNESS MY HAND AND OFFICIAL SEAL DAY AND YEAR ABOVE WRITTEN

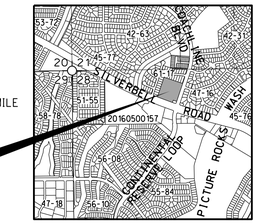
GABRIELLA CAZARES-KELLY, COUNTY RECORDER

BY: _____
DEPUTY

SHEET INDEX

1 COVER SHEET
2 FINAL PLAT SHEET

SCALE: 3" = 1 MILE



LOCATION MAP
A PORTION OF SECTION 28, T 12 S, R 12 E, G & SRM, TOWN OF MARANA
PIMA COUNTY, ARIZONA

OWNERS

STACK - MARANA & SILVERBELL, LLC
2801 N THANKSGIVING WAY, SUITE 100
LEHI, UT 84043
(801)768-0500

ADMINISTRATIVE ADDRESS

8705 N COACHLINE BL
MARANA, AZ 85743

LEGEND

SYMBOL	ITEM
○	SURVEY MONUMENT, 1/2" REBAR, RLS 17479, UNLESS NOTED
▲	3.5" TOWN OF MARANA BRASS DISC, IN STREETWELL
●	LOT CORNER TO BE SET BY RLS
14 ○ 13	QUARTER SECTION CORNER
23	LOT NUMBER
— — —	EXIST R/W
— — —	SECTION LINE
━━━	SUBDIVISION BOUNDARY
———	LOT LINE
— · —	CENTERLINE
— — —	EASEMENT LINE
(R)	RECORD PER TITLE REPORT
(R1)	RECORD PER FINAL PLAT, BOOK 61 PAGE 17, M&P
(M)	MEASURED
(C)	CALCULATED

TOWN OF MARANA APPROVALS

_____, P.E.
MARANA TOWN ENGINEER/DEVELOPMENT ENGINEER DATE

MARANA PLANNING MANAGER DATE

CERTIFICATION

I,_____, CLERK OF THE TOWN OF MARANA HEREBY CERTIFY THAT THIS PLAT WAS APPROVED BY THE TOWN COUNCIL OF THE TOWN OF MARANA ON THE_____ DAY OF_____, 2022.

CLERK OF THE TOWN OF MARANA DATE

ASSURED WATER SUPPLY

THE UNDERSIGNED CERTIFIES THAT IT IS DESIGNATED AS HAVING AN ASSURED WATER SUPPLY AND WILL PROVIDE WATER SERVICE TO THIS SUBDIVISION.

BY:

ITS:
CITY OF TUCSON WATER DEPARTMENT DATE

PIMA COUNTY APPROVAL

PIMA COUNTY REGIONAL WASTEWATER RECLAMATION DEPARTMENT DATE

FINAL PLAT FOR

STACK SELF-STORAGE

LOTS 1 & 2

BEING A PORTION OF SECTION 28, TOWNSHIP 12 SOUTH, RANGE 12 EAST, GILA & SALT RIVER MERIDIAN, TOWN OF MARANA PIMA COUNTY, ARIZONA.

RELATED CASES: CUP2203-001, DPP2206-004

PRV2208-001
SHEET 1 OF 2

RICK ENGINEERING COMPANY
Tucson
3945 EAST FORT LOWELL ROAD - SUITE 111
TUCSON, AZ 85712
520-795-1000
J-5171
rickengineering.com
San Diego - Riverside - Orange - Sacramento - San Luis Obispo - Phoenix - Denver

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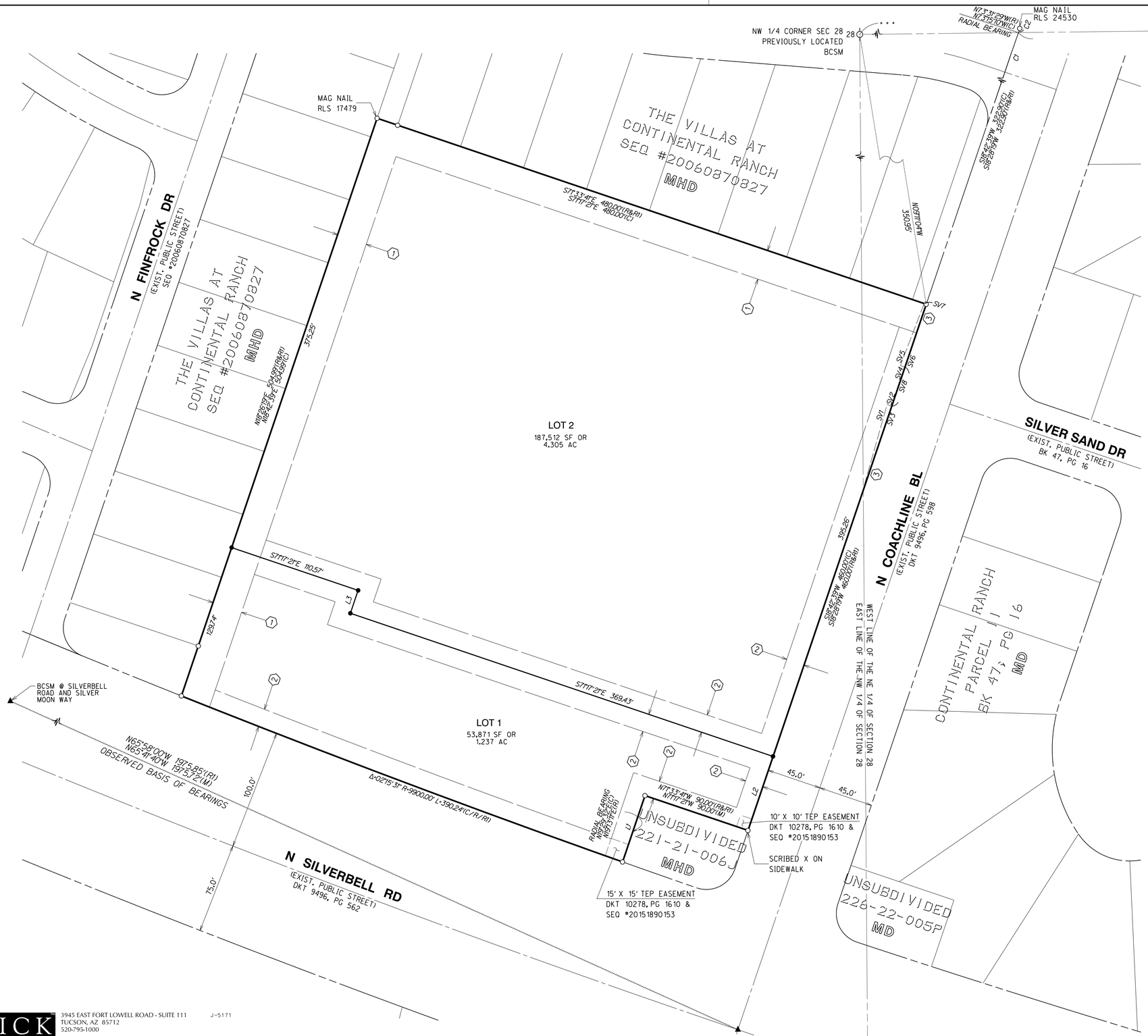
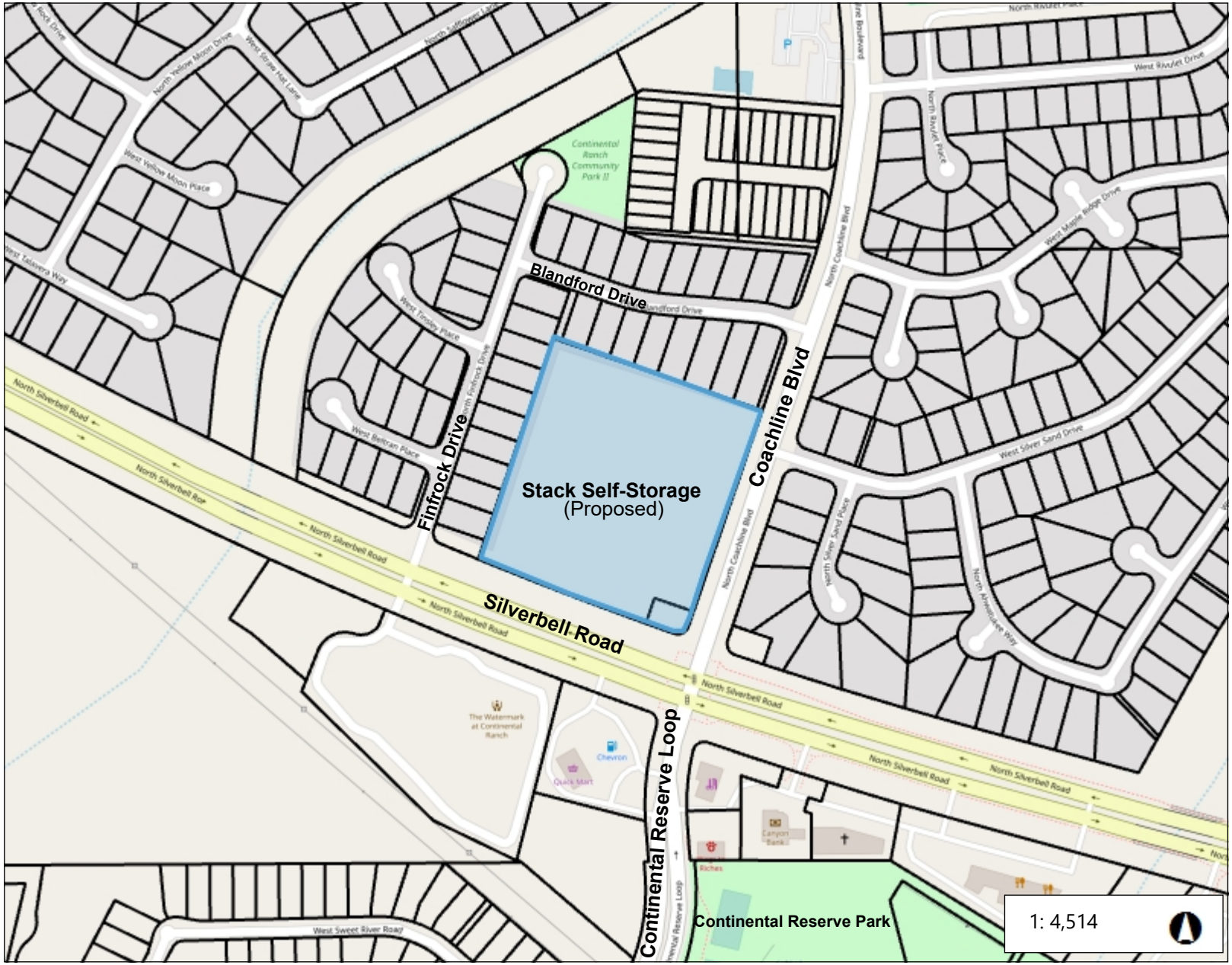
SEQUENCE # _____


NW 1/4 CORNER SEC 28
PREVIOUSLY LOCATED
BCSM
MAG NAIL
RLS 24530
N73°31'29"W(R1)
N73°31'29"W(C)
RADIAL BEARING
S89°04'24"W 2643.54'(R1)
S89°20'44"W 2643.54'(C)
S89°20'44"W 2470.31'(C)
S89°04'24"W 2470.31'(R1)
POINT OF COMMENCEMENT
NE COR SEC. 28
NOTHING FOUND
MAG NAIL
RLS 17479
THE VILLAS AT
CONTINENTAL RANCH
SEQ #20060870827
MHD
S71°33'14"E 480.00'(R&R1)
S71°17'21"E 480.00'(C)
N02°11'04"W
350.95'
N73°31'41"W 90.00'(R&R1)
N71°17'21"W 90.00'(M)

Town of Marana Planning

PRV2208-001 Final Plat for Stack Self-Storage



Legend

- Marana Town Limits
- Parcel Labels
- Parcels (Black)

Notes

0.1 0 0.07 0.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

© Latitude Geographics Group Ltd.

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

MARANA AZ

Development Services / maranaplanning@maranaAZ.gov
11555 West Civic Center Drive / Marana, AZ 85653
Ph (520) 382-2600 / Fax (520) 382-2641 / maranaAZ.gov

PROJECT APPLICATION

APPLICATION TYPE

☐ Annexation	☐ Development Plan	☐ Development Plan Package	☐ General Plan Amendment
☐ Rezone	☐ Minor Land Division	☐ Significant Land Use Change	☐ Conditional Use Permit
☐ Specific Plan	☐ Landscape Plan	☐ Native Plant Plan/Exception	☐ SWPP
☐ Variance	☐ Hydraulic Model	☐ Sewer Capacity Assurance	☐ Sign Program
☒ Plat	☐ Improvement Plan	☐ Report (Type): _____	☐ Other: _____

PROJECT INFORMATION

Project Name: Stack Self-Storage Final Plat	
Description of Project: Commercial subdivision	Number of Lots: 2
Parcel No.(s): 226-22-005S	Gross Area (Acres): 5.5
Project Address: 8696 N. Silverbell Road	
Ref. Project No.: DPP2206-004	

CONTACT INFORMATION

Owner: Stack - Marana & Silverbell, L.L.C.	Contact Name: Nache Nielson		
Address: 2801 N. Thanksgiving Way, Suite 100	City: Lehi	State: UT	Zip: 84043
Email: nn@stackstorage.us	Phone No.: (435) 459-1551		
Applicant: Rick Engineering Company	Contact Name: Steven Vasquez		
Address: 3945 East Fort Lowell Road, Suite 111	City: Tucson	State: AZ	Zip: 85712
Email: svasquez@rickengineering.com	Phone No.: (520) 795-1000		
Consultant/Engineer: Rick Engineering Company	Contact Name: Doug Schneider		
Address: 3945 East Fort Lowell Road, Suite 111	City: Tucson	State: AZ	Zip: 85712
Email: dschneider@rickengineering.com	Phone No.: (520) 795-1000		

OWNER/APPLICANT AUTHORIZATION

I hereby certify that the information set forth in this application are true and correct to the best of my knowledge and that I am either the owner of the property or that I have been authorized in writing by the owner to file this application. (If applicant is not the owner, attach written authorization from the owner.)

Steven E. Vasquez	Steven E. Vasquez	8/17/2022
Applicant Name (PRINT)	Signature	Date

FOR OFFICIAL USE ONLY

Project No._____ **Date Received**_____

Revision Date 03/29/2019

Council-Regular Meeting **C2**

Meeting Date: 11/01/2022

To: Mayor and Council

From: Jane Fairall, Town Attorney

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: Resolution No. 2022-110: Relating to Development; approving and authorizing the Mayor to execute the Termination of Development Agreement between Old Lobo Villagio, LLC and the Town of Marana acknowledging termination of the Tangerine/Thornydale Development Agreement (Jane Fairall)

Discussion:

Tangerine/Thornydale, L.L.C. ("Tangerine") and the Town of Marana entered into the Tangerine/Thornydale Development Agreement dated July 11, 2006, regarding the development of approximately 58.84 acres of land located generally at the northwest corner of Tangerine and Thornydale Roads (the "Agreement"). Tangerine then partially assigned its interest in the Agreement to Old Lobo Villagio, LLC ("Old Lobo") pursuant to a Partial Assignment and Assumption of Developer's Rights and Obligations dated October 26, 2006, when Old Lobo purchased the eastern portion of the parcel subject to the Agreement. The Agreement provided that it shall automatically terminate and shall thereafter be void for all purposes on the tenth anniversary of the later of (i) the effective date of the Town Council resolution approving the Agreement, (ii) the effective date of the Specific Plan, or (iii) the date the Developer takes ownership of the Property.

It has been more than 10 years since all of the three milestones mentioned above took place and Old Lobo has requested that the Town enter into a termination agreement, acknowledging that the Agreement is terminated as to Old Lobo's parcel. The proposed termination agreement will acknowledge that the agreement has expired and

is no longer in force and effect for Old Lobo's property.

Staff Recommendation:

Staff recommends approval of the termination agreement.

Suggested Motion:

I move to adopt Resolution No. 2022-110, approving and authorizing the Mayor to execute the Termination of Development Agreement between Old Lobo Villagio, LLC and the Town of Marana acknowledging termination of the Tangerine/Thornydale Development Agreement.

Attachments

Resolution No. 2022-110

Exhibit A - Termination Agreement

Original DA

Original DA Assignment

MARANA RESOLUTION NO. 2022-110

RELATING TO DEVELOPMENT; APPROVING AND AUTHORIZING THE MAYOR TO EXECUTE THE TERMINATION OF DEVELOPMENT AGREEMENT BETWEEN OLD LOBO VILLAGIO, LLC AND THE TOWN OF MARANA ACKNOWLEDGING TERMINATION OF THE TANGERINE/THORNYDALE DEVELOPMENT AGREEMENT

WHEREAS Tangerine/Thornydale, L.L.C. ("Tangerine") and the Town of Marana entered into that certain Tangerine/Thornydale Development Agreement recorded July 14, 2006 at Sequence No. 20061350941 in the official records of Pima County, Arizona (the "Agreement"); and

WHEREAS Tangerine then partially assigned its interest in the Agreement to Old Lobo Villagio, LLC pursuant to that certain Partial Assignment and Assumption of Developer's Rights and Obligations dated October 26, 2006 and recorded October 27, 2006 Sequence No. 20062081308 in the official records of Pima County, Arizona; and

WHEREAS the Agreement provided that it shall automatically terminate and shall thereafter be void for all purposes on the tenth anniversary of its effective date, as defined in the Agreement; and

WHEREAS the ten-year term of the Agreement has expired; and

WHEREAS the Mayor and Council find that entering into the Termination Agreement acknowledging the termination of the Agreement is in the best interest of the Town.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA, that the Termination of Development Agreement between the Town of Marana and Old Lobo Villagio, LLC attached to and incorporated by this reference in this resolution as Exhibit A is hereby approved, the Mayor is hereby authorized and directed to sign it for and on behalf of the Town of Marana, and the Town's Manager and staff are hereby directed and authorized to undertake all other and further tasks required or beneficial to carry out its terms, obligations, and objectives.

PASSED AND ADOPTED by the Mayor and Council of the Town of Marana, Arizona, this 1st day of November, 2022.

_____
Mayor Ed Honea

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

When recorded, return to:
Law Office of Kristin Henry, PC
111 East Dunlap Avenue, Suite 1-229
Phoenix, Arizona 85020

TERMINATION OF DEVELOPMENT AGREEMENT

THIS TERMINATION OF DEVELOPMENT AGREEMENT (the "Termination") is dated as of the _____ day of October 2022 by and between OLD LOBO VILLAGIO, LLC, an Arizona limited liability company ("Developer") and the TOWN OF MARANA, an Arizona municipal corporation (the "Town").

RECITALS:

A. Tangerine/Thornydale, L.L.C. ("Tangerine") and the Town entered into that certain Tangerine/Thornydale Development Agreement recorded July 14, 2006 as Instrument No. 2006-1350941 in the official records of Pima County, Arizona (the "Agreement").

B. Tangerine then partially assigned its interest in the Agreement to Developer pursuant to that certain Partial Assignment and Assumption of Developer's Rights and Obligations dated October 26, 2006 and recorded October 27, 2006 as Instrument No. 2006-2081308 in the official records of Pima County, Arizona (the "Assignment").

C. The Agreement by its terms was to terminate ten years following satisfaction of certain conditions contained therein.

D. The conditions that were to be satisfied to terminate the Agreement occurred more than ten years ago.

AGREEMENT:

1. The Agreement is hereby terminated and is of no further force or effect, with respect to the real property that is the subject of the Assignment and the parties are hereby released and relieved of their obligations and liabilities thereunder.

2. Each and all of the covenants, terms, agreements, and obligations of this Termination shall extend to and bind and inure to the benefit of the parties and their respective officers, directors, shareholders, members, heirs, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed this Termination of Development Agreement as of the date first written above.

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TOWN:
THE TOWN OF MARANA, an Arizona municipal corporation

By:_____
Ed Honea, Mayor

DEVELOPER:
OLD LOBO VILLAGIO, LLC, an Arizona limited liability company

By:_____
Ron B. Ault, Manager

ATTEST:

_____
_____, Town Clerk

APPROVED AS TO FORM:

_____

Jane Fairall, Town Attorney

STATE OF _____)
) ss.
County of _____)

On _____, before me, _____, a Notary Public in and for said state, personally appeared Ron B. Ault personally known to me (or proved to me on the basis of satisfactory evidence) to be the persons whose names are subscribed to the within instrument and acknowledged to me that they executed the same in their authorized capacities, and that by their signatures on the instrument, the persons, or the entity upon behalf of which the persons acted, executed the instrument.

WITNESS my hand and official seal.

_____
Notary Public in and for said State

My Commission Expires:

_____

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F. ANN RODRIGUEZ, RECORDER
RECORDED BY: BMV
DEPUTY RECORDER
1985 PE1

SMARA
TOWN OF MARANA
ATTN: TOWN CLERK
11555 W CIVIC CENTER DR
MARANA AZ 85653

DOCKET: 12846
PAGE: 4720
NO. OF PAGES: 13
SEQUENCE: 20061350941
07/14/2006
AG 16:26

MAIL
AMOUNT PAID $ 12.00

TANGERINE / THORNYDALE DEVELOPMENT AGREEMENT

TOWN OF MARANA, ARIZONA

THIS DEVELOPMENT AGREEMENT ("this Agreement") is made by and between the TOWN OF MARANA, an Arizona municipal corporation (the "Town"), and TANGERINE/THORNYDALE, L.L.C., (the "Developer"). The Town and the Developer are collectively referred to in this Agreement as the "Parties," any one of which is sometimes individually referred to as a "Party."

RECITALS

General Background

A. The Developer has an option to purchase approximately 58.84 acres of land located in the Town limits, as depicted on the map attached as **EXHIBIT A** and legally described on **EXHIBIT B** (the "Property").

B. The Developer proposes to develop the western portion of the Property as a medium-density attached or detached home residential project with approximately 107 residential units and the eastern portion of the Property as an approximately seven-acre mixed-use commercial development (collectively, the "Project").

C. The Parties desire the Project to be developed in a manner consistent with the development regulations that now apply to the Property, as amplified and supplemented by this Agreement (the "Applicable Development Requirements").

D. The Town and the Developer acknowledge that the development of the Property pursuant to this Agreement will result in planning and economic benefits to the Town and its residents.

E. The Developer has made and by this Agreement will continue to make a substantial commitment of resources for public and private improvements on the Property.

F. The Parties understand and acknowledge that this Agreement is a "Development Agreement" within the meaning of, and entered into pursuant to the terms of, A.R.S. § 9-500.05.

Land Use Background

G. The following are among the development regulations that apply to the Property:

i) The Town of Marana Land Development Code (including the written rules, regulations, procedures, and other policies relating to development of land, whether adopted by the Mayor and Council or by Town Staff) (collectively the "Land Development Code"), establishing, among other things, the type of land uses, location, density and intensity of such land uses, and community character of the Property, and providing for, among other things, the development of a variety of housing, commercial and recreation / open space opportunities.

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ii) The Tangerine / Thornydale Specific Plan (PCZ-05151) adopted by the Town on July 5, 2006 by Ordinance No. 2006.20 (the "Specific Plan").

H. This Agreement is consistent with the portions of the Town's General Plan applicable to the Property.

Development Impact Fees Background

I. The Town has adopted and may in the future amend certain development impact fees for roads, regional parks, water gravity storage, water renewable resources and water system infrastructure pursuant to A.R.S. § 9-463.05.

J. The Property is not within the Town's water service area, and is therefore not subject to the Town's water gravity storage, water renewable resources and water system infrastructure development impact fees.

K. The Developer will be entitled to credit pursuant to A.R.S. § 9-463.05(B)(3) toward the payment of the Town's adopted and future development impact fees based on the required dedication of lands and improvements for public regional parks and arterial roadways provided or to be provided by the Developer in connection with the development of the Project.

L. The Parties desire to memorialize their agreement concerning the amount of the development impact fee credit applicable to the Project, based on anticipated developer-financed infrastructure.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises and the mutual promises and agreements set forth in this Agreement, the Parties hereby agree as follows:

Article 1. Environmental Sensitivity and Site Disturbance

1.1. Site Disturbance Restriction. The Developer is entitled to disturb up to but shall disturb no more than 40% of the Property remaining after the dedication of Tangerine or Thornydale Roads (see paragraph 3.1 below). For purposes of this requirement, disturbed areas shall include, without limitation, any disturbance associated with emergency access, utilities, easements, onsite roadways, constructed drainageways, homesites, driveways, landscaping, or any other development activity that will occur or has already occurred on the Property. Town-approved unsurfaced pedestrian recreational trails within undisturbed natural open space areas shall not be considered disturbed areas for purposes of this requirement. If the Property is divided before undisturbed areas are identified and set aside in accordance with this Article, each individual parcel shall separately satisfy and account for the disturbance areas and undisturbed natural areas.

1.2. Identification of Undisturbed Areas. Before the issuance of any grading permit or other approval that would otherwise allow the Developer to remove vegetation from the Property, the Developer shall identify the portions of the Property anticipated to remain in their undisturbed natural state with such maps or other documentation as are reasonably acceptable to the Town. As development and development approvals occur for the Property, the specific locations of undisturbed natural areas, and the maps or other documentation associated with it, may be modified with the written reasonable consent of the Town, provided that the Developer shall at all times remain in compliance with paragraph 1.1 above.

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1.3. Protection of Undisturbed Areas During Construction. The Developer shall install construction fencing to assure that all areas required to remain in their undisturbed natural state are protected during construction. Except as specifically modified by the terms of this Agreement, the Developer shall comply with all Town grading requirements.

1.4. Permanent Maintenance of Undisturbed Natural Areas. With the exception of recreational trails constructed in undisturbed natural areas as provided in paragraph 1.1 above, undisturbed natural areas set aside as required by this Article shall be permanently maintained in their undisturbed natural state.

1.5. Ownership and Control of Undisturbed Natural Areas. Not later than when construction begins for each development plan or subdivision plat of the Property, the undisturbed natural areas set aside and maintained as required by this Article shall be placed in the permanent ownership and control of (i) one or more homeowners or owners associations established by declarations of restrictive covenants recorded over all or part of the Property or (ii) a government or conservation entity the Town reasonably determines is willing and able to permanently maintain the undisturbed natural areas as required by this Article.

1.6. Compliance with State and Federal Laws and Regulations. No approval, permit or authorization of the Town authorizes the Developer to violate any applicable federal or state laws or regulations, or relieves the Developer from the responsibility to ensure compliance with all applicable federal and state laws and regulations, including but not limited to the Endangered Species Act and Clean Water Act.

Article 2. Development Plans.

2.1. Development Review. The Property shall be developed in a manner consistent with the Applicable Development Requirements, which together establish the basic land uses, and the densities, intensities and development regulations that apply to the land uses authorized for the Property. Upon the Developer's compliance with the Applicable Development Requirements, the Town agrees to issue such permits or approvals for the Property as may be requested by the Developer.

2.2. Archaeological / Historic Resources. Development of the Property shall meet all Town requirements set forth in Title 2 and Title 20 of the Land Development Code related to Archeological and Historic Resources.

2.3. Site Built Construction and Building Permits. All construction on any portion of the Property, whether sold in bulk or individually, whether subdivided or not, shall be site built and shall require building permits.

Article 3. Infrastructure.

3.1. Right-of-Way Dedications. The Developer shall dedicate 125 feet of right-of-way for Tangerine Road and 45 feet of right-of-way for Thornydale Road, as shown in the Specific Plan. These right-of-way dedications shall be accomplished within one year after the Effective Date either by the recording of one or more subdivision plats showing the dedication or by separate instrument.

3.2. Water Utilities. Prior to the approval of the first final plat for the Property, the Developer shall prepare a Water Master Plan for the Property and shall enter into a Water Service Agreement with the City of Tucson Water Department ("Tucson Water") for potable and non-

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potable systems which sets for the various agreements of the Parties relating to, among other things, the interconnection and main extension from the existing water system, and the development, construction, dedication, ownership, and design of the water system, including necessary storage and well(s) necessary to serve the Property. The Parties intend that Tucson Water will provide potable water service to the Property, and that Tucson Water will provide non-potable water service to the Property (through the non-potable water system constructed by the Developer and dedicated to Tucson Water).

3.3. Wastewater. The Developer shall construct the necessary on-site sewer collection and transmission system to serve the Property. The sewer system shall be in conformance with, and subject to, the requirements of Pima County Wastewater Management and the Town, and shall be designed and constructed at no cost to the Town. The Developer will construct any necessary off-site trunk sewer lines necessary to serve the Property. To the extent necessary, the Town agrees to grant approval for construction within the public right-of-way.

3.4. Fire Protection. Before a certificate of occupancy is issued for any dwelling unit on the Property, the Developer shall have completed or shall provide evidence to the Town's satisfaction that Developer has made a diligent effort to complete the process of having the Property annexed into a fire district.

Article 4. Cooperation and Alternative Dispute Resolution.

4.1. Appointment of Representatives. To further the commitment of the Parties to cooperate in the progress of the Development, the Town and the Developer each shall designate and appoint a representative to act as a liaison between the Town and its various departments and the Developer. The initial representative for the Town (the "Town Representative") shall be the Planning Director, and the initial representative for the Developer shall be Mike Teufel or a replacement to be selected by the Developer. The representative shall be available at all reasonable times to discuss and review the performance of the Parties to this Agreement and the development of the Property.

4.2. Timing. The Town acknowledges the necessity for timely review by the Town of all plans and other materials (the "Submitted Materials") submitted by the Developer to the Town under this Agreement or pursuant to any zoning procedure, permit procedure, or other governmental procedure pertaining to the development of the Property and agrees to use its best efforts to accomplish such timely review of the Submitted Materials whenever possible.

4.3. Default; Remedies. If either Party defaults (the "Defaulting Party") with respect to any of that Party's obligations under this Agreement, the other Party (the "Non-Defaulting Party") shall be entitled to give written notice in the manner prescribed in paragraph 7.1 below to the Defaulting Party, which notice shall state the nature of the default claimed and make demand that such default be corrected. The Defaulting Party shall then have (i) 20 days from the date of the notice within which to correct the default if it can reasonably be corrected by the payment of money, or (ii) 30 days from the date of the notice to cure the default if action other than the payment of money is reasonable required, or if the non-monetary default cannot reasonably be cured within 30 days, then such longer period as may be reasonably required, provided and so long as the cure is promptly commenced within 30 days and thereafter diligently prosecuted to completion. If any default is not cured within the applicable time period set forth in this paragraph, then the Non-Defaulting Party shall be entitled to begin the mediation and arbitration proceedings set forth in paragraphs 4.4 and 4.5 below. The Parties agree that due to the size,

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nature and scope of the project to be developed on the Property, and due to the fact that it may not be practical or possible to restore the Property to its condition prior to Developer's development and improvement work, once implementation of this Agreement has begun, money damages and remedies at law will likely be inadequate and that specific performance will likely be appropriate for the enforcement of this Agreement. This paragraph shall not limit any other rights, remedies, or causes of action that either party may have at law or in equity.

4.4. Mediation. If there is a dispute under this Agreement which the Parties cannot resolve between themselves, the Parties agree that there shall be a 45 days moratorium on arbitration during which time the Parties agree to attempt to settle the dispute by nonbinding mediation before commencement of arbitration. The mediation shall be held under the commercial mediation rules of the American Arbitration Association. The matter in dispute shall be submitted to a mediator mutually selected by Developer and the Town. If the Parties cannot agree upon the selection of a mediator within seven days, then within three days thereafter the Town and the Developer shall request the presiding judge of the Superior Court in and for the County of Pima, State of Arizona, to appoint an independent mediator. The mediator selected shall have at least five years experience in mediating or arbitrating disputes relating to real estate development. The cost of any such mediation shall be divided equally between the Town and the Developer. The results of the mediation shall be non-binding on the Parties, and any Party shall be free to initiate arbitration after the moratorium.

4.5. Arbitration. After mediation (paragraph 4.4 above), an dispute, controversy, claim or cause of action arising out of or relating to this Agreement shall be settled by submission of the matter by both Parties to binding arbitration in accordance with the rules of the American Arbitration Association and the Arizona Uniform Arbitration Act, A.R.S. § 12-501 *et seq.*, and judgment upon the award rendered may be entered in a court having jurisdiction.

Article 5. Protected Development Rights.

5.1. General. To establish legally protected rights for the development of the Property in a manner consistent with the Applicable Development Requirements and to ensure reasonable certainty, stability and fairness to the Developer and the Town, the Developer and the Town agree that the Applicable Development Requirements shall remain in effect and shall not be changed for a period of four years after the execution of this Agreement without the written consent of the Developer. If a development plan or subdivision plat is approved within the four-year period, the Applicable Development Requirements for the approved development plan or subdivision plat shall remain in effect and shall not be changed for three years from the date of the development plan or subdivision plat approval without the written consent of the Developer.

5.2. Exceptions. As exceptions to the rights granted under paragraph 5.1 above, the Applicable Development Requirements may be modified to the extent necessary to:

5.2.1. comply with any state or federal laws or regulations, provided that if any such state or federal law or regulation prevents or precludes compliance with any provision of this Agreement, the affected provision shall be modified as necessary to comply with the state or federal law or regulation; or

5.2.2. alleviate or otherwise contain a legitimate, bona fide threat to the health or safety of the general public, in which event any ordinance, rule or regulation to be imposed in an

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effort to contain or alleviate the threat may be imposed only after public hearing and comment and shall not, in any event, be imposed arbitrarily.

Article 6. Development Impact Fees and Credits

6.1. General provisions applicable to the determination of all development impact fees and credits.

6.1.1. Total Lots. One hundred seven total residential lots are anticipated to be constructed on the western portion of the Property in connection with the development of the Project.

6.1.2. Recalculation of Credits Based on Revised Lot Total. The development impact fee credits calculated in this Article 6 shall be recalculated based on the actual number of lots shown on final subdivision plats for the Project.

6.1.3. Actual Construction and Dedication as Condition of Credit. The credit against development impact fees calculated in accordance with this Article 6 shall apply only to the extent the Developer's construction and dedication or transfer of rights to the Town as anticipated in the calculation of the credit has been completed or is in progress to the reasonable satisfaction of the Town.

6.1.4. Administration of Credits. Development impact fee credits will be administered and applied to the Project as set forth in the applicable development impact fee ordinance or in Town regulations and policies adopted in connection with it. Development impact fee credits are currently divided equally among all lots in the development entitled to the credit.

6.1.5. Future Fee Revisions. If the Town amends its development impact fees applicable to the Project, the fee per lot shall be the then-applicable fee minus the credit per lot calculated for that particular fee.

6.1.6. Future Impact Fees. If the Town adopts an impact fee not addressed in this Article 6 for the same infrastructure for which Developer has contributed land or made improvements or paid a voluntary fee pursuant to this Agreement, Developer shall be entitled to a credit for those contributions as set forth in A.R.S. § 9-463.05, and the credit shall be calculated in a manner consistent with the development impact fee credits set forth in this Article 6.

6.2. Arterial Roadway Development Impact Fees and Credits.

6.2.1. No Current Fee. As of the date of this Agreement, the Town has not yet adopted a roadway development impact fee that applies to the Project, but it anticipates adopting one while this Agreement is in effect.

6.2.2. Right-of-Way Dedications. The Developer will be entitled to credits against the future arterial roadway development fee based on the value of the rights-of-way for Tangerine and Thornydale Roads dedicated by the Developer to the Town pursuant to paragraph 3.1 above. The amount of the credit is anticipated to be determined based on the right-of-way costs used in determining the amount of the arterial roadway development fee.

6.2.3. No Developer Arterial Roadway Construction. The Developer does not anticipate constructing any arterial roadway improvements in connection with the Project, and is therefore not anticipated to be entitled to a credit for construction.

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6.3. Regional Park Development Impact Fees and Credits.

6.3.1. No Developer-Provided Regional Parks. The Developer does not anticipate constructing or providing any public regional parks in connection with the development of the Project, and is therefore not anticipated to be entitled to any credits against the Town's regional park development impact fee.

6.3.2. Current fee. As of the date of this Agreement, the Town's regional park development impact fee applicable to the Project is $3,028 per residential unit.

Article 7. General Terms and Conditions.

7.1. Notices and filings. All notices, filing, consents, approvals and other communications provided for in or given in connection with this Agreement shall be validly given, filed, made, transmitted or served if in writing and delivered personally or sent by registered or certified United States mail, postage prepaid, if to (or such other addresses as any Party may from time to time designate in writing and deliver in a like manner):

To the Town: Michael A. Reuwsaat, Town Manager
TOWN OF Marana
11555 West Civic Center Drive, A3
Marana, AZ 85653

To the Developer: Mike Teufel
TANGERINE/THORNYDALE, L.L.C.
2751 North Campbell Avenue
Tucson, AZ 85719

7.2. Term. After its execution by all Parties, this Agreement shall become effective upon the later of (i) the effective date of the Town Council resolution approving this Agreement, (ii) the effective date of the Specific Plan, or (iii) the date the Developer takes ownership of the Property (the "Effective Date"). However, this Agreement shall not become effective and shall have no force and effect if the Developer fails to take ownership of the Property within six months after the effective date of the Specific Plan. The term of this Agreement shall begin on the Effective Date and, unless sooner terminated by the mutual consent of the Parties, shall automatically terminate and shall thereafter be void for all purposes on the tenth anniversary of the Effective Date. If the Parties determine that a longer period is necessary for any reason, the term of this Agreement may be extended by written agreement of the Parties. The Developer shall be entitled to terminate this Agreement if the Town materially impairs the development entitlements on the Property granted by this Agreement.

7.3. Waiver. No delay in exercising any right or remedy shall constitute a waiver of that right or remedy, and no waiver by the Town or the Developer of the breach of any covenant of this Agreement shall be construed as a waiver of any preceding or succeeding breach of the same or any other covenant or condition of this Agreement.

7.4. Attorneys' Fees. If any Party brings a lawsuit against any other Party to enforce any of the terms, covenants or conditions of this Agreement, or by reason of any breach or default of this Agreement, the prevailing Party shall be paid all reasonable costs and reasonable attorneys' fees by the other Party, in an amount determined by the court and not the jury. Nothing in the use

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of the word "lawsuit" in the preceding sentence shall constitute a waiver of paragraph 4.5 above, requiring disputes to be resolved by binding arbitration.

7.5. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. The signature pages from one or more counterparts may be removed from such counterparts and such signature pages all attached to a single instrument so that the signatures of all Parties may be physically attached to a single document.

7.6. Headings and Recitals. The descriptive headings of this Agreement are inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions of this Agreement. The Recitals set forth at the beginning of this Agreement are hereby acknowledged, confirmed to be accurate and incorporated here.

7.7. Exhibits. Any exhibit attached to this Agreement shall be deemed to have been incorporated in this Agreement by reference with the same force and effect as if fully set forth in the body of this Agreement.

7.8. Further Acts. Each of the Parties shall execute and deliver all documents and perform all acts as reasonably necessary, from time to time, to carry out the matter contemplated by this Agreement. Without limiting the generality of the foregoing, the Town shall cooperate in good faith and process promptly any requests and applications for plat or permit approvals or revisions, and other necessary approvals relating to the development of the Property by the Developer and its successors.

7.9. Future Effect.

7.9.1. Time Essence and Successors. Time is of the essence of this Agreement. All of the provisions of this Agreement shall inure to the benefit of and be binding upon the successors, assigns and legal representative of the Parties, except as provided in paragraph 7.9.2 below.

7.9.2. Termination Upon Sale to End Purchaser or User. This Agreement shall terminate without the execution or recordation of any further document or instrument as to any lot which has been finally subdivided and individually (and not in "bulk") leased (for a period of longer than one year) or sold to the end purchaser or user and thereupon such lot shall be released from and no longer be subject to or burdened by the provisions of this Agreement.

7.10. No Partnership and Third Parties. It is not intended by this Agreement to, and nothing contained in this Agreement shall, create any partnership, joint venture or other arrangement between the Developer and the Town. No term or provision of this Agreement is intended to, or shall be for the benefit of any person, firm, organization or corporation not a party to this Agreement, and no such other person, firm, organization or corporation shall have any right or cause of action under this Agreement.

7.11. Other Instruments. Each Party shall, promptly upon the request of the other, have acknowledged and delivered to the other any and all further instruments and assurances reasonably requested or appropriate to evidence or give effect to the provisions of this Agreement.

7.12. Imposition of Duty by Law. This Agreement does not relieve any Party of any obligation or responsibility imposed upon it by law.

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7.13. Entire Agreement. This Agreement constitutes the entire agreement between the Parties pertaining to the subject matter of this Agreement. All prior and contemporaneous agreements, representation and understanding of the Parties, oral or written, are hereby superseded and merged in this Agreement.

7.14. Amendments to Agreement. No change or addition shall be made to this Agreement except by a written amendment executed by the Parties. The Parties agree to cooperate and in good faith pursue any amendments to this Agreement that are reasonably necessary to accomplish the goals expressed in the Final Plat and Specific Plan as amended by this Agreement. Within ten days after any amendment to this Agreement, it shall be recorded in the office of the Pima County Recorder by and at the expense of the Party requesting the amendment.

7.15. Names and Plans. The Developer shall be the sole owner of all names, titles, plans, drawings, specifications, ideas, programs, designs, and work products of every nature at any time developed, formulated or prepared by or at the instance of the Developer in connection with the Property or any plans; provided, however, that in connection with any conveyance of portions of the infrastructure as provided in this Agreement such rights pertaining to the portions of the infrastructure so conveyed shall be assigned to the extent that such rights are assignable, to the appropriate governmental authority.

7.16. Good Standing; Authority. The Developer represents and warrants to the Town that it is duly formed and validly existing under the laws of Arizona and is authorized to do business in the state of Arizona. The Town represents and warrants to the Developer that it is an Arizona municipal corporation with authority to enter into this Agreement under applicable state laws. Each Party represents and warrants that the individual executing this Agreement on its behalf is authorized and empowered to bind the Party on whose behalf each such individual is signing.

7.17. Severability. If any provision of this Agreement is declared void or unenforceable, it shall be severed from the remainder of this Agreement, which shall otherwise remain in full force and effect. If a law or court order prohibits or excuses the Town from undertaking any contractual commitment to perform any act under this Agreement this Agreement shall remain in full force and effect, but the provision requiring the act shall be deemed to permit the Town to act at its discretion, and if the Town fails to act, the Developer shall be entitled to terminate this Agreement.

7.18. Governing Law. This Agreement is entered into in Arizona and shall be construed and interpreted under the laws of Arizona, and the Parties agree that any litigation or arbitration shall take place in Pima County, Arizona. Nothing in the use of the word "litigation" in the preceding sentence shall constitute a waiver of paragraph 4.5 above, requiring disputes to be resolved by binding arbitration.

7.19. Interpretation. This Agreement has been negotiated by the Town and the Developer, and no party shall be deemed to have drafted this Agreement for purposes of construing any portion of this Agreement for or against any party.

7.20. Recordation. The Town shall record this Agreement in its entirety in the office of the Pima County Recorder no later than ten days after it has been executed by the Town and the Developer.

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7.21. No Developer Representations. Except as specifically set forth in this Agreement, nothing contained in this Agreement shall be deemed to obligate the Town or the Developer to complete any part or all of the development of the Property.

7.22. Approval. If any Party is required pursuant to this Agreement to give its prior written approval, consent or permission, such approval, consent or permission shall not be unreasonably withheld or delayed.

7.23. Force Majeure. If any Party shall be unable to observe or perform any covenant or condition of this Agreement by reason of "force majeure," then the failure to observe or perform such covenant or condition shall not constitute a default under this Agreement so long as such Party shall use its best effort to remedy with all reasonable dispatch the event or condition causing such inability and such event or condition causing such inability and such event or condition can be cured within a reasonable amount of time. "Force majeure," as used in this paragraph, means any condition or event not reasonably within the control of such party, including without limitation, "acts of God," strikes, lock-outs, or other disturbances of employer / employee relations; acts of public enemies; orders or restraints of any kind of government of the United States or any state thereof or any of their departments, agencies, or officials, or of any civil or military authority; insurrection; civil disturbances; riots; epidemics; landslides; lightning; earthquakes; subsidence; fires; hurricanes; storms; droughts; floods; arrests, restraints of government and of people; explosions; and partial or entire failure of utilities. Failure to settle strikes, lock-outs and other disturbances or employer / employee relations or to settle legal or administrative proceedings by acceding to the demands of the opposing Party or Parties, in either case when such course is in the judgment of and unfavorable to a Party shall not constitute failure to use its best efforts to remedy such a condition.

7.24. Conflict of Interest. This Agreement is subject to A.R.S. § 38-511, which provides for cancellation of contracts in certain instances involving conflicts of interest.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

12846 0472 29

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the last date set forth below their respective signatures.

TOWN:

THE TOWN OF MARANA, an Arizona municipal corporation

By: _____
Ed Honea, Mayor

Date: July 11, 2006

DEVELOPER:

TANGERINE/THORNYDALE, L.L.C.

By: _____
[Print Name] Michael Teufel
Its: Member
Date: 7/6/06

ATTEST:

_____
Jocelyn Bronson, Town Clerk

APPROVED AS TO FORM:

_____
Frank Cassidy, Town Attorney

STATE OF ARIZONA)
: SS
COUNTY OF PIMA)

The foregoing instrument was acknowledged before me on July 6, 2006, by Michael Teufel, as Member of Tangerine/Thornydale, L.L.C., an Arizona limited liability corporation.

_____
Notary Public

OFFICIAL SEAL
CHRISTINA THOMAS
NOTARY PUBLIC-ARIZONA
PIMA COUNTY
My Comm. Exp. June 30, 2007

12846 0473 0

Exhibit A: Legal Description

Tangerine/Thornydale Specific Plan

The South 1040 feet of the East half of Section 31 Township 11 South Range 13 East, Gila and Salt River Base and Meridian, Pima County, Arizona;

EXCEPT the East 30 feet lying within Thornydale Road as established by instrument recorded in Docket 1064 page 205, records of Pima County, Arizona; and

EXCEPT the South 50 feet lying within Tangerine Road according to Book 7 of Road Maps page 83, records of Pima County, Arizona; and

EXCEPT any portion lying within Camino de Manana Road No. 220, according to Book 2 of Road Maps, Pages 1 to 4 inclusive, records of Pima County, Arizona; and

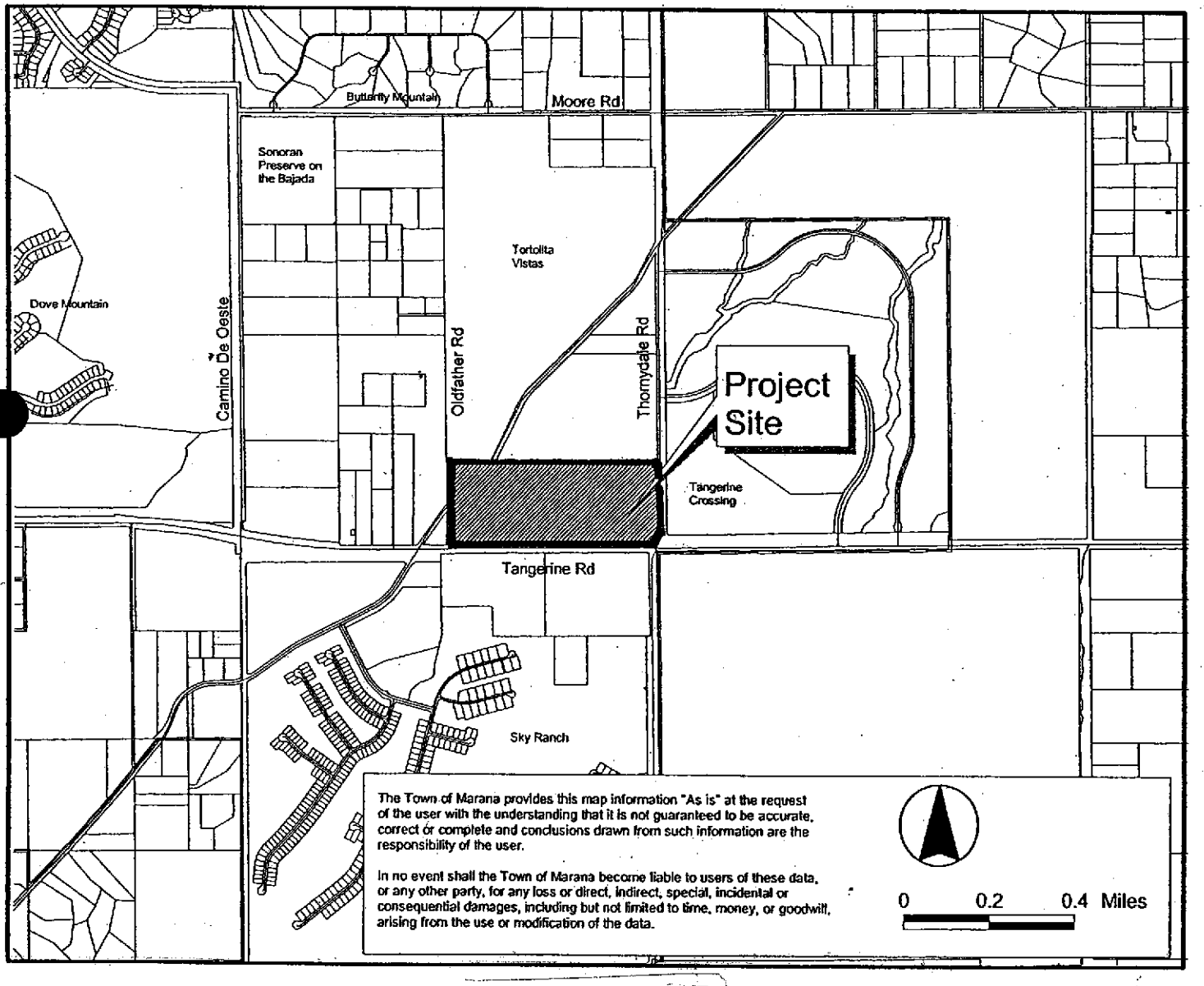
EXCEPT the triangular portion of land at the corner of Tangerine and Thornydale as described in Docket 12203 at page 6168 of the records of Pima County.

12846 0473 1

TOWN OF MARANA

Exhibit B
Tangerine/ Thornydale Specific Plan

CASE NO. PCZ-05151



A request for rezoning approximately 58.8 acres of land from "R-144" (Single Family Residential, 144,000 square foot minimum lot size) to "F" Specific Plan..

12846 0473 2

F. ANN RODRIGUEZ, RECORDER
RECORDED BY: DG
DEPUTY RECORDER
9999 PE4
TFNTI
BRIER IRISH & HUBBARD
2400 E ARIZONA BILTMORE CIR STE 1300
PHOENIX AZ 85016

DOCKET: 12919
PAGE: 8134
NO. OF PAGES: 5
SEQUENCE: 20062081308
10/27/2006
PAS 17:30
MAIL
AMOUNT PAID $ 10.00

Helen Shapiro, Esq.
Brier, Irish & Hubbard, PLC
2400 E. Arizona Biltmore Circle, Suite 1300
Phoenix, AZ 85016-2195

PARTIAL ASSIGNMENT AND ASSUMPTION OF DEVELOPER'S RIGHTS AND OBLIGATIONS

This Partial Assignment and Assumption of Developer's Rights and Obligations (the "Agreement") is entered into as of 10/26/06, 2006, between Tangerine Thornydale, L.L.C., an Arizona limited liability company (the "Original Developer"), and Old Lobo Villagio, LLC, an Arizona limited liability company (the "Successor Commercial Developer").

RECITALS

A. Original Developer is the "Developer" under that certain Tangerine Crossing Development Agreement dated July 11, 2006, between the Town of Marana, Arizona, and Original Developer, recorded on July 14, 2006, at Docket 12846, Page 4720, Official Records of Pima County, Arizona (the "Development Agreement").

B. Simultaneously with the recordation of this Agreement, Successor Commercial Developer has become the legal title holder of that portion of the real property subject to the Development Agreement described on **Exhibit "A"** attached hereto and incorporated herein by this reference (the "Commercial Property").

C. Original Developer desires to assign to Successor Commercial Developer all of Original Developer's rights under the Development Agreement with respect to the Commercial Property, and Successor Commercial Developer desires to assume all of Original Developer's obligations with respect to the Commercial Property under the Development Agreement, all upon the terms and conditions set forth below.

AGREEMENT

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Assignment and Assumption. Original Developer hereby assigns to Successor Commercial Developer all of its rights as Developer under the Development Agreement with respect to the Commercial Property, and Successor Commercial Developer hereby assumes all of the obligations of the Original Developer as the Developer under the Development Agreement with respect to the Commercial Property.

[Signature Page Follows]

12919 8134

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first set forth above.

Tangerine Thornydale, L.L.C., an Arizona limited liability company

By: One of its Managers, Tangerine Investments, L.L.C., an Arizona limited liability company

By: Its Manager, Tangerine Management, LLC, an Arizona limited liability company

By: _____
Printed Name: Michael P. Teufel Sr., solely in his capacity as the sole member of Tangerine Management, LLC

Old Lobo Villagio, LLC, an Arizona limited liability company

By: _____
Printed Name: Ron B. Ault
Its: Manager

20190810135

STATE of Arizona)
)
County Pima)

On October 27 2006, before me, Leslie Grant personally appeared Michael P Teutel Sr the manager of _____ of Tangerine Management, LLC, an Arizona limited liability company and the manager of Tangerine Investments, L.L.C., an Arizona limited liability company, one of the managers of Tangerine Thornydale, L.L.C., an Arizona limited liability company, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal.

Leslie A Grant
Notary Public

[SEAL]

OFFICIAL SEAL
LESLIE A. GRANT
NOTARY PUBLIC - ARIZONA
PIMA COUNTY
My Comm. Expires May 17, 2008

STATE of Arizona)
)
County of Pima)

On Sept 20, 2006 before me, J. Kaiser personally appeared Ron B. Ault, the manager of Old Lobo Villagio, LLC, an Arizona limited liability company, on behalf of the company, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s) or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and official seal.

J Kaiser
Notary Public

[SEAL]

OFFICIAL SEAL
J. KAISER
NOTARY PUBLIC-ARIZONA
PIMA COUNTY
My Comm. Exp. Sept. 30, 2006

12919 0836

EXHIBIT "A"

LEGAL DESCRIPTION

1996 0813 7

Escrow No. 60017186-JK
Title Order No. 60017186

EXHIBIT ONE

Proposed East Parcel Description

All that portion of the south 1040.00 feet of the east half of Section 31, Township 11 south, Range 13 east, Gila and Salt River Base and Meridian, Pima County, Arizona, more particularly described as follows:

Commencing at the southwest corner of the east half of said Section 31;

Thence north 00°04'55" west, along the west line of the east half of said Section 31, a distance of 1040.00 feet to a point on a line 1040.00 feet north of and parallel with the south line of the east half of said Section 31;

Thence north 89°51'29" east, along said parallel line, a distance of 1796.39 feet to the TRUE POINT OF BEGINNING;

Thence continue north 89°51'29" east, along said parallel line, a distance of 763.31 feet to a point 75.00 feet west of and parallel with the east line of the east half of Section 31;

Thence south 00°02'29" east, along said parallel line, a distance of 660.41 feet to a point on a line 45.00 westerly of and parallel with the westerly line of that certain parcel of land recorded in Docket 12203 at Page 6168;

Thence south 13°35'26" west, along said westerly line, a distance of 210.61 feet to a point on a line 175.00 feet north of and parallel with the south line of the east half of said Section 31;

Thence south 89°51'29" west, along said parallel line, a distance of 1031.26 feet;

Thence north 20°06'28" east, a distance of 921.99 feet to the TRUE POINT OF BEGINNING.

19619 0813 8

Council-Regular Meeting **C3**

Meeting Date: 11/01/2022

To: Mayor and Council

From: Jane Fairall, Town Attorney

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: Resolution No. 2022-111: Relating to Public Works; approving and authorizing the Mayor to execute a termination agreement between the Regional Transportation Authority of Pima County and the Town of Marana to terminate the Wildlife Linkages Amendment to Intergovernmental Transportation Funding Agreement for construction of improvements to Tangerine Road – Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive (Jane Fairall)

Discussion:

The Regional Transportation Authority of Pima County ("RTA") and the Town of Marana ("Town") entered into an intergovernmental agreement to facilitate the construction of improvements to Tangerine Road from Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive recorded on October 21, 2015, at Sequence 20152940571 (the "Project IGA"). The RTA and the Town subsequently entered into the Wildlife Linkages Amendment to the Project IGA to design and construct wildlife linkage improvements for the project. The Wildlife Amendment was recorded in the Pima County Recorder's office on December 6, 2016, at Sequence 20163410467.

The original Wildlife Amendment funding amount was $2,600,000 for design and construction of various wildlife linkage improvements for that first phase of the project. The improvements for this phase have been completed and are now fully operational, and the Town and the RTA now wish to terminate the Wildlife Amendment and make the remaining funds available (approximately $981,542.00) for

the next phase of the wildlife linkage improvements for the Tangerine Road corridor project from Interstate 10 to Dove Mountain Boulevard/Twin Peaks Road. The proposed termination agreement provides that the Wildlife Amendment will be terminated as of November 3, 2022, and that no further work under the Wildlife Amendment shall be performed or funded for this phase of the project after November 3, 2022.

Financial Impact:

The termination of this agreement makes funding available for subsequent phases of the project, as the first phase has been completed. The Town's current five year CIP program includes budget capacity for the project. Budget authorization includes both Town and RTA funding sources.

Staff Recommendation:

Staff recommends approval of the termination agreement.

Suggested Motion:

I move to adopt Resolution No. 2022-111, approving and authorizing the Mayor to execute a termination agreement between the Regional Transportation Authority of Pima County and the Town of Marana to terminate the Wildlife Linkages Amendment to Intergovernmental Transportation Funding Agreement for construction of improvements to Tangerine Road – Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive.

Attachments

Resolution No. 2022-111

Exhibit A - Termination Agreement

MARANA RESOLUTION NO. 2022-111

RELATING TO PUBLIC WORKS; APPROVING AND AUTHORIZING THE MAYOR TO EXECUTE A TERMINATION AGREEMENT BETWEEN THE REGIONAL TRANSPORTATION AUTHORITY OF PIMA COUNTY AND THE TOWN OF MARANA TO TERMINATE THE WILDLIFE LINKAGES AMENDMENT TO INTERGOVERNMENTAL TRANSPORTATION FUNDING AGREEMENT FOR CONSTRUCTION OF IMPROVEMENTS TO TANGERINE ROAD – DOVE MOUNTAIN BOULEVARD/TWIN PEAKS ROAD TO LA CAÑADA DRIVE

WHEREAS A.R.S. § 48-5301, *et seq.*, authorizes the Regional Transportation Authority of Pima County (RTA) to act as a regional taxing authority for the purpose of funding multi-modal transportation operations and improvements identified in the Regional Transportation Plan approved on May 6, 2006; and

WHEREAS the RTA is authorized by A.R.S. § 48-5304 (16) and § 48-5308 to administer and distribute the regional transportation funds to the members of the RTA and to sell bonds in furtherance of that purpose to fund those projects or programs identified in the Regional Transportation Plan; and

WHEREAS the Town Council adopted Marana Resolution Nos. 2009-101, 2010-42, and 2012-10, approving and amending an intergovernmental agreement with the RTA to facilitate and pay for a design concept report for the Tangerine Road corridor from La Cañada Drive to Interstate 10; and

WHEREAS the Town Council adopted Marana Resolution No. 2015-102 on September 15, 2015, approving an intergovernmental agreement with the Regional Transportation Authority of Pima County (RTA) for construction of improvements to Tangerine Road from Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive (the "Project IGA"); and

WHEREAS the Town Council adopted Marana Resolution No. 2016-094 on September 20, 2016, approving a Wildlife Linkages Amendment to the Project IGA; and

WHEREAS the Wildlife Linkages Amendment provided a funding amount of $2,600,000.00 for design and construction of various wildlife linkage improvements for the project; and

WHEREAS the improvements addressed by the Wildlife Linkage Amendment have been completed and are now fully operational, and the parties now wish to

terminate the Wildlife Linkages Amendment and make the remaining funds available (approximately $981,542.00) for the next phase of the wildlife linkage improvements along Tangerine Road from Interstate 10 to Dove Mountain Boulevard/Twin Peaks Road; and

WHEREAS the Mayor and Council of the Town of Marana feel it is in the best interests of the citizens of Marana to enter into the termination agreement addressed by this resolution.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, that the termination agreement between the Town of Marana and the RTA attached to and incorporated within this resolution as Exhibit A is hereby approved, and the Mayor is authorized to execute it for and on behalf of the Town of Marana.

IT IS FURTHER RESOLVED that the Town Manager and staff are hereby directed and authorized to undertake all other and further tasks required or beneficial to carry out the terms, obligations, conditions and objectives of the termination agreement.

PASSED AND ADOPTED by the Mayor and Council of the Town of Marana, Arizona, this 1st day of November 2022.

_____
Mayor Ed Honea

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

REGIONAL TRANSPORTATION AUTHORITY OF PIMA COUNTY (RTA) **TERMINATION OF INTERGOVERNMENTAL AGREEMENT AMENDMENT RECORDED IN SEQUENCE 20163410467** **PROJECT: TRANSPORTATION FUNDING AGREEMENT FOR THE WILDLIFE LINKAGE IMPROVEMENTS ALONG TANGERINE ROAD** **PARTIES**: **RTA AND THE TOWN OF MARANA**	

ORIGINAL TERM:	Not specified	**ORIGINAL AMOUNT:**	$2,600,000.00
CURRENT TERMINATION DATE:	Not specified	**PRIOR AMENDED AMOUNT:**	$0.00
AMENDED TERMINATION DATE:	11/3/2022	**AMOUNT THIS AMENDMENT:**	$0.00

TERMINATION AGREEMENT

WHEREAS, the Regional Transportation Authority of Pima County ("RTA") has entered into an Intergovernmental Agreement with the Town of Marana ("Town") to facilitate the construction of improvements to Tangerine Road – Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive recorded with its authorizing resolutions in the Pima County Recorder's office on October 21, 2015, at Sequence 20152940571 (the "Project IGA").

WHEREAS, RTA and Town subsequently entered into the Wildlife Linkages Amendment to the Project IGA to design and construct wildlife linkage improvements along the segment of Tangerine Road from Dove Mountain Boulevard/Twin Peaks Road to La Cañada Drive recorded with its authorizing resolutions in the Pima County Recorder's office on December 6, 2016, at Sequence 20163410467 (the "Wildlife Amendment").

WHEREAS, the original Wildlife Amendment funding amount was $2,600,000.00 for design and construction of various wildlife linkage improvements; and

WHEREAS, the improvements for this phase have been completed and are now fully operational, and the parties now wish to terminate the Wildlife Amendment as of the execution of this Termination Agreement, and make the remaining funds available (approximately $981,542.00) for the next phase of the wildlife linkage improvements along Tangerine Road from Interstate 10 to Dove Mountain Boulevard/Twin Peaks Road.

NOW, THEREFORE, the parties hereby agree that the Wildlife Amendment shall be terminated as of November 3, 2022, and that no further work under the Wildlife Amendment shall be performed or funded for this phase of the project after November 3, 2022.

In Witness Whereof, the Regional Transportation Authority of Pima County has caused this Termination Agreement to be executed by its Chair, and the Town of Marana has caused it to be executed by its Mayor, as demonstrated and attested below.

REGIONAL TRANSPORTATION AUTHORITY OF PIMA COUNTY:

_____ _____
Peter Yucupicio, Chair Date

TOWN OF MARANA:

_____ _____
Ed Honea, Mayor Date

ATTEST:

_____ _____
David Udall, Town Clerk Date

ATTORNEY CERTIFICATION

The foregoing Termination Agreement by and between the Regional Transportation Authority of Pima County and the Town of Marana has been reviewed pursuant to A.R.S. § 11-952 by the undersigned who have determined that it is in proper form and is within the powers and authority granted under the laws of the State of Arizona to those parties to the Agreement.

Regional Transportation Authority of Pima County:

_____ _____
Thomas Benavidez, Attorney for the Authority Date

Town of Marana:

_____ _____
Jane Fairall, Town Attorney Date

Council-Regular Meeting **C4**

Meeting Date: 11/01/2022

To: Mayor and Council

From: David L. Udall, Town Clerk/Assistant Town Attorney

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: Resolution No. 2022-112: Relating to Utilities; approving and authorizing the Mayor to sign agreements for construction of water and sewer facilities under private contract with Southern Arizona Logistics Center, LLC (David L. Udall)

Discussion:

This agenda item presents water and sewer infrastructure construction agreements for Southern Arizona Logistics Center, LLC pursuant to Section 14-4-3 of the Marana Town Code. If approved, these agreements will require the developer to construct the water and sewer infrastructure necessary to serve its development.

Staff Recommendation:

Staff recommends approval of Resolution No. 2022-112.

Suggested Motion:

I move to adopt Resolution No. 2022-112, approving and authorizing the Mayor to sign agreements for construction of water and sewer facilities under private contract with Southern Arizona Logistics Center, LLC.

Attachments

Resolution No. 2022-112

Exhibit A - Water Agreement

MARANA RESOLUTION NO. 2022-112

RELATING TO UTILITIES; APPROVING AND AUTHORIZING THE MAYOR TO SIGN AGREEMENTS FOR CONSTRUCTION OF WATER AND SEWER FACILITIES UNDER PRIVATE CONTRACT WITH SOUTHERN ARIZONA LOGISTICS CENTER, LLC

WHEREAS Southern Arizona Logistics Center, LLC desires for the Town to provide water and sewer services to the land described and depicted as Block 2 in the Final Block Plat for Crossroads at Gladden Blocks 1 – 8, recorded in the office of the Recorder of Pima County, Arizona on December 10, 2021, at Sequence No. 20213440123; and

WHEREAS Town staff has negotiated an Agreement for Construction of Water Facilities Under Private Contract and an Agreement for Construction of Sewer Facilities Under Private Contract with Southern Arizona Logistics Center, LLC (together, the "Facility Service Agreements"); and

WHEREAS the Mayor and Council find that entering into these agreements is in the best interests of the Town and its citizens.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA, that the Facility Service Agreements, substantially in the same form attached to and incorporated by this reference in this resolution as Exhibits A and B, are hereby approved, the Mayor is hereby authorized and directed to sign them for and on behalf of the Town of Marana, and the Town's Manager and staff are hereby directed and authorized to undertake all other and further tasks required or beneficial to carry out the terms, obligations, and objectives of the agreements.

PASSED AND ADOPTED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA, this 1st day of November, 2022.

_____
Mayor Ed Honea

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

TOWN OF MARANA AGREEMENT FOR CONSTRUCTION OF WATER FACILITIES UNDER PRIVATE CONTRACT

Southern Arizona Logistics Center Public Water Plan

THIS AGREEMENT (this "Agreement") is entered into by and between the TOWN OF MARANA an Arizona municipal corporation (the "Town"), and SOUTHERN ARIZONA LOGISTICS CENTER, LLC, a Delaware limited liability company (the "Developer"). The Town and the Developer are sometimes collectively referred to as the "Parties," each of which is sometimes individually referred to as a "Party."

RECITALS

A. This Agreement is entered into and authorized pursuant to Title 14 of the Marana Town Code as it may be amended from time to time ("Marana Town Code Title 14").

B. The Developer desires for the Town to provide water service to the land described in the Special Warranty Deed, recorded in the Pima County Recorder's office on May 12, 2022 at Sequence 20221320504, whose land area is referred to in this Agreement as the "Subject Property."

C. The Developer is the owner of the "Subject Property."

D. As a condition of securing water service from the Town for the Subject Property, the Developer agrees to install those certain water infrastructure improvements (the "Developer-Installed Facility") in accordance with the required plans, specifications, and materials as outlined and depicted in the Public Water Plan for Southern Arizona Logistics Center, Plan No. ENG2203-015, sealed by EPS Group on September 9, 2022, as revised and approved by the Town of Marana on October 4, 2022 (the "Facility Plan"), which is on file in the office of the Town of Marana Water Department.

E. The Developer desires that the Town take ownership of, operate, and service the Developer-Installed Facility.

F. The Town is willing to accept the Developer-Installed Facility and permit it to be connected to the Town water system provided it meets Town standards and the work is done in accordance with Town requirements.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants set forth in this Agreement, the Parties hereby agree as follows:

1. The Developer-Installed Facility

1.1. *Developer installation of the Developer-Installed Facility*. The Developer has designed and shall install, at the Developer's own expense, the water infrastructure

improvements as depicted in the Facility Plan. The water infrastructure improvements depicted on the Facility Plan are referred to in this Agreement as the "Developer-Installed Facility," and shall conform to the design standards of the City of Tucson Water Department and the Town of Marana Town Code Title 14 and special specifications and details as approved by the Town and by this reference made a part of this Agreement. The Facility Plan includes a plan note identifying the Developer-In-stalled Facility as a new water facility and shows any and all alterations to the existing water system. Construction and installation of the Developer-Installed Facility in accordance with the Facility Plan, including without limitation all labor, materials, equipment, supplies, and tools required for the construction and installation, is referred to in this Agreement as the "Work."

1.2. *Work by licensed contractor*. The Work shall be performed by a contractor properly licensed by the State of Arizona as determined by the Arizona Registrar of Contractors. In addition to any other contractor's license classifications required by the Arizona Registrar of Contractors, the contractor shall hold contractor's license classifications A, A-12 and A-16.

1.3. *Payment of connection fees*. Before any service connections are made from the Town's water system to the Developer-Installed Facility, the person or entity seeking the service connection shall pay to the Town the connection fees and any other fees required under Marana Town Code Title 14.

1.4. *Anticipated cost per meter*. The person or entity seeking installation of a meter from the Town shall pay all applicable fees and charges in effect at the time of the meter installation request. As of the effective date of this Agreement, the Town's fees and charges to install a five-eighths-inch water meter on the Subject Property are:

1.4.1. Meter Install Fee: $360

1.4.2. Water Infrastructure Impact Fee: $2,331

1.4.3. Water Resource Development Impact Fee: $3,050

1.5. *Developer-Installed Facility acceptance by Town*. No service connections shall be made from the Town's water system to the Developer-Installed Facility until the Developer-Installed Facility has been accepted by the Town in accordance with Marana Town Code Title 14.

1.6. *Developer's certification*. Execution of this Agreement certifies that the Developer has reviewed the Facility Plan and all other specifications applicable to the Work and has approved and agrees with the location of all service lines.

1.7. *Termination for lack of Work*. Approval of the Facility Plan shall lapse and this Agreement shall terminate if more than one year has passed since the date of this Agreement and the Work has not begun, or if the Work is discontinued for a period of one year.

2. Engineering and Inspection

2.1. *Registered civil engineer*. The Developer shall employ a Civil Engineer registered in the State of Arizona to design, lay out, establish control lines for and certify the layout of the Work according to the Facility Plan.

2.2. *Town inspector's authority*. Any inspector authorized by the Town shall have

full inspection authority over the Work.

2.3. *Inspection provisions*. The Developer shall furnish the Town's inspector with all facilities reasonably necessary to inspect the Work. The Work shall be subject to Town inspection at all times. Defective work shall be corrected in a manner satisfactory to the Town's inspector. Inspection by the Town is for the purpose of ensuring compliance with plans and specifications only. The Town makes no guarantee as to the safety or engineering soundness of plans prepared by the Developer or any contractor.

2.4. *Payment of Town inspector's overtime cost*. If scheduling by the Developer's contractor reasonably requires the Town's inspector to work overtime, the Developer or Developer's contractor shall pay the Town for any additional salaries, expenses or employee benefits relating to the overtime. For purposes of this paragraph, overtime is any time over 40 hours worked in a seven-day work period, any time over eight hours worked Monday through Friday, and any time worked on weekends and legal holidays observed by the Town.

3. Preconstruction Procedure

3.1. *Request to begin construction*. The Developer shall submit a written request to begin construction to the Town a minimum of five working days before the Work is to commence.

3.2. *Construction permit*. This Agreement shall be completed, signed and notarized, and returned to the Town prior to issuance of a construction permit for the Work.

3.3. *Start and completion of the Work*. No portion of the Work shall begin until the Town has issued a construction permit specifying the starting date and a reasonable time for completion.

3.4. *Progress of the Work*. The Work shall be commenced and carried on at such points and in such order as may be directed by the Town.

3.5. *Materials sampling and testing*. Materials shall be available for sampling and testing by the Town prior to being used in the Work. Materials that fail to meet Town specification shall be removed from the site.

3.6. *Permits and approvals*. The Developer shall, at Developer's expense, obtain all necessary permits and licenses for the Work, pay all fees and comply with all laws, ordinances and regulations relating to the Work.

4. Construction

4.1. *Developer's presence on site*. The Developer, or Developer's designated agent, shall be present at all times during performance of the Work. The name of the Developer's designated agent and the contractor performing the Work shall be furnished to the Town before the Work begins. Instructions given by the Town to the designated agent shall be deemed to have been given to the Developer.

4.2. *Competence and diligence*. The Developer shall employ only competent and efficient laborers, mechanics or artisans on the Work, and the Developer agrees to perform diligently to complete the Work on or before the completion date given in the notice to proceed.

4.3. *Paving*. The Applicant shall identify and locate all water valves prior to paving and set valve boxes to final grade after paving.

4.4. *Alterations to the existing Town water system*. The Developer shall, at Developer's expense, make any and all alterations to the existing water system either on-site or off-site necessitated by paving, drainage, or other improvements caused by the development of the Subject Property.

4.5. *Worksite safety*. The Developer shall require all contractors and subcontractors performing any portion of the Work to comply with all safety requirements of the Occupational Safety and Hazards Act as set forth by the Federal Government and as implemented by the State of Arizona. The Developer or its contractors shall be solely responsible for all fines or other penalties provided for by law for any violations of the Occupational Safety Hazards Act.

5. Dedication

5.1. *Transfer of the Developer-Installed Facility to the Town*. Upon the Town's final acceptance of the Work, the Developer shall at no cost grant, bargain, sell, convey, transfer and deliver to the Town the Developer-Installed Facility free and clear of all liens, claims, charges or encumbrances.

5.2. *Two-year warranty*. The Developer (or its contractor) shall warrant the Work to be free from all failures due to poor workmanship or materials for a period of two years from the date of the Town's final acceptance of the Work.

5.3. *Other conflicting construction prohibited*. The Developer shall not construct or allow the construction of any utility, structure, building, or other improvement that would interfere with the operation or maintenance of the Developer-Installed Facility.

5.4. *Developer's obligation to maintain finished grade*. The Developer agrees that all service lines, meters, and meter boxes on the Subject Property shall be to finished grade and that the Developer will remain responsible for raising or lowering said services as required until the Subject Property is fully developed.

5.5. *Acceptance by the Town*. The Town shall accept title to and take possession of the Developer-Installed Facility when the Work has been completed to the satisfaction of the Town. Subject to the Developer's continuing obligations under this Agreement, the Town shall operate and service the Developer-Installed Facility after taking over possession of it under this paragraph.

6. Miscellaneous

6.1. *Indemnity*. Developer shall indemnify, defend, and hold harmless the Town, its Mayor and Council, officers and employees, boards, committees and commissions from and against any loss, claim, suit, demand, cause of action, or liability of any nature, including but not limited to damage to property and injuries to persons, including death, arising or alleged to have arisen, in whole or in part, out of any negligent act or omission of the Developer or any contractor, subcontractor, or any person employed directly or indirectly by any of them in the performance of the Work or in the operation of the Developer-Installed Facility.

6.2. *Binding effect.* This agreement shall be binding upon and inure to the benefit of the successors and assigns of the Parties.

6.3. *Consent required for assignment.* The Developer may not assign this Agreement without the prior written consent of the Town, which consent shall not unreasonably be withheld.

6.4. *Cancellation for conflict of interest.* This Agreement is subject to A.R.S. § 38-511, which provides for cancellation in certain instances involving conflict of interest.

6.5. *Miscellaneous*. This Agreement shall be governed by and construed under the laws of the State or Arizona without regard to its conflicts of law principles, may be signed in multiple counterparts with the same effect as if all signatories had executed the same instrument, constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements and undertakings with respect to the same, and may not be modified, amended, altered or supplemented other than by written instrument signed by all of the parties hereto.

[Signature page follows.]

IN WITNESS WHEREOF the Parties have executed this Agreement as of the last date set forth below their respective signatures.

THE "TOWN":

TOWN OF MARANA,
an Arizona municipal corporation

By:_____
Ed Honea, Mayor

Date:_____

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

THE "DEVELOPER":

SOUTHERN ARIZONA LOGISTICS CENTER LLC, a Delaware limited liability company

By: SOUTHERN ARIZONA LOGISTICS CENTER MANAGER LLC
Its: Manager

By: _____
Name: Hunter Harris
Title: Manager

Date: _____

STATE OF _____)
)ss
County of _____)

The foregoing instrument was acknowledged before me on _____, 2022, by Hunter Harris, Manager of SOUTHERN ARIZONA LOGISTICS CENTER MANAGER, LLC, the Manager of SOUTHERN ARIZONA LOGISTICS CENTER, LLC, a Delaware limited liability company (the "Developer"), on its behalf.

(Seal)

_____
Notary Public

TOWN OF MARANA AGREEMENT FOR CONSTRUCTION OF SEWER FACILITIES UNDER PRIVATE CONTRACT

Southern Arizona Logistics Center Public Sewer Plan

THIS AGREEMENT (this "Agreement") is entered into by and between the TOWN OF MARANA an Arizona municipal corporation (the "Town"), and SOUTHERN ARIZONA LOGISTICS CENTER, LLC, a Delaware limited liability company (the "Developer"). The Town and the Developer are sometimes collectively referred to as the "Parties," each of which is sometimes individually referred to as a "Party."

RECITALS

A. This Agreement is entered into and authorized pursuant to Title 14 of the Marana Town Code as it may be amended from time to time ("Marana Town Code Title 14").

B. The Developer desires for the Town to provide sewer service to the land described in the Special Warranty Deed, recorded in the Pima County Recorder's office on May 12, 2022 at Sequence 20221320504, whose land area is referred to in this Agreement as the "Subject Property."

C. The Developer is the owner of the "Subject Property."

D. As a condition of securing sewer service from the Town for the Subject Property, the Developer agrees to install those certain sewer infrastructure improvements (the "Developer-Installed Facility") in accordance with the required plans, specifications, and materials as outlined and depicted in the Public Sewer Plan for Southern Arizona Logistics Center, Plan No. ENG2208-018, sealed by EPS Group on August 14, 2022 and approved by the Town of Marana on _____ (the "Facility Plan"), which is on file in the office of the Town of Marana Water Department.

E. On April 2, 2019, the Marana Town Council adopted Resolution No. 2019-027, designating as a protected facility the gravity portion of the Tangerine/Downtown Conveyance System (Town of Marana Project No. WR010, referred to in this Agreement as the "T/D Gravity Sewer") and requiring any land use with a sewer connection served by the T/D Gravity Sewer to pay a protected facility fee per single-family residence (or equivalent).

F. The Developer desires that the Town take ownership of, operate, and service the Developer-Installed Facility.

G. The Town is willing to accept the Developer-Installed Facility and permit it to be connected to the Town sewer system provided it meets Town standards and the work is done in accordance with Town requirements.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants set forth in this Agreement, the Parties hereby agree as follows:

1. The Developer-Installed Facility

1.1. *Developer installation of the Developer-Installed Facility*. The Developer has designed and shall install, at the Developer's own expense, the sewer infrastructure improvements as depicted in the Facility Plan. The sewer infrastructure improvements depicted on the Facility Plan are referred to in this Agreement as the "Developer-Installed Facility," and shall conform to the design standards of the Pima County Regional Wastewater Reclamation Department and the Town of Marana Town Code Title 14 and special specifications and details as approved by the Town and by this reference made a part of this Agreement. The Facility Plan includes a plan note identifying the Developer-Installed Facility as a new sewer facility and shows any and all alterations to the existing sewer system. Construction and installation of the Developer-Installed Facility in accordance with the Facility Plan, including without limitation all labor, materials, equipment, supplies, and tools required for the construction and installation, is referred to in this Agreement as the "Work."

1.2. *Work by licensed contractor*. The Work shall be performed by a contractor properly licensed by the State of Arizona as determined by the Arizona Registrar of Contractors. In addition to any other contractor's license classifications required by the Arizona Registrar of Contractors, the contractor shall hold contractor's license classifications A, A-12 and A-16.

1.3. *Payment of connection fees*. Before any service connections are made from the Town's sewer system to the Developer-Installed Facility, the person or entity seeking the service connection shall pay to the Town the connection fees and any other fees required under Marana Town Code Title 14.

1.4. *Offsite sewer*. Each connection to the T/D Gravity Sewer shall be responsible for payment of the protected facility fee existing as of the time of the building permit for its fair-share portion of the Town's cost to construct the T/D Gravity Sewer, payable upon application for a building permit for construction to be connected to the T/D Gravity Sewer. The protected facility fee is dependent on meter size. As of the date of this Agreement (and subject to amendment by the Marana Town Council), the protected facility fee for a five-eighths-inch meter is $519.67 per equivalent demand unit (EDU).

1.5. *Development impact fees*. The Developer shall be responsible to pay all applicable development impact fees including, but not limited to, the Wastewater Facilities Development Impact Fee. As of the effective date of this Agreement, the Town's Wastewater Facilities Development Impact Fee (based on a five-eighths-inch water meter) is $3,930.

1.6. *Developer-Installed Facility acceptance by Town*. Service connections shall not be made to the Developer-Installed Facility, and the Developer-Installed Facility shall not be connected to the Town's sewer system, until the Developer-Installed Facility has been accepted by the Town in accordance with Marana Town Code Title 14.

1.7. *Developer's certification*. Execution of this Agreement certifies that the Developer has reviewed the Facility Plan and all other specifications applicable to the Work and has approved and agrees with the location of all service lines.

1.8. *Termination for lack of Work*. Approval of the Facility Plan shall lapse and this Agreement shall terminate if more than one year has passed since the date of this Agreement and the Work has not begun, or if the Work is discontinued for a period of one year.

2. Engineering and Inspection

2.1. *Registered civil engineer*. The Developer shall employ a Civil Engineer registered in the State of Arizona to design, lay out, establish control lines for and certify the layout of the Work according to the Facility Plan.

2.2. *Town inspector's authority*. Any inspector authorized by the Town shall have full inspection authority over the Work.

2.3. *Inspection provisions*. The Developer shall furnish the Town's inspector with all facilities reasonably necessary to inspect the Work. The Work shall be subject to Town inspection at all times. Defective work shall be corrected in a manner satisfactory to the Town's inspector. Inspection by the Town is for the purpose of ensuring compliance with plans and specifications only. The Town makes no guarantee as to the safety or engineering soundness of plans prepared by the Developer or any contractor.

2.4. *Payment of Town inspector's overtime cost*. If scheduling by the Developer's contractor reasonably requires the Town's inspector to work overtime, the Developer or Developer's contractor shall pay the Town for any additional salaries, expenses or employee benefits relating to the overtime. For purposes of this paragraph, overtime is any time over 40 hours worked in a seven-day work period, any time over eight hours worked Monday through Friday, and any time worked on weekends and legal holidays observed by the Town.

3. Preconstruction Procedure

3.1. *Request to begin construction*. The Developer shall submit a written request to begin construction to the Town a minimum of five working days before the Work is to commence.

3.2. *Construction permit*. This Agreement shall be completed, signed and notarized, and returned to the Town prior to issuance of a construction permit for the Work.

3.3. *Start and completion of the Work*. No portion of the Work shall begin until the Town has issued a construction permit specifying the starting date and a reasonable time for completion.

3.4. *Progress of the Work*. The Work shall be commenced and carried on at such points and in such order as may be directed by the Town.

3.5. *Materials sampling and testing*. Materials shall be available for sampling and testing by the Town prior to being used in the Work. Materials that fail to meet Town specification shall be removed from the site.

3.6. *Permits and approvals*. The Developer shall, at Developer's expense, obtain all necessary permits and licenses for the Work, pay all fees and comply with all laws, ordinances and regulations relating to the Work.

4. Construction

4.1. *Developer's presence on site*. The Developer, or Developer's designated agent, shall be present at all times during performance of the Work. The name of the Developer's designated agent and the contractor performing the Work shall be furnished to the Town before the Work begins. Instructions given by the Town to the designated agent shall be deemed to have been given to the Developer.

4.2. *Competence and diligence*. The Developer shall employ only competent and efficient laborers, mechanics or artisans on the Work, and the Developer agrees to perform diligently to complete the Work on or before the completion date given in the notice to proceed.

4.3. *Alterations to the existing Town sewer system*. The Developer shall, at Developer's expense, make any and all alterations to the existing sewer system either on-site or off-site necessitated by paving, drainage, or other improvements caused by the development of the Subject Property.

4.4. *Worksite safety*. The Developer shall require all contractors and subcontractors performing any portion of the Work to comply with all safety requirements of the Occupational Safety and Hazards Act as set forth by the Federal Government and as implemented by the State of Arizona. The Developer or its contractors shall be solely responsible for all fines or other penalties provided for by law for any violations of the Occupational Safety Hazards Act.

5. Dedication

5.1. *Transfer of the Developer-Installed Facility to the Town*. Upon the Town's final acceptance of the Work, the Developer shall at no cost grant, bargain, sell, convey, transfer and deliver to the Town the Developer-Installed Facility free and clear of all liens, claims, charges or encumbrances.

5.2. *Two-year warranty*. The Developer (or its contractor) shall warrant the Work to be free from all failures due to poor workmanship or materials for a period of twoyears from the date of the Town's final acceptance of the Work.

5.3. *Other conflicting construction prohibited*. The Developer shall not construct or allow the construction of any utility, structure, building, or other improvement that would interfere with the operation or maintenance of the Developer-Installed Facility.

5.4. *Developer's obligation to maintain finished grade*. The Developer agrees that all service lines and other sewer facilities on the Subject Property shall be to finished grade and that the Developer will remain responsible for raising or lowering said services as required until the Subject Property is fully developed.

5.5. *Acceptance by the Town*. The Town shall accept title to and take possession of the Developer-Installed Facility when the Work has been completed to the satisfaction of the Town. Subject to the Developer's continuing obligations under this Agreement, the Town shall operate and service the Developer-Installed Facility after taking over possession of it under this paragraph.

6. Miscellaneous

6.1. *Indemnity.* Developer shall indemnify, defend, and hold harmless the Town, its Mayor and Council, officers and employees, boards, committees and commissions from and against any loss, claim, suit, demand, cause of action, or liability of any nature, including but not limited to damage to property and injuries to persons, including death, arising or alleged to have arisen, in whole or in part, out of any negligent act or omission of the Developer or any contractor, subcontractor, or any person employed directly or indirectly by any of them in the performance of the Work or in the operation of the Developer-Installed Facility.

6.2. *Binding effect.* This agreement shall be binding upon and inure to the benefit of the successors and assigns of the Parties.

6.3. *Consent required for assignment*. The Developer may not assign this Agreement without the prior written consent of the Town, which consent shall not unreasonably be withheld.

6.4. *Cancellation for conflict of interest.* This Agreement is subject to A.R.S. § 38-511, which provides for cancellation in certain instances involving conflict of interest.

6.5 *Miscellaneous*. This Agreement shall be governed by and construed under the laws of the State or Arizona without regard to its conflicts of law principles, may be signed in multiple counterparts with the same effect as if all signatories had executed the same instrument, constitutes the entire agreement between the parties with respect to the subject matter hereof and supersedes all prior agreements and undertakings with respect to the same, and may not be modified, amended, altered or supplemented other than by written instrument signed by all of the parties hereto.

[Signature page follows.]

IN WITNESS WHEREOF the Parties have executed this Agreement as of the last date set forth below their respective signatures.

THE "TOWN":

TOWN OF MARANA,
an Arizona municipal corporation

By:_____
Ed Honea, Mayor

Date:_____

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

THE "DEVELOPER":

SOUTHERN ARIZONA LOGISTICS CENTER LLC, a Delaware limited liability company

By: SOUTHERN ARIZONA LOGISTICS CENTER MANAGER LLC
Its: Manager

By: _____
Name: Hunter Harris
Title: Manager

Date: _____

STATE OF _____)
)ss
County of _____)

The foregoing instrument was acknowledged before me on _____, 2022 by Hunter Harris, Manager of SOUTHERN ARIZONA LOGISTICS CENTER MANAGER, LLC, the Manager of SOUTHERN ARIZONA LOGISTICS CENTER, LLC, a Delaware limited liability company (the "Developer"), on its behalf.

(Seal)

_____
Notary Public

Council-Regular Meeting **C5**

Meeting Date: 11/01/2022

To: Mayor and Council

Submitted For: Jing Luo, Water Director

From: Stephen Dean, Deputy Water Director

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: Resolution No. 2022-113: Relating to Utilities; approving and authorizing the Mayor to sign an amendment to the Intergovernmental Agreement, effective December 1, 2022, between the Town of Marana and Pima County for provision of water consumption data and sewer user account billing services (Jing Luo)

Discussion:

On November 17, 2020, the Town Council approved Resolution No. 2020-121 authorizing the Town to enter into an intergovernmental agreement (IGA) with Pima County for provision of water consumption data and sewer user account billing services. Based on this IGA between Pima County and the Town of Marana, the Marana Water Department processes billing for Pima County Regional Wastewater Reclamation Department (RWRD) customers each month and transfers appropriate data and revenues to RWRD. For this service, the Town currently collects $1.59 per month per customer account processed. The IGA has a two-year term with up to four optional one-year contract extensions following the initial term.

As the original agreement expires on November 30, 2022, Marana Water Department staff has negotiated a new billing rate for the upcoming year. Pursuant to the amendment to the IGA attached as Exhibit A, the rate will increase from $1.59 to $1.86 per account/per month, the maximum yearly limit will increase from $65,000 to $85,000 per year, and the IGA will be extended through November 30, 2023.

If adopted by Council, this amendment to the IGA will result in a slight increase in revenue from what is currently projected ($78,000).

Financial Impact:

Fiscal Year:	FY23
Budgeted Y/N:	Y
Amount:	$85,000

Staff Recommendation:

Staff recommends adoption of Resolution No. 2022-113, approving and authorizing the Mayor to sign an amendment to the intergovernmental agreement, effective December 1, 2022, between the Town of Marana and Pima County for provision of water consumption data and sewer user account billing services.

Suggested Motion:

I move to adopt Resolution No. 2022-113, approving and authorizing the Mayor to sign an amendment to the intergovernmental agreement, effective December 1, 2022, between the Town of Marana and Pima County for provision of water consumption data and sewer user account billing services.

Attachments

Resolution No. 2022-113

Amendment to Agreement

MARANA RESOLUTION NO. 2022-113

RELATING TO UTILITIES; APPROVING AND AUTHORIZING THE MAYOR TO SIGN AN AMENDMENT TO THE INTERGOVERNMENTAL AGREEMENT, EFFECTIVE DECEMBER 1, 2022, BETWEEN THE TOWN OF MARANA AND PIMA COUNTY FOR PROVISION OF WATER CONSUMPTION DATA AND SEWER USER ACCOUNT BILLING SERVICES

WHEREAS Pima County operates and maintains a public sanitary sewerage system and is the designated public sewer system provider for the eastern and southern portions of the Town of Marana; and

WHEREAS the Town of Marana is the potable water provider for a portion of the area that receives sewer service from Pima County; and

WHEREAS on November 17, 2020, the Town Council approved Resolution No. 2020-121 authorizing the Town to enter into an intergovernmental agreement with Pima County, effective December 1, 2020, for the provision of water consumption data and sewer user account billing services, which terminates on November 30, 2022; and

WHEREAS Town staff has negotiated with Pima County to increase the billing rate for each customer account to reflect increased costs for the Town and to extend the agreement; and

WHEREAS the Town and Pima County desire to enter into a an amendment to the intergovernmental agreement, effective December 1, 2022, extending the agreement through November 30, 2023 and increasing the monthly billing rate for the provision of water consumption data and sewer user account billing services.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA, AS FOLLOWS:

SECTION 1. The amendment to the intergovernmental agreement between the Town of Marana and Pima County for provision of water consumption data and sewer user account billing services set forth in the agenda materials accompanying this resolution is hereby approved, and the Mayor is hereby authorized to sign it for and on behalf of the Town of Marana.

SECTION 2. The Town's Manager and staff are hereby directed and authorized to undertake all other and further tasks required or beneficial to carry out the terms, obligations, and objectives of the intergovernmental agreement.

PASSED AND ADOPTED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA, this 1st day of November, 2022.

_____
Mayor Ed Honea

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

Pima County Department of Regional Wastewater Reclamation

Project: Sewer Billing and Collection Services

Contractor: Town of Marana

Contract No.: CT-WW-21-224

Contract Amendment No.: One (1)

Orig. Contract Term:	12/01/2020 - 11/30/2022	**Orig. Amount:**	$130,000.00
Termination Date Prior Amendment:	N/A	**Prior Amendments Amount:**	$ 0.00
Termination Date This Amendment:	11/30/2023	**This Amendment Amount:**	$ 85,000.00
		Revised Total Amount:	$215,000.00

INTERGOVERNMENTAL AGREEMENT AMENDMENT

WHEREAS, COUNTY and TOWN entered into an Intergovernmental Agreement (IGA) for services as referenced above; and

WHEREAS, TOWN and COUNTY pursuant to Article 4 – Term, have agreed to extend the IGA term for the first of four one-year renewal periods, and

WHEREAS, TOWN and COUNTY have agreed to increase the total contract amount to allow payment for the continued provision of sewer billing and collection services during the extended term of the contract.

NOW, THEREFORE, it is agreed as follows:

CHANGE: <u>Article 3 – Financing</u>

FROM:

a. For the services described in Exhibit A - Scope of Services, the County agrees to pay Town a monthly administrative and billing fee (collectively, the "Unit Price") of $1.59 per account per month, for the purpose of reimbursing the Town for the cost of billing and collection services each year. The billing fee is also intended to compensate Town for its implementation of cost and price control activities. Town will invoice County on a monthly basis for the billing and collection services rendered. Each invoice will include detailed documentation supporting the requested payment. Payment requests will assign all costs to items identified and authorized by this IGA. County will pay Town within 30 days for the services invoiced pursuant to this IGA. County may challenge any invoice or may request additional supporting data, but such challenge or data request will not delay County's payment.

TO:

a. For the services described in Exhibit A - Scope of Services, the County agrees to pay Town a monthly administrative and billing fee (collectively, the "Unit Price") of $1.86 per account per month, for the purpose of reimbursing the Town for the cost of billing and collection services

each year. The billing fee is also intended to compensate Town for its implementation of cost and price control activities. Town will invoice County on a monthly basis for the billing and collection services rendered. Each invoice will include detailed documentation supporting the requested payment. Payment requests will assign all costs to items identified and authorized by this IGA. County will pay Town within 30 days for the services invoiced pursuant to this IGA. County may challenge any invoice or may request additional supporting data, but such challenge or data request will not delay County's payment.

FROM:

b. Total payment for this contract shall not exceed $65,000.00 (the "Maximum Yearly Limit") annually. In the event population growth projections indicate that the Maximum Yearly Limit will be exceeded, County and Town will meet to discuss increasing funding to cover the costs for services. The terms of this IGA, however, may only be amended pursuant to Article 20 below.

TO:

b. Total payment for this contract shall not exceed $85,000.00 (the "Maximum Yearly Limit") annually. In the event population growth projections indicate that the Maximum Yearly Limit will be exceeded, County and Town will meet to discuss increasing funding to cover the costs for services. The terms of this IGA, however, may only be amended pursuant to Article 20 below.

CHANGE: <u>Article 4 – Term</u>

FROM: "…will terminate on November 30, 2022…"

TO: "…will terminate on November 30, 2023…"

CHANGE: <u>Scope of Services – Exhibit A, Section F</u>.

FROM:

F. Provide the County with read-only access to the computerized customer billing system maintained by the Town.

TO:

F. Provide the County with read-only access to the computerized customer billing system, Sprypoint, once it is implemented by the Town.

REMAINDER OF THIS PAGE INTENTIONALLY BLANK

Counterparts. This agreement may be executed in counterparts, each of which when fully executed and delivered will constitute a duplicate original. All counterparts together shall constitute a single agreement.

All other provisions of the Contract not specifically changed by this Amendment remain in effect and are binding upon the parties.

PIMA COUNTY:	**TOWN OF MARANA:**
_____	_____
Chair, Board of Supervisors	Mayor, Town of Marana
ATTEST	ATTEST
_____	_____
Clerk of the Board	Town Clerk
_____	_____
Date	Date

Approval as to Content for Pima County:

_____
Director, RWRD

_____
Date

_____
Director, Finance

_____
Date

Intergovernmental Agreement Determination

The foregoing Intergovernmental Agreement Amendment between Pima County and the Town of Marana has been reviewed by the undersigned, each of whom has determined that it is in proper form and is within the powers and authority granted under the laws of the State of Arizona to the party he or she represents.

PIMA COUNTY:	**TOWN OF MARANA:**
_____	_____
Deputy County Attorney	Town Attorney

Council-Regular Meeting **C6**

Meeting Date: 11/01/2022

To: Mayor and Council

Submitted For: George Cardieri, Real Property Manager

From: George Cardieri, Real Property Manager

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: Resolution No. 2022-114: Relating to Real Estate; approving and authorizing the Town Engineer to execute a Temporary Construction Easement granting Pima County the right to enter upon and to construct underground force main sewer pipelines through Town owned properties in the vicinity of the Santa Cruz River Park and El Rio Preserve (George Cardieri)

Discussion:

Pima County will be constructing the Continental Ranch Regional Pump Station Force Main Augmentation Project, which increases sewer conveyance capacity and adds redundancy between Pima County's Continental Ranch Regional Pump Station and Pima County's Tres Rios Wastewater Reclamation Facility. Pima County has requested a Temporary Construction Easement to enter into Town owned properties for the immediate commencement of construction activities in advance of presenting offers of just compensation to the Town for the permanent and temporary easement rights.

The proposed resolution will authorize the Town Engineer to execute the Temporary Construction Easement in favor of Pima County.

Staff Recommendation:

Staff recommends adoption of Resolution No. 2022-xxx, authorizing the Town Engineer, on behalf of the Town, to execute the Temporary Construction Easement in substantially the form attached to and incorporated in this resolution as Exhibit A, as requested by Pima County for the Continental Ranch Regional Pump Station Force Main Augmentation Project.

Suggested Motion:

I move to adopt Resolution No. 2022-114, authorizing the Town Engineer to execute the Temporary Construction Easement as requested by Pima County.

Attachments

Resolution No. 2022-xxx

Exhibit A (Temporary Construction Easement)

Project Information Sheet

MARANA RESOLUTION NO. 2022-114

RELATING TO REAL ESTATE; APPROVING AND AUTHORIZING THE TOWN ENGINEER TO EXECUTE A TEMPORARY CONSTRUCTION EASEMENT GRANTING PIMA COUNTY THE RIGHT TO ENTER UPON AND TO CONSTRUCT UNDERGROUND FORCE MAIN SEWER PIPELINES THROUGH TOWN OWNED PROPERTIES IN THE VICINITY OF THE SANTA CRUZ RIVER PARK AND EL RIO PRESERVE

WHEREAS the Town of Marana owns various properties in the vicinity of the Santa Cruz River Park and El Rio Preserve; and

WHEREAS Pima County will be constructing the Continental Ranch Regional Pump Station Force Main Augmentation Project, which increases sewer conveyance capacity and adds redundancy between Pima County's Continental Ranch Regional Pump Station and Pima County's Tres Rios Wastewater Reclamation Facility; and

WHEREAS Pima County has requested a Temporary Construction Easement to enter into Town owned properties for the immediate commencement of construction activities in advance of presenting offers of just compensation to the Town for the permanent and temporary easement rights; and

WHEREAS the Mayor and Council of the Town of Marana find that the public interests are served by approving this resolution.

NOW, THEREFORE, BE IT RESOLVED by the Mayor and Council of the Town of Marana, Arizona, authorizing the Town Engineer, on behalf of the Town, to execute the Temporary Construction Easement in substantially the form attached to and incorporated in this resolution as Exhibit A.

PASSED AND ADOPTED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA, this 1st day of November 2022.

Mayor Ed Honea

ATTEST:

APPROVED AS TO FORM:

David L. Udall, Town Clerk

Jane Fairall, Town Attorney

00079621.DOCX /1

TEMPORARY CONSTRUCTION EASEMENT

For valuable consideration, Town of Marana, an Arizona municipal corporation ("Grantor") grants unto **Pima County**, a political subdivision of the State of Arizona ("County") an exclusive Temporary Construction Easement over and upon the real property depicted on the attached **Exhibit "A"** (the "Property") for construction activities associated with the Continental Ranch Pump Station Force Main Sewer Improvement Project.

This Easement is subject to the following terms:

1. This Easement shall be effective, and County shall have a right to utilize the Property upon the start of construction and shall terminate upon the earlier of (i) 12 months after its effective date; or (ii) the completion of construction of the project.
2. Upon the completion of construction activities on the Property, County will remove all materials and supplies and leave the Property in a clean and graded condition.
3. Nothing herein contained shall be construed as granting title to the Property or as vesting in County any right of entry to the Property after the termination of this Easement.
4. County shall indemnify, defend and hold harmless Grantor from any and all present or future claims, demands, and causes of action in law or equity caused by the negligent or intentionally wrongful acts of the officers, authorized agents and/or employees of County, in connection with the work done pursuant to this Easement.

Signed this ___ day of _____, 20___.

TOWN OF MARANA, an Arizona municipal corporation

By:_____

Title:_____

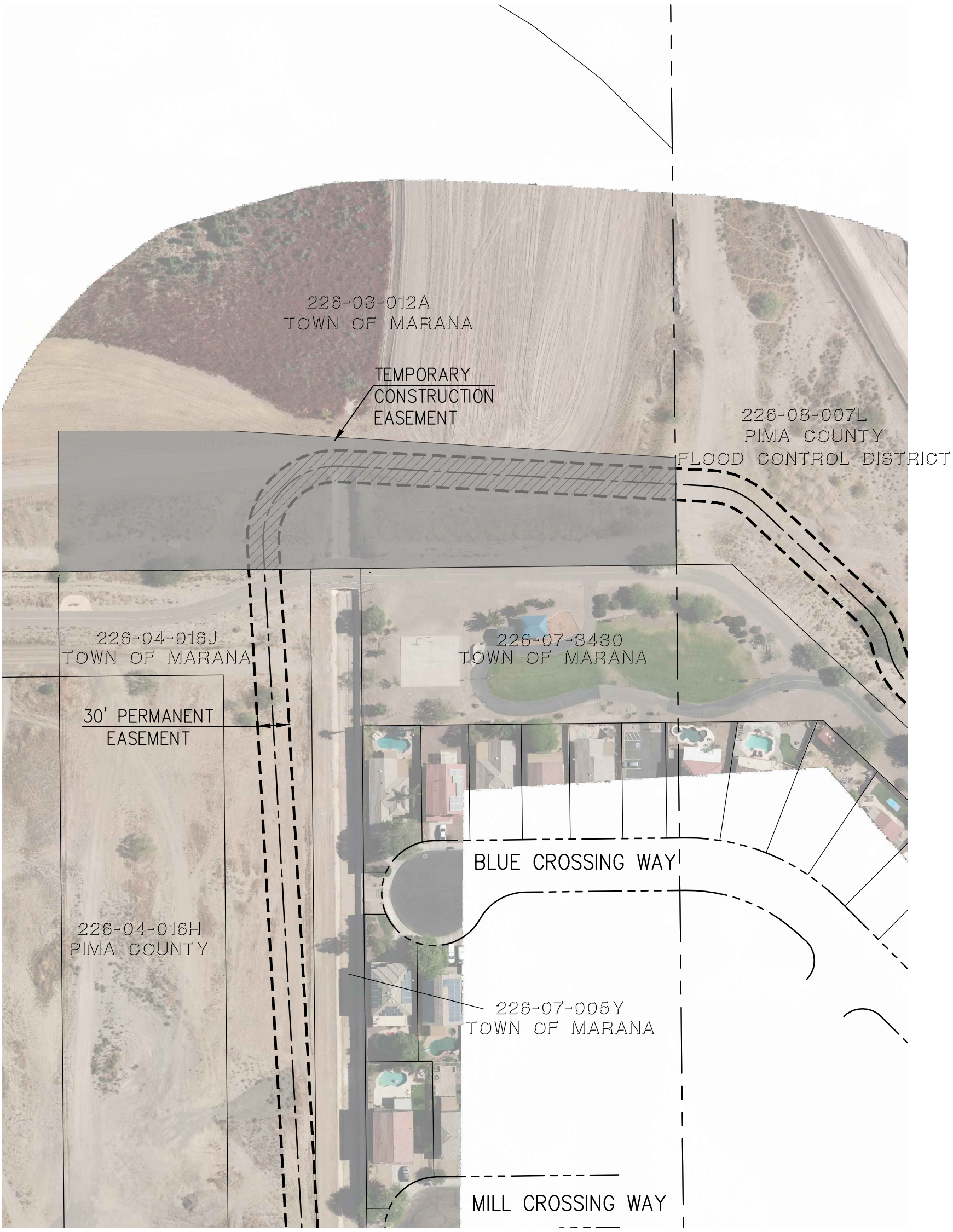
STATE OF ARIZONA)
) §
COUNTY OF PIMA)

This instrument was acknowledged before me this __ day of _____, 20___, by _____ as _____ of Town of Marana.

_____

(Seal) Notary Public

Exhibit A to Marana Resolution No. 2022-114



LEGEND

TEMPORARY CONSTRUCTION EASEMENT (1.64 AC)
(INCLUDES PERMANENT EASEMENT AREA)

PERMANENT EASEMENT (0.32 AC)

FORCE MAIN CENTERLINE

N
W E
S

0' 100'

SCALE: 1" = 100'

WestLand
100% EMPLOYEE OWNED
Engineering & Environmental Services, Inc.

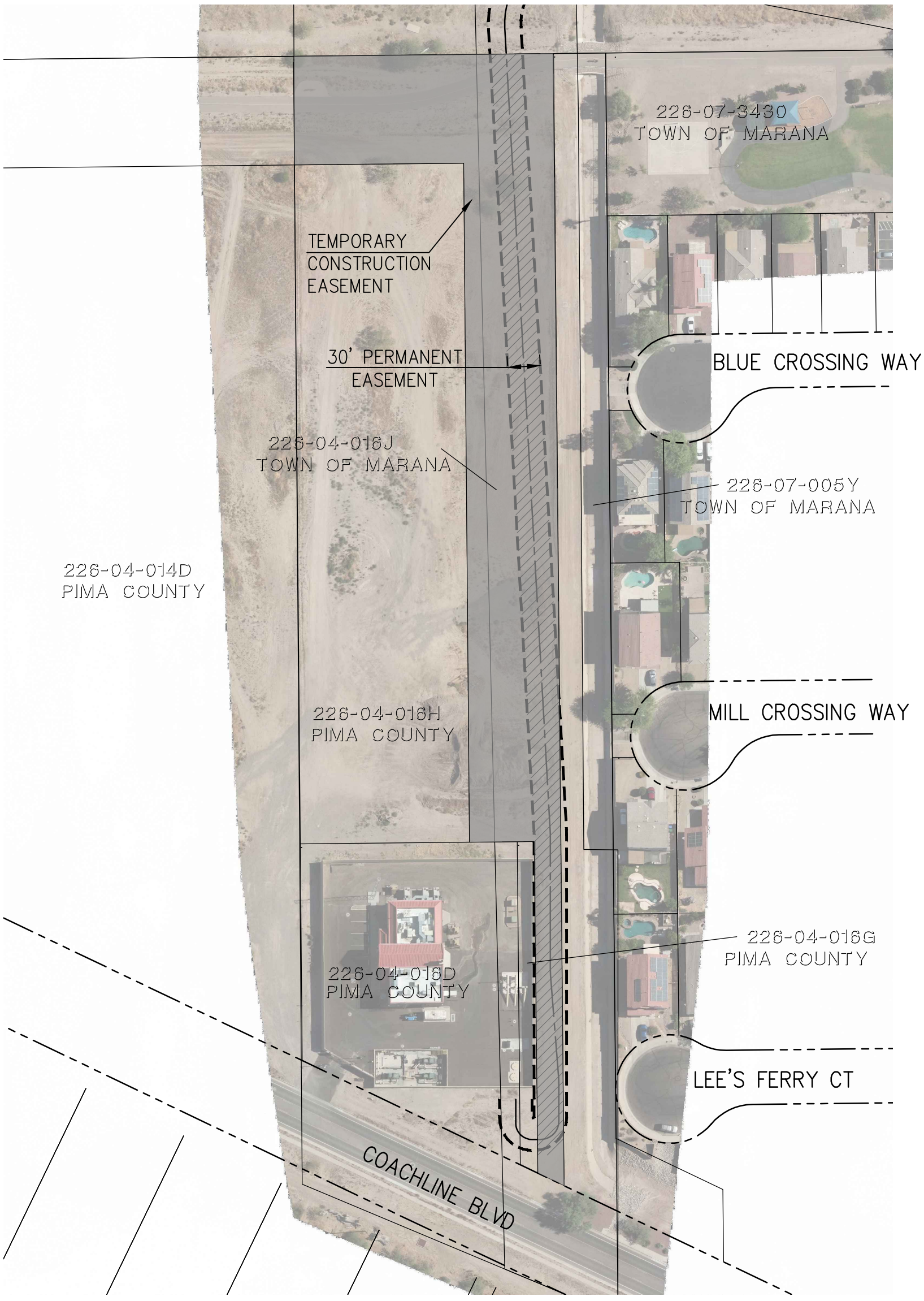
4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

CONTINENTAL RANCH REGIONAL PUMP STATION FORCE MAIN

EASEMENT EXHIBIT FOR PARCEL 226-03-012A

OCTOBER 04, 2022

M:\Jobs\1300's\1398.32\ENG\Exhibits\Phase 2 Easment Exhibits\1398.32-Ph2 Esmt 226-03-012A.dwg Oct 04, 2022



LEGEND

TEMPORARY CONSTRUCTION EASEMENT (1.93 AC)
(INCLUDES PERMANENT EASEMENT AREA)

PERMANENT EASEMENT (0.65 AC)

FORCE MAIN CENTERLINE

N
W E
S

0' 100'

SCALE: 1" = 100'

CONTINENTAL RANCH REGIONAL PUMP STATION FORCE MAIN

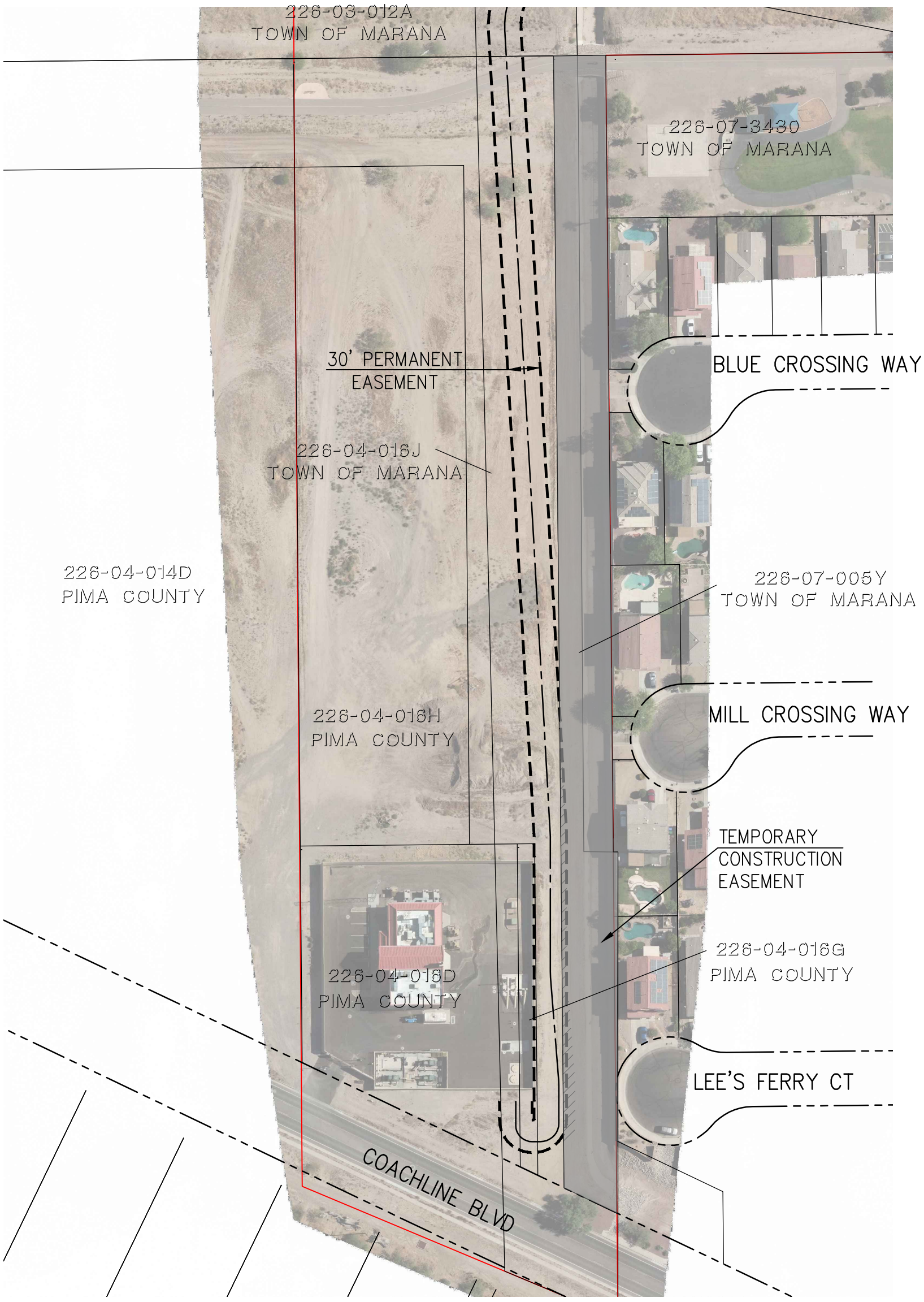
EASEMENT EXHIBIT FOR PARCEL 226-04-016J

OCTOBER 03, 2022

WestLand
100% EMPLOYEE OWNED
Engineering & Environmental Services, Inc.

4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

M:\Jobs\1300's\1398.32\ENG\Exhibits\Phase 2 Easment Exhibits\1398.32-Ph2 Esmt 226-04-016J.dwg Oct 03, 2022



LEGEND

TEMPORARY CONSTRUCTION EASEMENT (1.16 AC)
(INCLUDES PERMANENT EASEMENT AREA)

PERMANENT EASEMENT (0.05 AC)

FORCE MAIN CENTERLINE

N
W E
S

0' 100'

SCALE: 1" = 100'

CONTINENTAL RANCH REGIONAL PUMP STATION FORCE MAIN

EASEMENT EXHIBIT FOR PARCEL 226-07-005Y

OCTOBER 03, 2022

WestLand
100% EMPLOYEE OWNED
Engineering & Environmental Services, Inc.

4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

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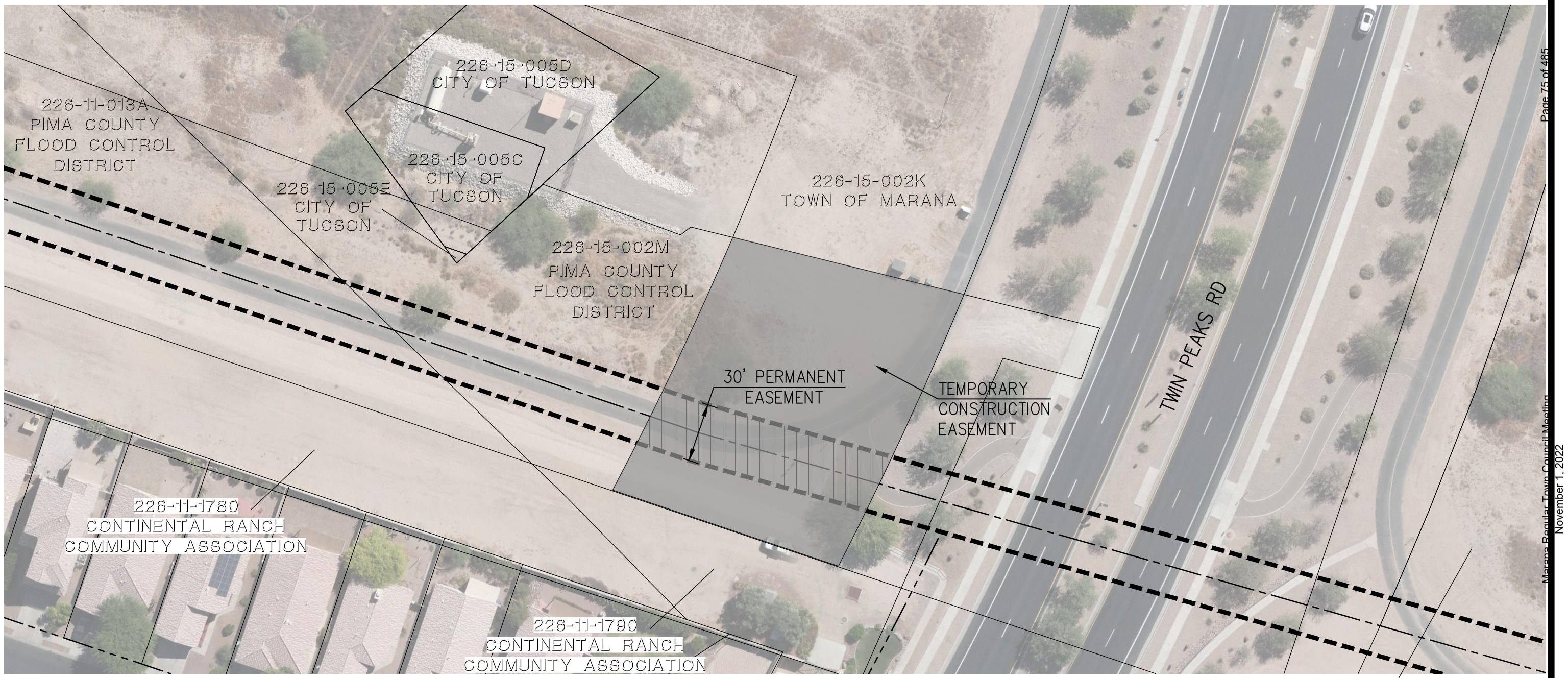


N
W E S

0' 50'

SCALE: 1" = 50'

LEGEND

- TEMPORARY CONSTRUCTION EASEMENT (0.40 AC) (INCLUDES PERMANENT EASEMENT AREA)
- PERMANENT EASEMENT (0.08 AC)
- FORCE MAIN CENTERLINE

WestLand
100% EMPLOYEE OWNED
Engineering & Environmental Services, Inc.

4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

CONTINENTAL RANCH REGIONAL PUMP STATION FORCE MAIN

EASEMENT EXHIBIT FOR PARCEL 226-15-002K

OCTOBER 04, 2022

PROJECTS

Project Overview

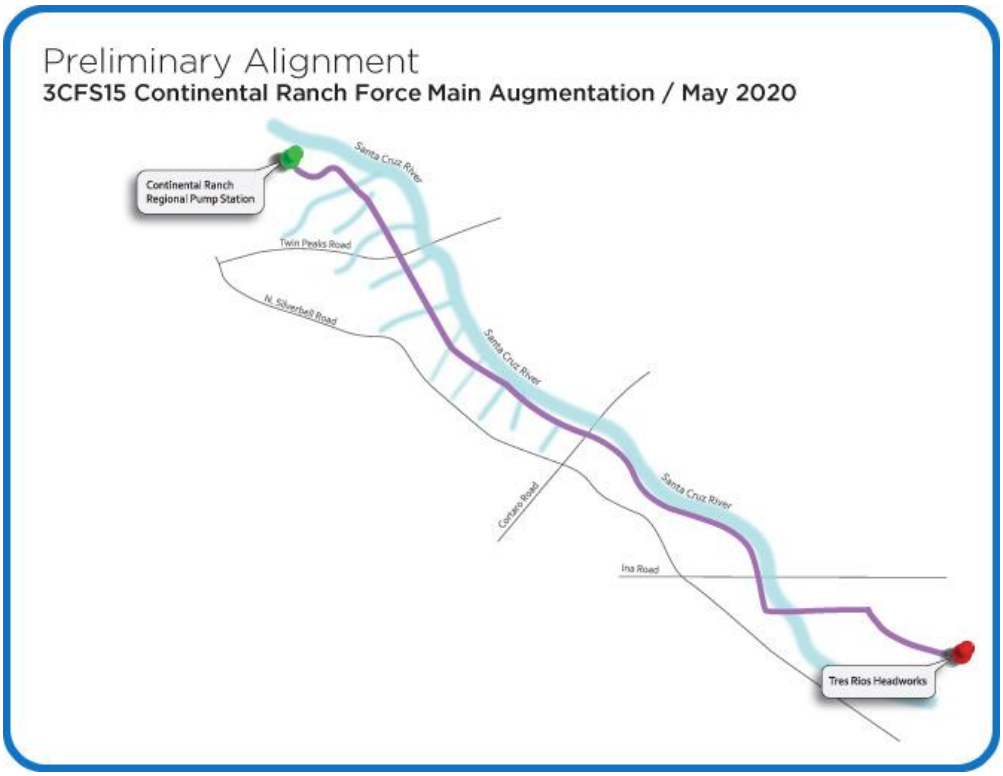
Tucson Boulevard Diversion Structure Replacement

Continental Ranch Force Main Augmentation

Old Nogales Interceptor

Completed Project Archive

Continental Ranch Regional Pump Station Force Main Augmentation



The Pima County Regional Wastewater Reclamation Department (RWRD) and its Design-Build Team, consisting of Borderland Construction, B&F Contracting, and Westland Resources, will soon begin a project to design and build seven miles of new dual force main sewer in Pima County, northwest Tucson/Marana area (see map). A force main is a pressurized sewer pipe that conveys wastewater where gravity sewage flows are not possible. Pumps push the sewage through the force main from lower to higher elevations or across landscapes where deep excavation is not feasible.

RWRD owns and operates the Continental Ranch Regional Pump Station (CRRPS) located on Coachline Boulevard approximately one-half mile east of Silverbell Road, and halfway between Twin Peaks Road and Avra Valley Road. The CRRPS delivers wastewater to the Tres Ríos Water Reclamation Facility (WRF) located on the west side of Interstate 10 near Ina Road, by means of an existing force main routed generally along the west bank of the Santa Cruz River to Cortaro Road, to Silverbell Road, to Ina Road, and then along the south side of Ina Road to the facility.

The addition of the dual-pipe force main between the CRRPS and Tres Ríos WRF will increase sewer conveyance capacity, operational flexibility, and adds redundancy to the existing pump station operations. The new dual force main will follow a similar alignment along the western bank of the Santa Cruz River, but vary as needed to optimize construction and operations.

Construction Alerts

COACHLINE BLVD. EAST OF LAMBERT LANE

Delivery of Pipe to Begin Mid-May
May 4, 2022

SANTA CRUZ RIVER FROM INA TO SILVERBELL PARK

Trenching Begins for 24-inch Pipe
Apr 28, 2022

Underground Utility Investigation Begins
Nov 12, 2020

EL RIO PRESERVE PARK AND INA ROAD

Geotechnical Boring and Soil Sampling Begin July 15
Jul 10, 2020

Design phase services to establish the new force main alignment and footprint started on April 13, 2020 and will take approximately 9-12 months to complete. Construction is slated to begin in early 2021. We expect the new force mains to be complete by late 2022. There may be preconstruction field investigations along the alignment prior to construction.

Check this page for updated project information or the latest traffic alerts detailing preconstruction field investigations that may have impacts to the traveling public. You can also sign up to receive electronic notifications.

PIMA COUNTY

Stay in touch or send us your comments

Want more information? Have a problem? A suggestion? Sign up with your email address to receive project updates or send us your comments.

Name

Email Address

All Projects

Message

SUBMIT

FOR MORE INFORMATION

Sewer Improvement Hotline
622-2527
Available 24 hours a day

Pima County Operations
724-6500
Available 24 hours a day

Council-Regular Meeting **C7**

Meeting Date: 11/01/2022

To: Mayor and Council

From: David L. Udall, Town Clerk/Assistant Town Attorney

Date: November 1, 2022

Subject: Approval of the Regular Council Meeting Summary Minutes of October 18, 2022 (David L. Udall)

Attachments

Regular Council Meeting Summary Minutes, 10/18/2022

MARANA TOWN COUNCIL
REGULAR COUNCIL MEETING

11555 W. Civic Center Drive, Marana, Arizona 85653
Council Chambers, October 18, 2022, at or after 6:00 PM

Ed Honea, Mayor
Jon Post, Vice Mayor
Patti Comerford, Council Member
Jackie Craig, Council Member
Herb Kai, Council Member
John Officer, Council Member
Roxanne Ziegler, Council Member

SUMMARY MINUTES

CALL TO ORDER AND ROLL CALL

Mayor Honea called the meeting to order at 6:00 PM and directed the Town Clerk to call the roll. All seven Council Members were present. A quorum was present.

PLEDGE OF ALLEGIANCE/INVOCATION/MOMENT OF SILENCE: Led by **Mayor Honea.**

APPROVAL OF AGENDA

Vice Mayor Post moved to remove Item C2 from the Consent Agenda and place it under Council Action and to otherwise approve the agenda as presented. Council Member Kai seconded the motion. Motion passed, 7-0.

CALL TO THE PUBLIC

PROCLAMATIONS

PR1 Proclamation recognizing the month of November as "American Diabetes Awareness Month" (David L. Udall): The proclamation was read by the Town Clerk.

PR2 Proclamation recognizing the month of November as "Lung Cancer Awareness Month" (David L. Udall): The proclamation will be mailed to the recipient.

MAYOR AND COUNCIL REPORTS: SUMMARY OF CURRENT EVENTS

Council Member Comerford recognized Marana High School dance team members in attendance at the meeting and highlighted a letter from a constituent complementing the Town.

Mayor Honea commented on and praised the recent Fall Festival event.

MANAGER'S REPORT: SUMMARY OF CURRENT EVENTS

Town Manager Terry Rozema stated the Town issued 15 single-family residential permits in October thus far with 21 pending applications. Last October, there was a total of 128 issued permits for the month. He praised the Fall Festival event and staff that put on the event and said the Holiday Festival event was scheduled for December 3, 2022. **Mr. Rozema** said the Town was draining water at El Rio Preserve for testing and for shoring up the bottom of the lake. He said another Concerts in the Courtyard event was scheduled for October 20, 2022 at 5:00 PM. **Mr. Rozema** stated the construction work around the Municipal Complex is on schedule to be completed prior to the Holiday Festival. He said **Development Services Deputy Director Jennifer Flood** would be the new Public Works Deputy Director**.**

PRESENTATIONS

CONSENT AGENDA

C1 Ordinance No. 2022.018: Relating to Business Regulations; revising Marana Town Code Title 9 (Business Regulations); revising section 9-13-7 (Operational Requirements) to authorize mobile food vendors selling shaved ice to operate on public rights-of-way in areas zoned for residential use; and designating an effective date (Libby Shelton)

[Item C2 was removed from the Consent Agenda and placed under Council Action.]

C3 Ordinance No. 2022.020: Relating to Municipal Court; revising Marana Town Code Title 5 (Municipal Court), chapter 5-2 (Magistrate department), section 5-2-1 (Town magistrate) to provide that the Town Magistrate's term of office shall be for a minimum period of two years; and designating an effective date (Jane Fairall)

C4 Resolution No. 2022-102: A resolution of the Mayor and Common Council of the Town of Marana, Arizona, approving the form and authorizing the execution and delivery of a loan agreement with the Water Infrastructure Finance Authority of Arizona from its Drinking Water Revolving Fund Program; delegating the determination of certain matters relating thereto to the manager of the town; providing for the transfer of certain monies and making certain covenants and agreements with respect thereto; authorizing the taking of all other actions necessary to the consummation of the transactions contemplated by such loan agreement and this resolution and declaring an emergency (Jing Luo)

C5 Resolution No. 2022-104: Relating to Municipal Court; approving the appointment of Mary Soehnle as a civil traffic violation hearing officer for the Marana Municipal Court (Laine McDonald)

C6 Resolution No. 2022-105: Relating to Police Department; approving and authorizing the Chief of Police to execute a Task Force Agreement between the United States Department of Justice, Drug Enforcement Administration and the Marana Police Department for 2022-2026 (Libby Shelton)

C7 Resolution No. 2022-106: Relating to Water; approving and authorizing the Mayor to sign the Intergovernmental Agreement Between the Arizona Water Banking Authority and Town of Marana for M&I Firming (Jing Luo)

C8 Approval of the Regular Council Meeting Summary Minutes of October 4, 2022, and Approval of Council Special Meeting Summary Minutes of October 5, 2022 (David L. Udall)

Vice Mayor Post moved to approve the Consent Agenda with Item C2 removed. Council Member Kai seconded the motion. Mayor Honea requested a roll call vote. In favor: Mayor Honea, Vice Mayor Post, Council Member Craig, Council Member Comerford, Council Member Kai, Council Member Officer, and Council Member Ziegler. Against: None. Motion passed, 7-0.

LIQUOR LICENSES

BOARDS, COMMISSIONS AND COMMITTEES

COUNCIL ACTION

C2 Ordinance No. 2022.019: Relating to Mayor and Council; revising Marana Town Code Title 2 (Mayor and Council), chapter 2-2 (Council election), section 2-3-4 (Powers and duties of the mayor) to provide that the Mayor's emergency powers do not include the power to close businesses; and designating an effective date (Jane Fairall)

Town Attorney Jane Fairall presented this item. **Ms. Fairall** said the ordinance would amend the Town Code to conform with the requirements of HB 2107, which changed state law to preclude mayors from closing businesses as part of their emergency powers.

Council Member Ziegler moved to adopt Ordinance No. 2022.019. Council Member Comerford seconded the motion. Motion passed 7-0.

A1 PUBLIC HEARING: Ordinance No. 2022.021: Relating to Development; approving a modification of a rezoning condition of Marana Ordinance No. 2004.07, which approved the rezoning for the 104-acre Willow Ridge development, to delete a condition that prohibits two-story construction within 300 feet of Cortaro Farms Road as it applies to Block B of Willow Ridge, a 3.60-acre parcel located at the southwest corner of Cortaro Farms Road and Sandy Desert Trail (Brian D. Varney)

Mayor Honea opened the public hearing at 6:15 PM.

Senior Planner Brian Varney presented this item. A copy of the PowerPoint presentation is on file with the Town Clerk's Office. **Mr. Varney** explained the rezoning request involves changing a rezoning condition in Ordinance No. 2004.07 to allow for two-story development within 300 feet of Cortaro Farms Road for an approximately 3.60-acre parcel of land located on the southwest corner of Cortaro Farms Road and Sandy Desert Trail.

Mr. Burak Bekat with A23 Studios Corporation addressed the Council on behalf of the applicant and asked if there were any questions.

Mayor Honea asked if apartments or condominiums would be developed on the subject property. **Mr. Bekat** stated condominiums would likely be developed on the property.

Mayor Honea closed the public hearing at 6:20 PM.

Vice Mayor Post moved to adopt Ordinance No. 2022.021. Council Member Kai seconded the motion. Motion passed, 7-0.

A2 PUBLIC HEARING: Ordinance No. 2022.022: Relating to Development; adopting revisions to Title 17 "Land Development" of the Marana Town Code, including miscellaneous revisions to Chapter 17-4 "Zoning", Section 17-4-2 (Use matrix) and Section 17-4-7 (Commercial zoning districts), Section 17-6-8 (Medical marijuana dispensary), and Chapter 17-10 "Signs", Section 17-10-15 (Classification; enforcement; removal); and designating an effective date

Resolution No. 2022-107: Relating to Development; declaring as a public record filed with the Town Clerk the amendments adopted by Ordinance No. 2022.022, revisions to Title

17 "Land Development" of the Marana Town Code, including miscellaneous revisions to Chapter 17-4 "Zoning", Section 17-4-2 (Use matrix) and Section 17-4-7 (Commercial zoning districts), Section 17-6-8 (Medical marijuana dispensary), and Chapter 17-10 "Signs", Section 17-10-15 (Classification; enforcement; removal) (Steve Cheslak)

Mayor Honea opened the public hearing at 6:22 PM.

Planning Manager Steven Cheslak presented this item. A copy of the PowerPoint presentation is on file with the Town Clerk's Office. **Mr. Cheslak** explained that the Town Council adopted comprehensive revisions to the Land Development Code on June 15, 2021 (Ordinance No. 2021.010) with additional minor revisions adopted on March 15, 2022 (Ordinance 2022.006). He summarized the following proposed additional revisions:

- Amending Chapter 17-4 (Zoning) to modify the Use Matrix in Section 17-4-2 to include "motel" use under the lodging category and to modify Table 6 in Section 17-4-7 (Commercial zoning districts) to include cross references to existing residential standards for allowed residential uses in commercial zones.
- Amending Chapter 17-6 (General Development Regulations) to modify Section 17-6-8 (Medical marijuana dispensary) to clarify the definition of offsite cultivation location.
- Amending 17-10 (Signs) to modify Section 17-10-15 (Classification; enforcement; removal) to provide authority to Code Enforcement staff to remove signs on public property in addition to removing signs within public right-of-way.

Mayor Honea closed the public hearing at 6:25 PM.

Council Member Kai moved to adopt Ordinance No. 2022.022 and Resolution No. 2022-107. Council Member Officer seconded the motion. Motion passed, 7-0.

A3 Ordinance No. 2022.023: Relating to Finance; amending the Town of Marana comprehensive fee schedule to modify police extra-duty rates, to clarify fee for traffic impact analysis, to add sewer and water tap fees, and to clarify fee for commercial activity permit; and designating an effective date (Yiannis Kalaitzidis)

Finance Director Yiannis Kalaitzidis presented this item. **Mr. Kalaitzidis** explained that the proposed fee update involved: extra duty police service fees adjusted to reflect market changes related to salaries for police officers, sewer and water fees adjusted to reflect actual costs of service, and changes to development and Parks and Recreation fees to provide clarification for customers. **Mr. Kalaitzidis** said notice was posted and that

relevant stakeholders were contacted. No comments were received. The changes would become effective on December 1, 2022.

Vice Mayor Post moved to adopt Ordinance No. 2022.023. Council Member Ziegler seconded the motion. Motion passed, 7-0.

A4 Resolution No. 2022-108: Relating to Building; approving and authorizing the Mayor to sign an Intergovernmental Agreement with Northwest Fire District for fire code official services (David L. Udall)

Town Clerk/Assistant Town Attorney David Udall presented this item. **Mr. Udall** explained the Town Council approved an intergovernmental agreement (IGA) between the Town and Northwest Fire District in February of 2009 authorizing the District to provide Fire Code Official services for portions of the Town located outside of a fire district. The IGA was renewed in April of 2015 and expired in 2020. He further explained that in 2016, the Marana Town Code was amended to define "fire chief" for areas not within a fire district as the Town's building official or designee. **Mr. Udall** said that if approved, the resolution would authorize the renewal of the IGA, and that the renewed IGA would account for the 2016 Town Code change by designating the District's fire chief, or someone authorized to act on his or her behalf, as the "fire chief" for areas of the Town not located within a fire district.

Council Member Comerford moved to adopt Resolution No. 2022-108. Council Member Officer seconded the motion. Motion passed, 7-0.

ITEMS FOR DISCUSSION / POSSIBLE ACTION

EXECUTIVE SESSIONS
Pursuant to A.R.S. § 38-431.03, the Town Council may vote to go into executive session, which will not be open to the public, to discuss certain matters.

FUTURE AGENDA ITEMS
Notwithstanding the Mayor's discretion regarding the items to be placed on the agenda, if three or more Council members request that an item be placed on the agenda, it must be placed on the agenda for the second regular Town Council meeting after the date of the request, pursuant to Marana Town Code Section 2-4-2(B).

Mayor Honea asked for future agenda items. There were no future agenda items.

ADJOURNMENT

Mayor Honea asked for a motion to adjourn the meeting.

Vice Mayor Post moved to adjourn the meeting. Council Member Comerford seconded the motion. Motion passed, 7-0. Meeting adjourned at 6:30 PM.

CERTIFICATION

I hereby certify that the foregoing are the true and correct minutes of the Marana Town Council meeting held on October 18, 2022. I further certify that a quorum was present.

_____

David L. Udall, Town Clerk

DRAFT

Council-Regular Meeting **A1**

Meeting Date: 11/01/2022

To: Mayor and Council

From: Brian Varney, Senior Planner

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: PUBLIC HEARING: Ordinance No. 2022.024: Relating to Development; approving an amendment to the Sanders Grove Specific Plan, including comprehensive revisions to the Land Use Plan, an increase in the maximum number of residences permitted, and a change of the name of the plan to Ranch House Specific Plan, for the 841-acre specific plan area located north of Marana Road, east of Wentz Road, and west of Sanders Road; and approving a minor amendment to the Marana General Plan to amend the Future Circulation Map as it applies to the specific plan area (Brian D. Varney)

Resolution No. 2022-115: Relating to Development; declaring as a public record filed with the Town Clerk the Ranch House Specific Plan Amendment adopted by Ordinance No. 2022.024 (Brian D. Varney)

Discussion:

Request

Lazarus and Silvyn, PC is requesting approval to amend the Sanders Grove Specific Plan. The amendment to the Specific Plan proposes comprehensive revisions to the Land Use Plan including a revised Land Use Concept, an increase in the maximum number of residential lots allowed within the Plan, and revisions to the distribution of attached and multi-family residential housing products. The proposed amendment to the Specific Plan is accompanied by a request to amend the Future Circulation map of the 2040 General Plan, as it applies to the Specific Plan area, to correspond with the adopted development agreement for Sanders

Grove as well as the proposed Specific Plan amendment.

As a part of the proposed amendment, the Sanders Grove Specific Plan has been rebranded as the **Ranch House Specific Plan**. The project will predominantly be referred to as Ranch House in this report, as well as in other documents and discussions moving forward.

Location
The property is located north of Marana Road, east of Wentz Road, and west of Sanders Road within a portion of Sections 17 and 20, Township 11S, Range 11E.

Proposed Amendments and Land Use
The Sanders Grove Specific Plan was adopted in March 2004 and amended in May 2015 in an effort by the property owners to adjust the Plan in reaction to changes in real estate market conditions. After a recent market analysis and a better understanding of the process and costs for extending infrastructure, the property owners are now proposing a second amendment to the Sanders Grove Specific Plan.

The proposed Specific Plan amendment includes the following changes:

- A new land use concept plan is proposed for the 841 acre site. The proposed changes include redesigned circulation and open space plans that utilize a collector road system that is broken up multiple times by neighborhood parks, framed by homes, and connects the parks with an extensive trail system. The land use categories within the plan have remained the same with small changes in the allocation of acreage for each of those categories. The existing and proposed land use concept plan acreage allocation is as follows:

  Existing land use acreage
  Commercial - 23.1 acres, Medium High Density Residential - 47.8 acres, Medium Density Residential - 536.6 acres, Medium Low Density Residential - 233.5 acres

  Proposed land use acreage
  Commercial - 18 acres, Medium High Density Residential - 65 acres, Medium Density Residential - 343 acres, Medium Low Density Residential - 141 acres.
- The maximum number of residential units is proposed to be increased from the existing cap of 2,500 units to 3,200 units, plus a potential for up to 300 additional units to be built as rental homes, yielding a maximum of 3,500 residences permitted within the Specific Plan area.

- A maximum of 12% (384) of the 3,200 proposed lots within the plan may be between 3,500 square feet and 4,500 square feet, and may only be permitted within the Medium High Density Residential (MHDR) land use designation. The remainder of single-family residential lots shall be a minimum of 4,500 square feet or greater.

- Both attached and detached housing products are proposed to be allowed on lots between 3,500 square feet and 4,500 square feet in the MHDR designation. The existing plan requires a minimum of 4,500 square feet for detached products in the MHDR designation.

- Multi-family residential use is proposed to be allowed within the Commercial (C) designation, only as a detached rental home product. These units will be developed on a single parcel, limited to 14 residence per acre (RAC) and a maximum of 300 units.

Minor General Plan Amendment
A minor amendment to the 2040 General Plan is also proposed with this Specific Plan amendment. The requested amendment applies to the General Plan Future Circulation Map. Both the Sanders Grove Specific Plan, and the First Amendment to Sanders Grove Development Agreement (2016) specify right-of-way widths for Kirby Hughes Road and Hardin Road, both serving this development, as significantly less than what is shown on the Future Circulation Map in the Marana 2040 General Plan. The development agreement stipulated that Kirby Hughes Road, when required by a traffic impact analysis, would be constructed from Sanders Road to Wentz Road as a two-lane urban cross-section constructed to Town standards with a maximum right-of-way of 90 feet along its current alignment. The Future Circulation Map in the General Plan indicates that this road is anticipated to be classified as an arterial street with a right-of-way width of 150 feet. A Capacity Analysis Memo prepared by Greenlight Traffic Engineering indicates that the Town's 90-foot Urban Collector Median cross-section (Detail 110-2) will be sufficient to accommodate the traffic for Ranch House that is anticipated by the traffic impact analysis.

Similarly, the Future Circulation Map designates a right-of-way width of 190 feet (Including a drainageway) for Hardin Road and anticipates it being developed as an arterial street. The Development Agreement stipulates that Hardin Road, a collector roadway, when required by the Traffic Impact Analysis, shall be constructed as a two-lane rural cross-section within the existing 60-foot right-of-way. The draft Ranch House Traffic Impact Analysis indicates that the anticipated traffic from Ranch House may be accommodated by a 60-foot right-of-way for Hardin Road. Under this scenario, staff expects that the drainage along Hardin Road will be accommodated either within right-of-way or on private property.

This request to amend the Future Circulation Map of the General Plan in order to align with the existing and proposed Specific Plan and the First Amendment to Sanders Grove Development Agreement (2016), is supported by both the Planning Division and the Traffic Engineering Division as it applies to this project. This support comes with a stipulation that the traffic impact analysis currently in review will be resubmitted, reviewed, and must be approved by the Town Engineer. A condition has been added to the staff recommendation in this report addressing this stipulation.

Citizen Participation
The applicant mailed a letter to the neighboring property owners informing them of the application submitted to the Town and inviting them to reach out for discussion. The applicant did receive feedback, and will share the results at the public hearing.

Public Notification
This public hearing was appropriately noticed in The Daily Territorial, and all property owners within 300 feet of the boundary of the specific plan area were noticed by United States mail of the date, time, and topic of the public hearing. Additional notice was posted at various locations within the community.

Case Analysis Review Criteria
Pursuant to Town Code Section 17-3-1(D), the Planning Commission and Town Council shall consider the following questions, at a minimum, in reviewing an application for rezoning:

1. Any change of character in the area due to installation of public facilities, other zone changes, new growth trends, deterioration, and development;

   Based upon the requirements and conditions, the rezoning amendment does not appear to be detrimental to the character of the area due to installation of public facilities or any other rezoning changes.

2. The degree to which the proposed zoning will benefit the community; whether there will be benefits derived by the community, or area, by granting the proposed rezoning;

   With the acceptance of the recommended conditions, this rezoning will benefit the community by providing additional commercial opportunities and residential options.

3. Whether the proposed rezoning is compatible with the surrounding area or whether there will be adverse impacts on the capacity or safety of the portion of street network influenced by the rezoning, parking problems, or environmental impacts that the new use will generate such an excessive storm runoff, water, air, or noise pollution, excessive nighttime lighting, or other nuisances;

   Based on the recommended requirements and conditions, the rezoning amendment is compatible with the surrounding area and does not appear to be adversely impact the adjacent street network or generate such excessive storm runoff, water, air, or noise pollution, excessive nighttime lighting, or other nuisances

4. Whether the proposal conforms with and is in furtherance of the implementation of the goals and policies of the general plan, other adopted plans, and the goals, objectives and policies of the land development code, and other town regulations and guidelines, including goals and policies relating to economic development;

   With the acceptance of the recommended conditions and the approval of the accompanying Minor General Plan Amendment, the rezoning amendment conforms

with the goals and policies of the general plan, the land development code, and other town regulations and guidelines.

5. The zoning districts and existing land uses of the surrounding properties;

   Based on the recommended requirements and conditions, the rezoning amendment is compatible with the surrounding properties zoning and existing land use.

6. Whether the existing and proposed transportation infrastructure is suitable and adequate to serve the traffic anticipated to be generated by the proposed development;

   With the acceptance of the recommended conditions, the existing and proposed transportation infrastructure is suitable and adequate to serve the traffic anticipated to be generated by the proposed development

7. Whether the existing and proposed utility infrastructure, public facilities, and public services are suitable and adequate to serve the proposed rezoning area;

   Based upon the rezoning requirements and conditions, there is adequate utility infrastructure, public facilities, and public services in the area to serve the proposed rezoning area

8. Whether the subject property is suitable for the uses to which it has been restricted under the existing zoning classification;

   Based upon the rezoning requirements and conditions, the subject property is suitable for the proposed uses.

9. Whether the rezoning is compatible with the adjacent neighborhood, especially residential neighborhood stability and character;

   Based upon the rezoning requirements and conditions, this rezoning amendment is compatible with the adjacent neighborhood in area stability and character;

10. If applicable, the length of time the subject property has remained vacant as zoned:

    The subject property has remained vacant since annexation in to the Town.

11. Whether there is an adequate supply of land available in the subject area and the surrounding community to accommodate the zoning and community needs:

    Based upon the rezoning amendment subject area location, there is an adequate supply of land available in the area and the surrounding community to accommodate the zoning and community needs.

Staff Recommendation:

This is a discretionary item for the Town Council to consider. Should the Town Council choose to approve this item, staff recommends the approval be based upon the recommended findings and subject to the conditions set forth in the draft ordinance attached.

Planning Commission Recommendation
The proposed Specific Plan amendment and minor General Plan amendment were considered at a public hearing before the Marana Planning Commission on September 28, 2022. The Planning Commission voted unanimously 6-0 to recommend to the Town Council approval of the proposed amendment subject to the recommended conditions, as well as two additional conditions, which have been word-smithed and included in the draft attached ordinance:

1. Right-of-way will be reserved along the I-10 Frontage Road and the northern boundary (Hardin Road) to provide area for drainage infrastructure in accordance with the Northwest Area Drainage Master Plan, Feb 2020.

2. Prohibit apartment-style multi-family housing throughout the specific plan area.

Suggested Motion:
I move to adopt Ordinance No. 2022.024, approving the Ranch House Specific Plan Amendment and the minor amendment to the Marana General Plan subject to the recommended conditions in the draft ordinance attached, and Resolution No. 2022-115, declaring the Ranch House Specific Plan Amendment to be a public record.

Attachments

Ordinance No. 2022.024
Exhibit A to Ordinance
Resolution No. 2022-115
Exhibit A to Resolution - Specific Plan Amendment
PCZ2204-001 RHSPA GPA Narrative
PCZ2204-001 RHSPA Map
PCZ2204-001 RHSPA Application

MARANA ORDINANCE NO. 2022.024

RELATING TO DEVELOPMENT; APPROVING AN AMENDMENT TO THE SANDERS GROVE SPECIFIC PLAN, INCLUDING COMPREHENSIVE REVISIONS TO THE LAND USE PLAN, AN INCREASE IN THE MAXIMUM NUMBER OF RESIDENCES PERMITTED, AND A CHANGE OF THE NAME OF THE PLAN TO RANCH HOUSE SPECIFIC PLAN, FOR THE 841-ACRE SPECIFIC PLAN AREA LOCATED NORTH OF MARANA ROAD, EAST OF WENTZ ROAD, AND WEST OF SANDERS ROAD; AND APPROVING A MINOR AMENDMENT TO THE MARANA GENERAL PLAN TO AMEND THE FUTURE CIRCULATION MAP AS IT APPLIES TO THE SPECIFIC PLAN AREA

WHEREAS The JEITO Foundation 31.53%, SREP Tucson II Associates LLC 66.94%, RB Land LLC 1.53%, Corp of the Presiding Bishop of Church of Jesus Christ of Latter Day Saints, and SREP Marana Retail Assoc. II LLC (collectively the "Property Owners") own approximately 841 acres of land previously entitled as the Sanders Grove Specific Plan by the adoption of Ordinance No. 2005.09 by the Mayor and Council on March 1, 2005, as amended by the adoption of Ordinance No. 2015.013 by the Mayor and Council on May 19, 2015, and located north of Marana Road, east of Wentz Road, and west of Sanders Road within a portion of Sections 17 and 20, Township 11 South, and Range 11 East, described on Exhibit "A" attached to and incorporated in this ordinance by this reference (the "Rezoning Area"); and

WHEREAS the Rezoning Area is subject to the Sanders Grove Development Agreement recorded in the Pima County Recorder's Office at Docket 12559 Page 2498, as amended by the First Amendment to Sanders Grove Development Agreement recorded in the Pima County Recorder's Office at Sequence No. 20163000144 (collectively the "Development Agreement"); and

WHEREAS the Property Owners have authorized Sanders Grove Management LLC and Lazarus & Silvyn, P.C. to submit an application for rezoning ("this Rezoning") to amend the Sanders Grove Specific Plan to revise the land use concept, increase the maximum number of residential lots allowed within the Plan, revise the distribution of attached and multi-family residential housing products, and make other revisions including changing the name of the plan to Ranch House Specific Plan, and to request a minor amendment to the Marana 2040 General Plan Future Circulation Map, as it applies to the Rezoning Area; and

WHEREAS the Marana Planning Commission held a public hearing to consider this Rezoning on September 28, 2022, and voted unanimously 6-0 to recommend that the Town Council approve this Rezoning and minor general plan amendment subject to the recommended conditions, as well as two additional conditions; and

WHEREAS the Marana Mayor and Town Council held a public hearing to consider this Rezoning on November 1, 2022, and determined that this Rezoning and minor general plan amendment should be approved.

NOW, THEREFORE, BE IT ORDAINED by the Mayor and Council of the Town of Marana, Arizona, as follows:

Section 1. The Sanders Grove Specific Plan is hereby amended and renamed the "Ranch House Specific Plan," establishing the zoning regulations applicable to the Rezoning Area. The Ranch House Specific Plan Amendment, one electronic and one printed copy of which are on file in the office of the Town Clerk of the Town of Marana, Arizona, which was made a public record by and is attached as Exhibit A to Marana Resolution No. 2022-115, is hereby referred to, adopted and made part of this ordinance as if fully set out here.

Section 2. A minor amendment to the Marana 2040 General Plan Future Circulation Map is hereby approved, reducing the future right-of-way width for both Kirby Hughes Road and Hardin Road to be consistent with the Ranch House Specific Plan, as amended by this Ordinance, as well as the Development Agreement.

Section 3. This Rezoning is subject to the following conditions, which replace the conditions listed in Section 2 of Ordinance No. 2015.013, the violation of which shall be treated in the same manner as a violation of the Marana Town Code (but which shall not cause a reversion of this Rezoning), and which shall be binding on the Property Owners and their successors in interest (all of whom are collectively included in the term "Property Owners" in the following conditions):

1. Compliance with all applicable provisions of the Town's codes and ordinances current at the time of any subsequent development including, but not limited to, requirements for public improvements and payment of application fees and applicable development impact fees.
2. Any preliminary plat or development plan for any portion of the Rezoning Area shall be in general conformance with the Land Use Concept Plan presented to and approved by the Town Council as part of this Rezoning.
3. The development proposed by this Rezoning shall be consistent with and in conformance with the Development Agreement.
4. A master drainage study must be submitted by the Property Owners and accepted by the Town Engineer prior to Town approval of a preliminary plat or development plan for any portion of the Rezoning Area.

5. A water infrastructure and phasing plan (WIP) must be submitted by the Property Owners and accepted by Marana Water and Water Reclamation (the "water utility") prior to approval of a preliminary plat or development plan for any portion of the Rezoning Area. The WIP shall identify all on-site and off-site water facilities needed to serve the proposed development. The WIP shall include all information required by the water provider, such as (but not limited to) analysis of water use and fire flow requirements, and well source, reservoir, and booster station infrastructure needed to serve the proposed development. If the water provider requires a water service agreement as a condition of service to the proposed development, the Property Owners must enter into a water service agreement with the water provider consistent with the accepted WIP.
6. A master sewer plan must be submitted by the Property Owners and accepted by Marana Water and Water Reclamation (the "wastewater utility") prior to the approval of any final plat or development plan for the Rezoning Area. The master sewer plan shall identify all on-site and off-site wastewater facilities needed to serve the proposed development, and shall include all information required by the wastewater utility. If the wastewater utility requires a sewer service agreement as a condition of service to the proposed development, the Property Owners must enter into a sewer service agreement with the wastewater utility consistent with the accepted master sewer plan.
7. The Property Owners must design and construct any roadway, drainage, water, and wastewater improvements, and dedicate or acquire any property rights associated with those improvements, that the Town requires based on the data and findings of the accepted traffic impact analysis, the accepted master drainage study, the accepted WIP, the accepted master sewer plan, and other studies approved in connection with the approval of a preliminary plat or development plan for any portion of the Rezoning Area.
8. The final design of all streets and circulation facilities, including gated access (if applicable) must be accepted by the Northwest Fire District prior to Town Council consideration of a final plat for any portion of the Rezoning Area.
9. The maximum number of residences within the Rezoning Area shall not exceed 3,500, consisting of a maximum of 3,200 single-family residences and a maximum of 300 multi-family residential units, constructed as detached rental homes.
10. No approval, permit or authorization by the Town of Marana authorizes violation of any federal or state law or regulation or relieves the Property Owners from responsibility to ensure compliance with all applicable federal and state laws and regulations, including the Endangered Species Act and the Clean Water Act. The Property Owners should retain appropriate experts and consult appropriate federal and state agencies to determine any action necessary to assure compliance with applicable laws and regulations.

11. The Property Owners shall transfer to the water provider, by the appropriate Arizona Department of Water Resources form, those water rights being IGR, Type I or Type II for providing designation of assured water supply and water service to the Rezoning Area. If Type I or Type II is needed on the Rezoning Area, the water provider and the Property Owners shall arrive at an agreeable solution to the use of those water rights appurtenant to the affected portion of the Rezoning Area.
12. Prior to the issuance of any grading permits, the Property Owners shall submit evidence to the Town that all federal permit requirements have been met through the Corps of Engineers and the State Historic Preservation Office, if federal permits are required for the development of the Rezoning Area.
13. The Property Owners shall not cause any lot split of any kind without the written consent of the Town of Marana.
14. The Property Owners shall install a non-potable system to serve the common open space areas and other landscaped amenities, as accepted by the Cortaro-Marana Irrigation District.
15. The Property Owners shall improve and dedicate to the Town of Marana a public park at a minimum size of 20 acres.
16. Pursuant to paragraph 2.3 of the Development Agreement, the Property Owners shall submit a traffic impact analysis (TIA) which must be accepted by the Town prior to approval of the initial subdivision plat for the entire Rezoning Area and which shall be updated with each new subdivision plat or development plan submittal. The timing and scope of regional roadway improvements will be determined by the Town based on the findings of the Town-approved TIA. The TIA shall take into account the redistribution of traffic from the Rezoning Area due to the termination of collector roads at park facilities interior to the Rezoning Area. If warranted by the TIA, the Property Owners shall construct improvements to Wentz Road, from Marana Road to Kirby Hughes Road, as part of the Property Owners' responsibility for regional roadway improvements.
17. Notwithstanding the General Plan amendment approved by Section 2 of this Ordinance, reducing the widths of Kirby Hughes Road and Hardin Road, the Property Owners shall dedicate all necessary rights-of-way for road expansions and drainage requirements within the Rezoning Area, as required by the Town Engineer and in accordance with the Northwest Area Drainage Master Plan, Feb 2020, including any necessary rights-of-way or drainage easements along the I-10 Frontage Road and the northern boundary of the Rezoning Area.
18. Apartment-style multi-family housing is prohibited throughout the Rezoning Area.
19. Within 60 days after the adoption of this ordinance, the Property Owners shall provide the Development Services Department with two bound copies, and two electronic copies in PDF format of the Ranch House Specific Plan Amendment.

Section 4. All ordinances, resolutions and motions and parts of ordinances, resolutions, and motions of the Marana Town Council in conflict with the provisions of this ordinance are hereby repealed, effective as of the effective date of this ordinance.

Section 5. If any section, subsection, sentence, clause, phrase or portion of this ordinance is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this ordinance.

PASSED AND ADOPTED by the Mayor and Council of the Town of Marana, Arizona, this 1st day of November, 2022.

_____

Mayor Ed Honea

ATTEST:

_____

David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____

Jane Fairall, Town Attorney

EXHIBIT A to Marana Ordinance No. 2022.024

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY Pima, STATE OF Arizona, AND IS DESCRIBED AS FOLLOWS:

Parcel A:

Section 17 and the North half of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona.

EXCEPT THEREFROM Parcels 1, 2, 3, 4 and 5, more particularly described as follows:

Parcel 1: (Northeast of I-10)

That portion of the North half of Section 17, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, lying Northeasterly of the Southwesterly right-of-way line of Casa Grande-Tucson Highway (Interstate 10);

Parcel 2: (Northern Church parcel)

That portion of the Northwest quarter of Section 17, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the Northwest corner of said Section 17;

THENCE North 89 degrees 24 minutes 46 seconds East, along the North line of said Section 17, a distance of 1252.82 feet;

THENCE at a right angle, South 00 degrees 35 minutes 14 seconds East, a distance of 120.00 feet to the TRUE POINT OF BEGINNING;

THENCE North 89 degrees 24 minutes 46 seconds East, parallel with and 120.00 feet South of said North line of Section 17, a distance of 387.66 feet to the beginning of a curve to the right having a radius of 350.00 feet;

THENCE Easterly along said curve, through a central angle of 40 degrees 06 minutes 14 seconds, an arc distance of 244.98 feet.

THENCE South 50 degrees 29 minutes 00 seconds East, a distance of 69.71 feet;

THENCE South 37 degrees 55 minutes 33 seconds West, a distance of 398.75 feet;

THENCE North 50 degrees 29 minutes 00 seconds West, a distance of 18.98 feet to the beginning of a curve to the left having a radius of 232.75 feet;

THENCE Westerly, along said curve through a central angle of 40 degrees 06 minutes 14 seconds, an arc distance of 162.91 feet;

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THENCE South 89 degrees 24 minutes 46 seconds West, a distance of 253.69 feet;

THENCE North 00 degrees 35 minutes 14 seconds West, a distance of 372.25 feet to the POINT OF BEGINNING.

Parcel 3: (Active Adult Parcel)

Those portions of the South half of Section 17 and the North half of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona., described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of the Northeast quarter of said Section 20, a distance of 1834.76 feet;

THENCE at a right angle, South 89 degrees 29 minutes 02 seconds West, a distance of 75.00 feet to the POINT OF BEGINNING;

THENCE North 00 degrees 30 minutes 58 seconds West, parallel with and 75.00 feet West of said East line of the Northeast quarter of Section 20, a distance of 801.42 feet to a point on the section line common to said Sections 17 and 20;

THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 75.00 feet West of the East line of the Southeast quarter of said Section 17, a distance of 174.35 feet;

THENCE North 89 degrees 24 minutes 22 seconds East, a distance of 0.99 foot to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 90 degrees 01 minutes 46 seconds, an arc distance of 39.28 feet;

THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 49.00 feet West of said East line of the Southeast quarter of Section 17, a distance of 1017.02 feet to the beginning of a curve to the right having a radius of 1149.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 16 degrees 47 minutes 35 seconds an arc distance of 336.77 feet to a point on said East line of the Southeast quarter of Section 17;

THENCE North 00 degrees 37 minutes 24 seconds West, along said East line, a distance of 821.35 feet to a point on the Southwesterly right-of-way line of Casa Grande-Tucson Highway (Interstate 10);

THENCE North 50 degrees 29 minutes 00 seconds West, along said right-of-way line, a distance of 1154.87 feet to the beginning of a curve to the left having a radius of 25.00 feet;

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THENCE Westerly, along said curve, through a central angle of 90 degrees 00 minutes 00 seconds, an arc distance of 39.27 feet;

THENCE South 39 degrees 31 minutes 00 seconds West, a distance of 141.16 feet to the beginning of a curve to the right having a radius of 1145.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 49 degrees 24 minutes 22 seconds, an arc distance of 987.33 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 89 degrees 30 minutes 37 seconds, an arc distance of 39.06 feet;

THENCE South 00 degrees 35 minutes 15 seconds East, a distance of 5.04 feet;

THENCE South 89 degrees 24 minutes 45 seconds West, parallel with and 75.00 feet South of the East-West mid-section line of said Section 17, a distance of 742.43 feet to a point on the North-South mid-section line of said Section 17;

THENCE South 89 degrees 26 minutes 14 seconds West, parallel with and 75.00 feet South of said East-West mid-section line, a distance of 248.32 feet;

THENCE South 52 degrees 19 minutes 53 seconds West, a distance of 68.83 feet;

THENCE South 15 degrees 37 minutes 37 seconds West, a distance of 321.41 feet;

THENCE South 27 degrees 43 minutes 42 seconds East, a distance of 405.99 feet;

THENCE South 71 degrees 01 minutes 58 seconds East, a distance of 177.55 feet;

THENCE South 33 degrees 41 minutes 42 seconds East, a distance of 198.63 feet;

THENCE South 06 degrees 07 minutes 58 seconds East, a distance of 79.85 feet;

THENCE South 02 degrees 04 minutes 59 seconds West, a distance of 288.74 feet;

THENCE South 23 degrees 50 minutes 33 seconds East, a distance of 246.64 feet;

THENCE South 48 degrees 36 minutes 23 seconds East, a distance of 265.79 feet;

THENCE South 38 degrees 56 minutes 39 seconds East, a distance of 71.79 feet;

THENCE South 71 degrees 52 minutes 22 seconds West, a distance of 243.51 feet;

THENCE South 22 degrees 53 minutes 14 seconds West, a distance of 342.28 feet;

THENCE South 02 degrees 19 minutes 19 seconds West, a distance of 151.65 feet;

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THENCE South 05 degrees 13 minutes 55 seconds East, a distance of 172.63 feet;

THENCE South 09 degrees 28 minutes 55 seconds West, a distance of 71.11 feet;

THENCE South 31 degrees 45 minutes 51 seconds West, a distance of 81.76 feet;

THENCE South 00 degrees 04 minutes 30 seconds West, a distance of 430.93 feet;

THENCE South 60 degrees 20 minutes 40 seconds East, a distance of 356.88 feet;

THENCE South 88 degrees 40 minutes 47 seconds East, a distance of 1016.16 feet;

THENCE South 79 degrees 18 minutes 05 seconds East, a distance of 374.59 feet;

THENCE North 83 degrees 42 minutes 10 seconds East, a distance of 382.62 feet;

THENCE South 69 degrees 32 minutes 57 seconds East, a distance of 276.54 feet;

THENCE North 83 degrees 16 minutes 26 seconds East, a distance of 261.23 feet to the POINT OF BEGINNING.

Parcel 4: (Southern Church Parcel)

That portion of the Southeast quarter of the Northeast quarter of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of said Northeast quarter of Section 20, a distance of 802.25 feet;

THENCE South 89 degrees 27 minutes 32 seconds West, parallel with and 802.25 feet North of the East-West mid-section line of said Section, a distance of 75.00 feet to the TRUE POINT OF BEGINNING;

THENCE continuing South 89 degrees 27 minutes 32 seconds West, a distance of 531.22 feet;

THENCE North 00 degrees 30 minutes 58 seconds West, a distance of 410.00 feet;

THENCE North 89 degrees 27 minutes 32 seconds East, a distance of 531.22 feet;

THENCE South 00 degrees 30 minutes 58 seconds East, parallel with and 75.00 feet West of said East line of the Northeast quarter, a distance of 410.00 feet to the TRUE POINT OF BEGINNING.

Parcel 5: (Commercial Parcel)

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That portion of the Southeast quarter of the Northeast quarter of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of said Northeast quarter of said Section 20, a distance of 802.25 feet;

THENCE South 89 degrees 27 minutes 32 seconds West, parallel with and 802.25 feet North of the East-West mid-section line of said Section, a distance of 75.00 feet to the POINT OF BEGINNING;

THENCE continuing South 89 degrees 27 minutes 32 seconds West, a distance of 1165.21 feet;

THENCE South 00 degrees 00 minutes 00 seconds East, a distance of 677.28 feet;

THENCE North 89 degrees 27 minutes 32 seconds East, parallel with and 125.00 feet North of said East-West mid-section line, a distance of 1146.32 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 89 degrees 58 minutes 30 seconds, an arc distance of 39.26 feet;

THENCE North 00 degrees 30 minutes 58 seconds West, parallel with and 75.00 feet West of said East line of the Northeast quarter of Section 20, a distance of 652.26 feet to the POINT OF BEGINNING.

Parcel B:

A temporary construction easement as set forth in Docket 12585 at page 2405, corrected in Docket 12652 at page 1 and in Docket 12754 at page 3789.

Parcel C: (Active Adult Parcel)

Those portions of the South half of Section 17 and the North half of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of the Northeast quarter of said Section 20, a distance of 1834.76 feet;

THENCE, at a right angle, South 89 degrees 29 minutes 02 seconds West, 75.00 feet to the POINT OF BEGINNING;

THENCE North 00 degrees 30 minutes 58 seconds West, parallel with and 75.00 feet West of said East line of the Northeast quarter of Section 20, a distance of 801.42 feet to a point on the Section line common to said Sections 17 and 20;

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THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 75.00 feet West of the East line of the Southeast quarter of said Section 17, a distance of 174.35 feet;

THENCE North 89 degrees 24 minutes 22 seconds East, 0.99 foot to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Northeasterly, along said curve through a central angle of 90 degrees 01 minutes 46 seconds, an arc distance of 39.28 feet;

THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 49.00 feet West of said East line of the Southeast quarter of Section 17, a distance of 1017.02 feet to the beginning of a curve to the right having a radius of 1149.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 16 degrees 47 minutes 35 seconds, an arc distance of 336.77 feet to a point on said East line of the Southeast quarter of Section 17;

THENCE North 00 degrees 37 minutes 24 seconds West, along said East line, 821.35 feet to a point on the Southwesterly right-of-way line of Casa Grande-Tucson Highway (Interstate 10);

THENCE North 50 degrees 29 minutes 00 seconds West, along said right-of-way line, 1154.87 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Westerly along said curve, through a central angle of 90 degrees 00 minutes 00 seconds an arc distance of 39.27 feet;

THENCE South 39 degrees 31 minutes 00 seconds West, 141.16 feet to the beginning of a curve to the right having a radius of 1145.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 49 degrees 24 minutes 22 seconds an arc distance of 987.33 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 89 degrees 30 minutes 37 seconds an arc distance of 39.06 feet;

THENCE South 00 degrees 35 minutes 15 seconds East, 5.04 feet;

THENCE South 89 degrees 24 minutes 45 seconds West, parallel with and 75.00 feet South of the East-West mid-section line of said Section 17, a distance of 742.43 feet to a point on the North-South mid-section line of said Section 17;

THENCE South 89 degrees 26 minutes 14 seconds West, parallel with and 75.00 feet South of said East-West mid-section line, 248.32 feet;

THENCE South 52 degrees 19 minutes 53 seconds West, 68.83 feet;

THENCE South 15 degrees 37 minutes 37 seconds West, 321.41 feet;

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THENCE South 27 degrees 43 minutes 42 seconds East, 405.99 feet;

THENCE South 71 degrees 01 minutes 58 seconds East, 177.55 feet;

THENCE South 33 degrees 41 minutes 42 seconds East, 198.63 feet;

THENCE South 06 degrees 07 minutes 58 seconds East, 79.85 feet;

THENCE South 02 degrees 04 minutes 59 seconds West, 288.74 feet;

THENCE South 23 degrees 50 minutes 33 seconds East, 246.64 feet;

THENCE South 48 degrees 36 minutes 23 seconds East, 265.79 feet;

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THENCE South 09 degrees 28 minutes 55 seconds West, 71.11 feet;

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THENCE South 00 degrees 04 minutes 30 seconds West, 430.93 feet;

THENCE South 60 degrees 20 minutes 40 seconds East, 356.88 feet;

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THENCE South 79 degrees 18 minutes 05 seconds East, 374.59 feet;

THENCE North 83 degrees 42 minutes 10 seconds East, 382.62 feet;

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MARANA RESOLUTION NO. 2022-115

RELATING TO DEVELOPMENT; DECLARING AS A PUBLIC RECORD FILED WITH THE TOWN CLERK THE RANCH HOUSE SPECIFIC PLAN AMENDMENT ADOPTED BY ORDINANCE NO. 2022.024

BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, ARIZONA that the Ranch House Specific Plan Amendment adopted by Ordinance No. 2022.024 and attached to and incorporated in this resolution as Exhibit A, one electronic and one paper copy of which are on file in the office of the Town Clerk, is hereby declared to be a public record and ordered to remain on file with the Town Clerk.

PASSED AND ADOPTED by the Mayor and Council of the Town of Marana, Arizona, this 1st day of November, 2022.

Mayor Ed Honea

ATTEST:

APPROVED AS TO FORM:

David L. Udall, Town Clerk

Jane Fairall, Town Attorney

RANCH HOUSE SPECIFIC PLAN AMENDMENT

(formerly known as Sanders Grove Specific Plan)

13100 West Marana Road

Marana, Arizona 85653

Town of Marana Case Number: PCZ2204-001

October 2022

RANCH HOUSE SPECIFIC PLAN AMENDMENT

(formerly known as Sanders Grove Specific Plan)

Marana, Arizona

Submitted to:

Town of Marana
Planning Department
11555 West Civic Center Drive
Marana, Arizona 85653

Prepared for:

Sanders Grove Management, LLC
6720 North Scottsdale Road, Suite 380
Paradise Valley, Arizona 85253

Prepared by:

Lazarus & Silvyn, P.C.
5983 East Grant Road, Suite 290
Tucson, Arizona 85712

The WLB Group
1600 West Broadway Road, Suite 150
Tempe, Arizona 85282

Greey Pickett
7144 East Stetson Drive, Suite 205
Scottsdale, Arizona 85251

Southwest Traffic Engineering
3838 North Central Avenue, Suite 1810
Phoenix, Arizona 85012

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Appendix A: Legal Description

I. INTRODUCTION

A. Specific Plan Summary

1. Background & Vision

The Ranch House Specific Plan, formerly known as the Sanders Grove Specific Plan, ("Specific Plan" or the "Project") establishes comprehensive guidance and regulations for the development of approximately 841 acres (the "Property") located in the Town of Marana (the "Town"). (See *Exhibit I.A: Regional Map*.) The Specific Plan was originally adopted in 2005 via Ordinance No. 2005.09, and along with several other specific plans adopted at the height of the real estate boom, there was an expectation that much of northern Marana's farmlands would be developed today with several master planned communities featuring an abundance of housing and neighborhood-level commercial uses to support these homes. That vision has not come to fruition.

The Property presents an awesome opportunity: a very large, vacant and well-positioned parcel of land in a desirable town. The Property's ownership entities (the "Ownership") intend to create a place inspired from the land and its location. To emphasize this new direction, Sanders Grove is now being branded "Ranch House".

The vision for Ranch House is one where residents will be energized by their surroundings and enjoy the outdoors, where they can get to know their neighbors and experience a real connection to the land. The buyers in Ranch House are expected to be mostly young couples, families and move-down couples looking for a place where life is a little simpler—a place they can afford to either raise their families or begin again in retirement. They are looking for a community with a modern look and feel that supports an active lifestyle.

The Ownership and its development design team see the land as an opportunity to create a different style of community. The key focus for designers of Ranch House is to create a safe and fun place to live and enjoy family and friends—a place that fosters social interaction and neighborhood connectivity, that is highly connected and promotes smaller intimate neighborhoods. After conducting current market analyses and gaining a better understanding of the cost to extend infrastructure for the Specific Plan, the Ownership is requesting a Specific Plan Amendment ("SPA") to fulfill this vision.

2. SPA Proposal

The Specific Plan has been in place for more than 17 years with no development activity. Since its original adoption, the real estate market has substantially changed. In recent years, it has become increasingly apparent that the market is demanding more diverse housing options, including smaller lot sizes for single-family residences

and more rental opportunities. In addition, this Specific Plan requires a significant investment for infrastructure (specifically sewer) extensions and that cost needs to be spread over more units than is currently permitted. The SPA addresses these concerns. This SPA request includes:

- *A new Land Use Concept that supports the Ranch House vision.*

  Ranch House is a place where parents feel safe allowing their children to play and visit friends. Trails are abundant, and neighborhood (or "pocket") parks are framed by homes to ensure there are residential eyes watching park activities. The community is designed for safe access and circulation utilizing a collector road that is broken up multiple times by these neighborhood-scale parks that will provide slower and safer vehicular movement without creating a huge community divide.

  In addition, the community's focal point, *The Ranch House*, will serve as the central hub where the community can come together under the stars with outdoor grilling, participate in pool and water activities under the sun, and make connections with their neighbors, friends and family.

- *An increase in the maximum number of residential units that may be constructed with the Specific Plan.*

  The previous cap on residential lots within the Specific Plan was 2,500 or 3 residences per acre ("RAC")—a number that does not appear to have been established based on a market demand study or a cost analysis related to the infrastructure extensions required of the Specific Plan nor does it reflect the densities of surrounding specific plans. There are substantial infrastructure improvements required for the development of Ranch House. The Ownership determined it needs to develop at a higher overall density to offset the cost of development. Up to 3,200 individual lots, plus up to 300 rental units (for a maximum of 3,500 residences), are permitted within Ranch House.

  Under this new unit cap, only a limited number of smaller lots (i.e., those measuring 3,500 square feet) is permitted. Up to 12% (or 384) of the 3,200 permitted lots within the Specific Plan may be 3,500 square-feet in size, and those lots are only permitted in the Medium-High Density Residential ("MHDR") designation. The remainder of the single-family residential ("SFR") lots within Ranch House will measure 4,500 square feet and above.

- *Detached products, along with the attached products, to be built on 3,500 square-foot lots within the MHDR designation.*

  Previously, only attached home products were permitted to be constructed on 3,500 square-foot lots within the MHDR designation. This SPA allows both attached and detached products to be built using this smaller lot size.

In the last few years, many homebuilders have expanded their portfolios in response to market demands. They are designing their single-family detached homes to fit on 3,500 square-foot lots and are still able to ensure each home has private patio and/or backyard space. The overall Project is also designed to create more community open spaces with the centralized park spaces throughout. Some residents are choosing smaller living and private outdoor spaces in exchange for what they deem to be quality-of-life features, including proximity to work or schools and access to commercial, entertainment, recreation or open space.

- *Multi-family residential uses within the Commercial designation.*

  Multi-family residential ("MFR") uses are now permitted within the Specific Plan. The Ownership is interested in developing a rental home community that resembles a higher density SFR neighborhood. These are detached single-family homes in design and concept that are rented instead of sold. Because the lots are not platted like traditional neighborhoods, they are classified in the Specific Plan as a MFR use. This rental community will be developed on a single lot, and owned and operated by a single managing entity. To the resident, it will function like a neighborhood but without the constraints of homeownership. While most apartment units are developed at over 20 residences per acre, the density of MFR within this Specific Plan is limited to 14 RAC to align with the SFR design concept for rental. A maximum of 300 MFR homes may be developed within Ranch House.

  Many people are opting for renting over homeownership—even long-term. Renting offers more flexibility to the resident if and when they choose to relocate, and it removes the burden of home maintenance and repairs. Many rental communities are providing amenities, such as playgrounds, community space for arts and crafts and fitness centers, in an effort to target a specific demographic. The Ownership is eager to offer this rental option within Ranch House.

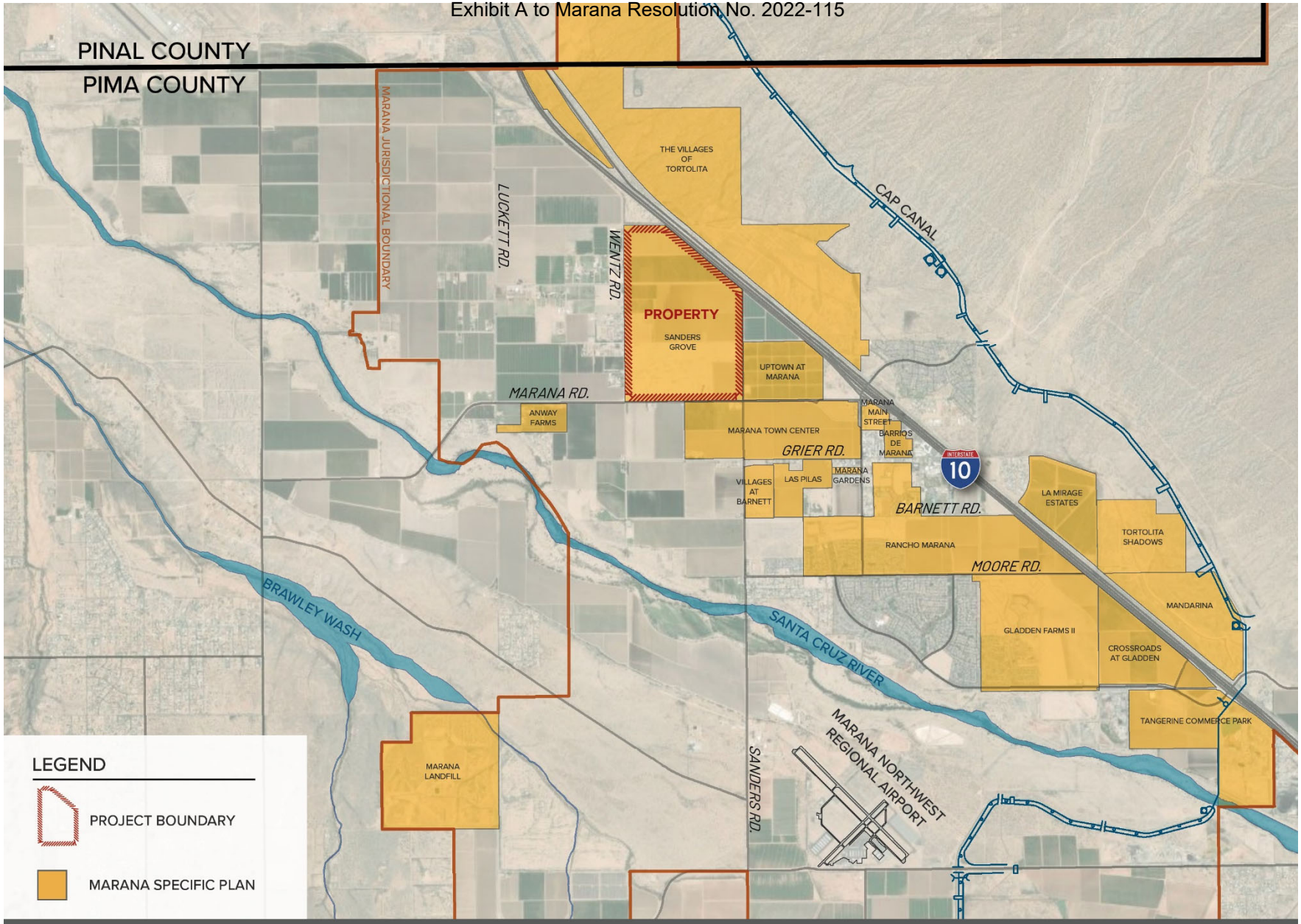


Exhibit I.A: Regional Context

B. Location

The Specific Plan lies in the Central Growth Area of the Town, as defined by the Town's General Plan, *Make Marana 2040*. The Central Growth Area largely encompasses agricultural lands, although much of that land is entitled via specific plans. This area, which includes Downtown Marana, is bounded by the Santa Cruz River to the south, the Central Arizona Project ("CAP") canal to the east and the Pima/Pinal County border to the north.

The Property lies within Sections 17 and 20 of Township 11 South, Range 11 East. This location is approximately 1.3 miles south of the Pinal County/Pima County line and 1.6 miles northwest of the Marana Municipal Complex in a generally agricultural area consisting of terraced fields, access roads and irrigation canals. Interstate 10 is adjacent to the northeast boundary of the Property and is located approximately one mile west of the Marana/Interstate 10 interchange.

See Exhibit I.B: Location and Vicinity Map.

C. Authority and Scope

The authority for the preparation of specific plans is found in Arizona Revised Statutes, Section 9-461.08. State law allows the preparation of specific plans based on the general plan, as may be required for the systematic execution of the general plan.

Town Ordinance 87.22 provides the uniform procedures and criteria for the preparation, review, adoption and implementation of specific plans in Marana.

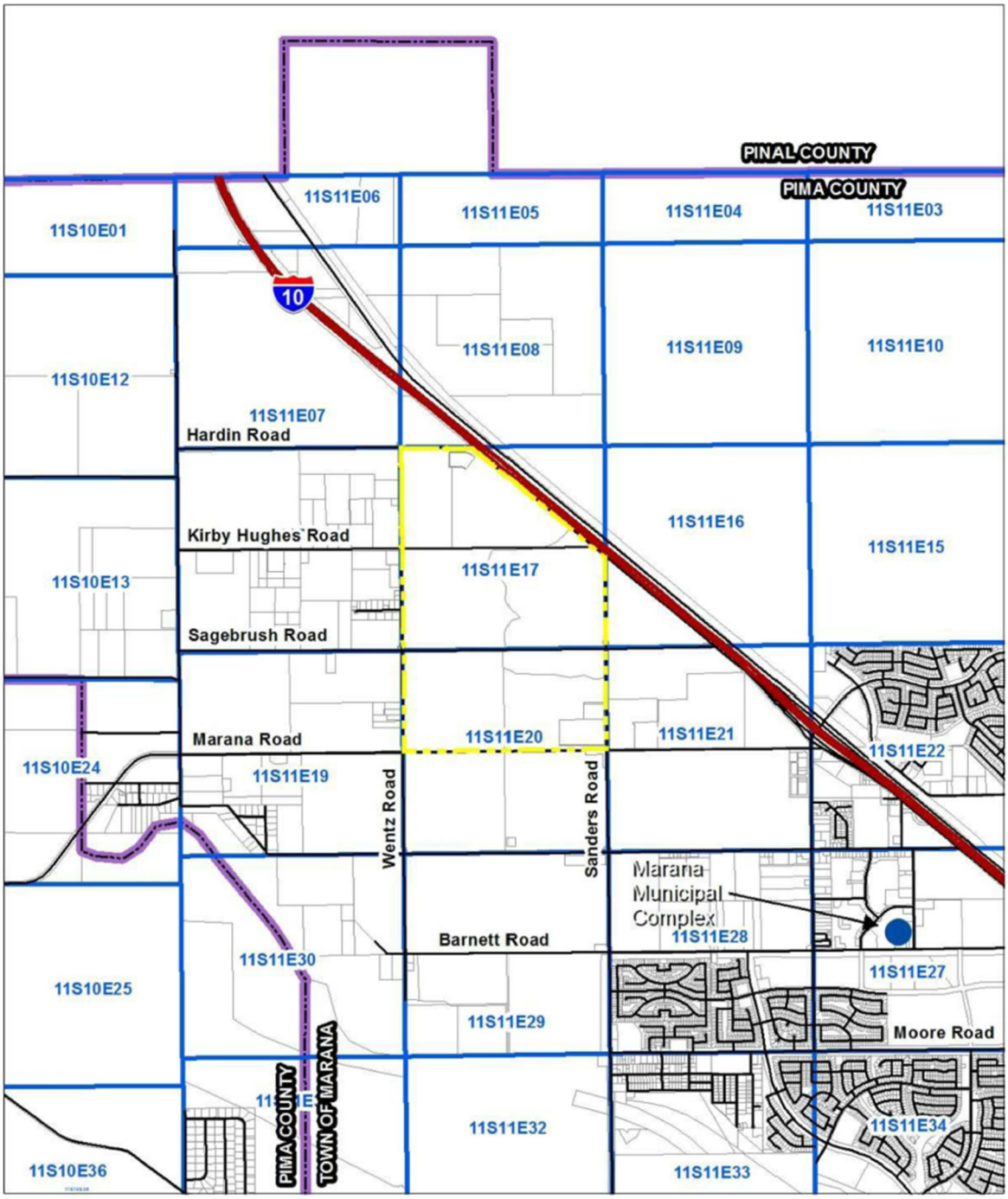
Pursuant to these state statutes and Marana Town Code ("MTC") Sections 17-3-1 and 17-4-15, a public hearing will be conducted by the Town Planning Commission and the Town Council after which the Specific Plan ordinance may be adopted by the Town Council and become effective.

The Specific Plan is a regulatory plan, which, once adopted, will serve as the zoning and development code for the Property. Subdivision plats and any other development approvals must be consistent with the Specific Plan.

D. Legal Description

A copy of the legal description for the Property is included in *Appendix A*.

Exhibit I.B: Location and Vicinity Map



LEGEND

- Specific Plan Boundary
- Township, Range & Section
- Jurisdictions

Notes:

Project Site is located at:
Township 11S, Range 11E, and Section 17 & 20
Acreage: Approx. 841 AC
Parcel ID #'s: 217-17-003F, 217-17-002B, 217-17-003H, 217-17-003J, 217-17-003G, 217-17-003E, 217-17-003D, 217-24-001K, 217-24-001E, 217-24-0020, 217-24-001L, 217-24-001M, 217-24-001P and 217-24-001N

NORTH 0' 2000' 4000'

FILE NAME: SGM-01_location.mxd
SOURCE: Pima County GIS, 2014

II. DEVELOPMENT CAPABILITY REPORT – (SECTION NOT AMENDED)

The Development Capability Report ("DCR") section of this Specific Plan includes an analysis of the Property's existing site conditions. Since the Specific Plan was amended in 2015, very little has changed in this part of the Town. Land has been entitled for more intense development and neighboring Specific Plans have been amended, but the Property is still largely surrounded by very low-density residential and agricultural uses. There are no changes in the Property's physical characteristics, including its hydrological, geological and topographical features, vegetation and wildlife habitat, cultural resources and viewsheds.

Portions of the DCR, particularly those referring to infrastructure, may be obsolete. The Town is in the process of implementing a regional sewer system, a portion of which is located along Marana Road at the southern boundary of the Property, and other components are planned across the Property. The Project Team is working closely with the Town's Utility Department to ensure coordination. Changes to the Town's regional circulation patterns, such as the realignment of Marana Road at its intersection with Tangerine Farms Loop Road, are acknowledged and considered in the updated Traffic Impact Analysis (submitted under separate cover).

III. DEVELOPMENT PLAN

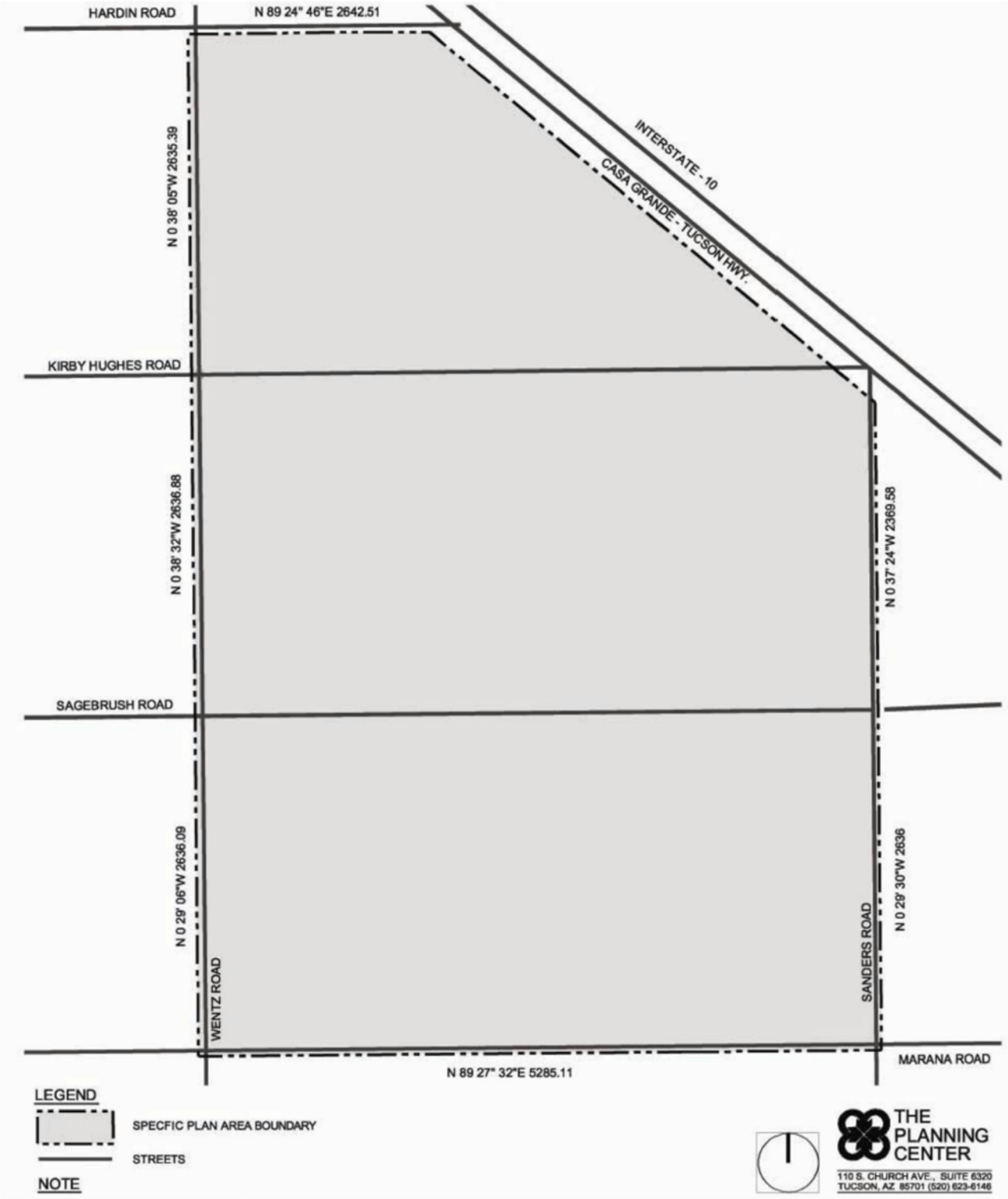
A. Purpose and Intent

This section contains a description of the goals, objectives and policies of the Specific Plan, which reflect the Town's vision for development in Northwest Marana and provide the rationale for the Development & Design Guidelines found in Section IV.

The Ranch House Development Plan is the result of thorough site analysis and research, as presented in Section II: Development Capability Report. (As noted in Section II, the Development Capability Report was not updated for this amendment.) The Specific Plan establishes the location and intensity of land uses, the circulation pattern and overall character of the Ranch House development. The Specific Plan focuses on coordinating a mix of residential densities with commercial uses, while supporting internal pedestrian linkages to recreational uses and open space. The Specific Plan also supports a variety of housing options with a range of lot sizes and price points.

The Specific Plan is a method used to implement the General Plan and Strategic Plan at a more detailed, site-specific, level for a focused area. The Specific Plan establishes the type, location, density and community character within the Specific Plan area. The Specific Plan contains the standards and guidance to ensure that development will occur in a controlled manner with infrastructure as planned. The boundaries of the Specific Plan are shown in *Exhibit III.A: Specific Plan Boundaries*.

Exhibit III.A: Specific Plan Boundaries



B. Objectives of the Specific Plan

The Ownership has established the following objectives for the development of Ranch House:

- Implement the goals, objectives and policies of the General Plan;
- Establish a community character that reflects the Town's agricultural and ranching heritage;
- Provide a blend of public and private park amenities, including both active and passive recreation areas, that create meaningful open spaces for residents of Ranch House and the overall Marana community;
- Design a community that provides a sense of place by locating pocket parks throughout residential areas that are managed by the local homeowners' association;
- Develop a circulation system that is efficient for all modes of traffic, including automobiles, bicycles and pedestrians;
- Provide uniform development regulations for land use, circulation and open space;
- Provide infrastructure systems and public facilities to support development in an efficient and timely manner; and
- Provide a framework for the management and administration of this Specific Plan.

C. Relationship to Adopted Plans

1. Marana General Plan

The Specific Plan is located within the General Plan's Central Growth Area, which is described as an area *"…envisioned to become the central activity hub in Marana, featuring event and gathering spaces, shops, entertainment destinations, and employment opportunities. New residential development supports robust commercial activity throughout Downtown, in combination with enhanced connections to and from Interstate 10 and the Santa Cruz River. This Growth Area is further enlivened by public art displaying, portraying, and celebrating Marana and its rich cultural history."*

The Specific Plan supports the goals and policies outlined in the General Plan, including:

LAND USE

Goal BE-7. Residential areas are well-served by a full range of supporting land uses that contribute to a balanced community.

- Policy BE 7-1. Incorporate the full range of uses to support the ultimate build-out population in development proposals for large scale residential areas that support the neighborhood community.
- Policy BE 7-2. Promote a walkable community by centrally locating institutional uses, civic uses, public spaces, and open spaces within the residential developments.
- Policy BE 7-3. Plan open space areas within residential areas to accommodate a greater variety of passive and active recreational uses.

Goal BE-8. Mixed-use development in Marana provides quality areas of housing, commerce, and community interaction.

- Policy BE 8-1. Encourage mixed-use development proposals in appropriate locations, with the scale and intensity compatible with existing and planned uses in the area.
- Policy BE 8-3. Support mixed-use projects in appropriate areas that promote walkability and livability through compact and integrated residential, commercial and employment areas.

Specific Plan Conformance: Ranch House is primarily a residential community that contributes to the overall balance of land uses in the Central Growth Area of the Town. The Specific Plan's highest intensity uses (i.e., multi-family residential and commercial) are adjacent to the Uptown at Marana Specific Plan to the east and across Marana Road from the Marana Towne Center Specific Plan, which primarily features non-residential uses. The key to supporting non-residential uses—and commercial uses in particular—is developing more rooftops. Together, the residential uses within this Specific Plan and Uptown at Marana should generate the critical mass necessary for successful non-residential uses in Marana Towne Center.

HOUSING

Goal BE-9. Multi-family development in Marana is of high design quality and is supported by necessary infrastructure and community serving uses.

- Policy BE 9-3. Provide access to multi-family residential development from either arterial streets or collector streets.

- Policy BE 9-4. Reduce the bulk and massing of multi-family buildings through orientation, façade articulation, roof plane variation, fenestration, and material and color variations.

Goal BE-27. Marana maintains a diverse housing stock that accommodates the various housing needs of all residents.

- Policy BE 27-2. Encourage a range of housing types, housing sizes, and lot sizes that foster a variety of options, such as detached single-family homes, attached single-family homes, and multi-family units that increase choices throughout the community.

- Policy BE 27-3. Promote development proposals for multi-family residential, mixed-use, and small lot residential areas that are compatible with the existing and planned land uses in the area.

- Policy BE 27-4. Encourage the development of apartments, garden homes, court homes, townhomes, condominiums, and attached single-family dwellings in appropriate locations to increase available housing options for price-sensitive rentals.

Goal BE-28. The cost of housing is affordable for those living and working in Marana.

- Policy BE 28-1. Increase available housing choices in Marana to accommodate a range of needs, such as family size, age, and income.

Specific Plan Conformance: Over the years, it has become increasingly apparent that the market is demanding more diverse housing options, including smaller lot sizes for single-family residences and more rental opportunities. Ranch House provides the opportunity to build a wide range of housing types at a variety of densities. The buyers in Ranch House are expected to include young couples, families and empty-nesters looking for a place they can afford to either raise their families or enjoy their retirement. Ranch House also intends to offer rental opportunities for those who are looking for an alternative to homeownership. By providing a diverse housing stock and increasing the overall availability of housing at a variety of price points in the Town's Central Growth Area, Ranch House will be contributing to the housing needs of the community.

OPEN SPACE & RECREATION

Goal PC-21. Marana proactively plans for future parks that enhance the overall community.

- Policy PC 21-1. Identify potential locations for future district and community parks in the Parks, Recreation, Trails, and Open Space

Master Plan, particularly in underserved areas, in anticipation of future development.

Goal PC-22. Marana's parks and recreational amenities are accessible throughout the Town and to all residents.

- Policy PC 22-3. Ensure that parks and recreational facilities are linked to neighborhoods, schools, and the regional trail network.
- Policy PC 22-4. Locate future community and regional parks near major arterials.

Goal PC-24. New residential developments feature accessible park and recreational amenities that are integrated and connected to the Town-wide network.

- Policy PC 24-2. Continue to require developers to include parks, open spaces, and trails in new residential development.
- Policy PC 24-3. Support the development of recreational facilities in existing and new residential developments.

Specific Plan Conformance: The Specific Plan has been designed with emphasis on its outdoor spaces. Ranch House is a place where parents feel safe allowing their children to play and visit friends. Trails are abundant, linking neighborhoods and open spaces throughout Ranch House, in accordance with the Town's Parks, Recreation, Trails and Open Space Master Plan. Pocket parks will help establish neighborhood identities and are framed by homes to activate public spaces and ensure there are residential eyes watching park activities.

A 20-acre community park will be developed adjacent to I-10, making it easily accessible to Ranch House residents, as well as the greater Marana community.

In addition, the community's focal point, The Ranch House, will serve as the central hub where the community's residents can make connections with their neighbors, friends and family.

TRANSPORTATON

Goal BE-21. Marana provides for orderly development of roads in conjunction with development.

- Policy BE 21-3. Continue to require traffic reports for master planned communities, rezonings, specific plans, subdivision plats, and development plans.

- Policy BE 21-4. Require that new development provide mitigation for traffic impacts to existing roads, as identified in a traffic impact analysis reviewed and approved by the Town Engineer, in conjunction with the request for development approval.

Specific Plan Conformance: The Ranch House community is designed for safe access and circulation that complies with Town standards and is based on a traffic impact analysis prepared for the Project. The Project's interior circulation system focuses on a collector road that is broken up by a series of small pocket parks that will provide slower and safer vehicular movement through the individual neighborhoods without creating a huge community divide. The traffic analysis also identifies a number of offsite improvements that will be constructed as part of Ranch House's phased development.

2. Marana Strategic Plan

The Specific Plan supports the five areas of the Marana Strategic Plan:

Commerce - Construction of the proposed community will provide jobs as well as revenue to the Town through construction sales tax and development services fees. The commercial planning area proposed for the southeast corner of the Property will not only provide nearby shopping and amenities to area residents, but it will also produce commercial sales tax and employment opportunities for the Town.

Community - This new residential community will provide a diverse mix of lot sizes and housing choices in northwest Marana, attracting new residents to the Town. Offering larger lots north of Kirby Hughes Road and adjacent to existing development to the west creates a logical transition in housing product type and price when moving east through the Property to Interstate 10. Higher density attached residential units such as condos or townhouses surrounding the proposed southeast commercial corner will also help to transition and buffer less intense residential development from commercial uses at the southeast corner of Ranch House.

Heritage - The historic agricultural use of the Property highlights the area's unique heritage as a farming town. The option to use reclaimed or non-potable water to irrigate landscape areas throughout Ranch House furthers the water conservation techniques that have been vital to life in the arid southwest for generations.

Progress/Innovation - Dedication to a conscientious approach to responsible development, high-performing homes and cost saving for potential future homebuyers reflects the intent of the Specific Plan. The community will strive to incorporate sustainable building practices such as the use of energy efficient construction materials and appliances, non-potable water for landscape irrigation

and innovative site design conservation techniques to decrease energy usage, minimize impact to the environment, conserve water and promote healthy lifestyles. The diverse mix of proposed residential offerings combined with the commercial in the southeast corner also help to create a mixed-use atmosphere that integrates land uses, ultimately requiring a smaller development footprint. This translates to fewer vehicle miles traveled/carbon emissions and can help facilitate the protection of valuable undisturbed land elsewhere in the Town.

Recreation - The development plan proposes a variety of open space and recreation opportunities for all ages of its residents, ranging from active and passive recreation areas to linear open space areas and trails. The proposed linear open space will feature a multi-use path that will connect the 20-acre community park in the northeast portion of the Property, adjacent to the Interstate 10 Frontage Road, to Marana Road. Smaller, privately-owned and maintained neighborhood trails will branch off of the main multi-use path.

D. Compatibility with Adjoining Development

Ranch House establishes a residential community compatible with surrounding existing and planned development, transitioning from the highest, most dense development at the southeast corner to less intense residential development on larger lots toward the west and northwest. The Specific Plan's highest intensity uses (i.e., multi-family residential and commercial) are adjacent to the Uptown at Marana Specific Plan to the east and across Marana Road from the Marana Towne Center Specific Plan, which primarily features non-residential uses. The key to supporting non-residential uses—and commercial uses in particular—is developing more rooftops. Together, the residential uses within this Specific Plan and Uptown at Marana should generate the critical mass necessary for successful non-residential uses in Marana Towne Center. The Project's circulation system has also been designed to minimize the effects of vehicular traffic on adjacent development. The primary and secondary access points into the community will be located on Marana Road and Sanders Road, thereby deemphasizing Wentz Road in its relationship to the Project. Both public and private open space/recreation amenities located within the plan area will be accessible through the Project's interior circulation system.

E. Land Use Concept Plan

The Land Use Concept Plan (*Exhibit III.E: Land Use Concept Plan*) establishes a neighborhood scale and unique identity for Ranch House, while at the same time integrating it into the larger community. The 841-acre Property will include neighborhoods with a range of residential densities, a strategically placed commercial

area and generous open spaces. Ranch House includes the following 5 land use designations:

- Medium-Low Density Residential ("MLDR")
- Medium Density Residential ("MDR")
- Medium-High Density Residential ("MHDR")
- Commercial
- Open Space/Recreation

Ranch House, which may include up to 3,200 SFR lots (plus up to 300 MFR units), has been primarily designed as a residential community that will accommodate commercial development if the market dictates commercial viability. The community design incorporates residences, recreational facilities, parks and commercial services in a pedestrian-friendly environment. Commercial and or MFR uses will be located at the southeast corner of the Property, surrounded by medium-high density housing options. In general, residential intensities gradually decrease toward the northwest except surrounding the neighborhood pocket parks, where higher-density residential products may be located to help activate the public space and provide eyes on the street and parks. The entire community, including open space areas, will be accessible by various modes of transportation.

The majority of the Specific Plan has been designated MDR, which consists of single-family detached homes. Many of the lots will back onto the open space and recreation amenities provided in Ranch House. The southeast corner of the Property has been designated as Commercial, and in addition to commercial uses, this designation supports MFR. The MHDR designation, which may consist of attached and/or detached single-family residences, provides a transition between the Commercial area on the corner and the MDR homes within the center of the community.

A system of internal open space linkages has been incorporated into the Specific Plan. The placement of pocket parks and other open space amenities in close proximity to residential areas reinforces individual neighborhood identity. The pocket parks and other private open space areas will be maintained by the Ranch House Community Association ("RHCA").

The community's public open space includes a 20-acre park located along the I-10 Frontage Road at the northern boundary of the Property, which will help buffer the noise from I-10 that would otherwise affect residents of the Project. Upon its completion, the community park will be dedicated to the Town.

Open space areas of various sizes will be located throughout the development, including a large linear open space area extending along the former Sagebrush Road alignment. Pedestrian friendly movement and open space corridors have been a dynamic focus and

the backbone the Ranch House land use concept. Because access to open space and the desire for inter-connectivity are such an important guiding factor in the design of the community, they have greatly influenced the shape of the parcels, park locations, and lotting within the Specific Plan. The extensive improved trail network will have a variety of path types, including open space paths, paseo walks, multi-use trails and roadside sidewalks that will create a web of access throughout Ranch House. The intended uses for the different trails include, but are not limited to, walking, running and riding. Although the final shapes, undulation, and sizes have not been fully incorporated into the Specific Plan, the trails will be designed taking these uses into account.

A multi-use trail system will be included along Marana Road and will feature an asphalt shared-use path designed and constructed to Town standards. Local trails and/or paths constructed within Ranch House will connect to the shared-use path constructed along Marana Road. The exact size, location and configuration for open space, including the 20-acre community park, all pocket parks, trails and recreation amenities are subject to adjustment based on final site engineering, such as drainage and grading, and the incorporation of input from the various agencies that provide comments on the subdivision plat. The minimum area and types of amenities provided will meet or exceed the Town's recreation requirements in MTC Section 17-5-3(B)(12) and will be constructed in compliance with the Town's Subdivision Recreational Area Manual ("Recreation Manual"). In addition, public trail easements and connections will be provided, as required by the Town.

A breakdown of the land uses depicted in *Exhibit III.E: Land Use Concept Plan* is provided in *Table III.E: Ranch House Land Use Concept*.

Table III.E: Ranch House Land Use Concept

Land Use	Approximate Acreage	Minimum Lot Area	Minimum Lot Depth
MLDR	141	6,000 SF	90 feet
MDR	343	4,500 SF	75 feet
MHDR	65	3,500 SF* (4,500 SF)	N/A
Commercial	18	MHDR for SFR N/A for MFR (max 14 RAC)	N/A
Open Space**	180		
Rights-of-Way	94		
TOTAL	841		

*Maximum of 384 units (12% of total 3,200 SFR units).

**Includes 20-acre community park, pocket parks and landscape buffers.

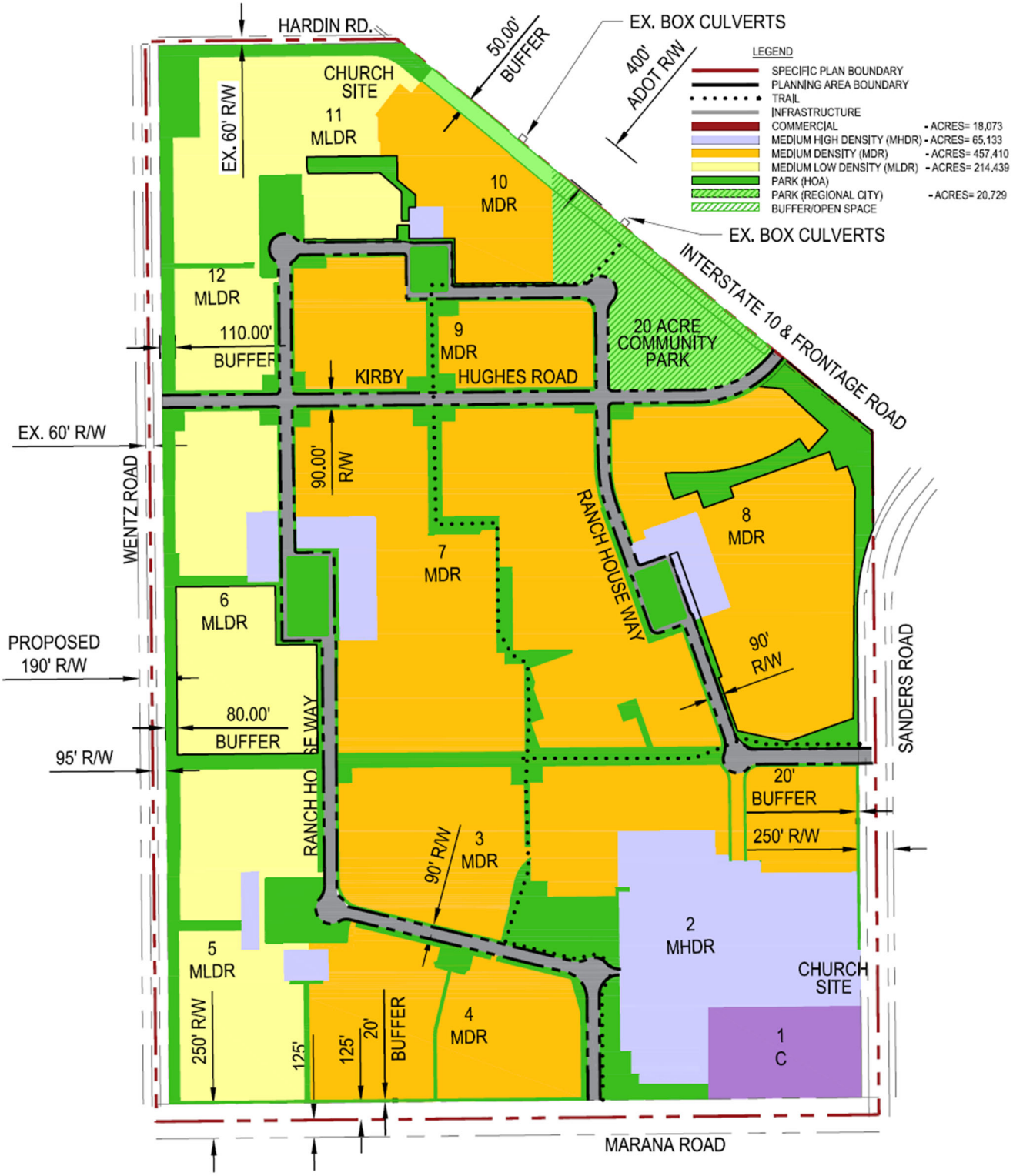


EXHIBIT III.E: LAND USE CONCEPT PLAN

The WLB Group INC. WLB

F. Circulation

The circulation for Ranch House is designed to provide a safe and efficient movement of people. The main access points to the Project are located along Sanders Road and Marana Road. Intersecting with Sanders Road to the east and Marana Road to the south is the proposed Ranch House Way, which is classified as a collector, providing access throughout the Property. Kirby Hughes Road will remain, connecting Wentz Road to the Frontage Road.

Ranch House is designed for safe access and circulation utilizing a collector road that is broken up multiple times by neighborhood focal parks that will be framed by homes. This approach will provide slower and safer vehicular movement without creating a huge community divide. Multiple access roads connect the interior of Ranch House to perimeter roadways that are already in place to allow typical higher traffic volumes and greater speeds outside the neighborhoods. The physical layout, which supports a variety of housing stock styles, maximizes the opportunity to make Ranch House a truly unique community in Marana.

As displayed on *Exhibit III.F: Circulation Concept Plan*, direct access to the Project will be provided through access points along Sanders Road and Marana Road. Sanders Road will be extended to the I-10 Frontage Road, which provides additional access to the community park, if approved by ADOT. The new Ranch House Way will be a collector road providing access to the entire Property. Ranch House Way intersects with Marana Road to the south and Sanders Road to the east. Local roads extending from Ranch House Way provide access to the parks, northern planning areas and regional recreation area. Kirby Hughes Road will remain in place connecting Wentz Road and the Frontage Road. Kirby Hughes Road is the only access point onto Wentz Road from the interior of the Property. The former Sagebrush Road alignment will be transformed into a linear open space feature that doubles as a drainage and utility corridor. Internal circulation of the Property consists of local streets branching off Ranch House Way and Kirby Hughes Road. The internal streets will be public.

Pedestrian friendly movement throughout the Property is a main goal of the Circulation Concept. This is accomplished in a variety of ways. Ranch House Way, the primary collector spine road that connects all neighborhoods within the community, will be broken up by a series of pocket parks. A system of pedestrian trails provides connections throughout Ranch House and to the proposed community park adjacent to I-10 and Sanders Road. The trails will be accessible from local streets and are designed with sidewalks and bicycle access. All areas of the Property are accessible by automobile, bicycles and pedestrians.

An important aspect of the trail system is not only to serve those living within Ranch House, but to connect and expand on the existing pedestrian infrastructure the Town has developed around the site, most importantly along Marana Road. Ranch House

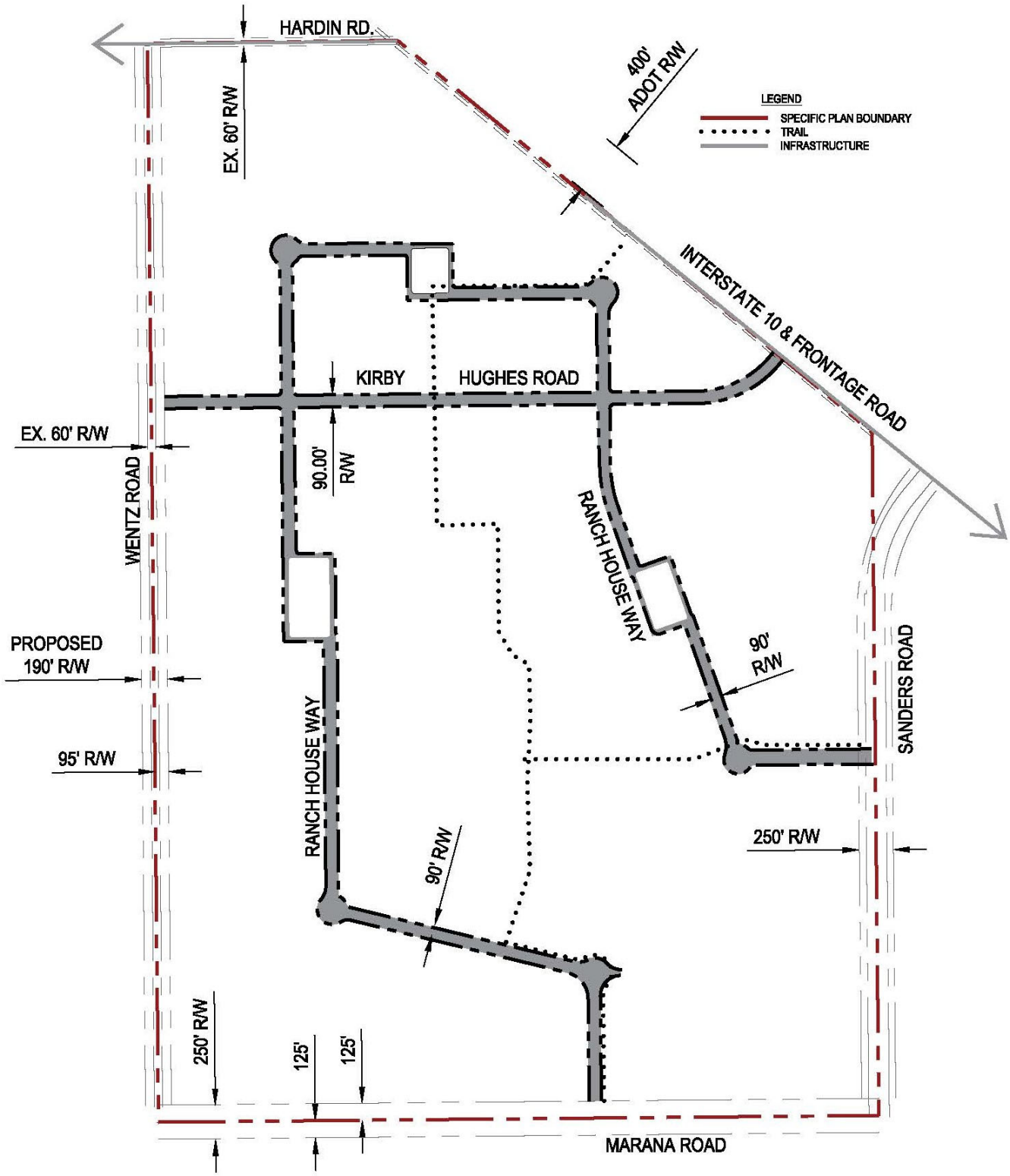
understands the importance of this trail corridor, and the integration between the two systems will be designed and constructed to the Town's standards for shared-use paths for a flawless transition.

The community materials will unify the masterplan as a whole. This unity will continue with the material used on the different trail classifications. Although final materials have not been identified, these may include the use of concrete, colored concrete, pavers, decomposed granite and asphalt. The final material selection will be cognizant of the intended use of the trails. The trails will be constructed based on the Town's/industry standards.

All onsite roadway improvements are the responsibility of the Master Developer. The extent and specific nature of offsite roadway improvements will be described in the existing development agreement between the Town and the Developer. The exact nature of the roadway improvements will be determined based on the findings of the Ranch House Traffic Impact Analysis ("TIA"), submitted for review under separate cover. The timing and scope of construction of offsite road improvements (including the construction of traffic signals) to be provided by the Developer will be determined by the Town based on the findings of the TIA. Slope and utility easements for internal roadways may extend beyond the minimum right-of-way.

G. Grading Concept

The entire Property is an agricultural field; therefore, mass grading will occur. Prior to site disturbance, additional geological studies will be done in order to meet necessary standards. The Property will require stormwater retention per the *Revised Development Requirements for Drainage in Northern Marana, dated December 9, 2000*. The excavated material from the mass grading will be used onsite as needed to establish positive flow from the southeast to the northwest as the Property historically drained.



DEVELOPMENT PLAN
EXHIBIT III.F: CIRCULATION CONCEPT PLAN

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H. Water Resources

The development of the Project will mitigate existing sheet flow conditions on the Property by constructing interceptor channels around the perimeter of the Property that will have capacity to accept the 100-year discharge, as determined from the Tortolita Alluvial Fan Study non-regional storm model. (See Section J - Post-Development Hydrology for additional information regarding the design parameters for the channels.) Plans and studies will be submitted to FEMA for review, and upon approval, FEMA will issue a Conditional Letter of Map Revision ("CLOMR"). Upon completion of the perimeter roadway drainage improvements and submittal of as-built drawings to FEMA, post-Project FEMA flood hazard mapping within the Property will be revised to Zone X. The Property will be removed from the Special Flood Hazard Area ("SFHA") only after receiving the Letter of Map Revision ("LOMR").

The surface drainage outfall from the Property is located at the northwest corner of the Property at the Wentz Road/Hardin Road intersection. Flow concentrates at the Wentz/Hardin intersection before overtopping Wentz Road and continuing west.

The proposed drainage improvements will maintain historical drainage patterns along the downstream Property boundary. There is, and will continue to be, a low flow outlet pipe that drains from the detention basin to an existing tailwater channel at the northwest corner of Wentz Road and Hardin Road. The profile of Wentz Road will remain the same as under existing conditions to provide the 800-foot-long overflow weir to downstream areas. Outletting flow in this manner will preserve the sheet flow conditions along the downstream boundary.

I. Topography

The conceptual land use plan will utilize the existing topographic characteristics of the land. The Project will generally maintain the natural 0.2% slope from the southeast corner to the northwest corner of the Property. Localized changes in the slope will occur within proposed local streets where necessary for drainage and sewer collection purposes. No slopes greater than 15% are anticipated on the Property.

J. Post Development Hydrology

1. Offsite

A master drainage plan will be submitted during the platting process. Most of the Property is subject to shallow sheet flow with flooding depths of 0.5 to 1.0 feet, which are mapped as Zone X (shaded) or Zone AO-1 (depths of 1-1.5 feet). Offsite flows reaching the Property will require the construction of interceptor channels to collect flow and convey it to the downstream Property boundary. To mitigate offsite flows, water will be collected along the south, east and north Property boundaries within drainage features/open space areas and conveyed through the Property or along its boundaries to the northwest Property corner. *Exhibit III.J: Post Development Hydrology* depicts the storm water control features for mitigation of offsite and onsite drainage impacts. The function of these channels is described below.

a. South

Approximately 460 cfs reaches Marana Road and continues north onto the Ranch House Property. Prior to reaching Marana Road, these flows emanate from the property located due south (Wentz 154) of the Ranch House Project and will be intercepted along the Wentz 154 eastern boundary via a gunite-lined trapezoidal channel and conveyed north to Marana Road. (See *Exhibit III.J.*) Flows will then be conveyed west to Wentz Road where they will be routed thru 2-cell 3-foot x 10-foot reinforced concrete box culverts ("RCBC") to the northeast corner of the Marana/Wentz intersection. From here, flows will be conveyed north along the east side of Wentz Road via a gunite-lined trapezoidal channel to the Sagebrush Road alignment. At this point, flows will cross Sagebrush Road via 2-cell 3-foot x 10-foot RCBCs and discharge into a gunite-lined trapezoidal channel, which will be taking stormwater from the east. The channel will be upsized at this location to accommodate flows from both directions.

b. East

Storm flows reaching the east Property boundary originate from the south and east. Flows cross Marana Road at the Uptown at Marana project's southern boundary. Due to agricultural conditions, these flows spread out and sheet flow west until they reach the Property's east boundary (Sanders Road alignment). Flows reaching the east boundary are depicted on *Exhibit III.J* as concentration points ("CP") 3 & 4, respectively.

Peak flows reaching CP 3 will be intercepted by a gunite-lined trapezoidal channel and conveyed north along the east side of an improved Sanders Road right-of way until they reach the Sagebrush Road alignment. Flows will cross under Sanders Road and Sagebrush Road via 3-cell 4-foot x 10-foot RCBCs and will be picked up by a gunite-lined trapezoidal channel and routed west along the north side of the Sagebrush Road alignment to the Wentz/Sagebrush

intersection. At this point, the channel will be upsized to accommodate flows coming from the south, as discussed above. Storm discharges reaching the Wentz/Sagebrush intersection will be conveyed under Kirby Hughes Road via 4-cell 6-foot x 10-foot RCBCs and discharged into Retention Basin B. Retention Basin B is designed to contain onsite storm flows for the 10- and 100-year, 1-hour storm events.

Peak flows reaching CP 4 will be intercepted by a gunite-lined trapezoidal channel and conveyed north along the east side of an improved Sanders Road right-of way until they reach the I-10 Frontage Road. At this location, water will be routed via 2-cell 4-foot x 10-foot RCBCs under Sanders Road and into a gunite-lined trapezoidal channel, which will route storm flows northwest along the west side of the I-10 Frontage Road to Retention Basin A. Retention Basin A is designed to contain storm flows for the 10- and 100-year, 1-hr storm event. Flows in excess of this will weir out along its west boundary. Water overtopping the weir for Retention Basin A will be directed into a gunite-lined trapezoidal channel and conveyed northwest along the southwest side of the I-10 Frontage Road to the Hardin Road/I-10 Frontage Road intersection.

c. *Northeast*
Flows reaching CP 5 and 6 originate from east of I-10 and are conveyed under the I-10 freeway via existing 4-cell 4-foot x 10-foot RCBCs. Flows eventually cross the northeast boundary of Ranch House. Stormwater from these existing culverts will be intercepted by the channel and conveyed northwest along the southwest side of the I-10 Frontage Road to the Hardin/I-10 Frontage Road intersection. From here, flows are conveyed west along the south side of Hardin to Retention Basin B.

2. Onsite

The Property will be mass graded and left undeveloped with the exception of drainage infrastructure. The Property will be graded to match existing conditions as much as possible (i.e., gentle slope from southeast to northwest) with storm water sheet flowing to the northwest corner of each catchment. The overall Property was delineated into 3 separate watersheds and the 10- and 100-year peak discharge for each was calculated. *Exhibit III.J* reflects proposed conditions onsite drainage patterns as well as proposed improvements of handling offsite stormwater.

Watershed A will be graded to sheet flow from southeast to northwest. Flows will be intercepted by channels designed along Wentz Road and the Sagebrush Road alignment to convey offsite flows to the northwest corner of the Property. Storm water from Watershed A will ultimately be combined with flows from Watershed C and retained within Retention Basin B. The total estimated 10- and 100-year peak discharges reaching Concentration Point 10 are approximately 147 cfs and 451 cfs, respectively.

Watershed B will be graded to sheet flow from southeast to northwest. Flows will be intercepted by and retained within Retention Basin C. The total estimated 10- and 100-year peak discharges reaching Concentration Point 20 are approximately 150 cfs and 457 cfs, respectively.

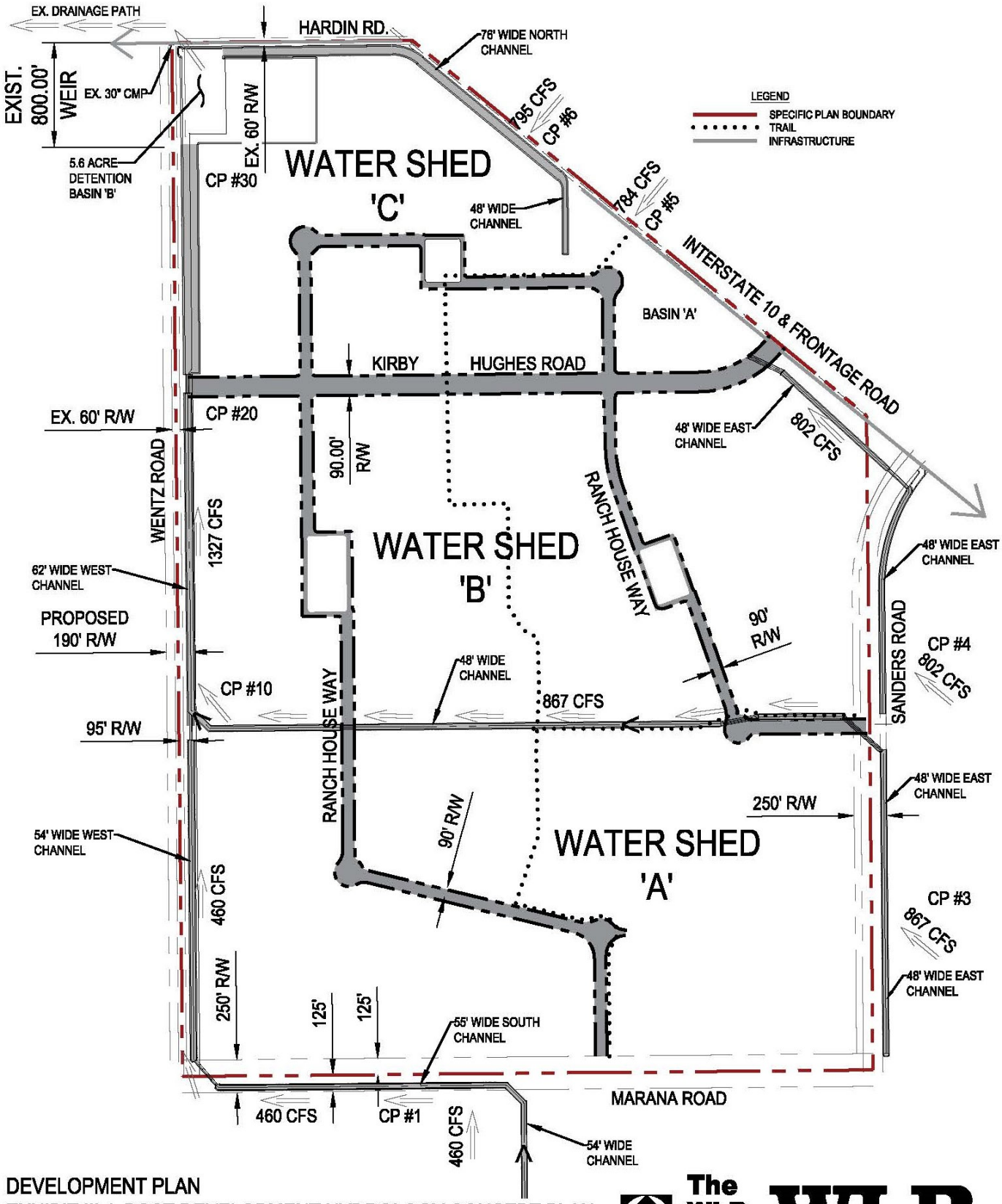
Watershed C will be graded to sheet flow from southeast to northwest. Flows will be intercepted by and retained within Retention Basin B. The total estimated 10 and 100-year peak discharges reaching Concentration Point 30 are approximately 84 cfs and 266 cfs respectively.

Onsite flows from Watersheds A and C will be combined and retained within Retention Basin B located in the northwest corner of the site. The high flow outlet from this basin will be an 800-foot section of Wentz Road just south of its intersection with Hardin Road. The weir will discharge offsite stormwater into an existing 30-inch diameter corrugated metal pipe ("CMP"). When the capacity of this pipe is exceeded, stormwater will overtop Wentz Road and continue west via a series of tailwater pipes, channels and CMID irrigation ditches.

All building finish floor elevations will be designed to a minimum of 1 foot above post-Project 100-year flood elevations. The channel system described above will mitigate sheet flooding on the Property. A CLOMR will be prepared and submitted to FEMA in conjunction with the subdivision platting process. A LOMR shall be applied for after relevant grading and drainage infrastructure has been as-built certified. The LOMR shall be effective prior to the release of building permits. The AO-1 flood zone requirements shall be in effect until the LOMR has become effective.

Onsite-generated stormwater will be conveyed to the onsite retention/detention areas via the interior street network by a series of storm drains and sidewalk scuppers, which will be designed during the subdivision platting process. Onsite stormwater conveyance will adhere to current Town development standards, FEMA requirements and applicable basin management plans.

A stormwater pollution prevention plan ("SWPPP") submitted to the Town will be required prior to the issuance of grading permits for the future development of the Property.



DEVELOPMENT PLAN
EXHIBIT III.J: POST DEVELOPMENT HYDROLOGY CONCEPT PLAN

The WLB Group WLB

K. Environmental Resources

Due to its previous use as an agricultural field, the Property has been completely graded. There are no significant environmental resources on the Property. A Phase I environmental report was completed by CMT Engineering, dated October 26, 2021. No hazardous material was found onsite. An updated Phase I Environmental Assessment report must be submitted to the Town and is valid for 180 days prior to the dedication of any future easement or right-of-way to the Town and must document the status of the former Kirby Farms Airstrip site west of Wentz Road.

L. Landscape Concept

Ranch House's overall landscape theme is to tie the Project to the Town's agricultural and ranching heritage and strengthen its position as a gateway to the Marana Town Center. A soft transition between urban development and adjacent rural areas is achieved through the provision of perimeter buffers, which may incorporate open space and multi-use trails. The buffers will be designed in an attractive manner using informal groupings of shrubs and trees or, where appropriate, by planting trees in an orchard grid arrangement.

Another objective of the Ranch House landscape design is to enhance the pedestrian character and climate of the community by introducing the concept of landscaped pedestrian linkages and gathering places. Landscaped trails within the rights-of-way of arterial and collector roads will facilitate access to parks throughout the Property.

The landscape concept includes the utilization of a combination of both drought-resistant plants ("xeriscape" plants) and lush vegetated areas throughout Ranch House. Landscape themes are used to create both a shady and green appearance to counter hot and arid conditions of the community's summer climate. Such themes will be incorporated into design of open space and recreation areas, as well as streetscapes, plazas and pedestrian nodes.

All landscaping and bufferyards within Ranch House will be provided in accordance with the requirements of the Marana Town Code ("MTC").

M. Open Space, Recreation, Parks and Trails Concept

The key focus for designers of Ranch House is to create an environment that fosters social interaction and neighborhood connectivity, that is highly connected and promotes smaller intimate neighborhoods, and where parents feel safe allowing their children to play and visit friends. Ranch House is a place where trails are abundant and parks are available close to everyone with residential eyes on the parks. In addition, the community's focal point, The Ranch House, will serve as the central hub where the community can come together to connect with neighbors, friends and family.

There will be multiple pocket parks located along Ranch House Way throughout the Specific Plan. Circulation surrounding the parks has been intentionally designed to make them the focal point of the individual neighborhoods. These areas will be pedestrian-oriented, accessible via sidewalks and neighborhood trails. One-way streets will slow vehicular traffic around the park. Each park will include a variety of amenities, such as landscaping, benches and linkage opportunities and will be constructed in accordance with MTC 17-5-3(B)(12), which sets forth the minimum recreational areas. The Specific Plan will also comply with the Recreation Manual, which will be used as a guide to comply with Town Code. Required park areas may be combined to form larger park spaces that offer active recreational amenities such as ball fields.

A large community park will be constructed adjacent to the I-10 Frontage Road and Sanders Road. The minimum size of the community park is 20 acres, and it will provide active and passive recreation opportunities, including picnic areas, ramadas, grills, soccer/football fields, baseball/softball fields and basketball courts. This park will be dedicated to the Town. The park will be accessible by car from Sanders Road and the I-10 Frontage Road with approval from Arizona Department of Transportation ("ADOT"). Pedestrian and bicycle access will be provided via the community and neighborhood trails located throughout Ranch House. The design of the park will be subject to a Parks Master Plan acceptable to the Town.

Linear open space connects the community park in the northeast corner of the Property to Marana Road on the south. Within this open space, there is a multi-use path from which the neighborhood trails will branch off. These trails will be privately owned and maintained. Community trails are proposed within the right-of-way of Ranch House Way and possibly Marana Road. As this area of Marana continues to develop, these trails will provide open space continuity throughout Northwest Marana and the regional trail system. The RHCA will be established to provide long-term maintenance of privately owned recreation facilities, trails and other common areas.

The exact size, location and configuration of all parks, recreation and trail system improvements will be defined at time of platting.

See Exhibit III.M: Open Space Concept Plan.

EXHIBIT III.M: OPEN SPACE CONCEPT PLAN

The WLB Group WLB

N. Cultural Resources

No areas of significance were found during a partial survey of the Property conducted in 1983. Because the entire Property has not been surveyed, prior to any onsite disturbance, a field survey over the entire Property will be conducted. Specifically, a cultural resource Class III (field survey) report for the Property must be reviewed and approved prior to the issuance of a grading permit. The survey must also be less than 10 years old at the time of review and approval. If the Project has a federal nexus, then the cultural report must be reviewed by the State Historic Preservation Office (SHPO).

In addition, any recommended testing and mitigation measures will be completed before Property disturbance. In the event that significant archeological objects, any human remains, or funerary objects are uncovered during construction work, all work will be stopped in the area of the discovery and the Director of the Arizona State Museum will be immediately notified of the discovery in accordance with A.RS 41-865. Action must then be taken to prevent further disturbance of such remains. The Director of the Arizona State Museum will have ten working days to respond to any request to proceed with ground- disturbing activities. If any artifacts are found, the Master Developer will work with the Arizona State Museum to incorporate them into the development, if possible.

O. Viewsheds

The Property is relatively flat with no significant topographical features. This allows neighbors to see directly onto the Property and far distances. Immediate adjacent viewsheds currently experienced by surrounding properties, may be impacted by proposed development, especially for the neighbors along Wentz Road. However, neighbors along Wentz Road will still enjoy the distant views of the surrounding mountain ranges.

The areas of the property with the highest visibility from adjacent offsite locations are located on the perimeter of the Property, specifically the portion of the Property adjacent to the I-10 Frontage Road and Wentz Road. Landscaped buffers established along the perimeter of the Property and along major arterials within the rights-of-way help to mitigate the impact of the Project on the neighboring properties.

P. Infrastructure, Public Services and Utilities

This section describes the type of infrastructure, public services and utilities that the development requires. The phasing of the implementation of these services is discussed in Section V.C: Phasing. All infrastructure will be constructed in accordance with the build-out schedule.

1. Sewers

The first component of a regional sewer system has been installed along Marana Road at the southern boundary of the Property. An additional component of the regional system is planned to be located along the Sagebrush alignment.

Marana Utility Department is currently in design for a 27-inch sewer line from Clark Farms to the Sagebrush alignment along Sanders Road. The 27-inch line will follow the Sagebrush alignment west through the Project. Ranch House will utilize gravity and force mains to convey onsite wastewater to the 27-inch main.

2. Schools

As shown on *Exhibit II.C.9.a: Recreation and Schools*, the Property is located within the Marana Unified School District ("MUSD"). There are no schools located within a one-mile radius of the Property. The following schools within MUSD are expected to serve the proposed development until new schools become available: Another Chance at Education (ACE), Estes Elementary School, Marana Career - Technical High School, Marana Middle School, Marana High School and Roadrunner Elementary School.

It is anticipated that this Project will generate approximately 3,500 residential units if fully developed at the target residential densities. MUSD provided the following multipliers to use for student enrollment projections (MUSD multipliers do not distinguish between different housing projects):

- Elementary: 0.25 students per home (0.25 x 3,500) = 875 students
- Junior High & High School: 0.10 students per home (0.10 x 3,500) = 350 students

Onsite development will impact school capacity. The Master Developer has agreed to a $1,200 per dwelling unit voluntary school fee.

3. Fire/Emergency Vehicle Service

The Property is within the Northwest Fire District with the exception of the two church properties and the Commercial parcel at the southeast corner of the Property, which have not yet been annexed into the fire service district.

Northwest Fire District Station 336, located approximately 1.4 miles southeast of the Property at 13475 North Marana Main Street, is the nearest fire station.

Prior to a certificate of occupancy being issued for any dwelling unit located within the parcels not currently within a fire service district, the owner shall have completed or shall provide evidence to the Town's satisfaction that the Property has been annexed into a fire district or otherwise provide for fire protection service, as accepted by the Town.

See Exhibit II.C.9.b (3): Fire Service.

4. Water Service

The Town Water Department will provide water service to this Project.

Two new water systems will need to be designed to serve this Property. The first is a domestic or potable water system that may require a pumping station and a water storage tank adequately sized to meet all fire and daily use demands, per the water modeling completed by the Town's Utility Department.

Any water to be used for irrigation purposes within landscaped open areas, recreation sites and public facilities shall be coordinated with CMID. The Master Developer will explore the option of providing lakes and basins on the Property which could also be used for non-potable water. Connections to individual residential lots may also be installed, although there are no meter requirements for these connections. CMID has the surface water rights to be used for this type of system. At least one properly sized basin will be required onsite to serve the irrigation system. Coordination for the irrigation system will be handled through the CMID.

5. Private Utilities

a. *Natural Gas*
Southwest Gas Corporation will provide natural gas service. There is an existing Southwest Gas line adjacent to Sagebrush Road within the Property and an El Paso Natural Gas line on the east side of Hardin Road along the 1-10 Frontage Road, which will require special design consideration when improvements are made to Hardin. Additionally, there is a plastic distribution gas main within the right-of-way of Wentz Road between Price Lane and Marana Road.

b. *Communications*
Telephone service and line installation is available in this area through Century Link.

Comcast Cable will provide cable services and installation to the Property.

c. Electricity
Electric services will be provided by Tucson Electric Power Company.

6. Cortaro-Marana Irrigation District

Irrigation water flows westerly onsite along the current roadways bisecting the Property in open-air concrete-lined "V" ditch canals. The interior irrigation ditches are in use and currently under the control of Cortaro-Marana Irrigation District ("CMID").

In order for the water to continue to pass through the Property to serve those lands to the west and north, all existing ditches will be piped underground or will be addressed by other agreement with CMID and the Town. The Town has existing requirements to underground these irrigation ditches that are independent of any CMID requirement. Any improvements made to the existing irrigation canals will be the result of the Master Developer working closely with CMID and the Town to ensure all parties' needs are met and that all improvements comply with Town and CMID standards.

IV. DEVELOPMENT & DESIGN GUIDELINES

A. Purpose and Intent

These regulations serve as the primary mechanism for implementation of the Specific Plan. The Specific Plan Development & Design Guidelines establish the intensity and character of the development by prescribing site-specific development standards and design guidelines that are tailored to the unique qualities of the Project. The regulations contained within this section provide an appropriate amount of flexibility to anticipate future needs and to achieve compatibility with surrounding land uses.

The purpose of these guidelines is to encourage creativity and a high level of design quality. The guidelines foster development that enhances the physical image, identity and value of the community.

B. General Provisions

1. Applicability of the Marana Town Code

If an issue, condition, or situation arises or occurs that is not addressed by this Specific Plan, the applicable portions of the Marana Town Code ("MTC") that are in place at the time of development shall apply.

2. Building Code

All construction and development within the Specific Plan shall comply with applicable provisions of various codes and regulations adopted by the Town including, but not limited to, building codes, mechanical codes, electrical codes, plumbing codes, and fire codes current at the time of development.

3. Additional Uses

Whenever a use has not been specifically listed as being a permitted use in a particular zone classification within the Specific Plan, it shall be the duty of the Town Zoning Administrator to determine if said use is: (1) consistent with the intent of the zone, and (2) compatible with other listed permitted uses. Any person aggrieved by the determination may appeal that decision to the Board of Adjustment.

C. Development Guidelines

1. Medium-Low Density Residential

a. Permitted Uses

- Single Family Residential Detached
- Parks and Recreation Facilities
- Churches/Houses of Worship
- Group Homes

b. Accessory Uses

- Detached accessory structures, such as tool sheds, patios and cabanas, non-commercial hobby shops, children's playhouses, etc.
- Swimming pools, spas and related structures
- Home occupations
- Guest House

c. Prohibited Uses

- Commercial Uses
- Industrial Uses

d. Development Standards

- Minimum Lot Area: 6,000 square feet
- Minimum Lot Width: None
- Minimum Lot Depth: 90 feet Minimum Lot Setbacks:
- Front: 20 feet minimum; front setbacks may be reduced in accordance with MTC Section 17-7-8.
- Side: 5 feet minimum; side setbacks may be reduced in accordance with MTC Section 17-7-8.
- Street Side: 10 feet minimum
- Rear: 15 feet; rear setbacks may be reduced in accordance with MTC Section 17-7-8.
- Maximum Building Height: 30 feet
- Minimum Building Separation: 6 feet between primary and secondary buildings; however, the adopted fire code shall take precedence.

2. Medium Density Residential

a. Permitted Uses

- Single Family Residential Detached

- Parks and Recreation Facilities
- Churches/Houses of Worship
- Group Homes

b. *Accessory Uses*
- Detached accessory structures, such as tool sheds, patios and cabanas, non-commercial hobby shops, children's playhouses, etc.
- Swimming pools, spas and related structures
- Home occupations
- Guest House

c. *Prohibited Uses*
- Commercial Uses
- Industrial Uses

d. *Development Standards*
- Minimum Lot Area: 4,500 square feet
- Minimum Lot Width: None
- Minimum Lot Depth: 75 feet
- Minimum Lot Setbacks:
  - Front: 20 feet minimum; front setbacks may be reduced in accordance with MTC Section 17-7-8.
  - Side: 5 feet minimum; side setbacks may be reduced in accordance with MTC Section 17-7-8.
  - Street Side: 10 feet minimum
  - Rear: 15 feet; rear setbacks may be reduced in accordance with MTC Section 17-7-8.
  - Maximum Building Height: 30 feet
  - Minimum Building Separation: 6 feet between primary and secondary buildings; however, the adopted fire code shall take precedence.

3. Medium-High-Density Residential

a. *Permitted Uses*
- Single-Family Residential (Attached or Detached)
- Parks and Recreation Facilities
- Churches/Houses of Worship
- Group Homes

b. *Accessory Uses*
   - Detached accessory structures, such as tool sheds, patios and cabanas, non-commercial hobby shops, children's playhouses, etc.
   - Swimming pools, spas and related structures
   - Home occupations

c. *Prohibited Uses*
   - Commercial Uses
   - Industrial Uses

d. *Development Standards*

The following development standards apply to both attached & detached dwelling units:

- Minimum Lot Area: 3,500 square feet, provided:
  - A maximum of 384 units (or 12% of the total 3,200 units within the Specific Plan) are permitted on 3,500 square-foot lots, and
  - The remainder of the lots must measure 4,500 square feet or greater.
- Minimum Lot Width: None
- Minimum Lot Depth: None
- Minimum Site Setbacks:
  - Front: 20 feet minimum; front setbacks may be reduced in accordance with MTC Section 17-7-8.
  - Street: 10 feet minimum
  - Side: 5 feet minimum; side setbacks may be reduced in accordance with MTC Section 17-7-8.
  - Rear: 10 feet; rear setbacks may be reduced in accordance with MTC Section 17-7-8
  - Minimum setback for second story elements: 15 feet (20 feet for front-facing garage)
- Maximum Building Height: 30 feet
- Minimum Building Separation: 6 feet between primary and accessory buildings; however, the adopted fire code shall take precedence.

4. Commercial

a. *Permitted Uses*
   - Apparel stores
   - Appliance stores

- Automobile service stations
- Bakery
- Banks and financial institutions
- Barber and beauty shops
- Bicycle shops
- Blueprinting or photocopying Book and stationery store Childcare institutions Churches/Houses of Worship Furniture stores
- Convenience stores
- Drive-through facilities for banks, financial institutions, restaurants and other similar uses
- General offices: real estate, data processing, executive suites, photographic services, travel agents, research services, administrative offices, etc.
- Group homes
- Hardware stores
- Laundromat and dry-cleaning services
- Medical and dental offices, including laboratories and clinics
- Multi-Family Residential
- Parks and Recreation Facilities
- Professional offices: law, architectural, engineering, planning, business management, consulting, travel agency, financial services, etc.
- Public Facilities
- Restaurants (excluding drive-thrus)
- Single-Family Residential (attached & detached)
- Supermarkets
- Tailor shop
- Veterinary clinics

b. *Prohibited Uses*

- No single user over 60,000 square feet
- Automobile paint, body, brake and tire shops
- Car washes
- Contractors' yards
- Heavy equipment sales or lease
- Manufacturing

- Storage uses

c. *Development Standards*

(1) Non-residential

- Minimum Lot Setbacks:
  - Front: 30 feet
  - Side: 20 feet
  - Rear: 20 feet
- Building Setback Reduction: Building setback requirements may be reduced 15% when any of the following conditions are met:
  - Landscape requirements are increased by 50%.
  - Parking is located in the rear of building(s).
  - Customer and pedestrian sitting areas are provided.
- Maximum Building Height: 30 feet
- Maximum Lot Coverage: 35 percent
- Parking: Per MTC.

(2) Residential

- Single-Family Residential (attached & detached): see MHDR Development Standards.
- Multi-Family Residential (up to 14 RAC permitted): see Commercial Non-Residential Development Standards.

5. Design Criteria

The Specific Plan will be developed in compliance with the Town's Residential Design Standards (MTC Section 17-7) and Multi-Family, Commercial and Industrial Design Standards (MTC Section 17-8).

6. Circulation

a. *Minimum Roadway Development Standards*
All roadways within Ranch House will be built to current Town Standards.

Proposed streets within Ranch House are a mixture of collector and local subdivision streets. The new Ranch House Way is the spine road providing access to the entire Property. It will be designed as a collector road with a 90-foot right-of-way and will provide internal access to parks and local streets within the Specific Plan and external access to Marana Road and Sanders Road.

Other internal streets will be classified as local streets, which provide access to individual residences. Local streets are designed to handle 1000 average trips

per day. Local residential streets within Ranch House will utilize the Typical Roadway Local Street Section included in the Town's Subdivision Street Standards Manual.

Marana Road and Sanders Road are classified as arterial roadways. The Specific Plan is proposing a 250-foot right-of-way for Marana Road and a 250-foot right-of-way for Sanders Road. Both rights-of-way include multi-use lanes and sidewalks within generous landscape buffers to promote alternative forms of transportation. The landscape buffers within the rights-of-way will also be used for retention/detention facilities.

b. *Traffic Calming Techniques*
Traffic calming techniques, including, but not limited to, varying street widths, parks with one-way streets and a mixed use of paving materials will be utilized in Ranch House, subject to approval by the Town.

c. *Drainage*
Interior collector roads and the perimeter roads will implement a storm drain system at the time of roadway improvements, where applicable.

7. Streetscape

(a) A minimum 20-foot landscaped buffer shall be provided along arterial roads with a 10-foot landscape buffer provided along collector roads.
(b) Medians shall be landscaped.
(c) Open space relief is encouraged at the end of cul-de-sacs.
(d) Landscaped curbways separating curbs and sidewalks will be provided in accordance with the Town's Residential Design Standards to enhance community identity and encourage pedestrian activity.
(e) Use of front porches or front-facing terraces is encouraged, as they promote neighborhood interaction and provide a people-oriented streetscape.
(f) Low open-type fencing or landscape barriers should be used in areas where vehicular or pedestrian access is discouraged.

8. Landscaping

(a) Informal groups of shade trees shall be planted next to structures within recreation and open space common areas, school bus and transit stops, near mailbox areas and along multi-use trails.
(b) A minimum tree size of 15 gallons shall be required for street and parking lot trees. Along spine roads, 20% of the trees shall be 24 gallons in size or greater. Shrubs must be a minimum of 1 gallon.
(c) Trees that produce large canopies and provide shade are especially encouraged.
(d) Landscaping should be used to provide thematic and visual continuity at major arterial street intersections, with tree plantings located in a manner to provide

accent, consistency and definition to the street intersection.

(e) Landscaping in perimeter bufferyards shall include indigenous plants, wildflowers and scattered groupings of trees and understory. In some areas, the use of orchard trees in a grid pattern may be appropriate for use as a buffer.

(f) Any undeveloped remnant space within each of the planning areas must be landscaped or used as park space.

(g) All orchard areas shall consist of a single species of trees and shall contain a minimum of 20 trees that are 15-gallon size or larger.

(h) All planter areas within parking lots shall be provided with trees at the rate of not less than one tree per four parking stalls. Diamond-shaped planter islands are acceptable in parking areas for commercial and recreational uses.

(i) New development adjacent to agricultural or rural residential uses will provide a minimum 20-foot landscaped, open space buffer.

(j) Long, unbroken expanses of high, solid walls or fencing are prohibited.

(k) A master landscape plan shall be submitted with every new development project within Ranch House.

(l) Landscape lighting should be low level and recessed to shield the source of the light. Shrubs must be used to conceal landscape lighting fixtures.

9. Recreation and Open Space

All recreational areas and facilities within Ranch House will be provided in compliance with Town standards, including Recreational Area Plan requirements.

a. Community Park

The Specific Plan proposes a large community park along the 1-10 Frontage Road. This 20-acre park will be dedicated to the Town, and it have a service area of approximately 1 mile. The park will provide both active and passive recreation opportunities to the residents of the Ranch House community and the surrounding areas. It will include multi-use fields, baseball/softball fields, playground equipment, picnic areas and grassy areas to be enjoyed by the public. Recreational facilities dedicated to the Town will be constructed to Town standards in place at time of development.

b. Pocket Parks

Pocket parks will provide common open space within individual subdivisions, becoming the focal point of each neighborhood. The size of these parks will vary as they are based on the number of residences within the subdivision. They will be privately owned and maintained by the RHCA.

c. Linear Open Space

A large linear open space area extends from the community park to Marana Road. The width of the open space will vary throughout its length, but it will have a minimum width of 30 feet. Attractive landscaping will be present

throughout this area, providing residents with an aesthetically pleasing open space amenity. This area will be owned and maintained by the Community Association for use by all residents within the Ranch House development.

d. *Community Trail System*

A community trail system will be established throughout Ranch House. It is a two-tier trail system (community trails and neighborhood trails) that incorporates pedestrian and multi-use paths to provide connectivity to the proposed community park, the pocket parks, the linear open space and the individual subdivisions.

The community public trails, to be dedicated to the Town, are planned to be constructed along Ranch House Way, within the linear open space extending from Marana Road to the community park and possibly Marana Road. These trails create a spine trail system that the neighborhood trails feed into and ultimately provide access to the entire Property. Multi-use paths will be constructed within the rights-of-way. Access to the community trails will be provided from the neighborhood trails and the local streets within Ranch House.

The neighborhood trails are smaller, more community-oriented trails providing the critical link between the subdivisions and community trails within the Ranch House area. These trails are meant to be used by the residents of Ranch House, whereas the community trails are for the public. Access to the neighborhood trails will be within the individual subdivisions and along the community trails. The neighborhood trails may or may not also be multi-use trails.

The Ranch House trail system will be constructed in compliance with the Town's Parks and Recreation Master Plan 2020-2030.

(1) Community Trails

- 30-foot average width trail with 8-foot minimum paved multi-use path and 2-foot clear space on both sides of the multi-use path placed along all arterial and residential collector roads within the right-of-way.
- Must provide access to all public open spaces, schools and community facilities within Ranch House development.
- Access points will be located at all street intersections and at a maximum of every 0.5 mile.
- Lighting at all street entrances to the trail.
- Benches will be placed along trails at a minimum of every 0.5 miles.
- Trails will be landscaped with native and drought tolerant vegetation.
- Accent plants will be placed outside of any pedestrian areas including the 2-foot clear space.

(2) Neighborhood Trails

- 20-foot average width trail corridor with a recommended 5- to-8-foot minimum compacted and stabilized decomposed granite ("DG") multi-use path.
- Must provide access to the community trails and subdivisions within Ranch House.
- Security lighting at trail access points and where appropriate along the trail
- Trails will be landscaped with native and drought tolerant vegetation.
- 2 shade trees per 100 feet with appropriate ground cover or landscape treatment.

10. Entry Features

Ranch House contains a series of entry features with an integrated design of landscape, hardscape, monumentation and signage. Entry features aid in defining the community's character and present an introduction to the development.

Entry features shall comply with Town sight visibility triangle requirements.

a. Primary Entry Monumentation

The primary entry features with monumentation will serve as a gateway into Ranch House. The monument, seen from a distance, provides the backdrop for the Project name and logo. It signifies arrival and establishes the theme of the development. The primary entry features for Ranch House, including walls, signs, landscaping and pavement treatments, will be designed and installed by the Master Developer. Project entry monuments for Ranch House will be located at Sanders Road/Ranch House Way and Marana Road/Ranch House Way.

b. *Secondary Entry Monumentation*
Secondary entry features identify the entrances into the individual neighborhoods within Ranch House. Each entry into a subdivision shall be uniquely designed with common elements that bind the entire Ranch House community together. Secondary entry features will be constructed by the developers of each subdivision with approval by the Master Developer.

c. *Commercial Entry Monumentation*
Monuments identifying commercial centers shall be designed using common elements found in the primary and secondary entry features within Ranch House. The Master Developer shall approve all commercial entry features.

11. Signage

All signage shall comply with MTC Section 17-10.

12. Public Art

The Master Developer will incorporate public artwork into the Specific Plan in compliance with Town Council Resolution No. 2021-126 to beautify the community and provide a unique identity for Ranch House. The following guidelines shall apply:

- Public artwork shall be incorporated into the design of community gathering areas, parks and commercial plazas. Streetscape elements, such as community entry features, bus shelters and traffic circles, should also feature artwork in their design.
- Adjacent property owners are encouraged to develop shared artwork, especially within common areas.
- Artwork shall be composed of durable, weather-resistant materials.
- Artwork shall be located so that it is reasonably visible to the public from a major road, open space area or building entrance.
- Maintenance of artwork is the responsibility of the property owner.

V. IMPLEMENTATION & ADMINISTRATION

A. Administration & Interpretation

The Specific Plan shall be administered by the Town's Zoning Administrator, and all implementation decisions shall be based on the purpose of the Specific Plan. If a conflict arises between the Specific Plan and the Marana Town Code ("MTC"), the Specific Plan shall control. If the Specific Plan is silent on any issue, and the MTC is consulted, the purpose and intent of the Specific Plan shall control the Zoning Administrator's decision whether and how to apply the MTC. Appeals of any Zoning Administrator interpretation of this Specific Plan may be made to the Board of Adjustment within 15 days of the date of the interpretation. The Specific Plan will not result in the modification or change of any existing Town-adopted building codes.

B. Implementation Responsibilities

The three entities responsible for the implementation of improvements within the Specific Plan are the Master Developer, the Builder and the RHCA.

The Master Developer is the entity responsible for ensuring the basic infrastructure facilities, including sewer, water and roads, are planned and constructed to serve the development areas within the Specific Plan in a timely and coordinated manner. They will also build the public open space, which will be dedicated to the Town, and the private open space which will be turned over to the RHCA.

At any time, the Master Developer may relinquish its rights and assign any or all rights to one or more Builders. The Builder is the purchaser of a development area, or portions of a development area and is responsible for building or providing for building within their area(s) of ownership.

The RHCA is the entity responsible for the maintenance and management of all shared private common areas that are not dedicated to the Town. In addition, the RHCA will enforce the Master CC&Rs placed on the properties.

C. Phasing

It is envisioned that this Project will be developed as a cohesive development, achieved in phases, with an estimated build-out period of 25 years. The development will likely consist of 4 phases, as illustrated in *Exhibit V.C: Phasing Schedule* and described below:

The total number of residences within the Specific Plan will not exceed 3,500 (up to 3,200 residential lots, plus up to 300 MFR units). The number of residential lots to be built in each phase will be determined at time of platting. The public and private open space areas will be constructed on a proportionate basis in accordance with the amount of land being developed. In general, development will progress from east to west, and south to north with the areas adjacent to Wentz and Hardin Roads the last to develop.

1. Phase 1

Residential development will begin with planning areas 2 and 3, and the beginning phases of the spine infrastructure will be installed, including:

- Ranch House Way, which will provide access to the entire Property, will be constructed westerly from Sanders Road and north from Marana Road to serve planning areas 2 and 3.
- Sanders Road will be extended from Marana Road to I-10 Eastbound Frontage Road.
- Traffic signals should be installed at the Ranch House Way/Marana Road intersection and at the Sanders Road/Marana Road intersection.
- Construction of water and sewer systems will also take place during this time.

2. Phase 2

- Residential development will continue in planning areas 4, 5 and 6.
- Ranch House Way will be extended from Marana Road to Kirby Hughes Road.

3. Phase 3

- Residential development includes planning areas 7 and 8.
- Ranch House Way will be extended from Sanders Road to Kirby Hughes Road.
- The intersection of I-10 Eastbound Frontage Road/Kirby Hughes Road will be reconstructed such that Kirby Hughes Road will align perpendicularly to the Frontage Road.

4. Phase 4

- The final phase includes construction of residential planning areas 9-13, north of Kirby Hughes Road and commercial planning area 1.

- The portion of Ranch House Way north of Kirby Hughes Road will be constructed.

The purpose of the phasing plan is to relate infrastructure requirements to proposed development. Although the sequence is implied, development of phases may occur in a different order or concurrently, at the discretion of the Master Developer, as long as the related infrastructure is adequately in place. Changes in the phasing order may occur due to unforeseen factors affecting development. Flexibility is needed within the Specific Plan to address these changing needs while still maintaining a timely development. Infrastructure such as roads, sewer, water and grading will be constructed and extended in accordance with the build-out of the Project.

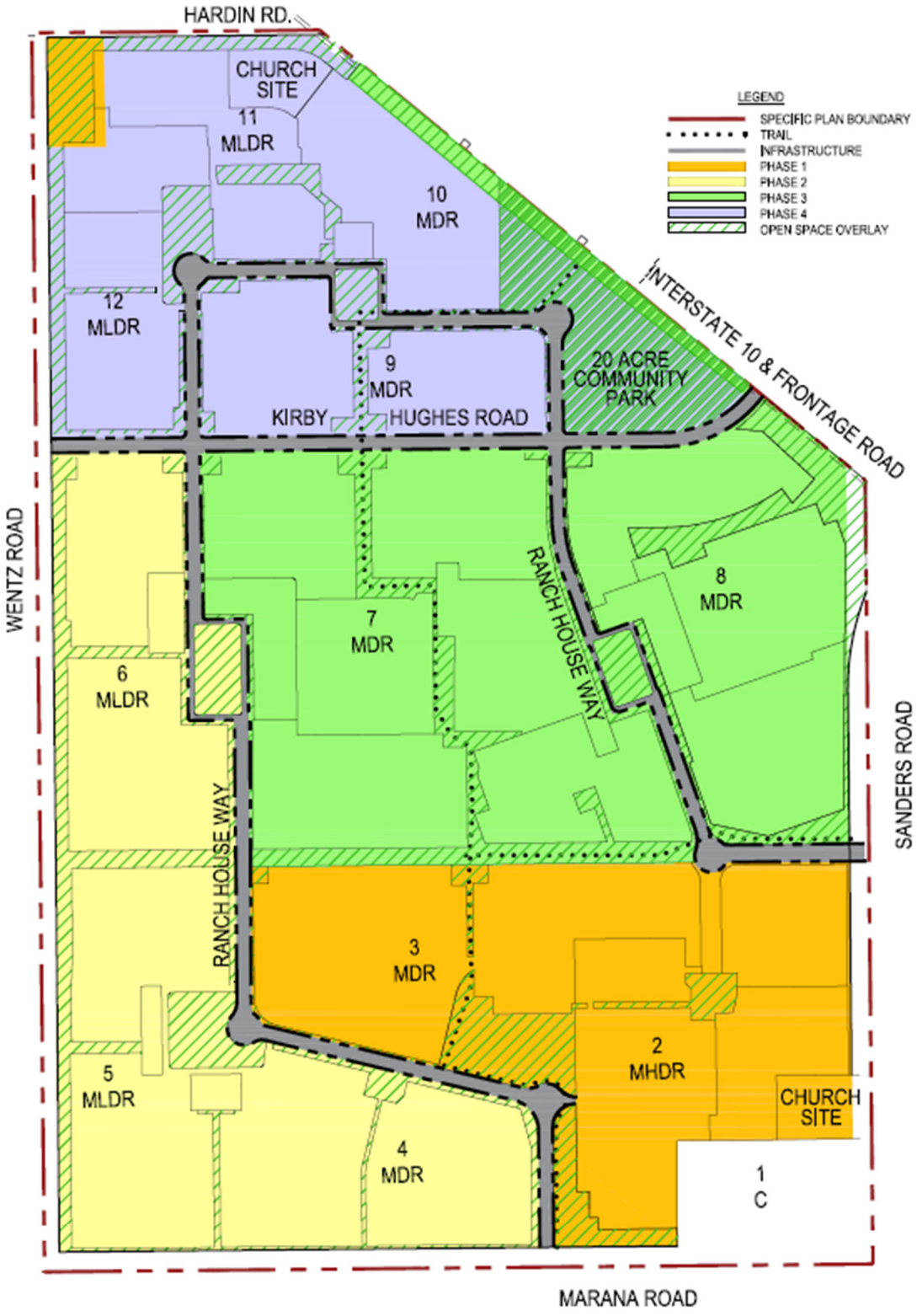


EXHIBIT V.C: PHASING SCHEDULE

D. Amendments

Amendments to the Specific Plans are categorized as either administrative amendments or substantial amendments. Administrative amendments are approved by the Zoning Administrator after written application is made. Substantial amendments are approved through the rezoning process set forth in MTC Section 17-3-1.

1. Zoning Administrator

The Zoning Administrator shall determine whether a proposed specific plan amendment is administrative or substantial.

2. Administrative Amendments

Categories of administrative amendments include, but are not limited to:

a. The addition of new information to the specific plan maps or text that does not change the effect of any regulations or guidelines.

b. Changes to infrastructure, such as drainage and utilities, which do not change the overall intent of the specific plan or increase the development capacity in the specific plan area.

c. Changes in the land use designation boundary, division of plan areas or combinations of areas.

d. Minor modifications or adjustments to intrusions, encroachments, easements, rights-of-way, or open spaces, so long as the modifications do not conflict with the overall intent of the specific plan.

e. The addition of a use that is materially similar to a listed use, as determined by the Zoning Administrator pursuant to the process set forth in MTC Section 17-4-2(C).

Legal Description

EXHIBIT A

THE LAND REFERRED TO HEREIN BELOW IS SITUATED IN THE COUNTY Pima, STATE OF Arizona, AND IS DESCRIBED AS FOLLOWS:

Parcel A:

Section 17 and the North half of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona.

EXCEPT THEREFROM Parcels 1, 2, 3, 4 and 5, more particularly described as follows:

Parcel 1: (Northeast of I-10)

That portion of the North half of Section 17, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, lying Northeasterly of the Southwesterly right-of-way line of Casa Grande-Tucson Highway (Interstate 10);

Parcel 2: (Northern Church parcel)

That portion of the Northwest quarter of Section 17, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the Northwest corner of said Section 17;

THENCE North 89 degrees 24 minutes 46 seconds East, along the North line of said Section 17, a distance of 1252.82 feet;

THENCE at a right angle, South 00 degrees 35 minutes 14 seconds East, a distance of 120.00 feet to the TRUE POINT OF BEGINNING;

THENCE North 89 degrees 24 minutes 46 seconds East, parallel with and 120.00 feet South of said North line of Section 17, a distance of 387.66 feet to the beginning of a curve to the right having a radius of 350.00 feet;

THENCE Easterly along said curve, through a central angle of 40 degrees 06 minutes 14 seconds, an arc distance of 244.98 feet.

THENCE South 50 degrees 29 minutes 00 seconds East, a distance of 69.71 feet;

THENCE South 37 degrees 55 minutes 33 seconds West, a distance of 398.75 feet;

THENCE North 50 degrees 29 minutes 00 seconds West, a distance of 18.98 feet to the beginning of a curve to the left having a radius of 232.75 feet;

THENCE Westerly, along said curve through a central angle of 40 degrees 06 minutes 14 seconds, an arc distance of 162.91 feet;

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THENCE South 89 degrees 24 minutes 46 seconds West, a distance of 253.69 feet;

THENCE North 00 degrees 35 minutes 14 seconds West, a distance of 372.25 feet to the POINT OF BEGINNING.

Parcel 3: (Active Adult Parcel)

Those portions of the South half of Section 17 and the North half of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona., described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of the Northeast quarter of said Section 20, a distance of 1834.76 feet;

THENCE at a right angle, South 89 degrees 29 minutes 02 seconds West, a distance of 75.00 feet to the POINT OF BEGINNING;

THENCE North 00 degrees 30 minutes 58 seconds West, parallel with and 75.00 feet West of said East line of the Northeast quarter of Section 20, a distance of 801.42 feet to a point on the section line common to said Sections 17 and 20;

THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 75.00 feet West of the East line of the Southeast quarter of said Section 17, a distance of 174.35 feet;

THENCE North 89 degrees 24 minutes 22 seconds East, a distance of 0.99 foot to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 90 degrees 01 minutes 46 seconds, an arc distance of 39.28 feet;

THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 49.00 feet West of said East line of the Southeast quarter of Section 17, a distance of 1017.02 feet to the beginning of a curve to the right having a radius of 1149.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 16 degrees 47 minutes 35 seconds an arc distance of 336.77 feet to a point on said East line of the Southeast quarter of Section 17;

THENCE North 00 degrees 37 minutes 24 seconds West, along said East line, a distance of 821.35 feet to a point on the Southwesterly right-of-way line of Casa Grande-Tucson Highway (Interstate 10);

THENCE North 50 degrees 29 minutes 00 seconds West, along said right-of-way line, a distance of 1154.87 feet to the beginning of a curve to the left having a radius of 25.00 feet;

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THENCE Westerly, along said curve, through a central angle of 90 degrees 00 minutes 00 seconds, an arc distance of 39.27 feet;

THENCE South 39 degrees 31 minutes 00 seconds West, a distance of 141.16 feet to the beginning of a curve to the right having a radius of 1145.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 49 degrees 24 minutes 22 seconds, an arc distance of 987.33 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 89 degrees 30 minutes 37 seconds, an arc distance of 39.06 feet;

THENCE South 00 degrees 35 minutes 15 seconds East, a distance of 5.04 feet;

THENCE South 89 degrees 24 minutes 45 seconds West, parallel with and 75.00 feet South of the East-West mid-section line of said Section 17, a distance of 742.43 feet to a point on the North-South mid-section line of said Section 17;

THENCE South 89 degrees 26 minutes 14 seconds West, parallel with and 75.00 feet South of said East-West mid-section line, a distance of 248.32 feet;

THENCE South 52 degrees 19 minutes 53 seconds West, a distance of 68.83 feet;

THENCE South 15 degrees 37 minutes 37 seconds West, a distance of 321.41 feet;

THENCE South 27 degrees 43 minutes 42 seconds East, a distance of 405.99 feet;

THENCE South 71 degrees 01 minutes 58 seconds East, a distance of 177.55 feet;

THENCE South 33 degrees 41 minutes 42 seconds East, a distance of 198.63 feet;

THENCE South 06 degrees 07 minutes 58 seconds East, a distance of 79.85 feet;

THENCE South 02 degrees 04 minutes 59 seconds West, a distance of 288.74 feet;

THENCE South 23 degrees 50 minutes 33 seconds East, a distance of 246.64 feet;

THENCE South 48 degrees 36 minutes 23 seconds East, a distance of 265.79 feet;

THENCE South 38 degrees 56 minutes 39 seconds East, a distance of 71.79 feet;

THENCE South 71 degrees 52 minutes 22 seconds West, a distance of 243.51 feet;

THENCE South 22 degrees 53 minutes 14 seconds West, a distance of 342.28 feet;

THENCE South 02 degrees 19 minutes 19 seconds West, a distance of 151.65 feet;

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THENCE South 05 degrees 13 minutes 55 seconds East, a distance of 172.63 feet;

THENCE South 09 degrees 28 minutes 55 seconds West, a distance of 71.11 feet;

THENCE South 31 degrees 45 minutes 51 seconds West, a distance of 81.76 feet;

THENCE South 00 degrees 04 minutes 30 seconds West, a distance of 430.93 feet;

THENCE South 60 degrees 20 minutes 40 seconds East, a distance of 356.88 feet;

THENCE South 88 degrees 40 minutes 47 seconds East, a distance of 1016.16 feet;

THENCE South 79 degrees 18 minutes 05 seconds East, a distance of 374.59 feet;

THENCE North 83 degrees 42 minutes 10 seconds East, a distance of 382.62 feet;

THENCE South 69 degrees 32 minutes 57 seconds East, a distance of 276.54 feet;

THENCE North 83 degrees 16 minutes 26 seconds East, a distance of 261.23 feet to the POINT OF BEGINNING.

Parcel 4: (Southern Church Parcel)

That portion of the Southeast quarter of the Northeast quarter of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of said Northeast quarter of Section 20, a distance of 802.25 feet;

THENCE South 89 degrees 27 minutes 32 seconds West, parallel with and 802.25 feet North of the East-West mid-section line of said Section, a distance of 75.00 feet to the TRUE POINT OF BEGINNING;

THENCE continuing South 89 degrees 27 minutes 32 seconds West, a distance of 531.22 feet;

THENCE North 00 degrees 30 minutes 58 seconds West, a distance of 410.00 feet;

THENCE North 89 degrees 27 minutes 32 seconds East, a distance of 531.22 feet;

THENCE South 00 degrees 30 minutes 58 seconds East, parallel with and 75.00 feet West of said East line of the Northeast quarter, a distance of 410.00 feet to the TRUE POINT OF BEGINNING.

Parcel 5: (Commercial Parcel)

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That portion of the Southeast quarter of the Northeast quarter of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of said Northeast quarter of said Section 20, a distance of 802.25 feet;

THENCE South 89 degrees 27 minutes 32 seconds West, parallel with and 802.25 feet North of the East-West mid-section line of said Section, a distance of 75.00 feet to the POINT OF BEGINNING;

THENCE continuing South 89 degrees 27 minutes 32 seconds West, a distance of 1165.21 feet;

THENCE South 00 degrees 00 minutes 00 seconds East, a distance of 677.28 feet;

THENCE North 89 degrees 27 minutes 32 seconds East, parallel with and 125.00 feet North of said East-West mid-section line, a distance of 1146.32 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 89 degrees 58 minutes 30 seconds, an arc distance of 39.26 feet;

THENCE North 00 degrees 30 minutes 58 seconds West, parallel with and 75.00 feet West of said East line of the Northeast quarter of Section 20, a distance of 652.26 feet to the POINT OF BEGINNING.

Parcel B:

A temporary construction easement as set forth in Docket 12585 at page 2405, corrected in Docket 12652 at page 1 and in Docket 12754 at page 3789.

Parcel C: (Active Adult Parcel)

Those portions of the South half of Section 17 and the North half of Section 20, Township 11 South, Range 11 East, Gila and Salt River Base and Meridian, Pima County, Arizona, described as follows:

COMMENCING at the East quarter corner of said Section 20;

THENCE North 00 degrees 30 minutes 58 seconds West, along the East line of the Northeast quarter of said Section 20, a distance of 1834.76 feet;

THENCE, at a right angle, South 89 degrees 29 minutes 02 seconds West, 75.00 feet to the POINT OF BEGINNING;

THENCE North 00 degrees 30 minutes 58 seconds West, parallel with and 75.00 feet West of said East line of the Northeast quarter of Section 20, a distance of 801.42 feet to a point on the Section line common to said Sections 17 and 20;

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THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 75.00 feet West of the East line of the Southeast quarter of said Section 17, a distance of 174.35 feet;

THENCE North 89 degrees 24 minutes 22 seconds East, 0.99 foot to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Northeasterly, along said curve through a central angle of 90 degrees 01 minutes 46 seconds, an arc distance of 39.28 feet;

THENCE North 00 degrees 37 minutes 24 seconds West, parallel with and 49.00 feet West of said East line of the Southeast quarter of Section 17, a distance of 1017.02 feet to the beginning of a curve to the right having a radius of 1149.00 feet;

THENCE Northeasterly, along said curve, through a central angle of 16 degrees 47 minutes 35 seconds, an arc distance of 336.77 feet to a point on said East line of the Southeast quarter of Section 17;

THENCE North 00 degrees 37 minutes 24 seconds West, along said East line, 821.35 feet to a point on the Southwesterly right-of-way line of Casa Grande-Tucson Highway (Interstate 10);

THENCE North 50 degrees 29 minutes 00 seconds West, along said right-of-way line, 1154.87 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Westerly along said curve, through a central angle of 90 degrees 00 minutes 00 seconds an arc distance of 39.27 feet;

THENCE South 39 degrees 31 minutes 00 seconds West, 141.16 feet to the beginning of a curve to the right having a radius of 1145.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 49 degrees 24 minutes 22 seconds an arc distance of 987.33 feet to the beginning of a curve to the left having a radius of 25.00 feet;

THENCE Southwesterly, along said curve, through a central angle of 89 degrees 30 minutes 37 seconds an arc distance of 39.06 feet;

THENCE South 00 degrees 35 minutes 15 seconds East, 5.04 feet;

THENCE South 89 degrees 24 minutes 45 seconds West, parallel with and 75.00 feet South of the East-West mid-section line of said Section 17, a distance of 742.43 feet to a point on the North-South mid-section line of said Section 17;

THENCE South 89 degrees 26 minutes 14 seconds West, parallel with and 75.00 feet South of said East-West mid-section line, 248.32 feet;

THENCE South 52 degrees 19 minutes 53 seconds West, 68.83 feet;

THENCE South 15 degrees 37 minutes 37 seconds West, 321.41 feet;

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THENCE South 27 degrees 43 minutes 42 seconds East, 405.99 feet;

THENCE South 71 degrees 01 minutes 58 seconds East, 177.55 feet;

THENCE South 33 degrees 41 minutes 42 seconds East, 198.63 feet;

THENCE South 06 degrees 07 minutes 58 seconds East, 79.85 feet;

THENCE South 02 degrees 04 minutes 59 seconds West, 288.74 feet;

THENCE South 23 degrees 50 minutes 33 seconds East, 246.64 feet;

THENCE South 48 degrees 36 minutes 23 seconds East, 265.79 feet;

THENCE South 38 degrees 56 minutes 39 seconds East, 71.79 feet;

THENCE South 71 degrees 52 minutes 22 seconds West, 243.51 feet;

THENCE South 22 degrees 53 minutes 14 seconds West, 342.28 feet;

THENCE South 02 degrees 19 minutes 19 seconds West, 151.65 feet;

THENCE South 05 degrees 13 minutes 55 seconds East, 172.63 feet;

THENCE South 09 degrees 28 minutes 55 seconds West, 71.11 feet;

THENCE South 31 degrees 45 minutes 51 seconds West, 81.76 feet;

THENCE South 00 degrees 04 minutes 30 seconds West, 430.93 feet;

THENCE South 60 degrees 20 minutes 40 seconds East, 356.88 feet;

THENCE South 88 degrees 40 minutes 47 seconds East, 1016.16 feet;

THENCE South 79 degrees 18 minutes 05 seconds East, 374.59 feet;

THENCE North 83 degrees 42 minutes 10 seconds East, 382.62 feet;

THENCE South 69 degrees 32 minutes 57 seconds East, 276.54 feet;

THENCE North 83 degrees 16 minutes 26 seconds East, 261.23 feet to the POINT OF BEGINNING.

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AMERICAN LAND TITLE ASSOCIATION

RANCH HOUSE MINOR GENERAL PLAN AMENDMENT

A. Background

The Ranch House Specific Plan, formerly known as the Sanders Grove Specific Plan, ("Specific Plan" or the "Project") encompasses approximately 841 acres (the "Property") on the north side of Marana Road between Wentz and Sanders Road within the Town of Marana (the "Town"). (See *Exhibit 1: Regional Map*.) The Specific Plan was originally approved in 2005 ("2005 Specific Plan") along with a development agreement between the Property owners and the Town in support of what is primarily a residential community that features a modest amount of commercial zoning at the corner of Marana and Sanders Roads. Both the 2005 Specific Plan and development agreement were subsequently amended in 2015 and 2016, respectively, to account for development trends, population forecasts and infrastructure plans current at that time in Northwest Marana.

A new amendment request was submitted in April 2022 to update the Specific Plan ("2022 SPA") in response to current market demands. Because very little has changed in Northwest Marana since 2016 in terms of infrastructure, population and land entitlements, no changes to the development agreement ("2016 DA", provided as *Appendix A*) are proposed.

Since its conception in 2005, the circulation plan for the major streets serving the Specific Plan has largely remained unchanged. Despite this, two of the streets serving the Specific Plan, Kirby Hughes and Hardin Roads, are identified on the Future Circulation Map (the "Circulation Map") within the Town's General Plan, Make Marana 2040, as having much larger rights-of-way widths than ever contemplated by this Project. (See *Exhibit 2: Circulation Map*.) Even taking into consideration the proposed amendments in the 2022 SPA, the future rights-of-way depicted on the Circulation Map are not warranted.

This is a request to amend the Circulation Map to align with the specifications outlined in the 2016 DA and the 2022 SPA ("GPA Request"). The GPA Request is being submitted for review concurrent with the second submittal of the 2022 SPA.

B. Minor GPA Request

As demonstrated on the Circulation Map (Exhibit 2), Northwest Marana is anticipating a tremendous amount of growth in the coming years. Much of this growth was already contemplated with the 2005 Specific Plan authorization, and certainly by the time the 2016 DA was approved. This GPA Request proposes to amend the Circulation Map within Make Marana 2040 so that it continues to align with the 2016 DA. Per Page 1-14 of Make Marana 2040, any change to the Circulation Map constitutes a minor amendment to the General Plan and may be processed concurrently with other zoning entitlement applications. The following is an explanation of (and justification for) the GPA Request.

1. Hardin Road

Circulation Map ROW:	**190 Feet**
GPA Proposed ROW:	**60 Feet**

Hardin Road, an east/west collector roadway, makes up the Project's northern boundary. The Circulation Map identifies Hardin as an arterial street with a 190-foot future right-of-way width, which may have been considered based on long-term plans by Arizona Department of Transportation ("ADOT") to construct a traffic interchange at the intersection of Hardin and Interstate 10 and turn the two-way Frontage Road traffic to one-way. Based on discussions with ADOT, the Frontage Road is not slated for transition to one-way travel for decades, and the Frontage Road would not be expanded to accommodate an intersection with the proposed 190-foot right-of-way. In the event the Frontage Road is transitioned to one-way travel many years down the road, Hardin's proposed 60-foot right-of-way would easily be able to tie into the Frontage Road. Further, the Frontage Road, which starts/ends at its intersection with Hardin Road, would not be extended northward due to conflicts with the regional drainage basin located along the north side of Hardin between Wentz Road and the Frontage Road.

As indicated in the Ranch House Traffic Impact Analysis ("TIA"), the anticipated traffic on Hardin may be accommodated by the proposed 60-foot right-of-way cross-section.

2. Kirby Hughes Road

Circulation Map ROW:	**150 Feet**
GPA Proposed ROW:	**90 Feet**

Kirby Hughes Road is currently an east/west collector roadway with no dedicated public right-of-way that intersects with the Interstate 10 Frontage Road on the east and Wentz Road on the west. The Circulation Map identifies Kirby Hughes as an arterial street with a 150-foot future right-of-way width. A Capacity Analysis Memo prepared by Greenlight Traffic Engineering (included as *Appendix B*) indicates that the Town's 90-foot Urban Collector Median cross-section (Detail 110-2) would be sufficient to accommodate future Ranch House traffic based on the TIA's projected traffic volumes for Kirby Hughes Road.

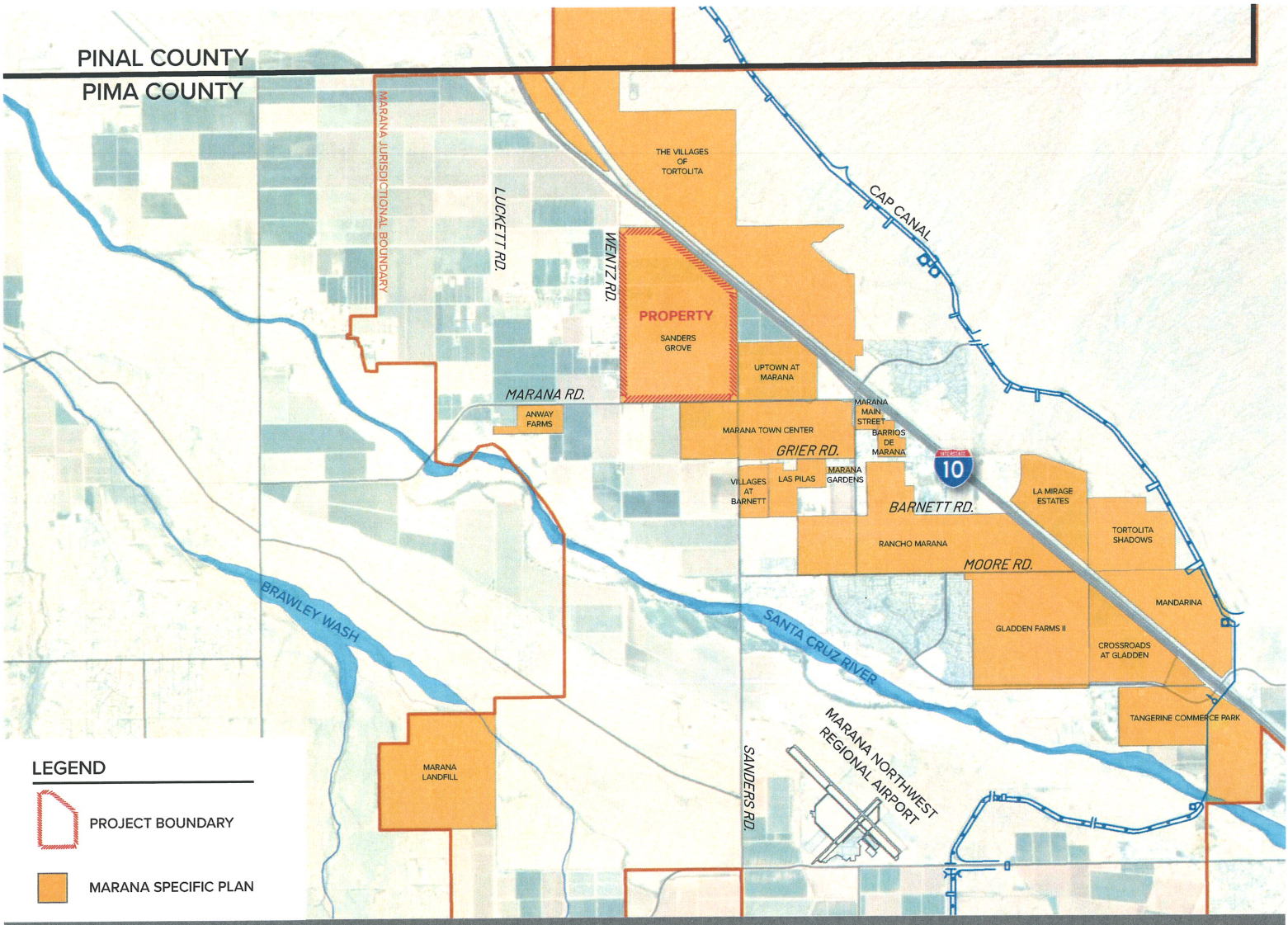
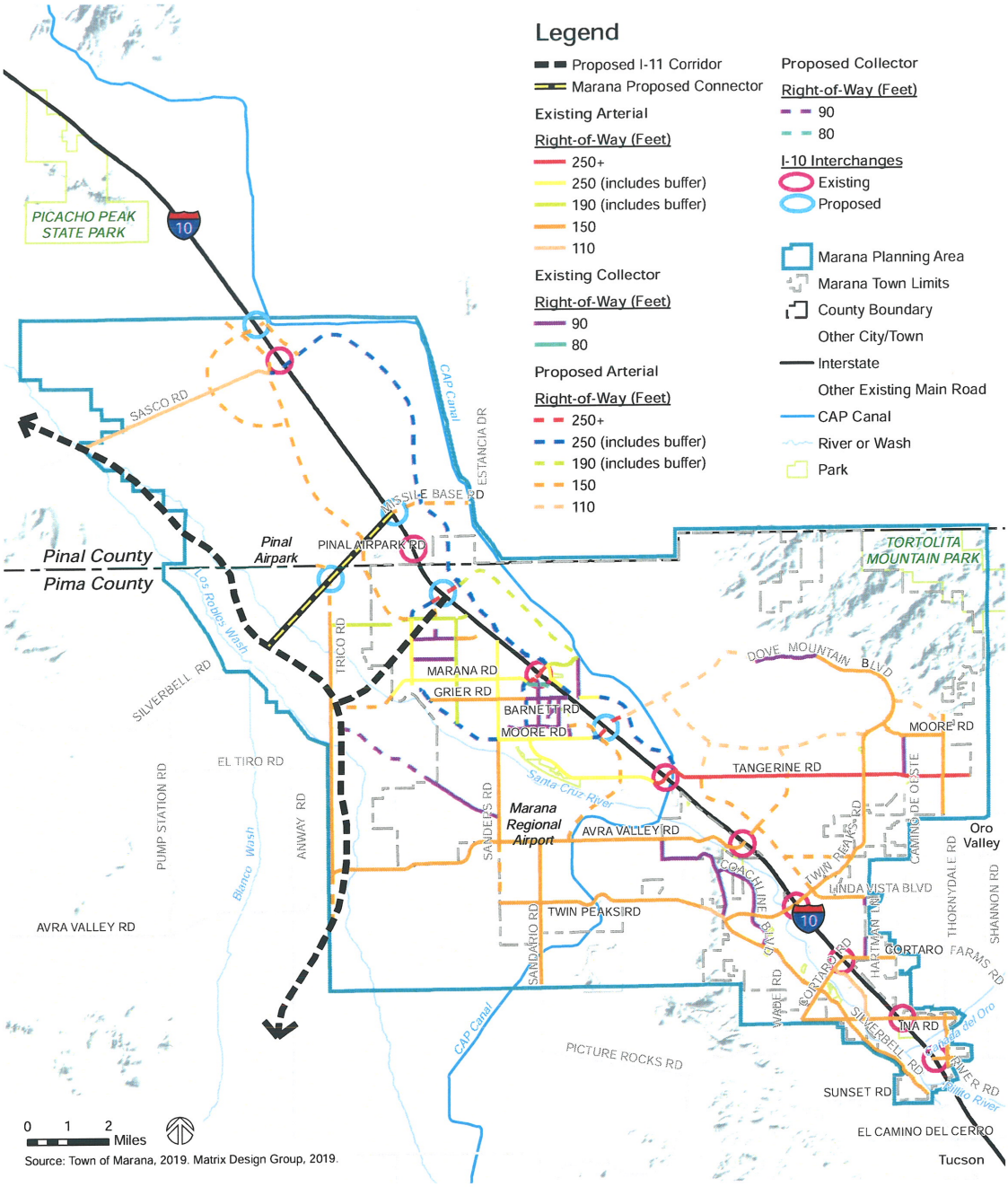


Exhibit 1: Regional Context



Matrix

MAKE MARANA 2040 • GENERAL PLAN

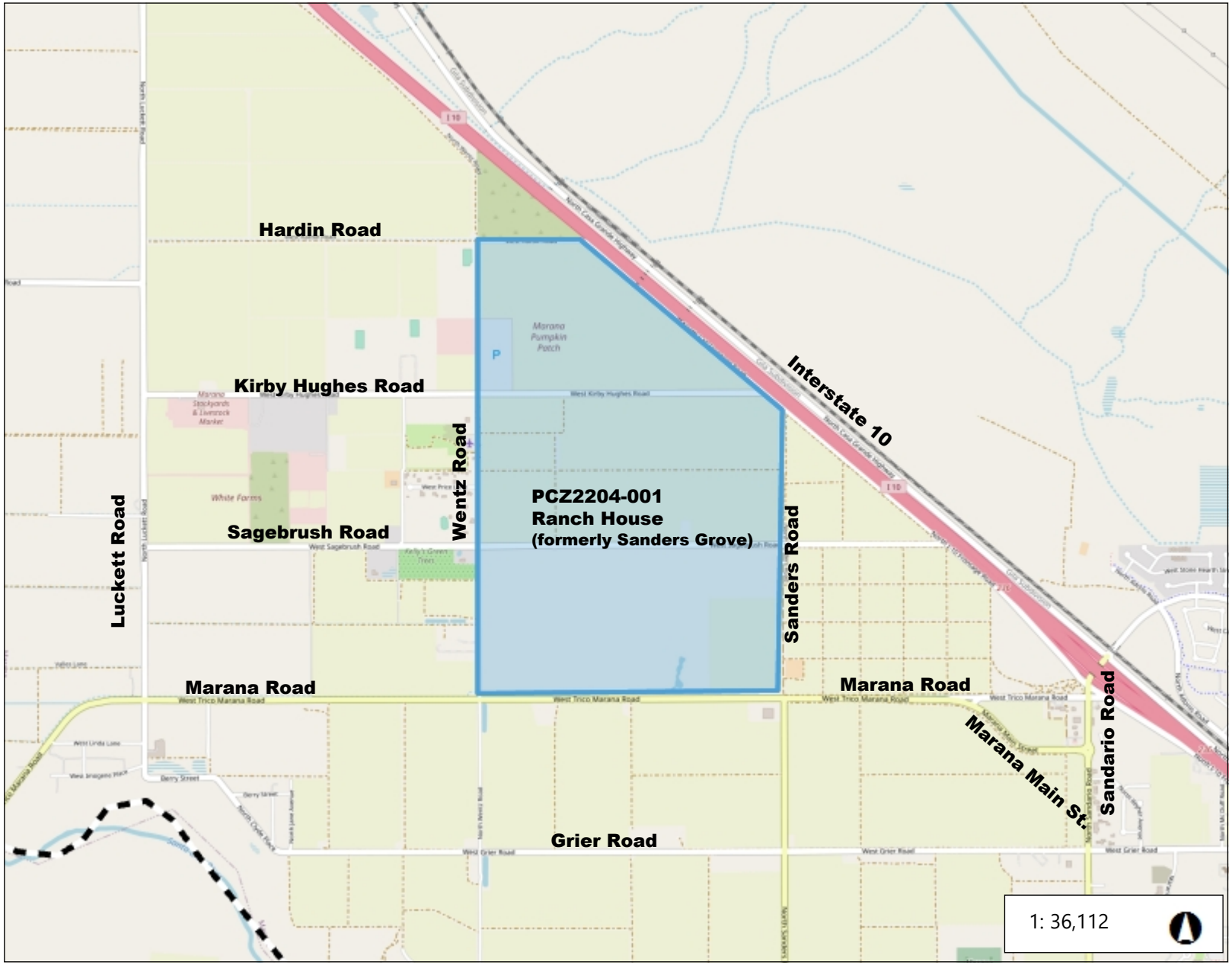
The Town of Marana provides this map information "As Is" at the request of the user with the understanding that it is not guaranteed to be accurate, correct or complete and conclusions drawn from such information are the responsibility of the user. In no event shall The Town of Marana become liable to users of these data, or any other party, for any loss or direct, indirect, special, incidental, or consequential damages, including but not limited to time, money, or goodwill, arising from the use or modification of the data.

Map Revised: 1/13/2020

Figure 2-4
Future Circulation

Town of Marana Planning

PCZ2204-001: Ranch House Specific Plan Amendment



Legend

Marana Town Limits

Notes

1.1 0 0.57 1.1 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

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This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Development Services / maranaplanning@maranaAZ.gov
11555 West Civic Center Drive / Marana, AZ 85653
Ph (520) 382-2600 / Fax (520) 382-2641 / maranaAZ.gov

PROJECT APPLICATION

APPLICATION TYPE

❑ Annexation	❑ Development Plan	❑ Development Plan Package	❑ General Plan Amendment
❑ Rezone	❑ Minor Land Division	❑ Significant Land Use Change	❑ Conditional Use Permit
❑ Specific Plan	❑ Landscape Plan	❑ Native Plant Plan/Exception	❑ SWPP
❑ Variance	❑ Hydraulic Model	❑ Sewer Capacity Assurance	❑ Sign Program
❑ Plat	❑ Improvement Plan	❑ Report (Type): _____	☒ Other: SPlan Amendment

PROJECT INFORMATION

Project Name: Ranch House (formerly Sanders Grove) Specific Plan Amendment	
Description of Project: Amend Sanders Grove Specific Plan	Number of Lots: 3,200
Parcel No.(s): multiple (see supplemental information, attached)	Gross Area (Acres): 841
Project Address: multiple (see supplemental information, attached)	
Ref. Project No.: PCZ-04019 & SPA1411-001	

CONTACT INFORMATION

Owner: Sanders Grove Management, LLC	Contact Name: Randy Bury		
Address: 6720 N. Scottsdale Rd., Ste. 380	City: Paradise Vall	State: AZ	Zip: 85253
Email: rbury@modernecommunities.com	Phone No.: (480) 993-7690		
Applicant: Lazarus & Silvyn, P.C.	Contact Name: Keri Silvyn/Robin Large		
Address: 5983 E. Grant Rd., Ste. 290	City: Tucson	State: AZ	Zip: 85712
Email: RLarge@LSLawAZ.com	Phone No.: (520) 207-4464		
Consultant/Engineer: The WLB Group	Contact Name: Jerry Zillman		
Address: 1600 W. Broadway Rd., Ste. 150	City: Tempe	State: AZ	Zip: 85282
Email: jzillman@wlbgroup.com	Phone No.: (480) 736-1600		

OWNER/APPLICANT AUTHORIZATION

I hereby certify that the information set forth in this application are true and correct to the best of my knowledge and that I am either the owner of the property or that I have been authorized in writing by the owner to file this application. (If applicant is not the owner, attach written authorization from the owner.)

Robin Large	Robin Large Digitally signed by Robin Large Date: 2022.03.28 11:40:23 -07'00'	3/28/2022
Applicant Name (PRINT)	Signature	Date

FOR OFFICIAL USE ONLY

Project No._____ **Date Received**_____

Revision Date 03/29/2019

Council-Regular Meeting **A2**

Meeting Date: 11/01/2022

To: Mayor and Council

Submitted For: Fausto Burruel, Public Works Director

From: Fausto Burruel, Public Works Director

Date: November 1, 2022

Strategic Plan Focus Area:
Not Applicable

Subject: PUBLIC HEARING: Relating to Development; public hearing regarding the intent to assess development impact fees for street facilities, park facilities, water facilities, water reclamation facilities, and water resources, pursuant to Arizona Revised Statutes section 9-463.05 (Fausto Burruel, Jim Conroy, Jing Luo)

Discussion:

Town staff is currently working to update the Town's impact fees for streets, parks, water, and wastewater. The Town last updated its impact fees in 2017. Updated land use assumptions and infrastructure improvements plans (IIPs) were adopted by Council on September 20, 2022. The Town published notice of tonight's public hearing on September 23, 2022. Draft impact fee reports were published on the Town's website on September 30, 2022. Tonight's public hearing is to solicit comments on the proposed fees based on the approved land use assumptions, IIPs, and draft fee reports.

Staff Recommendation:

No action, public hearing only. The impact fee reports will be brought back December 6, 2022 for possible adoption.

Suggested Motion:

None, public hearing only.

Attachments

Draft Streets Impact Fee Study
Draft Parks Impact Fee Study
Draft Water, Sewer, Water Resources Fee Study
Presentation

Town of Marana

Impact Fee Study

Streets Facilities Development Fee Report

Public Report

DRAFT

Prepared by

PSOMAS

333 East Wetmore Road, Suite 450
Tucson, AZ 85705

Prepared for

MARANA AZ
CELEBRATING 40 YEARS

11555 West Civic Center Drive
Marana, AZ 85653

Psomas Project No. 7TMA150123

September 27, 2022

Town of Marana Mayor and Council

Ed Honea – Mayor

Jon Post – Vice Mayor

Patti Comerford – Councilmember

Herb Kai – Councilmember

Roxanne Ziegler – Councilmember

John Officer – Councilmember

Jackie Craig - Councilmember

Key Staff

Terry Rozema, Town Manager

Fausto Burruel, P.E., Public Works Director & Acting Town Engineer

Jane Fairall, Town Attorney

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Psomas

333 East Wetmore Road, Suite 450

Tucson, AZ 85705

520-292-2300

Prime Consultant – All Tasks

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1. INTRODUCTION

The Town of Marana collects development fees to offset some of the infrastructure costs associated with growth. The Town's ordinance and fee structure complies with Arizona Revised Statute (ARS) §9-463.05. This report provides revised development fee studies, project lists, and fee schedules necessary to implement the update of its street impact fees.

The statute prescribes in detail development fee assessment procedures and programs. It limits the types of "necessary public services" which the fees can fund. A municipality must develop two preliminary products prior to calculating the fees for each service category: a set of land use assumptions and an infrastructure improvements plan (IIP). These documents were adopted by the Town Council on September 20, 2022.

As described in the Streets Facilities Infrastructure Improvements Plan (Streets IIP), the Town has three service areas for street improvements. The service areas are shown in Figure 1 on page 5. Note that this figure is slightly different than the one shown in the IIP because of the preexisting exemption for the Dove Mountain development.

This Development Fee Report defines terminology and identifies the maximum recommended fees to be collected to fund the Streets IIP. This report is an update of the Streets Facilities Fee Report approved and adopted by Town Council in December 2017.

2. STREETS FACILITIES FEE CATEGORIES

Streets facilities fees are assessed based on a development's size, type, and service area. The fees are divided into eight land use categories including residential, retail, high traffic retail, industrial, general office, medical facility, institutional, and recreation. Residential development and retail/service uses are further refined in subcategories. Definitions for these categories and subcategories are provided here, based on commonly used land use descriptions found in ITE's *Trip Generation* publication (ITE).

"Single Family Residential" (SFR) refers to all detached or attached residential structures characteristic of a primary residence, even if the residence is subsequently rented. Duplexes, Triplexes, Condominiums, Townhomes, as well as mobile homes and manufactured homes on individual parcels are assessed at the SFR rate. See also ITE Land Use Category 210.

"Multi-Family Residential" refers to development where more than a single residential unit occurs on a single lot. This includes apartments, student housing, and mobile home parks. See also ITE Land Use Category 220.

"Age Restricted Residential" refers to communities that restrict residents to those who are at least 55 years old with no one in the household under age 18. See ITE Land Use Categories 251 and 252.

"Hotel/Motel" refers to temporary lodging facilities including hotels, motels, time shares/fractional shares, and recreational vehicle parks. See ITE Land Use Categories 310, 320, and related categories.

"Congregate Care" refers to group housing that is typified by a central eating facility, smaller rooms, and a higher level of care for its tenants. This includes nursing homes, group homes, and other similar uses. See ITE Land Use Category 253.

"Retail Services" include myriad land uses providing retail sales, discount sales, and related services. See ITE Land Use Categories 800-899.

"High Traffic Retail" includes, but is not limited to, fast food restaurants, service stations, convenience stores, and high-turnover restaurants. See ITE Land Use Categories 853 and 900-999.

"Industrial" uses include all light and heavy industry, industrial parks, manufacturing, warehousing, mini-storage, and utilities. See ITE Land Use Categories 100-199.

"Office" includes all office uses, office parks, corporate headquarters, governmental offices, business parks, and research and development (R&D) parks. Doctor, dentist, and veterinary offices, clinics, and urgent care facilities fall under this category instead of medical facilities. See ITE Land Use Category 710 and related categories.

"Medical Facility" includes hospitals, micro hospitals, stand-alone emergency rooms, and other similar uses. See ITE Land Use Categories 610 and 630.

"Institutional" includes churches, schools, colleges, and universities, cemeteries, libraries, fraternal lodges, and day care centers. See ITE Land Use Categories 500-599.

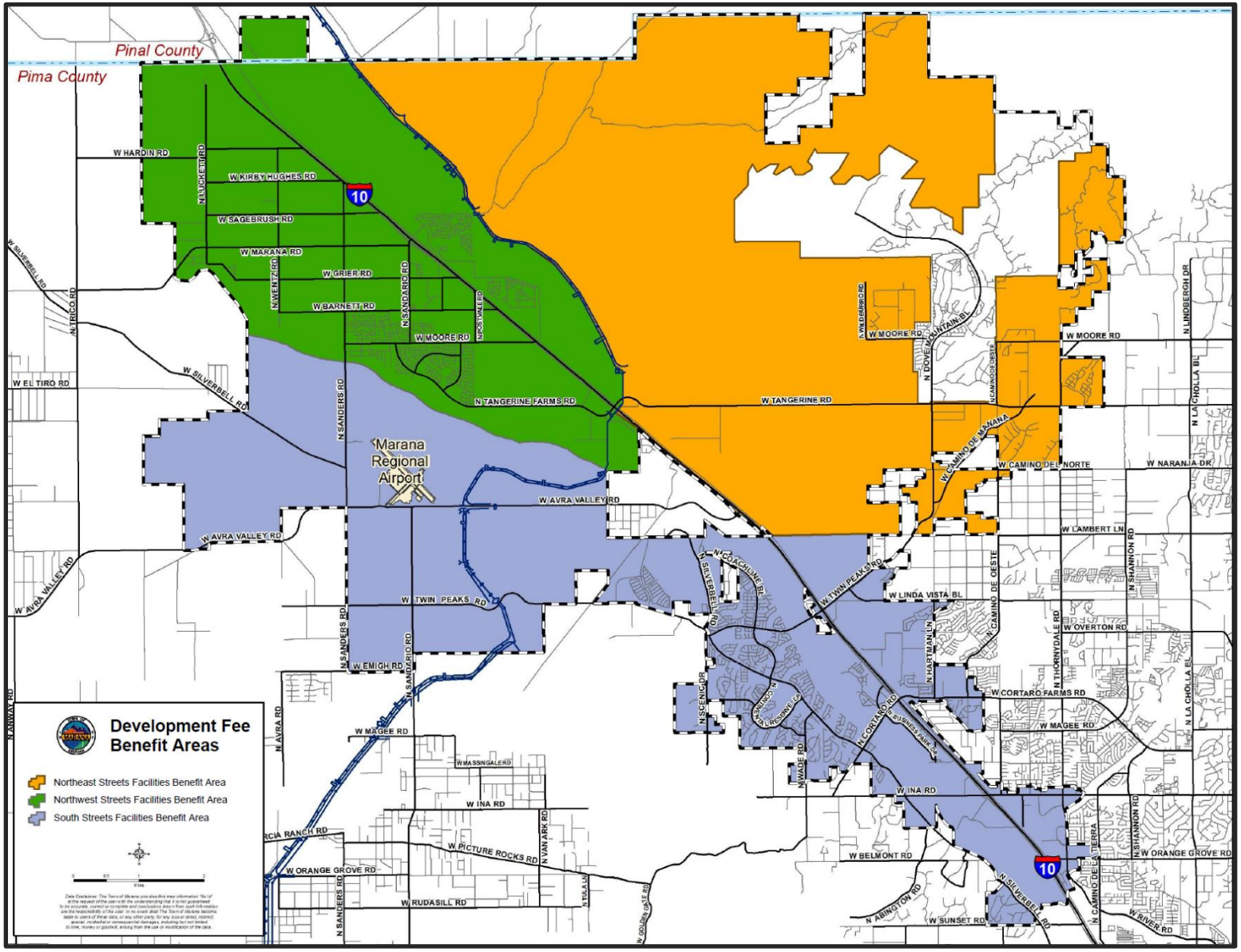
"Recreation" includes parks, camp grounds, golf courses, bowling alleys, movie theaters, racetracks, skating rinks, tennis courts, health/fitness clubs, and community recreational centers. See ITE Land Use Categories 400-499.

Additional definitions for terms used in the Streets IIP and in this report include the following:

"Equivalent Demand Unit (EDU)" is the demand for streets infrastructure created by a typical single family residence, or SFR. The average vehicle-miles of travel created by a SFR on the arterial/major collector network is one service unit, or EDU. The demand for streets infrastructure for other land uses is the ratio of its demand compared to that of a SFR, expressed in EDU. For example, the EDU/unit for one multi-family residential unit is 0.6 EDU. This definition differs from the Parks Fee study, which uses the ratio of household size (number of occupants) instead.

“Service Unit” means a standardized measure of infrastructure capacity consumption, use, generation or discharge attributable to an individual unit of development calculated pursuant to generally accepted engineering or planning standards for a particular category of necessary public services or facility expansions. In this Fee Report, the terms service unit and EDU are interchangeable.

Figure 1. Streets Facilities Benefit Areas



3. STREETS FACILITIES AND FUNDABLE IMPROVEMENTS

A list of proposed streets improvements to be funded between 2023 and 2032 is shown in Table 1 of the Streets IIP. That exhibit, titled "Necessary Streets Facilities, Existing and Future" is hereby incorporated by reference. The list includes projects in each of the three service areas, and total costs of improvements is $213,576,744. The total cost of the improvements is greater than the cost attributable to new development from 2023 to 2032, which totals $110,623,843, as shown in Table 1 below. The table also includes the cost of two updates to the impact fee studies during the 10-year period, estimated at $90,000 each, split proportionally (by EDUs) between the three service areas. These costs are eligible expenditures of development fees pursuant the definitions of necessary public services in A.R.S. §9-463.05(7)G.

The table also reflects the exemption of Dove Mountain from the northeast benefit area, including adjusted costs for the projects and the future impact fee (see additional discussion in Section 4). Per the existing agreement, the Town of Marana is responsible for impact fees which would have otherwise been paid by Dove Mountain.

Table 1. Gross Fee by Service Area

	Estimated EDUs by Service Area	Project Costs by Service Area	Impact Fee Study Costs	Total Costs by Service Area	Raw Streets Fee Per EDU
Northwest	9,784.7	$55,490,082	$106,458	$55,596,540	$5,681.96
Northeast (excluding Dove Mountain)*	1,800.5	$14,770,538	$19,589	$14,790,128	$8,214.47
Northeast (Dove Mountain)*	1,600.0	$13,125,749	$17,408	$13,143,157	$8,214.47
South	3,358.9	$27,237,473	$36,544	$27,274,018	$8,120.02
TOTALS	**16,544.1**	**$110,623,843**	**$180,000**	**$110,803,843**	**N/A**

*Dove Mountain costs will be borne by the Town of Marana per an existing agreement. See text.

4. DEVELOPMENT FEES FOR STREETS FACILITIES

The analysis of maximum recommended fees for the various land use categories, as applied to the three service areas, takes into consideration numerous factors. These include the trip generation rates, percent of primary trips, length of travel on the major collector/arterial system, and the current expected cost of building additional roadway capacity. These factors are inherent in the summary matrix provided in Table 2, which defines the recommended maximum base fee for each combination of land use and service area. (Additional detail is provided in Appendix B.) This table also includes fee offsets for the construction sales tax (CST) as applicable, which was detailed in the IIP. The CST credit described in the Streets IIP is split between the Streets Fee and the Parks Fee. The Parks fee credit is $500 per residential unit for single family, multi-family, and age restricted units and is $100 per unit, room, or 1,000 square feet as applicable for all other uses; the remainder is credited to the Streets Fee.

As examples, the recommended maximum base development fees for single family residences are $2,206 for the Northwest service area, $4,739 for the Northeast service area, and $4,759 for the South service area. The recommended maximum fees for other land uses are proportional to their relative EDU factors and allowable offsets. Note that fees for the "Retail and Services" category are assessed on a build-up basis. For example, a 150,000 square foot development in the South service area would be charged $87,435 for the first 15,000 square feet plus $9,946 times 135 for the remaining 135,000 square feet, for a total base fee of $1,430,145.

Fees are assessed not only for new capacity, but also for available capacity built in advance by the Town in anticipation of new development. The value of these completed capacity projects is factored into the analysis on a pro rata basis of construction costs and the utilization of these facilities by an expanded population and business base. These projects include portions of Tangerine Road, Twin Peaks Road, Moore Road, Cortaro Road, Silverbell Road, and Ina Road, as shown in Appendix B.

Table 2. Recommended Maximum Street Facilities Fee

Land Use Category	Unit	EDUs per Unit	Raw Fees*			Construction Sales Tax**	Base Fees***		
			Northwest	Northeast	South		Northwest	Northeast	South
Residential									
Single Family Residential	Dwelling Unit	1.0	$ 5,682	$ 8,215	$ 8,235	$ 3,476	**$ 2,206**	**$ 4,739**	**$ 4,759**
Multi-Family	Dwelling Unit	0.6	$ 3,409	$ 4,929	$ 4,941	$ 1,392	**$ 2,017**	**$ 3,537**	**$ 3,549**
Hotel/Motel	Rooms	0.5	$ 2,841	$ 4,107	$ 4,118	$ 1,095	**$ 1,746**	**$ 3,012**	**$ 3,023**
Congregate Care	Dwelling Unit	0.2	$ 1,136	$ 1,643	$ 1,647	$ 1,060	**$ 76**	**$ 583**	**$ 587**
Single Family Residential (age restricted	Dwelling Unit	0.4	$ 2,273	$ 3,286	$ 3,294	$ 3,476	**N/A**	**N/A**	**N/A**
Multi-Family Residential (age restricted	Dwelling Unit	0.3	$ 1,705	$ 2,464	$ 2,471	$ 1,392	**$ 313**	**$ 1,072**	**$ 1,079**
Retail and Services ****									
< 15,000 sf	1000 sf	0.9	$ 5,114	$ 7,393	$ 7,412	$ 1,583	**$ 3,531**	**$ 5,810**	**$ 5,829**
>15,000 sf	*Total fee for first 15,000 sq ft:*						**$ 52,965**	**$ 87,150**	**$ 87,435**
	1000 sf	1.4	$ 7,955	$ 11,500	$ 11,529	$ 1,583	**$ 6,372**	**$ 9,917**	**$ 9,946**
High Traffic Retail	1000 sf	1.9	$ 10,796	$ 15,608	$ 15,647	$ 2,186	**$ 8,610**	**$ 13,422**	**$ 13,461**
Industrial	1000 sf	0.4	$ 2,273	$ 3,286	$ 3,294	$ 2,186	**$ 87**	**$ 1,100**	**$ 1,108**
General Office	1000 sf	0.8	$ 4,546	$ 6,572	$ 6,588	$ 2,186	**$ 2,360**	**$ 4,386**	**$ 4,402**
Medical Facility	1000 sf	1.1	$ 6,250	$ 9,036	$ 9,059	$ 4,687	**$ 1,563**	**$ 4,349**	**$ 4,372**
Institutional	1000 sf	0.3	$ 1,705	$ 2,464	$ 2,471	$ 2,468	**N/A**	**N/A**	**$ 3**
Recreation	1000 sf	0.3	$ 1,705	$ 2,464	$ 2,471	$ 2,240	**N/A**	**$ 224**	**$ 231**

*Raw fees are the development fees before construction sales tax credits are applied.

** Construction sales tax credit for single family residential, multi-family, single family (age restricted) and multi-family (age restricted) has been reduced by $500 and for all other uses has been reduced by $100 to account for that portion of the CST credit applied to the Parks and Recreational Facilities fee.

***Base fees are the raw fees after applying the construction sales tax credits.

example, the impact fees for a 150,000-sq ft development in the South benefit area would be $87,435 for the first 15,000 sf plus ($9,946 x 135) for the remaining 135,000 sf, for a total base fee of $1,430,145.

The fees shall be determined by the Town utilizing the land use intensity factors contained in the fee tables, i.e., number of dwelling units or 1000s of square feet of building area. Portions of a development that do not generate traffic impacts may be excluded from the calculation of fees at the discretion of the Town.

Examples of such ancillary uses which would not generate traffic impacts include maintenance and storage facilities on a golf course or an outdoor car wash at an auto dealership. Fees shall be assessed to governmental uses including school districts, fire districts, water companies, and public utilities. The Town of Marana is a municipal corporation exempt from streets facilities development fees.

The Dove Mountain development is removed in its entirety from the streets facilities development fee northeast benefit area due to a prior agreement between the Town and the developer. This exemption does not alter the technical analysis or the resulting fee calculation. The fee study considers the exemption of approximately 1,300 single family and 500 multi-family dwelling units representing approximately 1600 EDUs anticipated in the Land Use Assumptions for Dove Mountain over the next 10 years. The subtraction of these EDUs does not change the result of the fee analysis because the total fees for the benefit area were reduced accordingly (i.e. the portion which Dove Mountain would have paid was removed from the total). The Town of Marana is obligated to provide any streets facilities project funding which otherwise would have been paid by Dove Mountain.

As a matter of sound fiscal policy, the streets fees should be reviewed, and if necessary, adjusted, every two years concurrent with the mandatory biennial audit. At a minimum, upon consideration by the Mayor and Council, adjustment should be made for the Construction Cost Index, which shall not exceed a five percent increase in the fee.

5. GUIDANCE ON SPECIAL FEE STUDIES

5.1. NEED FOR SPECIAL FEE STUDIES

In some cases, there will be a need for a special impact fee study because the routine application of the fee table is deemed unfair to either the developer or the Town. This might occur if the projected traffic from a proposed development has a significantly different trip generation rate or trip length, or if there is no strong nexus between the land use and the funded facilities. An example of this would include a student housing project where vehicle use is low, alternate modes are provided, and trip distances are short. Conversely, an industrial use might overburden a roadway structural section such that the roadway design basis used in the fee calculation is exceeded. In such a case, additional structural capacity would be needed for the proposed loading rather than adding travel lanes.

One use which is likely to require a special fee study is a logistics facility. These facilities generally dedicate most or all of their floor space to moving product, as opposed to a more typical industrial facility which includes a large amount of space for production and smaller amount of space for shipping/receiving. In addition, logistics facilities are likely to have a higher heavy truck percentage and higher overall trip generation than a “typical” industrial facility of the same size, and therefore, are expected to have a greater impact on the streets network.

For these examples (and other unusual situations), either the developer or the Town would request a special impact fee study be conducted. The study could be conducted by a qualified consultant on behalf of the developer, or by Town staff. The Town remains the final decision maker on these matters, including the need for a special study, who conducts it, and its ultimate approval resulting in a modified fee.

5.2. TIMING OF SPECIAL FEE STUDIES

Special fee studies may be initiated by a developer or by the Town. In the case of developer-initiated studies, the developer shall submit to the Town a letter of justification prior to conducting a special fee study. The letter shall state the reasons why a special study is necessary. If Town staff concurs that a special study is justified, staff will then decide if the study will be conducted in-house at no cost to the developer, or by a mutually agreed upon and qualified third party, at the expense of the developer. The Town shall render a determination on the request within two weeks of submittal. Special fee studies must be justified, prepared, submitted, and approved (if appropriate) prior to the time when streets facilities development fees are due. Special studies may not be conducted retroactively or after development fees have been paid to the Town. Requests for full or partial refunds after payment of the fees are not allowed.

In cases where the Town initiates a special fee study, the Town shall notify the developer in writing not later than four weeks after a developer submits a tentative plat in the case of a subdivision, development plan, or building permit request. The Town shall conduct a special fee study and make a modified fee determination prior to the time fees are due. A developer may appeal the Town's findings to the Town Council in a manner prescribed by Town ordinances and codes. The Town may not conduct a special study or modify fees retroactively or after development fees have been paid to the Town.

In no case shall special fee studies be conducted due to simple disagreement with the Town's cost estimates, ITE trip generation rates, or projects defined in the Infrastructure Improvements Plan for Streets Facilities. Developer-initiated fee studies will generally be disallowed if the project can readily be reused for other more intense purposes.

5.3. PERSONS PREPARING SPECIAL FEE STUDIES

Due to the highly technical nature of development fee calculations, special fee studies shall be prepared by qualified professional(s), as defined by statutes. For studies conducted by a third party on behalf of the developers, the Town shall approve the selection of the person or firm preparing the study in advance of the study's submittal to the Town.

5.4. CONTENT OF SPECIAL FEE STUDIES

Special fee studies may be prepared as a freestanding report or as a supplement to a traffic impact report required by the Town as a precondition of development approval. Special fee studies shall include the following elements:

- *Introduction* describing the project location, land use, and intensity. State the assigned Marana case number.
- *Justification for the Study*, which may be a reiteration of the approved letter of request.
- Technical analysis of the elements of fee basis, resulting in a new or revised EDU calculation used to estimate the impact fee. The technical analysis may consider the existing uses of the site.
- Detailed cost estimate of proposed development to determine construction cost credit. This cost estimate may ultimately be utilized by the Town for building permitting use.
- Recalculation of the proposed Streets facilities development fee to be paid by the developer, based on the revised EDU calculation. The fee recalculation may also consider credits for prior Streets facilities development fee payments to the Town and existing uses on the site.
- Summary of findings, briefly restating the contents of the study.
- Appendices, providing any supporting information such as field data, technical publications, and market information. Include copies of the letter of request for a special study and the approval of the request.
- Seal of professional registrant as required by R4-30-304, Use of Seals, Arizona State Board of Technical Registration.

6. GUIDANCE ON FEE CREDITS

Fee credits are allowed under three circumstances:

Credit for Prior Fees. If a streets facilities development fee has been paid previously to the Town for an approved development on the same site, the Town shall adjust the amount of the new impact fee due by subtracting the previous payment amount, uninflated, from the total due.

Credit for Existing Uses. The demand for roadway capacity from a conforming developed site may be subtracted from the impacts of a proposed new use or reuse in a special fee study. Replacement of existing conforming uses of the same type and scale (number of EDU) will have no fee assessed. Credit shall not be given for nonconforming existing uses under any circumstances.

Credit for Improvements in the IIP. A developer may be credited for making improvements contained in the IIP at an amount not greater than the estimated cost contained in the most current IIP, which includes right-of-way costs. Partial improvements shall be credited on a pro rata basis as determined by the Town. Dedications-of-rights of way only shall be credited based on the presumptive right-of-way unit costs used in the preparation of the Streets IIP, which is $45,000 per acre.

Appendix A
List of Preparers

Psomas

Alejandro Angel, PhD, P.E., PTOE, RSP_{2i}

Darlene Danehy Yellowhair, P.E., PTOE, ENV SP, RSP_{2i}

Staff Participants

Fausto Burruel, P.E., Public Works Director & Acting Town Engineer

Jane Fairall, Town Attorney

Appendix B

Assessed Costs by Project and Service Area

	Road Project	Limits		Project Type	# of Lanes	Classification	Volume Before Improvements	Existing Volume (veh/day)	Existing Capacity (veh/day)	Future Volume (veh/day)	Future Capacity (veh/day)	Traffic from Development	% of Capacity used by development	Total Improvement Costs	Cost of New Two-Lane Roadway	Outstanding Impact Fee Credits / Debt Service	Cost of Vehicular Improv (80%)	Cost of bike/ped improv (20%)	Cost Attributable to Develoment = (Vehicular Cost * % Capacity used) + 100% of ped/bike improvements
Northwest	Marana Main Street	Sandario Rd	Grier Rd	New	2	Collector	0	0	N/A	3,000	13,990	3,000	21%	$ 3,255,000					$ 3,255,000
	Marana Main Street	Tangerine Farms Rd	Sandario Rd	Legacy	2	Collector	0	1,000	16,730	4,300	16,730	3,300	20%			$ 873,000			$ 873,000
	Tangerine Farms Road	I-10 (Tangerine TI)	Clark Farms	Legacy	4	Arterial	0	13,500	37,610	27,500	37,610	14,000	37%			$ 3,018,397			$ 3,018,397
	Clark Farms	Riccati Dr	Despain Dr	Legacy	3	Collector	0	3,200	17,567	8,700	17,567	5,500	31%						
	Tangerine Farms Road	Clark Farms	I-10 (Marana TI)	New	4	Arterial	0	0	N/A	10,000	30,620	10,000	33%	$ 15,977,000	$ 7,484,400				$ 7,484,400
	Marana Road Interchange, Phase 1	N/A	N/A	Interchange Reconstruct	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	$ 6,753,000					$ 6,753,000
	Clark Farms	Despain Dr	Lon Adams Rd	New	3	Collector	0	0	N/A	10,000	14,690	10,000	68%	$ 4,520,000			$ 3,616,000	$ 904,000	$ 3,365,622
	Clark Farms	Lon Adams Rd	Tangerine Farms Rd	New	4	Collector	0	0	N/A	9,000	30,620	9,000	29%	$ 25,313,000	$11,774,700				$ 11,774,700
	Adonis Road	Grier Rd	Tangerine Rd	New	2	Collector	0	0	N/A	10,000	15,930	10,000	63%	$ 20,601,000			$ 16,480,800	$4,120,200	$ 14,465,963
	Tangerine Road Interchange	N/A	N/A	Interchange Reconstruct	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	$ 4,500,000					$ 4,500,000
Northeast	Tangerine Road, Phase 1	Dove Mountain Blvd	Town Limits	Completed Capacity	4	Arterial	14,444	15,400	37,610	20,400	37,610	5,000	13%	$ 6,189,000			$ 4,951,200	$1,237,800	$ 1,896,029
	Tangerine Road, Phase 2	I-10 (Tangerine TI)	Dove Mountain Blvd	Improvement	4	Arterial	N/A	8,000	16,730	14,000	37,610	6,000	16%	$ 42,537,000			$ 34,029,600	$8,507,400	$ 13,936,211
	Twin Peaks Road	Lambert Ln	Tangerine Rd	Completed Capacity	4	Arterial	0	16,000	37,610	23,500	37,610	23,500	62%			$ 3,642,259			$ 3,642,259
	Moore Road	Camino De Oeste	Thornydale Rd	Completed Capacity	2	Collector	0	3,000	13,990	7,000	16,730	7,000	42%			$ 291,788			$ 291,788
	Cayton Road	Dove Mountain Blvd	Thornydale Rd	New	2	Collector	0	0	N/A	5,400	13,990	5,400	39%	$ 6,630,000					$ 6,630,000
	Tangerine Road Interchange	N/A	N/A	Interchange Reconstruct	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%	$ 1,500,000					$ 1,500,000
South	Twin Peaks Interchange	N/A	N/A	Legacy	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%			$ 3,757,886			$ 3,757,886
	Twin Peaks Road	I-10	Lambert Ln	Legacy	4	Arterial	0	22,000	37,610	33,000	37,610	11,000	29%						
	Twin Peaks Road/Rattlesnake Pass	Saguaro Highlands Dr	Silverbell Rd	Expansion	4	Collector	N/A	12,500	16,730	22,700	37,610	10,200	27%	$ 18,001,838			$ 14,401,470	$3,600,368	$ 7,506,111
	Cortaro Road	I-10	Camino de Oeste	Completed Capacity	4	Arterial	23,000	25,000	37,610	29,000	37,610	4,000	11%	$ 8,134,735			$ 6,507,788	$1,626,947	$ 2,319,081
	Silverbell Road	Ina Rd	Cortaro Rd	Completed Capacity	4	Arterial	9,800	14,000	37,610	22,500	37,610	8,500	23%	$ 21,068,682			$ 16,854,946	$4,213,736	$ 8,023,017
	Ina Road	I-10	Silverbell Rd	Completed Capacity	4	Arterial	12,848	26,000	16,730	32,300	37,610	6,300	17%	$ 9,000,000			$ 7,200,000	$1,800,000	$ 3,006,062
	Silverbell Road	Ina Rd	Sunset Rd	Expansion	4	Arterial	N/A	10,000	16,730	16,000	37,610	6,000	16%	$ 8,013,159			$ 6,410,527	$1,602,632	$ 2,625,316

Town of Marana

Impact Fee Study Update and Parks Infrastructure Improvement Plan

Public Report – DRAFT

Prepared by
Town of Marana Parks and Recreation Department
Town of Marana Engineering Division
McGann & Associates, Landscape Architects
September 27, 2022

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Town of Marana
Impact Fee Study Update and
Parks Infrastructure Improvement Plan

Part 1
Introduction and Methodology

Introduction:

In accordance with Arizona Revised Statute (ARS) §9-463.05 the Town of Marana assesses and collects Development Impact Fees to help pay for the construction of new parks and recreational facilities as needed to meet the increased demands placed on the municipal park system by new development.

As a precedent to the collection of Development Impact Fees, §9-463.05 requires that an Infrastructure Improvement Plan (IIP) be prepared to identify the required improvements. Per the subject statute, the IIP is defined as:

> *"…. a written plan that identifies each necessary public service or facility expansion that is proposed to be the subject of a development fee and otherwise complies with the requirements of this section and may be the municipality's capital improvements plan."*

Included in this document is the Town of Marana's updated Park Infrastructure Improvement Plan. This new IIP replaces the 2017 IIP which was adopted by Marana Resolution 2017-090 on September 19, 2017. This new plan includes fee schedules and a list of capital improvements that are projected to be constructed over the next ten years.

Methodology:

This Impact Fee Study Update employs an incremental expansion method that identifies the Town's existing level of service and projects the level of service assumptions over the next ten years as the community grows. The existing level of service for parks and recreation facilities is assigned a value based on the cost of replacement. The value of the parks and recreation system is adjusted to subtract outstanding debt on existing facilities, the balance collected, unspent impact fees, developer fee credits and the cost of the Impact Fee Study.

Demand for an expanded park system will be driven by both residential and non- residential development. The primary driver will be residential development. As new homes are built in the community, the residents that occupy these homes will use the various park resources available to them. The secondary driver will be new non-residential development. As offices, retail outlets, medical offices, and other non-residential facilities are constructed, these facilities will create jobs for individuals including those living outside of the Town. These employees will use Town Park facilities before or after work or during lunch-time breaks.

Based on the above, the service units for residential development will be Equivalent Dwelling Units (EDU's). The service unit for non-residential development will be 1,000 S.F. of Non-Residential Development.

The adjusted value of the existing parks and recreation facilities is then distributed across the existing level of community development to calculate a value of the existing parks system per service unit. The adjusted value of the existing parks and recreation facilities relative to current development is then projected onto new development using estimates for future development found in the Town's land use assumptions.

Using this methodology, the Town's existing level of parks and recreation service is maintained as the community grows and the expansion of parks and recreation facilities necessary to meet the demand of growth has a supplemental funding source in development impact fees.

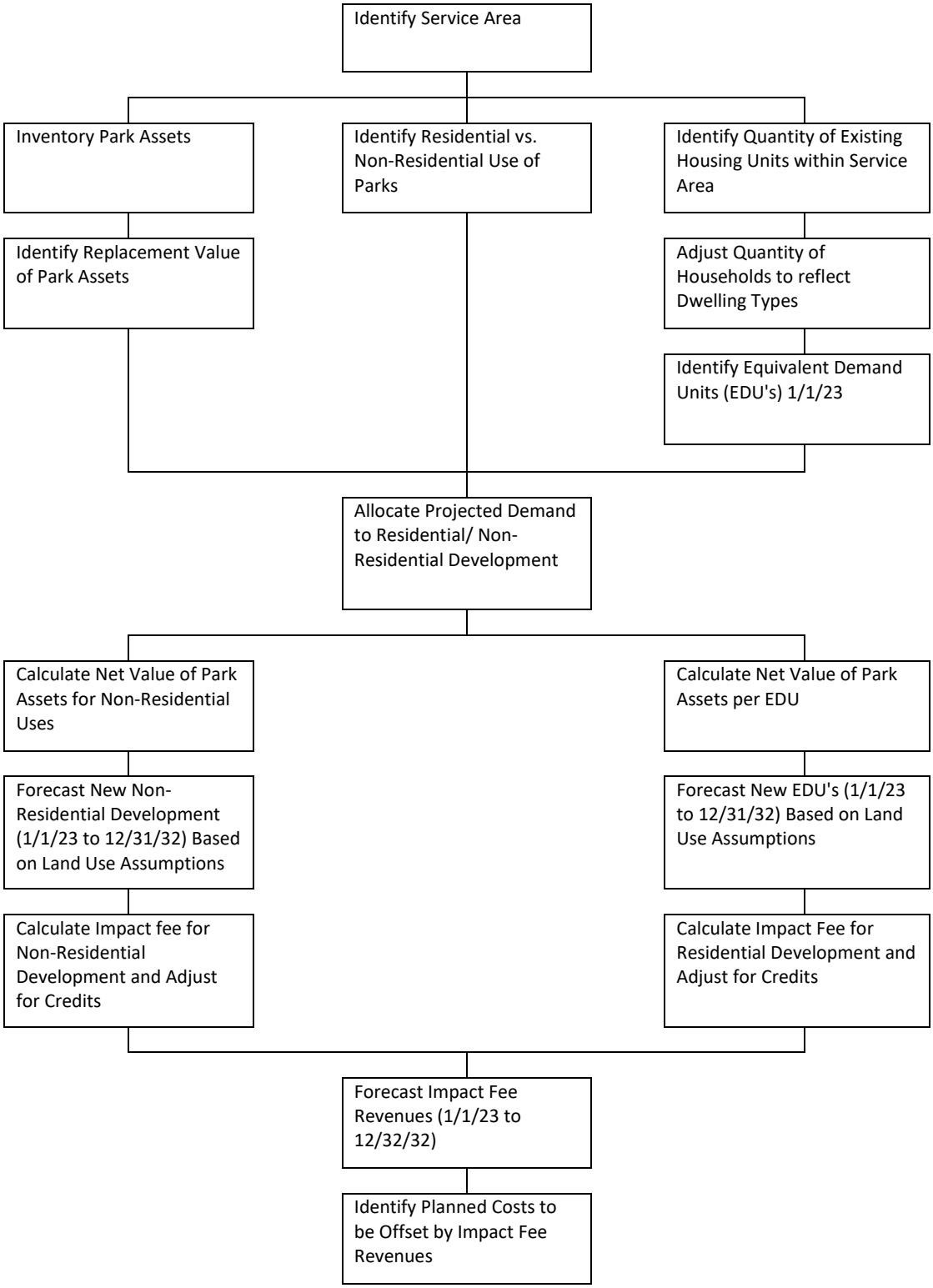
The advantages of using this incremental expansion method over other methods (e.g., a general standards based or plan-based method), include the following:

- The fee is based on the existing level of service provided by the Town instead of a national standard that fails to account for local jurisdictional variations.

- The incremental expansion method more accurately identifies the value of existing level of service compared to estimating a general cost per acre of developed parkland. Existing level of service is valued by assigning replacement costs to inventoried park assets.

- The incremental expansion method is flexible because the impact fee is based on existing level of service. Consequently, the Town may fine tune capital improvements identified in the IIP to meet changing community recreation needs. A standards-based approach based on the Parks and Recreation Master Plan would require an update to the Master Plan and a re-calculation of the impact fees to meet changing community needs.

Figure 1: Methodology Flow Chart



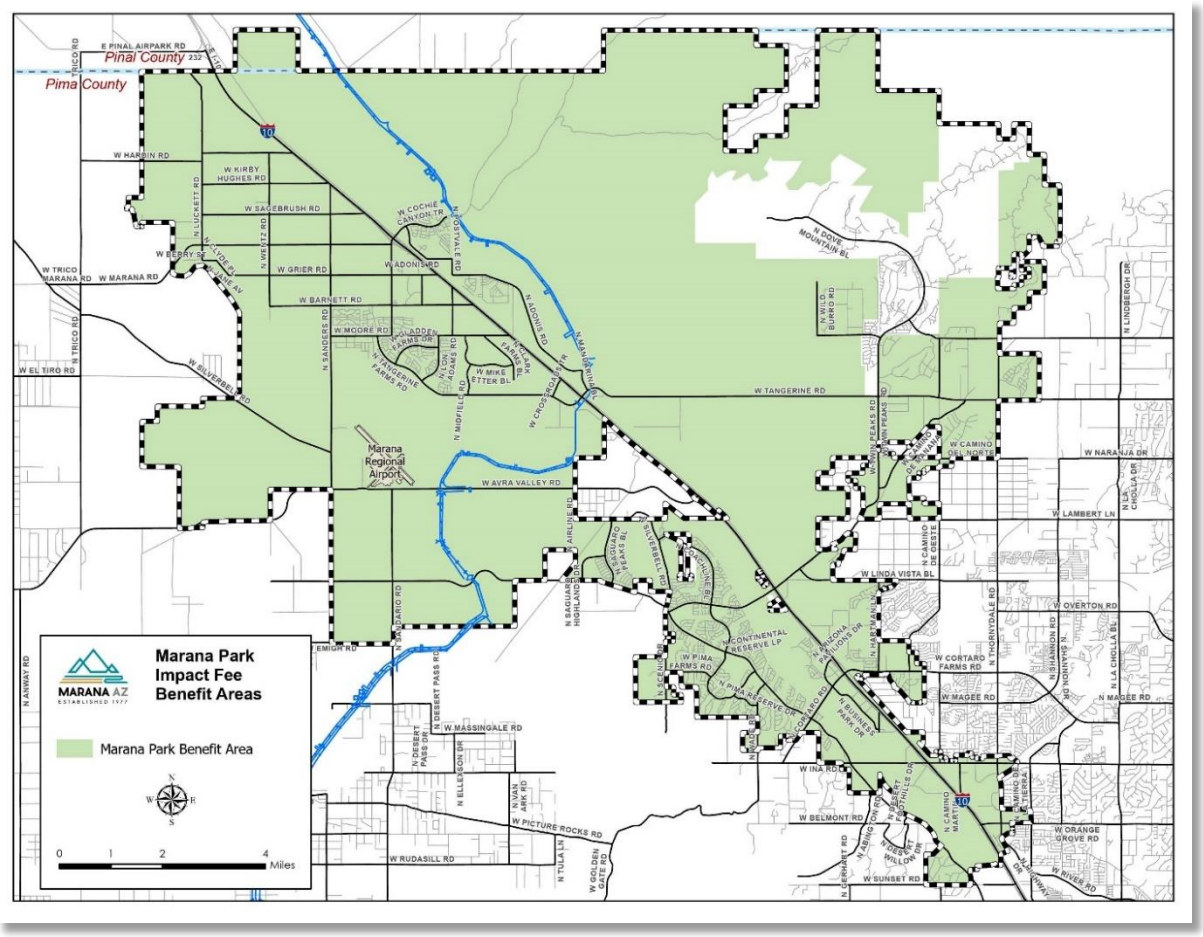
Service Area:

Service areas are defined in ARS §9-463.05 (T)9 as:

> *"… any specified area within the boundaries of a municipality in which development will be served by necessary public services or facility expansions and within which a substantial nexus exists between the necessary public services or facility expansions and the development being served as prescribed in the infrastructure improvements plan."*

For purposes of this Impact Fee Study Update, there is one service area identified for the Town of Marana. This service area is shown in Figure 2, below. The service area includes all areas within the jurisdictional boundaries of the Town with the exception of lands within the Dove Mountain Specific Plan boundary. The Dove Mountain area is excluded based on a Town approved Development Agreement. For the remainder of the Town, the most densely developed areas are where existing municipal parks and recreation facilities are located. These densely developed areas are served by the Town's existing parks and other recreation facilities. It is in areas of new development that park and recreation facility expansion is needed to meet the demands created by growth.

Figure 2: Service Area



Consequently, new facilities that expand the parks and recreation system will directly benefit residents in areas of new growth in keeping with the legislative requirements for collecting development impact fees. There is, however, a need for additional trails to serve the developed areas of Marana. Since the Town is committed to providing a uniform level of service across the entire town, a single service area will be used.

Inventory of Existing Parks:

Provided on the following pages is a chart that summarizes the assets associated with the Town of Marana's existing park system. It includes only improvement types that would be eligible for impact fee funding and excludes items not eligible based on ARS §9-463.05. Per ARS §9-463.05.A, development impact fees may be used:

> *"… to offset costs to the municipality associated with providing necessary public services to a development, including the costs of infrastructure, improvements, real property, engineering and architectural services, financing and professional services required for the preparation or revision of a development fee pursuant to this section, including the relevant portion of the infrastructure improvement plan."*

Per ARS §9-463.05.B and 9-463.05.T., development impact fees may not be used for:

> *"Construction, acquisition or expansion of public facilities or assets other than necessary public services or facility expansions identified in the infrastructure improvements plan."*
>
> *"Repair, operation or maintenance of existing or new necessary public services or facility expansions."*
>
> *"Upgrading, updating, expanding, correcting or replacing existing necessary public services to serve existing development in order to meet stricter safety, efficiency, environmental or regulatory standards."*
>
> *"Upgrading, updating, expanding, correcting or replacing existing necessary public services to provide a higher level of service to existing development."*
>
> *"Administrative, maintenance or operating costs of the municipality."*
>
> *"… vehicles, equipment or that portion of any facility that is used for amusement parks, aquariums, aquatic centers, auditoriums, arenas, arts and cultural facilities, bandstand and orchestra facilities, bathhouses, boathouses, clubhouses, community centers greater than three thousand square feet in floor area, environmental education centers, equestrian facilities, golf course facilities, greenhouses, lakes, museums, theme parks, water reclamation or riparian areas, wetlands, zoo facilities or similar recreational facilities, but may include swimming pools."*

Replacement Value:

Replacement values as shown on the following chart are based on:

- Replacement values identified in the 2017 plan escalated to reflect inflation in construction costs through January 1, 2023.
- Recent park construction project bids for similar facilities.
- Published construction cost data reports.

Figure 3: Inventory Table - Existing Parks and Replacement Value	Continental Ranch Park	Continental Reserve park	Crossroads at Silverbell Park	El Rio Neighborhood Park	Gladden Farms Park	Honea Heights Park	Ora Mae Harn Park	Saguaro Bloom Park	San Lucas Park	Tangerine Sky Park	Wade McLean Park	Wild Burro Trailhead	Sanders Road Trailhead	North Coachline Boulevard Trailhead	Total Facility Units	Replacement Value Per Unit	**Total Replacement Valve**
Acres (Total)	11.9	9.23	48.27	1.3	25.7	1.0	34.72	22.0	13.49	17.98	4.23	2.0	0.8	1.5	194.12		
Acres (Eligible)	11.9	9.23	30.0	1.3	25.7	1.0	30.0	22.0	13.49	17.98	4.24	2.0	0.8	1.5	171.14		
Real Property																	
Real Property - Eligible Park Sites	11.9	9.23	30.00	1.3	25.7	1	30.0	22.0	13.49	17.98	4.23	2.0	0.8	1.5	171.14	$30,000.00	$5,134,200.00
Buildings and Structures:																	
Community Center - Allowable Portion (SF)							3,000	1							3,000	$450.00	$1,350,000.00
Restroom Buildings	1	1	3		3		3		1	1	1	1			16	$165,000.00	$2,640,000.00
Concessions	1	1	1				1				1				5	$235,000.00	$1,175,000.00
Operations and Maintenance Building			1						1						2	$470,000.00	$940,000.00
Storage Building	1	1													2	$180,000.00	$360,000.00
Group Ramada (+/- 30’ x 60’ - Site Built or Pre-Eng.))			1				1			1					3	$130,000.00	$390,000.00
Picnic Ramada - (+/- 30’ x 30’ - Site Built or Pre-Eng.)		1	5		1	1	1	1	2	2	1			1	16	$85,000.00	$1,360,000.00
Picnic Ramada - Small - (Pre-Engineered)	4			1		1	6		2	2	1	1	1		17	$15,000.00	$255,000.00
Fields:																	
Multi-Sport Rectangular Fields with Lights			2		2		1								5	$400,000.00	$2,000,000.00
Multi-Sport Rectangular Fields w/o Lights									2		1				3	$150,000.00	$450,000.00
Slow Pitch Softball Fields with Lights			1				1								2	$560,000.00	$1,120,000.00
Fast Pitch Softball Fields with Lights			2				4								6	$355,000.00	$2,130,000.00
Fast Pitch Softball Fields w/o Lights	4	2									1				9	$200,000.00	$1,800,000.00
Courts:																	
Basketball Courts - with Lights	2	1	2				1		1	1					8	$150,000.00	$1,200,000.00
Basketball Courts - w/o Lights				.5		.5		1							2	$70,000.00	$140,000.00
Tennis Courts - with Lights	2	1	1				1								5	$150,000.00	$750,000.00
Tennis Courts - w/o Lights								1							1	$95,000.00	$95,000.00
Pickleball Courts - with Lights							3								3	$65,000.00	$195,000.00
Pickleball Courts - w/o Lights															0	$40,000.00	$0.00
Sand Volleyball Courts - with Lights			2						1						3	$36,000.00	$108,000.00
Sand Volleyball Courts - w/o Lights								1							1	$17,000.00	$17,000.00
Playgrounds and Play Structures:																	
Play Structures / Surfacing (2-5 Year)	1	1	2	1	1		2	1	1	1					11	$165,000.00	$1,815,000.00
Play Structures / Surfacing (5-12 Year)	1	1	1		1	1	1	1	1	1					9	$125,000.00	$1,125,000.00
Swings / Surfacing		1	1	1	1	1	1	1	1	1					9	$50,000.00	$450,000.00
Zip Line										1					1	$80,000.00	$80,000.00
Fabric Shade Canopies	2			1	2	1	8	2	2	1					19	$30,000.00	$570,000.00
Special Use Facilities:																	
Off-Leash Dog Park			1				1	1	1	1					5	$250,000.00	$1,250,000.00
Skate / Wheel Park	1														1	$1,200,000.00	$1,200,000.00
Aquatic Facilities:																	
Swimming Pool							1								1	$5,000,000.00	$5,000,000.00
Splash Pad			1		1										2	$500,000.00	$1,000,000.00

Figure 3: (Continued) Inventory Table - Existing Parks and Replacement Value	Continental Ranch Park	Continental Reserve park	Crossroads at Silverbell Park	El Rio Neighborhood Park	Gladden Farms Park	Honea Heights Park	Ora Mae Harn Park	Saguaro Bloom Park	San Lucas Park	Tangerine Sky Park	Wade McLean Park	Wild Burro Trailhead	Sanders Road Trailhead	North Coachline Blvd. Trailhead	Total Facility Units	Replacement Value Per Unit	**Total Replacement Value**
Miscellaneous Public Use Facilities:																	
Horseshoe Pits	2		2				1								5	$3,000.00	$15,000.00
Benches	10	6	7	1	15		22	10	12	8	4	1		2	98	$750.00	$73,500.00
Picnic Tables	8	10	32	1	14	7	39	4	6	13		1		2	137	$1,450.00	$191,800.00
Barbecue Grills	2	4	8		3	2	9		5	6				1	40	$600.00	$24,000.00
Bleachers	8	2	6		2	1	5				2				26	$3,000.00	$78,000.00
Exercise Stations - Fitness Area		1					10		6						17	$1,500.00	$25,500.00
Trash Receptacles	14	8	43	3	9	4	52	10	10	10	2			1	166	$300.00	$49,800.00
Drinking Fountains	7	4	8	1	3	3	8		3	1	1			1	40	$3,500.00	$140,000.00
Bicycle Racks	1	1	1	1	3	1	1	1	1	1					12	$800.00	$9,600.00
Supporting Infrastructure:																	
Park Access / Circulation Drives (LF)	1,500	430	3,000	107	3,160	400	2,200	1,100	950	1,300				330	14,477	$85.00	$1,230,545.00
Paved Parking Spaces (EA)	133	59	305	9	231	12	202	67	51	60		79	1	27	1,1,243	$1,250.00	$1,553,750.00
Electrical Service - Average (Acre)															171.14	$11,000.00	$1,882,540.00
Potable Water Service - Average (Acre)															171.14	$2,000.00	$342,280.00
Sanitary Sewer System - Private / On-Site (Acre)															171.14	$2,500.00	$427,850.00
Fencing (Acre)															171.14	$7,350.00	$1,257,879.00
Signage (Acre)															171.14	$3,000.00	$513,420.00
Parking Lot and Security Lighting (Acre)															171.14	$14,000.00	$2,395,960.00
Irrigation Booster Pumps		1	1		1				1						4	$10,000.00	$40,000.00
Landscape and Irrigation:																	
Landscape - Turf Areas Other than Fields (Acres)	2.7	1.9	2.34	.32	1.21	.02	9.96	.77	2.68	.97	1.5				24.37	$30,000.00	$731,100.00
Landscape - Trees (EA)	75	40	407	15	239	15	110	25	72	50	24			20	1,092	$300.00	$327,600.00
Turf Irrigation System - Other than Fields (SF)	2.7	1.9	2.34	.32	1.21	.02	9.96	.77	2.68	.97	1.5				24.37	$22,000.00	$536,140.00
Drip Irrigation System (Acres)															171.14	$3,500.00	$598,990.00
Automated Irrigation Control System - Med - Large	1	1	1		1		1	1	1	1				1	9	$7,500.00	$67,500.00
Automated Irrigation Control System - Small				1		1					1			1	4	$2,500.00	$10,000.00
Hardscape / Pedestrian Paving:																	
Accessible Walkways - Concrete (LF)	3,300	1,100	6,500		2,770	520	5,300	2,050	960	2,400				220	25,120	$48,00	$1,205,760.00
HC Ramps	2	2	3		6	1	3	6	2	2				1	28	$900.00	$25,200.00
Pathways and Trails:																	
Loop Shared-Use Pathways															18.22	$400,000.00	$7,288,000.00
Loop Road / Highway Underpasses															3	$300,000.00	$900,000.00
In-Park Shared-Use Pathways - Asphalt (LF)		450	6.850	500	2,600				3,200	3,150					9,900	$15.00	$148,500.00
In-Park Decomposed Granite Pathways (LF)								2,700							2,700	$4.00	$10,800.00
Single Track Trails (Miles)															45.6	$93,500.00	$4,263,600.00
																Total	**$57,329,614.00**

Allocation of Asset Value:

ARS §9-463.05(B)13 provides:

> *If development fees are assessed by a municipality, the fees shall be assessed against commercial, residential and industrial development…*

In-as-much as residential and non-residential development will impact the need for additional parks, it is necessary to allocate asset value to each so that a proportionate share can be assessed to each type of development. This allocation is based on Residential Hours and Non-Resident (Inflow Commuter) Hours each year. The Inflow Commuter Hours are hours non-residents will spend at jobs within the Town.

According to U.S. Census Bureau web application OnTheMap (2019 US Census), there are 10,640 Inflow Commuters working within the Town of Marana. The 2019 Census also identifies the resident population of Marana to be 49,030. Based on this data, the allocation of asset value is calculated as follows:

Figure 4: Cost Allocation

		Hour Allocation			**Cost Allocation**	
Marana Residents (2019 Census)	Inflow Commuters (2019 Census)	Residential Hours (*)	Non-Residential Hours (**)	Total Hours	Residential	Non-Residential
49,030	10,064	429,502,800	16,102,400	445,605,200	96%	4%

(*) Residential Hours / Year: 8,760 (24 Hours / Day x 365 Days)
(**) Non-Residential Hours / Year: 1,600 (50 Weeks / Year x 4 Days per Week x 8 Hours / Day)

Based on the total park asset value of $57,329,614.00 (See Section 4) and the cost allocation noted above, the asset value allocated to residential and non-residential land uses is as follows:

Figure 5: Asset Value by Land use Type

Land Use Type	**Total Asset Value**	**Cost Allocation (%)**	**Asset Value**
Residential	$57,329,614.00	96%	$55,036,429.
Non-Residential	$57,329,614.00	4%	$2,293,185.

Town of Marana
Impact Fee Study Update and
Parks Infrastructure Improvement Plan

Part 2
Impact Fee Calculation for Residential Development

Town of Marana

Service Units - Residential:

ARS §9-463.05 requires that service units be defined in an impact fee study and used as the basis for impact fee collection. This Impact Fee Study uses an Equivalent Demand Unit (EDU) as the service unit for the park impact fee for residential uses.

To calculate an EDU, housing unit types are weighted in relation to single-family detached housing. The weight of each housing type reflects a park service multiplier derived from the average household size for each housing type based on United States Census Bureau statistics. The average household size for a single-family detached housing unit is 2.7 while the average household size of a multi-family/single-family attached housing unit is 1.8. The park service multiplier for a single-family detached residence is therefore 1.0 while the park service multiplier for a multi-family/single-family attached dwelling unit is 0.67. The sum of these weighted dwelling units by housing type results in total EDUs for the Town.

Unlike impact fee studies for parks improvements, impact fee studies for transportation infrastructure expansion often use land use categories that are identified through analysis of vehicle usage and trip data that is available locally and is part of published transportation planning literature. Because there is no data on visits to existing parks, the Impact Fee Study for Parks and Recreation Facilities makes use of the differentiation between single-family and multi-family residential units and their average household sizes to fine tune the definition of service units for the purpose of establishing a park impact fee.

Figure 6: Service Units as Equivalent Demand Units

Housing Type	Average Household Size (Persons)	Equivalent Demand Units
Single Family Detached	2.7 (*)	1.00
Multi-Family / Single Family Attached	1.8 (*)	0.67

(*) Reference: U.S. Census Bureau

Figure 7: Total Quantity of Existing Equivalent Demand Units (EDU's) - January 1, 2023:

Housing Type	Dwelling Units (January 1, 2023)	Multiplier	Service Units (EDU's) (January 1, 2023)
Single Family Detached	16,679	1.00	16,679
Multi-Family / Attached	2,220	0.67	1,487
		Total - January 1, 2023	**18,166**

Necessary Public Services - Existing:

As required in ARS §9-463.05(E)1, an IIP must include:

> *"A description of the existing necessary public services in the service area and the costs to upgrade, update, improve, expand, correct or replace those necessary public services to meet existing needs and usage and stricter safety, efficiency, environmental or regulatory standards, which shall be prepared by qualified professionals licensed in this state, as applicable."*

In addition, ARS §9-463.05(E)2 requires:

> *"An analysis of the total capacity, the level of current usage and commitments for usage of capacity of the existing necessary public services, which shall be prepared by qualified professionals licensed in this state, as applicable."*

In response to the required analysis of existing, necessary public park services, an inventory of parks and recreation assets throughout the Town of Marana has been compiled. (See Section 4 of this document). The inventory was based on data provided by the Town of Marana Parks and Recreation Department and lists existing park amenities by facility (site) with an identified replacement cost. The inventory excludes park acreage beyond the 30-acre limit referenced in ARS §9463.05(T)7(g).

The existing level of service provided by the Town's current parks and recreation facilities is quantified by distributing the value of the existing parks and recreation facilities over the total number of existing EDUs in the Town. The existing number of EDUs is described in Figure 5. Figure 3 describes the total value of existing parks and recreation infrastructure. The existing level of service provided by the Town of Marana's park infrastructure is quantified by dividing the total value of the existing infrastructure (See Section 4) by the existing number of EDUs (Figure 5).

Figure 8: Existing Park Value by Equivalent Demand Unit

	Credits	Offsets	Total
Total Replacement Value *	$55,036,429.00		
Impact Fee Account Balance	$150.00		
Outstanding Impact Fee Credits		$0.00	
Outstanding Park Debt		$0.00	
Subtotal	$55,036,279.00		
Adjusted Existing Park Value			$55,036,279.00
Divided by EDU			18,166
Net Value per EDU			$3,029.63

(* As allocated to residential development)

Projected Service Units for New Development:

ARS §9-463.05(E)5 requires and IIP to include:

> *"The total number of projected service units necessitated by and attributable to new development in the service area based on the approved land use assumptions and calculated pursuant to generally accepted engineering and planning criteria."*

The Town of Marana has developed Land Use Assumptions that estimate the number of new dwelling units expected over the next ten years. Figure 9 presents the existing and future dwelling units in the 10-year window based on the Town's Land Use Assumptions. The final result is the number of new EDUs expected over the next ten years.

Figure 9: Park Equivalent Demand Units (January 1, 2023 to December 31, 2032)

Housing Type	**Dwelling Units (1/1/23)**	**Park Service Unit Multiplier**	**Service Units - EDU's (1/1/23)**
Single Family Detached	16,679	1.00	16,679
Multi-Family / Single Family Attached	2,220	0.67	1,487
Total EDU's - (1/1/23)			18,166
Housing Type	**Dwelling Units (12/31/32)**	**Park Service Unit Multiplier**	**Service Units - EDU's (12/31/32)**
Single Family Detached	28,361	1.00	28,361
Multi-Family / Single Family Attached	4,480	0.67	3,002
Total EDU's - (12/31/32)			31,363
New EDU's (1/1/23 to 13/31/32)			**13,197**

Projected Park Impact Fee Revenue (January 1, 2023 to December 31, 2032):

ARS §9-463.05(E)6 requires an IIP to include:

> *"The projected demand for necessary public services or facility expansions required by new service units for a period not to exceed ten years."*

Figure 10 calculates the total expected revenue from impact fees collected between January 1, 2023 and December 31, 2032 based on the estimated number of new EDUs (Figure 9) and updated impact fee. The total projected revenue does not include development credits.

Figure 10: Projected Park Impact Fee Revenue - (1/1/23 to 12/31/23) (Before Credits)

Service Area	New EDU's	Impact Fee / EDU (Before Credits)	Projected Revenue 1/1/23 to 12/31/32 (Before Credits)
Town-wide	13,197	$3,029.63	$39,982,027.11

ARS §9-463.05(E)7 requires an IIP to include:

> *"A forecast of revenues generated by new service units other than development fees, which shall include estimated state-shared revenue, highway users revenue, federal revenue, ad valorem property taxes, construction contracting or similar excise taxes and the capital recovery portion of utility fees attributable to development based on the approved land use assumptions, and a plan to include these contributions in determining the extent of the burden imposed by the development as required in subsection B, paragraph 12 of this section."*

The Town of Marana collects no property tax to include in revenue forecasts. However, the Town does collect a 4% construction sales tax and also receives revenue from the state related to gas taxes. It is recommended that **Five Hundred Dollars ($500.00)** of the sales tax be credited on a per EDU basis, resulting in a fee of **Two Thousand Five-Hundred and Twenty-Nine Dollars and Sixty-Three cents ($2,529.63) per EDU**. Figure 11 calculates the projected revenue and percent of planned costs covered by this revenue forecast. The remainder of the sales tax credit would be credited against the yet-to-be-calculated Street Facilities fee.

It is recommended that the credits associated with HURF/VLT be applied fully to the street facilities fee. If approved, no additional credits would be applied to the Parks and Recreational Facilities fee.

Figure 11: Projected Park Impact Fee Revenue - January 1, 2023 to December 31, 2032 (After Credits):

Service Area	New EDU's	Impact Fee / EDU (Less the $500.00 Credit)	Projected Revenue (1/1/23 to 12/31/32)
Town-wide	13,197	$2,529.63	$33,383,527.00

In summary, the Impact Fee Update and Infrastructure Improvement Plan will result in a final calculation of the Impact Fee per EDU of **Two Thousand Five-Hundred and Twenty-Nine Dollars and Sixty-Three Cents ($2,529.63).**

Part 3
Impact Fee Calculation for Non-Residential Development

Service Units – Non-Residential Development:

ARS §9-463.05 requires that service units be defined in an impact fee study and used as the basis for impact fee collection. This Impact Fee Study uses Jobs per 1,000 S.F. as the service unit for non-residential development.

There are several categories of non-residential development, and each will result in a different quantity of jobs per square foot of development. These categories, and the quantity of jobs that will be created per 1,000 square foot of new development, are identified in the Land Use Assumptions (Table 4) and are summarized below.

Figure 12: Jobs per 1,000 S.F. – Non-Residential Land Uses

Non-Residential Land Use Category	S.F. per Job	Jobs per 1,000 S.F. of New Non-Residential Development
Retail	600	1.67
High Traffic Retail	200	5.00
Office	400	2.50
Industrial	500	2.00
Hotel	1,800	0.56
Medical	500	2.00

The Land Use Assumptions (Table 5) also include projections of the quantity of jobs that will be created by new non-residential development. These projections are summarized below:

Figure 13: New Job Projections (January 1, 2023 to December 31, 2032)

Non-Residential Land Use Category	New Jobs (From Land Use Assumptions)
Retail	2,327
High Traffic Retail	2,212
Office	370
Industrial	2,993
Hotel	-
Medical	682
Total New Jobs	**8,584**

Park Impact Fee – Non-Residential Development:

The park expansion and development costs allocated to non-residential development equals 4% of the cost of required improvements or $1,665,918.00. (4% x $41,647,945, the value of required improvement needed to maintain the current level of service). This cost will be borne by the 8,584 new jobs that will be created within the town, resulting in a fee of $194.00 per job.

Figure 14: Non-Residential Impact Fees per Job (Without Development Classification)

Total Cost Allocated to Non-Residential Development	Projected Quantity of New Jobs (1/1/23 to 12/31/32)	Non-Residential Impact Fee per Job
$1,665,918.00	8,584	$194.00

To properly assess this fee, the quantity of jobs must be related to square feet of new development. Figure 15 below summarizes this calculation.

Figure 15: Non-Residential Impact Fees per 1,000 S.F. of Development (Before Credits)

Non-Residential Land Use Category	Jobs per 1,000 S.F. of new Development	Impact Fee per Job	Impact Fee per 1,000 SF of New Non-Residential Development
Retail	1.67	$194.00	$324.00
High Traffic Retail	5.00	$194.00	$970.00
Office	2.50	$194.00	$485.00
Industrial	2.00	$194.00	$388.00
Hotel	0.56	$194.00	$109.0
Medical	2.00	$194.00	$388.00

As noted in Section 9 of this report, the Town collects a 4% construction sales tax with these revenues contributing to park expansion and development. It is recommended that **One Hundred Dollars ($100.00)** of the sales tax revenue be credited on a per 1,000 S.F. of new non-residential development basis. With this credit, the adjusted impact fees, by development type, are identified below.

Figure 16: Non-Residential Impact Fees Per 1,000 S.F. of Development (After Credits)

Non-Residential Land Use Category	Impact Fee per 1,000 S.F. of New Non-Residential Development Prior to $100.00 Adjustment	**Proposed Impact Fee per 1,000 S.F. of New Non-Residential Development**
Retail	$324.00	**$224.00**
High Traffic Retail	$970.00	**$870.00**
Office	$485.00	**$385.00**
Industrial	$388.00	**$288.00**
Hotel	$109.0	**$9.00**
Medical	$388.00	**$288.00**

Projected Park Impact Fee – Non-Residential Development:

The projected revenues to be collected from non-residential development fees for the period between 1/2/23 and 12/32/32 are summarized below.

Figure 17: Projected Impact Fee Revenues – Non-Residential Development

Non-Residential Land Use Category	New Jobs	Jobs per 1,000 S.F.	Development Scope (1,000 S.F.)	Fee per 1,000 S.F.	Projected Revenue
Retail	2,327	1.67	1,393	$224.00	$312,032.00
High Traffic Retail	2,212	5.00	442	$870.00	$384,540.00
Office	370	2.50	148	$385.00	$56,980.00
Industrial	2,993	2.00	1,497	$288.00	$431,136.00
Hotel	-	0.56	0.00	$9.0	$0.00
Medical	682	2.00	341	$288.00	$98,208.00
Total Projected Revenue – Non-Residential Development					**$1,282,896.00**

Town of Marana
Impact Fee Study Update and
Parks Infrastructure Improvement Plan

Part 4
Parks Capital Improvement Program

Projected Park Impact Fee – Residential and Non-Residential Development:

The combined revenues projected to be collected from both residential and non-residential development fees for the period between 1/2/23 and 12/32/32 are summarized below.

Figure 18: Projected Impact fee Revenues – Residential and Non-Residential Development

Projected Revenues – Residential Development	$33,383,527.00
Projected Revenues – Non-Residential Development	$1,282,896.00
Total Revenues (1/1/23 to 12/31/32)	$34,666,423.00

Necessary Public Services - New Development:

ARS §9-463.05(E)3 requires:

> *"A description of all or the parts of the necessary public services or facility expansions and their costs necessitated by and attributable to development in the service area based on the approved land use assumptions, including a forecast of the costs of infrastructure, improvements, real property, financing, engineering and architectural services, which shall be prepared by qualified professionals licensed in this state, as applicable."*

In response to the statutory mandate for a description of parks and recreation facility expansion projects required to meet the demand of new growth, the Town of Marana has developed the Ten-Year Capital Improvement Plan for park facilities. This plan is summarized in Figure 19 below. Impact fees that are collected between January 1, 2023 and December 31, 2032 will be directed to the capital improvements identified in Figure 19 with the understanding that A.R.S. §9-463.05 allows that:

> *"…a municipality may amend an infrastructure improvements plan adopted pursuant to this section without a public hearing if the amendment addresses only elements of necessary public services in the existing infrastructure improvements plan and the changes to the plan will not, individually or cumulatively with other amendments adopted pursuant to this subsection, increase the level of service in the service area or cause a development fee increase…".*

Figure 19 - Parks Capital Improvement Plan - January 1, 2023 to December 31, 2032:

Project	Development Cost
El Rio Disc Golf Course	$288,334.00
El Rio Recreation Area - Loop Access Parking Lot	$204,237.00
Gladden Farms Baseball Field Improvements	$660,765.00
Gladden Farms Lighted Soccer Fields	$286,636.00
Tortolita Preserve Trailhead, Trails, and Fencing	$156,181.00
Honea Heights Park - Phase 2 Improvements	$1,261,461.00
Continental Ranch Park to Loop Extension	$420,487.00
New Competition Swimming Pool (50 Meter)	$3,934,557.00
Ora Mae Harn Park Facility Expansion	$1,784,066.00
Saguaro Bloom Park - Phase 1	$1,600,375.00
Saguaro Bloom Park - Phase 2	$4,805,566.00
Gladden Farms Bike Park	$1,201,391.00
Twin Peaks Park District Park - Land Acquisition and Phase 1 Development	$17,415,052.00
Mandarina Community Park	$7,568,766.00
Impact Fee Study	$60,000.00
Total	**$41,467,945.00**
Amount Funded by Parks Impact Fee	**$34,666,423.00**
Amount Funded by Construction Sales Tax Credits	**$6,801,522.00**

Additional Information related to these projects is provided below.

El Rio Disc Golf Course:

This project involves the construction of an 18-hole disc golf course. The course will provide a safe and appropriate location where this activity can occur. It will allow disc golf activities to be moved from other community parks, where it occurs on an informal basis, to this new location. The course will have the capacity to serve both existing users and new / future residents who engage in this recreational activity enabling the Parks and Recreation Department to maintain a consistent level of service.

El Rio Recreation Area – Loop Access Parking Lot:

The El Rio Recreation Area is a district or zone within the Town's Park system that includes (or will include) the El Rio Neighborhood Park, the El Rio Disc Golf Course, and portions of the Loop shared-use pathway. As the community's population grows, there will be increased demand for access to these facilities and other recreational facilities that can be accessed via the Loop. The proposed parking lot will allow the Town to continue to provide safe and legal access to these facilities consistent with the increased demand resulting from anticipated population growth.

Gladden Farms Baseball Field Improvements:

This project involves the installation of field lights and the construction of other related improvements that will change the fields from daytime-only use fields to daytime and evening use fields. The improvements will enable the Town to significantly expand the hours of operation and the number of teams / individuals who can use and benefit from access to this facility. It will help the Parks and Recreation Department to maintain a consistent level of service related baseball / softball field availability.

Gladden Farms Park New Lighted Soccer Fields:

The scope of the project includes the construction of two new natural turf, multi-sport / soccer fields within the existing boundaries of Gladden Farms Park. Improvements will include the fields, field lights to expand the potential hours of operation, and the parking area / restrooms required for public use. The project will increase the quantity of fields available to the community in response the anticipated increase in population and assist the Parks and Recreation Department in their efforts to maintain a consistent level of service related to multi-sport field availability.

Tortolita Preserve Trailhead, Trails, and Fencing:

As the population of the Town grows, there has been a steady increase in the number of residents using the Tortolita Preserve. The proposed Tortolita Preserve trailhead development and trail expansion project will enhance access, extend the length of the trail system, maintain site security, and allow additional residents to use this facility consistent with the increased demand resulting from population growth.

Honea Heights Park – Phase 2 Improvements:

The Honea Heights Park Phase 2 development project will include the construction of two new lighted multi-sport / soccer fields and supporting site improvements. The project will increase the quantity of fields available to the community in response the anticipated increase in population allowing the Parks and Recreation Department to maintain a consistent level of service.

Continental Ranch Park to Loop Connection:

The scope of this project consists of the construction of an accessible shared-use pathway that will connect the Continental Ranch Community Park with the Loop shared-use pathway system. As the community's population grows and the extent of the Loop pathway system expands, there is a need to provide new access facilities to maintain the same level of service for Marana residents. This project will contribute to addressing that need.

New Competition Swimming Pool:

The scope of this project involves the construction of a new competition swimming pools that will allow the Town to continue to provide swimming pool access to the growing number of Marana residents. Improvements will include the pool and the associated mechanical and water filtration / purifications equipment, only.

Ora Mae Harn Park Facility Expansion:

The scope of this project will involve the construction of a new racquet sport area with lighted pickleball and tennis courts. It will also include the construction of a new lighted multi-sport field and the expansion of the park's pathway system. The project will enable the Town to address increased demand for these facilities due to population growth and continue to provide the same level of service.

Saguaro Bloom Park Phase 1:

The new Saguaro Bloom Park (Phase 1) will include sport courts, playgrounds, picnic facilities, restrooms, and related site improvements and is being developed in response to population growth. It will allow the Parks and Recreation Department to provide these basic recreational resources to new residents, consistent with the resources it provides current residents.

Saguaro Bloom Park Phase 2:

Phase 2 of the Saguaro Bloom Park will include two lighted diamond (baseball / softball) fields, a lighted multi-sport / soccer field, an expanded dog park, and related facilities. As with Phase 1 of this project, it will allow the Parks and Recreation Department to provide these basic recreational resources to new residents, consistent with the resources it provides current residents.

Gladden Farms Bike Park:

The Gladden Farms Bike Park will include bike trails, a pump track, and similar features that can be used by Town residents. Outdoor recreation trends indicate that more and more individuals, both children and adults, are now choosing to engage in this recreational activity. Some of these activities currently occur within the Tortolita Preserve but as demand grows, it will be important to expand the areas available to the public so that the same level of service can be maintained.

Twin Peaks District Park Land Acquisition and Phase 1 Development:

The Twin Peaks District Park will be a new park as identified in the Town's Parks and Recreation 2020-2030 Master Plan. The park will be centrally located and will serve existing and new residents from throughout the Marana community. Proposed (Phase 1) facilities will include lighted fields, courts, playgrounds, picnic facilities, a dog park, and the supporting infrastructure. The park will be a component of the park system's expansion as needed to maintain a consistent level of service.

Mandarina Community Park:

Mandarina Community Park will be a new park and will similarly expand the recreational facilities available to residents while maintaining the same level of service for existing and new residents. Improvements planned for the park include lighted multi-sport / soccer fields, sport courts, ramadas, picnic facilities, and the infrastructure needed to support these improvements.

Summary of Projected Revenues and Planned Costs:

Provided below is a summary of projected revenues, projected costs, and Impact fees for various types of new development.

Figure 20: Summary of Projected Revenues and Planned Costs

Projected Revenues – Residential Development Impact Fees (1)	$33,383,527.00
Projected Revenues – Non-Residential Development Impact Fees (2)	$1,282,896.00
Total	**$34,666,423.00**
Planned Costs (3)	**$34,666,423.00**
Revenues as Percent of Planned Costs	**100%**

(1) See Figure 11 – Section 9
(2) See Figure 17 – Section 12
(3) See Figure 19 – Section 14

Figure 21 - Summary of Park Impact Fees:

Residential		
Single Family Residence (1 EDU)	$2,529.63	Per Dwelling Unit
Multi-Family Residential Unit (.67 EDU)	$1,694.85	Per Dwelling Unit
Non-Residential		
Retail	$224.00	Per 1,000 S.F.
High Traffic Retail	$870.00	Per 1,000 S.F
Office	$285.00	Per 1,000 S.F.
Hotel	$9.00	Per 1,000 S.F.
Industrial	$288.00	Per 1,000 S.F.
Medical	$288.00	Per 1,000 S.F.

TOWN OF

Marana

Water Infrastructure, Water Resources, and Water Reclamation Impact Fee Report

Final Draft Report / September 30, 2022

RAFTELIS

RAFTELIS

September 30, 2022

Ms. Jing Luo, PhD, PE
Director
Marana Water Department
Town of Marana
11555 W. Civic Center Dr.
Tucson, AZ 85653

Subject: Draft Water Infrastructure, Water Resources, and Water Reclamation Impact Fee Report

Dear Ms. Luo,

Raftelis is pleased to provide this Draft Water Infrastructure, Water Resources, and Water Reclamation Impact Fee Report (Report) for the Town of Marana (Town) to determine utility impact fees to recover the cost of serving new development within the Town. The Town's utility impact fees were last updated in 2017. The Town anticipates a rapid pace of growth over the next 10 years and needed to revise its impact fees to ensure that the costs of providing water infrastructure, water resources, and water reclamation service to these new customers are appropriately recovered from them.

We have carefully reviewed the Town's infrastructure improvements plans (IIP) and Land Use Assumptions (LUA) documents to understand the growth and capacity required to serve new development over the next 10 years. Based on these documents, discussions with Town staff and other Town consultants, we have applied industry standard methodologies to determine utility impact fees which comply with Arizona Revised Statutes (ARS) § 9-463.05.

This report summarizes the key findings and recommendations related to the development of the impact fees. It has been a pleasure working with you, and we thank you and Town staff for the support provided during the course of this study.

Sincerely,

Todd Cristiano
Senior Manager

Collin Drat
Manager

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1. Executive Summary

1.1. Introduction

The Town of Marana (Town) retained Raftelis to conduct a comprehensive update to its water infrastructure, water resources, and water reclamation impact fees pursuant to the requirements of Arizona Revised Statutes (ARS) § 9-463.05 (Statute). These fees were last updated in 2017. The requirements of the Statute include 3 major components to determine fees:

1. **Land Use Assumptions (LUA) Report**, which identifies the level of residential and non-residential growth anticipated in the Town's utility service area from January 1, 2023 to December 31, 2032 (the Study Period). This document was developed by the Town and Psomas.

2. **Infrastructure Improvements Plan (IIP) Report**, which identifies the current and future facilities required to serve development identified in the LUA. The Town retained Westland Resources, Inc. to develop the water infrastructure and water resources IIP (Water IIP) and HDR to develop the water reclamation IIP (Sewer IIP).

3. **Impact Fee Report (Fee Report)**, the subject of this document, which outlines the calculation of impact fees, which will appropriately recover the costs of the identified infrastructure improvements to support growth throughout the Study Period.

This report includes updates to the following fees:

Water Infrastructure Impact Fees. These fees recover the cost of water system improvement to serve new development within the North Marana, Twin Peaks, and Saguaro Bloom benefit areas.

Water Resources Impact Fees. These system-wide fees recover the cost to secure water resources for new customers, which include 50% of the Town's water reclamation facility (WRF), whose effluent is used for groundwater recharge, and the cost of acquiring additional water resources. Currently, reclaimed water/effluent makes up 22% of Marana's designation of assured water supply authorized by Arizona Department of Water Resources (ADWR).

Water Reclamation Impact Fees. These system-wide fees recover the cost incurred to provide wastewater collection and treatment service to new customers and includes the cost wastewater collection system improvements, and 50% of the cost of the Town's WRF.

1.2. Findings and Conclusions

Arizona Revised Statutes §9-463.05 (Statute) identifies the specific requirements for municipalities to assess impact fees. Impact fees can only be calculated and assessed for expansion-related existing or proposed improvements included in an approved IIP. The IIP must be tied to the LUA or growth projections that are tied to the service area in which fees will be enacted. The Statute also provides for strict notification, public hearing, and implementation schedules, among other provisions.

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This fee report describes the methodology used to determine impact fees which recover the cost of growth anticipated in the Town over the next ten years (2023 – 2032). The proposed fees are anticipated to be effective 75 days after they are formally adopted by the Town Council. **Table 1** compares the existing and calculated fees. The fees calculated in this report represent supportable fees under the Statute. The Town may choose to adopt fee levels up to these amounts and still be within the legal requirements of the Statute.

Table 1: Comparison of Existing and Calculated Fees

Description	Water Infrastructure			Water Resources	Water Reclamation
	North Marana	Twin Peaks	Saguaro Bloom		
Existing					
5/8"	$ 2,331	$ 2,740	$ 838	$ 3,050	$ 3,930
3/4"	3,497	4,110	1,257	4,575	5,895
1"	5,828	6,850	2,095	7,626	9,824
1 1/2"	11,656	13,700	4,189	15,251	19,648
2"	18,650	21,920	6,703	24,402	31,437
Calculated Fee					
5/8"	$ 3,356	$ 4,704	$ 838	$ 5,358	$ 4,995
3/4"	5,033	7,056	1,257	8,036	7,493
1"	8,388	11,760	2,095	13,394	12,488
1 1/2"	16,776	23,520	4,189	26,787	24,975
2"	26,841	37,632	6,703	42,859	39,960
Change					
5/8"	$ 1,025	$ 1,964	$ -	$ 2,308	$ 1,065
3/4"	1,536	2,946	-	3,461	1,598
1"	2,560	4,910	-	5,768	2,664
1 1/2"	5,120	9,820	-	11,536	5,327
2"	8,191	15,712	-	18,457	8,523

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2. Introduction

2.1. Report Organization and Relationship to Other Reports

Our report to the Town includes the following sections:

1. Executive Summary
2. Introduction
3. Water Infrastructure Fees
4. Water Resources Fees
5. Water Reclamation Fees

The recommendations outlined in this report are based on information from the Town's Water and Sewer IIP reports. References to those reports are made throughout and this report is intended to be read alongside those reports.

2.2. Impact Fee Methodology

Impact fees are one-time fees assessed to new development in the Town to fund the additional capacity required to serve new development; the impact fee represents the unit cost of this capacity. The Statute states that a municipality may assess fees to offset the costs to provide necessary public services. This includes the cost of infrastructure, improvements, property, architectural services, financing and professional services to develop the fees. Under Arizona law the development of the fees must meet the following requirements:

- Provide a beneficial use to the development
- Fees must be calculated based on an IIP
- Fees must not exceed the proportionate share of capacity costs of public facilities, based on service units, needed to provide the necessary public services to the development
- Costs for necessary public service shall not exceed the current level of service (LOS)
- Fees may only be used to fund projects identified in the approved infrastructure improvements plan for expansion-related facilities. Fee cannot be used to correct existing deficiencies or to fund operating expenses.

An impact fee is designed to recover the capital cost of system capacity dedicated to or "used up" by new development. There are three generally accepted methodologies used to calculate impact fees. They are described below.

- ***Recoupment (Buy-in).*** New development pays its proportionate share of existing facilities that have available capacity to serve growth. Revenue from these fees is 'recouped' by existing rate payers thereby compensating them for their initial investment to serve existing and future growth.

- ***Incremental Expansion.*** This method develops the existing level of service for each of the facilities based on specific characteristics of the facility. It is assumed there are no existing deficiencies or future capacity in facility infrastructure. New development pays for its proportionate share of growth-related facilities that is sufficient to maintain current LOS standards. Revenue from fees under incremental expansion will be reserved for funding future development.

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- ***Hybrid.*** This method considers the amount and cost of available capacity along with the cost and amount of future capacity. The available capacity costs and future capacity costs are divided by the sum of available and projected capacity to calculate the unit costs (per EDU) of the service.

For this study, Raftelis used the following approaches for each impact fee:

- Water Infrastructure – Incremental
- Water Resources – Hybrid
- Water Reclamation – Hybrid

2.3. Reliance on External Data

Throughout the project, the Town provided Raftelis with a variety of information including financial reports and projected capital expenditures for each fee area. Raftelis has reviewed the data for reasonableness and general representation of cost and related activities. Raftelis did not independently assess or verify the accuracy of such data – historic or projected. We have relied on this data in the formulation of our findings and recommendations, as well as in the preparation of this report. After the projects are completed, there will be differences between actual and projected data, and the differences will be reconciled in a future impact fee study. Raftelis takes no responsibility for the accuracy of the costs and/or projections provided by or prepared on behalf of the Town by others, nor does Raftelis have any responsibility for updating this report for events occurring after this report has been finalized. The primary sources of information relied upon for this report are the "Water Facilities Infrastructure Improvement Plan" (Water IIP) prepared by Westland Resources, Inc and the "Wastewater Facilities Infrastructure Improvement Plan (Sewer IIP)" prepared by HDR.

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3. Water Infrastructure Fees

3.1. Benefit Areas

Currently, the Town's water service area is comprised of seven (7) individual water systems:

1. North Marana
2. Tangerine Business Park
3. Hartman Vistas
4. Picture Rocks
5. Marana Airport
6. Saguaro Bloom
7. Palo Verde

In addition to these 7 water systems, the Town also wheels water to customers through the City of Tucson's (City) water system, pursuant to an intergovernmental agreement (IGA) with the City. The Town's water system will become increasingly interconnected as the improvements are completed. Accordingly, many of the identified projects will benefit more than one water system. To recognize these shared benefits, the Water IIP consolidates the 7 water systems to the 5 benefit areas identified in **Table 2** below. The Town's Water IIP identifies infrastructure improvements in 5 water systems (North Marana, Tangerine Business Park, Hartman Vista, Picture Rocks, and Marana Airport) only. No infrastructure improvements have been identified for Palo Verde or the IGA area. The fee for the Saguaro Bloom benefit area recovers the cost of debt issued by the Town to fund growth related infrastructure improvements. The existing Saguaro Bloom fees will continue to be collected until the previous cost/debt is repaid.

Table 2: Water Infrastructure Benefit Areas

Water Systems	Benefit Areas
North Marana	North Marana
Tangerine Business Park	
Hartman Vistas	Twin Peaks
Picture Rocks	
Marana Airport	
Saguaro Bloom	Saguaro Bloom
Palo Verde	Palo Verde
IGA	IGA

Source(s): Water IIP p. 1-2

3.2. Water Infrastructure EDUs

The Town's water system must deliver water to customers at appropriate pressures under average and peak conditions. The projects identified in the Water IIP are based on engineering design criteria which are: 1) the same for all benefit areas and 2) the same for new customers as for existing customers.[1] The level of service for the

[1] See Water IIP p. 2-4 for further detail on level of service for water customers.

Town's water systems is expressed in terms of equivalent dwelling units (EDUs) with one EDU equal to the demand of one single family residence.

The Town's LUA report projects the level and type of development which is anticipated to occur over the Study Period. Using these projections, the Water IIP then develops a projection of EDUs for the Study Period. **Table 3** identifies the projected number of EDUs by benefit area. The total number of EDUs included in the Water IIP is 12,205. While the Water IIP anticipates 850 additional EDUs in the Saguaro Bloom water system and 546 EDUs in the IGA area, there are no water infrastructure projects associated with these benefit areas. Accordingly, only 10,809 EDUs are included as the basis for the water infrastructure impact fee calculation.

Table 3: Water Infrastructure EDUs by Benefit Area

IIP Benefit Areas	Study Period Growth
North Marana	8,821
Twin Peaks	1,988
Saguaro Bloom	850
Palo Verde	-
IGA	546
Grand Total	**12,205**

Source(s): Water IIP Table 4

3.3. Water Infrastructure Impact Fee Costs

Expansion-related capital costs include the cost of infrastructure improvements required to support growth in the two benefit areas, as well as other costs which support the funding and delivery of these improvements. In both cases the costs represent the *incremental* costs to serve new development during the Study Period.

Table 4 lists the 16 expansion-related projects that are required to serve the EDUs added over the Study Period. Projects 1-6 will address projected deficiencies throughout both the North Marana and Twin Peaks benefit areas. The remaining projects are specific to supporting growth in either the North Marana benefit area or the Twin Peaks benefit area. The cost of projects 1 through 4 will be 50% funded through the water infrastructure impact fee with the remainder funded through water rates or other funding sources. The Marana Park Reservoir project, which addresses an existing deficiency, will be funded through impact fees and a partially forgivable WIFA loan, which will be repaid through water rates. This is in proportion to the storage deficiency in the North Marana benefit area. The other projects will be 100% impact fee funded.

In addition to the infrastructure improvements identified above, there are three other costs which will be recovered via the water infrastructure impact fee. The Town issued bonds to construct improvements to support development in the Hartman Vistas water system (included in the consolidated Twin Peaks benefit area). The remaining payments for these bonds total $1,573,010 and will be recovered via the Twin Peaks impact fee. Costs for a water system master plan ($150,000[2]) and the next impact fee study ($60,000), have also been included for both the North Marana and Twin Peaks benefit areas.

[2] Per Water IIP p. 22

Table 4: Water Infrastructure Impact Fee Costs

#	Description	Total Cost	% Fee Funded	$ Included
	Project Costs			
1	50% Airport Connection to NRWWDS Pipeline	$ 4,050,163	50%	$ 2,025,081
2	50% Partnered NRWWDS Project	7,471,788	50%	3,735,894
3	50% Marana Booster at NRWWDS	4,215,549	50%	2,107,775
4	50% Blending Plan	120,000	50%	60,000
5	B-Zone Booster and Transmission Line	4,413,278	100%	4,413,278
6	B-Zone Reservoir	617,700	100%	617,700
7	C-Zone Booster	1,819,375	100%	1,819,375
8	Tangerine 16" with Break Tanks	5,307,960	100%	5,307,960
9	Tangerine 16" at I-10	2,634,128	100%	2,634,128
10	Marana Park Well	991,302	100%	991,302
11	Marana Park Reservoir	4,566,723	78%	3,566,723
12	Sanders Road 24" Pipeline	4,878,502	100%	4,878,502
13	Twin Peaks Interconnect	2,901,250	100%	2,901,250
14	Picture Rocks Interconnect	1,554,163	100%	1,554,163
15	Honea East Well	216,550	100%	216,550
16	Heritage Park Water Plant	5,328,123	100%	5,328,123
	Subtotal: Project Costs	$ 51,086,554	83%	$ 42,157,804
	Other Costs			
17	Master Plan	$ 150,000	100%	$ 150,000
18	Impact Fee Study	60,000	100%	60,000
19	Hartman Debt Service Reimbursements	1,573,010	100%	1,573,010
	Subtotal: Other Costs	$ 1,783,010		$ 1,783,010
	Total Water Impact Fee Costs	**$ 52,869,564**		**$ 43,940,814**

Source(s): Project Costs (Water IIP Table 18), Hartman Vistas Debt and Master Plan (Water IIP p. 22)

3.4. Water Infrastructure Fees and Projected Revenue

Table 5 shows the water infrastructure impact fee calculation per EDU. As noted above, the Water IIP has identified water infrastructure projects for the North Marana and Twin Peaks benefit areas only. Projects which support growth in both benefit areas have been allocated to each benefit area in proportion to the projected Study Period EDUs. North Marana represents 82% of the Study Period EDUs of the North Marana and Twin Peaks benefit areas combined. Accordingly, the North Marana fee has been allocated 82% of these costs, with the balance (18%) included in the Twin Peaks fee. The remaining projects have been allocated directly based on the benefit area they support. The master plan ($150,000) and the impact fee study ($60,000) will support both benefit areas and have been allocated in proportion to Study Period EDUs.

The calculation also includes a credit for the fund balance in the water infrastructure impact fee fund. This balance represents the difference between the fees which have been collected to date and the project costs which have been incurred and provides credit for funds collected in previous years in advance of the projects being constructed. As noted above, the project costs indicated below represent the incremental cost to serve the Study Period EDUs only. Accordingly, the fee per EDU is calculated by summing the costs, by benefit area, and dividing by the incremental Study Period EDUs.

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Table 5: Water Infrastructure Impact Fee per EDU

Description	System-Wide	North Marana		Twin Peaks	
Impact Fee Costs					
50% Airport Connection to NRWWDS Pipeline	$ 2,025,081	$ 1,652,627	[1]	$ 372,455	[1]
50% Partnered NRWWDS Project	3,735,894	3,048,785	[1]	687,109	[1]
50% Marana Booster at NRWWDS	2,107,775	1,720,111	[1]	387,664	[1]
50% Blending Plan	60,000	48,965	[1]	11,035	[1]
B-Zone Booster and Transmission Line	4,413,278	3,601,584	[1]	811,694	[1]
B-Zone Reservoir	617,700	504,092	[1]	113,608	[1]
C-Zone Booster	1,819,375	-		1,819,375	
Tangerine 16" with Break Tanks	5,307,960	5,307,960		-	
Tangerine 16" at I-10	2,634,128	2,634,128		-	
Marana Park Well	991,302	991,302		-	
Marana Park Reservoir	3,566,723	3,566,723		-	
Sanders Road 24" Pipeline	4,878,502	4,878,502		-	
Twin Peaks Interconnect	2,901,250	-		2,901,250	
Picture Rocks Interconnect	1,554,163	-		1,554,163	
Honea East Well	216,550	216,550		-	
Heritage Park Water Plant	5,328,123	5,328,123		-	
Master Plan	150,000	122,412	[1]	27,588	[1]
Impact Fee Study	60,000	48,965	[1]	11,035	[1]
Hartman Debt Service Reimbursements	1,573,010	-		1,573,010	
Total Impact Fee Costs	$ 43,940,814	$ 33,670,829		$ 10,269,985	
Divided by: New EDUs	10,809	8,821		1,988	
Equals: Infrastructure Cost per EDU		**$ 3,817**		**$ 5,166**	
Less: Balance on 8/23/2022	$ 4,993,825	$ 4,075,357	[1]	$ 918,468	[1]
Divided by: New EDUs	10,809	8,821		1,988	
Equals: Credit for Balance per EDU		**$ 462**		**$ 462**	
Water Infrastructure Fee per EDU (Infrastructure Cost - Balance)		**$ 3,355**		**$ 4,704**	

Source(s): Impact Fee Costs (Table 4), Balance on 8/23/2022 (per Town), EDUs (Table 3)

[1] Split proportionate to EDUs

Table 6 indicates the calculated water infrastructure impact fees. The Town's fee structure is based on water meter size, with a 5/8" meter representing the size for a 1 EDU customer. The fee is scaled up based on the capacity of each larger size meter, relative to the 5/8" meter size based on meter flow equivalency ratios from the American Water Works Association (AWWA) and rounded to the nearest $1. As noted above, the water infrastructure impact fees for Saguaro Bloom will remain at their current levels.

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Table 6: Water Infrastructure Impact Fees by Meter Size

Size	Ratio [1]	North Marana	Twin Peaks	Saguaro Bloom
1 EDU	**1**	**$ 3,355**	**$ 4,704**	**$ 838**
Calculated Fee by Size (Rounded)				
5/8"	1	$ 3,356	$ 4,704	$ 838
3/4"	1.5	5,033	7,056	1,257
1"	2.5	8,388	11,760	2,095
1 1/2"	5	16,776	23,520	4,189
2"	8	26,841	37,632	6,703
3"	15	50,327	70,560	13,408
4"	25	83,878	117,600	20,950
6"	50	167,756	235,200	41,900
8"	80	268,410	376,319	67,040

Source(s): Fee per EDU (Table 5)

[1] AWWA Manual M1, 7th Edition p. 386

Table 7 illustrates the impact fee revenue that will be realized over the Study Period if development occurs at the pace identified in the Town's LUA report and Water IIP.

Table 7: Water Infrastructure Impact Fee Revenue Projection

Year	North Marana			Twin Peaks			Total Revenue
	EDUs	Fee	Revenue	EDUs	Fee	Revenue	
2023	837	$ 3,356	$ 2,808,972	228	$ 4,704	$ 1,072,512	$ 3,881,484
2024	837	3,356	2,808,972	229	4,704	1,077,216	3,886,188
2025	837	3,356	2,808,972	229	4,704	1,077,216	3,886,188
2026	837	3,356	2,808,972	229	4,704	1,077,216	3,886,188
2027	837	3,356	2,808,972	229	4,704	1,077,216	3,886,188
2028	927	3,356	3,111,012	168	4,704	790,272	3,901,284
2029	927	3,356	3,111,012	169	4,704	794,976	3,905,988
2030	927	3,356	3,111,012	169	4,704	794,976	3,905,988
2031	927	3,356	3,111,012	169	4,704	794,976	3,905,988
2032	928	3,356	3,114,368	169	4,704	794,976	3,909,344
Total	**8,821**		**$ 29,603,276**	**1,988**		**$ 9,351,552**	**$ 38,954,828**

Source(s): Fee per EDU (Table 6), EDUs (Water IIP Table 4)

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4. Water Resources Fees

4.1. Benefit Areas

The water resources fee is a system-wide fee because the need for water resources is the same per EDU, regardless of where that EDU is located. Accordingly, the water resources fee recommended in this report (described in further detail below) is the same for all water systems including the IGA areas.

4.2. Water Resources EDUs

The Water IIP identifies an average day demand of 270 gallons per day (gpd) of renewable water resources for 1 EDU. The anticipated growth of 12,205 EDUs will increase the Town's water resource needs to 7,371 acre-feet per year (AFY). The Town will meet the needs of existing and new customers from three sources: recharge of the effluent from the Town's Water Reclamation Facility (WRF), the purchase of Non-Indian Agricultural Central Arizona Project water (NIA/CAP), and the purchase of renewable water supplies with a 100-year assurance. The projected EDUs which can be served from each source are indicated in **Table 8**. Note that the EDUs for the Marana WRF represent the full capacity of the plant (including a 1.5 mgd expansion), in recognition of all the customers (existing and future) who will benefit from the renewable water supply provided by the WRF.

Table 8: Water Resources EDUs

Description	Acre-Feet	GPD	GPD/EDU	EDUs
Marana WRF	3,360	3,000,000	270	11,111
NIA/CAP	242	216,044	270	800
Add'l Water Resources	773	690,090	270	2,556
Total	**4,375**	**3,906,134**		**14,467**

Source(s): Water IIP p. 24-26

4.3. Water Resources Impact Fee Costs

In order to calculate the per EDU (unit) cost of water resources, the cost of the water reclamation facility (WRF) acquisition and expansion, the cost of recharge basins, the cost of acquiring renewable water supply, and the costs supporting the funding and delivery of renewable resources are included to calculate the total costs. This *total* cost represents the *total* cost to serve all customers (existing and new). Then the unit cost is calculated by dividing the *total* cost by *total* customers.

4.3.1. WATER RECLAMATION FACILITY (WRF) COSTS

In addition to its water reclamation function, the Town's WRF also serves as a source of renewable water supply. As indicated above, the Town's WRF will meet 3,360 acre-feet of the projected water resources needs for Town customers. The treated effluent (reclaimed water) from the WRF will be recharged generating groundwater recharge credits, which are an important source of the Town's water supply. Currently, reclaimed water/treated effluent represents 22% of Marana's designation of assured water supply authorized by Arizona Department of Water Resources (ADWR).

The existing WRF has a capacity of 1.5 million gallons per day (mgd) and was acquired and expanded to its current capacity at a cost of $50.5 million. The Town's General Fund contributed $3.1 million, reducing the cost to

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$47.4 million. The remaining funding came from a combination of loans and additional cash funding from the Town's Transportation, Water, and Wastewater Funds. The loans include the cost of the original acquisition (2013), the expansion to 1.5 mgd (2017A) and the recharge project (2017C). The total cost of the existing WRF and recharge basins, including the cost of financing the project, is $80.4 million. The Town's $3.1 million contribution reduces the cost to be recovered from impact fees to $77.3 million.

As noted in the Water IIP (p. 25) and the Sewer IIP (p. 14), the WRF is projected to reach capacity by 2027. Accordingly, the Sewer IIP recommends a 1.5 mgd expansion to the WRF by 2027. The design and construction cost of the 1.5 mgd WRF and recharge basin expansion is $43.2 million.[3] The total cost, including the projected cost to finance the project is $69.3 million.[4]

As noted above, the WRF serves a dual role for water reclamation and as a source of renewable water supply. Accordingly, 50% of the WRF costs have been included in the water resources fee and 50% have been included in the water reclamation fee described in **Section 5** of this report.

4.3.2. ADDITIONAL WATER RESOURCES COST

Over the Study Period the Town will acquire an additional 1,015 AFY of water supplies from NIA/CAP and the purchase of renewable water supplies with a 100-year assurance. The Water IIP includes the cost of 242 AFY[5] of NIA/CAP water at a cost of $1,072,743 over the Study Period. The remaining renewable resource acquisition included in the Water IIP is 773 AFY of market purchases which are available from a variety of potential water sources. The purchase will provide 773 AFY, for 100 years, at an estimated cost of $11,500 per acre-foot.[6] The cost under those terms would be $8,889,500. Purchases will be made as supplies are available and contracts are negotiated. The costs of capital projects that are particularly designed and constructed to generate long-term water credits shall also be considered as eligible expenses for water resources acquisition. An alternative approach would be to purchase water annually from the Central Arizona Groundwater Replenishment District (CAGRD). The cost for CAGRD water is approximately $800 per acre-foot per year, but the required 773 acre-feet would need to be purchased every year. The cost of the CAGRD alternative would be $61,840,000 over the same 100-year period.[7]

Costs for an integrated water resources plan ($435,000[8]) and the next impact fee study ($60,000), have also been included. **Table 9** indicates the water resources costs which are included in the water resources impact fee calculation.

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[3] See Water IIP p. 25
[4] Based on a 20-year loan at 5% annual interest. See Appendix A for estimated principal and interest payments.
[5] See Water IIP p. 26
[6] This estimate is based upon known dollar amounts used in current negotiations between several Arizona municipalities and entities owning groundwater outside of an AMA that have the legal right to deliver groundwater into an AMA.
[7] 773 acre-feet per year x $800 per acre-foot x 100 years
[8] Per Water IIP p. 23

Table 9: Water Resources Impact Fee Costs

Project Description	Total Cost	% Fee Funded	$ Included
Water Reclamation Facility (WRF)			
WRF 2013 Principal and Interest	$ 34,527,164	50%	$ 17,263,582
WRF 2017A Principal and Interest	32,096,067	50%	16,048,033
WRF 2017C Principal and Interest	4,702,544	50%	2,351,272
WRF Loaned from Transportation Fund	2,400,000	50%	1,200,000
WRF Loaned from Water Fund	367,388	50%	183,694
WRF Loaned from Wastewater Fund	3,169,279	50%	1,584,640
WRF Expansion Principal and Interest	62,847,780	50%	31,423,890
Recharge Expansion Principal and Interest	6,427,056	50%	3,213,528
Subtotal: Water Reclamation Facility (WRF)	$ 146,537,278		$ 73,268,639
All Other Water Resources			
NIA/CAP	1,072,743	100%	1,072,743
Additional Water Resources	8,889,500	100%	8,889,500
Subtotal: All Other Water Resources	$ 9,962,243		$ 9,962,243
Other Costs			
Integrated Water Resources Plan	$ 435,000	100%	$ 435,000
Impact Fee Study	60,000	100%	60,000
Subtotal: Other Costs	495,000		495,000
Total Water Resources Impact Fee Cost	**$ 156,994,521**		**$ 83,725,882**

Source(s): WRF Costs (per Town), Expansion Costs (Water IIP p. 25 amortized 20 years @ 5%), NIA/CAP, Additional Water Resources (Water IIP p. 26), Integrated Water Resource Plan (Water IIP p. 23)

4.4. Water Resources Fees and Projected Revenue

Table 10 indicates the water resources impact fee calculation per EDU. The fee includes 50% of WRF costs in recognition of the fact that the facility serves as a source of renewable water supply in addition to its role in water reclamation. The remaining costs relate specifically to water resources. 100% of these costs have been included in the water resources impact fee calculation. The calculation also includes a credit for the impact fee fund balance in the water resources impact fee fund. This balance represents the difference between impact fees which have been collected to date and the costs which have been incurred and provides credit for funds collected in previous years in advance of the costs being incurred. The resources costs indicated below represent the total cost to serve all customers (existing and new). Accordingly, the resources cost per EDU is calculated by dividing the total cost by the EDUs supported by the three sources of renewable resources (WRF, NIA/CAP and Additional Water Resources). The credit for the beginning balance is divided by new EDUs.

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Table 10: Water Resources Impact Fee per EDU

Description	System-Wide	Water Resources
Impact Fee Costs		
WRF 2013 Principal and Interest	$ 34,527,164	$ 17,263,582
WRF 2017A Principal and Interest	32,096,067	16,048,033
WRF 2017C Principal and Interest	4,702,544	2,351,272
WRF Loaned from Transportation Fund	2,400,000	1,200,000
WRF Loaned from Water Fund	367,388	183,694
WRF Loaned from Wastewater Fund	3,169,279	1,584,640
WRF Expansion Principal and Interest	62,847,780	31,423,890
Recharge Expansion Principal and Interest	6,427,056	3,213,528
NIA/CAP	1,072,743	1,072,743
Additional Water Resources	8,889,500	8,889,500
Integrated Water Resources Plan	435,000	435,000
Impact Fee Study Expenses	60,000	60,000
Total Impact Fee Costs	$ 156,994,521	$ 83,725,882
Divided by: Total EDUs		14,467
Equals: Resources Cost per EDU		**$ 5,787**
Less: Balance on 8/23/2022	$ 5,248,244	$ 5,248,244
Divided by: New EDUs		12,205
Equals: Credit for Balance per EDU		**$ 430**
Water Resources Fee per EDU (Resources Cost - Balance)		**$ 5,357**
Source(s): Impact Fee Costs (Table 9), Balance on 8/23/2022 (per Town), EDUs (Table 8)		

Table 11 indicates the calculated water resources impact fees. The Town's fee structure is based on water meter size, with a 5/8" meter representing the size for a 1 EDU customer. The fee is scaled up based on the capacity of each larger size meter, relative to the 5/8" meter size based on meter flow equivalency ratios from the American Water Works Association (AWWA) and rounded to the nearest $1.

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Table 11: Water Resources Impact Fees by Meter Size

Size	Ratio [1]	System-Wide
1 EDU	**1**	**$ 5,357**
Calculated Fee by Size (Rounded)		
5/8"	1	$ 5,358
3/4"	1.5	8,036
1"	2.5	13,394
1 1/2"	5	26,787
2"	8	42,859
3"	15	80,360
4"	25	133,933
6"	50	267,865
8"	80	428,584

Source(s): Fee per EDU (Table 10)

[1] AWWA Manual M1, 7th Edition p. 386

Table 12 illustrates the impact fee revenue that will be realized over the Study Period if development occurs at the pace identified in the Town's LUA report and Water IIP.

Table 12: Water Resources Impact Fee Revenue Projection

Year	System-Wide		Total Revenue
	EDUs	Fee	
2023	1,334	$ 5,358	$ 7,147,572
2024	1,335	5,358	7,152,930
2025	1,336	5,358	7,158,288
2026	1,336	5,358	7,158,288
2027	1,336	5,358	7,158,288
2028	1,104	5,358	5,915,232
2029	1,105	5,358	5,920,590
2030	1,106	5,358	5,925,948
2031	1,106	5,358	5,925,948
2032	1,107	5,358	5,931,306
Total	**12,205**		**$ 65,394,390**

Source(s): Fee per EDU (Table 11), EDUs (Water IIP Table 4)

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5. Water Reclamation Fees

5.1. Benefit Areas

The Town provides sewer service within the Designated Management Area (DMA), which is generally the western portion of the Town and areas beyond the Town limits to the west and south. Generally this coincides with the North Marana and Saguaro Bloom water benefit areas. The Town also provides service to the Marana Regional Airport, though—as noted below—no sewer projects have been identified for the Marana airport system. The Town's water reclamation fee is the same throughout the Town's sewer service area because the nature of the service provided does not vary throughout the Town's sewer service area.

5.2. Water Reclamation EDUs

The projects identified in the Sewer IIP are based on engineering design criteria which are: 1) the same throughout the Town's active sewer area and 2) the same for new customers as for existing customers.[9] The level of service for the Town's sewer system is expressed in terms of the number of equivalent dwelling units (EDUs) with one EDU equal to the demand of one single family household.

The Town's LUA report projects the level and type of development which is anticipated to occur over the Study Period. Using these projections, the Sewer IIP then develops a projection of EDUs for the Study Period. The Sewer IIP projects that 9,267[10] EDUs will be added over the Study Period. These incremental EDUs will be used to determine the cost per EDU for expansion related collection system projects. In addition to the collection system costs, the water reclamation fees will also recover the cost of the Town's WRF, which serves existing and new customers. This component of the fee will be calculated using total EDUs which can be served by the WRF (including the 1.5 mgd expansion noted in Section 4). **Table 13** indicates the EDUs for the water reclamation fee calculation.

Table 13: Water Reclamation EDUs

Description	GPD	GPD/EDU	EDUs
Existing Flow	842,278	139.6	6,034
New EDUs [1]	1,293,673	139.6	9,267
Additional Capacity	864,049	139.6	6,189
Total	**3,000,000**		**21,490**

Source(s): Flow and GPD/EDU (Sewer IIP Table 7-2), New EDUs (Sewer IIP Table 7-1)

[1] Excludes Airport

5.3. Water Reclamation Impact Fee Costs

The costs which are eligible for inclusion in the water reclamation impact fee are a portion of the cost of the WRF, and the cost of constructing collection system improvements to support growth throughout the Town's active sewer

[9] See Sewer IIP p. 4-8 for further detail on level of service for sewer customers.
[10] 9,267 excludes 40 EDUs anticipated to be added at the Marana Regional Airport, which is a separate, standalone sewer system, with no projects identified in the Sewer IIP.

area. In order to calculate the per EDU (unit) cost of the WRF, the cost of the water reclamation facility (WRF) acquisition and expansion, the cost of recharge basins, and the financing costs are included to calculate the total costs. This *total* cost represents the *total* cost to serve all customers (existing and new). Then the unit cost is calculated by dividing the *total* cost by *total* customers.

The remaining costs represent the *incremental* cost to serve new customers only.

5.3.1. WATER RECLAMATION FACILITY COSTS

As described in Section 4, the WRF is projected to reach its capacity by 2027. Accordingly, the Sewer IIP recommends a 1.5 mgd expansion to 3 mgd prior to 2027. The cost to construct the expansion to the WRF and recharge basins is $39.2 million and $4.0 million, respectively, for a total project cost of $43.2 million. The total cost of the expansion, including the cost to finance the project, is $69.3 million.[11] The cost for the Town's existing WRF was $80.4 million (including the cost of financing), $3.1 million of which was funded by the Town, reducing the cost to $77.3 million. As noted in Section 4, given the dual role of the WRF 50% of WRF costs are allocated to the water resources fee and 50% of WRF costs are allocated to the water reclamation fee.

5.3.2. COLLECTION SYSTEM COSTS

The Sewer IIP has identified $27.6 million in collection system improvements which are needed to support growth during the Study Period. Improvement 1 has been completed and was developer funded, therefore no costs were included. Improvements 3 through 7 will be funded 50% by impact fees and 50% by American Recovery Plan Act (ARPA) funds available to the Town. Improvements 2, 9, 10 and 11 will be funded 100% by impact fees. Improvement 8, as identified in Table 8-2 of the Sewer IIP, is the WRF expansion and is shown under the "Water Reclamation Facility (WRF)" heading.

Costs for a sewer master plan ($180,000) and the next impact fee study ($60,000), have also been included. **Table 14** indicates the water reclamation costs which are included in the water reclamation impact fee calculation.

[11] Based on a 20-year loan at 5% annual interest. See Appendix A for estimated principal and interest payments.

Table 14: Water Reclamation Impact Fee Costs

Project Description	Total Cost	% Fee Funded	$ Included
Water Reclamation Facility (WRF)			
WRF 2013 Principal and Interest	$ 34,527,164	50%	$ 17,263,582
WRF 2017A Principal and Interest	32,096,067	50%	16,048,033
WRF 2017C Principal and Interest	4,702,544	50%	2,351,272
WRF Loaned from Transportation Fund	2,400,000	50%	1,200,000
WRF Loaned from Water Fund	367,388	50%	183,694
WRF Loaned from Wastewater Fund	3,169,279	50%	1,584,640
WRF Expansion Principal and Interest	62,847,780	50%	31,423,890
Recharge Expansion Principal and Interest	6,427,056	50%	3,213,528
Subtotal: Water Reclamation Facility (WRF)	$ 146,537,278		$ 73,268,639
Collection System			
Improvement 1	$ -	100%	$ -
Improvement 2	325,297	100%	325,297
Improvement 3 [1]	2,745,062	50%	1,372,531
Improvement 4 [1]	3,066,315	50%	1,533,158
Improvement 5 [1]	1,696,982	50%	848,491
Improvement 6 [1]	3,034,513	50%	1,517,257
Improvement 7 [1]	3,371,261	50%	1,685,631
Improvement 9	3,034,513	100%	3,034,513
Improvement 10	5,809,844	100%	5,809,844
Improvement 11	4,500,690	100%	4,500,690
Subtotal: Collection System	$ 27,584,477		$ 20,627,411
Sewer Master Plan	$ 150,000	100%	$ 150,000
Impact Fee Study	60,000	100%	60,000
Total Water Reclamation Impact Fee Cost	**$ 174,331,755**		**$ 94,106,049**

Source(s): WRF Costs (per Town), WRF Expansion Costs (Sewer IIP Table 8-2 amortized 20 years @ 5%), Recharge Expansion Costs (Water IIP p. 25 amortized 20 years @ 5%), Collection System Costs (Sewer IIP Tables 8-2 and 8-3)

[1] 50% funded by ARPA Grant

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5.4. Water Reclamation Fees and Projected Revenue

Table 15 indicates the water reclamation impact fee calculation. The fee includes 50% of WRF costs in recognition of the fact that the facility serves as a source of renewable water supply in addition to its role in water reclamation. The remaining costs (Collection System and Other) relate specifically to water reclamation. The calculation also includes a credit for the impact fee fund balance in the water reclamation impact fee fund. This balance represents the difference between impact fees which have been collected to date and the costs which have been incurred and provides credit for funds collected in previous years in advance of the costs being incurred. To determine a cost per EDU, the calculation below segregates the costs which are incurred to serve existing and new customers (WRF) from those incurred to serve new development only (collection system, sewer master plan, new impact fee study).

The costs incurred to serve all customers are divided by total EDUs. As described above total EDUs represent the full capacity of the WRF (3 mgd), expressed on an EDU basis. The costs incurred to serve new customers only are divided by new EDUs only. The credit for the beginning balance is divided by new EDUs.

Table 15: Water Reclamation Fee per EDU

Description	System-Wide	Water Rec Share
WRF Costs		
WRF 2013 Principal and Interest	$ 34,527,164	$ 17,263,582
WRF 2017A Principal and Interest	32,096,067	16,048,033
WRF 2017C Principal and Interest	4,702,544	2,351,272
WRF Loaned from Transportation Fund	2,400,000	1,200,000
WRF Loaned from Water Fund	367,388	183,694
WRF Loaned from Wastewater Fund	3,169,279	1,584,640
WRF Expansion Principal and Interest	62,847,780	31,423,890
Recharge Expansion Principal and Interest	6,427,056	3,213,528
Subtotal: Water Reclamation Facility (WRF)	$ 146,537,278	$ 73,268,639
Divided by: Total EDUs		21,490
Equals: WRF Cost per EDU		**$ 3,409**
Collection System Costs		
Improvement 1	$ -	$ -
Improvement 2	325,297	325,297
Improvement 3	2,745,062	1,372,531
Improvement 4	3,066,315	1,533,158
Improvement 5	1,696,982	848,491
Improvement 6	3,034,513	1,517,257
Improvement 7	3,371,261	1,685,631
Improvement 9	3,034,513	3,034,513
Improvement 10	5,809,844	5,809,844
Improvement 11	4,500,690	4,500,690
Subtotal: Collection System	$ 27,584,477	$ 20,627,411
Divided by: New EDUs		9,267
Equals: Collection System Cost per EDU		**$ 2,226**
Sewer Master Plan	$ 150,000	$ 150,000
Impact Fee Study	$ 60,000	$ 60,000
Divided by: New EDUs		9,267
Equals: Impact Fee Study and Master Plan Cost per EDU		**$ 23**
Less: Balance on 8/23/2022	$ 6,144,392	$ 6,144,392
Divided by: New EDUs		9,267
Equals: Credit for Balance per EDU		**$ 663**
Water Reclamation Fee per EDU (WRF + Collection + IF Study - Balance)		**$ 4,995**
Source(s): Impact Fee Costs (Table 14), Balance on 8/23/2022 (per Town), EDUs (Table 13)		

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Table 16 indicates the maximum recommended water reclamation impact fees. The Town's fee structure is based on water meter size, with a 5/8" meter representing the size for a 1 EDU customer. The fee is scaled up based on the capacity of each larger meter size, relative to the 5/8" meter size based on meter flow equivalency ratios from the American Water Works Association (AWWA) and rounded to the nearest $1.

Table 16: Water Reclamation Impact Fees by Meter Size

Size	Ratio [1]	System-Wide
1 EDU	**1**	**$ 4,995**
Calculated Fee by Size (Rounded)		
5/8"	1	$ 4,995
3/4"	1.5	7,493
1"	2.5	12,488
1 1/2"	5	24,975
2"	8	39,960
3"	15	74,925
4"	25	124,874
6"	50	249,748
8"	80	399,597

Source(s): Fee per EDU (Table 15)

[1] AWWA Manual M1, 7th Edition p. 386

Table 17 illustrates the impact fee revenue that will be realized over the Study Period if development occurs at the pace identified in the Town's LUA report and Sewer IIP.

Table 17: Water Reclamation Impact Fee Revenue Projection

Year	System-Wide		Total Revenue
	EDUs [1]	Fee	
2023	931	$ 4,995	$ 4,650,345
2024	931	4,995	4,650,345
2025	931	4,995	4,650,345
2026	931	4,995	4,650,345
2027	931	4,995	4,650,345
2028	923	4,995	4,610,385
2029	923	4,995	4,610,385
2030	922	4,995	4,605,390
2031	922	4,995	4,605,390
2032	922	4,995	4,605,390
Total	**9,267**		**$ 46,288,665**

Source(s): Fee per EDU (Table 16), EDUs (Sewer IIP Table 7-1)

[1] EDUs spread equally from 2023-2027 and 2028-2032

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APPENDIX A

Debt Service Schedules

Appendix A1 – WRF Expansion Debt Service Schedule

Year	Principal	Interest	Total	Water Resources (50%)	Water Reclamation (50%)
1	$ 1,184,333	$ 1,958,056	$ 3,142,389	$ 1,571,195	$ 1,571,195
2	1,243,550	1,898,839	3,142,389	1,571,195	1,571,195
3	1,305,728	1,836,661	3,142,389	1,571,195	1,571,195
4	1,371,014	1,771,375	3,142,389	1,571,195	1,571,195
5	1,439,565	1,702,824	3,142,389	1,571,195	1,571,195
6	1,511,543	1,630,846	3,142,389	1,571,195	1,571,195
7	1,587,120	1,555,269	3,142,389	1,571,195	1,571,195
8	1,666,476	1,475,913	3,142,389	1,571,195	1,571,195
9	1,749,800	1,392,589	3,142,389	1,571,195	1,571,195
10	1,837,290	1,305,099	3,142,389	1,571,195	1,571,195
11	1,929,154	1,213,235	3,142,389	1,571,195	1,571,195
12	2,025,612	1,116,777	3,142,389	1,571,195	1,571,195
13	2,126,893	1,015,496	3,142,389	1,571,195	1,571,195
14	2,233,237	909,152	3,142,389	1,571,195	1,571,195
15	2,344,899	797,490	3,142,389	1,571,195	1,571,195
16	2,462,144	680,245	3,142,389	1,571,195	1,571,195
17	2,585,251	557,138	3,142,389	1,571,195	1,571,195
18	2,714,514	427,875	3,142,389	1,571,195	1,571,195
19	2,850,239	292,150	3,142,389	1,571,195	1,571,195
20	2,992,751	149,638	3,142,389	1,571,195	1,571,195
Total	$ 39,161,113	$ 23,686,667	$ 62,847,780	$ 31,423,890	$ 31,423,890

Source: Project Cost - Sewer IIP Table 8-2

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Appendix A2 – Recharge Basins Expansion Debt Service Schedule

Year	Principal	Interest	Total	Water Resources (50%)	Water Reclamation (50%)
1	$ 121,114	$ 200,238	$ 321,353	$ 160,676	$ 160,676
2	127,170	194,183	321,353	160,676	160,676
3	133,529	187,824	321,353	160,676	160,676
4	140,205	181,148	321,353	160,676	160,676
5	147,215	174,137	321,353	160,676	160,676
6	154,576	166,777	321,353	160,676	160,676
7	162,305	159,048	321,353	160,676	160,676
8	170,420	150,933	321,353	160,676	160,676
9	178,941	142,412	321,353	160,676	160,676
10	187,888	133,464	321,353	160,676	160,676
11	197,283	124,070	321,353	160,676	160,676
12	207,147	114,206	321,353	160,676	160,676
13	217,504	103,849	321,353	160,676	160,676
14	228,379	92,973	321,353	160,676	160,676
15	239,798	81,554	321,353	160,676	160,676
16	251,788	69,564	321,353	160,676	160,676
17	264,378	56,975	321,353	160,676	160,676
18	277,597	43,756	321,353	160,676	160,676
19	291,476	29,876	321,353	160,676	160,676
20	306,050	15,303	321,353	160,676	160,676
Total	$ 4,004,766	$ 2,422,290	$ 6,427,056	$ 3,213,528	$ 3,213,528

Source: Project Cost - Water IIP p. 25

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Impact Fee Program Update: Streets and Parks

Fausto Burruel, PE
Public Works Director

November 1, 2022

Background on Impact Fees

- Authorized under ARS §9-463.05
- Can only be used (and credits given) for new improvements, not maintenance
- Can NOT be used to improve existing deficiencies – only build equivalent level of service
- Must be for a proportionate share
- Must use current land use assumptions and infrastructure needs for a 10-year cycle
- Land use assumptions and infrastructure improvement plans shall be updated at least every five years

Streets Impact Fee Calculations

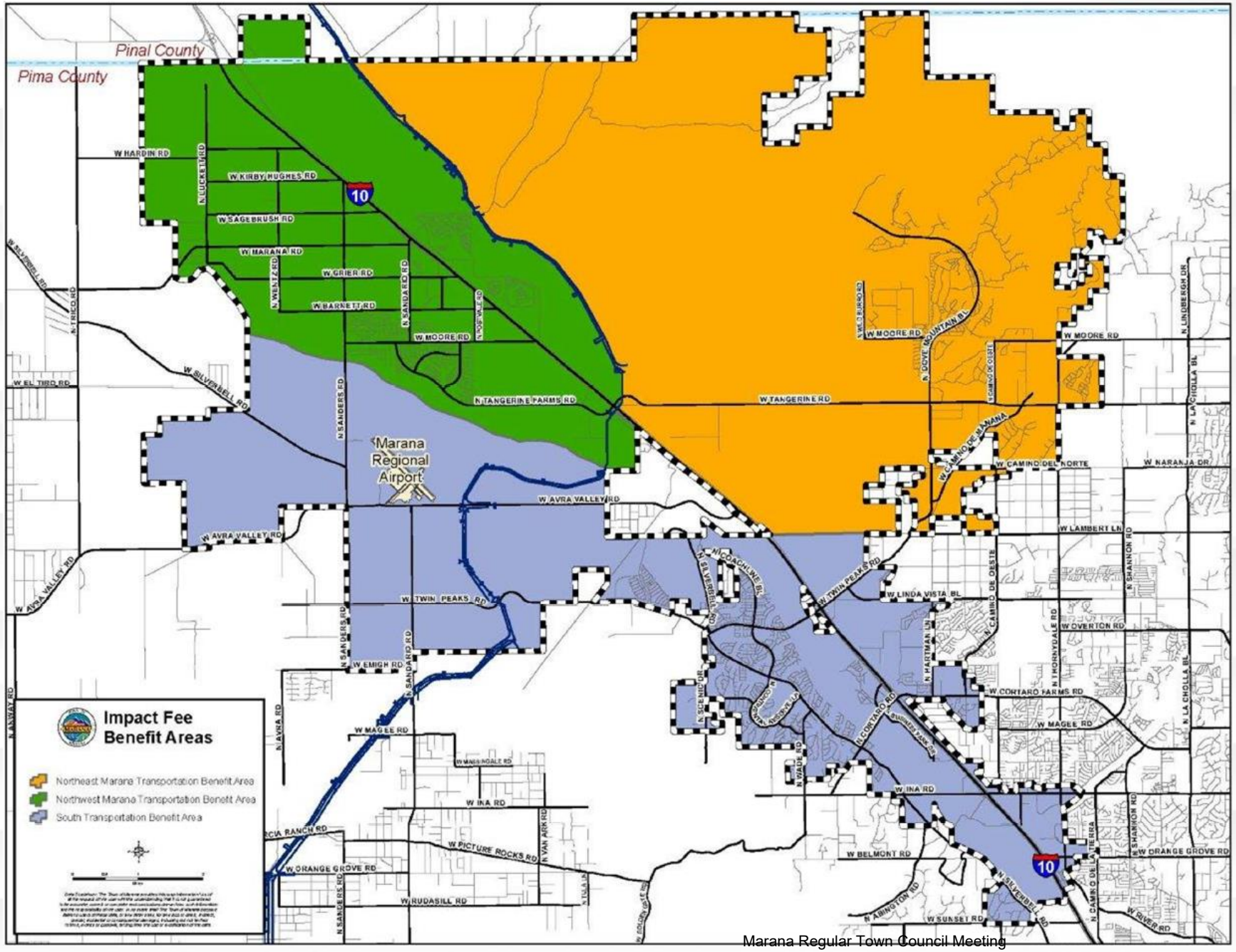
Impact Fee Calculations

1. Determine existing level of service and users of infrastructure
2. Calculate EDU relationships
3. Forecast growth in the next 10 years
4. Determine infrastructure needed to serve the future growth
5. Determine portion of infrastructure attributable to the growth = raw cost per EDU
6. Assign credits for concurrent revenues (if applicable)

Land Use Assumptions - 2022

10-year population and employment forecast

- **2017 Final Report**
  - 6,973 new residential units
  - 17,103 new population
  - 341 acres of commercial/industrial/office
  - 4,750 new jobs
- **2022 Final Report**
  - 13,942 new residential units (+99.9%)
  - 33,309 new population (+94.8%)
  - 439 acres of commercial/industrial/office (+28.7%)
  - 8,584 new jobs (+80.7%)



Streets Fee Service Areas

Boundaries set by:

1. Geographic features (I-10, CAP, Santa Cruz River)
2. Travel patterns

Projected Transportation Projects - Northwest

	Road Project	Limits		Project Type	Total Improvement Costs	Cost of Vehicular Improv (80%)	Cost of bike/ped improv (20%)	Cost Attributable to Develoment	Service Area Total
Northwest	Marana Main Street	Sandario Rd	Grier Rd	New	$ 3,255,000			$ 3,255,000	**$ 55,490,082**
	Marana Main Street	Tangerine Farms Rd	Sandario Rd	Legacy				$ 873,000	
	Tangerine Farms Road	I-10 (Tangerine TI)	Clark Farms	Legacy				$ 3,018,397	
	Clark Farms	Riccati Dr	Despain Dr	Legacy					
	Tangerine Farms Road	Clark Farms	I-10 (Marana TI)	New	$ 15,977,000			$ 7,484,400	
	Marana Road Interchange, Phase 1	N/A	N/A	Interchange Reconstruct	$ 6,753,000			$ 6,753,000	
	Clark Farms	Despain Dr	Lon Adams Rd	New	$ 4,520,000	$ 3,616,000	$ 904,000	$ 3,365,622	
	Clark Farms	Lon Adams Rd	Tangerine Farms Rd	New	$ 25,313,000			$ 11,774,700	
	Adonis Road	Grier Rd	Tangerine Rd	New	$ 20,601,000	$ 16,480,800	$4,120,200	$ 14,465,963	
	Tangerine Road Interchange	N/A	N/A	Interchange Reconstruct	$ 4,500,000			$ 4,500,000	

Projected Transportation Projects - Northeast

	Road Project	Limits		Project Type	Total Improvement Costs	Cost of Vehicular Improv (80%)	Cost of bike/ped improv (20%)	Cost Attributable to Develoment	Service Area Total
Northeast	Tangerine Road, Phase 1	Dove Mountain Blvd	Town Limits	Completed Capacity	$ 6,189,000	$ 4,951,200	$1,237,800	$ 1,896,029	**$ 27,896,288**
	Tangerine Road, Phase 2	I-10 (Tangerine TI)	Dove Mountain Blvd	Improvement	$ 42,537,000	$ 34,029,600	$8,507,400	$ 13,936,211	
	Twin Peaks Road	Lambert Ln	Tangerine Rd	Completed Capacity				$ 3,642,259	
	Moore Road	Camino De Oeste	Thornydale Rd	Completed Capacity				$ 291,788	
	Cayton Road	Dove Mountain Blvd	Thornydale Rd	New	$ 6,630,000			$ 6,630,000	
	Tangerine Road Interchange	N/A	N/A	Interchange Reconstruct	$ 1,500,000			$ 1,500,000	

Projected Transportation Projects - South

	Road Project	Limits		Project Type	Total Improvement Costs	Cost of Vehicular Improv (80%)	Cost of bike/ped improv (20%)	Cost Attributable to Develoment	Service Area Total
South	Twin Peaks Interchange	N/A	N/A	Legacy				$ 3,757,886	$ 27,237,473
	Twin Peaks Road	I-10	Lambert Ln	Legacy					
	Twin Peaks Road/Rattlesnake Pass	Saguaro Highlands Dr	Silverbell Rd	Expansion	$ 18,001,838	$ 14,401,470	$3,600,368	$ 7,506,111	
	Cortaro Road	I-10	Camino de Oeste	Completed Capacity	$ 8,134,735	$ 6,507,788	$1,626,947	$ 2,319,081	
	Silverbell Road	Ina Rd	Cortaro Rd	Completed Capacity	$ 21,068,682	$ 16,854,946	$4,213,736	$ 8,023,017	
	Ina Road	I-10	Silverbell Rd	Completed Capacity	$ 9,000,000	$ 7,200,000	$1,800,000	$ 3,006,062	
	Silverbell Road	Ina Rd	Sunset Rd	Expansion	$ 8,013,159	$ 6,410,527	$1,602,632	$ 2,625,316	

Summary of Infrastructure Costs

Service Area	Projects	Population Growth	Development's Proportionate Share ($M)
Northwest	10	15,190	$55.5
Northeast	6	11,718	$27.9
South	7	6,506	$27.2
TOTAL	**23**	**33,414**	**$110.6**

Final Fee Process

1. The Infrastructure Improvement Plan (IIP) determines what infrastructure is required due to projected growth, but infrastructure provided likely yields more capacity than what is needed.
2. The Fee study determines the proportional cost per EDU. This sets the Raw Impact Fee.
3. The Fee study must also take into account other revenues that the Town receives and credit them against the Raw Impact Fee. This creates the Base Impact Fee which is what is published as the "Impact Fee".
4. Should a developer build infrastructure that is part of the original IIP, the cost of that infrastructure is also credited against the Base Impact Fee.

Construction Sales Tax Credit – NE Area Streets Example

1. The Town charges a 4% construction sales tax and normally a 2% retail sales tax. State law requires the Town to credit the difference against impact fees.
2. The State formula for construction sales tax assumes 65% of a construction charge is for materials and 35% is for labor. The Tax only applies to materials.
3. The Town uses the same International Code Council cost per square foot table used in building permit fee valuation to also determine impact fee valuation.

State Formula

(65% x 10.1%)/(1+(65% x 10.1%)) x (4%/10.1%) x ((4%-2%)/4%) = 1.2199%

NE Area Retail Example, ICC cost per sf = $137.88, raw impact fee = $7,393 per 1,000sf

$137.88/sf x 1000sf x 1.2199% = $1,683 ($1,583 – Streets, $100 – Parks) reduction from raw fee $7,393 - $1,583 = $5,810 per 1,000sf base fee

Summary of Streets Facilities Fees

Land Use Category	Unit	EDUs per Unit	Raw Fees*			Construction Sales Tax**	Base Fees***		
			Northwest	Northeast	South		Northwest	Northeast	South
Residential									
Single Family Residential	Dwelling Unit	1.0	$ 5,682	$ 8,215	$ 8,235	$ 3,476	$ 2,206	$ 4,739	$ 4,759
Multi-Family	Dwelling Unit	0.6	$ 3,409	$ 4,929	$ 4,941	$ 1,392	$ 2,017	$ 3,537	$ 3,549
Hotel/Motel	Rooms	0.5	$ 2,841	$ 4,107	$ 4,118	$ 1,095	$ 1,746	$ 3,012	$ 3,023
Congregate Care	Dwelling Unit	0.2	$ 1,136	$ 1,643	$ 1,647	$ 1,060	$ 76	$ 583	$ 587
Single Family Residential (age restricted	Dwelling Unit	0.4	$ 2,273	$ 3,286	$ 3,294	$ 3,476	N/A	N/A	N/A
Multi-Family Residential (age restricted	Dwelling Unit	0.3	$ 1,705	$ 2,464	$ 2,471	$ 1,392	$ 313	$ 1,072	$ 1,079
Retail and Services ****									
< 15,000 sf	1000 sf	0.9	$ 5,114	$ 7,393	$ 7,412	$ 1,583	$ 3,531	$ 5,810	$ 5,829
>15,000 sf	*Total fee for first 15,000 sq ft:*						$ 52,965	$ 87,150	$ 87,435
	1000 sf	1.4	$ 7,955	$ 11,500	$ 11,529	$ 1,583	$ 6,372	$ 9,917	$ 9,946
High Traffic Retail	1000 sf	1.9	$ 10,796	$ 15,608	$ 15,647	$ 2,186	$ 8,610	$ 13,422	$ 13,461
Industrial	1000 sf	0.4	$ 2,273	$ 3,286	$ 3,294	$ 2,186	$ 87	$ 1,100	$ 1,108
General Office	1000 sf	0.8	$ 4,546	$ 6,572	$ 6,588	$ 2,186	$ 2,360	$ 4,386	$ 4,402
Medical Facility	1000 sf	1.1	$ 6,250	$ 9,036	$ 9,059	$ 4,687	$ 1,563	$ 4,349	$ 4,372
Institutional	1000 sf	0.3	$ 1,705	$ 2,464	$ 2,471	$ 2,468	N/A	N/A	$ 3
Recreation	1000 sf	0.3	$ 1,705	$ 2,464	$ 2,471	$ 2,240	N/A	$ 224	$ 231

Parks Impact Fee Calculations

Approved Infrastructure Improvement Plan Parks

Project	Development Cost
El Rio Disc Golf Course	$288,334.00
El Rio Recreation Area - Loop Access Parking Lot	$204,237.00
Gladden Farms Baseball Field Improvements	$660,765.00
Gladden Farms Lighted Soccer Fields	$286,636.00
Tortolita Preserve Trailhead, Trails, and Fencing	$156,181.00
Honea Heights Park - Phase 2 Improvements	$1,261,461.00
Continental Ranch Park to Loop Extension	$420,487.00
New Competition Swimming Pool (50 Meter)	$3,934,557.00
Ora Mae Harn Park Facility Expansion	$1,784,066.00
Saguaro Bloom Park - Phase 1	$1,600,375.00
Saguaro Bloom Park - Phase 2	$4,805,566.00
Gladden Farms Bike Park	$1,201,391.00
Twin Peaks Park District Park - Land Acquisition and Phase 1 Development	$17,415,052.00
Mandarina Community Park	$7,568,766.00
Impact Fee Study	$60,000.00
Total	**$41,467,945.00**
Amount Funded by Parks Impact Fee	**$34,666,423.00**
Amount Funded by Construction Sales Tax Credits	**$6,801,522.00**

Summary of Base Park Impact Fees

Residential		
Single Family Residence (1 EDU)	$2,529.63	Per Dwelling Unit
Multi-Family Residential Unit (.67 EDU)	$1,694.85	Per Dwelling Unit
Non-Residential		
Retail	$224.00	Per 1,000 S.F.
High Traffic Retail	$870.00	Per 1,000 S.F
Office	$285.00	Per 1,000 S.F.
Hotel	$9.00	Per 1,000 S.F.
Industrial	$288.00	Per 1,000 S.F.
Medical	$288.00	Per 1,000 S.F.

Proposed Base Impact Fees

Single Family Residential	2017 Study/Current	2022 Proposed
Northwest Streets	$3,719	$2,206
Northeast Streets	$4,291	$4,739
South Streets	$4,327	$4,759
Parks	$2,461	$2,530

Questions/Discussion

Summary of Timeline

5/13/2022	Publication of Draft LUA and IIP's
6/23/2022	Stakeholder Outreach Meeting
8/3/2022	Public Hearing for LUA and IIP's
9/20/2022	Council Action on LUA and IIP's
9/23/2022	Notice of Intent to Implement Impact Fees
11/1/2022	Public Hearing for Impact Fees
12/6/2022	Council Action for Impact Fees
2/20/2023	Impact Fees Effective (min 75 days from council action)

Council-Regular Meeting **A3**

Meeting Date: 11/01/2022

To: Mayor and Council

From: Curry C. Hale, Human Resources Director

Date: November 1, 2022

Strategic Plan Focus Area:
Vibrant Community

Strategic Plan Focus Area Additional Info:
We will maintain and enhance our reputation as a safe and well-planned community.

a. Identify participants and ensure that staff receives training
b. Establish and maintain regional partnerships for emergency response and disaster recovery

Subject: Resolution No. 2022-116: Relating to Emergency Management; approving and authorizing implementation of the 2022 Pima County Multi-Jurisdictional Hazard Mitigation Plan (Curry C. Hale)

Discussion:

The proposed Pima County Multi-Jurisdictional Hazard Mitigation Plan was prepared by the Pima County Office of Emergency Management (PCOEM) along with the Town of Marana, the Town of Oro Valley, the Town of Sahuarita, the City of Tucson, and the Pascua Yaqui Tribe, as well as interested public, appointed representatives and elected officials of these jurisdictions. The Plan has been approved by FEMA and each of the participating jurisdictions is now empowered to formally adopt the Plan on behalf of their respective jurisdictions.

This 2022 update to the Plan was a countywide effort that included a revision and update of the previous plan, the integration of new components to the plan, and incorporation of new participants into the planning process. A multi-jurisdictional Planning Team was assembled to conduct the review of the 2017 plan, which was adopted by the Town, to evaluate its efficacy over the last five years, and to propose revisions for the 2022 plan. PCOEM served as the lead planning agency for the process, with support from the Arizona Department of Emergency and Military Affairs (ADEMA).

Each year in the United States, disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event." The goal of risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre- and post-disaster environments. This is achieved through regulations, local ordinances, land use, and building practices and mitigation projects that reduce or eliminate long-term risk from hazards and their effects.

Hazard mitigation planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies to lessen impacts are determined, prioritized, and implemented. The Plan identifies relevant hazards and risks, and identifies the strategy that will be used to decrease vulnerability and increase resiliency and sustainability.

This Plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 and the implementing regulations set forth in the Federal Register (DMA2K) which require that a community have an approved hazard mitigation plan in order to qualify for federal funding from grant programs, including the following programs:

- Pre-Disaster Mitigation Competitive (PDM-C)
- Hazard Mitigation Grant Program (HMGP)
- Flood Mitigation Assistance (FMA)

Information in this Plan will be used to help guide and coordinate mitigation activities and decisions for future land use. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting structures, reducing exposure and minimizing overall community impacts and disruption. The community has been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for federal funding. In the future, climate variability could affect the outcome of hazards by either reducing or increasing disaster impacts. This plan will attempt to address potential variables in each of the hazards addressed.

Approval of the Town's participation in the Pima County Multi-Jurisdictional Hazard Mitigation Plan fulfills requirements established through the Federal Disaster Mitigation Act of 2000 that the Town have a FEM approved hazard mitigation plan to be eligible for federal disaster mitigation funds. Staff does not anticipate incurring significant costs associated with the approval of this plan that are not already included in the approved budget of the respective department(s).

Staff Recommendation:

Staff recommends approval of the Plan.

Suggested Motion:

I move to adopt Resolution No. 2022-116, approving and authorizing implementation of the 2022 Pima County Multi-Jurisdictional Hazard Mitigation Plan.

Attachments

Resolution No. 2022-116

Exhibit A to Resolution

MultiJurisdictionalHazardMitigationPlanSep2022

MARANA RESOLUTION NO. 2022-116

RELATING TO EMERGENCY MANAGEMENT; APPROVING AND AUTHORIZING IMPLEMENTATION OF THE 2022 PIMA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS the 2022 Pima County Multi-Jurisdictional Hazard Mitigation Plan (the "Plan") was prepared by the Pima County Office of Emergency Management, along with the Town of Marana, the Town of Oro Valley, the Town of Sahuarita, the City of Tucson, and the Pascua Yaqui Tribe; and

WHEREAS the Plan was prepared pursuant to the requirements of the Disaster Mitigation Act of 2000 and the implementing regulations set forth in the Federal Register which require that a community have an approved hazard mitigation plan in order to qualify for federal grant funding for emergency management and disaster relief; and

WHEREAS information in this Plan will be used to help guide and coordinate mitigation activities and decisions for future land use and to help reduce the cost of disaster response and recovery to the community and its property owners by protecting structures, reducing exposure, and minimizing overall community impacts and disruption; and

WHEREAS the Mayor and Council of the Town of Marana find that this resolution is in the best interests of the Town of Marana and its citizens.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE TOWN OF MARANA, that the 2022 Pima County Multi-Jurisdictional Hazard Mitigation Plan attached to this resolution as Exhibit A is hereby approved.

IT IS FURTHER RESOLVED that the Town Manager and staff are hereby directed and authorized to undertake all other and further tasks required or beneficial to implement the Plan.

PASSED AND ADOPTED by the Mayor and Council of the Town of Marana, Arizona, this 1st day of November, 2022.

_____
Mayor Ed Honea

ATTEST:

_____
David L. Udall, Town Clerk

APPROVED AS TO FORM:

_____
Jane Fairall, Town Attorney

Pima County Multi-Jurisdictional Hazard Mitigation Plan 2022

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SECTION 1: INTRODUCTION

1.1 Purpose

The purpose of the Plan is to identify natural hazards that impact the various incorporated jurisdictions located within Pima County, assess the vulnerability and risk posed by those hazards to community-wide human and structural assets, develop strategies for mitigation of those identified hazards, present future maintenance procedures for the plan, and document the planning process.

Pima County and all the incorporated Cities and Towns are political subdivisions of the State of Arizona and are organized under Title 9 (cities/towns) and Title 11 (counties) of the Arizona Revised Statutes. This Pima County Multi-Jurisdictional Hazard Mitigation Plan was prepared by the Pima County Office of Emergency Management (PCOEM) and the listed participating jurisdictions, along with interested public, appointed representatives, and elected officials of these jurisdictions. Accordingly, each of the participating jurisdictions is empowered to formally plan and adopt the Plan on behalf of their respective jurisdictions.

1.2 Background and Scope

Each year in the United States, disasters take lives, cause injury, and damage human-made items. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters because additional expenses to insurance companies and nongovernmental organizations are not reimbursed by tax dollars. Many disasters are predictable, and much of the damage caused by these events can be alleviated or even eliminated.

Hazard mitigation is defined by FEMA as "any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event. The goal of risk reduction is to reduce the risk to life and property, which includes existing structures and future construction, in the pre- and post-disaster environments. This is achieved through regulations, local ordinances, land use, and building practices and mitigation projects that reduce or eliminate long-term risk from hazards and their effects."

Hazard mitigation involves the whole community and is one of the phases of a comprehensive emergency management program. FEMA encourages the Whole Community approach to mitigation, prevention, protection, response, and recovery activities. The vision of Whole Community, includes engagement with local, tribal, state, and federal emergency management entities, academia, non-governmental organizations, community members, and the private sector in all phases of emergency management.

Hazard mitigation planning is the process of identifying natural hazards likely to occur in a geographic location, measuring threat probability, analyzing the risk, setting mitigation goals and strategies to lessen impacts to the community associated, and implementing actions. This Plan documents the planning process employed by the planning teams for Pima County's Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The Plan reflects hazards, risks, and strategies identified by the Whole Community.

Examples of hazard mitigation strategies include, but are not limited to the following:

- Development of mitigation standards, regulations, policies, and programs
- Land use/zoning policies
- Building code and floodplain management regulations
- Dam safety program and levee systems
- Acquisition of flood-prone and environmentally sensitive lands.
- Retrofitting/hardening/elevating structures and critical facilities
- Relocation of structures, infrastructure, and facilities out of vulnerable areas
- Public awareness/education campaigns
- Improvement of warning and evacuation systems

This Plan was prepared according to the requirements of the Disaster Mitigation Action of 2000 (hereafter, these requirements will be referred to collectively as the DMA2K). While the act emphasized the need for mitigation plans and coordinated mitigation planning and implementation efforts, the regulations established the requirements that hazard mitigation plans must meet to be eligible for certain federal disaster assistance and hazard mitigation funding under the Robert T. Stafford Relief and Emergency Act.

Currently, four FEMA grant programs provide funding to local entities that have a FEMA-approved local mitigation plan that meets federal hazard mitigation plan requirements. Two of the grant programs are authorized under the Stafford Act. The remaining two programs are authorized under the National Flood Insurance Act and the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act.

The grant programs available include:

- Hazard Mitigation Grant Program (HMGP)
- The Building Resilient Infrastructure and Communities (BRIC) Program [formerly Pre-Disaster Mitigation (PDM)]
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims Program (RFC)

Information in this Plan will be used to help guide and coordinate mitigation activities and decisions for future land use. Proactive mitigation planning will help reduce the cost of disaster response and recovery to the community and its property owners by protecting structures, reducing exposure, and minimizing overall community impacts and disruption. The community has been affected by hazards in the past and is thus committed to reducing future disaster impacts and maintaining eligibility for Federal funding. In the future, climate variability could affect the outcome of hazards by either reducing or increasing disaster impacts. This plan will attempt to address potential variables in each of the hazards addressed.

This is a multi-jurisdictional plan that geographically covers the participating communities within the Pima County boundaries (hereinafter referred to as the planning area). The following jurisdictions participated in the planning process:

- Pima County (Unincorporated)
- Town of Marana
- Town of Oro Valley
- Town of Sahuarita
- City of Tucson
- Pascua Yaqui Tribe

1.3 Tribal Assurance

The Pascua Yaqui Tribe is a federally recognized tribe, organized and established as a sovereign nation pursuant to the provisions of the Indian Reorganization Act of June 18, 1934. The Pascua Yaqui Tribe achieved federal recognition as an established tribe on September 18, 1978 and became recognized as a historic tribe in 1994.

The Pascua Yaqui Tribe will comply with all applicable Federal Statutes and regulations during the periods for which it receives grant funding, in compliance with DMA 2000 requirement §201.7(c)(6), and will amend its plan whenever necessary to reflect changes in tribal or Federal laws and statutes as required.

1.4 Plan Organization

This Plan is organized as follows:

- Section 1: Introduction
- Section 2: Community Descriptions
- Section 3: Planning Process
- Section 4: Risk Assessment
- Section 5: Mitigation Strategy
- Section 6: Plan Maintenance

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SECTION 2: COMMUNITY DESCRIPTIONS

2.1 County Overview

History

Pima County is unique for being one of the oldest continuously inhabited areas of the United States. Originally named for the Native American tribe inhabiting the area, evidence of human settlement in Pima County dates back over 9,000 years with Native Americans have lived here from ancient times to the present. The Tohono O'odham Nation has lived in this region from their Hohokam ancestors to contemporary times and concentrated along the Santa Cruz and Gila Rivers. The Tohono O'odham reservation that covers almost half of Pima County is the second-largest in Arizona. The arrival of the Spanish in the 1690s marked the first European peoples to establish settlements in the area. Missionary and explorer Father Eusebio Francisco Kino established the San Xavier del Bac mission. Throughout the 1700s, the Spanish continued to settle throughout southern Arizona. In 1775, the Tucson Presidio was built to protect settlers from raiding tribes of Apaches. Residents of the fort began to refer to it as the "Old Pueblo", which remains today as a nickname for Tucson

Pima County was created in 1864 and included all of southern Arizona acquired from Mexico by the Gadsden Purchase. It is the second-largest of the four original counties. Over time, portions of Pima County were carved off to create Maricopa, Pinal, Cochise, and Graham Counties.

Development began to flourish around the middle of the 18th century when silver and gold were discovered in the geographical area and the arrival of prospectors from Mexico. With the expansion of mining and ranching in the late 1800s, Pima County continued to witness increasing populations as new residents migrated to the Tucson region settling in proximity to major transportation corridors. Slowly, development moved eastward from Tucson until abutting with federally owned land resulting in a trend reversal with new growth occurring to the northwest. In the 1960s the county flourished due to the copper industry, and by the 1970s, the industry was responsible for the employment of almost 9,000 people.

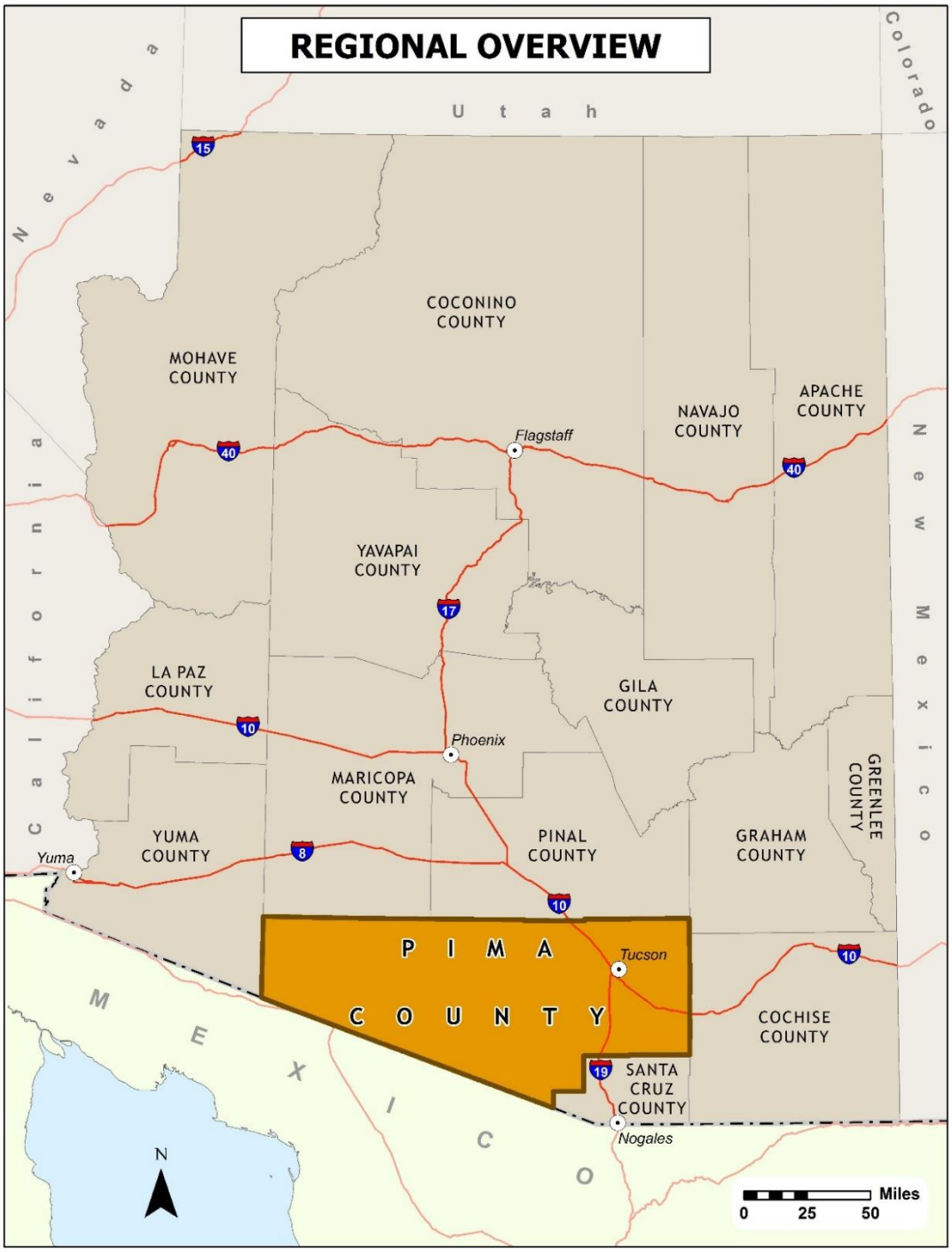
According to recent 2020 data, Pima County has a population of around 1,043,433, with a projected population increase to 1.4 million by 2041. Pima County is multi-culturally diverse and unique in the sense that it is a very urbanized county, with more than one-third of the population living outside of any incorporated cities or towns. The county seat of Pima County is Tucson, where most of the population is located. Tucson is a major commercial and academic hub, and is home to the University of Arizona, Pima Air & Space Museum, and the Arizona-Sonora Desert Museum.[1]

Geography

Pima County is in southern Arizona and encompasses 9,184 square miles, which is roughly equal in area to the states of Rhode Island and Connecticut combined. Pima County shares a 120-mile border in common with Mexico. Pima County lies within the Basin and Range Physiographic Province, characterized by northwest-trending mountain ranges separated by alluvial basins. Separated by the Tucson and Sierrita Mountains, a large portion of Pima County lies in two alluvial basins: Avra Valley to the west and the Tucson basin to the east. The regional drainage network, primarily formed by the Santa Cruz River and its tributaries, is dry for most of the year except during the spring runoff or from heavy storms.

Varying in elevation from desert valleys at roughly 1,200 feet to the 9,185-foot peak of Mount Lemmon, the county is home to diverse plant and animal communities. Numerous mountain ranges ring the Tucson basin, including the Santa Catalina, Rincon, Empire, Santa Rita, Sierrita, and Tucson mountains. Two cactus forests traverse the county – Saguaro National Park to the northeast and Organ Pipe Cactus National Monument in the southwestern portion. In addition, the county is home to the Cabeza Prieta National Wildlife Refuge nestled along the western boundary of the county and the Coronado National Forest in the eastern portion of the county within the Santa Catalina Mountains.

[1] Source: http://webcms.pima.gov/government/about_pima_county/, 2021



Source: Pima County GIS, 2021

Figure 2-1: Regional Overview

The geographical characteristics of Pima County have been mapped into the following three terrestrial ecoregions:

- **Chihuahuan Desert** – this ecoregion is typical of the high-altitude deserts and foothills and is found in much of the southeastern portion of Arizona. Elevations in this zone vary between 3,000-4,500 feet. The average temperatures for the Chihuahuan Desert tend to be cooler than the Sonoran Desert due to the elevation differences. However, like its lower elevation cousin, the summers are hot and dry interspersed with varying amounts of summer monsoon rainfall. Winters are mild to cool, relatively dry but interspersed with some widespread seasonal rainfall.
- **Sierra Madre Occidental Pine-Oak Forest** – this ecoregion is predominant in mountainous regions in southeast Arizona with elevations generally above 5,000 feet. The average temperatures tend to be cool during the summer and cold in winter.
- **Sonoran Desert** – this ecoregion is an arid environment that covers much of southwestern Arizona. The elevation varies in this zone from approximately sea level to 3,000 feet. Vegetation in this zone is comprised mainly of Sonoran Desert Scrub and is one of the few locations in the world where saguaro cactus can be found. The climate is typically hot and wet during the summer and mild during the winter with a very dry spring and fall.

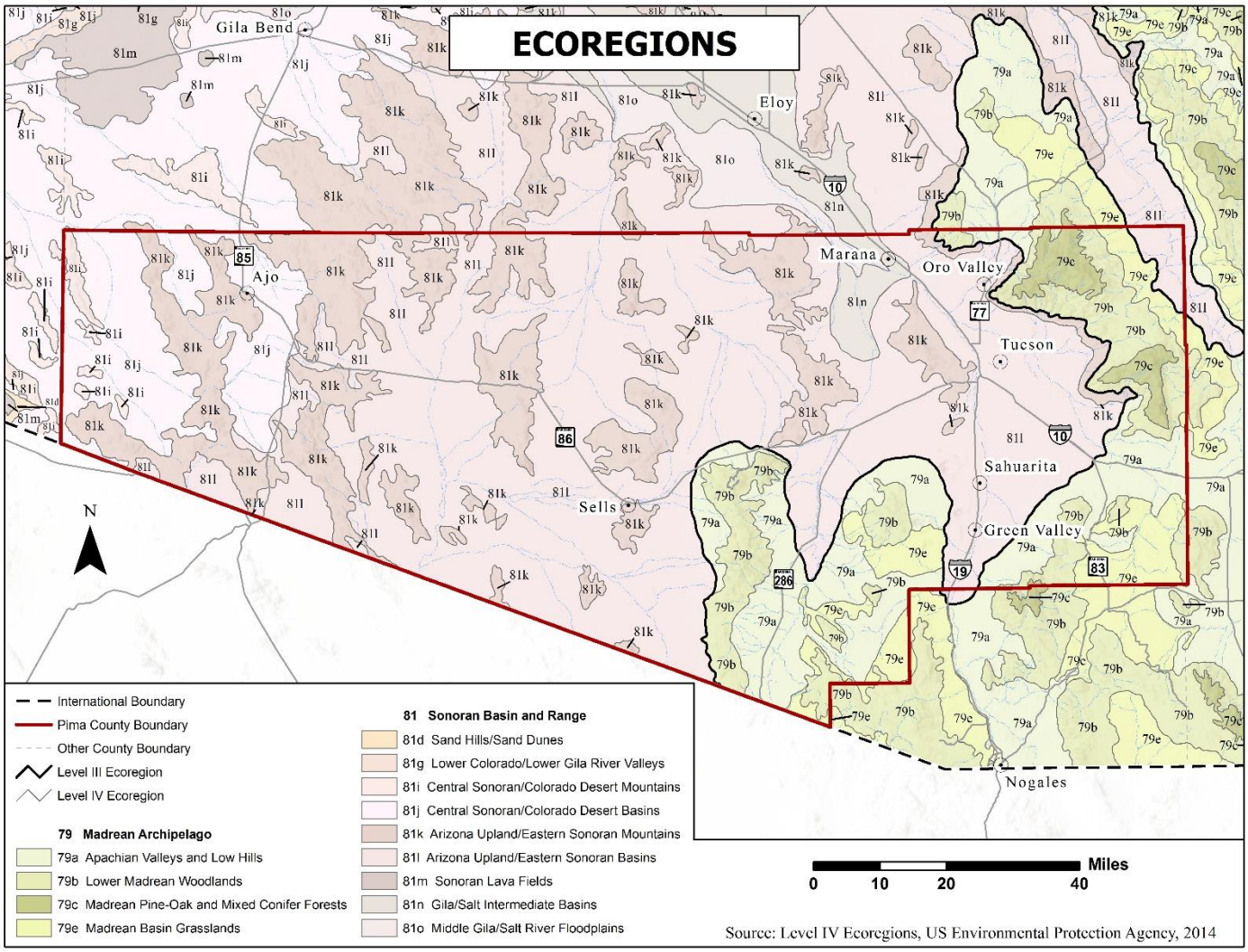
Land ownership within Pima County is divided between Native American tribal lands (42%), Private (12%), U.S. Forest Service and Bureau of Land Management (12%), State Trust Land (14%), and other public lands (20%).[2]

Government

The governmental and administrative affairs of the unincorporated areas of Pima County are directed by a five-member Board of Supervisors with each member elected from a designated district. Because of Arizona's constitutional provisions and the requirements promulgated by Arizona Revised Statutes, the government of Pima County is organized to have a direct and indirect relationship with the Board of Supervisors. The Board of Supervisors has direct control over the county's general government functions including community services; indigent defense; medical, health, and welfare services; and public works functions. These broad functions include the county's internal governmental administrative/management activities; maintenance and construction of the county's sewerage and sanitation infrastructures; county streets, roads, and bridges which comprise the county's transportation infrastructure; natural resources, parks, community centers, recreational facilities and libraries (in cooperation with the City of Tucson); and numerous clinics. Indirect relationships are maintained with the elected officials. The Board of Supervisors appoints a County Administrator to be responsible for the general direction, supervision, administration, and coordination of all affairs of the county.

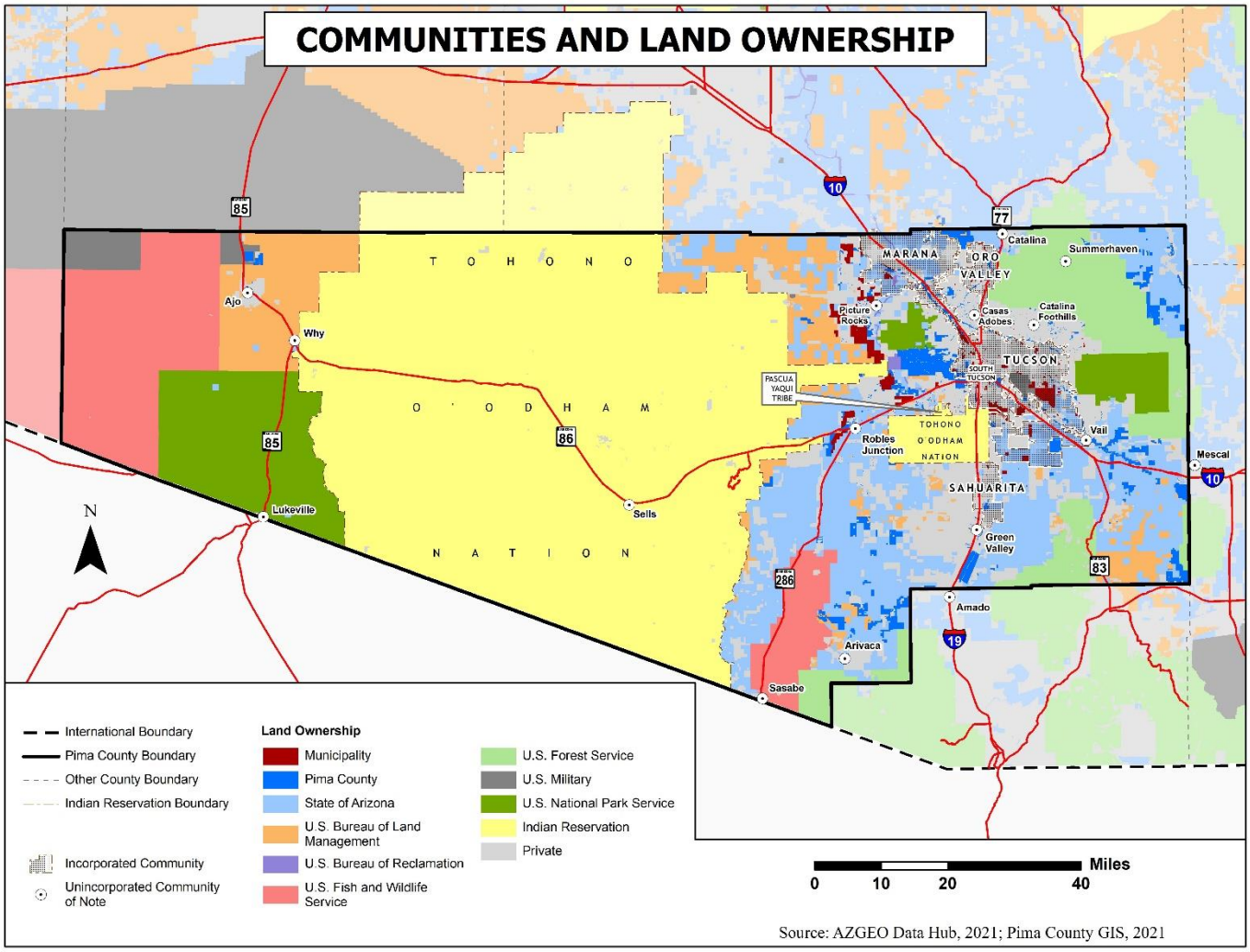
Each of the five municipalities in the county (Town of Marana, Town of Oro Valley, Town of Sahuarita, City of South Tucson, and the City of Tucson) are governed by a mayor and council form of government. An elected tribal council governs the Pascua Yaqui Tribe. Each of the municipalities and the tribal community are described in more detail in Section 2.2 below.

[2] Source: Pima County Geographic Information Systems, 2021



Source: Pima County GIS, 2021

Figure 2-2: Ecoregions



Source: Pima County GIS, 2021

Figure 2-3: Community Location and Land Ownership

Geology

Pima County is comprised of complex geology reflective of a history of faulting and folding of the earth's crust. The mountains include sedimentary, metamorphic volcanic, or intrusive igneous rock, or a combination of the three. The alluvial basins consist of well-consolidated sediments eroded from the surrounding mountain ranges with caliche, or hardpan, underneath. Caliche is formed as calcium carbonate and deposited within the soil through water seepage.

Transportation

As shown in Figure 2-4, several major roadways support both local and interstate transportation needs. I-10 provides connectivity with the Phoenix metropolitan area to the north and I-19 with Mexico to the south. Several other State and US highways, most notably State Highways 85 and 86, coupled with Federal Indian Routes provide local and regional access throughout southern Arizona. Pima County is host to four municipal airports providing commercial and general aviation services to the region. In addition, the county is home to the Davis-Monthan Air Force Base in Tucson.

Climate

For the majority of Pima County, the climate is typical of the Sonoran Desert areas of the state and is characterized by abundant sunshine, a long summer, mild winter, low average annual precipitation, relatively low humidity, and generally light winds. In the relatively small areas of the county above 4,000 feet mean sea level, the climate tends to be more moderate. Climatic statistics for weather stations within Pima County are produced by the Western Region Climate Center and span records dating back to the early 1900s. [1].

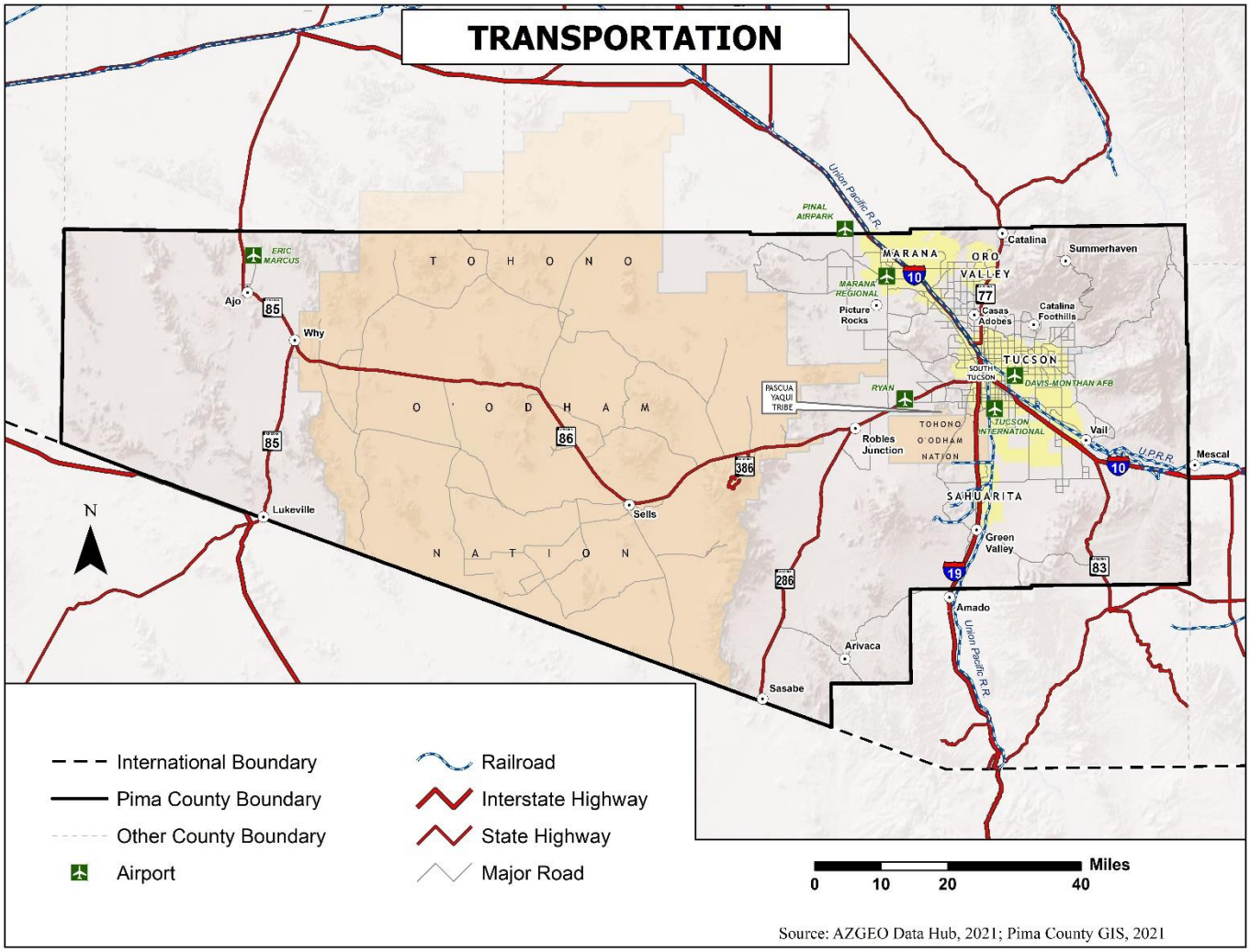
Table 2-1 lists some partial climate statistics for several of the weather stations located within the county. Average temperatures within Pima County range from near freezing during the winter months to over 100°F during the hot summer months. The severity of temperatures in either extreme is highly dependent upon the location, and more importantly the altitude, within the county. For instance, temperature extremes in the foothill communities will generally be about 10°F less than those in valley communities.

Table 2-1: Climate Statistics for Stations in Pima County

Location	Average Temperature (F)				Precipitation (inches)		
	January		July				Total Annual Average
	Min	Max	Min	Max	Wettest Month	Driest Month	
Ajo	41.6	64.2	77.8	103	1.90 (August)	0.07 (May)	8.37
Cascabel	30.0	64.8	65.3	99.2	2.59 (August)	0.31 (May)	13.33
Kitt Peak	33.0	49.6	60.8	80.4	4.53 (August)	0.44 (May)	23.16
Sabino Canyon	37.1	66.4	72.4	101.9	2.41 (August)	0.19 (May)	12.73
Green Valley/Sahuarita	37.0	67.7	73.6	98.8	3.23 (July)	0.21 (May)	13.42
Sells	36.9	66.0	72.1	101.1	2.58 (July)	0.15 (May)	11.76
Tucson Magnetic Observatory	34.2	64.8	71.3	100.5	2.25 (August)	0.24 (May)	12.62
Tucson, University of Arizona	37.6	65.5	73.9	100.1	2.15 (August)	0.18 (May)	11.5

Note: Period of record varies by station but generally spans from the early 1900's to 2010. Sabino Canyon 1941-2002. Green Valley 1988-2016 is near Sahuarita.
Source: Western Regional Climate Center, 2021.

[1] Most of the data provided and summarized here is taken from the WRCC website beginning at the following URL: https://wrcc.dri.edu/summary/Climsmaz.html



Source: Pima County GIS, 2021

Figure 2-4: General Location and Transportation

Precipitation throughout Pima County is governed largely by elevation and season of the year. From November through March, storm systems from the Pacific Ocean cross the state as broad winter storms producing mild precipitation events and snowstorms at the higher elevations. Summer rainfall begins early in July and usually lasts until mid-September. Moisture-bearing winds move into Arizona at the surface from the southwest (Gulf of California) and aloft from the southeast (Gulf of Mexico). The shift in wind direction, termed the North American Monsoon, produces summer rains in the form of thunderstorms that result largely from excessive heating of the land surface and the subsequent lifting of moisture-laden air, especially along the primary mountain ranges. Thus, the strongest thunderstorms are usually found in the mountainous regions of the central southeastern portions of Arizona. These thunderstorms are often accompanied by strong winds, blowing dust, and infrequent hailstorms.[1]

Wind speeds are similar across Arizona, averaging approximately 6-9 miles per hour annually. Pima County generally experiences average wind speeds at approximately 8 mph. However, significant variations can exist throughout the year, as a consequence of extreme changes in topography in the area. The surrounding mountains and topography of the region influence wind velocities and directions in the Tucson basin.

Population

As of April 1, 2020, 1,043,433 residents call Pima County home.[2] Most of the citizens still live in the incorporated communities or reservation portion of Pima County. The largest community is the City of Tucson. The two incorporated cities and three towns are geographically located in the eastern portion of Pima County.

Table 2-2: Population Estimates

Jurisdiction	2010	2015	2020
Pima County	981,168	1,009,371	1,043,433
Town of Marana*	35,051	41,655	51,908
Town of Oro Valley	40,984	43,499	47,070
Pascua Yaqui Tribe (Pascua Pueblo Reservation)	3,745	8,831**	6,782***
Town of Sahuarita	25,259	27,637	34,134
City of South Tucson	5,672	5,712	5,701
Tohono O'odham Nation	9,051	Not reported	Not Reported
City of Tucson	520,795	529,845	542,629
Unincorporated County	353,319	361.023	367,904

2010 Pascua Yaqui Tribe and Tohono O'odham Nation estimates from 2010 Census Block data
2010 2015, 2021 data from AZDOA: https://population.az.gov/population-estimates
*A portion of Marana is in Pinal County
** Provided by Pascua Yaqui Tribe and current as of September 2016
***Provided by Pascua Yaqui Tribe and current as of September 2021

Economy

The metropolitan Tucson area is the center of economic activity for the county. As of September 2021, the countywide labor force was estimated at 491,351 with an unemployment rate of 4.2%.[3] A majority of workers in Pima County are employed in the educational services, healthcare, and social assistance sector of the economy, followed by arts and entertainment, and then professional, scientific and management. The labor force is reflective of the influence of tourism, academia, and the retirement population in the Tucson metropolitan area.

[1] Office of the State Climatologist for AZ, 2021.
[2] U.S. Census Bureau, Quick Facts, 2020. U.S. Census Bureau QuickFacts: Pima County, Arizona; United States
[3] AZ Department of Administration Employment and Population Statistics, July 2019. https://laborstats.az.gov/sites/default/files/Emp-Report.pdf

2.2 Jurisdictional Overviews

Town of Marana

Nestled along Interstate 10 (I-10), northwest of Tucson, the Town of Marana has experienced dramatic growth for over two decades because of annexation policies and the development of master-planned communities. It is now the fastest-growing community in southern Arizona.

Founded in 1881, in conjunction with the development of rail transportation, Marana solidified itself as a destination with its appearance on Southern Pacific Railroad maps in 1890. Although ranching and the railroad dominated the community prior to World War I, the post-war years brought significant change to the region with the implementation of extensive agricultural irrigation systems and the development of cotton farming. Other substantial factors in Marana's development were the location of Marana Army Air Field (now Pinal Airpark and Evergreen Air Center) and the removal of the downtown business district due to the widening of I-10 in the early 1960s.

In March of 1977, the Town of Marana incorporated with an area roughly 10 square miles. Governed by a seven-member Town Council consisting of a Mayor and six council members elected for four-year terms, the Town utilizes a Council-Manager form of government. The Town Council appoints a Town Manager responsible for the daily operation of town services and the orderly administration of affairs.

Although a majority of Marana's topography is flat, much of the area is designated as a floodplain. In addition, the existing Town boundaries include portions of the Tortolita and Tucson Mountain foothills that are dominated by slopes exceeding 15%. The development constraints posed by these environmentally sensitive lands provide the potential for natural open space and habitat conservation areas to balance with the urban development occurring. Several riparian features, including major wash crossing in the Tortolita Fan and the Santa Cruz River, provide natural wildlife habitat for diverse species native to the Sonoran Desert. The Santa Cruz River has also provided the opportunity for a Shared Use Path (SUP) to be constructed from Ina Road north to Sanders Road approximately 13.5 miles. This SUP is a world-class outdoor recreation amenity and contributes greatly to the health and wellness of the Marana community.

Although witnessing substantial urban growth during the past two decades, Marana continues to hold onto its agricultural and ranching roots and serves as the main trade and transportation center for the surrounding rural periphery for the eastern portion of Pima County. As illustrated in Table 2-2, the 2020 Census population of Marana is 51,300. On average between the years of 2010-2014, the civilian labor force was 64.5% of the town's population. New building permits issued in 2020 were 2,664. Of these, 915 were for new homes.

Marana's General Plan, adopted on December 10, 2019, reflects the Town's shared values that include a sense of community, quality development, and economic growth. Marana's Land Use Map (Figure 2-5) defines a pattern of growth that is logical, fiscally responsible, and financially sustainable. The Resources and Sustainability Theme of the Marana General Plan seeks to balance growth and development with the need to protect and conserve natural resources to support a healthy environment for generations to come. This theme is supported by five general plan elements, Open Space, Water Resources, Environmental Planning, Conservation, and Energy Elements. Lower density and intensity use in proximity to environmentally sensitive areas provide a transition to more intensive commercial and industrial uses located in proximity to major transportation corridors including I-10, major thoroughfares, and the Marana Regional Airport.

Although agriculture remains a factor in Marana's economy, a continuing influx of residential and commercial development has occurred due to its location between Phoenix and Tucson along I-10 and the Union Pacific Railroad, to the south, adjacent to Tucson, is a new commercial business district. Continental Ranch/Peppertree Ranch Industrial Park has several new tenants and new industrial properties will soon be available at Marana Northwest Regional Airport. Marana's major private employers include Arizona Portland Cement, Costco, Home Depot, Wal-Mart, Lowes, Sargent Controls & Aerospace, and Tucson Ready Mix. Major public employers include the Marana Unified School District and the Town of Marana. Marana's planning area encompasses approximately 228 square miles in Pima and Pinal Counties. Existing land uses include residential of varying densities (rural residential, low-density residential, traditional neighborhood), open space, airport and commercial, and industrial development. A majority of the planning area beyond the Town boundaries to the north and west is undeveloped.

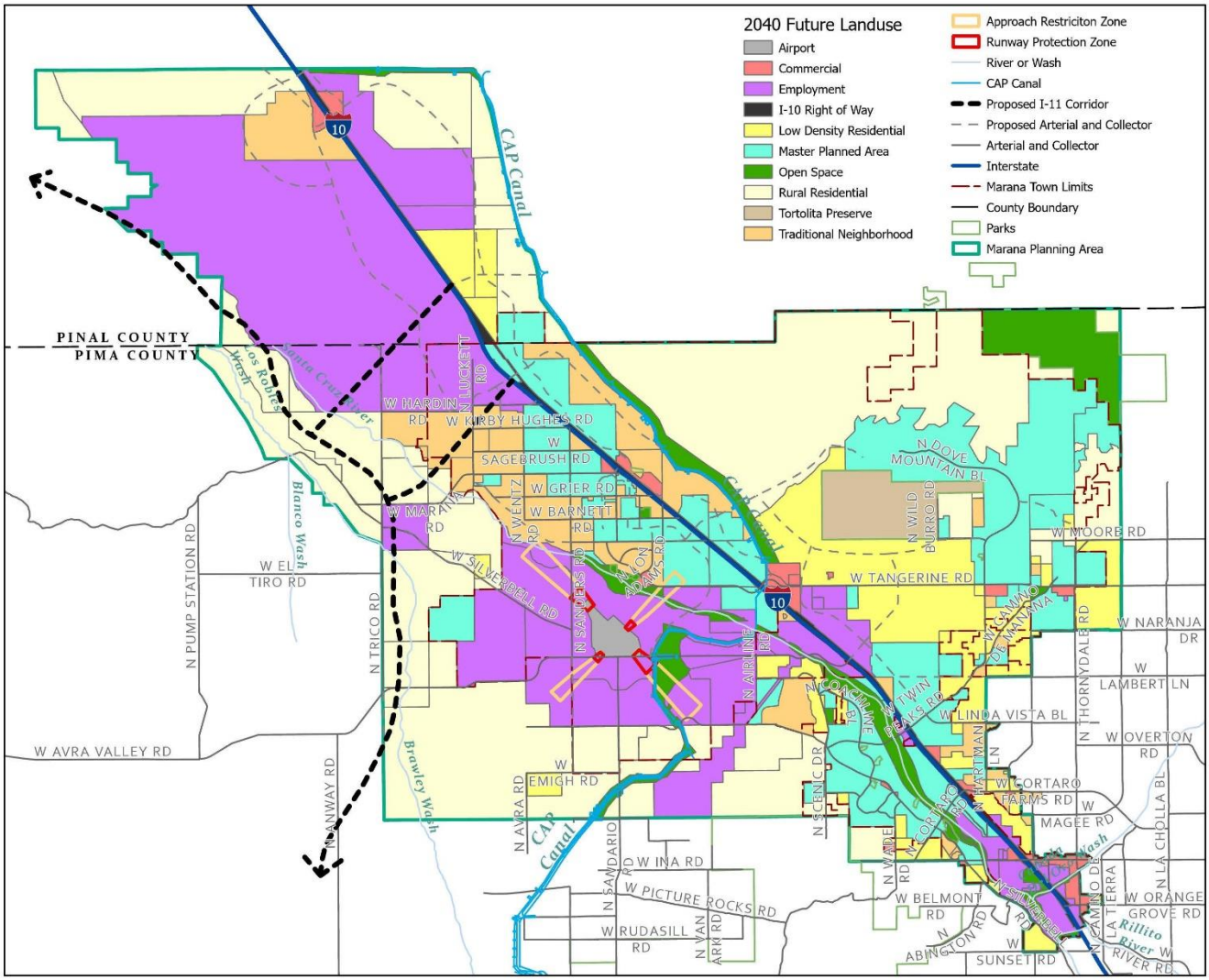
Marana's Town limits reflect the many changes and transitions that have occurred since its incorporation. Marana's rural heritage is reflected in traditional family farms and agricultural activities that continue on many acres of land historically used for agriculture. Older, low-density residential and commercial development was located west of I-10 in and near the traditional Town area where many Marana pioneer families settled. This northwest part of Marana began a transition to a more densely populated area in the early 2000s. At that time, the Cactus Ferruginous Pygmy-Owl was listed as an endangered species, which limited development in much of the area east of I-10. This shifted the development focus to the farm fields in northwest Marana. The extension of bank protection along the Santa Cruz River to Sanders Road removed many of the farm fields from the floodplain and opened them up to development opportunities; along with the extension of sewer lines brought urban services to the northwest area. By 2021, there were more than 6,000 lots platted in this area of the Town, with an additional 21,000 lots planned. The new growth brought approximately 10,000 new residents to this once rural area.

Marana’s planning area includes natural areas, such as the Tortolita Mountain Alluvial Fan in the northeast, which provide physical constraints that limit development. Characterized by steep slopes, natural drainage ways, native vegetation, and floodplains, this area provides natural undisturbed open space and habitat for a multitude of plant and animal species. The Town has proactively moved to direct new growth and development away from the fan to other more appropriate areas.

The Town of Marana 2040 General Plan indicates that residential development is the predominant land use, occupying more than 50% of the total land area. The residential categories provide a range of densities within each designation. However, the maximum density cannot always be achieved because of land use policies or physical constraints. Commercial and industrial uses may potentially accommodate a wide range of uses.

Much of the current development activity in northeast Marana is occurring along the Twin Peaks Road corridor. Related to this, Tangerine Road was improved to four lanes with a central median, turn-lanes, multi-use paths, and sidewalks from La Cañada Drive to Dove Mountain Boulevard. The segment from Dove Mountain Boulevard to I-10, is currently in design for the expansion of up to four lanes that will facilitate the expected growth in the region. Just east of the Tangerine/I-10 freeway interchange is the new Mandarina Boulevard/Adonis Extension, which connects the existing San Lucas and Adonis neighborhoods through the proposed Tortolita Shadows and Mandarina developments to Tangerine Road. These infrastructure projects will allow for the capacity necessary for continued growth in the area as well as provide better circulation and connectivity in the community including access to the Town of Oro Valley.

At the Marana Regional Airport, a future focal point of the town’s local economy, continual upgrading, and expansion of the facility has benefit to the airport and to the Town’s ability to attract commerce. The recent addition of road and utility infrastructure in the I-10 area directly east of the airport will attract new businesses to the Town while others will be attracted to the airport because of its business-class jet capabilities, convenient location, and access for business or pleasure.



Source: Town of Marana Technology Services

Figure 2-5: Town of Marana Land Use

Town of Oro Valley

Located between the Santa Catalina Mountains to the east and the Tortolita Mountains to the northwest, Oro Valley is located six miles northwest of the Tucson city limits. Other nearby communities include the Town of Marana to the west and the unincorporated community of Catalina to the north. Oro Valley serves as a gateway to regional parks, sharing its eastern border with Catalina State Park and the Coronado National Forest. These areas provide vast recreational and natural open space opportunities for the community and are integral to the Town's identity as a community known for its integration of residential uses within the natural Sonoran Desert and as a resort area. Major access to Oro Valley is via I-10, located approximately 12 miles to the west, and SR 77, or Oracle Road, which runs north-south through the Town and is the original transportation corridor linking Tucson with the Phoenix metropolitan area to the north. The Town was incorporated in April of 1974 and operates under a Council-Manager form of government, which includes a mayor and six council members elected at large. The Mayor is directly elected while the Vice Mayor is selected by the Council from among the six Council members.

Oro Valley is a growing community. The 2020 estimated population of Oro Valley is 47,070. The population is forecasted to grow to more than 51,000 by 2030. Residential growth has been a large part of economic activity in the past and will remain important into the future. In recent years, more diverse employment opportunities have become part of the community. Oro Valley's large employers include Roche Tissue Diagnostics; Honeywell Aerospace; Town of Oro Valley; Oro Valley Hospital; Amphitheater Public Schools; Casa de la Luz Hospice; SimpleView; Splendido at Rancho Vistoso; El Conquistador Tucson, A Hilton Resort; and Meggitt Securaplane Technologies, Inc. Oro Valley is emerging as a regional center for biotech, biomed, and high-tech industries featured on the campuses of Innovation Park.

The Town of Oro Valley's General Plan guides the character and future directions for the community over a 10-year period. The *Your Voice, Our Future* General Plan was adopted by Town Council on September 21, 2016, and ratified by the Oro Valley voters on November 8, 2016. The Plan supports the potential of an evolving community, with a focus on family-friendly features, economic development, and amenities contributing to a "complete community". This is balanced with long-held values for the natural environment and lower density development. Future commercial growth will likely be concentrated in designated growth areas, primarily the Oracle Road corridor and secondarily smaller neighborhood commercial clusters dispersed throughout the Town. Residential growth will likely occur in both smaller infill projects as well as a few larger tracts of land on the western portion of Town.

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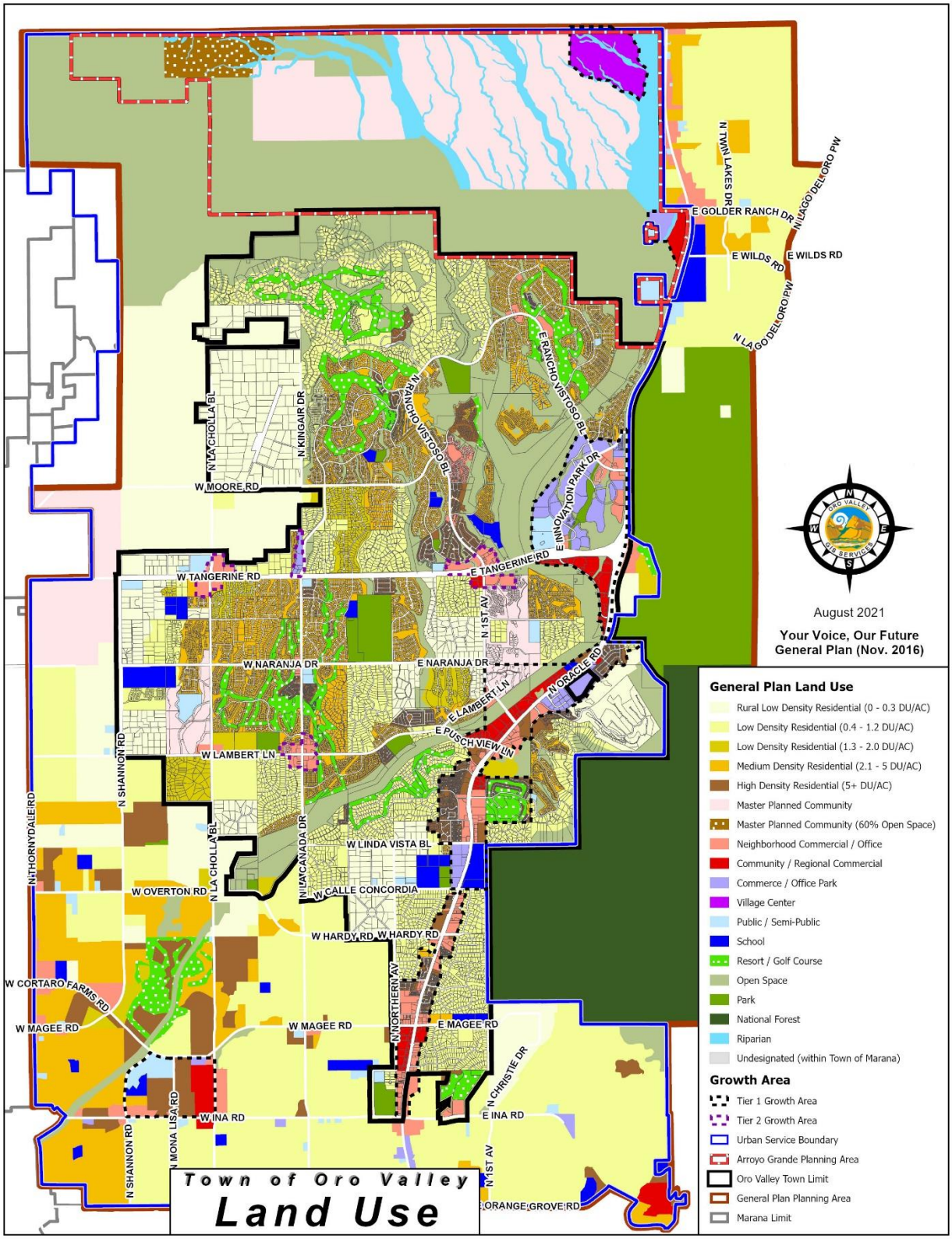


Source: Town of Oro Valley, 2021

Figure 2-6: Town of Oro Valley Land Use

Pascua Yaqui Tribe

The lands of the Pascua Yaqui became part of the United States in the 1870s. Calling themselves the Yaquis, the first modern settlements of these descendants from the ancient Uto-Azteca people, were near Nogales and South Tucson. Over time, the Yaquis spread out, settling north of Tucson in an area they named Pascua Village and in Guadalupe near Tempe. Retaining their religious and cultural ways of life, the Yaquis began calling themselves the Pascua Yaqui Tribe and accepted political integration into American society during the 1950s. In 1952, the Pascua Yaqui Tribe was annexed by the City of Tucson. In 1964, Congress transferred 202 acres of desert land southwest of Tucson to the Pascua Yaquis who were looking for an area to preserve their tribal identity. Members of the Pascua Yaqui Tribe relocating to the reservation struggled to secure federal recognition for the Tribe until finally being recognized in 1978. The Tribe acquired an additional 690 acres in 1988. In 1994, the Tribe's status was changed from a created tribe to a historic tribe.

Today, the Pascua Yaqui Tribe is scattered throughout eastern Pima County and includes several small communities. These communities include Yoem Pueblo in Marana, Old Pascua in Tucson, Barrio Libre in South Tucson, and the Pascua Pueblo, a 1.87-square mile reservation located southwest of the City of Tucson.

According to Tribal sources, the population as of August 2021 for the Pascua Yaqui Tribe within Pima County communities was 11,109. Table 2-3 summarizes enrolled Tribal membership by the various Pascua Yaqui communities located both within Pima County and outside. Enrollment demographics for the Pascua Yaqui Tribe have increased due to housing development. The community of New Pascua reservation proper is comprised of approximately 876 residential structures, 73 office and commercial buildings, and 5 commercial buildings under construction. An estimated 8,000 citizens reside within the exterior boundaries of the New Pascua reservation proper that includes tribal and non-tribal citizens.

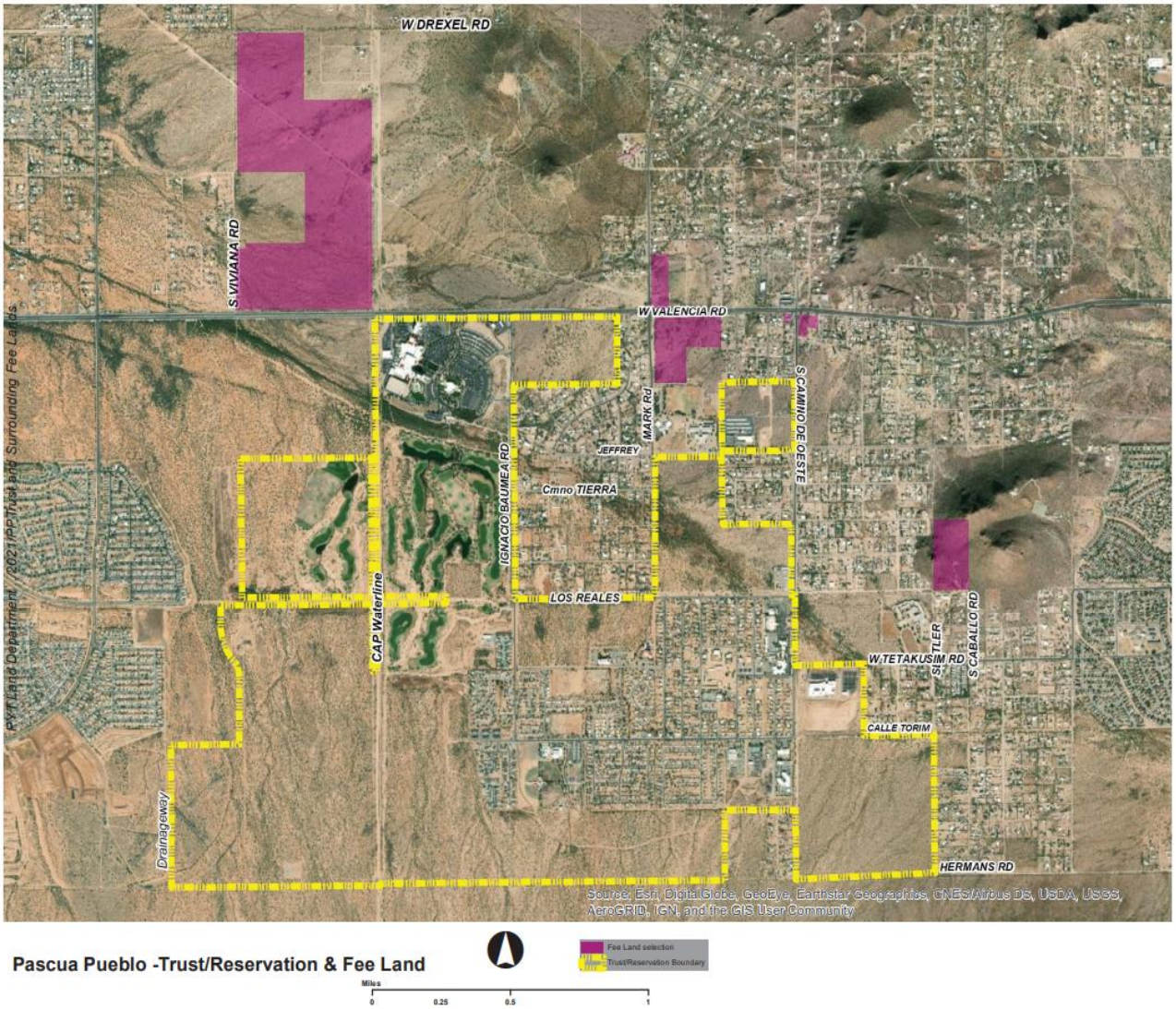
The Pascua Yaqui Tribe also had proposed amendments to its constitutions effecting the Tribe's base enrollment to its tribal members. The amendments were passed by the federal government that gave the authority to the Pascua Yaqui Tribal Council to have the power to enact ordinances, subject to the approval of the Secretary of the Interior, governing future membership and loss of membership. This rise in enrolment is reflected in Table 2-3 demographics with the Yaqui Communities of New Pascua and Marana falling under the Tribe and included in the Plan.

Table 2-3: Pascua Yaqui Tribal Enrollment Demographics

Pascua Yaqui Communities	Enrolled Members	
	2016	2021
New Pascua	5,086	5,137
Old Pascua	775	775
Barrio Libre (South Tucson)	741	748
Yoem Pueblo (Marana)	123	122
Guadalupe (Maricopa County)	3,537	3,616
High Town (Chandler)	113	118
Penjamo Pueblo (Scottsdale)	250	242
Eloy/Coolidge (Pinal County)	247	351
Community Total	**10,872**	**11,109**
Other Arizona Cities	6,446	9,966
Outside the State of AZ	2,011	
Total Active Membership	**19,329**	**21,075**

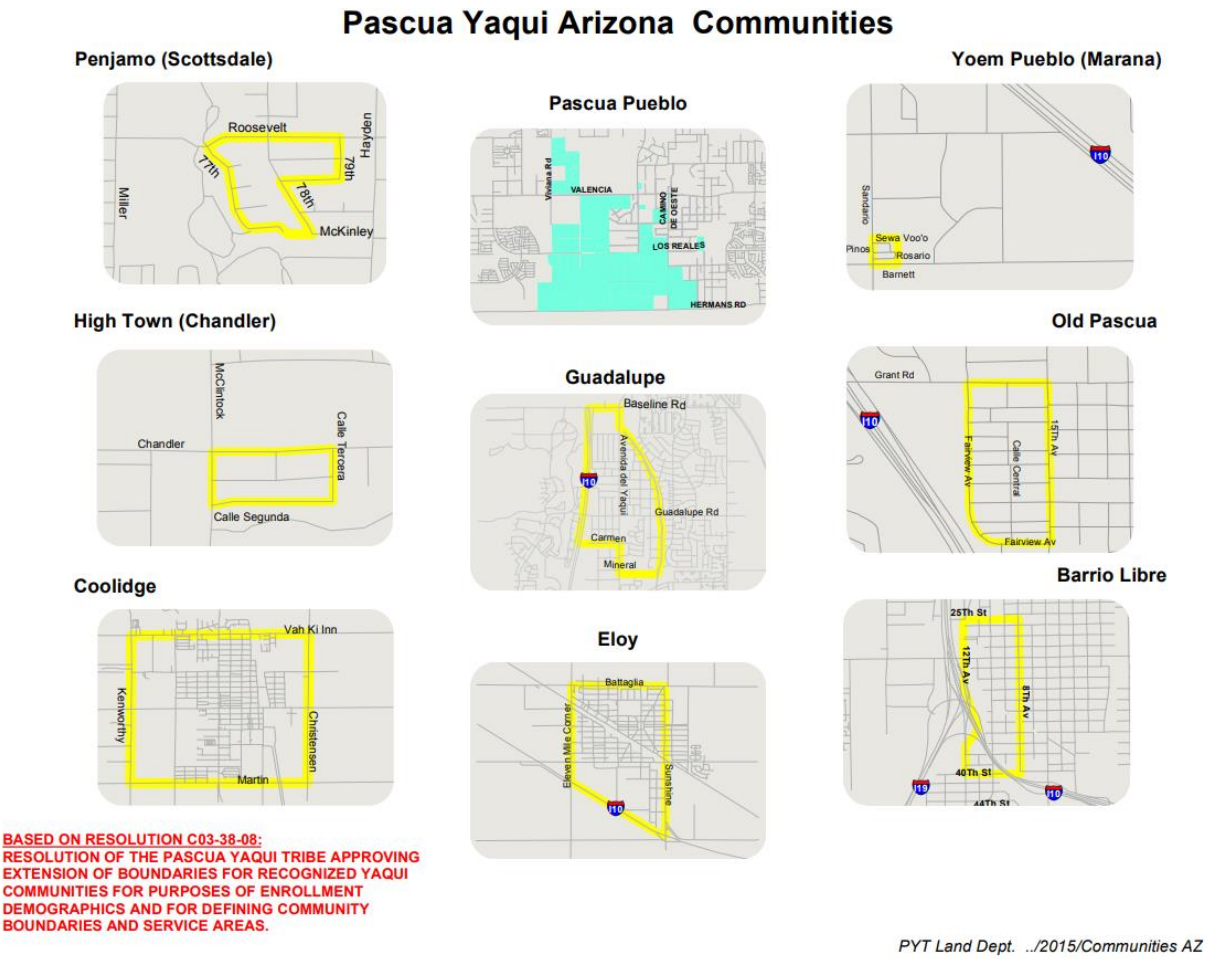
Source: Pascua Yaqui Tribe, September 2021

The Pascua Yaqui Tribe operates two casinos within Pima County, the 40,000 square foot Casino of the Sun and the 75,000 square foot Casino del Sol. Other tribal enterprises include the Sol Casino Hotel and Convention Center, which includes 215 rooms and a 20,000 square foot ballroom; Estrella Tower, which includes 151 rooms and a 1,081 square foot conference room(s) area; the Anselmo Valencia Amphitheater 4,470 seat open-air concert venue, and the Del Sol Marketplace. The Sewailo Golf Course opened in 2013 measures 7,400 yards from the championship tees, with 5 different tee boxes on each hole to allow for players of all abilities. It is known as one of the finest golf courses in Tucson and the state of Arizona.



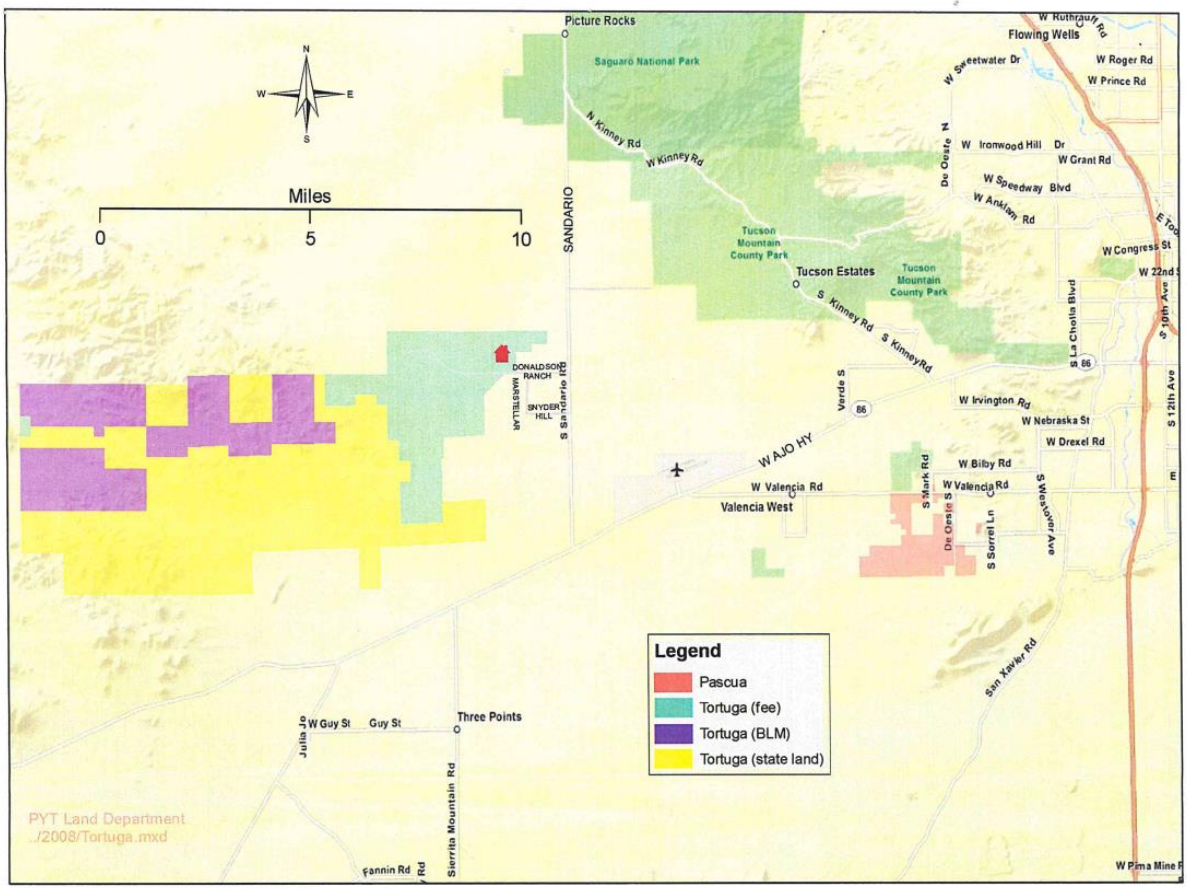
Source: PYT Land Department, 2021

Figure 2-7: Pascua Pueblo – Trust/Reservation & Fee Land



Source: PYT Land Department, 2021

Figure 2-8: Pascua Yaqui Communities



Source: PYT Land Department, 2021

Figure 2-9: Tortuga Ranch

Mochik – Tortuga Ranch is land located in western Pima County that is a combination of tribal, state, BLM, and Fee land. The Pascua Yaqui Tribe are stewards of this area that is used to house a number of tribal services to include:

- Desert planting and harvesting
- Equine Wellness Groups
- Green House: Teach cultivation and production to youth and community
- Hoop House: Habitat for growing cultural herbs and plants
- Ranch Skills Training
- Youth Horsemanship Skills
- Youth Ranch Skills

Town of Sahuarita

The Town of Sahuarita, incorporated in 1994, now encompasses a little over 31 square miles. Land uses within the incorporated boundaries of the Town include primarily residential and agricultural uses and vacant land. The next largest land use in the town is institutional, which includes schools, public uses, and utilities. In addition to these, there are commercial and light industrial land and recreational/open space uses.

The 2020 census found 13,569 dwelling units and 12,075 occupied households with a population of 34,134 (see Table 2-2). The Town population increased by 8,875 between the years of 2000 to 2020.

Table 2-4 Population and Housing

	2020 Total Census Population	Total Units 2020	Total Occupied 2020	Total Vacant 2020	Group Quarters Population 2020	Owner Occupied 2020	Renter Occupied
Sahuarita	34,134	13,569	12,075	1,494	87	75.5%	13.5%

Source: U.S. Census Bureau; 2020 Census

Using the 2020 Census average household size and average family size of 2.77 and 3.16, respectively, the Town calculates future population projections using 2.89 persons per unit. The 2020 Census found an almost equal male/female ratio within the study area. The Town does not currently have a large group quarters facility.

Within Sahuarita are five age-restricted communities: Quail Creek, a fully age-restricted master-planned community; Rancho Resort and Sonora within Rancho Sahuarita; La Jolla Verde, which lies southeast of I-19, and Duval Mine Road; and the Green Valley RV Resort that lies west of I-19 and north of Duval Mine Road. The Town shows a more traditional mix of population by age category not indicative of being skewed to the senior age groups. The Town of Sahuarita prides itself in being open to families with children as well as other household types.

Nearly 75.5% of the 12,075 occupied housing stock within the Town was owner-occupied in 2020. Based on this demographic holding in the future, the Town should plan either on ensuring that there is an adequate supply of single-family housing or assume that a significant part of its housing stock will likely be owner-occupied units. National trends, however, show a shift towards smaller household sizes and an increase in renting vs homeownership. It is unclear if this trend will affect Sahuarita, but it may be prudent to plan for a variety of housing types to best position the Town for the future.

Sahuarita represents five predominant land use themes today. First are the existing, older residential areas, primarily on larger lots, located in the western portion of the town, and interspersed by undeveloped properties.

Secondly, there is the rise of the master-planned community from Rancho Sahuarita to the northwest and Madera Highlands and age-restricted Quail Creek to the southeast. Most of the growth anticipated in the Town during the life of the 2015 general plan will occur within master-planned communities. Each is unique and caters to its individual market but differs from more rural Sahuarita.

Third, are the developing commercial and potentially mixed-use centers in the southern portion of the Town around the intersection of I-19 and Duval Mine Road. These centers provide regional services to Green Valley and much of the Upper Santa Cruz Valley in addition to Town residents.

Fourth are the production of agriculture orchards and ranches in the eastern portion of the Town. Some of this land lies within the 100-year floodplain, but some of it lies outside and is imminently developable. Agricultural employment, in particular, the pecan orchards owned and operated by Farmers Investment Company (FICO), provides a source of employment in the community that brings in revenues from outside the Town and helps the local economy. It is expected that over time, FICO holdings will likely convert to more urban scale development, completely or in part. The Sahuarita Farms Specific Plan and River Master Plan reflect the type of transition anticipated in this area.

Lastly, the Santa Cruz River and its large floodplain, which bisect the Town, provide both a constraint and an opportunity. Most of the river's floodplain within the Town is not in a natural condition today; indeed, there are several structural uses, particularly around the historic Sahuarita town site as well as irrigated agriculture and institutional uses. Currently, there are no flood control measures planned for the Santa Cruz River within the Town of Sahuarita; however, consideration of such measures in the future may occur, pursuant to pre-existing agreements and the recently approved Sahuarita and Continental Farms River Master Plans.

Major employers in the area include Freeport-McMoRan and Asarco; Caterpillar Proving Grounds; FICO; Wal-Mart; Fry's; Safeway; Desert Diamond Casino, an Enterprise of the Tohono O'odham Nation; the Sahuarita School District; and the Town of Sahuarita itself.

Size and Location

Currently 31 square miles in area, Sahuarita is located just 15 minutes south of Tucson and approximately 40 minutes north of the Mexican border. Tucson International Airport is within a 20-minute drive.

Located along I-19, 40 minutes north of the U.S./Mexico border and 18 miles south of downtown Tucson, Sahuarita is uniquely positioned to capture 24 million annual visitors from Mexico. Sahuarita is overflowing with retail opportunities, executive living, and a viable center for companies and employers to conduct business with Mexico.

Each day, on average, more than 65,000 Mexican residents come to Arizona to work, visit friends and relatives, recreate, shop, and spend over $7,350,000. This contributes substantially to Arizona's export trade with Mexico. Familial ties, long-term friendships, work opportunities, leisure activities, and shopping experiences not yet available in Mexico continue to support strong cross-border interactions between Arizona and its neighbor, Sonora.

Town Government

The Town of Sahuarita operates under the council-manager form of government. The Sahuarita Town Council is responsible for the policy matters of the town, and the town manager oversees staff and carries out the day-to-day functions of the town. Sahuarita is administered by the seven-member town council, which includes a Mayor and Vice Mayor. The Mayor and Vice Mayor are not elected into those positions but are instead chosen among elected council members. The Town Council oversees all issues pertaining to Sahuarita, including residential and commercial development and natural preservation.

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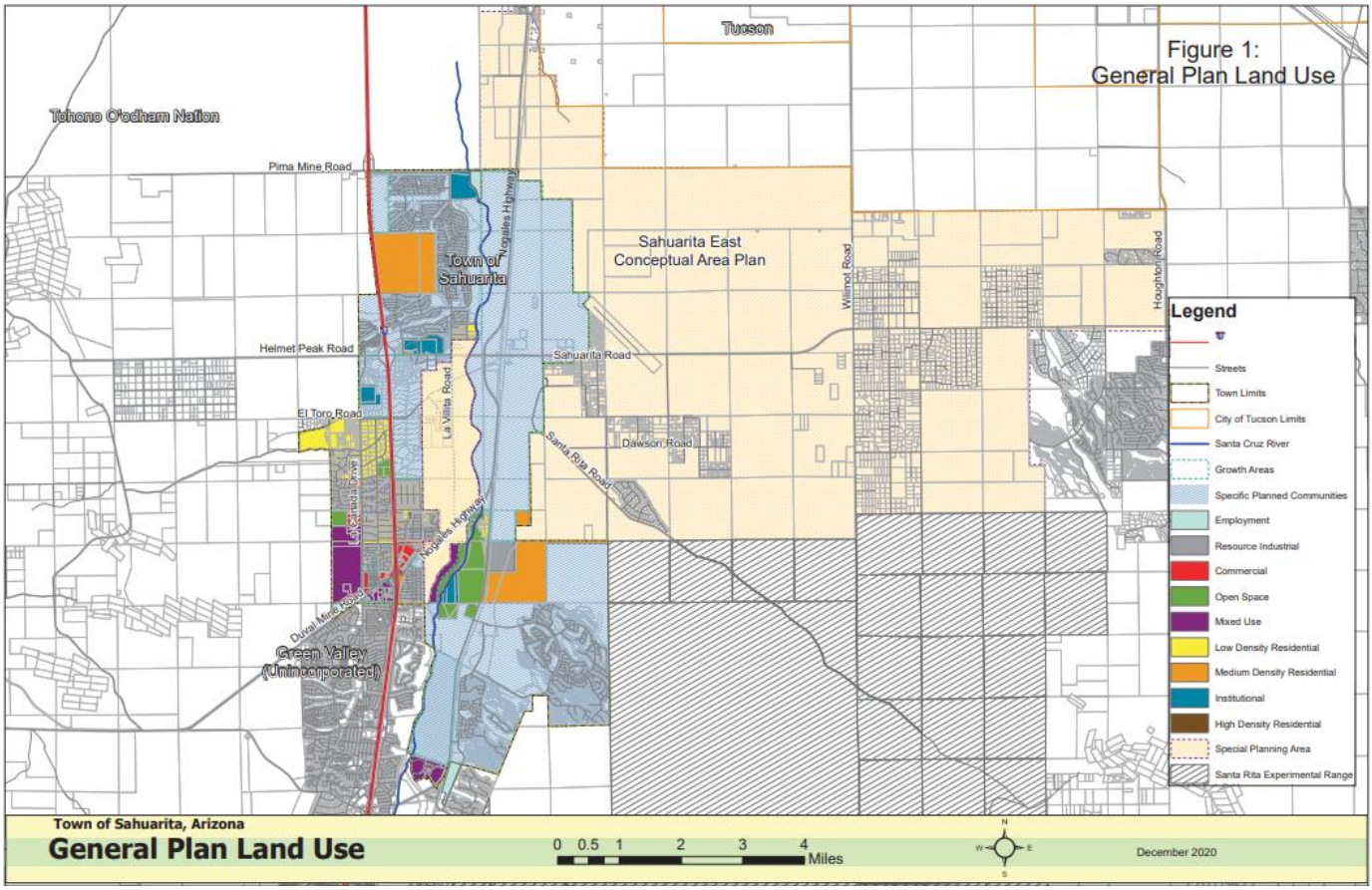

Source: Town of Sahuarita

Figure 2-10: Town of Sahuarita General Plan Land Use

City of South Tucson

Surrounded by the City of Tucson, the City of South Tucson is a one square mile community just south of historical downtown Tucson nestled between the junction of Interstates 10 and 19. Rich in ethnic heritage, this small community services a population of which 83% are Mexican-American and 10% are Native American. Developed as a suburban community to Tucson, South Tucson enjoyed a colorful history after incorporation in 1936, un-incorporation in 1938, and reincorporation in 1940.

The City of South Tucson is located within a U.S. Department of Housing and Urban Development (HUD) –designated Empowerment Zone and Tucson Pima Enterprise Zone, both of which are dedicated to revitalizing dilapidated areas in the greater Tucson metropolitan area. The City of South Tucson has also been designated a rural 'Colonia' by the United States Department of Agriculture.

A Mayor, Six Council Members, and a City Manager govern the City of South Tucson. The local police and fire department have both full-time and volunteer personnel.

In 2020, the population of South Tucson was 4613, an 18.4% decrease over the 2010 population of 5652. South Tucson will continue to provide a small declining percentage of Pima County's overall resident population. This pattern is reflective of the strong growth throughout eastern Pima County and the City's inability to gain in available landmass. Similarly, South Tucson's small labor force is anticipated to parallel the Town's population growth by comprising a smaller share of the region's employment opportunities. The City of South Tucson updated their General Plan in 2002. Although not mandated to contain Growing Smarter elements due to their small size, this information was added to the 2002 revision to provide consistency with other municipalities in the region.

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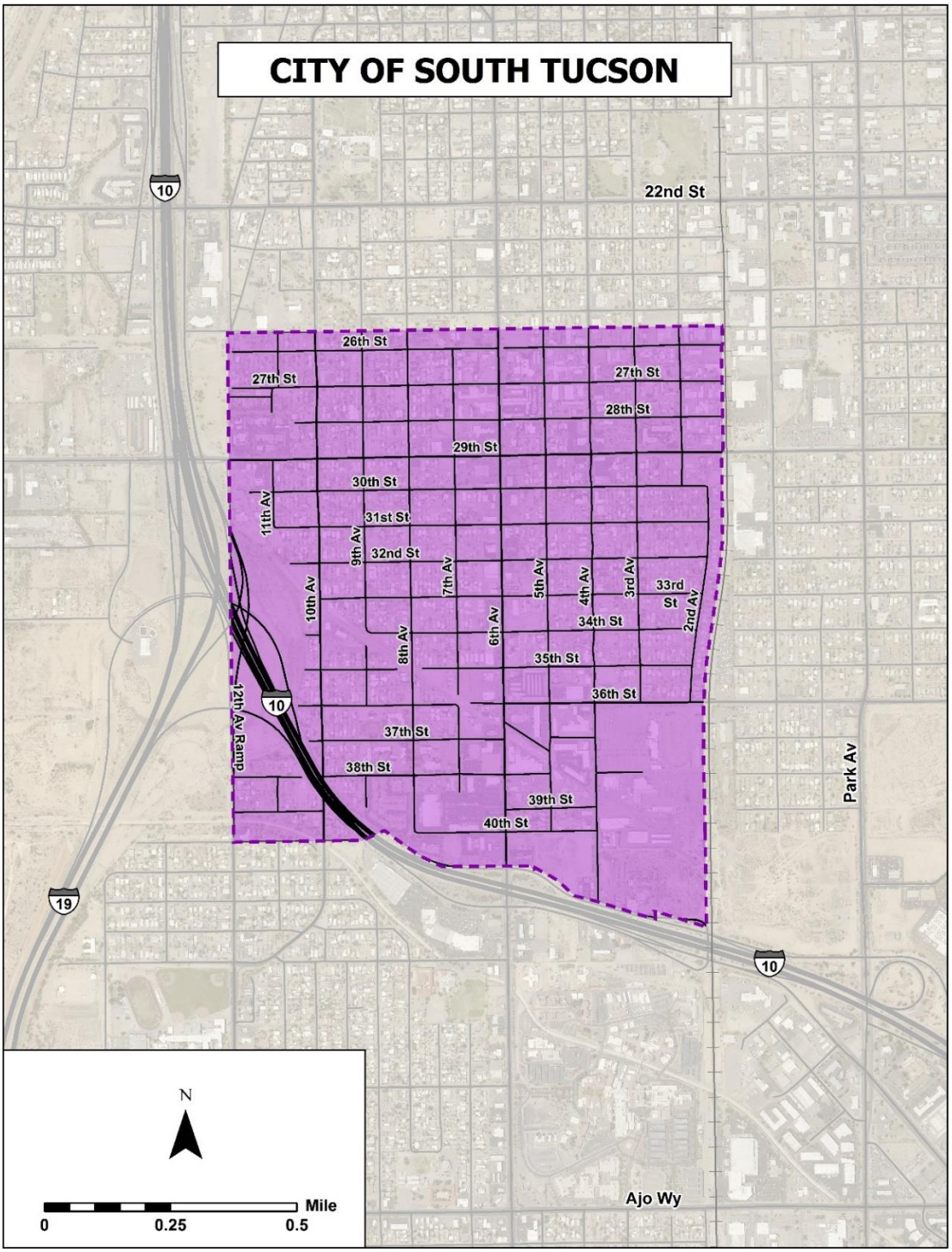

Source: Pima County Geographical Information Systems, 2021

Figure 2-11: City of South Tucson Land Ownership and Location

City of Tucson

The City of Tucson, Arizona's second-largest and oldest city, serves as the focal point for political, economic, and cultural activities for Pima County. Prior to the establishment of the first Spanish mission in 1700, San Xavier del Bac, and the arrival of the Spanish Conquistadors, various Native American tribes including the Pima, Hohokam, and the Tohono O'odham inhabited the area presently occupied by the City of Tucson. Founded in 1775, Tucson began as a Spanish military garrison to protect settlers from Indian raids from nearby tribes. Receiving independence from Spanish colonial rule in 1821, governance of the area passed to the Republic of Mexico and remained part of the State of Sonora until 1854 when it became part of the United States with the Gadsden Purchase. Formally incorporated in 1877 with an area of 2 square miles, the City of Tucson presently includes 240 square miles and is the nation's thirty-third (33rd) most populous city. Fueled by the availability of cheap and abundant land, Tucson experienced rapid growth in the 1950s following World War II. Much of this new growth, however, occurred outside the city limits leading to a widespread lineal development pattern. Surrounded by unincorporated portions of Pima County, Tucson completely surrounds the City of South Tucson and is in close proximity to the smaller communities of Marana to the northwest, Oro Valley to the north, and Sahuarita to the south. A mayor and six City Council Members representing various wards within the City govern Tucson. Operating under a charter form of government, the Mayor and City Council set policies to be carried out by an appointed City Manager and other city officials.

Known for its natural beauty, Tucson's natural environment is characteristic of the Sonoran Desert with diverse habitats and conditions ranging from low land deserts to the highlands of the Santa Catalina and Rincon Mountains. In addition to the rich biodiversity of the region, the proximity of the Mexican border and the presence of the University of Arizona and the Davis-Monthan Air Force Base, which draw residents from throughout the United States as well as from other countries, influence the City's cultural diversity and tradition for cultural heritage preservation. As depicted in Figure 2-12, Tucson's primary transportation corridors are Interstates 10 and 19, which provide accessibility to distant urban locations, and a well-developed arterial network providing connectivity within the metropolitan area. Tucson International Airport, providing commercial air service, and Ryan Airfield, serving business and general aviation traffic, provide additional transportation service to Tucson.

The City of Tucson has experienced tremendous growth in the infrastructure and population since its incorporation over 145 years ago. This growth has led to a current population of 554,146 people with positive growth in 2020 of 5.19%. The population of Tucson represents 53% of the county according to the 2020 Census. Regardless of its role as the regional focal point, Tucson's relative position as the population center will slow in the future as other incorporated jurisdictions and unincorporated communities in the urban periphery absorb a larger share of the regional growth. Tucson has a broad-based economy anchored in tourism, higher education, retail, military, government, and various high-tech and health care employers. With 350 days of sunshine every year, tourism is a major economic engine for the Tucson community. Major world-class attractions include Saguaro National Park, the Arizona-Sonora Desert Museum, and the Pima Air and Space Museum. Thousands of visitors attend annual signature events, such as the Tucson Gem and Mineral Show, El Tour de Tucson, 4th Avenue Street Fair, All-Souls Procession, and the Tucson Rodeo and Parade (La Fiesta de los Vaqueros). These visitors generate sales in lodging, dining, retail, recreation, and transportation and have an estimated local impact of $150 million.

The economic forecast is calling for expansion at a moderate pace with gains in jobs, income, and population. In 2018, retail sales increased approximately 5.3%, while personal income increased 5.7%. The preliminary estimate for the October 2018 unemployment rate is 4.4%, a slight increase from 4.0% in October 2017, and median home sale prices increasing by 3.7%. The City's revenues, particularly business privilege and transient occupancy taxes, were increasing at a more significant percentage than any other year. With sales tax revenues comprising approximately 41% of the City's General Fund, and retail sales being a major component, the City experienced strong sales tax growth from fiscal year 2019 amount of $219.3 million to the fiscal year 2020 amount of $225.9 million; a 3% increase.[1] Even during the Coronavirus Virus 2019 (COVID-19) Pandemic brought uncertainty the City of Tucson

[1] Comprehensive Annual Financial Report 2020 https://www.tucsonaz.gov/files/finance/Accounting/City_of_Tucson_CAFR_FY_2020.pdf Pg.vii

still growth one example was in permits issued for new buildings from 2019 at 1,151 permits issued to 1,169 permits issued in 2020.

Approved in December of 2013, Tucson's General Plan reflects a community that is responding to the diverse nature of its residents and the natural character of the region as represented in Figure 1. The plan anticipates that new growth will be accommodated primarily through infill development; higher density, mixed-use activity centers; and corridor planning to reduce the peripheral sprawl. Tucson is positioning itself to take advantage of its distinctive natural setting by clearly separating urban uses from rural and natural resource-based areas. Economic development activity will be encouraged to locate transportation hubs along existing transportation corridors including I-10, I-19, the Southern Pacific Railroad, and airports. As an alternative to the linear pattern of commercial development, small-scale neighborhood commercial centers will be focused on major street intersections with regional centers positioned in mixed-use activity centers.

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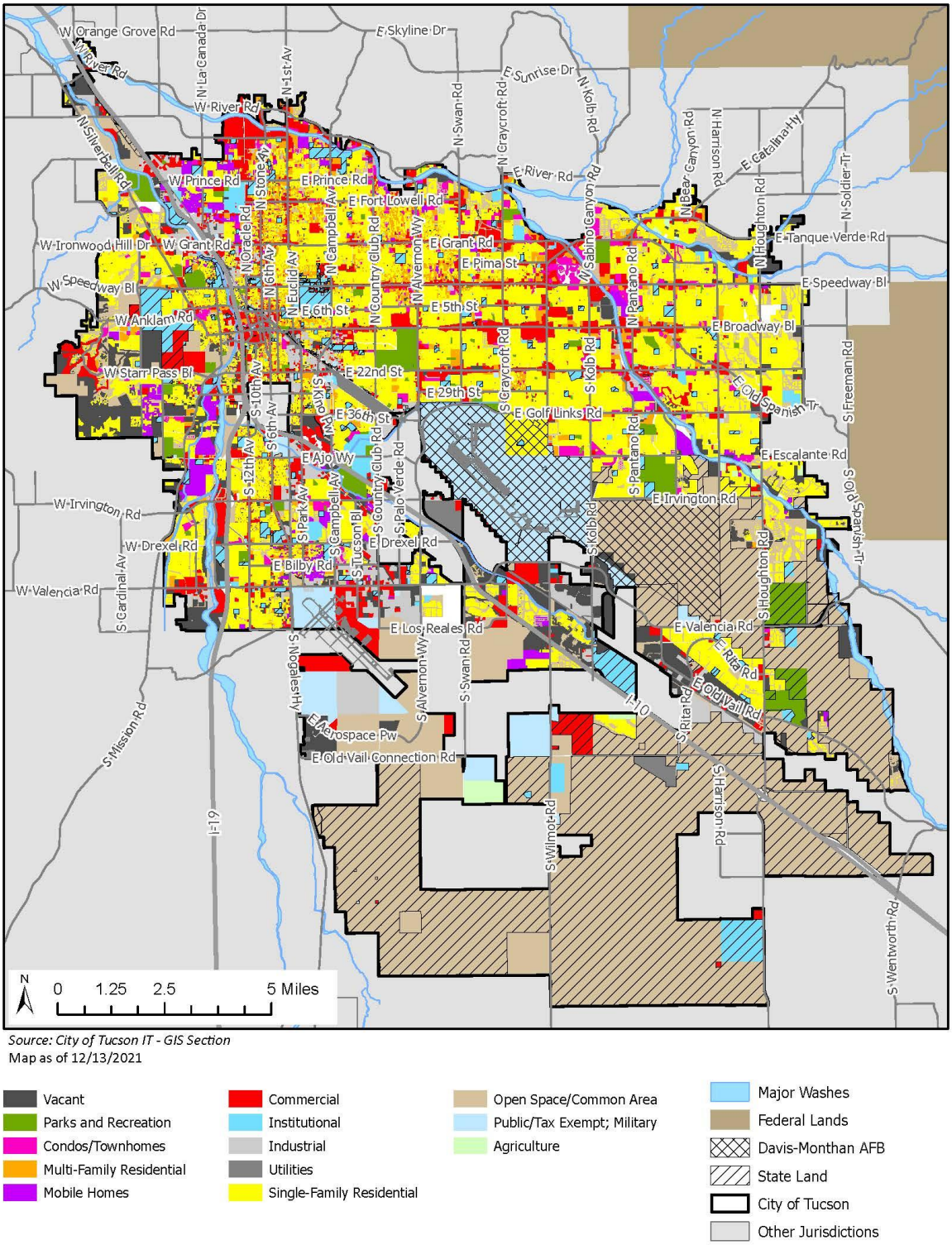


Source: City of Tucson GIS

Figure 2-12: City of Tucson Land Ownership and Location

SECTION 3: PLANNING PROCESS

3.1 Planning Process

The 2022 Plan update was a countywide effort that included revising and updating the previous plan, integrating new components into the plan, and incorporating new participants into the planning process.

A multi-jurisdictional planning team was assembled to review the 2017 plan, evaluate its efficacy over the last five years, and propose revisions for the 2022 plan. County Administration extended invitations to participate in the planning process to each jurisdiction's Mayors, Town Managers, and Emergency Managers within the planning area. In addition, invitations to participate were extended to over 80 partners and community stakeholders, including non-government organizations, academia, and the private sector.

Two levels of planning teams were organized for this Plan update. The first was a Multi-Jurisdictional Planning Team (MJPT) comprised of one or more representatives from each participating jurisdiction and predominantly the primary points of contact. The second level planning team was the jurisdiction's Local Planning Team (LPT).

PCOEM served as the lead planning agency for the process, with support from the Arizona Department of Emergency and Military Affairs (DEMA). Pima County's Emergency Management Planner took the lead in recruiting participants, conducting planning team meetings, tracking progress, editing documents, and keeping the project on schedule. The MJPT members were responsible for evaluating and updating the sections of the plan for their respective jurisdictions and supporting Pima County in completing the plan.

3.2 Planning Activities and Teams

The planning team facilitated the coordination, research, and planning element activities to update the 2022 Plan. Four multi-jurisdictional planning team meetings were conducted over the period of August 2021 through February of 2022, beginning with the first meeting on August 11, 2021. Representatives from each jurisdiction were required to participate in all planning team meetings, as the meetings were structured to take the jurisdictions through a systematic planning process. At each meeting, next steps and procedures were presented and discussed, progress was reported, and the action items assigned. Subsequent meetings built on the information discussed previously and on the individual assignments completed between meetings. In addition, jurisdictions also conducted independent meetings and coordination efforts to compile and contribute to the overarching planning efforts.

The MJPT representatives, noted in Table 3-1, had the responsibility of being the liaison to the jurisdictional LPT, and were tasked with the following primary responsibilities:

- Conveying information and assignments to the jurisdictional LPT of which several jurisdictions organized for specific plan parts or for mitigation ideas.
- Ensuring all requested assignments were completed fully and returned on a timely basis.
- Arranging for review and official adoption of the final Plan.

To support MJPT, the jurisdictional LPT, noted in Table 3-2, were tasked with:

- Convening meetings as needed to work through assignments from the Planning Team.
- Providing support and data.
- Developing and refining mitigation strategies.
- Assisting with the prioritization of hazards and plan objectives.
- Assisting the MJPT representatives with assignments.
- Making planning decisions regarding Plan components.
- Reviewing the Plan draft documents.

Cultivating a well-rounded, representative planning team was the responsibility of the PCOEM. Using the list of participants from the 2017 Plan as a guide, the PCOEM identified a list of potential participants and contributors to the 2022 Plan update. PCOEM initiated contact with and extended invitations to participate to jurisdictional representatives and agencies from all incorporated communities within Pima County, the Pascua Yaqui Tribe, and the Tohono O'odham Nation.

Pascua Yaqui tribal members/citizens and partners were invited to participate in the process. Due to the ongoing COVID-19 Pandemic, all planning meetings were conducted via virtual workshops, emails, phone calls, and one-on-one sessions throughout the process.

Table 3-1: Multi-Jurisdictional Planning Team Participants (participants in **bold** returning members)

Name	Jurisdiction / Organization	Planning Team Role
Ackerman, Char	Town of Oro Valley	MJPT Member, Jurisdictional Point of Contact, Lead Planner for the Town of Oro Valley
Hill, Sgt. David	City of Tucson / Office of Emergency Management	MJPT Member, Jurisdictional Point of Contact and Lead Planner for City of Tucson
Lebsack, Rita	Town of Marana	MJPT Member, Jurisdictional Point of Contact, Lead Planner for Town of Marana
Galvale, Galovale	Town of Sahuarita	MJPT Member, Jurisdictional Point of Contact, Lead Planner for the Town of Sahuarita, LPT Lead for the Town's Wastewater and Floodplain Hazard
Maese, Alexandria	AZ Department of Emergency and Military Affairs	State Mitigation Strategic Planner, Management Level Support for Planning Effort, Mitigation Strategy Development
Mesa, Paul	Pascua Yaqui Tribe Office of Emergency Management	MJPT Member, Lead Jurisdictional Point of Contact, Lead Planner for Pascua Yaqui Tribe
Moya-Flores Griselda	Pima County Office of Emergency Management	Lead Planner

An integral part of the planning process was working with other agencies and organizations, both within and outside of the participating jurisdiction's governance, to obtain specialized information and data for inclusion into the Plan or to provide more public exposure to the planning process. In addition to the adopting jurisdictions, several agencies and organizations that operate within, or have jurisdiction over small and large areas of Pima County were invited to participate in the planning process. Some were invited to the first planning meeting, while others were brought in as the MJPT discovered a need for their assistance.

The other agencies and organizations who assisted by providing data or otherwise contributing to this Plan are listed in Table 3-2. The specific jurisdiction with whom they collaborated is noted.

Table 3-2: Local Planning Team and Content Resources (participants in **bold** returning members)

Name	Agency/Dept./Division	Role/Contribution
Abraham, Peter	Town of Oro Valley	Local Planning Team Member for Town of Oro Valley
Abramovitz, Beth	Town of Sahuarita	Local Planning Team Leader for Town of Sahuarita

Table 3-2: Local Planning Team and Content Resources (participants in **bold** returning members)		
Name	**Agency/Dept./Division**	**Role/Contribution**
Acuña, Guy	Pima County Office of Emergency Management	Local Planning Team Member for Pima County, Wildfire Hazard Technical Information
Adler, Margie	Town of Oro Valley	Local Planning Team Member for Town of Oro Valley
Armendariz, Xavier	Pima County Information Technology	Local Planning Team Member for Pima, GIS Lead
Bahe, Jason	Pascua Yaqui Tribe Facilities Department	LPT Member for Pascua Yaqui Tribe, Flood Information Resource
Bellavance, Bailey	Town of Marana	LPT Member Town of Marana GIS Support
Bowlden, Michael	City of Tucson General Services Department	LPT Member for City of Tucson
Boyce, Karn	Town of Oro Valley	LPT Member for Town of Oro Valley, Water Resources
Boyer, Chuck	Town of Oro Valley	LPT Member for Town of Oro Valley
Boyle, Erin	NOAA	Climate and Weather Expert
Bran, Keith	Town of Marana	LPT Member Town of Marana, Engineering and Planning
Browning, Sharon	Pima County Health Department	LPT Member for Pima County
Burk, Daniel	Tucson Fire Department	LPT Member for City of Tucson
Canale, Todd	Davis-Monthan AFB/Fire Emergency Services	Local Planning Resource
Cardnal, Chris	City of Tucson GIS	LPT Member for City of Tucson, GIS Lead
Casadei, Anna	Town of Sahuarita	Local Planning Team Member for the Town of Sahuarita, Planning and Zoning
Catanzaro, Michael	City of Tucson General Services Department	LPT Member for City of Tucson
Chavez, Kathy	Pima County Office of Sustainability	LPT Member for Pima County, Climate Resource, Drought Hazard Lead
Conroy, Jim	Town of Marana	LPT Member for Town of Marana, Fire Hazard Mitigation Information
Conway, Michael	Arizona Geological Survey, The University of Arizona	Climate and Geological Expert
Crowe, Jonathan	Pima County Department of Transportation	LPT Member for Pima County, Landslide Hazard lead
Drozd, Ken	NOAA	Climate and Weather Expert
Espinoza, Sandra	Pima County Office of Emergency Management	LPT Member for Pima County, Management Level Support
El-Ali, Mo	Town of Marana	LPT Member for Town of Marana Public Works Information

Table 3-2: Local Planning Team and Content Resources (participants in **bold** returning members)		
Name	**Agency/Dept./Division**	**Role/Contribution**
Felix, Fred	City of Tucson Transportation and Mobility	LPT Member for City of Tucson
Flood, Jennifer	Town of Marana	LPT Member for Town of Marana, Floodplain Information
Flores, Carlos	Pascua Yaqui Tribe Fire Pascua Yaqui Tribe Department	LPT Member for Pascua Yaqui Tribe, Fire Ordinances, Laws and Codes Resource
Fortes, Tony	Land Department	LPT Member for Pascua Yaqui Tribe, GIS planning resource
Freer, Richard	Town of Oro Valley	LPT Member for Town of Oro Valley , GIS Support
Hathaway, Vic	Town of Marana	LPT Member for Town of Marana, Community Description Resource
Hitt, Greg	Pima County Capital Program Office	LPT Member for Pima County, Designated Liaison for City of South Tucson
Hoyos, Artemio	Pascua Yaqui Tribe Economic Development	LPT Member for Pascua Yaqui Tribe, Community Description, Economic and Land Use Planning Resource
Jackson, Greg	City of Tucson Parks and Recreation	LPT Member for City of Tucson
Johnson, Sgt. Steven	Town of Marana Police Department	LPT Member for Town of Marana
Kosiorowski, Joey	Green Valley Fire District	Historical Information for Wildfire Hazard
Ladd, Keith	University of Arizona	Climate Resource
Lee, Jenette	Pima County Regional Wastewater Reclamation	LPT Member for Pima County, Wastewater, Wind Hazard Lead
Leibold, Elizabeth	City of Tucson Transportation and Mobility	LPT Member for City of Tucson
Lewis, Lt. Dan	Tucson Police Department/Emergency Management	LPT Member for City of Tucson, Supervisor City of Tucson project
Luna, Fatima	City of Tucson Mayor and Council	LPT Member for City of Tucson
Lunde, Steve	Golder Ranch Fire District	LPT Member for Town of Oro Valley
Macias, Barbara	Pascua Yaqui Tribe Information & Technology Department	LPT Member for Pascua Yaqui Tribe, IT Network Resource
Matus Sr., Andre	Pascua Yaqui Tribe Office of Emergency Management	LPT Member for Pascua Yaqui Tribe, Hazard Mitigation Actions and Projects Development
Matus, Andre	Pascua Yaqui Tribe Fire Department	LPT Member for Pascua Yaqui Tribe, Wildland Fire Resource
McDowell, Jennifer	Pima County Health Department	LPT Member, Lead Planner for Pima County Health Department

Table 3-2: Local Planning Team and Content Resources (participants in **bold** returning members)		
Name	**Agency/Dept./Division**	**Role/Contribution**
McGlone, Matt	Pima County Office of Emergency Management	LPT Member, Community Outreach, Public Information Assistance for Pima County
Orchard, Lynn	Pima County Regional Flood Control	Advisory Information for Flood Hazard and Flood Notifications
Overstreet, Glenna	City of Tucson Parks and Recreation	LPT Member For City of Tucson
Quintanar, Dan	Tucson Water	LPT Member For City of Tucson
Romero, Lisa	Pima County Office of Emergency Management	LPT Member, Jurisdictional Administrative Support for Pima County
Saxe, Greg	Pima County Regional Flood Control	LPT Member, Flood Hazard Lead
Shepp, Eric	Pima County Regional Flood Control	LPT Member For Pima County, Flood Information Source
Simms, Karen	Pima County National Resources, Parks and Recreation	LPT Member For Pima County
Simms, Millini	Town of Oro Valley	LPT Member for Town of Oro Valley
Simon, Michelle	Pima County Library	Local Planning Resource, Ask A Librarian Resource For Community Profile
Small, Elias	Davis-Monthan AFB 355th Wing	Local Planning Resource
Spiker, John	Town of Oro Valley	LPT Member for Town of Oro Valley
Toma, Michael	Pascua Yaqui Tribe Fire Department	LPT Member for Pascua Yaqui Tribe, Environmental Resource
Trevillyan, Clayton	City of Tucson Planning and Development	LPT Member for City of Tucson
Valenzuela, Louie	Pima County Health Department	LPT Member, Jurisdictional Point of Contact for Pima County Health Department
Valenzuela, Steve	Pascua Yaqui Tribe Facilities Department	LPT Member for Pascua Yaqui Tribe, Community Description, Transportation, Traffic Resource

3.3 Public and Stakeholder Involvement

Public involvement and input to the planning process was encouraged cooperatively among all the participating jurisdictions using several venues throughout the revision planning cycle. This Plan remains on the county and individual jurisdiction's websites on a continual basis throughout all phases of the planning process. Once approved and adopted by each jurisdiction it will remain on Pima County's website for public review and comment. Public comments submitted through Pima County's website will be managed by Pima County disseminated to local jurisdictions for consideration and incorporation into the Plan. Stakeholders are assumed jurisdictional representatives, technical and subject matter experts and others not considered members of the public who have an interest in the development or use of the plan.

The pre-draft public involvement strategy for the Plan development included public web notices. The 2017 Plan was posted to the county website and made available for public review and comment. The local jurisdictions placed announcements on their websites linking the reader to the Plan on the county website. The post-draft strategy included

posting the draft plan to the county website, with website links from local jurisdictions, and requesting public comment. The PCOEM monitored the public notices through the county website, no questions or comments were received from either the draft or post-draft version of the Plan from the general public.

The PCOEM also reached out to surrounding counties during plan revision at regional meetings held by the Arizona Department of Emergency and Military Affairs.

For the Pascua Yaqui Tribe specifically, the Tribal Local Planning Team developed public notices that included links for capturing public feedback and comments. The initial notification of the 2022 Plan update was coordinated through the Pascua Yaqui Tribe Office of Emergency Management (PYT-OEM). In the notice circulated to the tribal communities and stakeholders, all requests for additional information, questions, or comments were routed to the PYT-OEM. The notice was also posted at the tribal administration office and included an area for comments to be submitted.

The PYT-OEM also distributed the notice for public comment on the draft of the 2022 Plan update. The notice included a link to Pima County's website for public review and comment. In addition, PYT-OEM's contact information was included as an additional method for collecting information, questions and, comments from tribal communities and stakeholders. The PYT-OEM monitored all online forums as well as in-person opportunities for public comment or feedback over the planning process update; however, no comments or feedback were submitted to be consolidated and incorporated into the Plan.

Tribal Definition of "Public"

While the Tribe does not have a specific legal definition of "public" the Tribe acknowledges its general public audience consists of enrolled tribal members, tribal-enterprise employees, and its visitors. The Pascua Yaqui Tribe has formulated the following statement to define "public" for the purposes of this planning effort to satisfy the Tribal Planning requirements:

"All residents of the Pascua Yaqui Reservation, as its boundaries may be revised from time to time."

Table 3-3: Past Public and Stakeholder Involvement

Jurisdiction	Activity or Opportunity
Pima County	• Maintained the county website that included the current Plan and provided contact information for continued comment and input. • Attended community events and engaged with the public on mitigation and preparation activities. • Conducted Emergency Management meetings with local emergency management professionals on a quarterly basis and discussed hazard mitigation events. • Worked with Pima County Regional Flood Control District on Community Rating System requirements such as planning and exercising. • Continued to improve and expand Public Notification and Warning capability, working with County DOT and PRFCD to expand monitoring, in addition to increasing awareness for partners and community members. • Maintained social media presence and focus on mitigation measures that citizens can take before monsoon and fire seasons. • Posted warning notices/pamphlets at public trailheads managed by Pima County Natural Resources, Parks, and Recreation regarding risks associated with flooding and overheating. • Provided environmental education programs that included components of monsoon safety, wildfire danger, and heat injury awareness.

Table 3-3: Past Public and Stakeholder Involvement	
Jurisdiction	**Activity or Opportunity**
City of Tucson	• City of Tucson Office of Emergency Management webpages were dedicated to preparedness and mitigation topics. • Performed annual "Operation Splash" outreach efforts to raise awareness of the dangers of driving through flooded washes and roadways. • Performed annual "Operational Freeze" outreach effort to raise awareness of the dangers of cold and freezing weather. • Utilized "Don't Get Swept Away, Find a Safer Place to Play" campaign to encourage people to avoid flooded washes and other storm water infrastructure during the monsoon season. • The Tucson Office of Emergency Management routinely utilized social media sites to share preparedness and mitigation information to the public. • Declaration signed by the Mayor and Council of September Preparedness Month, with public preparedness outreach at public events, via social media, on television etc. • Regular water conservation outreach efforts from Tucson Water Department via bill inserts, social media, television etc. • Weekly preparedness and safety tips via the Tucson Fire Department posted online and aired on television. • Monthly safety tips via the Tucson Police Department posted on social media. • Provided preparedness and mitigation brochures and pamphlets to each of the City Council Ward offices for their constituents, along with an orientation for Council staff on the mission of emergency management including mitigation efforts.
Town of Oro Valley	• Provided hazard awareness and preparedness information to the community through articles, social media, PSAs, podcasts, website, newsletters, public surveys, videos, meetings, youth outreach and education through the schools, and community presentations. • Partnered with Pima County Regional Flood Control District on post Bighorn Fire flood risks, mitigation projects, and outreach activities to properties affected. • Provided staff support and technical guidance to homeowners, businesses, and HOAs about flood mitigation projects on private property. • Expanded annual pre-monsoon education campaign and free sandbag program for Oro Valley residents. • Annual proclamation for September as National Preparedness Month, with associated messaging. • Provided information on how to sign-up for emergency notifications through CodeRed and Pima County MyAlerts. • Provided access to customer "WaterSmart" portal which encourages customers to conserve water and track usage. • Collaborated with regional partners on opportunities to engage the public through different methods.
Town of Marana	• Provided information to the public, business and first responders by participating in the Local Emergency Planning Committee (LEPC) for hazardous materials preparedness. • Provided floodplain related hazard and mitigation information to targeted properties in high-risk areas. • Provided flood hazard outreach to residents of the Town of Marana, located within the flood plain. • Provided a library of pamphlets in the Marana Municipal Complex (MMC) Lobby area for all interested parties to peruse and take for reference. • Established Water Academy which educates the community on water conservation and drought considerations.

Table 3-3: Past Public and Stakeholder Involvement	
Jurisdiction	**Activity or Opportunity**
Pascua Yaqui	• Continued mitigation activities in correlation to the Pascua Yaqui Tribe Improvement Projects program. • The Pascua Yaqui Tribe continued to use the plan for reference for profiling of cultural sites for economic development. • The Pascua Yaqui Department of Public Safety, who oversees mitigation planning, has supported the plan by referencing the plan with other tribal departments for grants and infrastructure improvement opportunities. • During Tribal Recognition Days, an information booth was set up to promote mitigation opportunities and hazard reduction.
Town of Sahuarita	• Town of Sahuarita website (https://sahuaritaaz.gov). • Town of Sahuarita Resident/Citizen Portal. • Town of Sahuarita Facebook.

Table 6-1 summarizes opportunities for continued public engagement and dissemination of information each jurisdiction plans to pursue when relevant and appropriate.

3.4 Reference Documents and Resources

Additional reference material, such as other plans, studies, reports, and technical information, was obtained during the planning process and reviewed for incorporation or reference in the updated plan. Much of the additional reference material pertained specifically to the risk assessment and the capabilities assessment. To a lesser extent, the community descriptions and mitigation strategy also benefitted from additional document and technical information research. Table 3-4 provides a reference listing of the primary resource documents and technical resources reviewed and used in the Plan. Detailed bibliographic references for the risk assessment are provided in each hazard risk profile in Section 4 as footnotes.

Table 3-4: Resource documents reviewed and incorporated in this plan	
Resource	**Description of Reference and Its Use**
AZ Department of Emergency and Military Affairs	Resource for state and federal disaster declaration information for Arizona. Also a resource for hazard mitigation planning guidance and documents.
AZ Department of Water Resources	Resource for data on drought conditions, statewide drought management, and land subsidence all used in risk assessment.
AZ Geological Survey	Resource for earthquake, fissure, landslide/mudslide, subsidence, and other geological hazards. Used in the risk assessment.
Census Bureau	Source for 2020 Census demographics.
Federal Emergency Management Agency	Guidance (How-To series) for floodplain and flooding related NFIP data (mapping, repetitive loss, NFIP statistics), and historic hazard incidents. Used in the risk assessment and mitigation strategy.
HAZUS-MH	Based data sets within the program were used in the vulnerability analysis.
National Climatic Data Center	Online resource for weather related data and historic hazard event data. Used in the risk assessment.
National Weather Service	Source for hazard information, data sets, and historic event records. Used in the risk assessment.
National Wildfire Coordination Group	Source for historic wildfire hazard information.
Pima County Hazard Mitigation Plan (2017)	FEMA approved hazard mitigation plan that is the subject of the plan update process.
Arizona State Climatologist	Reference for weather characteristics for the county. Used for community descriptions and risk assessment.
US Forest Service	Source for local wildfire data.
US Geological Survey	Source for geological hazard data and incident data. Used in the risk assessment.
Western Regional Climate Center	Online resource for climate data used in climate discussion.

SECTION 4: RISK ASSESSMENT

4.1 Risk Assessment

One of the key elements to the hazard mitigation planning process is the risk assessment. In performing a risk assessment, a community determines "what" can occur, "when" (how often) it is likely to occur, and "how bad" the effects are, are generally categorized into the following measures:

Hazard Identification and Screening

Assessing Vulnerability to Hazards

Hazard Profiling

The risk assessment for Pima County and participating jurisdictions was performed using a countywide, multi-jurisdictional perspective, with much of the information gathering and development being accomplished by the MJPT. This integrated approach was employed because many hazard events are likely to affect numerous jurisdictions within the county and are not often relegated to a single jurisdictional boundary. The vulnerability analysis was performed in a way such that the results reflect vulnerability at an individual jurisdictional level and at a countywide level. For most of the hazards, quantitative vulnerability was removed, and a qualitative vulnerability created by each of the jurisdictions for the hazards that they identified as priorities in their area.

4.2 Hazard Identification

For this Plan, the list of hazards identified in the 2017 Plan were reviewed by the planning team with the goal of refining the list to reflect the hazards that pose the greatest risk to the jurisdictions represented by this Plan.

Table 4-1: Comparison of Plan Hazards

2017 Hazards for Plan	2022 Hazards for Plan
• Drought • Earthquake • Extreme Cold • Extreme Heat • Flood • Landslide • Severe Wind • Wildfire	• Drought • Earthquake • Extreme Cold • Extreme Heat • Flood • Landslide • Severe Wind • Wildfire

The review included an initial screening process to evaluate each of the listed hazards based on the following considerations:

- Experiential knowledge on behalf of the planning team regarding the relative risk associated with the hazard;
- Documented historic context for damages and losses associated with past events (especially events that have occurred during the last plan cycle);
- The ability/desire of planning team to develop effective mitigation for the hazard under current DMA 2000 criteria;
- Compatibility with the state hazard mitigation plan hazards; and
- Duplication of effects attributed to each hazard.

Each jurisdiction evaluated and rated the hazards using the Calculated Priority Risk Index (CPRI) and met to discuss results amongst the jurisdictions after they had chosen hazards for their jurisdiction to address.

The table below summarizes federal and state disaster declarations that included Pima County. If a hazard is not listed, that means there were no events reported for that hazard.

Table 4-2: Pima County Declared Disaster Costs (1995 – 2020)

Incident Type	Disaster Area	Declaration Date		State Declaration	Expenditures	
		State	Federal	Terminated	State	Federal
	Statewide - Wheat (Karnal Bunt)	03/13/96		10/21/98	$ 796,455.78	
Wildfire	Wildfire – Statewide	05/16/96		10/21/98	$ 1,000,728.63	
Drought	Drought – Statewide	06/07/96		10/22/98	$ 211,499.19	
	Red Imported Fire Ant – Statewide	01/20/99				
	Wildland – Statewide	05/06/99		05/10/00	$4,894.09	
Drought	Statewide Drought	06/23/99			$ 4,894.09	
Flooding	Pima County Flash Flood Emergency - Pima County	08/16/99		02/23/00	$ -	
	Y2K – Statewide	01/05/00		02/23/00	$ 23,073.19	
Severe Wind, Flooding	Gila Bend/Ajo Storm Emergency Maricopa & Pima County	08/01/17		02/02/19	$14,237	
	Terrorism Incident September 2001 – Statewide	09/12/01		05/19/09	$ 2,913,677.35	
	Forest Health Emergency – Statewide	05/22/03		05/19/09	$ 2,378,061.14	
Wildfire	Aspen Fire - Pima & Pinal County	06/19/03		07/14/03	$675,568	$5,363,459
	Mediterranean Fruit Fly Emergency - La Paz, Pima, Santa Cruz & Yuma	09/23/04		09/16/05	$197,421	
	Border Security Emergency - Cochise, Pima, Santa Cruz & Yuma	08/15/05		05/19/09	$1,492,758.44	
	Operation Good Neighbor – Statewide	09/03/05	09/12/05	10/12/12	$ 113,040.05	$ 5,726,164.08
Flooding	Flash Flood Emergency - Pima County	09/16/05		02/07/08	$256,948.47	
	Glassy-Winged Sharpshooter Inf. - Cochise, Yuma, Pima, Pinal, Maricopa & Santa Cruz	06/23/06		05/19/09	$567,257	
Severe Wind, Flooding	Monsoons & Flooding - Pinal, Pima, Gila, Graham, Greenlee, Navajo	08/08/06	09/07/06		Est. $2,409,278	$12,141,752
Flooding	January 2008 Severe Precipitation Emergency - Pima County	02/19/08		01/28/11	$231,798	
Winter Storm	January 2010 Severe Winter Storm - Apache, Coconino, Gila, Greenlee La Paz, Maricopa, Mohave, Navajo, Pima, Pinal, Yavapai, City of Yuma	01/21/10	03/18/10		Est. $4,497,895	Est. $14,210,904

Table 4-2: Pima County Declared Disaster Costs (1995 – 2020)						
	State Wide Opioid Health Emergency	06/05/17		05/29/18		
	State Wide Wildfire Suppression	04/23/17		06/30/17	$ 5,450,375.34	
Winter Storms	February 2019 Winter Storms - Apache, Coconino, Gila, Mohave, Navajo, Pima, and Yavapai Counties	02/28/19 #1 07/18/19			Est $ 2,200,000.00	
	Riots - Phoenix, Flagstaff, Gilbert, DPS, Kingman, Cochise County, Eloy, NAU, Pima County, Tucson, ASU, Buckeye, Chandler, Glendale, Maricopa County Sheriff's Office, Mesa, Paradise Valley, Scottsdale, Surprise, Tempe	05/31/2020 12/21/2020			Est. $200,000	
				Totals	$ 25,812,670.36	$ 37,442,279.75
Source: DEMA Emergency Declarations 1966 to Present, 2021 https://dema.az.gov/emergency-management/operationscoordination/recovery-branch/infrastructure						

4.3 Vulnerability Analysis Methodology

General

The following sections summarize the methodologies used to perform the vulnerability analysis portion of the risk assessment. For this update, the entire vulnerability analysis was either revised or updated to reflect the availability of new hazard and census data. Individual jurisdictions discuss their vulnerably to chosen hazards in the appropriate section.

Climate Change

Climate is a major driver of our weather and influences the severity of cascading effects we confront as Emergency Managers. The quantity and intensity of disasters continues to increase. As such, it is important to increase awareness and understanding of climate change as a compounding threat and existing and future vulnerabilities as well as potential solutions. In recent years, FEMA and others have begun to take a harder look at the impacts of climate change on natural hazards and the mitigation planning process. In March 2016, FEMA released new state mitigation planning guidance that will require all state hazard mitigation plans to address climate change beginning with all updates submitted after March 2016[1]. FEMA's National Advisory Council noted that the effects of climate change could manifest as a "threat multiplier". When considering probabilities of hazard events, it is typical to make the implicit assumption that the past is a prologue for the future; however, trending changes to climate related variables may require broader thinking and projections to develop mitigation actions and projects that account for those changes.[2]

The scope and severity of cause and impacts relating to climate change are still difficult to predict and highly debated. There is, however, a growing body of science and research that indicates a few noticeable trends that should be considered when evaluating natural hazard vulnerability and risk. In 1989, the U.S. Global Change Research Program (USGCRP) was established by Presidential Initiative and later mandated by Congress in the Global Change Research Act of 1990 with the stated purpose of assisting "the Nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change." In 2018, the USGCRP released the 4th National Climate Assessment (NCA), which is a comprehensive compilation of the latest body of work and science on the topic of

[1] FEMA, 2016, State Mitigation Plan Review Guide, released March 2016, effective March 2016, FP 302-094-2
[2] Greenlee County All Hazard Mitigation Plan, 2021

climate change. The NCA results and discussion are divided into regions to focus the discussions and conclusions to a regional perspective. The Southwest region includes the states of Arizona, California, Colorado, Nevada, New Mexico, and Utah. According to Chapter 25 of the NCA[3], the Southwest regional climate change impacts noted in the recent research include increased heat, drought, and insect outbreaks that result in more wildfires, declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas. In its 2018 report, the NCA released the following "Key Messages" for the Southwest Region:

- Water for people and nature in the Southwest has declined during droughts, due in part to human-caused climate change. Intensifying droughts and occasional large floods, combined with critical water demands from a growing population, deteriorating infrastructure, and groundwater depletion, suggest the need for flexible water management techniques that address changing risks over time, balancing declining supplies with greater demands.

- The integrity of Southwest forests and other ecosystems and their ability to provide natural habitat, clean water, and economic livelihoods have declined as a result of recent droughts and wildfire due in part to human-caused climate change. Greenhouse gas emissions reductions, fire management, and other actions can help reduce future vulnerabilities of ecosystems and human well-being.

- Many coastal resources in the Southwest have been affected by sea level rise, ocean warming, and reduced ocean oxygen—all impacts of human-caused climate change—and ocean acidification resulting from human emissions of carbon dioxide. Homes and other coastal infrastructure, marine flora and fauna, and people who depend on coastal resources face increased risks under continued climate change.

- Traditional foods, natural resource-based livelihoods, cultural resources, and spiritual wellbeing of Indigenous peoples in the Southwest are increasingly affected by drought, wildfire, and changing ocean conditions. Because future changes would further disrupt the ecosystems on which Indigenous peoples depend, tribes are implementing adaptation measures and emissions reduction actions.

- The ability of hydropower and fossil fuel electricity generation to meet growing energy use in the Southwest is decreasing as a result of drought and rising temperatures. Many renewable energy sources offer increased electricity reliability, lower water intensity of energy generation, reduced greenhouse gas emissions, and new economic opportunities.

- Food production in the Southwest is vulnerable to water shortages. Increased drought, heat waves, and reduction of winter chill hours can harm crops and livestock; exacerbate competition for water among agriculture, energy generation, and municipal uses; and increase future food insecurity.

- Heat-associated deaths and illnesses, vulnerabilities to chronic disease, and other health risks to people in the Southwest result from increases in extreme heat, poor air quality, and conditions that foster pathogen growth and spread. Improving public health systems, community infrastructure, and personal health can reduce serious health risks under future climate change.

FEMA has established that future changes in probabilities and severity of hazard events influenced by climate change should be addressed during mitigation planning. Accordingly, the risk assessment portion of the Plan provides the factual basis for activities that reduce future losses from the identified hazards impacting our community.

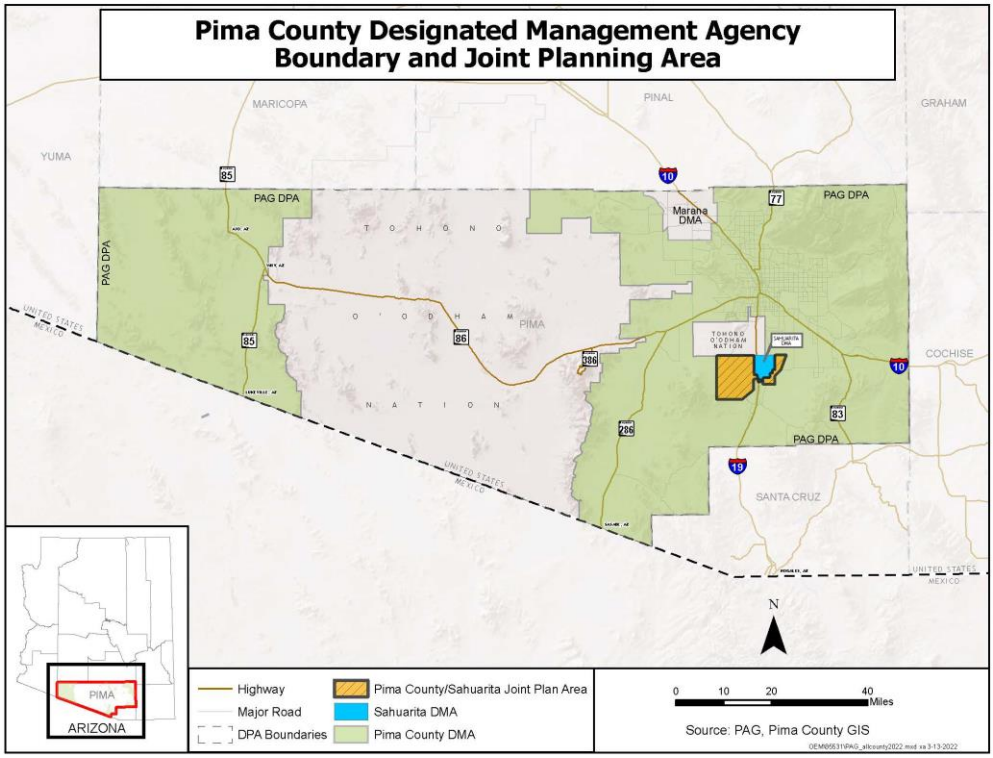
Wastewater - Multi-Jurisdictional Overview

Public wastewater collection systems and wastewater treatment facilities are located within one of three wastewater Designated Management Areas (DMAs) in Pima County: (1) Pima County DMA - operated by the Pima County Regional Wastewater Reclamation Department (PCRWRD), (2) the Town of Marana DMA and (3) the Town of Sahuarita DMA. The Pima County DMA area includes the entire county area, excluding Tohono O'odham Nation and Pascua Yaqui Tribe lands and the areas associated with the Sahuarita and Marana DMAs. Pascua Yaqui Nation and

[3] Fourth National Climate Assessment, Chapter 25: Southwest, https://nca2018.globalchange.gov/chapter/25/

the Tohono O'odham Nation lands are not part of the DMA but sewer service is provided through Intergovernmental Agreements with Pima County. Also within Pima County are non-DMA, non-municipal, wastewater facilities that are operated by private entities (e.g. Town of Ajo, Desert Museum, etc.).

- City of Tucson
- City of South Tucson
- Pascua Yaqui Nation (Intergovernmental Agreement – Sewer Service)
- Tohono O'odham Nation (San Xavier District – Sewer Service Agreement)
- Town of Marana – (excluding Marana DMA)
- Town of Oro Valley
- Town of Sahuarita – (excluding Sahuarita DMA)
- Unincorporated Pima County – (e.g. Mt. Lemmon-Summerhaven, Green Valley, Avra Valley, Corona de Tucson, Arivaca Junction)



Source: Pima County GIS

Figure 4-1 Designated Management Agency Boundary

In service of the jurisdictions noted above, Pima County owns and operates two major metropolitan and five sub-regional water reclamation facilities with the combined total capacity to treat up to 95 million gallons of wastewater per day. Wastewater conveyance and treatment assets within Pima County include 3,500 miles of sewer lines, 21 active pump stations, 67,000 manholes, 8,400 cleanouts, 28 odor control sites, and 36 permanent flow meters. Pima County treats and recycles more than 58 million gallons daily of the community's wastewater into reclaimed water.

High-quality recycled wastewater supports aquatic habitat along the Santa Cruz River, allowing the return of the endangered Gila Topminnow and increasing the potential for the return of other native species. Clean, high-quality treated wastewater also contributes to community drought mitigation measures, such as reclaimed water irrigation programs and groundwater recharge.

All-Hazard incidents (such as power outages, flood, landslides and subsidence, extreme weather, drought, pandemic, cyber, and wildfires) have the potential for significant impacts to public health, the environment and other infrastructure sectors due to loss of wastewater service.

Calculated Priority Risk Index (CPRI) Evaluation

The first step in the vulnerability analysis (VA) is to assess the perceived overall risk for each of the plan hazards using the Calculated Priority Risk Index (CPRI). The CPRI value is obtained by assigning varying degrees of risk to four categories for each hazard and then calculating an index value based on a weighting scheme. Table 4-3 summarizes the CPRI risk categories and provides guidance regarding the assignment of values and weighting factors for each category. Table 4-4 summarizes the CPRI results for each jurisdiction and unincorporated Pima County. Jurisdictions each worked under their lead planner to complete their own CPRI scores and then the MJPT met to review all scored hazards for consistency. In addition to Table 4-4, each hazard section has a CPRI table where the jurisdictions in bold have chosen that hazard for the 2022 Plan.

Table 4-3: Calculated Priority Risk Index Categories and Risk Levels

CPRI Category	Degree of Risk			Assigned Weighting Factor
	Level ID	Description	Index Value	
Probability	Unlikely	▪ Extremely rare with no documented history of occurrences or events. ▪ Annual probability of less than 0.001.	1	45%
	Possibly	▪ Rare occurrences with at least one documented or anecdotal historic event. ▪ Annual probability that is between 0.01 and 0.001.	2	
	Likely	▪ Occasional occurrences with at least two or more documented historic events. ▪ Annual probability that is between 0.1 and 0.01.	3	
	Highly Likely	▪ Frequent events with a well-documented history of occurrence. ▪ Annual probability that is greater than 0.1.	4	
Magnitude/ Severity	Negligible	▪ Negligible property damages (less than 5% of critical and non-critical facilities and infrastructure). ▪ Injuries/illnesses are treatable with first aid and there are no deaths. ▪ Negligible quality of life lost. ▪ Shut down of critical facilities for less than 24 hours.	1	30%
	Limited	▪ Slight property damages (greater than 5% and less than 25% of critical and non-critical facilities and infrastructure). ▪ Injuries/illnesses do not result in permanent disability and there are no deaths. ▪ Moderate quality of life lost. ▪ Shut down of critical facilities for more than 1 day and less than 1 week.	2	
	Critical	▪ Moderate property damages (greater than 25% and less than 50% of critical and non-critical facilities and infrastructure). ▪ Injuries/illnesses result in permanent disability and at least one death. ▪ Shut down of critical facilities for more than 1 week and less than 1 month.	3	
	Catastrophic	▪ Severe property damages (greater than 50% of critical and non-critical facilities and infrastructure).	4	

Table 4-3: Calculated Priority Risk Index Categories and Risk Levels

		▪ Injuries/illnesses result in permanent disability and multiple deaths. ▪ Shut down of critical facilities for more than 1 month.		
Warning Time	Less than 6 hrs	Self-explanatory.	4	15%
	6 to 12 hrs	Self-explanatory.	3	
	12-24 hrs	Self-explanatory.	2	
	More than 24 hours	Self-explanatory.	1	
Duration	Less than 6 hrs	Self-explanatory.	1	10%
	Less than 24 hrs	Self-explanatory.	2	
	Less than one week	Self-explanatory.	3	
	More than one week	Self-explanatory.	4	

Table 4-4: Hazards to Be Mitigated by Jurisdiction

Jurisdiction	Drought	Earthquake	Extreme Cold	Extreme Heat	Flood	Landslide	Severe Wind	Wildfire
Unincorporated Pima County	x			x	x	x	x	x
Marana					x			x
Oro Valley	x			x	x			x
Pascua Yaqui Tribe				x	x			x
Sahuarita	x			x	x			
South Tucson	No data provided							
Tucson	x	x	x	x	x		x	

Asset Inventory

In 2017, the PCOEM obtained the critical infrastructure dataset from the Department of Homeland Security but was unable to use the data in HAZUS. The Pima County Geographical Information System team member was unable to integrate the data in a meaningful way. A detailed asset inventory was performed for the 2022 Plan to establish an accurate baseline data set for assessing the vulnerability of each jurisdiction's assets to the hazards previously identified.

Each jurisdiction is responsible for identifying its critical facilities and infrastructure. For the purpose of the Plan, the working definition for:

Assets are: *Any natural or human-caused feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.*

Critical facilities and infrastructure is: *Systems, structures and infrastructure within a community whose incapacity or destruction would:*

- *Have a debilitating impact on the defense or economic security of that community*
- *Significantly hinder a community's ability to recover following a disaster*

The following criteria were used to define critical facilities and infrastructure for this analysis:

1. **Communications Infrastructure:** Telephone, cell phone, data services, radio towers, and internet communications, which have become essential to the continuity of business, industry, government, and military operations.
2. **Electrical Power Systems:** Generation stations and transmission and distribution networks that create and supply electricity to end-users.
3. **Gas and Oil Facilities:** Production and holding facilities for natural gas, crude and refined petroleum, and petroleum-derived fuels, as well as the refining and processing facilities for these fuels.
4. **Banking and Finance Institutions:** Banks, financial service companies, payment systems, investment companies, and securities/commodities exchanges.
5. **Transportation Networks:** Highways, railroads, ports and inland waterways, pipelines, and airports and airways that facilitate the efficient movement of goods and people.
6. **Water Supply Systems:** Sources of water; reservoirs and holding facilities; aqueducts and other transport systems; filtration, cleaning, and treatment systems; pipelines; cooling systems; and other delivery mechanisms that provide for domestic and industrial applications, including systems for dealing with water runoff, wastewater, and firefighting.
7. **Government Services:** Capabilities at the local, tribal, state, and federal levels of government required to meet the needs for essential services to the public.
8. **Emergency Services:** Medical, police, fire, and rescue systems.

Table 4-5 summarizes the facility counts based on data from the HAZUS general building stock database. It should be noted that the facility counts summarized in Table 4-5 do not represent a comprehensive inventory of all the category facilities that exist within the county.

Table 4-5 Asset inventory structure counts by category and jurisdiction as of December 2021

Jurisdiction	Communication Infrastructure	Electrical Power systems	Gas and Oil Facilities	Banking and Finance institutions	Transportation Networks	Water Supply Systems	Government Services	Emergency Services	Educational*	Cultural*	Business*	Flood Control*	Residential*	Agriculture*
Marana	104	5	0	2	78	23	18	6	17	0	857	44	34,733	26
Oro Valley	31	1	0	2	53	60	13	8	16	0	790	24,479	13,078	17
Pascua Yaqui Tribe	4	0	1	0	1	0	1	5	2	0	3	0	3610	0
Sahuarita	16	1	0	1	75	16	13	3	11	0	40	7	5,834	3
South Tucson	1	0	0	0	3	0	3	1	4	1	169	0	1573	1
Tucson	657	13	1	15	413	17	83	53	302	4	7952	282	164,285	263
Pima County	723	9	0	10	424	61	75	56	130	12	4,104	714	152,617	253
County-Wide Totals	1,536	29	3	30	1,047	177	206	132	482	17	13,915	1179	375,730	563

*Assets were derived from HAZUS and included for context.

Other assets such as public libraries, schools, businesses, museums, parks, recreational facilities, historic buildings or sites, churches, residential and commercial subdivisions, apartment complexes, and so forth, are typically not classified as critical facilities and infrastructure unless they serve a secondary function to the community during a disaster emergency (e.g. - emergency housing or evacuation centers).

Loss Estimations

The hazards profiled in this Plan revision may not include quantitative exposure and loss estimates. The vulnerability of people and assets associated with some of the hazards is nearly impossible to evaluate given the uncertainty associated with where these hazards will occur as well as the relatively limited focus and extent of the damage. Instead, a qualitative review of vulnerability will be discussed to provide insight into the nature of losses that are associated with the hazard. For subsequent updates of this Plan, the data needed to evaluate these unpredictable hazards may become refined such that comprehensive vulnerability statements and thorough loss estimates can be made. Loss estimations for Flood to meet National Flood Insurance Program requirements are updated in the 2022 revision and found in the Flood Hazard Section 4.4.5.

Development Trend Analysis

The updated analysis will focus on the potential risk associated with projected growth patterns and their intersection with the Plan identified hazards.

Specifically, for the Pascua Yaqui Tribe, a subdivision of 30 homes were developed within the last reporting period. This was a HUD project; the homes have safe zones around them for the wildfire urban interface. They worked with their Land and Development, Facilities Management, and Housing Department to make sure the development has adequate drainage and infrastructure to reduce flood hazards. The Housing Department has increased the standard for windows and insulation and other construction materials to reduce the exposure to extreme temperatures with energy efficient design and construction. The Pascua Yaqui Tribe will continue working to improve residential and rental properties to provide affordable housing solutions for its membership; Phase I of these projects consists of the construction of 50 single-family units, currently in process. Phase II will consist of 27 town-home dwellings within 7 building structures. Phase III is in its incipient development; however, initial plans are for 50, one to two-bedroom units within a three-four story structure.

Cultural and sacred sites are of high priority to the Pascua Yaqui Tribe and special attention is needed when considering hazard mitigation of these areas. Because of their cultural importance, these sites require special attention and protection. Normally, the Tribe does not share the location of these sites and areas. For this reason, these sites and areas will not be included in this Plan. The Pascua Yaqui Tribe will ensure within its internal planning efforts that these sites and areas are included in their mitigation activities. Cultural and Sacred sites are protected but are available for tribal use. Information on sites can be requested through the Land Department which is located at 7474 S. Camino Del Oeste. The Land Office Director can be reached at 520-879-5288. A separate appendix will be provided as an appendix to this plan for tribal use upon adoption with approximate areas but not exact locations of cultural and sacred sites.

4.4 Hazard Risk Profiles

The following sections summarize the risk profiles for each of the Plan hazards identified in Section 4.1. For each hazard, the following elements are addressed to present the overall risk profile:

- **Description**
- **History**
- **Extent**
- **Probability of Future Events**
- **Vulnerability**
  - **CPRI Results**
  - **Loss Estimations**
- **Changes in Development in Hazard Area**

Much of the 2022 Plan data has been updated, incorporated, and revised to reflect current conditions and planning team changes. Discussions for each hazard are limited to state and county impacts; however, jurisdictions may discuss historical events in their vulnerability statements.

4.4.1 Drought

Description

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Drought is a temporary aberration from normal climatic conditions; thus, it can vary significantly from one region to another. Drought is different from aridity, which is a permanent feature of the climate in regions where low precipitation is the norm, as in a desert.[1]

Drought is a complex natural hazard on which human factors, such as water demand and water management, can exacerbate the impact. The following are three commonly used definitions:[1]

- Meteorological drought is usually defined based on the degree of dryness, as compared to some "normal" or average, and the duration of the dry period.
- Hydrological drought usually occurs following periods of extended precipitation shortfalls that affect water supplies such as stream flows, reservoir and lake levels, or groundwater.
- Agricultural drought links various characteristics of meteorological drought to agricultural impacts, focusing on precipitation shortages, soil water deficits, reduced groundwater or reservoir levels needed for irrigation, and so forth.

The effects of drought increase with duration as more moisture-related activities are impacted. Non-irrigated croplands are most susceptible to precipitation shortages. Many rangelands and irrigated agricultural crops do not respond to moisture shortage as rapidly but yields during periods of drought can be substantially affected. During periods of severe drought, lower moisture in plant and forest fuels create an increased potential for devastating wildfires. In addition, lakes, reservoirs, and rivers can be subject to water shortages that affect recreational opportunities, irrigated crops, and availability of water supplies for activities such as fire suppression and human consumption, and the natural habitats of animals. Socioeconomic effects include higher unemployment and lower land values. Insect infestation can also be a particularly damaging impact by severe drought conditions.

The US Drought Monitor's (USDM) drought intensity scale is composed of five different levels: D0, D1, D2, D3, and D4. The abnormally dry category, D0, corresponds to an area experiencing short-term dryness that is typical with the onset of drought. This type of dryness can slow crop growth and elevate fire risk to above average. This level also refers to areas coming out of drought, which have lingering water deficits and pastures or crops that have not fully recovered. It is also important to note that scientists only consider D0 level areas to be dry, and they are not necessarily experiencing drought conditions.

The moderate drought category, D1, corresponds to an area where damage to crops and pastures can be expected and where fire risk is high, while stream, reservoir, or well levels are low. The severe drought category, D2, corresponds to an area where crop or pasture losses are likely, fire risk is very high, water shortages are common, and water restrictions are typically voluntary or mandated. The extreme drought category, D3, corresponds to an area where major crop and pasture losses are common, fire risk is extreme, and widespread water shortages can be expected requiring restrictions. The highest category, exceptional drought, or D4, corresponds to an area experiencing exceptional and widespread crop and pasture losses, fire risk, and water shortages that result in water emergencies.[2]

[1] National Weather Service. (2008, May). *Drought Public Fact Sheet*. Retrieved 2016, from http://www.nws.noaa.gov/os/brochures/climate/DroughtPublic2.pdf

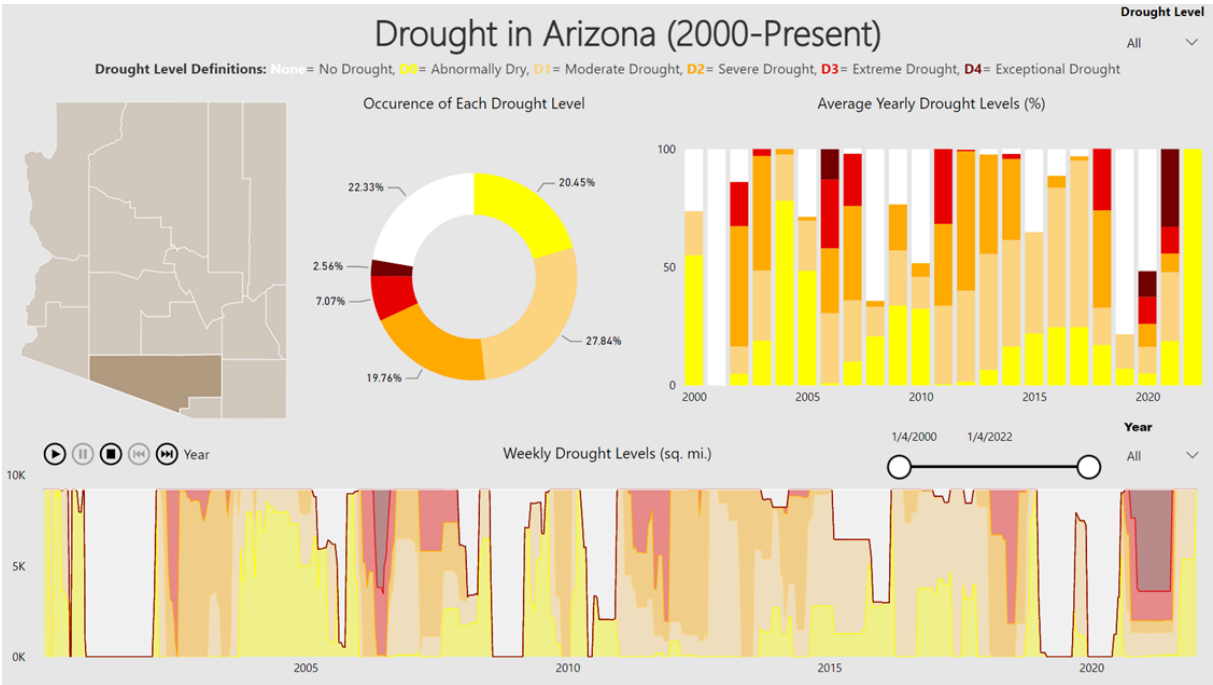
[2] DROUGHT: Degrees of Drought Reveal the True Picture | National Centers for Environmental Information (NCEI) formerly known as National Climatic Data Center (NCDC) (noaa.gov)

History

Arizona has been in a state of long-term drought since the mid-1990s according to the Arizona Department of Water Resources 2020 Arizona Drought Preparedness Annual Report[3]. Figure 4-2 shows the weekly drought conditions from 2000 to 2022 for Pima County.

Over the past plan cycle (2016-2021), Pima County has been included as a primary county in USDA Secretarial drought disaster declarations for crop years 2017, 2018. 2019, 2020, and 2021. (USD) [4]

Figure 4-2 also illustrates the time series of drought conditions in Pima County from January 4, 2000 and January 4, 2022. The donut-shaped graph, to the right of the Arizona map, shows the average percentage of each drought level from 2000 to present. The bar chart, to the right of the donut-shaped graph, shows the average percentage of each drought level by year from 2000 to present. The time-series graph on the bottom of the dashboard shows weekly drought levels in square miles for the state.



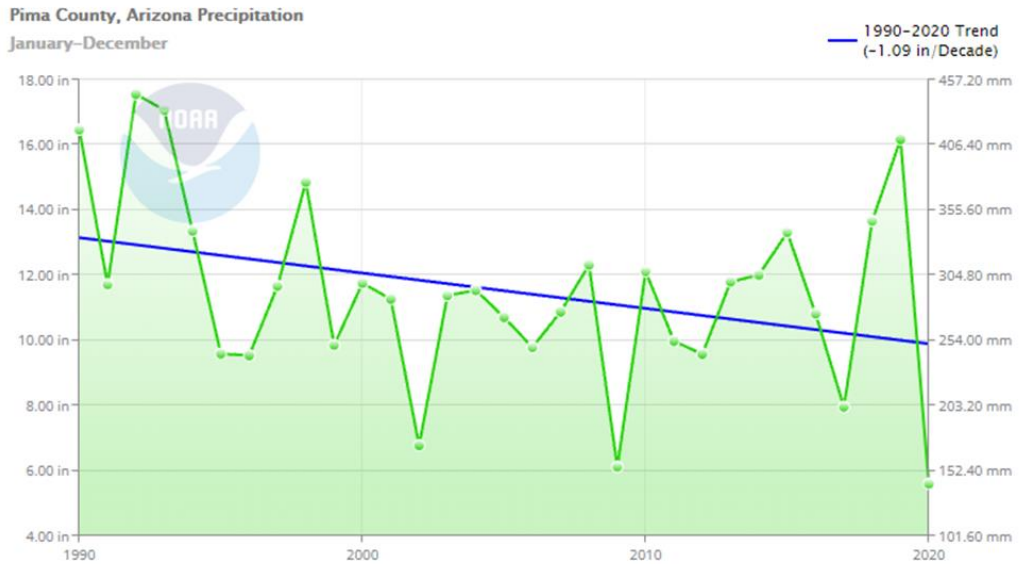
Source: ***Drought Data Dashboard | Arizona Department of Water Resources (azwater.gov)***

Figure 4-2: ADWR Drought Dashboard 2000-2022

[3] ADWR's 2020 Arizona Drought Preparedness Annual Report, https://new.azwater.gov/sites/default/files/media/2020_AZDroughtPrepAnnualReport.pdf

[4] USDA Disaster Designation Information https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/disaster-designation-information/index

Figure 4-3 depicts precipitation data from NCEI regarding average Pima County precipitation variances from normal.



Source: Graph created at NCEI Climate at a Glance https://www.ncdc.noaa.gov/cag/county/time-series

Figure 4-3: Pima County average precipitation variances based on 1990-2020 trend.

The following is a representative sample of drought events that have impacted the County:

2017-2018
The extreme drought (D3) category was reached in late January across southeast Pima County, Santa Cruz County, and far southwest Cochise County including portions of the Tohono O'odham Nation, the Baboquivari and, Santa Rita, Mountains.

Below normal precipitation occurred each month from August of 2017 through January of 2018. Soil moisture readings were well below normal and ranked below the 20th percentile. Although most of the area received between 2 and 4 inches of precipitation from one storm system in mid-February, overall soil moisture readings only improved slightly, and generally remained ranked below the 20th percentile. Wildfire activity was suppressed as a result of the widespread precipitation. While some rain did fall in the extreme drought area, amounts were light, ranging from 10% to 50% of normal for March in northern areas and less than 25% of normal in southern areas. Wildfire activity picked up in April with at least five notable human-caused wildfires occurring in or near the Extreme Drought area.

Extreme drought (D3 category) expanded across the western half of Pima County and parts of southeast Pinal County in May. Light rainfall amounts occurred on one day during the month, but this was not sufficient to stave off the drought's expansion. Soil moisture values in the western deserts were ranked below the 10th percentile.

2019
The ADWR Annual Report Water Year 2019 describes conditions for Pima County as follows: [5]

Short-Term (USDM): Water Year 2019 started with a mix of Moderate Drought in western and eastern Pima County and a central pocket of Severe Drought. Through November, drought improved across Pima County as Moderate Drought receded and Abnormally Dry conditions expanded across the County. By January, there was improvement

[5] ADWR's 2019 Arizona Drought Preparedness Annual Report, https://new.azwater.gov/sites/default/files/media/2019_ArizonaDroughtPreparednessAnnualReport_Final_WebVersion.pdf

with Abnormally Dry conditions covering the eastern and southeastern Pima County with no drought in central and western corners. In February, drought receded all across Pima County leaving the county drought-free. By September, Abnormally Dry conditions returned in northern Pima County. Abnormally Dry conditions expanded across the County with Moderate drought across most of Pima County as drought worsened.

Long-Term (MTC): From October to December, western Pima County was in Extreme and Severe Drought that was radiating to the east with a large part of Moderate Drought in east corners. By January, Extreme Drought had receded in the western areas, and Abnormally Dry conditions and No Drought expanded in eastern Pima County. Drought conditions continued to recede through the end of the water year with expansion of drought recovery into eastern Pima County.

2020

The extreme drought (D3) category was reached during late August and continued throughout September across the sections of southeast Arizona.

Below normal precipitation occurred each month from April through August of 2020 and the summer was the hottest on record in many locations. Several lightning-caused wildfires and at least one human-caused wildfire spread rapidly due to dry fuels and continued into September.

Dry, hot conditions in May created prime growth conditions for the lightning-caused Bighorn fire. The Bighorn fire started in June and ran across the Santa Catalina Mountains consuming more than a hundred thousand acres before being put out in late July.

Aside from isolated thunderstorms that produced heavy rain near the Pima/Cochise county line on the September 8th, most of the area received less than 0.25 of rainfall during September, with continued record-breaking heat. While the heavy rain on the 8th doused the relatively small Spud Rock Fire in the Rincon Mountains, several other lightning-caused wildfires that started in August continued into September due to dry conditions and the lack of monsoon rainfall.

In October, the extreme drought (D3) category, expanded further to include all of the Tohono O'odham Nation. Extreme drought continued across all of southeast Arizona and the exceptional drought (D4) category began in eastern portions of Pima County.
Tucson recorded its fifth warmest October on record and while most of October was dry and warmer than normal, Tucson recorded its 4th earliest fall freeze on record, which was brought on by an early-season winter storm that also produced low elevation snow during the last week of the month. Nevertheless, precipitation totals from this storm were generally less than a quarter-inch in the valleys and not enough to stop drought conditions from deteriorating further. Several human-caused wildfires took hold during October. The largest that month was the Encinos Fire which consumed nearly 15,000 acres along and east of the Baboquivari Mountains in Pima County. Soil moisture readings remained well below normal, falling to below the 5th percentile ranking in most areas.

The exceptional drought (D4) category expanded across central Pima County during November. The extreme drought (D3) category, which began in late August and expanded through October, expanded slightly into the Huachuca Mountains and continued across the rest of southeast Arizona except for western Pima County. Precipitation totals for the month, which fell in the form of valley rain and mountain snow primarily November 7th through the 9th, totaled 0.10 to 1 inch. The 0.15 inch of rain recorded at the Tucson International Airport was the only measurable rainfall received during September, October, and November, resulting in the 2nd driest autumn on record. November totals across southeast Arizona were 0.5 to 1.5 inches below normal for the month and were not enough to keep drought conditions from further deteriorating. Soil moisture readings remained below the 5th percentile ranking in most areas.

2021

The exceptional (D4) and extreme (D3) drought categories continued across a large part of southeast Arizona during January through June, with the exception of western Pima County. Most areas only tallied 0.5 or less for the month, which is close to normal. A few locations received 1-1.5 inches of rain, but that was not enough to make up for record rainfall deficits over the past 12 to 15 months. Soil moisture readings remained below the 5th percentile ranking across

most of southeast Arizona. Numerous human and lightning-caused wildfires occurred, five of which grew to more than 10,000 acres during the hot, dry, and windy month.

A wet July caused the exceptional (D4) drought category and extreme (D3) drought category to cease across nearly all of southeast Arizona. The extreme (D3) drought category remained across parts of the Tohono O'odham Nation. July rainfall varied widely from 2 to 15 inches across southeast Arizona. In areas where the drought lingered through the end of the month, this equated to 75% to 125% of normal rainfall while areas in which the drought eased further rainfall tallied as much as 400%of normal. July ranked as the wettest on record for any month at the Tucson International Airport where 8.06 inches was recorded. The rainfall caused wildfire season to end and soil moisture readings to improve from below the 10th percentile to between the 30th and 70th percentiles by month's end.

Extent

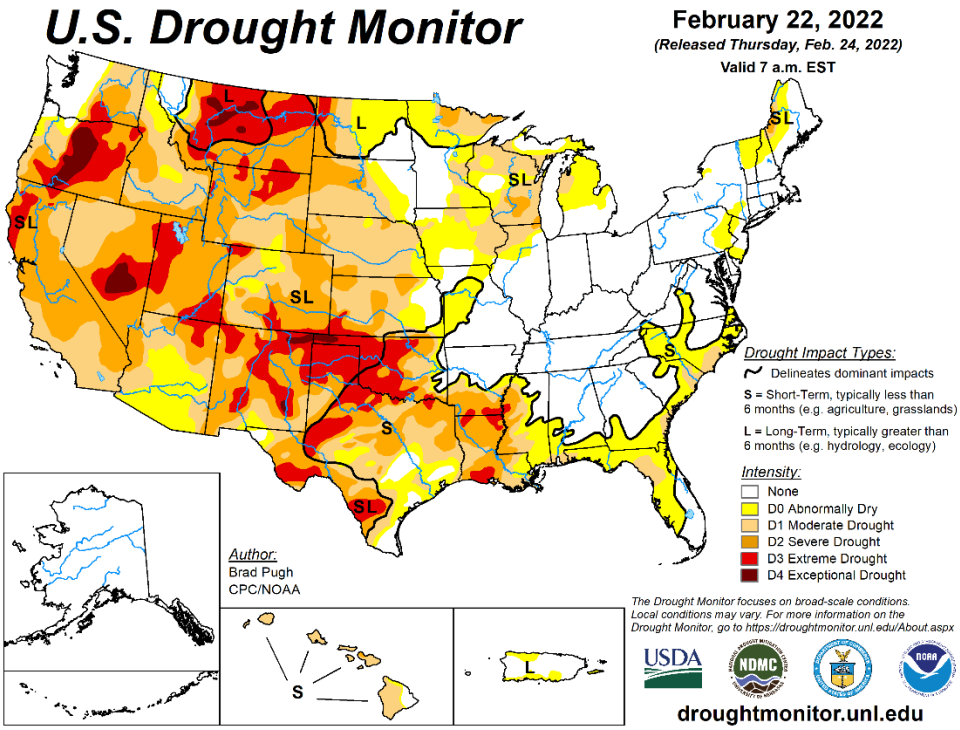
An extreme, multiyear drought could impact the region with little warning. There is no commonly accepted return period or non-exceedance probability for defining the risk from drought (such as the 100-year or 1% annual chance of flood). The magnitude of drought is usually measured in time and the severity of the hydrologic deficit. There are several resources available to evaluate drought status and even project expected conditions for the very near future.

The National Integrated Drought Information System (NIDIS) Act of 2006 (Public Law 109-430) prescribes an interagency approach for drought monitoring, forecasting, and early warning.[6] The NIDIS maintains the U.S. Drought Portal, which is a centralized, web-based access point to several drought-related resources including the U.S. Drought Monitor (USDM) and the U.S. Seasonal Drought Outlook (USSDO). [7] The USDM, shown in Figure 4-2, is a weekly map depicting the status of drought and is developed and maintained by the National Drought Mitigation Center. The USSDO, shown in Figure 4-3, is a 6-month projection of potential drought conditions developed by the National Weather Service's Climate Prediction Center. The primary indicators for these maps for the Western U.S. are the Palmer Hydrologic Drought Index and the 60-month Palmer Z-index. The Palmer Drought Severity Index (PSDI) is a commonly used index that measures the severity of drought for agriculture and water resource management. It is calculated from observed temperature and precipitation values and estimates soil moisture. However, the Palmer Index is not considered consistent enough to characterize the risk of drought on a nationwide basis and neither of the Palmer indices is well suited to the dry, mountainous western United States. [8]

Probability of Future Events

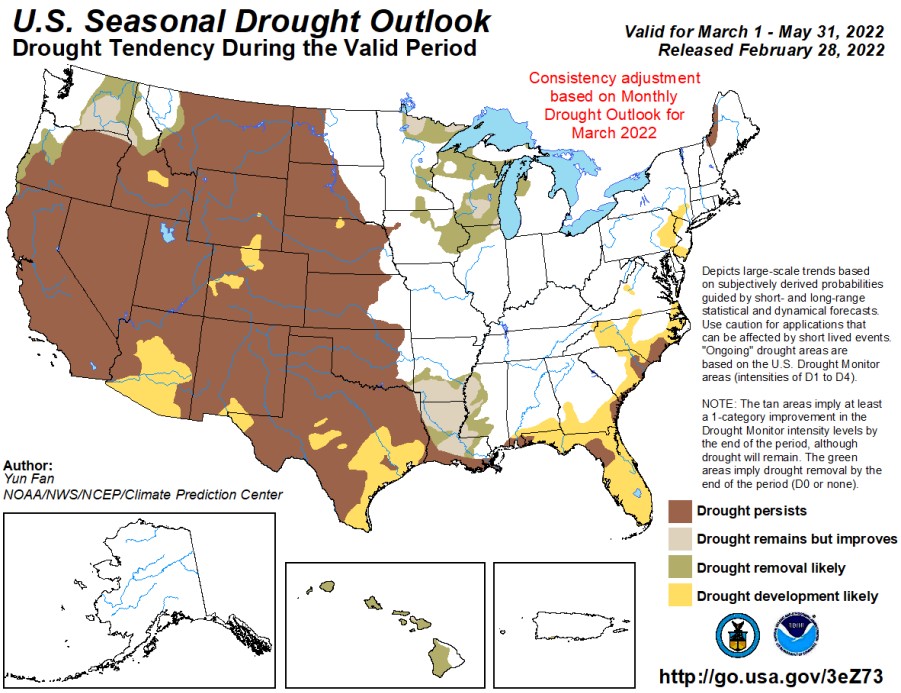
More widespread drought and associated crop failure, more frequent or necessary larger reductions in livestock numbers grazing on grassland pastures, movement of invasive species, more frequent wildland fire, increased energy emergencies, and more intense climate events such as storms and extreme heat will occur throughout the County. Extreme variability of precipitation across the southwest, combined with the trend of increasing temperatures, has led to extremely dry conditions within the forest and grasslands of Pima County. A good monsoon season may provide short-term relief, but it will do very little for the long-term drought.

[6] National Integrated Drought Information System, 2016, *National Integrated Drought Information System Implementation Plan*, NOAA.
[7] NIDIS U.S. Drought Portal website is located at: https://www.drought.gov/drought/home
[8] Federal Emergency Management Agency, 1997, *Multi-Hazard Identification and Risk Assessment – A Cornerstone of the National Mitigation Strategy.*



Source: United States Drought Monitor, 2021: http://droughtmonitor.unl.edu/

Figure 4-4: U.S Weekly Drought Monitor Map



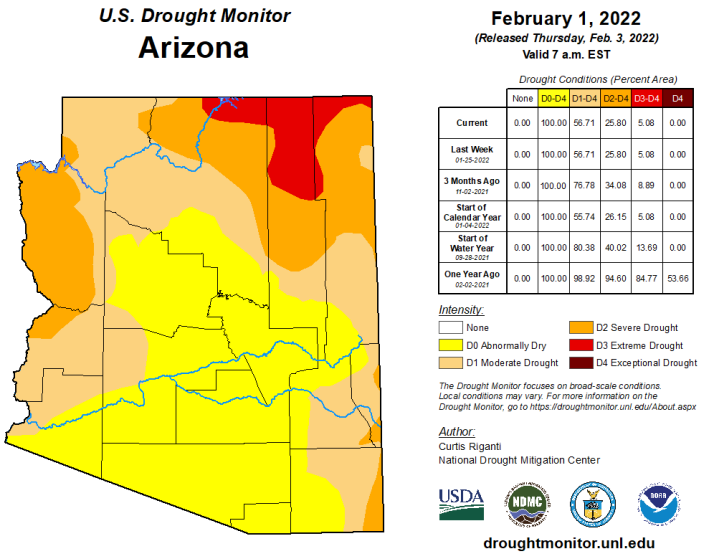
Source: United States Drought Monitor, 2021: http://droughtmonitor.unl.edu/

Figure 4-5: U.S. Seasonal Drought Outlook

Due to climate variability, there is a likelihood of continuously higher temperatures and below-normal precipitation, all aiding in drought conditions. The local vulnerability depends on duration, intensity, geographic extent, and regional water supply demands by humans and vegetation.

Realizing the need for drought preparedness in Arizona, a Governor's Drought Task Force was created in 2003 and the Arizona Drought Preparedness Operational Plan, including the Arizona Water Conservation Strategies Report, was developed and adapted in 2004. The principal intent of the Drought Preparedness Operational Plan was to establish a flexible framework to refine Arizona's drought monitoring process as well as the understanding of drought impacts and mechanisms for limiting future vulnerability in Arizona.

Led by the Arizona Department of Water Resources (ADWR), the plan includes criteria for determining both short and long-term drought status for each of the 15 major watersheds in the state using assessments that are based on precipitation and streamflow. The plan also provides the framework for an interagency group that reports to the governor on drought status, in addition to local drought impact groups in each county and the State Drought Monitoring Technical Committee. Twice a year this interagency group reports to the governor on the drought status and the potential need for drought declarations. The counties use the monthly drought status reports to implement drought actions within their drought plans. The State Drought Monitoring Technical Committee defers to the U.S. Drought Monitor (USDM) for the short-term drought status and uses a combination of the Standardized Precipitation Index (SPI), evaporation, and streamflow for the long-term drought status. Figures 4-6 and 4-7, present the most current short and long-term maps available for Arizona as of the writing of this plan.



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	56.71	25.80	5.08	0.00
Last Week 01-25-2022	0.00	100.00	56.71	25.80	5.08	0.00
3 Months Ago 11-02-2021	0.00	100.00	76.78	34.08	8.89	0.00
Start of Calendar Year 01-04-2022	0.00	100.00	55.74	26.15	5.08	0.00
Start of Water Year 09-28-2021	0.00	100.00	80.38	40.02	13.69	0.00
One Year Ago 02-02-2021	0.00	100.00	98.92	94.60	84.77	53.66

Source: Data Graphs | U.S. Drought Monitor (unl.edu)

Figure 4-6 Short-Term Drought Status

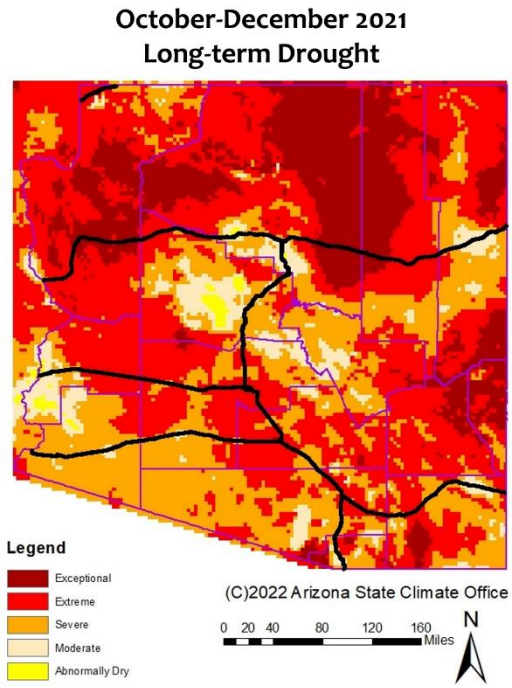


Figure 4-7 Long-Term Drought Status

The current drought maps are in general agreement that Pima County is currently experiencing an abnormally dry to extreme drought condition for the short term and in a moderate drought condition for the long term. The consensus of the Monitoring Technical Committee is that several years of above normal precipitation would be needed before the drought status is removed.[9] Figure 4-3 indicates that the drought conditions are projected to persist or intensify for Pima County over the next few months.

[9] AZ Department of Water Resources, 2021 https://new.azwater.gov/sites/default/files/media/JointCAPADWR-FactSheet-CoRiverShortage-2022.pdf

When attempting to evaluate the probability of future events, it is important to note that potable water in Pima County is derived from both surface water and groundwater. Surface water to Pima County users comes from, the Colorado River, (through the Central Arizona Project (CAP) Canal).

Due to ongoing drought conditions in the Colorado River watershed, the US Bureau of Reclamation in 2021 declared a Tier 1 shortage on the Colorado River beginning 2022. The shortage will impact CAP water supplies by reducing 512,000 acre-feet to Arizona's allocation of Colorado River water. The shortage declaration was not unexpected, and Arizona, the Basin states, and the federal government are continuing to work in re-consultation of the 2007 Operating Guidelines and other consultations to reduce the decline of Lake Powell and Lake Mead in light of a hotter and drier climate. The Tier 1 shortage will not reduce municipal and industrial deliveries to water providers in Pima County.

The other major source of water for Pima County is groundwater. This water has been pumped out of large subsurface natural reservoirs known as aquifers. While a significant supply of water remains stored in the aquifers, groundwater has historically been pumped out much more rapidly than it can be replenished through natural recharge and has led to a condition known as overdraft. In 1980, Arizona implemented the Groundwater Management Code to promote conservation and long-range planning of water resources, including reducing reliance on groundwater supplies. Active Management Areas (AMAs) were formed based on groundwater basin areas and Pima County is mostly covered under the Tucson AMA which covers 3,866 square miles in southern Arizona.[10]

Reclaimed water, or effluent, is the only increasing source of water in the county, although it constitutes only a small amount of the overall water used. As the regional population grows; increasing amounts of reclaimed water will be available for agriculture, golf courses, and landscape irrigation, as well as industrial cooling, and maintenance of wildlife areas.

Vulnerability

Table 4-6: CPRI Results for Drought

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Likely	Critical	12-24 hours	>1 week	3.25
Oro Valley	Highly likely	Critical	>24 hours	>1 week	**3.25**
Pascua Yaqui Tribe	Likely	Limited	>24 hours	>1 week	2.50
Sahuarita	Highly likely	Critical	>24 hours	>1 week	**3.25**
Tucson	Highly likely	Limited	>24 hours	>1 week	**2.95**
Unincorporated Pima County	Highly likely	Limited	>24 hours	> 1week	**2.95**
				County-wide average CPRI =	**3.03**

*Jurisdictions in **bold** chose to mitigate against the hazard*

Drought is considered a high significance hazard for most of the region due to the extensive economic and environmental impacts. Drought can be widespread and pervasive for several years.

Town of Marana: The Town has a 100-year assured water supply designation from the State of Arizona. Additionally, Marana has been steadily working toward the use of renewable supplies rather than relying solely on our groundwater. Working with the regional partners, Marana developed and adopted a Drought Preparedness Plan. The Town of Marana Water Plan differs in some ways from other local provider plans and stages. The Town's plan was adopted to heighten awareness and provide response to the potential reduction in the Town's available water supply due to drought.

Town of Oro Valley: The susceptibility of the desert southwest to drought conditions continues to be a focus area across the federal, state, county, and local levels. The Town of Oro Valley, as part of the larger system, is not immune to the vulnerability to drought. For example, the management of the Colorado River is a multi-state system for power generation, drinking water, agriculture, and tourism. In 2021, drought conditions across the southwest triggered the first water shortages and restrictions on the Colorado River, having significant economic impacts across the entire system. The shortages cause water resources to be significantly more expensive, leading to direct increased economic

[10] Tucson AMA | Arizona Department of Water Resources (azwater.gov)

costs to the Town. Continued trends of higher average temperatures and less precipitation may also trigger power generation and additional water supply across the region issues in the future. Extended drought conditions also lead to a higher risk for wildfire, which also increases the risk for post-fire flooding. These many variables all impact the public health, safety, and economic resiliency of the community.

Town of Sahuarita: Currently, the Town of Sahuarita does not own or operate a water company. Within the town a limits, there currently are six independent privately owned water companies and smaller areas served by on-site wells. The list of providers includes:

- Community Water of Green Valley
- Farmers Water
- Las Quintas Serenas Water
- Quail Creek Water
- Sahuarita Village Water
- Sahuarita Water

Recognizing that all water companies are vulnerable to drought, the water companies have worked with each other and the town to develop an area wide drought plan. The drought plan considers Arizona Department of Water Resources goal of safe yield. Including obtaining an assured water supply certificate for many of the master plan communities.

City of Tucson: The City of Tucson has seen continual growth in populations and in size of the city limits. The natural growth of the City of Tucson has put an increased need on water usage, which has effected City of Tucson water reserves. The City of Tucson uses two thirds of its annual delivery of CAP water on an annual basis, which only allows for one third of its allotment to go into the aquifers for future use. In 2020, the National Weather Service reported the driest year on record for Tucson area with only 1.64 inches during the monsoon season. Since 2016, Tucson has received on an average of 12.4 inches of rain per year where the national average in the United States is over 30 inches per year.

The Tucson Water Department utilized the area's ground water resource to supply water to its customers (citizens and businesses) within the City via a large system of wells for decades. Over a decade of drought, leading to the lack of replenishment of ground water tables, has stressed the water supply and lead to measurable subsidence (drop in elevation) in area of the city as ground water tables are drained.

While the Tucson Water Department has begun to use its allotment of Colorado River Water to replenish water tables, and while they continue to undertake several water conservation programs for residents and business owner, continued periods of drought place stress on the water system leading to increase vulnerability for water storages in the future.

Unincorporated Pima County: The County is vulnerable to drought for the same reasons as the other jurisdictions. Pima County-owned and maintained open space and riparian habitat are most vulnerable to the impacts of sustained drought conditions. It is important the County continue to implement adaptive management strategies that include land conservation, riparian habitat restoration and protection of groundwater-dependent ecosystems. Existing building and land use codes requiring low water use fixtures and drought tolerant, native landscaping have helped reduce residential and commercial water consumption. Improved water quality at its wastewater reclamation facilities allows more uses of reclaimed water to support riparian habitat, replenish the aquafer and replace groundwater uses on parks and landscaping. Continued monitoring of local and state-wide drought conditions through the Local Drought Impact Group and ADWR Drought Program will enable Pima County to take proactive, planned mitigation measures should drought conditions persist or worsen. Pima County has a Drought Response Plan that establishes a four-stage trigger category corresponding to the Arizona Drought Monitor Report. Each "Stage" declaration within the county triggers drought stage reduction measures.[11] Actions within the plan will provide for maximum beneficial use of water resources for the interest of the public health, safety and welfare.

[11] Pima County Drought Management, 2021: Drought Management - Pima County

Loss Estimations

No standardized methodology exists for estimating losses due to drought and drought does not generally have a direct impact on critical and non-critical facilities, except perhaps water supply systems. A direct correlation to loss of human life due to drought is improbable for Pima County. Instead, drought vulnerability is primarily measured by its potential impact to certain sectors of the county economy and natural resources including:

- Crop and livestock agriculture
- Municipal and industrial water supply
- Recreation/tourism
- Wildlife and wildlife habitat

Sustained drought conditions will also have secondary impacts on other hazards such as fissures, flooding, subsidence, and wildfire. Extended drought may weaken and dry the grasses, shrubs, and trees of wildfire areas, making them more susceptible to ignition. Drought also tends to reduce the vegetative cover in watersheds, and hence decrease the interception of rainfall and increase the flooding hazard. Subsidence and fissure conditions are aggravated when lean surface water supplies force the pumping of more groundwater to supply the demand without the benefit of recharge from normal rainfall.

According to the 2021 annual report of the Pima County Local Drought Impact Group, the following drought impacts were noted:

- Flooding in the fire burn scar of the 2020 Bighorn wildfire in the Santa Catalina Mountains continues to be a concern. Long-term drought conditions intensified the wildfire extent and severity.
- Cienega Creek, a perennial stream in southeast Pima County continues to experience the impacts of sustained drought and shifts to the seasonal pattern of flow. In June 2021 Pima Association of Governments recorded 0.641 miles of flow in the monitored reach of Cienega Creek, about 37% less flow than recorded in June 2020.
- Drought impacts on saguaros and other vegetation were observed along with resurgence of invasive species, including buffelgrass, following an above normal summer monsoon season was reported.

From 2017 to 2020, farmers and ranchers in Pima County received $902,928 in disaster-related assistance funding from the U.S Department of Agriculture (USDA) for crop and livestock damages. Nearly half, $437,801 or 48%, was issued in 2018, following a record dry and hot fall, winter and spring in Water Year 2017-2018, and Extreme and Exceptional long-term drought in Pima County.

Other direct costs such as increased pumping costs due to lowering of groundwater levels and costs to expand water infrastructure to compensate for reduced yields or to develop alternative water sources, are a significant factor but very difficult to estimate due to a lack of documentation. There are also the intangible costs associated with lost tourism revenues and impacts to wildlife habitat and animals. Typically, these impacts are translated into the general economy in the form of higher food and agricultural goods prices and increased utility costs.

Changes in Development in the Hazard Area

With anticipated population growth, Pima County's water providers will require additional water resources to meet the demands of a projected population of 1.45 million by 2041 and focused water conservation efforts to reduce demand. Significant growth in the ranching and farming sectors is unlikely given the current constraints on water rights, grazing rights, and available rangeland.

The Pima County Local Drought Impact Group (LDIG), which is comprised of water providers and local, state, and federal agencies and serves as the local component of the Arizona Drought Preparedness Plan, is tasked with identifying local drought conditions and impacts, assessing severity and scope of impacts, ascertaining response and mitigation options and recommending drought staging to County Administration. LDIG submits annual drought reports to the state's Drought Monitoring Technical Committee. Pima County has also developed a Drought Response Plan and Water Wasting Ordinance that is administered and enforced through the Pima County Health Department for unincorporated areas of the county.

Drought planning should be a critical component of any domestic water system expansion or land development planning. Arizona Department of Water Resources ensures local water providers reduce their vulnerability to drought and prepare response plans in the event of a water shortage through the development of System Water Plans that are comprised of three components:

- Water Supply Plan – describes the service area, transmission facilities, monthly system production data, historic demand for the past five years, and projected demands for the next five, ten, and twenty years.
- Drought Preparedness Plan – includes drought and emergency response strategies, a plan of action to respond to water shortage conditions, and provisions to educate and inform the public.
- Water Conservation Plan – addresses measures to control lost and unaccounted for water, considers water rate structures that encourage efficient use of water, and plans for public information and education programs on water conservation.

Town of Marana: In the Town of Marana, the Marana Water Department requests voluntary conservation, asking that customers limit landscape irrigation and avoid outdoor water uses like misters and car washes when possible. In the years since its adoption, the Marana Water Department has diligently acquired renewable water supplies and grown its service area. This year, the Marana Water Department will work with regional partners and the Citizens' Water Academy to recommend updates to its Drought Preparedness Plan. The Marana Water Department partners with state and local entities to monitor drought.

Town of Oro Valley: Within the Town of Oro Valley, the use of potable water for the irrigation of higher use vegetation such as turf in commercial and residential developments is the only option due to water system limitations. This increases the Town's risk and vulnerability to drought by not transitioning to lower water use irrigation systems, alternative water supplies such as reclaimed water, and to lower water use landscaping and native plants (zero scape) which support water conservation efforts and improve community resiliency to drought.

Town of Sahuarita: In the Town of Sahuarita, CAP water has been extended from Pima Mine Road to Nogales Highway. FICO and Community Water of Green Valley have plans for CAP water.

City of Tucson: The City of Tucson continues to review and update the Tucson Water Department Drought Preparedness and Response Plan.

Unincorporated Pima County: The following are the major water providers that operate within unincorporated Pima County and have developed System Water Plans with specific recommendations and requirements during times of drought:

- Tucson Water
- Marana Water
- Metropolitan Domestic Water Improvement District
- Flowing Wells Irrigation District
- Oro Valley Water Utility
- Community Water Company of Green Valley

4.4.2 Earthquake

Description

An earthquake is a sudden motion or trembling caused by an abrupt release of accumulated strain along faults that can be found near or far from the Earth's tectonic plates. These rigid tectonic plates move slowly and continuously over the Earth's interior, where they move away, past or under each other at rates varying from less than a fraction of an inch up to 5 inches per year. While this sounds small, at a rate of 2 inches per year, 30 miles would be covered in approximately one million years[1]. The tectonic plates continually bump, slide, catch, and hold as they move past each other which causes stress that accumulates along faults. When this stress exceeds the strength of the rocks, an earthquake occurs, immediately causing sudden ground motion and shaking. Secondary hazards may also occur, such as surface fault ruptures, ground failure, landslides, liquefaction, and tsunamis. While most earthquakes occur near the edges of the tectonic plates, many damaging earthquakes also occur in the interior of plates.

Ground motion is the vibration or shaking of the ground during an earthquake caused by the radiation of seismic waves. The severity of vibration generally increases with the amount of energy released and decreases with distance from the causative fault or epicenter of the earthquake. Additional factors, such as soft soils or the presence of topographic ridges can further amplify ground motions. Ground motion causes waves in the earth's interior, also known as seismic waves, and along the earth's surface, known as surface waves. Seismic waves include P (primary) waves and S (secondary) waves. P waves are longitudinal or compressional waves similar in character to sound waves that cause back-and-forth oscillation along the direction of travel (vertical motion), with particle motion in the same direction as wave travel. They move through the earth at approximately 15,000 mph. S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side-to-side (horizontal motion) due to particle motion at right-angles to the direction of wave travel. Unreinforced masonry buildings are prone to damage from surface waves: Raleigh waves (retrograde particle motion), and Love waves (with horizontal particle motion perpendicular to the direction of propogation).

Seismic activity is commonly described in terms of magnitude and intensity. Magnitude (Mw), usually reported as moment magnitude replacing the more well-known Richter scale, is a measure of the total energy released during an earthquake. Intensity (I), as expressed by the Modified Mercalli Intensity (MMI) scale, subjectively describes the severity of an earthquake in terms of its effects on the earth's surface and on human society. Although an earthquake has only one magnitude, intensity varies by location – proximity to the epicenter-, substrate, building styles, and population density, among other factors. Magnitude is the measure of the amplitude of the seismic wave and is expressed by a logarithmic scale that represents the amount of energy released from the movement of the fault. An increase in the Magnitude scale by one whole number represents a tenfold increase in measured amplitude of the earthquake and a 30-fold increase in energy.

Another way of expressing an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. If an object is dropped while standing on the surface of the earth (ignoring wind resistance), it will fall towards earth and accelerate faster and faster until reaching terminal velocity. The acceleration due to gravity is often called "g" and is equal to 9.8 meters per second squared (980 cm/sec/sec). This means that every second something falls towards earth, its velocity increases by 9.8 meters per second, per second. Peak ground acceleration (PGA) measures the rate of change of motion relative to the rate of acceleration due to gravity. For example, acceleration of the ground surface of 244 cm/sec/sec equals a PGA of 25.0%. PGA is commonly estimated for an area and applied to building and infrastructure design. PGA, and similar calculations, are important input factors in determining the amount of shear stresses a structure can withstand.

One of the secondary hazards from earthquakes is surface faulting, the differential movement of two sides of a fault at the earth's surface. Linear structures built across active surface faults, such as railways, highways, pipelines, and tunnels, are at high risk to damage from earthquakes. Displacement along faults, both in terms of length and width, varies but can be significant (e.g., up to 20 feet), as can the length of the surface rupture (e.g., up to 200 miles). Surface rupture is rare in small magnitude events and is usually associated with earthquake magnitudes greater than Mw 6+.

Earthquake-related ground failure, due to liquefaction, is also a secondary hazard. Liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces

[1]Federal Emergency Management Agency, 1997, *Multi-Hazard Identification and Risk Assessment – A Cornerstone of the National Mitigation Strategy.*

between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to behave like a fluid (rather than a soil) for a brief period, causing substantial ground deformation. Liquefaction causes lateral spreads (horizontal movement commonly 10-15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction typically occurs where groundwater levels approach the ground surface, e.g., the Santa Cruz river valley of eastern Pima County.

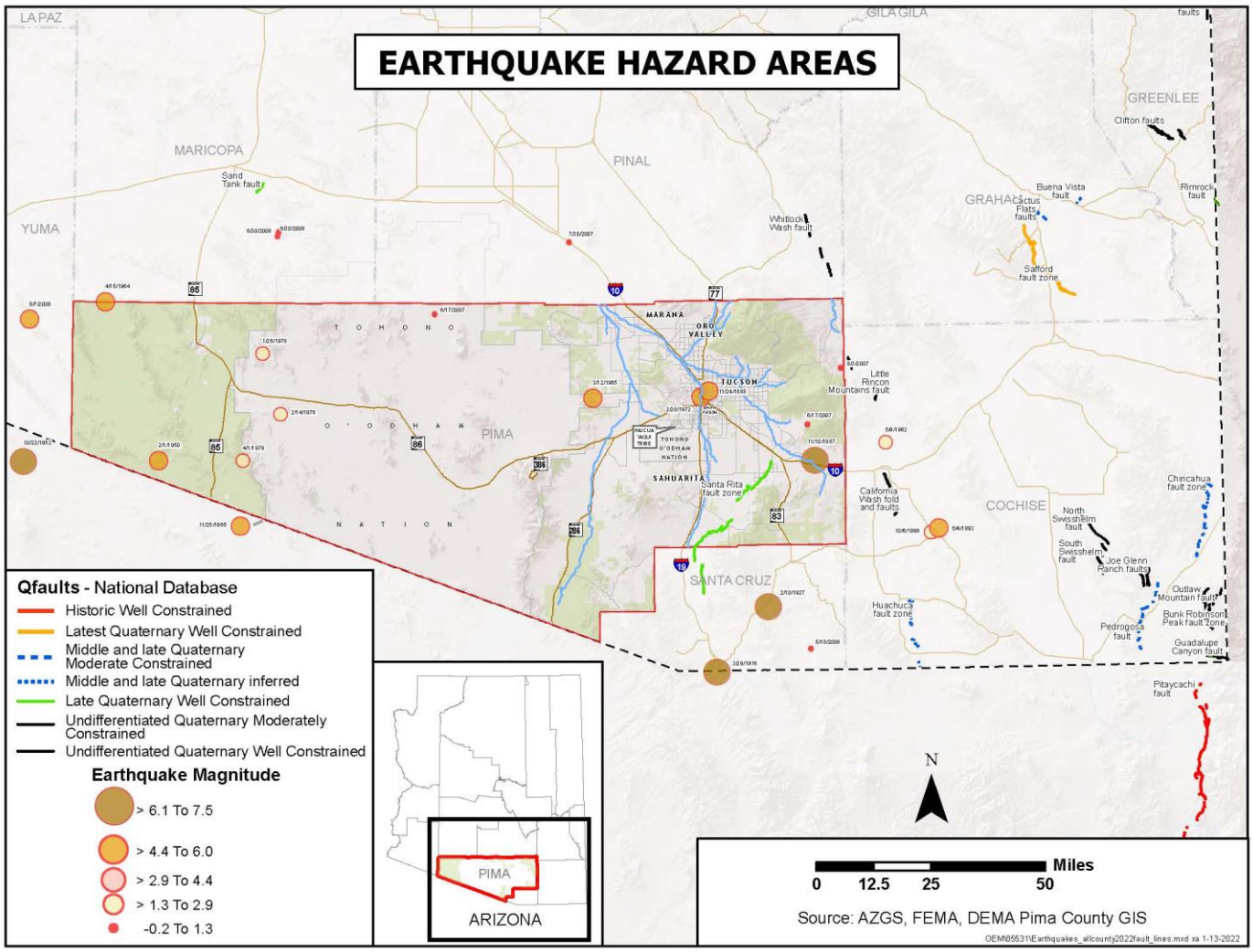
History

Seismic activity occurs on a regular basis throughout the State of Arizona, although most events are not felt, but are recorded by the Arizona Broadband Seismic Network. Although rare, damaging earthquakes affecting Pima County have been recorded in the past as follows:

- The earliest recorded earthquake affecting Arizona, and possibly the largest, occurred in 1830. With an estimated Modified Mercalli Intensity (MMI) of IX recorded at San Pedro, AZ, approximately 25 miles west of Tucson, the earthquake would have caused massive damage to built structures.[2]
- 1887, the Sonoran earthquake caused significant destruction in southern Arizona towns, including Tucson, and was one of the largest earthquakes in North American history. The earthquake was caused by the reactivation of a basin and range normal fault that is like other faults in Arizona.[3] The epicenter was located approximately 100 miles south of Douglas, Arizona, along the Pitaycachi Fault in Mexico, and caused great destruction near its epicenter. The earthquake was so large that it was felt from Guaymas, Mexico to Albuquerque, New Mexico. It is estimated variously to have been an intensity VIII and M7.6 earthquakes. In Arizona, water in tanks spilled over, buildings cracked, chimneys toppled, and railroad cars were set in motion. An observer at Tombstone, near the Mexican border, reported sounds ``like prolonged artillery fire"[4]. With the increase in development, if such an earthquake occurred today it would cause extensive damage in southeastern Arizona[5].

The main faults of concern in Pima County are as follows and shown in Figure 4-8. The three main Quaternary faults are the Pitaycachi, Santa Rita and the Huachuca faults. There have been no earthquake events of significance since the 2017revision. The Mw 5.3 earthquake near Duncan, Arizona on 28 June 2014 caused some light shaking – intensity of II-IV in Tucson and elsewhere in Pima County.

[2] Arizona Division of Emergency Management, *State of Arizona Multi-Hazard Mitigation Plan*
[3] DuBois, S.M., and Smith, A.W., 1980, *The 1887 earthquake in San Bernardino Valley, Sonora; historic accounts and intensity patterns in Arizona*: Arizona Bureau of Geology and Mineral Technology Special Paper no. 3, 112 p.
[4] Arizona Division of Emergency Management, *State of Arizona Multi-Hazard Mitigation Plan;* Bausch, Douglas B. and David S. Brumbaugh, May 23, 1994. Seismic Hazards in Arizona –Arizona Ground Shaking Intensity & 100 yr Acceleration Contour Maps, http://www4.nau.edu/geology/aeic/staterep.txt; D.B. Bausch and D.S. Brumbaugh, 1994, *Seismic hazards in Arizona:* Flagstaff, AZ Earthquake Information Center, 49 p., 2 sheets, scale 1:1,000,000.; US Geological Survey (USGS): September 12, 2003, "Earthquake History of Arizona." http://wwwneic.cr.usgs.gov/neis/states/arizona/arizona_history.html
[5] Jenny, J.P. and S.J. Reynolds, 1989. "Geologic Evolution of Arizona" in Arizona Geological Society Digest, No. 17.



Source: Pima County GIS, 2021

Figure 4-8 Southeastern Arizona Earthquake Fault Systems

Extent

Pima County is situated in the Basin and Range Province, characterized by rugged mountain ranges separated by deep sedimentary basins. Rupture of mountain range faults in Arizona's Basin and Range Province is infrequent, nonetheless they do occur and are capable of moment magnitudes of potentially damaging moderate (Mw4) to large (Mw7+) earthquakes. An enhanced continuous GPS network operated by Broermann and others, 2021 identified an anomalously high strain rate for southwestern Arizona. The authors warn that this magnitude of strain could portend release in one or more rare large-magnitude earthquakes in the future.[6]

Probability of Future Events

Probabilistic ground motion maps are typically used to assess the magnitude and frequency of seismic events. These maps estimate the probability of exceeding a certain ground motion, expressed as peak ground acceleration (PGA),

[6] Broermann, James, Bennett, R.A., Kreemer, C., Blewitt, G., Pearthree, P.A., 2021, Geodetic Extension Across the Southern Basin and Range and Colorado Plateau: Journal of Geophysical Research: Solid Earth, 126, e2020JB021355. https://doi.org/10.1029/2020JB021355.

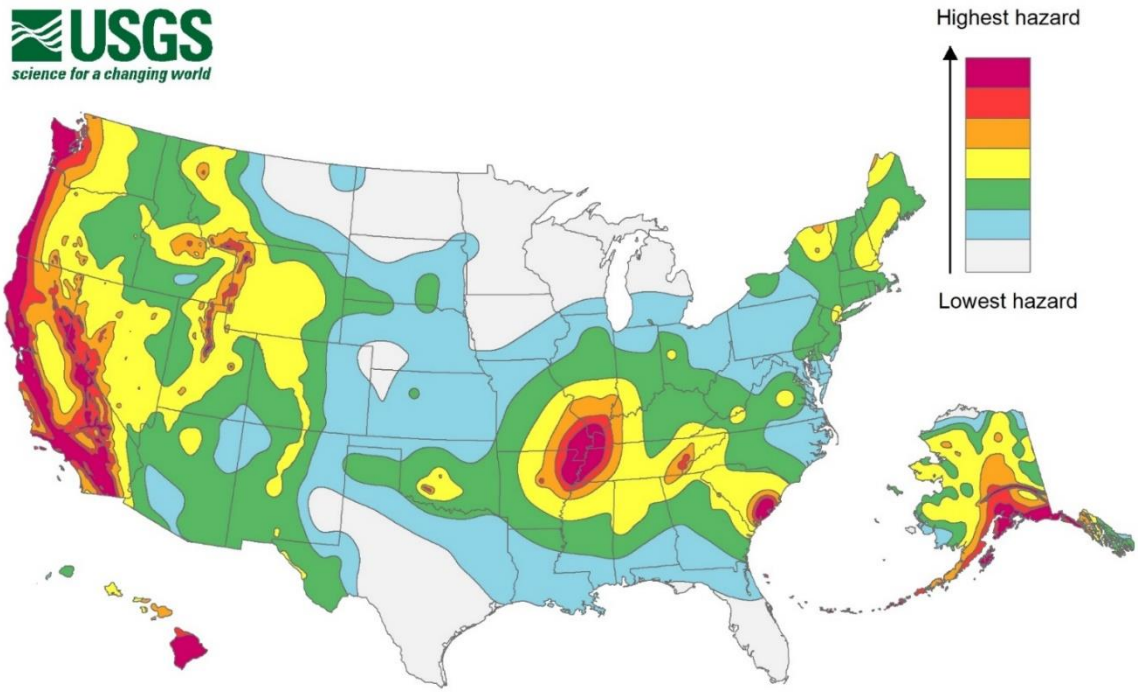
over a specified period of years. For example, Figure 4-9 displays the probability of exceeding a certain ground motion, expressed as PGA, in 50 years in the Western United States. This is a common earthquake measurement that shows the geographic area affected (colored areas on map below), the probability of an earthquake of each level of severity (e.g., 2% chance in 50 years), and the severity (PGA) as indicated by color.

Note that Figure 4-9 expresses a 2% probability of exceedance and, therefore, there is a 98% chance that the peak ground acceleration displayed will not be exceeded for 50 years. The 50-year return period use is based on statistical significance and does not imply that the structures are thought to have a useful life of only 50 years. Similar maps exist for other measures of acceleration, probabilities, and time periods.

It is useful to note that according to the USGS, a PGA of approximately 10% gravity (0.10 g) is the approximate threshold of damage to older (pre-1965) dwellings or dwellings not made resistant to earthquakes. The 0.10 g measure was chosen because, on average, it corresponds to the MMI VI to VII levels of threshold damage in California within 25 km of an earthquake epicenter.

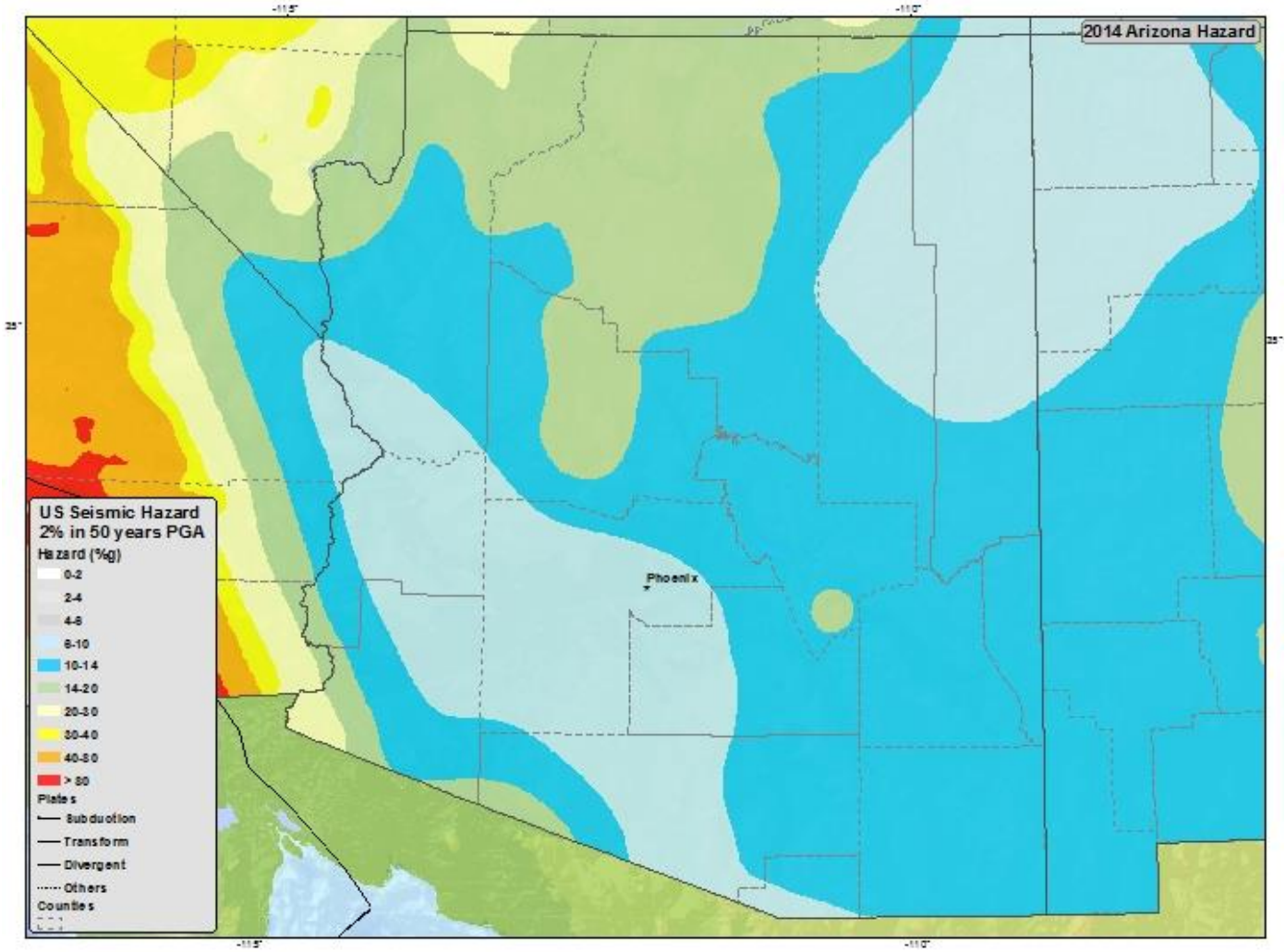
Figure 4-10 provides a more detailed view of the 2%, 50-year PGA map for Pima County. As demonstrated by this map, the central portion of Pima County has a PGA that ranges between 0.06g and 0.10g. The eastern third of the county is within the 0.10g to 0.12g range. The western portion of the county ranges from 0.08g to 0.16g with the highest PGA values occurring along the Yuma County and Mexico border. Overall, PGA values for Pima County are low in comparison with other counties within the State, and especially in areas of high population.

The possible effects of climate variability on earthquake probability should be low since earthquakes are non-climatic in nature.



Source: United States Geological Survey:
https://www.usgs.gov/programs/earthquake-hazards/science/2018-united-states-lower-48-seismic-hazard-long-term-model

Figure 4-9: USGS Simplified 2018 Earthquake Hazard Map



Source: United States Geological Survey 2014 Seismic Hazard Map: https://www.usgs.gov/media/images/2014-seismic-hazard-map-arizona

Figure 4-10: PGA for a 2% Chance in 50 Years' Recurrence

In general, the risk of seismic hazard in the urbanized portions of Pima County are relatively low; however, denser populations, existence of high rise buildings, existence of unreinforced masonry buildings, and the lack of earthquake awareness among its population elevate the risks associated with seismic activity.

The rate of seismicity in Pima County has historically been low, with the area's most recent quakes originating in San Luis in 1976 (M 6) and Baja, Mexico in 2010 (M 7.2). The largest impact of an earthquake on the metropolitan area would be the economic impact from a catastrophic southern California earthquake, which would disrupt approximately 60% of Arizona's fuel and 90% of Arizona's food goods. The Tucson metropolitan area could also be significantly affected by a major quake in the Yuma or Northern Arizona Seismic Belt (NASB). A repeat of the 1887 earthquake would result in significant damage to Arizona's population centers, particularly where development is located on alluvial plains and steep slopes. It should also be noted that although the small earthquakes occurring in Pima County are of low seismic risk to buildings, the repeated shaking could eventually cause structural damage. In unstable areas, small earthquakes may also trigger landslides and boulders rolling off mountain slopes.[7]

[7] Jenny, J.P. and S.J. Reynolds, 1989. "Geologic Evolution of Arizona" in Arizona Geological Society Digest, No. 17.

Vulnerability

Table 4-7: CPRI Results for Earthquake

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Possible	Critical	6-12 hours	< 1 week	2.55
Oro Valley	Possible	Limited	< 6 hours	< 6 hours	2.20
Pascua Yaqui Tribe	Possible	Limited	< 6 hours	< 6 hours	2.20
Sahuarita	Possible	Limited	< 6 hours	< 1 week	2.20
Tucson	Possible	Critical	< 6 hours	< 6 hours	**2.50**
Unincorporated Pima County	Possible	Limited	< 6 hours	> 1 week	2.50
				County-wide average CPRI =	**2.36**

*Jurisdictions in **bold** chose to mitigate against the hazard*

Only the City of Tucson chose Earthquake as a hazard to mitigate. Other jurisdictions gave it the same rating as 2.50 or higher, but it was not a priority for mitigation for those MJPT.

While earthquakes are not a regular occurrence in and around the City of Tucson - none have occurred within the last planning cycle and the last documented earthquake occurring more than a century ago - there is nonetheless a recognized and documented history of large earthquakes in the vicinity that have caused damage within the city. The lack of earthquake awareness and preparedness over the last century as Tucson has built up and out, and without specific building codes to protect buildings from seismic damage places the city is in a vulnerable position. Due to the development over the past century, it is understood that an earthquake many years ago may have only tipped over water towers and startled horses would today be likely to cause widespread damage and injury within the city.

The earthquake risk assessment performed for Pima County did not explore the potential for collateral hazards such as liquefaction or landslide. However, losses associated with these ground failures would have been negligible given the level of shaking expected for Pima County (i.e., not enough strong shaking to trigger significant ground failure). However, Landslide has been added to this Plan as a hazard for unincorporated Pima County.

Changes in Development in the Hazard Area

Future development in the Region is not anticipated to extensively change vulnerability to earthquake significantly. The major Quaternary faults within Pima County are generally located within the mountain ranges where development is limited due to state and local land ownership. The earthquake risk in the identified growth areas of the Pima County jurisdictions is at the borderline of the 10% g PGA, which as previously stated, is the approximate threshold of damage for older (pre-1965) dwellings or dwellings not made resistant to earthquakes. Throughout the county, new development is typically regulated to comply with current building codes that will provide for more stable seismic designs of new construction.

4.4.3 Extreme Cold

Description

Pima County's desert climate is generally prone to mild winters. The average overnight low temperature in the coldest months, December and January, hovers around 40°F in the valleys. During the rest of the cooler parts of the year, in late fall and early spring, low temperatures range from the lower 40s to the lower 50s.

This tendency for mild winters has led to infrastructure design that is not resistant to, nor built with the capacity for, extended cold periods. Additionally, the tendency for mild winters means that the people, residences, pets, as well as plants, and wildlife in the county are not prepared for cold weather. It is for this reason that temperatures that would be considered typical in other parts of the country where cold winters are the norm are instead considered extreme cold in Pima County.

While on average winters in Pima County are mild, it is not unusual to see brief periods where overnight lows drop below freezing or even reach hard freeze warning levels as described by the National Weather Service. While rare, very cold temperatures (colder than 20°F) can also occur during the winter months especially in the eastern portion of the county including the Tucson Metro area. The coldest temperatures often occur after winter storms move past the region, precipitation ends, and skies clear allowing for rapid cooling at night.

Since many water lines and inlets to residences and businesses are above ground and exposed to the elements, and since the populace is not well aware of the need to protect these pipes with proper insulation, these extremely cold temperatures can result in frozen and burst pipes. This can cause extensive water damage to homes, businesses, and government buildings.

Additionally, during extreme cold events, the populace seeks to keep warm by heating their home. However, due to the typically mild winters, natural gas distribution systems to and within the City of Tucson have not been built to handle peak loads during extreme cold events. This has led to instances of large-scale heating fuel outages during spells of extreme cold, putting residents at risk, especially those vulnerable populations with access and functional needs.

Finally, the culture in Pima County is to expect mild winters and therefore the populace is under-informed regarding the potential for and possible impacts of extreme cold. This has and can lead to damage to homes, crops, and injuries or deaths to people or their pets.

History

The National Weather Service qualifies "Extreme Cold" as incidents where temperatures or wind chills <-35F, and "Cold" threshold of -18F. While temperatures throughout Pima County do not meet the NWS definition of extreme cold or cold criteria, our community and infrastructure are at risk when we experience below-average temperatures. These risks may include hypothermia to individuals resulting in death or damage to infrastructure such as frozen or burst pipes. Events have occurred throughout Pima County with some regularity over the past years. A few examples follow:[8]

- January 2017, very heavy snow and strong damaging winds occurred on the Santa Catalina and Rincon Mountains. Numerous trees were toppled over along Catalina Highway near Mt. Lemmon. Additionally, one felled tree damaged a cable line on one of Ski Valley's ski lifts. Power was lost to most of the mountain for nearly 48 hours, and several of the communication and broadcast transmission towers were inoperable for several hours before backup generators functioned properly. Reports of 18 to 24 inches of snow were common. At lower elevations, rain caused rock slides that blocked portions of Catalina Highway and damaged guard rails. Heavy snow and strong winds occurred on the higher elevations of the Baboquivari Mountains including Kitt Peak.

- December 2018, heavy snow fell in the Catalinas with Summerhaven and Mount Lemmon Ski Valley reporting more than 15 inches of snow. A semi-tractor trailer jackknifed in the snowy conditions on Mount Lemmon Highway, blocking both lanes of traffic. The road closure resulted in about twenty people whose vehicles were farther up mountain having to spend the night in a shelter.

[8] National Centers for Environmental Information (NCEI), https://www.ncdc.noaa.gov/stormevents/

- January 2019, a relatively strong and cold weather system impacted southeast Arizona New Year's Eve through January 2nd. This storm resulted in heavy snow across area mountain ranges through New Year's Day, especially over 7000 feet in elevation with some locations receiving over a foot of snow. Heavy snow shifted to the lower elevations south and east of Tucson overnight on January 1st and on January 2nd. Snow levels dropped to 2500 feet and snow reports ranged from 2 to 7 inches on the valley floors.

- February 2019, a relatively strong and cold weather system impacted southeast Arizona on February 21st and 22nd. This storm resulted in heavy snow across area mountain ranges with locations above 5000 feet receiving one to two and a half feet of snow. Snow levels dropped to 2000 feet during the morning of the 22nd with snow reports ranging from 2 to 10 inches on the valley floors. Green Valley, Vail, and Corona de Tucson reported 3 to 7 inches of snow. There was an accident on I-10 eastbound near Vail. There were also multiple accidents along I-19 including a rollover near Duval Mine Road. Snow fell in the City of Tucson for several hours, with visibility reduced to less than a mile at times. While several inches of snow accumulated on non-paved surfaces, city streets remained wet or saw light slush accumulations.

- March 2019, a late winter weather system impacted southeast Arizona March 11th through 13th. This system along with anomalously high moisture caused the Catalina, Rincon, and White Mountains to receive over a foot of snow above 6500 feet. Snow began the evening of March 11th and continued into the evening of the 12th. By the afternoon of March 12th, a foot of snow had fallen in the Santa Catalina Mountains. Mount Lemmon Highway was closed to everyone but residents for a time due to heavy snow.

- January 2021, a pair of winter storm systems moved across Arizona January 24th through 26th. The first brought moderate snow accumulations to several mountain ranges above 6000 feet on January 24th. Mt. Lemmon Highway was closed at the base as a result. Thunderstorms produced hail and gusty winds at lower elevations. The second storm brought widespread heavy snow to southeast Arizona above 3500 feet and even brought slushy snow accumulations and slippery road conditions to parts of the greater Tucson Metro area. The bulk of the snow fell from the evening of January 25th through the morning of January 26th and was accompanied at times by wind gusts of 35 to 45 mph. Snow accumulations of 3 to 6 inches occurred between 3500 and 5000 feet with 6 to 12 inches from 5000 to 7000 feet and 12 to 20 inches above 7000 feet. The additional snow forced the closure of Mt. Lemmon Highway near Tucson to continue. Rain and snow showers created slippery roads in parts of eastern Pima County, which led to numerous, mainly minor, traffic accidents along I-19 near Green Valley and Sahuarita and along I-10 in northwest Tucson Metro area.

Extent

To calculate a magnitude and severity rating for comparison with other hazards, and to assist in assessing the overall impact of the hazard on the planning area, information from the event of record is used. In some cases, the event of record represents an anticipated worst-case scenario, and in others, it is a reflection of common occurrence. Based on the NCEI records, the most recent event of record for extreme cold in Pima County occurred on February 2, 2011 when record cold temperatures dropped into the mid to upper teens across the Tucson area for several nights in a row. There was also minimal daytime heating and high winds which combined resulting in two fatalities. The cold also led to numerous burst water pipes. As a result, at least 2000 residents and businesses were without water at some point for a day. Due to cold temperatures along the natural gas route from El Paso to Tucson, Southwest Gas could not meet natural gas demand, which resulted in about 14,000 Tucson customers being without heat. In Green Valley, over $17,000 in damage was sustained at 11 Green Valley recreational centers due to broken sprinkler systems. Pima County and the City of Tucson collaborated to open a warming shelter for residents without heat. Untold numbers of plants, trees, and shrubs were also killed by the record cold, including many saguaro cacti. This event resulted in $1M in damages.[9]

Extreme cold can occasionally cause problems with communications facilities and utility transmission lines. Danger to people is highest when they are unable to heat their homes and when water pipes freeze. In 2001, the NWS implemented an updated Wind-Chill Temperature index. This index was developed to describe the relative discomfort/danger resulting from the combination of wind and temperature. Wind chill is based on the rate of heat

[9] NCEI Storm Events Database - Event Details | National Centers for Environmental Information (noaa.gov)

loss from exposed skin caused by wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature and eventually the internal body temperature.

Wind Chill Chart

Wind (mph) \ Temperature (°F)	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Source: NWS, 2021 https://www.weather.gov/media/safety/windchillchart3.pdf

Figure 4-11: National Weather Service Wind Chill Chart

Extreme cold in Pima County would be cold temperatures that would induce hypothermia in an individual either over an interval, such as several days of temperatures that cause body temperature to drop below 96°F or from a singular drop in air temperature below 32°F, and without an adequate heat source, a person's temperature would fall below 96°F.

Probability of Future Events

Despite the generally mild winters, over the last decade, the National Weather Service averages three published hard freeze warnings in eastern Pima County each year.[10] Thus, the probability of extremely cold weather is highly likely on an annual basis. While any of these hard freeze events have the potential to cause infrastructure damage, damage to the environment, and, most importantly loss of life, the most extreme cold events noted above impact eastern Pima County with a high magnitude due to the nature of the typical building techniques, the design of utility infrastructure in the region, as well as the culture where the residents expect mild winters and are mostly unprepared for extreme cold.

[10] National Weather Service, Tucson

Vulnerability

Table 4-8: CPRI Results for Extreme Cold

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Possibly	Limited	12-24 hours	< 24 hours	2.00
Oro Valley	Possibly	Limited	< 6 hours	< 1 week	2.25
Pascua Yaqui Tribe	Possibly	Limited	> 24 hours	< 1 week	1.95
Sahuarita	Possibly	Limited	12-24 hours	< 1 week	2.10
Tucson	**Likely**	**Limited**	**> 12-24 hours**	**<1 week**	**2.55**
Unincorporated Pima County	Likely	Limited	12-24 hours	< 1 week	2.55
				County-wide average CPRI =	**2.23**

*Jurisdictions in **bold** chose to mitigate against the hazard*

The inherent nature of extreme cold makes it a regional threat, impacting most or all of the jurisdictions simultaneously as well as extending the effects into the surrounding jurisdictions. Lower elevations and valley bottoms can be more susceptible to trapping cold air, thus portions of Pima County are more prone to this hazard.

Town of Marana: The Town of Marana is rarely susceptible to extreme cold hazards. When events do occur they may include frozen feeder line residential-scale pipes which may burst and lead to additional damages on public and private properties.

Town of Oro Valley: While the Town of Oro Valley is potentially vulnerable to rare extreme cold events over a multiple-day period, most of the community's susceptibility to harm and damages is from cascading events. This for example includes electrical or gas outages, frozen or burst pipes, and loss of vegetation due to frost. Frozen and burst pipes can lead to damages, repair/replacement costs, and insurance claims due to flooding and water damages. As a result of the extreme cold event in February 2011, the Water Utility updated standard details to make their water infrastructure more resilient to freezing temperatures. Loss of electrical or gas heating during high-demand periods of extreme cold would put many residents at risk, especially vulnerable populations. Due to the relatively mild average winters, when these rare extreme cold events occur, the community may not be as prepared to highlight the importance of messaging and education.

Pascua Yaqui Tribe: While there were no significant extreme cold events that impacted the Pascua Yaqui Tribe specifically, both human and infrastructure losses could be expected with any significant extreme cold event. The at-risk population needs to include Elders and Access and Functional Needs (AFN) populations will be incorporated in planning methodologies and educational mitigation awareness.

City of South Tucson: While the City of South Tucson is potentially vulnerable to rare extreme cold events over a multiple-day period, most of the community's susceptibility to harm and damages is from cascading events. This for example includes electrical or gas outages, frozen or burst pipes, and loss of vegetation due to frost. Frozen and burst pipes can lead to damages, repair/replacement costs, and insurance claims due to flooding and water damages. While not limited to just the City, a loss of electrical or gas heating during high demand periods of extreme cold would put many residents at risk, especially vulnerable populations. Due to the relatively mild average winters, when these rare extreme cold events occur, the community may not be as prepared thus highlighting the importance of messaging and education.

City of Tucson: The City of Tucson chose it as a primary hazard to address due to its costly response costs particular to their jurisdiction. The most extreme cold events impact Tucson with a high magnitude due to the nature of the typical building techniques, the designs of utility infrastructure in the region, as well as the culture in Tucson where the residents expect mild winters and are mostly unprepared for the extreme cold. During the wintertime, extremely cold temperatures are something the City is less accustomed to and prepared for. Local building practices and codes do not consider the protection of water pipes from extremely cold weather, and local natural gas supply infrastructure was not built to take into account the demand for heating fuels when the temperatures drop well below freezing for extended periods of record-breaking cold. This type of cold weather has and can again lead to widespread failure to deliver heating fuel and failure of water delivery systems, again leaving large populations within the City vulnerable.

Loss Estimations

There is no standardized method for estimating losses associated with extreme cold events and none is made for this Plan. From a historical perspective, both human and infrastructure losses could be expected with any significant extreme cold event especially regarding loss of human life for those exposed to the cold weather for long periods, and damage to water supply infrastructure. This is especially true in Pima County non-mountainous areas, such as the City of Tucson, since extreme cold events are rare, and the general population is not likely to be prepared for such an event.

Changes in Development in the Hazard Area

While the extreme cold is a yearly threat, it is unlikely to affect future development. Enforcement and implementation of modern building codes to regulate new developments, in particular the proper installation and protection of water supply lines, in conjunction with public education on how to respond to hazardous cold conditions is probably the best way to mitigate against such losses.

Pascua Yaqui Tribe: To address the hazard area of impacts from extreme cold events, over the reporting period, Pascua Yaqui Tribe developed residential properties in order to provide affordable housing solutions, especially for elderly and AFN populations. Adequate and modern housing for Pascua Yaqui tribal membership will address and alleviate additional costs for temporary sheltering/heating for individuals/households who would otherwise fall into a vulnerable population. Phase I of these projects consists of 50 single-family units, currently under construction. Phase II will consist of 27 town-home dwellings within 7 building structures. Phase III is in its incipient development; however, initial plans are for 50, one to two-bedroom units within a three to four-story structure.

Another significant update that would address the hazard area for extreme cold events was a project developed using funding from the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) to install and or replace central heating/cooling units for Pascua Yaqui homeowners and renters that live on and off the reservation lands. This project was able to fund the installation/replacement of heating, ventilation and air conditioning (HVAC) units for 200 homes and 450 rental units within New Pascua reservation proper. Additionally, the Pascua Yaqui Tribe installed or replaced HVAC units for 550 members that reside off the reservation. The project was established to provide service to priority households that consisted of COVID positive patients with inadequate or no HVAC unit, elders and or individuals with comorbidities, and general population individuals

City of Tucson: Continued development also implies continued population growth, which raises the number of individuals potentially exposed to variations in weather patterns. Education efforts should continue to help the population understand the risks and vulnerabilities of outdoor activities, property maintenance, and regular exposures during periods of extreme cold. The City of Tucson continues to actively implement a winter weather risk awareness program to educate the public on the risks of severe cold during winter storms

In preparation for freezing temperatures, the City of Tucson implements several different programs such as Operation Deep Freeze, which works with voluntary organizations in providing shelter and temporary housing during the extreme cold. In addition, Operation Freeze, a road treatment program, is put into place to make sure the City's bridge decks are free of ice and safe for motorists to drive over. During Operation Freeze, City crews place "Wet Road Ahead" signs at bridge entrances and spray magnesium chloride on the bridge decks to lower the freezing temperature of water and prevent ice from forming on a roadway.

4.4.4 Extreme Heat

Description

Extreme temperatures can occur within any area and can often have adverse impacts on the health and welfare of a community or region. These extreme temperatures can affect people, pets, plants, and infrastructure throughout the area. Extreme heat is considered a risk to Pima County residents.

Extreme heat is either high temperature above the 95th percentile for the date or the combination of very high temperatures and exceptionally humid conditions that exceed regionally based indices for perceived risk. According to the National Weather Service, heat is one of the leading weather-related killers in the United States. Heat is responsible for hundreds of fatalities and even more heat-related illnesses.[11]

The major human risks associated with extreme heat are as follows:

- Heat Cramps: May occur in people unaccustomed to exercising in the heat and generally ceases to be a problem after acclimatization.
- Heat Syncope: This refers to sudden loss of consciousness and is typically associated with people exercising who are not acclimated to warm temperatures. Causes little or no harm to the individual.
- Heat Exhaustion: While much less serious than heatstroke, heat exhaustion victims may complain of dizziness, weakness, or fatigue. Body temperatures may be normal to moderately elevated. The prognosis is usually good with fluid treatment.
- Heatstroke: Considered a medical emergency, heatstroke is often fatal. It occurs when the body's responses to heat stress are insufficient to prevent a substantial rise in the body's core temperature. While no standard diagnosis exists, a medical heatstroke condition is usually diagnosed when the body's temperature exceeds 105°F due to environmental temperatures. Rapid cooling is necessary to prevent death, with an average fatality rate of 15% even with treatment.

Extreme heat affects individuals who work outdoors, as well as the homeless who have no access to shade or cooling, particularly at night. Nearly 3,000 people visit Arizona emergency rooms because of heat-related illnesses annually.[12]

Hikers and others involved in outdoor recreation frequently succumb to extreme heat when they run out of water. Extreme heat can stress the elderly and people with compromised immune systems or other health issues, leading to heart attacks and respiratory distress. Many of the elderly and those in poverty either have no air conditioning or have insufficient resources to use air conditioning during a heat wave. In the southwest deserts, air conditioning in the summer is as critical as home heating in the winter is for those in the northern tier of states. Other vulnerable populations during a heat wave include infants, young children, and those with functional or access needs.

In addition to the loss of life, extreme heat can affect infrastructure. Power lines are de-rated based on the ambient air temperature, which provides cooling to this equipment. High temperatures and windless conditions can lead to power lines as well as power transformers overheating, resulting in widespread power outages. Transportation systems also suffer during extreme heat or cold. Rail lines can buckle in extreme heat as the metal expands. Thermal expansion and contraction cause roadways to crack, leading to moisture penetration and degradation of asphalt or other road construction materials. Extreme heat also threatens pavement markings and signage, shortening their life and requiring more frequent replacement.

History

Extreme temperature events occur in Pima County on a regular basis, but damaging events typically occur during the summer months. History would indicate that multiple deaths due to extreme heat are highly likely, especially for the homeless, low-income, elderly, young, and people with access and functional needs. These populations are particularly vulnerable to extreme heat due to the increased exposure to the natural elements and decreased ability to compensate in the form of cooling apparatus.

Deaths of undocumented border crossers in the desert areas along the Arizona-Mexico border are also attributed to extreme heat. In the majority of the cases, the Pima County Medical Examiner lists the cause of death as undetermined,

[11] National Weather Service, 2016: http://www.nws.noaa.gov/os/heat/index.shtml
[12] Arizona Department of Health Services, 2020: Heat-Related Illness Summary 2016-2020 Arizona Residents and Non-Residents (azdhs.gov)

primarily due to limitations of examination of decomposed and skeletal remains. Environmental exposure to extreme heat combined with dehydration contributed to 90 deaths from 2017 to 2020.[13]

During the summer of 2020, the National Weather Service issued numerous excessive heat warnings during a persistently hot and dry summer/monsoon. New daily record high temperatures were established on 11 days during the summer in Tucson and the high temperature exceeded 105°F on 57 days. August was the hottest month ever recorded in Tucson for any month of the year.[14] According to the Pima County Medical Examiner, there were 185 heat-related deaths in Pima County between 2017 and 2020 with the highest total for a single year was 47 deaths in 2020. [15]

In the past, excessive heat events have produced these statistics:[16]

- June 2017, an extended period of excessive heat occurred across nearly all of southeast Arizona on June 6th. The highest temperatures during the period were 118°F at Ajo and 117°F at Organ Pipe National Monument. While no heat-related deaths occurred, there were numerous instances of heat-related illnesses in the Tucson Metro area.

  An extended period of excessive heat occurred across nearly all of southeast Arizona from June 18th through the 25th. The Tucson International Airport reached 115°F on three consecutive days for the first time and recorded the 2nd warmest reading on record of 116°F on the 20th. The low temperature of 87°F on the 20th was the warmest on record for June. Dozens of heat-related illnesses were reported in the Tucson Metro and two heat-related fatalities occurred west of Ajo.

- April 2018, hot temperatures were experienced in parts of southeast Arizona on April 25th with a temperature of 97°F recorded at Organ Pipe National Monument. One heat-related fatality occurred in western Pima County. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult male.

- May 2018, hot temperatures were experienced in parts of southeast Arizona on May 5th and 6th with a temperature of 102°F recorded at Sells. One heat-related fatality occurred east of Sells. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult female east of Sells.

- June 2018, hot temperatures were experienced in parts of southeast Arizona on June 3rd and 4th with temperatures of 107°F and 104°F recorded at Sells. One heat-related fatality occurred east of Sells.

  Well above normal temperatures occurred in southeast Arizona on June 22nd and 23rd. Temperatures as hot as 108°F occurred at Ajo, with a record high of 107°F at Sasabe and Sells and 106 at Tucson International Airport and Green Valley. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult on the Tohono O'odham Nation on the 23rd.

- August 2018, above normal temperatures occurred in Western Pima County on August 2nd and 3rd. Organ Pipe Cactus National Monument recorded high temperatures of 106 on the 2nd and 108 degrees on the 3rd, while Ajo reached 109°F and 108°F, respectively. Low temperatures were also above normal, in the lower 80s. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult male just northeast of Ajo on the 3rd.

- September 2018, above normal temperatures occurred in southern Pima County on September 10th and 11th. Sells recorded high temperatures of 102°F on the 10th and 104°F on the 11th, while Sasabe reached 101°F on both days. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult male just east of Sasabe on the 10th and another adult male northwest of Topawa on the Tohono O'odham Nation on the 11th.

- July 2019, above normal temperatures occurred in eastern Pima County on July 21st. The Tucson International Airport recorded a high temperature of 104°F after a morning low of 81. Green Valley topped

[13] Pima County Medical Examiner Reports, , Medical Examiner - Pima County

[14] National Weather Service, Tucson, 2021

[15] Arizona Department of Health Services, 2020: https://www.azdhs.gov/documents/preparedness/epidemiology-disease-control/extreme-weather/pubs/heat-related-mortality-year.pdf

[16] National Centers for Environmental Information (NCEI) Storm Events Database https://www.ncdc.noaa.gov/stormevents/

out at 103°F. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one female found in the desert southeast of Ryan Field.

- August 2019, above normal temperatures occurred in southeast Arizona on August 27th. High temperatures included 105°F at the Tucson International Airport, 107°F at Sells, and 104°F (record high) at Sasabe. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult male 11 miles south of Three Points.
- May 2020, above normal temperatures occurred in southeast Arizona on May 26th. High temperatures included 100°F at Sells, and 98°F at Sasabe, Anvil Ranch, and the Tucson International Airport. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult male 2 miles east of Sells, about 2 miles south of Tohono O'odham Community College.
- June 2020, above normal temperatures occurred in south-central Pima County on June 21st. High temperatures included 106°F at Sells and 104°F at Sasabe. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one adult male 2 miles southwest of Topawa, on the Tohono O'odham Nation.

  On June 28th, high temperatures included 98°F at Sells and 103°F at Sasabe. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one young adult male 5 miles southwest of Topawa, on the Tohono O'odham Nation.
- August 2020, above normal temperatures around 105°F occurred in central Pima County causing the Moderate Heat Risk category to be reached on August 8th. The Pima County Medical Examiner confirmed that heat was the primary cause of death for two adult males, one near Sells and another 15 miles southeast of Santa Rosa on August 8th. A second death heat-related death for one adult male just east of the Baboquivari Mountains on August 10th.
- September 2020, very hot temperatures were experienced in the lower elevations of southeast Arizona from September 4th through the 7th. Many locations approached or exceeded 110°F and set new daily record high temperatures. The Pima County Medical Examiner confirmed that heat was the primary cause of death for five individuals found in the desert in Pima and Cochise counties during the period.
- June 2021, very hot high temperatures of 106°F to 119°F, or 8°F to 13°F above normal, occurred in the lower elevations of southeast Arizona June 12th through the 20th and caused the High Heat Risk category to be reached. New record daily high temperature records were established at numerous sites on several days during this period. The Pima County Medical Examiner confirmed that heat was the primary cause of death for 14 people found in the desert of Pima and Santa Cruz counties during this period.
- August 2021, very hot temperatures of 101°F to 107°F, or 8°F to 12°F above normal were experienced in much of southeast Arizona on August 3rd and 4th with high temperatures equaling or exceeding established records in a few locations, and approaching record levels in most others. The Pima County Medical Examiner confirmed that heat was the primary cause of death for two males found in the desert in Pima County.

  During August 25th through the 27th, temperatures reached 104°F to 114°F or 5°F to 11°F above normal occurred, with high temperatures equaling or exceeding established records in a few locations, and approaching record levels in most others. The Pima County Medical Examiner confirmed that heat was the primary cause of death for one male found in the desert.
- September 2021, very hot temperatures were experienced west and south of Tucson September 11th through the 14th. The hottest two days were the 12th and 13th when high temperatures fell just shy of records across much of Pima County and topped out between 104°F and 109°F. During the four days, the Pima County Medical Examiner confirmed that heat was the primary cause of death for six individuals found in the desert, one at Organ Pipe Cactus National Monument and five on the Tohono O'odham Nation.

Extent

Climate change analysis predicts that the southwest will continue with an increase in daily temperatures during all months in the year resulting in warmer winters and hotter summers.[17] In addition, the climate models also predict less rainfall or snowfall, which will cause water shortages for human consumption as well as for generating electrical power.[18] During the 2021 summer, levels fell in Lake Mead to the lowest level seen in twenty years. In addition, the ongoing drought is forecasted to continue through the 2021 winter season. As noted in Figure 4-12, we experience extreme heat with temperatures above 95°F from April to October in any given year.

Probability of Future Events

There are no recurrence or non-exceedance probabilities developed for extreme temperature events in Arizona or Pima County. Table 2.1 *Climate Statistics for Stations in Pima County* provides example normal and extreme temperature ranges for various weather stations within the county. In general, extreme temperatures vary from normal by 10°F to over 30°F, with highs that exceed 110°F and the trend (though not linear) is toward increased number of days with high temperatures at or above 105ºF and 110ºF.

One indicator of the degree of danger associated with extreme heat is the Heat Index (HI) or the "Apparent Temperature." According to the NWS, the HI is an accurate measure of how hot it feels when the Relative Humidity (RH) is added to the actual air temperature. Figure 4-14 is a quick reference chart published by the NWS that shows the HI based on current temperature and relative humidity, and levels of danger for HI values. It should be noted that the HI values were devised for shady, light wind conditions and that exposure to full sunshine can increase HI values by up to 15°F. In addition, strong winds, particularly with very hot, dry air, can be extremely hazardous.

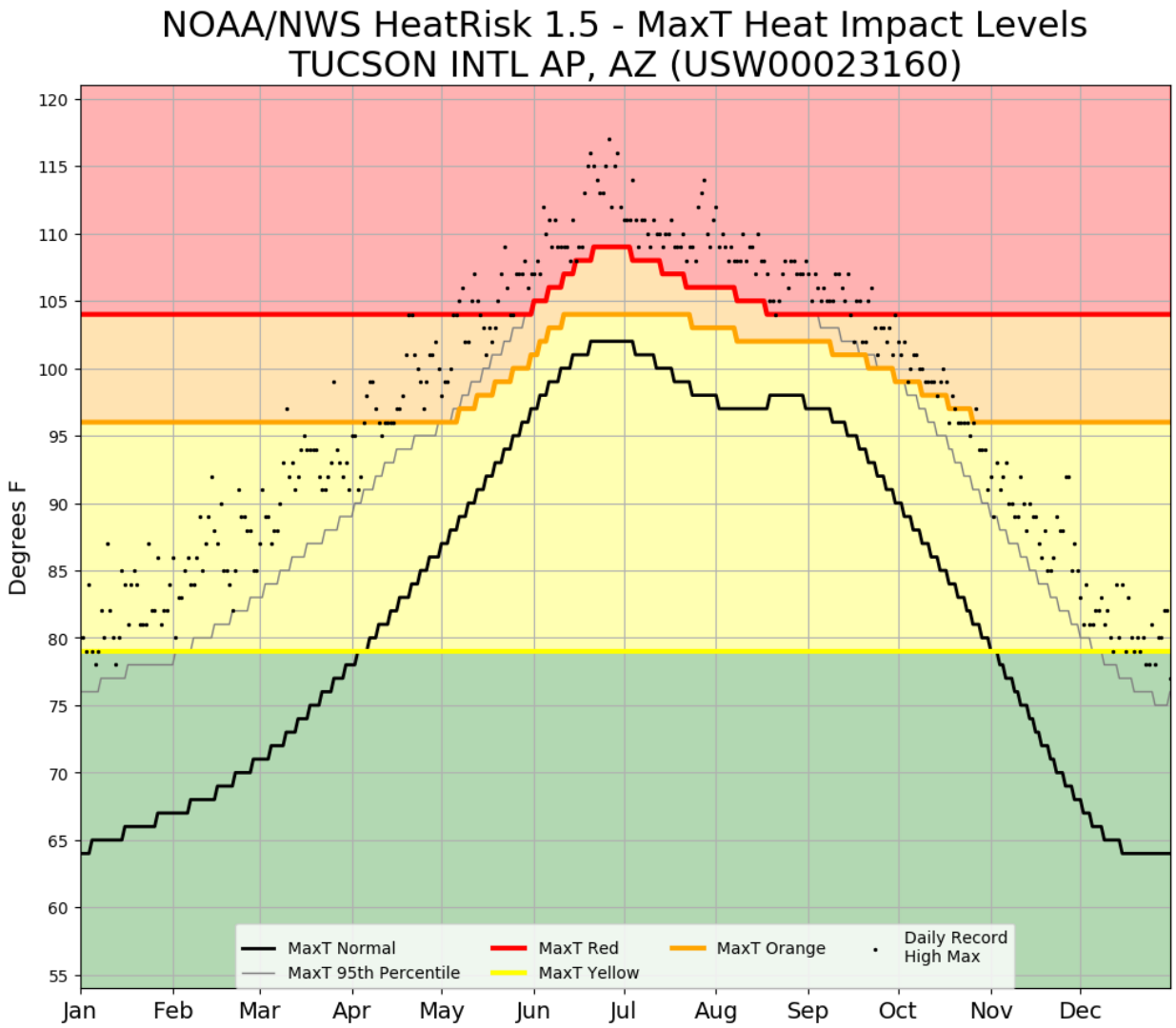
While the heat index is a valuable component toward understanding heat risk for people, there are not an adequate number of stations across the country, particularly in the West, that report hourly humidity values for a long enough period of years to develop a high resolution gridded climatology. Additionally, in most approaches to heat index warning criteria, the impacts of excessively warm nights are not considered. The HeatRisk approach utilizes the many more observations of temperature that exist across the country, along with leveraging well-known relationships between temperature and humidity to approximate the role of humidity. Hence, the HeatRisk approach does account for humidity, but in a more general sense, and its output will differ somewhat from specifically calculated heat index values.[19]

The HeatRisk takes into consideration:

1. How significantly above normal the temperatures are a given location,
2. The time of the year (for example, is this early season heat that you likely haven't become used to, or late-season heat that you have become more used to),
3. The duration of unusual heat (for example, are temperatures overnight at levels that would lower heat stress, or will warm overnight low temperatures continue to add to heat stress into the next day), and
4. If those temperatures are at levels that pose an elevated risk for heat complications, such as heat stress, based on peer-reviewed science.

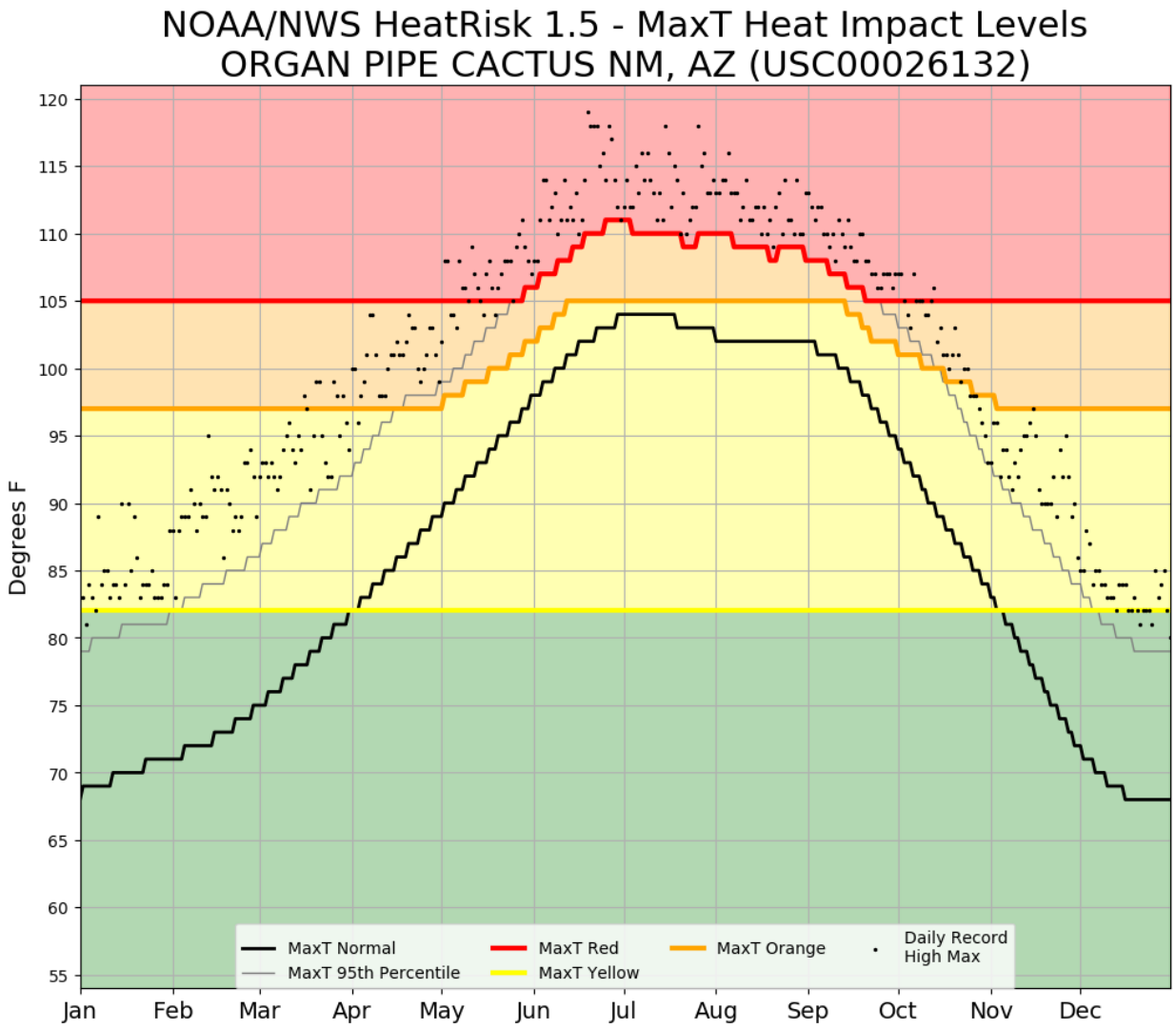
These factors are used to create daily dynamic heat thresholds for different locations for every day of the year which are plotted so that the climatological heat risk for particular locations on specific days of the year can be visualized.[20]

[17] Climate Change - Science of the American Southwest (U.S. National Park Service) (nps.gov) (https://www.nps.gov/subjects/swscience/climate-change.htm)
[18] Lake Mead level continues to drop, affecting power production - USA News Lab (https://usanewslab.com/us-news/las-vegas/lake-mead-level-continues-to-drop-affecting-power-production/)
[19] NWS Experimental HeatRisk: Identifying Potential Heat Risks in the Seven Day Forecast: https://www.wrh.noaa.gov/wrh/heatrisk/
[20] NWS Experimental HeatRisk Historical Data https://www.wrh.noaa.gov/wrh/heatrisk/historical/



Source: National Weather Service - Tucson

Figure 4-12 NOAA/NWS HeatRisk Maximum Heat Impact Levels for Tucson



Source: National Weather Service - Tucson

Figure 4-13 NOAA/NWS HeatRisk Maximum Heat Impact Levels for Organ Pipe National Monument

Climate variability may have a strong impact on extreme temperatures and extreme heat. The Centers for Disease Control says that rare extreme heat events that may occur once every 20 years could start occurring every two to four years in certain parts of the country including Arizona.[21] Events could become more severe and last longer as well as being more common.

[21] Centers for Disease Control, Climate Change and Extreme Heat Events, retrieved 2017: https://www.cdc.gov/climateandhealth/pubs/ClimateChangeandExtremeHeatEvents.pdf

National Weather Service Heat Index Chart

Temperature (°F)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity

Caution Extreme Caution Danger Extreme Danger

Source: NWS, 2021 https://www.weather.gov/images/wrn/social_media/2017/heat_index.jpg

Figure 4-14: National Weather Service Heat Index Chart

Vulnerability

Table 4-9: CPRI Results for Extreme Heat

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Likely	Limited	12-24 hours	> 1 week	2.65
Oro Valley	Highly Likely	Limited	> 24 hours	> 1 week	**2.95**
Pascua Yaqui Tribe	Highly Likely	Limited	> 24 hours	< 1 week	**2.85**
Sahuarita	Highly Likely	Critical	> 24 hours	> 1 week	**3.25**
Tucson	Highly Likely	Critical	12- 24 hours	<1 week	**3.40**
Unincorporated Pima County	Highly Likely	Critical	12-24 hours	>1 week	**3.40**
				County-wide average CPRI =	**3.08**

*Jurisdictions in **bold** chose to mitigate against the hazard*

Town of Oro Valley: The Town of Oro Valley is vulnerable to extreme heat. Extreme heat events occur on a regular basis, typically in the summer months resulting in threats to public health and safety. In recent years, temperatures in the summer months have been the warmest on record. Extreme heat, combined with less precipitation, and high wind days also increases the potential for major wildfires. Fluctuation in temperatures may also lead to higher uses of electricity, gas, or water that can lead to outages or interruptions in service. Oro Valley has susceptible populations in children and the elderly. Tourism, in the form of outdoor recreational activities, brings people from locales unfamiliar with the desert climate that can expose their susceptibility to the effects of extreme heat.

Pascua Yaqui Tribe: The Tribe's vulnerability to extreme temperature is primarily heat-related. The Tribe operates two casinos and one golf course that receive numerous heat-related emergency calls annually. As with other jurisdictions, elderly and AFN populations are also vulnerable to the temperature extremes and we will continue to identify vulnerable populations for heat-related illness, provide education targeted toward recreational activities, sustained education for tribal and enterprise workforce, visitors/travelers, and hospitality industry.

Town of Sahuarita: The Town of Sahuarita, like other neighboring communities, is vulnerable to heat and heat-related emergencies. Sahuarita, a planned community, emphasizes outdoor activities such as golf as one of its benefits for its residents and is home to several golf courses. Sahuarita has many senior communities and elder care facilities as well as neighborhoods for young families. As the elderly and young are more vulnerable to heat, the Town of Sahuarita chose extreme temperature as one of its hazards.

City of South Tucson: The City of South Tucson is vulnerable to extreme heat. Extreme heat events occur on a regular basis, typically in the summer months resulting in threats to public health and safety. In recent years, temperatures in the summer months have been the warmest on record. Extreme heat, combined with less precipitation, and high wind days also increases the potential for major wildfires. These compounding factors increase the potential for harm, damages, and losses. Fluctuation in temperatures may also lead to higher uses of electricity, gas, or water which can lead to outages or interruptions in service. South Tucson has susceptible populations in children elderly and low-income residents.

City of Tucson: Situated in a high-desert climate, Tucson is a place of extremes. The City of Tucson sees very high summer temperatures, and just months later will experience sub-freezing winter temperatures. While this is the norm, over the last decade the range of extremes has grown with recent summer temperatures breaking multiple records in one month and winter temperatures dropping to a point that the community, and infrastructure owners, are not prepared for.

During the summertime, extreme heat is generally handled well by the community dependent on the reliable delivery of electric power so that residents and businesses can cool their homes and buildings. The potential for electrical system failure during the summer due to storms, wildfires, or overuse/stress on the system are realities that Tucson as a city has begun to address more thoroughly in our planning processes as electrical system failure resulting in a long-term power outage would leave a large portion of the city vulnerable to heat-related illness during late spring, summer, and early fall where daytime temperatures exceed 90°F.

Unincorporated Pima County: Residents and visitors are vulnerable to extreme heat. Full-time citizens of Pima County are generally prepared for the hot climate; however, the homeless and visitors can be overcome due to exposure and lack of awareness. The Pima County Health Department maintains a "Beat the Heat" campaign and various other departments get involved during heat emergencies. Like others, unincorporated Pima County is vulnerable to electrical outages that moves the emergency from individuals outdoors to those indoors as well including the vulnerable elderly and young.

In fall 2021, Pima County was awarded a small grant to further efforts using the BRACE (Building Resilience Against Climate Effects) principles and practices from the Center of Disease Prevention and Control (CDC). To this aim, Pima County will research the installation of "cooling centers" that may be developed into "resilience centers" to support an all-hazard response within Pima County. In addition, Pima County is working with the US Environmental Protections Agency (EPA) to identify the infrastructure changes needed to enable schools, particularly high schools, to be regional locations for cooling as well as a source of good air quality, should air quality be compromised during heat waves.

One of the goals of the BRACE grant will be to determine the types of data that should be collected for decision making through a health equity lens. As such, the research will employ the social determinants of health as well as other principles that govern access or barriers to individuals and communities achieving their health and wellness aspirations. From anecdotal evidence, succumbing to heat-related illness often involves multiple factors mediated by the individual's exposure to heat. One known factor is prevalence of cardio-vascular disease in the community. Another factor is the relationship between taking prescription drugs that have as side effect the increased susceptibility to negative outcome from heat exposure

Loss Estimations

Losses due to extreme heat primarily occur in the form of death and illness for people and animals as mentioned at the beginning of this section. Arizona Department of Health Services tracks data and monitors trends and other factors to determine if a statistical significance exists. History would indicate that multiple deaths due to extreme heat are highly likely, especially for illegal immigrants that attempt to cross the Arizona deserts during the summer months. Homeless, low income, elderly, young and access and functional needs populations are particularly vulnerable to extreme heat due to the increased exposure to the natural elements and decreased ability to compensate in the form of cooling apparatus.

Changes in Development in the Hazard Area

Growth in Pima County has significantly increased the population and infrastructure exposed to extreme heat. There is also an increased demand on resources for electric power during the summer months. The primary intersect of extreme high temperature hazards and future development of the county is in the general increase in population and commensurate infrastructure development required.

Over the decades as the metropolitan area has dramatically grown, the "urban heat island" effect has developed. This has caused temperatures in the center of metropolitan areas to become much warmer than those in rural areas have. The concrete and asphalt of urban areas retains the heat of the day, and releases it slowly as compared to the surrounding desert terrain, which cools much quicker at night. As development continues to occur within Tucson and its surrounding area, heat-island conditions will continue to increase.

Pascua Yaqui Tribe: The Tribe's vulnerability to extreme temperature is primarily heat-related. The Tribe operates two casinos and one golf course that receive numerous heat-related emergency calls annually. As with other jurisdictions, elderly and AFN populations are also vulnerable to the temperature extremes and we will continue to identify vulnerable populations for heat-related illness, provide education targeted toward recreational activities, sustained education for tribal and enterprise workforce, visitors/travelers, and hospitality industry.

To address the hazard area of impacts from extreme hot events, over the reporting period, Pascua Yaqui Tribe improved residential/rental properties to provide affordable housing solutions, especially for the elderly and AFN populations. Adequate and modern housing for Pascua Yaqui tribal membership has addressed and alleviated additional costs for temporary sheltering/cooling for individuals/households who would otherwise fall into a vulnerable population. Phase I of these projects consists of 50 single-family units, currently under construction. Phase II will consist of 27 town-home dwellings within 7 building structures. Phase III is in its incipient development; however, initial plans are for 50, one to two-bedroom units within a three to four-story structure.

Another significant update that would address the hazard area for extreme heat events was a project developed using funding from the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) to install and or replace central heating/cooling units for Pascua Yaqui homeowners and renters that live on and off the reservation lands. This project was able to fund the installation/replacement of HVAC units for 200 homes and 450 rental units within the New Pascua reservation proper. Additionally, the Pascua Yaqui Tribe installed and or replaced HVAC units for 550 members that reside off the reservation. The project was established to provide service to priority households that consisted of COVID positive patients with inadequate or no HVAC unit, elders and or individuals with comorbidities, and general population individuals.

City of Tucson: The City of Tucson continues to actively implement a heat weather risk awareness programs to educate the public on the risks of severe hot temperatures during summer months. Tucson works to assess and identify at risk populations who are vulnerable to extreme heat and works with voluntary organizations in providing shelter and temporary housing during the extreme heat.

4.4.5 Flood

Description

Floods result from precipitation. Other floods due to dam or levee failures are addressed separately. Three seasonal atmospheric events tend to trigger floods in Pima County:

- *Tropical Storm Remnants*: The worst flooding tends to occur when the remnants of a hurricane that has been downgraded to a tropical storm or tropical depression enter the State. These events occur infrequently and mostly in the early autumn and usually bring heavy and intense precipitation over large regions causing severe flooding.
- *Winter Rains*: Winter brings storms that are low intensity; but long duration rains covering large areas that cause extensive flooding and erosion, particularly when combined with snowmelt.
- *Summer Monsoons*: In mid to late summer, the monsoon winds bring humid subtropical air into the state. Solar heating triggers afternoon and evening thunderstorms that can produce extremely intense, short-duration bursts of rainfall. The thunderstorm rains are mostly translated into runoff and in some instances, the accumulation of runoff occurs very quickly resulting in a rapidly moving flood wave referred to as a flash flood. Flash floods tend to be localized and cause significant flooding in local watercourses.

Damaging floods in the county include riverine, sheet, alluvial fan, and local area flooding. Riverine flooding occurs along established watercourses where the overbank areas become inundated. Sheet flooding occurs in regionally low areas with little topographic relief that can generate floodplains over a mile wide, such as in Avra Valley. Alluvial fan flooding is generally located near the base of mountains, such as the Tortolita Fan, which are characterized by multiple, highly unstable flow paths that can rapidly change during flooding events. Local area flooding is often the result of poorly designed or planned development wherein natural flow paths are altered, blocked, or obliterated, and localized ponding and conveyance problems result. Erosion is also often associated with damages due to flooding.

Another major flood hazard comes as a secondary impact of wildfires in the form of dramatically increased runoff from ordinary rainfall events that occur on burned watersheds. Loss of vegetation and soil changes are contributing to significantly increased runoff, turning a routine annual rainfall event into a raging flood with drastically increased potential for soil erosion, mud and debris flows.

History

Historical records of flooding in Pima County date back to the late 1800s. As one would expect, the frequency of reports of flood damage and loss increased over time as the population of the metropolitan area grew. By the late 1970s, the population in Pima County had grown to almost 500,000. By 2000, that number had risen to nearly 850,000.[1]

Pima County has been part of 13 disaster declarations for flooding, with none of those declarations occurring in the past five years, while disaster for fire has. The following historical incidents represent examples of major flooding that has affected the county:

- The October 1983 flood was the largest flood of record in the Tucson area. During August and September of 1983, nearly 7 inches of rain fell over the Tucson metropolitan area. Bridges in the area, including all spanning the Santa Cruz River except one, were damaged or partially washed away. Additional damage occurred along the other watercourses throughout the area. Several buildings fell into Rillito Creek due to bank erosion and extensive damage occurred to agriculture in Marana. Cost estimates (using 1984 dollars) to repair and mitigate flood damage were estimated at $105.7 million. Four deaths in Eastern Pima County were attributed to the flood. Due to the magnitude and extent of flooding and related damage, this flood is the one to which subsequent floods have been compared.
- The January 1993 Flood occurred during a 14-day period in 1993, from January 5th through the 19th. A series of severe winter storms produced record-breaking precipitation amounts. Heavy rains combined with melting snowpack caused heavy flooding throughout Pima County. Nearly every community and city within the county were impacted by the storms at some level. Although these were the most damaging floods to occur

[1]Pima County Regional Flood Control – Historical Flood Events: https://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=60316

in almost 10 years, no lives were lost and no residential and commercial structures were destroyed, with the exception of some horse barns associated with a business along Rillito Creek. The high water levels in the streams lasted almost two weeks, rather than the typical few days; Most of the heavy damage was associated with the Gila, San Pedro, and Santa Cruz Rivers. According to the USACE Flood Damages Report, the total public and private damages from the 1993 floods were estimated to exceed $12 million in Pima County alone. The flooding prompted a federal disaster declaration (FEMA-977-DR-AZ) for almost the entire state[2].

- August 14, 2005, and August 23, 2005, intense heavy rains caused significant damage to public infrastructure throughout Pima County. The severe runoff resulted in damages to numerous roads, traffic lights, water well fields, berms, crossings, and police vehicles. After over an inch of rain fell across a large portion of the Tucson metro area, some locations with more than 2 inches, several roads became flooded, closed, and impassable. In addition to all the impassible flooded roadways, several trailer homes located in the southern portion of the Tucson metro area, were flooded and surrounded by rising water. Rescue teams evacuated several people from their homes. Brawley Wash was out of its banks and flooding roadways causing them to be impassable. Over $260,000 in damages were estimated[3].
- In July and early August 2006, several areas of the state were struck by severe storms and monsoon flooding during the period of July 25-August 4, 2006. Tropical moisture poured into Southeast Arizona, saturating the ground at most locations. As rainfall continued, additional runoff quickly filled rivers and washes, exceeding bank full capacities and flooding homes, and businesses as well as nearby roads. Some roadways were washed away due to the strong floodwaters. Lots of flash flooding occurred throughout the Tucson metro area due to saturated grounds and extremely heavy rainfall. Numerous roads were closed due to flooding throughout the entire metro area for many hours. A USGS stream gage was destroyed by floodwaters in Rincon Creek. Additionally, there were numerous swift water rescues and nearly 100 vehicles stranded in flooded roadways. It was estimated that nearly 100 vehicles were flooded. Several rivers running through the Tucson metro area flooded on July 31, 2006. The Rillito River flooded with water over the cement banks near Dodge Boulevard. Additionally, the Rillito River was over bank full just east of the Swan Road Bridge. River Road near La Cholla Road was flooding from the Rillito River. Sabino Creek was out of its banks and houses were flooded near Sabino Canyon and Bear Canyon. The flooding prompted a federal disaster declaration (FEMA-1660-DR-AZ) for Gila, Graham, Greenlee, Pima, and Pinal Counties. Total disaster expenditures exceeded $13.6 million (DEMA, 2010; PCRFCD, 2011).[4]

Between July 2017 and August 2021 there were 67 flash flooding incidents with two deaths, one injury and property damage amounting to over 6.441 million dollars. The 2021 monsoon was the third wettest monsoon on record. Most of the Tucson area received more than 10 inches of rain, and the Catalina Mountains received 30-45 inches of rain. While the amount of damage was surprisingly low for such an active monsoon, there were a number of notable flood incidents. [5]

- July 10 2018, scattered thunderstorms moved slowly northwest across southeast Arizona. Thunderstorms produced 2 to 3 inches of rain in around one hour on both sides of I-10 from Cortaro to Twin Peaks which caused flash flooding. Some of these areas had also received 1 to 2 inches of rain two days earlier. Many roads and intersections were closed due to flash flooding on the northwest side of Tucson encompassing an area from Tangerine Road and I-10 down to Ina Road and I-10.

  A restaurant and animal shelter were also flooded, along with damage to Sanctuary Cove foot trail. First responders performed eight swift-water rescues of motorists. Floodwaters damaged railroad tracks and derailed over two dozen Union Pacific railroad cars north of Twin Peaks Road, causing extensive damage and closing the access road to Interstate 10 (I-10) for several days.

- September 2, 2018, thunderstorms produced large hail, heavy rain, and flash flooding in Pima, Santa Cruz, and Cochise counties during the afternoon and evening hours. The most substantial damage occurred from

[2] US Army Corps of Engineers, Los Angeles District, 1994, *Flood Damage Report – State of Arizona – Floods of 1993*
[3] NCEI Storm Events Database: https://www.ncdc.noaa.gov/stormevents/eventdetails.jsp?id=5522762
[4] Arizona Division of Emergency Management, Pima County Regional Flood Control District
[5] Historical Flood Events - Pima County

flash flooding in the Amado area where thunderstorms produced 3 to 5 inches of rain along Sopori Wash. Water flowed at depths ranging from 2 to 5 feet deep through several commercial properties including a restaurant, feed store, automotive shop, and youth center causing substantial damage to the buildings and their contents. Some of these structures were in Pima County and others were in Santa Cruz County. Additionally, several recreational vehicles (RV) suffered water damage at an RV storage park. Minor damage also occurred to Arivaca Road and other roads in the area. Property damage was estimated at $750,000.

- October 2018, what was Major Hurricane Rosa crossed the northern Baja peninsula as a tropical depression on October 1st. The remnant circulation entered southwest Arizona on October 2nd. Moisture ahead of these remnants fueled thunderstorms in southeast Arizona on September 30th. Rain associated with the remnant circulation moved northeast across southeast Arizona through October 2nd. The primary period of heavy rain occurred from 8 pm MST October 1st through 8 am MST October 2nd. Rainfall totals averaged 2 to 4 inches on the west half of the Tohono O'odham Nation with isolated heavier amounts of 5 to 8 inches. The heavy rain initially resulted in flash flooding but evolved into a longer-term period of flooding which led to evacuations of several villages, road closures, considerable infrastructure damage, and a subsequent disaster declaration. Property damage was estimated to be over 3.75 million dollars.

- February 2019, heavy rain fell on the mountains near Tucson beginning the morning of February 14th and continuing into the early morning hours of February 15th. Three to 7 inches of rain was recorded at the Santa Catalina Mountains causing flooding downstream along Sabino Creek, Tanque Verde Creek, and the Rillito River. Flooding also occurred along Rincon Creek from runoff down the Rincon Mountains. Multiple roads needed to be closed due to flooding and multiple swift-water rescues were performed. Mount Lemmon Highway was also closed due to several rock slides.

- July 23, 2020, scattered thunderstorms developed and moved west across southeast Arizona from the predawn hours through early afternoon. Some storms produced heavy rain and flash flooding in and around the Tucson metro area, including the Bighorn Fire burn scar area. Around 2 inches of rain fell in 60-90 minutes from the Catalina Foothills near Alvernon Way west through Flowing Wells and south to Tucson Estates, Drexel Heights, and the Pascua Pueblo. Rain totals of at least 3 to 4 inches in southwest Tucson caused numerous road closures, including San Xavier Rd near the Mission. Interstate 10 at Sunset Road was also closed briefly. Multiple vehicles became stranded in floodwaters and several swift-water rescues occurred in midtown. One man drowned after a rapid rise in the normally dry Santa Cruz River.

- August 20, 2020, a moisture surge from remnants of Hurricane Genevieve near lower Baja helped fuel thunderstorms that moved west and produced damaging winds and flash flooding in parts of Santa Cruz and eastern Pima counties. Heavy rain of 1 to 2 inches caused the closure of several streets in southwest Tucson between Drexel and Valencia Roads due to flash flooding.

- August 29, 2020, scattered thunderstorms developed and moved northeast across southeast Arizona during the afternoon and evening. One storm produced wind damage at Marana High School and another produced flash flooding over the Bighorn Fire burn scar. An inch of rain fell in less than an hour over the headwaters of the Bighorn Fire burn scar on the Santa Catalina Mountains. An 8-foot rise was noted along the Cañada del Oro Wash at Rancho Solano upstream in Pinal County. Strong flows continued downstream into Pima County causing water to flow across Edwin Road. Catalina State Park Road was also closed due to flows in Sutherland Wash.

- September 8, 2020, isolated to scattered thunderstorms developed and moved southeast across parts of southeast Arizona during the late afternoon and evening hours of September 8th. The strongest storms produced heavy rain and gusty winds across far eastern Pima and western Cochise counties. Flash flooding occurred late in the evening into the very early hours of September 9th. Flash flooding of small streams occurred in the Rincon Mountains causing the closure of roads at lower elevations.

Two to 5 inches of rain fell in the Rincon Mountains in a 2-hour period with at least 4 inches of rainfall in the upper reaches of the Tanque Verde Creek watershed. A four-foot rise in Tanque Verde Creek was measured at Chiva Tank and a 2.5-foot rise was measured downstream at Guest Ranch. Over a foot of water flowed across Wentworth Road about 3 hours after the crest at Chiva Tank.

The 2021 monsoon was the third wettest monsoon on record. Most of the Tucson area received more than 10 inches of rain, and the Catalina Mountains received 30-45 inches of rain. Below are several notable flood incidents:

- July 22-25, 2021, several rounds of thunderstorms were triggered by a westward-moving upper-level weather system across southeast Arizona from the afternoon of July 22nd into the early morning of July 23rd. Thunderstorms produced wind damage and flash flooding in, Green Valley and the Tucson Metro area. The widespread heavy rain across eastern Pima County resulted in widespread flooding of roadways and high flows along Pantano Wash and Rillito River and eventually downstream along the Santa Cruz River. Significant damage to the Loop hiking and biking trail system occurred.

  1 to 2 inches of rain fell in less than 90 minutes in southeast Pima County and caused extensive flash flooding from southeast Tucson and Vail southwest to Sahuarita and Green Valley. In the Vail area, three to four feet of water washed out East Andrada Road at the Santa Rita Wash, and a car was swept downstream 300 yards, but the occupants escaped unharmed. Many roads in Saguaro National Park East were also flooded or closed. In southeast Tucson, a person was rescued from a sandbar in the Pantano Wash near Harrison Rd. Farther south, Sahuarita Road and Wilmot Road were closed. In Sahuarita, a woman was rescued from her vehicle at Beta Street and the I-19 Frontage Road. In Green Valley, several roads were closed and homes were flooded in the Casa de Abrego neighborhood east of I-19.

- On July 23rd, 1 to 3 inches of rain fell in less than 1 hour over much of the Tucson Metro area, including parts of the Bighorn burn scar. Around ten swift-water rescues were performed during the overnight hours for motorists trapped in vehicles including near Escalante and Sarnoff. Plus, two people were rescued from the Rillito River near La Cañada Dr. Also, many trails were damaged at Sabino Canyon Recreation Area and six homes were flooded in near Finger Rock Wash in the Catalina Foothills due to runoff from the Bighorn burn scar. No injuries were reported.

  Near the Town of Marana, 1 to 2 inches of rain fell in less than an hour from the Tucson Mountains west to Picture Rocks. Numerous streets were flooded, closed, or damaged as a result. At least one vehicle was stranded in floodwaters, on Manville Road.

- On July 24th, a slow-moving upper-level weather system produced periods of heavy rain across southeast Arizona on July 24th and 25th. Flash flooding occurred where soils were already saturated from heavy rains of July 22th and 23rd and runoff continued to fill the Santa Cruz River downstream. Floodwaters caused considerable road damage. Green Valley received heavy rain of 1 to 1.5 in less than 1 hour and caused flash flooding and the closure of several roads. Five homes were flooded in the Casa de Abrego neighborhood, some of which had just been flooded less than 48 hours earlier. Early morning rainfall of 1 to 1.5 on the saturated ground quickly resulted in flash flooding and closure of several roads in north Marana. In Sahuarita more than 1 inch of rain fell on the saturated ground causing flash flooding of several roadways from Sahuarita to Corona de Tucson, including Sahuarita Road near Wilmot Road. In the Vail area, 1 to 2 inches of rain on the saturated ground caused numerous flooded and closed roads from just east of Rita Ranch to Old Spanish Trail and south to near I-10. One vehicle was stuck in floodwaters near Old Spanish Trail and Drexel Road. Up to 1 of rain on the saturated ground caused Franco Wash to rise rapidly and flood and damaged several roads in the Summit area.

  Before the weather system exited the area, another round of heavy rain during the afternoon and evening of July 27th caused additional flash flooding in the Tucson Metro area. At Mt. Lemmon, around 2.5 of rain in less than an hour was measured near the headwaters of Sabino Creek in the Bighorn burn scar and caused a two-foot rise in the stream that crosses trails in the Sabino Canyon Recreation Area. Six hikers had to be rescued after becoming trapped by the high flows. Heavy rain of 2.5 inches in less than 90 minutes occurred in Vail near the headwaters of Rincon Creek. Flash flooding occurred downstream in the Rincon Ranch Estates area. Camino Loma Alta became flooded and impassable.

- July 30, 2021, more than 1 inch of rain fell on the saturated ground causing flash flooding of several roadways from Sahuarita to Corona de Tucson, including Sahuarita Road near Wilmot Road. 1 to 2 inches of rain fell in less than an hour northeast of the Tucson International Airport causing flash flooding of area roads. One swift water rescue was conducted for a vehicle stalled in a wash. 1 to 2 inches of rain in less than 1 hour fell from south of Ajo to east of Why. This caused flash flooding of area washes and the closure of Highway 86 east of Why and Highway 85 between Ajo and Why. In the Vail area, 1 to 2 inches of rain on the saturated ground caused numerous flooded and closed roads. One vehicle was stuck in floodwaters near Old Spanish Trail and Drexel Road.

- August 17, 2021, multiple rounds of thunderstorms developed and moved across southeast Arizona from mid-morning of August 16th through the early evening of August 17th. Individual storms produced heavy rain of 1 to 2 inches per hour, but some locations where multiple thunderstorm events occurred received 3 to 4 inches of rain during the period. The result was numerous reports of flash flooding, road closures, and swift water rescues.

  Up to 3 inches of rain west and northwest of Tucson late in the evening caused flash flooding of Brawley Wash and smaller washes that flow into it. An additional 1 to 2 inches of rainfall during the predawn hours south of Three Points flowed through the Altar Wash into the Brawley Wash causing flooding from northeast of Three Points through the Garcia Strip of the Tohono O'odham Nation, north to Marana from early that morning into the late afternoon that resulted in damage to area roads. 1 to 2 inches of rain in two hours caused flash flooding and road closures in Marana and Avra Valley. More than one inch of rain in less than an hour caused a rapid rise in the Alamo Wash where a storm had produced an inch of rain three hours earlier. A motorist was rescued from a vehicle stuck in floodwaters on Chantilly Roadd. at the Alamo Wash.

  In Vail, the widespread heavy rain resulted in widespread flooding of roadways and high flows along Pantano Wash and Rillito River. Significant damage to the Loop hiking and biking trail system occurred. Damage from thunderstorm winds and lightning also occurred in the Tucson Metro.

- August 28, 2021, scattered thunderstorms moved west across southeast Arizona during the afternoon and evening. Thunderstorm wind gusts downed power poles in Catalina and Vail while more than 1 inch of rain in less than an hour caused flash flooding in central and eastern Tucson.

- August 31, 2021, moisture from the remnants of tropical system Nora produced moderate to heavy rainfall during the afternoon and evening hours with totals of 1 to 2 inches common and up to 3 inches in mountains, but the prolonged nature of the rain led to little if any significant flooding. However, flash flooding did occur along the Artesia Wash west of Sells where heavier rain fell in a shorter amount of time.

Pascua Yaqui Tribe: The Tribe has significant concerns regarding flooding. Rain runoff from the Black Mountain watershed has the potential to cause hazards to roadways and or built structures. As a result of runoff at times throughout the monsoon, Pascua Yaqui Tribe experiences localized flooding, and road closures occur primarily for areas along the Black Wash.

While not within the reporting period, in 2015, a monsoon flood event washed out critical communications infrastructure including phone and data lines. This event continues to be a relevant indication of the level of potential impacts Pascua Yaqui Tribe faces because of flooding.

In July 2020, a monsoon flood event caused significant localized flooding of major roadways prohibiting access in and out of the New Pascua reservation proper area including emergency and first responder agencies. This event also resulted in damages:

- A drainage channel near the PYT - Education Department Building was damaged because of water levels.
- Floodwaters caused significant erosion damage to two concrete box culverts within the Community Cemetery.
- Residential flooding at the PYT 5-Plex Apartment complex east of Ignacio Baumea Rd, south of Calle Torim; residents had to be temporarily sheltered at the local wellness center during the event.

Town of Sahuarita: Monsoon Season 2021 brought the Town of Sahuarita an unusual amount of rain. The months of August and September saw that Town face flooding in a few areas. There were a few damages to channels and a lot of debris and sediment accumulation in drainage structures. A couple of homes in one of the communities received some water due to debris blocking a private retention/detention basin.

City of Tucson Flooding is a regular occurrence in the City of Tucson area and can occur during either of our two primary rainy seasons – the monsoon season (which can be further impacted by remnants of Pacific hurricanes) and our winter rains. Flooding can make roads impassable, can create dangerous conditions in and around usually dry washes, and can flood homes and businesses within the City. Many incidents of flooding have been recorded in the Tucson area. Recent and large-scale flooding events have occurred in and around Tucson, which results in yearly deaths, and destruction of property to the citizens of Tucson.

Extent

The magnitude or strength of floods is measured in rainfall intensity, depth, and velocity. Within Pima County, rainfall intensity above 1.5 inches per hour is the first warning system trigger at which dry washes flow bank to bank and may create flash floods or road closures. Overbank floods may occur when these rainfall intensity rates are sustained over several hours. Predetermined flow depth and velocity readings expressed as cubic feet per second from streamflow gages are then used to trigger additional warning and response. During the last five years pre-scripted warning messages utilizing the County's Mass Communication platform were added to the ALERT Flood Threat Recognition and Early Warning system operated by the Pima County Regional Flood Control District (PCRFCD) throughout the County.

On June 5, 2020, as a result of the Big Horn Fire, the District analyzed post-fire flood risk based on fire-caused hydrologic changes and installed additional gauges in the burn area to facilitate updated warning information for the District's Automated Local Evaluation in Real Time (ALERT) system, Office of Emergency Management (OEM) and the first responders. The District distributed enhanced warning outreach letters to affected properties. Since July 11, 2020, 4 alerts were sent. While in 2021 there have 16 notifications.

Probability of Future Events

For the purposes of this Plan, the probability and magnitude of flood hazards in Pima County jurisdictions are based on the 1% probability floodplains (also known as the 100-year flood, as the flood has a 1% chance of being equaled or exceeded in any single year) delineated on FEMA Flood Insurance Rate Maps (FIRMs)[6]. FEMA completed a map modification program to update the FIRMs for the county into a digital FIRM (DFIRM) format. The PCRFCD is responsible for keeping these current as revisions are made. Floodplain GIS base files were obtained from the PCRFCD and are the basis for the flood hazard depictions in this Plan.

Vulnerability

Table 4-10: CPRI Results for Flood

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Highly Likely	Catastrophic	12-24 hours	< 24 hours	**3.50**
Oro Valley	Likely	Critical	< 6 hours	< 24 hours	**3.05**
Pascua Yaqui Tribe	Likely	Limited	6-12 hours	< 24 hours	**2.60**
Sahuarita	Likely	Critical	12-24 hours	< 1 week	**2.85**
Tucson	Highly Likely	Critical	6hours	< 24 hours	**3.50**
Unincorporated Pima County	Highly Likely	Critical	< 6 hours	> 1 week	**3.60**
				County-wide average CPRI =	**3.18**

*Jurisdictions in **bold** chose to mitigate against the hazard*

The different types of weather in Pima County described above produces distinctively different types of vulnerability.

[6] FEMA 100 Year Flood Zones, http://www.arcgis.com/home/item.html?id=e9aa2179f31b4b9cbe5c7f8b1b91cea3, 2016

Tropical storms, have historically caused the most damage in Pima County due to their regional extent. Weather systems moving from coastal waters inland toward the State of Arizona and over Pima County represent a distinct hazard because the predictability of occurrence is much lower than the winter and summer seasonal storms which are a regular part of the County's weather pattern. While weather is overall difficult to predict, the occurrence of tropical storms and their paths are especially difficult. While monitoring the potential for inland storm paths for remnants of tropical storms, the National Weather Service typically presents a band of possible storm paths. This band may or may not encompass the County, and the strength of the storm after passing overland may or may not be intense. If the storm continues to produce winds and heavy rainfalls after proceeding inland toward Pima County, the extent of severe weather is typically regional rather than more watershed-based as is the case with summer and winter storms. Tropical weather systems create more vulnerable conditions for Pima County because flooding may occur in numerous riverine and distributary floodplains simultaneously, and the duration of flooding may be between 24 to 72 hours in contrast to summer storms which tend to dissipate more quickly and affect a circumscribed area and winter storms which tend to be of lower intensity and to affect less aerial extent than tropical storms.

Summer monsoon storms produce intense rainfall over relatively small areas. Monsoon storms are more likely to trigger flood events on smaller watercourses. Furthermore, monsoon rainfall may affect just one watershed. In most years, the annual peak monsoon flow will occur on different days at different gauging stations. Flash floods are generally associated with summer monsoon thunderstorms. Several factors make flash floods a challenging hazard to mitigate.

1. Real-time precipitation gages may miss storm cells that are small enough in aerial extent although large enough in volume to cause flash flooding.
2. Extreme rainfall intensities can generate runoff that reaches peak flow in periods measured in minutes, providing little or no ability to provide the public with a warning about any specific event.
3. The leading edge of the flood may extend miles below the storm event that created it, flooding an area that may have received no rainfall and may not have even been cloudy, thus catching individuals completely unaware of the threat.

Thus monsoon hazards are severe but tend to be localized.

Winter mesoscale storms, as implied by the name produce bands of precipitation over days. Though characterized by low rainfall intensity, these long-duration storms yield the high volumes of water necessary to produce significant flow events on the major watercourses. In general, the largest floods on the Santa Cruz River have occurred because of tropical storms that come up from the Sea of Cortez in the fall, but do not produce significant flooding in most years. While high rainfall depths and extended duration certainly produce conditions conducive for flooding, saturated soils that have limited capacity to absorb rainfall also play a role. They may also include frontal systems that can provide more sustained flow durations, even as flood peaks tend to remain low. On rare occasions, winter frontal systems have produced rain on snow from January to March.

In addition to flash floods largely associated with mountain front drainage, sheet flow flooding is a phenomenon unique to watersheds with low topographic relief and a severe lack of adequate flow conveyance through channels. The lack of defined drainage channels often deceives the public into thinking that there are no flood hazards in the area. Sheet flow flooding may develop quickly but where slopes are particularly shallow, the duration of sheet flow flooding may extend more than 24 hours. Private roadways not designed for all-weather access are common in these areas. As a result, and in combination with the widespread nature of sheet flow flooding, during times of flooding, residents and emergency services ability to gain safe or reliable access to and from the affected area may be limited.

Alluvial fans create a special type of floodplain that has characteristics that are like sheet flow floodplains. Alluvial fans occur below mountain fronts and consist of an accumulation of sediment carried out of the mountains via riverine flow. At the margin of the mountain front, flow containment is lost, and floodwaters spread out across the alluvial fan. Alluvial fans may have better-defined channels or flow corridors, but they are not large enough to convey large storm events and, due to their location below the break-in slope, channels often aggrade and lose capacity. Since alluvial fans often consist of poorly consolidated alluvium, the loss of channel capacity in existing channels leads to the creation of new channels or the reestablishment of old channels. This characteristic of alluvial fans leads to significant uncertainty with respect to the location and severity of flood flows. The combination of severe, directed flow at uncertain locations, unconsolidated soils, and the likelihood of flash floods in this environment results in potentially extreme flood and erosion hazards.

Historically, flood events of limited aerial extent occur at least every few years in Pima County. These floods may not affect many people, but the effects of these floods may be severe for those affected. Floods on the major watercourses occur approximately once every ten years. Historically, these floods had a significant impact on the community; however, flood and erosion hazard improvements within the urban core have largely limited the hazards to the public from large flood events on the major watercourses. In addition, improved regulation of development through elevating structures above the base flood, protecting structures from erosion hazards, and protection of natural floodplains has ensured that new development is more flood resilient than was previously the case in unincorporated Pima County.

This section contains a map and data table for unincorporated areas known to flood frequently and where a warning is required per the NFIP (see Figures 4-15 and 4-16). Figure 4-15 is the Special Studies Floodplains maps showing locally mapped floodplains. These are mapped either by a developer or by PCRFCD. Table 4-16 contains data for these Special Studies Floodplains areas including exposure estimates.

While bank protection installed by the PCRFCD along major watercourses has reduced erosion and overbank flooding in much of the urbanized areas of the county, some development pre-exists floodplain regulations and infrastructure is at risk. These areas include:

- The Forty Niner's Country Club Subdivision on Tanque Verde Creek geologic floodplain Repetitive Loss Area.
- The alluvial fan areas of Lee Moore, Franco, and Flato washes particularly in the Summit neighborhood south of Sahuarita Road.
- The broad floodplains of Avra Valley and the Black Wash.
- Numerous canyon washes are impacted by wildfires within National Forests in the upper watershed and encroachment in the Catalina Foothill's residential areas.
- Private drainage ways in Green Valley. Urban areas with undersized, historic, or unimproved drainage infrastructure. This includes the Ruthrauff Basin Management Plan area which includes unincorporated Pima County and the City of Tucson, as well as a separate study conducted for South Tucson.

  The results of the Ruthrauff Basin Management Study (RBMS) were adopted by the Pima County Board of Supervisors and the Tucson City Council. The RBMS mapped eight square miles of urbanized floodplains southeast of the confluence of the Santa Cruz and Rillito Rivers including areas within unincorporated Pima County and the City of Tucson. This area is impacted by obstruction to flow created by Union Pacific Railroad features which historically have designed drainage infrastructure under their rail systems for smaller flow rates than those expected during a 1% chance storm event.

  Prior to urbanization, the area was used for irrigated agriculture with little topographic relief. Most of the subsequent development including mixed commercial and industrial uses and residential uses consisting of a good proportion of manufactured housing occurred prior to the adoption of the National Flood Insurance Program (NFIP) in 1968. Without NFIP guidelines, little planning for drainage and drainage infrastructure occurred. Structures were not elevated and streets were not designed to confine and convey flows to designated outfalls as they are elsewhere in many older urban areas. Today, flooding due to storm events tends to result in wide shallow flooding encompassing structures and properties located upstream of the Union Pacific Railroad which serves as an embankment prohibiting sufficient drainage to the Santa Cruz and Rillito Rivers.

  The RBMS produced new regulatory and FEMA floodplain maps and a list of alternatives for mitigating flooding. The alternatives include both structural and non-structural solutions. The District incorporates identified projects into its Capital Improvement Program as funding is available. Full flooding mitigation has not been accomplished due to feasible District funding schedules, significant delays in negotiating drainage easements with the Union Pacific Railroad and the extensive cost of obtaining private properties needed for flow conveyance and the construction of structural measures.

- Another urban area with similar characteristics is the City of South Tucson. In 2020 the District completed a floodplain study and identified alternatives to resolve urban flooding safety issues therein including undersized storm drains and culverts and flow within streets.

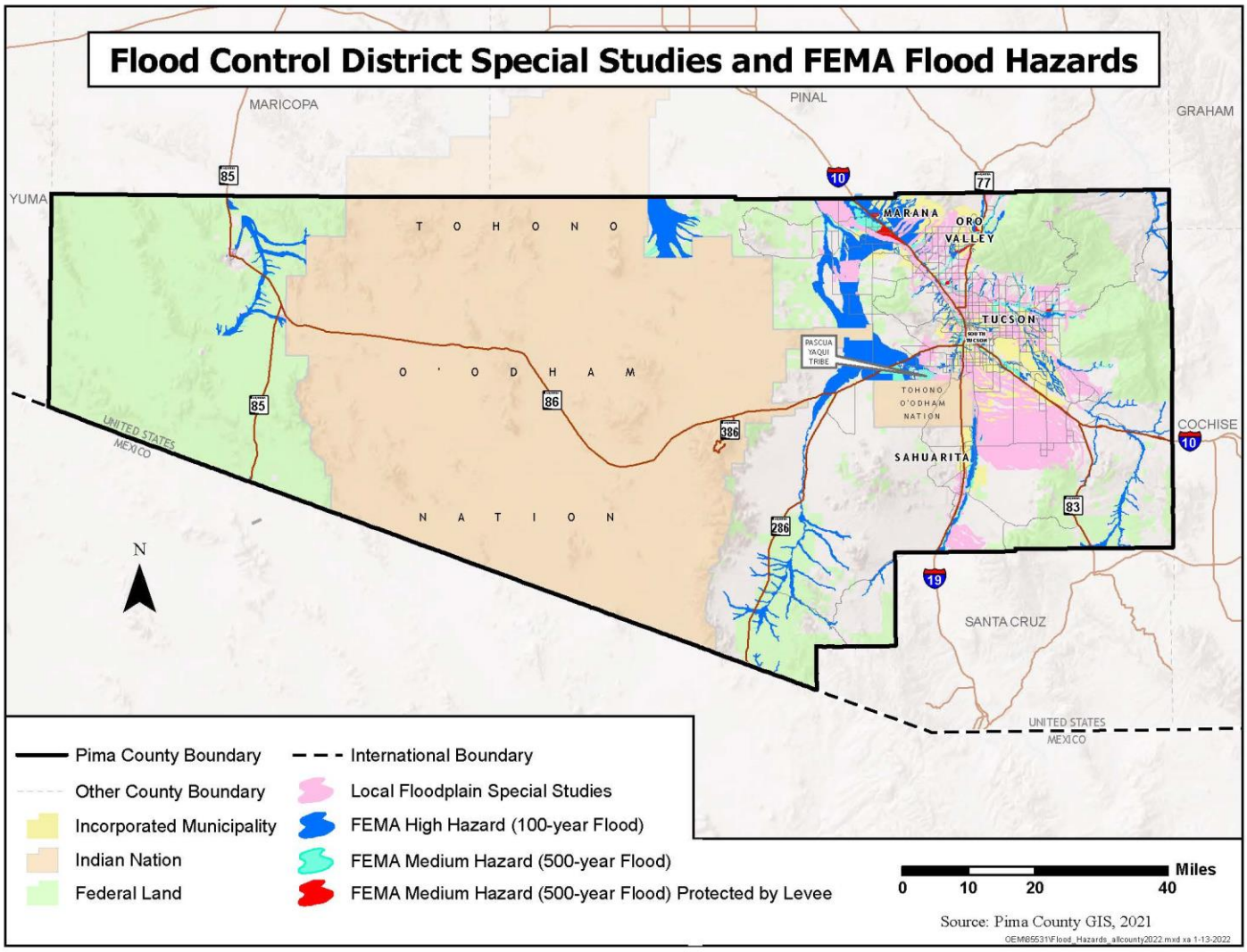


Figure 4-15: Flood Control District Special Studies and FEMA Flood Hazards

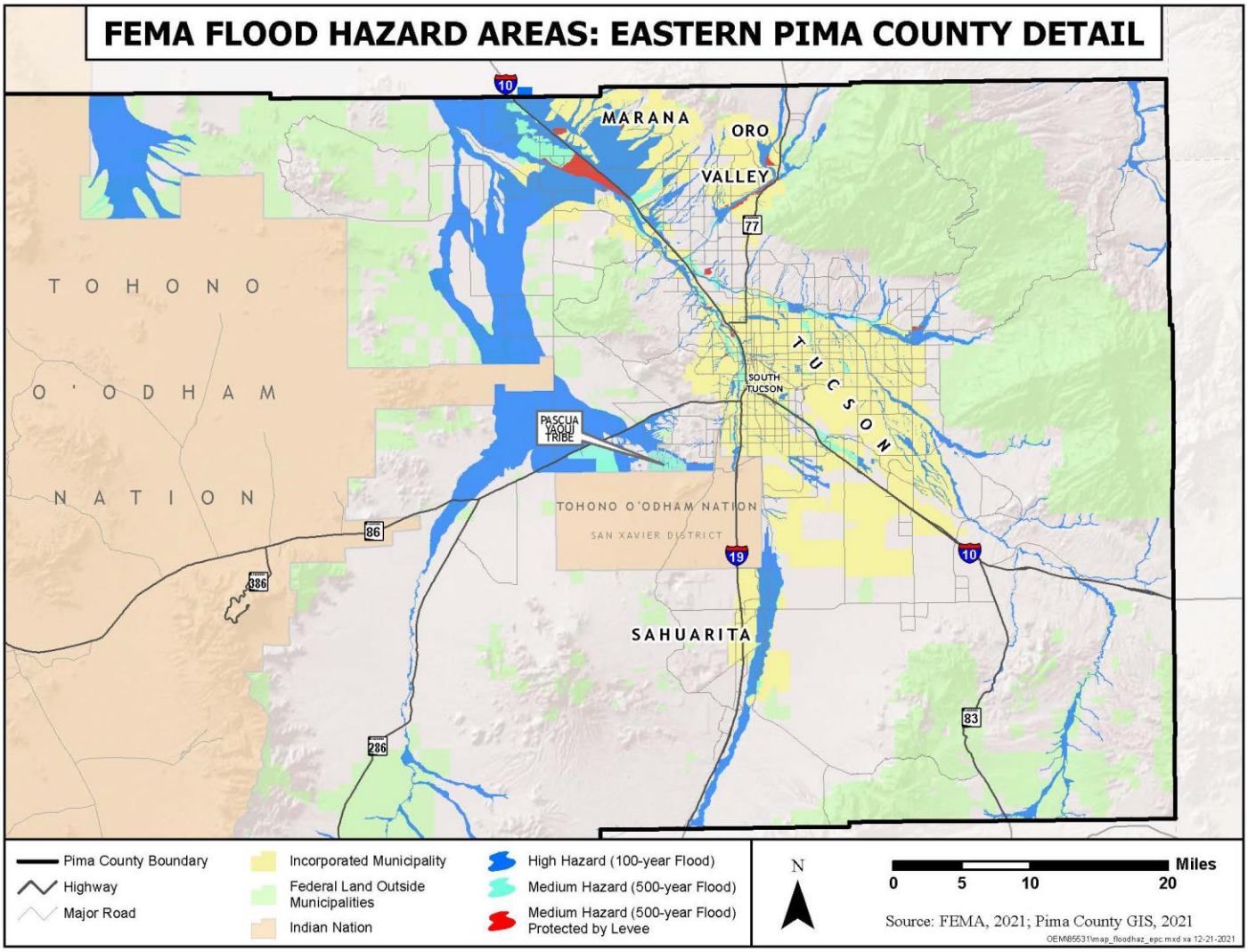


Figure 4-16: FEMA Flood Hazards: Eastern Pima County Flood Hazards Detail

Town of Marana: There are several flooding sources within the Town of Marana that can cause hazards to property or roadways. They include runoff from the Tortolita Mountains, runoff from the Tucson Mountains, and overbank flow from the Santa Cruz River. Two additional flooding sources include the Rillito River and the Cañada del Oro Wash, are contained within their banks during the base flood (commonly known as the "100-year flood") but are susceptible to hazardous erosive failures. Areas include:

- *Santa Cruz River*: Major regional storm events, such as significant rainfall in the Catalina Mountain watershed, can send enough Stormwater runoff into the Cañada del Oro or Rillito River systems that will direct floodwaters to the Santa Cruz River potentially causing the closure of the Ina Road bridge for structural precautions, the closure of the Sanders Road bridge due to overtopping, the capturing of the El Rio Open Space preserve, and evacuation due to overbank flows of the Berry Acres subdivision in far north Marana. Major storm systems south of Tucson, potentially all the way from Mexico, within the Santa Cruz watershed can also cause these issues. Some areas of Continental Ranch adjacent to the Santa Cruz River and the Town's airport could be impacted by Santa Cruz flood events above the base flood.

- *Tortolita Mountain Alluvial Fan*: The Tortolita Mountain watershed consists of several major washes that leave the mountain system whose floodplains overlap in a broad alluvial floodplain. Higher on the alluvial fan and closer to the mountains, the washes are well defined and the floodplains are more certain. The lower you travel on the floodplain the more the floodplain broadens out into overlapping sheet flow areas. Tangerine Road in its current condition is susceptible to flooding and road closures due to at-grade dip crossings. At the end of the alluvial fan lies the CAP canal system that has a protective berm on its upstream side and over chute pipe outlets to carry floodwaters across the canal at various locations. This berm/over chute system interrupts the sheet flow characteristics of the lower alluvial fan and re-concentrates the floodwaters at the pipe outlet locations. Localized flooding and road closures occur downstream of the over chutes. A similar situation occurs where the Tortolita Fan runoff is intercepted by the Union Pacific Railroad and I-10. These facilities are raised higher than the adjacent ground, impounding water on their upstream sides and creating focused flooding issues where culverts or interchange openings allow focused floodwaters through. There are also some areas of the interstate and railroad that can be outright overtopped. Should there be a rainfall event significant enough to cause runoff by the sandy soils of the Tortolita Fan; the water will go through the series of impoundments and discharges noted above through the CAP canal, Union Pacific Railroad, and I-10 to arrive at northwest Marana. These floodwaters then either sheet flow or are carried in the bar ditch and irrigation canal system in a northwesterly pattern throughout northwest Marana. Property damage and road closures occur until the floodwaters recede.

- *Tucson Mountain floodplain*: The Tucson Mountain watershed consists of several washes that leave the mountain system but unlike the Tortolita Fan, the washes remain well confined due to the rockier nature of the terrain and the closer proximity of the mountain range to the Santa Cruz River. The Town has not experienced major property damage from Tucson Mountain runoff but several roads both east and north of the mountain range are subject to closure during major rain events in the watershed. FEMA mapping categorizes the Town's airport as being in a sheet floodplain from the Tucson Mountains but the mapping does not appear to consider the raised CAP canal immediately east of the airport.

- *Cañada del Oro wash and Rillito River*: Both of these systems contain the base flood for their watersheds. However, property and roadways adjacent and crossing these systems could be susceptible to flooding from events above the base flood. A segment of the Cañada del Oro Wash west of Thornydale Road that is not armored with bank protection could experience erosive failure. Prior to the development of this area, the Town will require bank protection to be put in place. The most hazardous aspect of these systems however is where they come together at the Santa Cruz River just west of I-10. No part of this confluence is bank protected. A sand and gravel pit within the confluence area has been mined well below the bed of the river. If the berm protecting the sand and gravel pit were to fail, the resulting pit capture could cause a headcut eastwards and erode the adjacent portion of I-10, the Union Pacific Railroad, a major Tucson Electric Power transmission line, transcontinental high-pressure gas pipeline, and a transcontinental fiber optic line.

Town of Oro Valley: The Town of Oro Valley is susceptible to flood hazards on a relatively frequent basis due to tropical storm remnants, winter rains, and summer monsoons. Localized events are the most common and frequent types of flooding in Oro Valley, however, there are occasions of more widespread or regional flooding events. While the 2021 monsoons were the third wettest on record, the 2020 monsoons were the driest, highlighting the variability in precipitation from one year to the next. The Cañada del Oro Wash (CDO) divides the Town geographically and streamflow can be impacted by precipitation on the upper CDO and Mt. Lemmon. The CDO was identified through post-fire risk assessment to be at a heightened flood risk for the next three to five years, with 109 homes being added into the floodplain.

Other washes identified for post-fire risk include Sutherland Wash; Alamo Wash; Steam Pump Wash; Rooney Wash; Pusch Wash; and Rams Canyon. Major flooding in these washes would likely have significant impacts on residential and commercial structures, accessibility, utilities, and infrastructure.

Local flood mitigation projects and stormwater system maintenance, along with those completed in partnership with the PCRFCD have helped manage vulnerability to flooding. These projects are prioritized based on potential risks of damages/losses and available funding. In the event of a major flood, there would be other cascading events such as damages to infrastructure, severe wind (microbursts), downed power poles, power outages, uprooted trees, flooded homes, and other related damages.

Pascua Yaqui Tribe: The Tribe's flood vulnerability is mainly related to the main body of land for the Tribe that is in the Black Wash flood plain. The Black Wash gathers waters from washes from the Tohono O'odham and Pima County, runs through the jurisdiction and then back into Pima County. The flooding affects the residences as well as the business and gaming communities by cutting off critical services from citizens. In 2015, a monsoon flood event washed out critical communications infrastructure including phone and data lines.

Town of Sahuarita: The Town of Sahuarita is vulnerable to flooding mainly due to its proximity to the Santa Cruz River. Several large washes run through the Town and upstream rain events can overwhelm wash channels. Sahuarita Road runs from SR83 to the east to just west of I-19 through the town. Sahuarita Road has numerous low-level wash crossings that are vulnerable to flood events and can cut off citizens from emergency services. Numerous modular housing areas have structures with increased vulnerability to flooding when washes back up as well.

City of South Tucson: South Tucson is susceptible to flood hazards on a relatively frequent basis due to tropical storm remnants, winter rains, and summer monsoons. Localized events are the most common and frequent types of flooding in South Tucson, however, there are occasions of more widespread or regional flooding events. While the 2021 monsoons were the third wettest on record, the 2020 monsoons were the driest, highlighting the variability in precipitation from one year to the next. South Tucson is home to the former El Paso and Southwestern Railroad, while trains have not run on the old alignment in several decades, the raised rail bed continues to bisect the City, which creates a barrier in which floodwaters tend to collect and pool against. In addition to this, Union Pacific's Nogales line is the western city limit between South Tucson and the City of Tucson. This too creates a similar barrier for floodwaters within the City, which increases the chances of flooding businesses and homes.

City of Tucson: Flooding in the City of Tucson is a yearly expectation during the summer monsoons and often during the winter weather patterns. The community is generally well prepared for these storms and their short-term flash flooding effects. Although each year the damage is done to roadways and other infrastructure and people become stuck and sometimes injured or killed while trying to cross flooded washes that cross roadways. The flood vulnerably may come from two other sources. First, the potential for the track of tropical storms/hurricane remnants from the Pacific Ocean, usually via the Gulf of California, has led to widespread and large-scale rainfall causing severe flooding of large drainages such as the Santa Cruz River. These storms usually coincide with the tail end of the monsoon events. Second, there is a history of large-scale flooding events from El Nino weather patterns occurring during Tucson's winter rainy season. These weather patterns can again greatly increase overall rainfall over a short period of the season leading to flooding. They can create cascading events such as heavy snowpack on the mountains that border Tucson, followed by a warm tropical rainstorm that leads to heavy snowmelt and flooding of waterways and washes within the city.

While mitigation projects throughout the city have been underway since the record flooding in 1983, caused by remnants of Tropical Storm Octave, there is still a large length of waterways and washes that are vulnerable to erosion, bank degradation, and other flooding threats. Numerous bridges and roadways are vulnerable to substantial infrastructure damage during large-scale floods.

Loss Estimations

The estimation of potential exposure to high and medium flood hazards was accomplished by intersecting the human and facility assets with the flood hazard limits depicted on the Flood Hazard Maps. Population and residential building figures are from the 2010 Census; counts at the block level were intersected with those flood hazard areas using a more complex dasymetric technique from FEMA's HAZUS-MH software. This technique uses land cover information derived from satellite imagery to remove the areas in Census blocks that are largely without population or housing (e.g. vacant land, agricultural areas, etc.).

Table 4-11 summarizes the critical facility, population, and residential housing unit exposure and loss estimates for the high and medium flood hazards.

Table 4-11: Pima County Exposure and Loss Estimates Due to Flooding

Flood Hazard Exposure/Loss	Marana	Oro Valley	Pascua Yaqui Tribe	Sahuarita	South Tucson	Tucson	Unincorp Pima County	Total
Total Critical Facilities	348	185	17	148	23	1,976	1,358	4,692
Facilities in High Hazard Areas	107	13	0	32	1	133	157	4,443
Percentage of Total Facilities	2.28%	0.28%	0.00%	0.68%	0.02%	2.83%	3.35%	9.44%
Estimated Replacement Cost (x $1,000)	$ 347,974	$ 59,442		$ 164,753	$ 641	$ 345,899	$ 431,850	$ 1,350,559
Estimated Structure Loss (x $1,000)	$ 226,183	$ 38,637	$ -	$ 107,089	$ 417	$ 224,834	$ 280,703	$ 877,863
Facilities in Medium Hazard Areas **Not Protected by Levees** *	43	0	13	3	0	86	17	162
Percentage of Total Facilities *	0.92%	0.00%	0.28%	0.06%	0.00%	1.83%	0.36%	3.45%
Estimated Replacement Cost (x $1,000) *	$ 133,195.00	$ -	$ 89,150.00	$ 8,319.00	$ -	$ 339,930.00	$ 46,510.00	$ 617,103.00
Estimated Structure Loss (x $1,000) *	$ 86,577	$ -	$ 57,948	$ 5,407	$ -	$ 220,955	$ 30,232	$ 401,117
Facilities in Medium Hazard Areas **Protected by Levees** *	12	3	0	0	0	18	9	42
Percentage of Total Facilities *	0.26%	0.06%	0.00%	0.00%	0.00%	0.38%	0.19%	0.90%
Estimated Replacement Cost (x $1,000) *	$34,711	$19,510	0	0	0	$8,075	$71,747	$134,043
Estimated Structure Loss (x $1,000) *	$22,562	$12,682	$0	$0	$0	$5,249	$46,636	$87,128
Total Population	**58,835**	**47,927**	**3,466**	**36,255**	**4,895**	**565,628**	**414,285**	**1,131,291**
Population in High Hazard Areas	35,106	4,571	505	8,596	8	32,779	14,463	96,028
Percent Exposed	4.40%	9.10%	7.60%	3.20%	0.10%	6.10%	3.10%	12.09%
Population in Medium Hazard Areas **Not Protected by Levees** *	8,613	1296	0	0	blank	1,806	8,261	36,256
Percent Exposed *	11%	0.26%	0%	0	0	3.40%	1.70%	21.01%
Population in Medium Hazard Areas **Protected by Levees** *	801	364	0	0	0	42	544	1,751
Percent Exposed *	3.10%	2.45%	0.00%	0.00%	0.00%	0.14%	0.14%	5.77%
Total Residential Building Count	**14,771**	**16,922**	**952**	**10758**	**1,798**	**173,089**	**159,080**	**377,370**
Total Estimated Replacement Cost (x $1,000)	$ 6,033,773	$ 5,808,397	$ 621,677	$ 2,313,526	$ 733,753	$ 75,849,191	$ 76,428,859	$ 167,789,176
Structures in High Hazard Areas	895	27	-	105	-	3,550	6,374	10,951
Percentage of Total Structures	6	0.1	0	0.9	0	2	4	0.02
Estimated Replacement Cost (x $1,000)	$ 362,026.00	$ 9,267.00	$ -	$ 20,821.00	$ -	$ 1,516,983.00	$ 3,057,154.00	$ 4,966,251.00
Estimated Structure Loss (x $1,000)	$ 235,316.90	$ 6,023.55	$ -	$ 13,533.65	$ -	$ 986,038.95	$ 1,987,150.10	$ 3,228,063.15
Structures in Medium Hazard Areas **Not Protected by Levees** *	8,613	1,296	825	782	-	18,086	8,261	37,863
Percentage of Total Structures *	58.3	7.6	95	7.2	0	10.4	5.1	0.04
Estimated Replacement Cost (x $1,000) *	$ 3,386,295	$ 441,438	$ 590,593	$ 166,573	$ -	$ 7,888,315	$ 3,897,871	$ 16,371,085
Estimated Structure Loss (x $1,000) *	$ 2,201,092	$ 286,935	$ 383,885	$ 108,272	$ -	$ 5,127,405	$ 2,533,616	$ 10,641,205
Structures in Medium Hazard Areas **Protected by Levees** *	366	288	0	0	0	20	765	1439
Percentage of Total Structures *	2.00000%	1.70000%	0.00000%	0.00000%	0.00000%	1.50000%	0.48000%	0.00040%
Estimated Replacement Cost (x $1,000) *	$ 120,675	$ 987,427	$ -	$ -	$ -	$ 8,722	$ 366,858	$ 1,483,682
Estimated Structure Loss (x $1,000) *	$ 78,439	$ 641,828	$ -	$ -	$ -	$ 5,669	$ 238,458	$ 964,393

** Medium hazard area figures ONLY include critical facilities, population, or structures outside of high hazard areas (but within medium hazard areas)*

Sources: Pima County GIS, 2022; HAZUS Version 5.1 Release 16.1.0

Table 4-12: Pima County Exposure and Loss Estimates Due to Flooding in Local Flood Hazard Areas

Flood Hazard Exposure/Loss*	Marana	Oro Valley	Pascua Yaqui Tribe	Sahuarita	South Tucson	Tucson	Unincorporated Pima County	Total
Total Critical Facilities	**270**	**132**	**17**	**72**	**20**	**1,552**	**1,375**	**3,438**
Facilities in Local Flood Hazard Areas	25	4	0	5	0	205	96	335
Percentage of Total Facilities	0.73%	0.12%	0.00%	0.15%	0.00%	5.96%	2.79%	9.74%
Estimated Replacement Cost (x $1,000)	$ 91,229	$ 751	$ -	$ 837	$ -	$ 353,833	$ 352,078	$ 798,726
Estimated Structure Loss (x $1,000)	$ 59,299	$ 488	$ -	$ 544	$ -	$ 229,991	$ 228,851	$ 519,172
Total Population	**58,835**	**47,927**	**3,466**	**36,255**	**4,895**	**565,628**	**414,285**	**1,131,291**
Population in Local Flood Hazard Areas	13,262	8,350	1	1,006	-	231,950	124,790	379,359
Percent Exposed	1.17%	0.74%	0.00%	0.09%	0.00%	20.50%	11.03%	33.53%
Total Residential Building Count	**14,741.0**	**21,112.0**	**953.0**	**13,588.0**	**1,808.0**	**233,112.0**	**169,030.0**	**454,344.0**
Estimated Replacement Cost (x $1,000)	**$ 6,033,773**	**$ 4,554,999**	**$ 211,728**	**$ 913,363**	**$ 733,753**	**$ 69,497,100**	**$ 48,072,053**	**$ 130,016,769**
Structures in Local Flood Hazard Areas	5,579	3,824	-	404	-	99,156	53,394	162,357
Percentage of Total Structures	1.23%	0.84%	0.00%	0.09%	0.00%	21.82%	11.75%	35.73%
Estimated Replacement Cost (x $1,000)	$ 2,283,591	$ 825,043	$ -	$ 27,156	$ -	$ 29,561,131	$ 15,185,228	$ 47,882,149
Estimated Structure Loss (x $1,000)	$ 1,484,334	$ 536,278	$ -	$ 17,652	$ -	$ 19,214,735	$ 9,870,398	$ 31,123,397

** Local Flood Hazard Areas are selected Special Studies Floodplains defined by Pima County, not by FEMA*

Sources: Pima County GIS, 2022; HAZUS Version 5.1 Release 16.1.0

It is noted that the loss and exposure numbers presented above represent a comprehensive evaluation of the county. It is unlikely that a storm event would occur that would flood all the delineated high and medium flood hazard areas at the same time. Accordingly, actual event-based losses and exposure are likely to be only a fraction of those summarized above. Furthermore, any flood event that exposes assets or populations to a medium hazard will also expose assets and populations to the high hazard flood zone. That is, the 100-year floodplain would be entirely inundated during a 500-year flood in the localized area of impact.

Changes in Development in the Hazard Area

While Pima County continues to outpace development in most parts of the Country, for those jurisdictions participating in the NFIP CRS, adequate planning and regulatory tools are in place to regulate future development. The PCRFCD conducts basin (watershed) studies to identify floodplains, assess exposure, and identify mitigation measures not mapped by FEMA. In addition to managing the major watercourse and operating the Flood Threat Recognition and Warning System throughout the County, the PCRFCD works with all jurisdictions on mitigation projects regardless of their participation in the regulatory components of the NFIP. However, events of greater magnitude than the base flood due to climate variability and changes in upper watershed conditions may increase flood-related hazards.

The PCRFCD has been actively creating new floodplain delineations outside of FEMA designated floodplains and continually strives to improve floodplain development to create a more flood resilient community. Because of mapping efforts, the aerial extent of local floodplains within unincorporated Pima County exceeds the extent of federally mapped floodplains. Protection of these floodplains removed development pressure on some of the most hazardous areas. As future development occurs avoidance is required in most cases.

Pima County's arid environment, combined with anthropomorphic alterations to the landscape, creates conditions that promote the lateral migration of watercourses. Erosion along major watercourses has been some of the most dramatic flood damage historically however a major bank protection program has removed this risk along the major watercourses. Where bank protection is not in place, erosion hazard setbacks are.

Natural floodplains benefit the community by reducing flood and erosion hazards, improving water quality, increasing groundwater recharge, and providing biological corridors for plants and wildlife to thrive, all while providing public health, safety, and economic benefit to the citizens of Pima County. To the greatest extent possible, the PCRFCD promotes maintaining the natural functions of floodplains over structural measures to control flooding.

Town of Marana: Over the last five years, the Town of Marana has completed the following changes to mitigate flood hazards and minimize the risk of future hazards. The completion of Tangerine Road, Phase One from Dove Mountain to Oro Valley significantly improved flood hazard issued for that roadway segment in 2018. Pima County also completed a 20-year levee along the El Rio preserve that helps to protect that area in 2021. The permitting and construction of a major interception channel and bank protection for the De Anza development protects both that new subdivision and the existing Cortaro Ranch neighborhood in 2021. Pima County cleared and smoothed the Santa Cruz River channel approaching the Marana Road bridge in 2020. The Town utilized an easement to clear obstructing vegetation on Silverbell Road near the Continental Reserve Loop roadways that caused flooding in 2018. Union Pacific performed significant maintenance of the drainage channel and culverts along their line that contributed to the 2018 train derailment.

Town of Oro Valley: Within the Town of Oro Valley, while there continues to be commercial and residential development, there are requirements to meet the Stormwater Utility's current floodplain management and other building codes. These include the subdivision design standards, drainage criteria manual, international building codes, and zoning codes to address floodplain management and site drainage. While there is development, the infrastructure is being constructed/remodeled to potentially be at less risk/vulnerability to flooding.

Pascua Yaqui Tribe: In order to address household and community impacts to flooding in late 2021, the Pascua Yaqui Tribe purchased a 4-chute, gravity-fed Sandbagger machine and are consolidating a cache of sandbags to provide timely response and mitigation for infrastructure protection and commercial/residential protection.

- An Assisted Living Center was created after renovation to the old Fire Department Station in New Pascua reservation proper.
- A Men's Path and Women's Path facilities were constructed, off Camino de Oeste, north of Jefferey Road.
- A Boys and Girls Club is currently being constructed, south of the PYT - Wellness Center.

- In 2021, the construction of a Food Pantry facility began, this facility will provide a sustained community service for families/individuals in need of resources.
- Six 5-plex/Housing on Calle Torim, just west of Ignacio Baumea.
- Construction of the Pascua Yaqui Health and Social Services Family Center was completed in 2021.

The Pascua Yaqui Tribe has continued to institute flood control implementation strategies including detention catchment basin practices for stormwater flood protection of the Tribe's developed lands. All new construction developments incorporate these flood control measures.

City of South Tucson: Within the City of South Tucson, there continues to be a small amount of commercial and residential development, there are requirements to help reduce offsite drainage, other building codes. These include international building codes and zoning codes to address floodplain management and site drainage. While there is development, the infrastructure is being constructed/remodeled to potentially be at less risk/vulnerability to flooding.

City of Tucson: The City of Tucson continues to maintain compliance with NFIP regulations by enforcement of the current floodplain management ordinances through review of new developments located in the floodplain and issuance of floodplain permits. Tucson continues to improve floodplain administration under NFIP program by sending inspectors into the field when the City receives a flood warning from NWS, to assess bridges, washes, and other critical infrastructures within the City's jurisdiction.

National Flood Insurance Program Participation

Participation in the NFIP is a key element of any community's local floodplain management and flood mitigation strategy. Pima County and the six other incorporated jurisdictions participate in the NFIP. Joining the NFIP requires the adoption of a floodplain management ordinance that requires jurisdictions to follow established minimum standards set forth by FEMA and the State of Arizona when developing in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by the 100-year flood and that new floodplain development will not aggravate existing flood problems or increase damage to other properties. As a participant in the NFIP, communities also benefit from having Flood Insurance Rate Maps (FIRM) that map identified flood hazard areas and can be used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are also an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their communities. Table 4-13 summarizes the NFIP status and statistics for each of the jurisdictions participating in this Plan.

Table 4-13: NFIP Statistics as of October 2021

Jurisdiction	Community ID	NFIP Entry Date	Current Effective Map Date	Number of Policies	Amount of Coverage (x $1,000)	Floodplain Management Role
Pima County	40073	2/15/1983	9/28/2012	2,030	$522,026	Managed through PCRFCD
Marana	40118	8/1/1984	6/16/2011	290	$81,176	Provides floodplain management for the town
Oro Valley	40109	12/4/1979	6/16/2011	155	$50,369	Provides floodplain management for the town
Pascua Yaqui Tribe	---	---	---	---	---	Not a Participant in the NFIP
Sahuarita	40137	6/30/1997	6/16/2011	45	$12,906	Provides floodplain management for the town

Table 4-13: NFIP Statistics as of October 2021

Jurisdiction	Community ID	NFIP Entry Date	Current Effective Map Date	Number of Policies	Amount of Coverage (x $1,000)	Floodplain Management Role
South Tucson	40075	1/31/1979	6/16/2011	0	$0	City defers floodplain management to PCRFCD
Tucson	40076	8/2/1982	9/28/2012	1,636*	$365,837*	Provides floodplain management for the city

*based on date from the City of Tucson

Table 4-14 NFIP Compliance for: Pima County

Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction:

The process is subject to Pima County Code section 16 the Floodplain and Erosion Hazard Management Ordinance as well as policies and procedures available here:

https://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=60970

These policies require permits and review of subdivision and entitlements for all development within floodplains, erosion hazard setbacks and Pima County Regulated Riparian Habitat. This includes any development that is substantially damaged, defined as 50% of fair market value, over the lifetime of the property.

Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction:

The Pima County Regional Flood Control District budget supports an ongoing program of pro-active local floodplain studies which revise approximately mapped FEMA Special Flood Hazard Area and extensive local Special Studies Floodplains. Needs are identified in the approved Floodplain Management Plan. Many of these studies are conducted in-house while the largest involve consulting teams and stakeholder groups including affected municipalities. A complete set of DFIRMs including amendments are maintained by District GIS staff. The current effective FIRMs are the L Series DFIRMs, which became effective on June 16, 2011, though a number of panels in the Agua Caliente Wash area have since been replaced and are M Series DFIRMs. All of the previous K Series FIRMs have been superseded and should not be used for anything but historical comparison. A full list of completed studies is available here:

https://webcms.pima.gov/cms/one.aspx?portalId=169&pageId=60308

Studies which are planned or underway are listed in the Floodplain Management Action Plan available here:

www.pima.gov/fmp

Storms, catastrophic fires and development may prompt studies not identified therein. Approved maps are available to the public by visiting our office and in several formats on-line including a GIS Application and individual parcel or address query. Consultants and researchers may also gain direct access to the data servers which are updated nightly as new data is entered.

GIS: PimaMaps - Pima County

Printable and downloadable pdf "flood hazard map": https://gis.pima.gov/apps/floodhazard/

Table 4-14 NFIP Compliance for: Pima County
Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.):
The Pima County Regional Flood Control District provides map information services free of charge, and staff including Certified Floodplain Managers, hydrologists and engineers are available to assist those seeking elevation certificates, permits and entitlements to avoid the risks of floods. The District constructs projects to remove urbanized areas and critical facilities from the floodplain. The District conducts targeted outreach activities including mailers, advertisements and events which are all part of an approved Program for Public Information that is put together by a stakeholder committee. In the face of new flood insurance rating methodology effective in 2022 the District staff is developing additional expertise in this area. The same stakeholder committee guides the development of the Floodplain Management Plan discussed below and all District activities are overseen by the Flood Control District Advisory Committee that includes one member appointed by each Board of Supervisor District and one from each municipality in Pima County.
Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying, or adding flood hazard area mapping, etc.
Pima County is a Class 3 NFIP Community and conducts the full spectrum of 6 creditable NFIP activity types and 161 discreet watershed specific activities identified in the Board approved Floodplain Management Action Plan. Needs identified therein include: • Updating the definition, identification of and rules for development in "critical basins" as defined in PCC Section 16 the Floodplain and Erosion Hazard Management Ordinance and Stormwater Retention/Detention Manual. • Providing pre-vent technical assistance to emergency responders and the public to identify and provide warning of road closures due to flooding. Revising mapping procedures to address future conditions.

Table 4-15 NFIP Compliance for: Town of Marana
Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction:
The town's floodplain regulations are contained in Town Code Chapter 17-15 "Floodplain and Erosion Hazard Management", which was recently modified to more closely align with ADWR's Model Ordinance; which goes above and beyond the State of Arizona requirements. Regulatory floodplains are mapped on the town's GIS system. Private and Public development reviews verify that no infringement occurs within the floodplain (or that infringement is appropriately mitigated within that project). When a development is submitted through the Electronic Plan Review to Development Services staff, all plans and building permits undergo a floodplain status check, to determine the floodplain status. If a property is within the SFHA or EHS it is flagged in the Town's project tracking system and a series of restrictions are placed on the building permit which are cleared with each inspection/requirement. These restrictions are: • Establishment of an elevation reference hub (HANG in AO Zone) to determine the elevation of the top of bottom floor. • Verification of required structure elevation. Applicant's surveyor sets elevation on the top of form or completed pad with required slab thickness. • Receipt and verification of the Elevation Certificate.

Table 4-15 NFIP Compliance for: Town of Marana
Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction:
The Town utilizes Arc-View GIS to reflect the current DFIRM panels and LOMRs, which are downloaded from Pima County Regional Flood Control District, and paper/electronic FIRMS and LOMRs. The Town underwent re-mapping in 2008 with an effective date for the L-series mapping of 16 June 2011. The Town Engineers office is the official repository for floodplain documents for the jurisdiction.
Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.):
The Town provides assistance to the community in determining floodplain status, elevation certificates, LOMRs and other associated floodplain questions. The Town also does a yearly public information effort that is targeted two groups; at real estate professionals, mortgage lenders, engineers and banks and the second for the general public. This outreach outlines the basic precautions for construction in the floodplain, associated risks, mitigation strategies and contact information.
Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying, or adding flood hazard area mapping, etc.
The Town of Marana has updated the Floodplain Management Code in 2021 and is continually updating the policies and procedures for our floodplain management program as required or needed. The Town recently revised the floodplain use permit procedure to more closely align with ADWR and FEMA guidelines. The Town has performed several area-wide drainage studies in an effort to create a master drainage plan for the town. In these studies, areas that are determined to be within a new or re-mapped SFHA are marked and the appropriate floodplain management actions are then required by the Town. These actions help to reduce the risk to life and property and keep the Town's CRS rating.

Table 4-16 NFIP Compliance for: Town of Oro Valley
Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction:
The Town's floodplain regulations are contained in Town Code Chapter 17 "Floodplain and Erosion Hazard Management" which is drafted from ADWR's Model Ordinance. Nearly all the Town's regulatory floodplain areas are contained within town-owned properties, and/or are within a platted (or granted) Drainage Easement on other properties. Town-owned washes are further restricted against development and/or modification by the "Floodplain and Erosion Hazard Management Ordinance" (Town Code Article 17-3-2). The Town has a maintenance/control program, and annually allocates funds to remove channel-obstructing vegetation and debris from selected watercourses and other town-owned property. Regulatory floodplains are mapped on the Town's GIS system. Private development reviews verify that no infringement occurs within the floodplain (or that infringement is appropriately mitigated within that project). When a development is submitted through the Electronic Plan Review to Community and Economic Development staff, and all or some portion of the property is in the SFHA, it is tagged in our tracking system (Munis). Once a development is tagged, the application is sent to both the Stormwater Utility and Building for review. This lets staff know that the development must comply with Oro Valley's ordinances as they relate to NFIP.

Table 4-16 NFIP Compliance for: Town of Oro Valley
Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction:
Updated Town wide Federal Insurance Rate Map (FIRM) Panels became effective on June 6, 2011. Currently, these maps, in addition to Letters of Map Change (LOMC) may be used to determine if a particular piece of property is in a 100-year floodplain. FIRM panels will be updated for local LOMRs, updated community limits, and in certain locations, the FIRM panels will have new identification numbers and be printed at a closer scale.
Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.):
The Town of Oro Valley has worked with the Pima County Regional Flood Control District to provide Elevation Certificates for properties that have been re-mapped into the 100-year flood zone as a result of the updated North Ranch Watershed LOMR completed in 2020. Throughout the year, Public Open House Home Owners Association Meetings are held within the town, to educate the public on flood hazard areas, and rules and regulations for development activities within the flood hazard areas, and maintenance responsibilities within drainage ways. These meetings are coordinated with the Town Manager's Office of Oro Valley under their lead role. The Town has also produced a publicly available Floodplain Mapping resource showing all the currently identified floodplains; FEMA, Locally Platted, and Special Studies to assist the public in identifying their property floodplain status.
Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying, or adding flood hazard area mapping, etc.
The Town of Oro Valley updated its current Floodplain Management Ordinance on November 17, 2021 following the Arizona Department of Water Resources (ADWR) guidelines as published in their model ordinances for the communities within the state of Arizona. The Town has partnered with FEMA and the Pima County Regional Flood Control District to fund multiple Watershed Studies within and adjacent to the Town's boundaries. These studies will be used to identify areas subject to development activities with current or future flood hazard zones. These proactive steps help reduce the risk of loss of life and property within the flood-prone areas in the town

Table 4-17 NFIP Compliance for: Pascua Yaqui Tribe
Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction:
The Pascua Yaqui Tribe, Facilities Management Department employs a full-time registered Architect, and relative to new construction projects on the reservation, the Pascua Yaqui Tribe refers to current requirements used by Pima County Floodplain which uses FEMA maps and flood area designations. FEMA provides flood hazard and risk data to help guide mitigation actions. The zones designated area provide recommended top of flood elevations that are used in subsequent designs. For example, the Tribe is currently constructing a Food Pantry building. By using Pima County Floodplain guidelines, Pima County contour maps, and FEMA maps the Tribe was able to determine the minimum pad elevation of two feet above existing grades, develop a fill area and use a standard rip-rap detail for erosion control. On larger projects, the Tribe contracts out to registered Civil Engineers and Hydrological Engineering consultants. When asked for flood maps relative to the Tribe, we direct them to our Reservation wide study by JE Fuller Hydrology which is applied subjectively to each project. The Pascua Yaqui Tribe revised its FIRM to reflect LOMR, effective date March 21, 2016

Table 4-17 NFIP Compliance for: Pascua Yaqui Tribe
Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction:
The Pascua Yaqui Tribes' current Drainage Master Plan (JE Fuller) currently being used is slated for update in the next few years This along with current FEMA information provides flood hazard and risk data to help guide mitigation actions. Flood mapping is also part of the National Flood Insurance Program (NFIP), as it is the basis of the NFIP regulations and flood insurance requirements. FEMA's flood mapping program is a guide relative Risk Mapping, Assessment, and Planning, or Risk MAP panels included in the revision will be updated for local LOMRs, updated community limits, and in certain locations, the FIRM panels will have new identification numbers and be printed at a closer scale.
Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.):
Along with information from Pima County, FEMA provides flood hazard and risk data to help guide mitigation actions. Flood mapping as part of the National Flood Insurance Program (NFIP), is the basis for determining NFIP regulations and flood insurance requirements.
Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying, or adding flood hazard area mapping, etc.
The Drainage Master Plan provided by JE Fuller currently being used is slated for update in the next few years. This along with current FEMA information provides flood hazard and risk data to help guide mitigation actions.

Table 4-18 NFIP Compliance for: Town of Sahuarita
Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction:
The Town of Sahuarita's floodplain regulations are contained in the Sahuarita Town Code Title 14 Floodplain and Erosion Hazard Management, which is modeled off the Pima County Code. The majority of the Town's regulatory floodplain areas are along the FEMA Floodplains of the Santa Cruz River. The Town has partnered with the majority of the local community HOAs to keep local washes maintained and clean. Improvement and Development Plan reviews verify that no infringement occurs within the floodplain (or that infringement is appropriately mitigated within that project). The Department of Public Works is the main administrator for the Town of Sahuarita's Floodplain and Erosion Hazard Management Program.
Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction:
Since the majority of the Town's regulatory floodplain areas are along the FEMA Floodplains of the Santa Cruz River, the FEMA Map Service Center is a resource the Town uses for current floodplain hazard mapping. In addition, Tentative Plats are put through the Town's review process where flood and erosion hazard setback limits are identified and mitigated within that project when there's encroachment of the limits.
Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.):
The Town of Sahuarita provides community assistance through plan review process as well as through our permitting process. The Department of Public Works and Planning/Building work well together to provide information to the community. The Department of Public Works have a Flood Hazard Information form as well as a Floodplain Use Permit that provides a lot of useful information to all applicants.
Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying, or adding flood hazard area mapping, etc.

Table 4-18 NFIP Compliance for: Town of Sahuarita
The Town of Sahuarita's Floodplain and Erosion Management program is currently working well with the Town's growth. As the Town continues, it might need more of a local mapping to determine flood and erosion hazard setback limits of local washes as well as solidifying the enforcement process.

Table 4-19 NFIP Compliance for: City of Tucson
Describe your jurisdiction's current floodplain management / regulation process for construction of new or substantially improved development within your jurisdiction:
The City of Tucson's floodplain regulations are contained in Tucson Code Chapter 26 Article I Flood and Erosion Hazard Management Code, which is from ADWR's Model Ordinance. The City of Tucson maintains compliance with NFIP regulations by enforcement of the city's current flood and erosion hazard management codes through review of new development located in the regulatory flood prone and erosion hazard setback areas, and with the issuance of floodplain use permits. Many of the City of Tucson's regulatory floodplain areas are not contained within channels and some drainageways are on private properties maintained by homeowner associations, private owners, railroad, USA, county, schools, State, or other ownership. Some watercourses or stormdrain systems are within a platted (or granted) as public or private drainage easements. Some stormdrain systems are within public flowage easements. City-owned washes stormdrain system are inspected annually. The City of Tucson Department of Transportation and Mobility has an extensive drainage maintenance program, and hires environmental hazard companies, vactor services to supplement maintenance work. Regulatory floodplains, watercourse centerlines, flood elevations for FEMA zones and City Flood Hazard Areas are mapped on the City's GIS system MapTucson. Private development reviews verify that no encroachment occurs within the floodplain (that results in more than a tenth of a foot rise in floodplain fringe areas and zero rise in floodway). When a development is submitted through the electronic plan review to Department of Transportation and Mobility permitting staff for Right-of-way areas, or Planning and Development Services staff, and all or some portion of the property is in the SFHA or City regulatory flood area or within an erosion hazard setback, it is processed for a floodplain use permit that is issued concurrently or before other permits. Applications are sent to both Engineering (for flood and erosion reviews) as well as other staff such as Building review. Elevation / Construction Certificates are required for substantial improvements that need to show finished floor elevation and pad elevation compliance. When a certificate is required, a pre-slab certificate must be submitted in order for other inspections to continue. The hold is released after engineering staff has reviews the pre-slab certificate and then the foundation pour may then commence, otherwise woodwork for slab would need to be elevated to assure compliance with minimum elevation set forth in the floodplain use permit conditions.
Describe the status and/or validity of the current floodplain hazard mapping for your jurisdiction:
In compliance with the NFIP, the City of Tucson will continue to require the preparation and submittal of a CLOMR or CLOMR-F for all proposed developments within FEMA delineated Special Flood Hazard Areas. Through a FEMA grant, the City of Tucson obtained a Risk MAP identifying Flood Data and Risks and Areas of Mitigation Interests including Essential Facilities (Critical Facilities). The City of Tucson is looking to update this Tucson Flood Risk Map for flood risk mapping, flood assessment and flood risk planning purposes. The City will also continue to prepare record drawings and submit LOMR's per NFIP requirements. Updated Countywide Federal Insurance Rate Map (FIRM) Panels became effective on June 16, 2011 and revised September 28, 2012. Currently, these maps, in addition to Letters of Map Change (LOMC) may be used to determine if a particular piece of property is in a 100-year floodplain. The 500-year floodplain is also used to help determine critical facility compliance (elevating to higher standard for critical facilities as defined by floodplain ordinance), since the X-shaded areas in the City of Tucson are clarified on MapTucson for differentiating between 100-year shallow flood under a foot deep, protected by levee or 500-year flood. A PMR or Letter of Map Revision (LOMR) will be performed by Pima County Regional Flood Control District for the City's Downtown Links Project after the City of Tucson provides as-built data for the LOMR submittal by the county.

Table 4-19 NFIP Compliance for: City of Tucson
Describe any community assistance activities (e.g. – help with obtaining Elevation Certificates, flood hazard identification assistance, flood insurance acquisition guidance, public involvement activities, etc.):
As part of a NFIP participating community, the City of Tucson (040076) performs Elevation certificate review and inspection, Map information service, Outreach projects, Hazard disclosure, Flood protection information, Flood protection assistance, Flood insurance promotion, Floodplain mapping, Open space preservation, Higher regulatory standards, Flood data maintenance, Stormwater management, Repetitive loss outreach and mitigation assistance, Floodplain management planning, Acquisition and relocation, Flood protection, Drainage system maintenance, Flood warning and response, and Levees and Dams emergency response planning. City Floodplain Administration has held the TSMS Phase Va - Tucson Floodplain Management Plan Update in 2020 with open house and virtual public meetings. Outreach events including floodplain training for the Tucson real estate community was held in 2020, and in 2021 a Flood Insurance Meeting was held virtually for two sessions by the City of Tucson with assistance by the State and PCRFD. The City of Tucson works closely with PCRFCD on watershed studies. The City of Tucson also works with adjacent communities and agencies for development near and in the city boundaries (Unincorporated Pima County, City of South Tucson, Union Pacific Railroad, State of Arizona, Federal government, ADOT).
Describe identified needs in your floodplain management program. This could include things like updating the floodplain management code/regulation, establishing written review procedures, modifying, or adding flood hazard area mapping, etc.
The City of Tucson is seeking assistance to assure accurate regulatory floodplain delineations are being created during map updates; with the use of newer modeling software, there is now a need for quality check to assure smaller floodplain limits are not drawn for flowrates under regulatory flowrates of 100-cfs. The City of Tucson is also seeking funding for more floodplain management staff as well as money for projects that include a study, design plans, and construction to mitigate and prevent flood, erosion, drought, extreme heat, severe wind, and wildfire hazards. The City's Floodplain Management Plan adopted in December 2020 (updated from the 2016 FMP) has identified these and other action items.

Repetitive Loss Properties

Repetitive Loss (RL) properties are those NFIP-insured properties that since 1978, have experience multiple flood losses. FEMA tracks RL properties and to identify Severe RL (SRL) properties. RL properties demonstrate a record of accomplishment of repeated flooding for a certain location and are one element of the vulnerability analysis. RL properties are also important to the NFIP since structures that flood frequently put a strain on the National Flood Insurance Fund.

The table below lists the type of properties with RL, for the Town of Oro Valley there is one unmitigated property, but the type of structure is unknown.

Table 4-20: Repetitive Loss Property Statistics

Single Family Residential	Multi-Unit Residential	Commercial	Jurisdiction	No. of Properties	No. of Properties Mitigated	Total Payments
			Oro Valley	1	0	$41,805
3	2	2	Tucson	7	0	$153,971
23			Unincorporated Pima County	23	3	$1,056,184

Source: ADWR September 22, 2022 for Unincorporated Pima County. The City of Tucson provided their own data on September 23, 2002.

4.4.6 Landslide

Description

Landslide is the generic term used to describe the downslope movement of earth materials due to gravity. There are several different types of landslides that are categorized by the depth of failure, the type of material moved, the water content, and rate of movement. Landslides may be triggered by earthquakes, extreme precipitation, flooding, or otherwise removing support from the slope. Debris flows, a common type of landslide in Arizona, are moving masses of loose mud, sand, soil, rock, water and air. Such flows must have sparse vegetation and a supply of loose debris, so they often occur in areas disturbed by wildfires. They are closely associated with extreme precipitation and flooding, which is described in more detail in Section 4.4.5. Landslides may also cause flooding, either by displacing great volumes of water with surficial materials, or by damming a stream until it breaches and floods.

Cascading events are a hazard with landslides. The nature of cascading events associated with landslides stems from the mass, volume, water content, soil and rock conditions, rate of movement, and environs in which the landslide occurs. It is important to note, that landslides are commonly triggered by other events, e.g., an earthquake or flood, and thus may constitute a cascading event in their own right.

Common cascading events associated with landslides include:

- Damaged or destroyed transportation lines such as roads, railways, rivers.
- Flooding resulting from damming of river or water displacement resulting from the landslide mass encroaching on a body of water natural lake, river, canal, or reservoir.
- Broken infrastructure such as gas pipelines, water mains, sewer lines, utility lines, canals buildings.
- Secondary landslides following a primary slide.

History

Landslides, rock slides, and debris flows have occurred over the millennium in and around the mountainous regions of Pima County, typically associated with seasonal and heavy precipitation. In the summer of 2006, extreme precipitation caused a particularly significant occurrence of about 1,000 debris flows in four mountain ranges in southern Arizona.[1,2] Debris flows in the Santa Catalina Mountains north of Tucson occurred in nine canyons and exited or nearly exited the mouths of five of those canyons flowing into developed areas.[3] Debris flows and rockfalls temporarily closed portions of the Mt. Lemmon Highway and also destroyed a portion of the Mt. Lemmon Short Road at the base of Mt. Lemmon. Costs to repair infrastructure destroyed in Sabino Canyon was approximately $1.5 million. No landslides of major significance, such as multiple-day road closures, have since occurred between 2006 and 2021. During the 2021 monsoons, several small volume debris flows were observed in Finger Rock Canyon in the Santa Catalina during the 2021 monsoon. No damage was reported and the debris flows did not reach the canyon mouth.[4]

On July 22, 2021 there were between 1.5 to 2.5 inches of rain across the Town of Oro Valley, leading to some sediment and debris flows emanating from the Pusch Ridge area of the Santa Catalina Mountain Range. Residents in the Rancho Catalina and Sunnyslope subdivisions saw sediment and debris across their properties, local streets, and drainage ways. While no major damage was reported within the Town, this was a multiple-day storm system (between July 19-25) that required significant sediment and debris removal efforts on the part of the Town. Significant sediment and debris were noted in portions of the Catalina Foothills where more than 9 inches of rain was received over a four-day period, with reported damage due to sediment debris flows at homes in the foothills area. This storm was compared to a 2006 flood event within Pima County when an extraordinary meteorological event produced flash flooding and debris flow in southeastern Arizona in late July.

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[1] Pearthree, P.A., Youberg, A., 2006, *Recent Debris Flows and Floods in Southern Arizona*, Arizona Geology, Vol. 36, No. 3

[2] Magirl, C.S., Webb, R.H., Griffiths, P.G., Schaffner, M., Shoemaker, C., Pytlak, E., Yatheendradas, S., Lyon, S.W., Troch, P.A., Desilets, S.L.E., Goodrich, D.C., Unkrich, C.L., Youberg, A., and Pearthree, P.A., 2007, Impact of recent extreme Arizona storms: Eos, Transactions American Geophysical Union, v. 88, no. 17, p. 191-193.

[3] Webb, R.H., Magirl, C.S., Griffiths, P.G., and Boyer, D.E., 2008, Debris Flows and Floods in Southeastern Arizona from Extreme Precipitation in Late July 2006: Magnitude, Frequency, and Sediment Delivery. U.S. Geological Survey Open-File Report 2008-1274, 95 p.

[4] Arizona Geological Survey at the University of Arizona | Facebook post December 19, 2021.

Location

Debris flows, rockfalls and translational landslides are the most common type of landslides in Pima County. Landslides typically occur on steep upper slopes of mountain ranges. Accordingly, the Mt. Lemmon Highway is particularly vulnerable to rockfalls and landslides and must be periodically repaired. Debris flows and rock material may be deposited at the base of slopes where failures occur or transported to valley floors and alluvial fans at canyon mouths. The front range of the Santa Catalina Mountains is vulnerable to debris flows as evidenced by geologic deposits and by recent events.[5]

Extent

There is not enough current data to estimate the potential magnitude of landslides. In general terms, landslides can threaten human life, impact transportation corridors and communication systems, and cause damage to property and other infrastructure. Actual losses can range from mere inconvenience to high maintenance costs where very slow or small-scale destructive slides are involved. Landslides, rockfalls, and debris flows are typically associated with heavy rainfall events during the summer monsoon or following winter snowfall and rains. Landslides can also be triggered by moderate to large magnitude temblors. During periods of heavy precipitation, the onset of such events can be swift and severe and events may last hours or longer depending on severity.

Probability of Future Events

The probability of a landslide causing damage in the planning area is difficult to determine because of the lack of historic data. However, high-intensity and long-duration precipitation may cause landslides by oversaturating hillslope soils. Disturbances to slopes, particularly from wildfires, changes in hydrologic conditions make slopes more susceptible to failure from rainfall-runoff generated by commonly occurring storms (high-frequency, low-magnitude storms). Removal of substrate support (soil or rock) from the slopes where highways and roads are built can also result in landslides. Earthquakes may also cause landslides.

Landslides range in size and frequency, from small, nuisance events (minor shallow landslides, rockfalls) along roads or uninhabited areas, to large, fast-moving, destructive debris flows, with varying effects depending on location. Future climate variability could increase the frequency and number of landslide events if that variability leads to an increase in erosional weather factors.

Vulnerability

The impacts from landslides can cause deaths and damages without warning. In the United States, some of the economic factors that result from landslides include:[6]

- Cost $3.5 billion a year in damages
- Causes 25 - 50 deaths annually
- Reduction in real estate values and tourist revenue
- Lead to lost human, industrial, agricultural, and forest productivity
- Cause damage to the natural environment

[5] Youberg, A.M., Webb, R.H., Fenton, C.R., and Pearthree, P.A., 2014, Latest Pleistocene–Holocene debris flow activity, Santa Catalina Mountains, Arizona; Implications for modern debris-flow hazards under a changing climate: Geomorphology, v. 219, p. 87-102.
[6] US Geological Survey, Landslides Hazards Program, online at http://landslides.usgs.gov/

The general population is not overly vulnerable to landslides, but rockfall can cause serious injury or death. Pima County-owned facilities most vulnerable to landslides are roadways and bridges or culverts along known debris flow areas on the Catalina Highway up to Mount Lemmon within the Coronado National Forest and at the base of the mountain. Further study is needed to assess the magnitude of these risks, document landslide sites, and determine if mitigation efforts are warranted and feasible. Some post-fire debris flows have been documented.[7] The calculated priority risk index (CPRI) for landslides in Pima County jurisdictions is presented in Table 4-21. The unincorporated area's score is higher due to more locations in vulnerable areas than other areas located further away from mountainous regions.

Table 4-21: CPRI Results for Landslide

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Unlikely	Limited	12-24 hours	< 24 hours	1.55
Oro Valley	Possible	Limited	< 6 hours	< 6 hours	2.20
Pascua Yaqui Tribe	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Sahuarita	Unlikely	Negligible	> 24 hours	< 6 hours	1.00
Tucson	Unlikely	Negligible	< 6 hours	< 6 hours	1.45
Unincorporated Pima County	Likely	Limited	< 6 hours	< 6 hours	**2.65**
				County-wide average CPRI =	**1.72**

*Jurisdictions in **bold** chose to mitigate against the hazard*

Due to the proximity to the Santa Catalina Mountains, the Town of Oro Valley has a few neighborhoods with potential susceptibility to landslides, debris flows, and sediment when there is significant precipitation and/or localized flooding events. These neighborhoods may have sediment and debris across their properties, local streets, and in drainage ways that require debris-clean up and removal. As a result of the potential for post-fire flooding, the US Forest Service continues to monitor, assess, and identify any possible mitigation projects in the Catalina's to reduce potential impacts of any flooding, landslides, debris flow, and sediment initiating on the mountain.

The Pascua Yaqui Tribe's vulnerability to a Landslide event would stem from high-intensity and long-durations of precipitation oversaturating hillslope soils within the Black Mountain range. Disturbances to slopes, particularly from wildfires, changes in hydrologic conditions make slopes more susceptible to failure from rainfall-runoff generated by commonly occurring storms. Most vulnerable to landslides are roadways, bridges, and culverts.

Due to the geographical make-up of the City of Tucson the jurisdiction is most unlikely to be directly affected by a landslide. The effect that a landslide may cause would be indirectly related to the result of the impact of landslides in other areas such as Unincorporated Pima County, which have direct ties to the City of Tucson either through residents, or businesses.

Loss Estimation

Losses are difficult to estimate given a lack of accepted measurement standards, however, the county spends significant time and money removing and repairing landslide occurrences along portions of General Hitchcock Highway as well as other roadways, especially following precipitation events. During rainfall events, residential properties in the Santa Catalina's and other regional ranges have suffered damage from land and mudslide events. The losses in the Santa Catalina Sabino Canyon flood and rockslide topped over 1 million dollars in 2006.[8] For more information on total flooding impacts and losses which include landslide losses, see Section 4.4.5 on Flooding.

[7] Youberg, A., 2015, Geodatabase of Post-Wildfire Study Basins: Assessing the predictive strengths of post-wildfire debris-flow models in Arizona, and defining rainfall intensity-duration thresholds for initiation of post-fire debris flow. Arizona Geological Survey, geodatabase, excel workbook, report 10 p. http://repository.azgs.az.gov/uri_gin/azgs/dlio/1635

[8] Arizona State Geological Survey, http://www.azgs.az.gov/Hazards_ocr/slopefailure/Landslide-fact-sheet3.pdf, retrieved 2017

Changes in Development in the Hazard Area

Increased temperatures are projected to contribute to more water evaporation making drought more common, which would increase the probability of wildfire, reducing the vegetation that helps to support steep slopes. To the extent that development continues along the margins of the Santa Catalina's and other mountain ranges of Pima County, more structures and infrastructure could be exposed to risks associated with landslides, rockfalls and debris flows. Zoning codes and building codes should be evaluated and updated, if necessary, to inform development decisions in vulnerable areas and reduce these risks. Roadway improvements should continue to follow current Federal Highway Administration design guidelines and best practices to avoid and minimize landslide, rockfall, and debris flow hazards.

Within the Town of Oro Valley, while there continues to be commercial and residential development, there are requirements to meet the Stormwater Utility's current floodplain management and other building codes. These include the subdivision design standards, drainage criteria manual, international building codes, and zoning codes to address scour, erosion, and sediment transport. While there is development, the infrastructure is being constructed or remodeled to potentially be at less risk/vulnerability to sediment and debris flows.

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4.4.7 Severe Wind

Description

The hazard of severe wind encompasses all climatic events which produce damaging winds. For Pima County, severe winds usually result either from extreme pressure gradients that occur in the spring and early summer months or from thunderstorms. Thunderstorms can occur year-round and are usually associated with cold fronts in the winter, monsoon activity in the summer, and tropical storms in the late summer or early fall.

The National Oceanic and Atmospheric Administration (NOAA) notes that damaging winds are often called straight-line winds to differentiate the damage they cause from tornado damage. Strong thunderstorm winds can come from a number of different processes. Most thunderstorm winds that cause damage at the ground are a result of outflow generated by a thunderstorm downdraft. Damaging winds are classified as those exceeding 50-60 mph.[9]

Three types of damaging wind-related features typically accompany a thunderstorm:

- Downbursts are columns of air moving rapidly downward through a thunderstorm. When the air reaches the ground, it spreads out in all directions, creating horizontal wind gusts of 80 mph or higher. Downburst winds have been measured as high as 140 mph. Some of the air curls back upward with the potential to generate a new thunderstorm cell. Downbursts are called macrobursts when the diameter is greater than 2.5 miles, and microbursts when the diameter is 2.5 miles or less. Downbursts can be either wet or dry. Wet downbursts contain precipitation that continues down to the ground, while the precipitation in a dry downburst evaporates on the way to the ground, decreasing the air temperature and increasing the airspeed. In a microburst, the wind speeds are highest near the location where the downdraft reaches the surface, and are reduced as they move outward due to the friction of objects at the surface. Typical damage from downbursts includes uprooted trees, downed power lines, mobile homes knocked off their foundations, block walls and fences blown down, and porches and awnings blown off homes. Aircrafts caught in the downdraft can also be forced to the ground.[10]
- Straight-line winds develop similar to downbursts, but are usually sustained for greater periods as a thunderstorm reaches the mature stage. Straight-line winds travel (or are pushed), parallel to the ground surface on the leading edge of a thunderhead, reaching speeds of 75 mph or higher. These winds are frequently responsible for generating dust storms, sometimes called haboobs, reducing visibility, and creating hazardous driving conditions.
- A tornado is a rapidly rotating funnel (or vortex) of air that extends from the cloud to the ground. Most funnel clouds do not touch the ground, but when the lower tip of the funnel cloud touches the earth it becomes a tornado and can cause extensive damage. Tornadoes can also form when a dust devil is stretched upward to contact a thunderstorm cloud. For the County, tornadoes are the least common severe wind.

History

Pima County has had one state/federal declaration involving severe winds.[11] The combined economic loss of thunderstorm wind events (for those declared and not declared) is approximately $30 million damage to property and agriculture in the last 50 years, and there have at least 3 deaths and 103 injuries, associated with dust storm-related accidents on I-10. Severe wind events occur on a significantly more frequent basis throughout the county, but do not always have reported damages associated with every event. A search of the NOAA National Center for Environmental Information (NCEI) Storm Event Database revealed the following examples of significant severe wind events that have occurred in Pima County:[12]

- January 21, 2017, a winter storm impacted southeast Arizona on January 20th and 21st. This storm resulted in very heavy snow across area mountain ranges, especially over 7000 feet in elevation with some locations seeing in excess of 2 feet of snow. Strong winds caused damage at both high and lower elevations. Damage

[9] NOAA- Severe Weather 101, https://www.nssl.noaa.gov/education/svrwx101/wind/
[10] Arizona Division of Emergency Management, State of Arizona Hazard Mitigation Plan (2018). https://dema.az.gov/sites/default/files/publications/EM-PLN_State_Mit_Plan_2018.pdf.
[11] Disaster Designation Information – State and County Level Records of Presidential Major Disaster and Presidential Emergency Declarations – Pima County, AZ October 1-2, 2018; Severe Storms and Flooding. https://www.fsa.usda.gov/programs-and-services/disaster-assistance-program/disaster-designation-information/index.
[12] NOAA National Centers for Environmental Information, Storm Events Database

due to strong winds occurred in the Tucson metro area. Tree damage constituted the majority of the wind damage, including substantial tree damage at Agua Caliente Park. Additionally, a power pole was blown down in Marana. Damage was estimated at $75,000.

- July 14, 2017, numerous thunderstorms moved southwest across southeast Arizona. One thunderstorm produced a brief landspout tornado in the Marana area. Blowing dust reduced visibility to less than a quarter mile along I-10 near Pinal Air Park. No damage was reported.

- August 10, 2017, scattered thunderstorms moved northwest across southeast Arizona. The most notable produced a large swath of tree damage across the east side of Tucson. Over one hundred eucalyptus and other large shallow-rooted trees were toppled and many other tree limbs were downed on the east side of Tucson. The damage path from this severe thunderstorm was about a mile and a half on either side of a line from Broadway Boulevard and Kolb Road to Tanque Verde and Sabino Canyon Roads. Several trees fell onto buildings near Speedway Boulevard and Pantano Road, including the Woodridge Apartment complex, which sustained significant damage to several units. One of the trees also crushed an automobile. Many other trees damaged retaining walls or power lines when they were downed. At least one power pole was also snapped. At least 7,000 customers were without power for several hours. Additionally, the roof was ripped off one house near 5th Street and Kent Drive. Damage was estimated at $250,000.

- August 10, 2019, scattered thunderstorms produced moderate to locally heavy rain in southeast Arizona. A landspout tornado formed north of Three Points and persisted for 3 minutes.

- September 23, 2019, an upper level low and tropical moisture created favorable conditions for severe weather with isolated to scattered storms forming mainly from Tucson eastward. These storms produced blowing dust in Pinal County, significant straight-line wind damage in Tucson, and an EF-1 tornado in Willcox. Dozens of trees were downed; there was damage to several residences roofs and fences. At least two vehicles were damaged from falling trees and limbs, and at least one road sign was bent over from the strong winds. Damage was estimated at $150,000.

- November 29, 2019 a line of thunderstorms caused extensive tree damage from the Rooney Ranch and Steam Pump Ranch area through Oro Valley Marketplace to Catalina Regional Park. A portion of the roof to an outbuilding was blown off at Steam Pump Ranch. An antenna on the Oro Valley Police substation located in the Marketplace was damaged. The most severe damage occurred to trees within the park and in a residential area immediately to the east. Several one-foot diameter trees were snapped off at the midpoint of the trunk while others were uprooted. Roof damage to mobile homes farther east was also noted. A tree fell on a car at one residence. Damage was estimated at $75,000.

- July 11, 2020, isolated to scattered thunderstorms developed and moved north across southeast Arizona, primarily south of I-10. The thunderstorms rolled northwest across the Tucson Metro area with thunderstorm outflow winds downing numerous trees and ten power poles. Power was out for several hours for at least 12,000 customers due to downed poles and lines as well as damaged transformers. Power poles were down at Broadway and Craycroft Road, Prince Road and Flowing Wells Road, and Ina Road and Oracle Road. Fallen trees caused damage to the Mission Palms Apartments near Orange Grove Road and La Cholla Boulevard. Trees also fell onto a vehicle at River and Craycroft and two cars in Oro Valley. A wind gust to 59 mph was recorded at KDMA Davis-Monthan AFB ASOS. Damage was estimated at $100,000.

- August 16, 2020, scattered thunderstorms developed and moved west-southwest across southeast Arizona during the late afternoon and early evening. Storms produced wind damage in the northwest Tucson Metro and Sells. Thunderstorm winds downed power poles along Silverbell Road north of Sunset Road in northwest Tucson resulting in the downed power lines that started a brush fire. Thunderstorm outflow winds caused a large dust storm to move southwest into parts of the Tohono O'odham Nation.

- July 2, 2021, scattered thunderstorms moved west across southeast Arizona, producing flash flooding and a swath of damaging winds across the Tucson Metro area which downed or uprooted numerous trees in

midtown Tucson including several at a cemetery on Prince Road and Oracle Boulevard. One tree fell on a house near Pima St. and Columbus Boulevard and another damaged a car at River Road and 1st Avenue. Winds also damaged a house under construction near Prince and Country Club Road and downed large power poles near Tucson Mall, causing the closure of 1st Avenue between River and Wetmore Roads. About 6000 customers lost electricity service. A landspout was also observed in northeast Tucson around Skyline Road and Kolb Road. Damage was estimated at $100,000.

- July 10, 2021, scattered thunderstorms developed across the Mogollon Rim and International Border and moved west across southeast Arizona. Several storms became severe with damaging winds of 60 to 90 mph that created blowing dust. Thunderstorms winds downed 30 power poles and dozens of trees in Green Valley and Sahuarita. One of the downed trees broke a water main and others blocked streets. Around 10,000 customers were without power into the overnight hours. A Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) observer on the southeast side of Green Valley measured a wind gust of 66 mph at 18:55 MST. The most extensive structural damage occurred in Green Valley/Sahuarita areas. Damage was estimated at $100,000.

- July 12, 2021, thunderstorm wind gusts downed several trees in western Oro Valley and Marana and downed power poles along Trico Road. Along with significant rainfall, there was also significant post-storm clean-up due to downed and uprooted trees and broken branches due to bursts of high winds during the storm in Oro Valley. Damage was estimated at $20,000.

- July 20, 2021, isolated thunderstorms developed and moved west across Pima County and thunderstorm winds caused damage at a church complex near Broadway Boulevard. and Craycroft Road in Tucson, blowing in one 50-foot tall stained glass window and blowing out another. An awning was damaged on the school building and the pastor's residence suffered shingle damage. A tree was also downed which damaged an iron post fence, and the church marquis was damaged. Nearby, a tree was downed damaging the wall of a house. Several other trees were downed farther north and west and a carport was destroyed near 5th Street and Alvernon Way. Damage was estimated at $100,000.

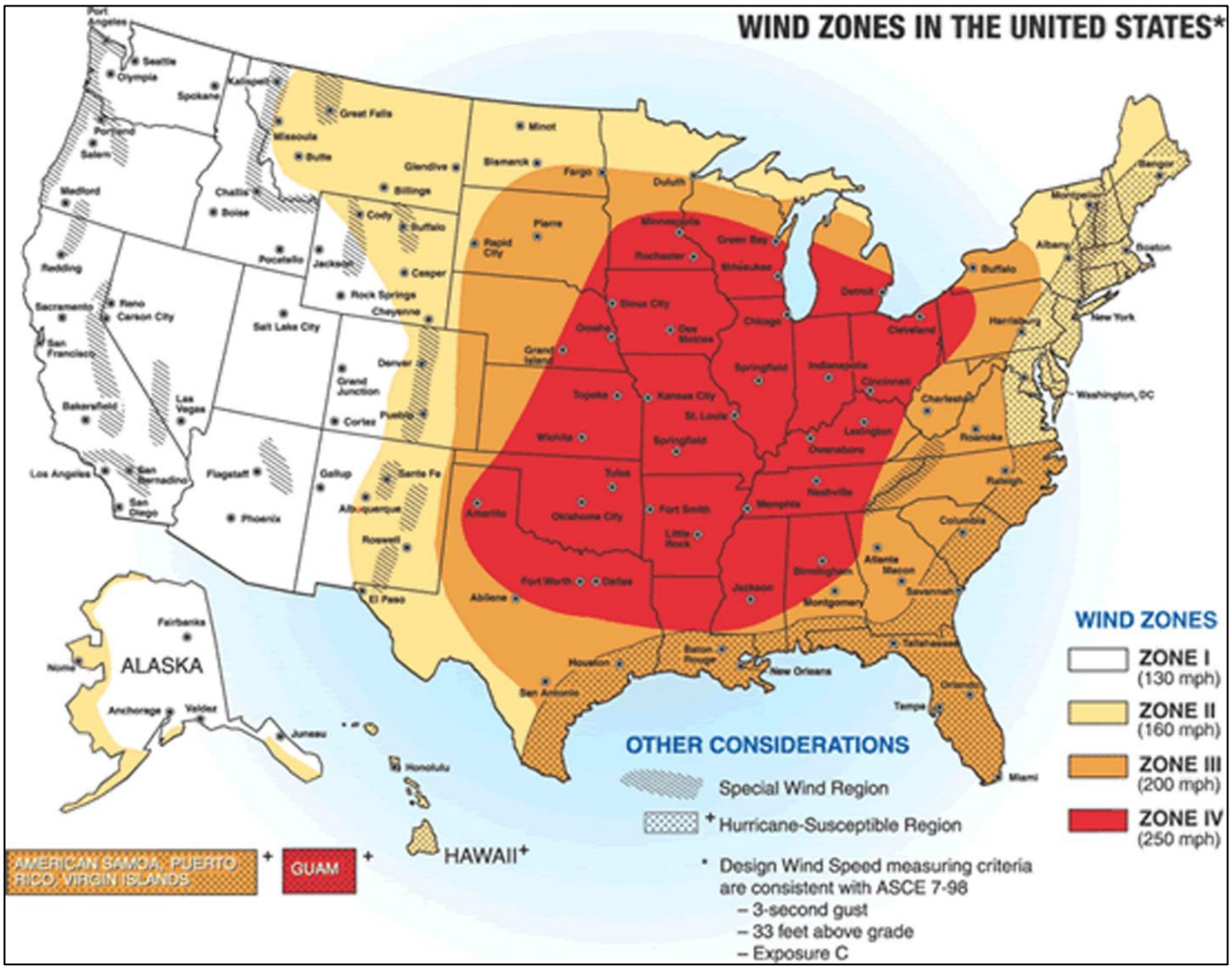
- July 22, 2021, several rounds of thunderstorms were triggered by a westward-moving upper-level weather system across southeast Arizona into the early morning of July 23. The thunderstorm winds downed 60 power poles and numerous trees and in Green Valley and Sahuarita, mostly along La Cañada Drive from Duval Mine Road to near Anamax Road and near the entrance to Quail Creek. A traffic signal was also damaged in Green Valley while the wall of a townhouse was blown over in Sahuarita. Wind damage and flash flooding occurred in Douglas, Green Valley, and the Tucson Metro area. Flooding also occurred along the San Pedro River as well as the Pantano Wash and Rillito River, and eventually downstream along the Santa Cruz River. Damage was estimated at $250,000.

City of Tucson: While windy days are not at all uncommon in the City of Tucson, there are times either during a winter storm or monsoon season that winds can become severe (caused by microburst, straight-line winds, and even a rare tornado), damaging homes, utilities and more as they pass through our City.

Extent

High winds, often accompanying severe thunderstorms, can cause significant property damage, threaten public safety, and have adverse economic impacts from business closures and power loss. Windstorms in the planning area are rarely life-threatening, but do disrupt daily activities, cause damage to buildings, and structures, and increase the potential for other hazards, such as wildfire. Strong thunderstorm winds can start a dust storm. Dust storms usually arrive suddenly in the form of an advancing wall of dust and debris which may be miles long and several thousand feet high. They strike with little warning and can drastically reduce visibility making driving conditions hazardous. Dust storms usually last only a few minutes and the blinding, choking dust can quickly reduce visibility causing accidents that may involve chain collisions, creating massive pileups.

The wind zone map shows how the frequency and strength of extreme windstorms vary across the United States. Pima County is entirely located in Zone 1, as illustrated in Figure 4-17. Wind speeds in Zone I, where the risk of extreme windstorms is lowest, can be as high as 130 miles per hour.



Source: Federal Emergency Management Agency. Double Jeopardy: Building Codes May Underestimate Risks Due to Multiple Hazards.

Figure 4-17 Wind Zones in the United States

The **Beaufort Wind Scale**, indicated by Table 4-22, provides a measure of wind magnitude versus expected damages. The Beaufort scale is useful since it specifically addresses wind effects over landbased on wind speed. Wind speeds in the Beaufort Number 10-11 range impact the county annually. On rare occasions, wind gusts in the county can creep into the low end of the Beaufort Number 12 category.

Table 4-22: The Beaufort Wind Scale

Force	Name	Wind Speed (mpg)	Consequences
0	Calm	0	Smoke rises vertically
1	Light Air	1-3	Smoke drifts with air
2	Light Breeze	4-7	Weather vanes become active
3	Gentle Breeze	8-12	Leaves and small twigs move
4	Moderate Breeze	13-18	Dust and loose paper rises. Small branches sway
5	Fresh Breeze	19-24	Small trees sway
6	Strong Breeze	25-31	Large branches sway
7	Near Gale	32-38	Whole trees sway – difficult to walk against wind
8	Gale	39-46	Twigs break off trees
9	Strong Gale	47-54	Shingles blow off roofs – light structure damage
10	Storm	55-63	Trees uprooted – Considerable structural damage
11	Violent Storm	64-73	Widespread structural damage
12	Hurricane	Over 73	Considerable and widespread damage to structures

Source: See generally, National Weather Service - Weather Prediction Center. Meteorological Conversions and Calculations – The Beaufort Wind Scale.

Tornado damage severity is measured by the **Enhanced Fujita Tornado Scale**, which assigns a numerical value of 0 to 5 based on wind speeds and damage potential, as shown in Table 4-23. Most tornadoes last less than 30 minutes, but some last for over an hour. The path of a tornado can range from a few hundred feet to miles in length. The width of a tornado may range from tens of yards to more than a quarter of a mile.

Table 4-23: The Enhanced Fujita Scale (EF Scale)

EF Rating	Character	3 Second Gust (mph)	Description
0	Weak	65-85	**Light Damage.** Some damage to chimneys; branches broken off trees, shallow-rooted trees uprooted, sign boards damaged.
1	Weak	86-110	**Moderate damage.** Roof surfaces peeled off; mobile homes pushed foundations or overturned; moving autos pushed off road.
2	Strong	111-135	**Considerable damage.** Roofs torn from frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light objects become projectiles.
3	Strong	136-165	**Severe damage.** Roofs and some walls torn from well-constructed houses; trains overturned; most trees in forested area uprooted; heavy cars lifted and thrown.
4	Violent	166-200	**Devastating damage.** Well- constructed houses leveled; structures with weak foundation blown some distance; cars thrown; large missiles generated.
5	Violent	Over 200	**Incredible damage.** Strong frame houses lifted off foundations, carried considerable distances, and disintegrated; auto-sized missiles airborne for several hundred feet or more; trees debarked.

Source: National Weather Service - Weather Prediction Center: The Enhanced Fujita Scale (EF Scale)

Probability of Future Events

High winds may be expected to occur in Pima County, several times a year. The probability of a severe thunderstorm winds occurring with high velocity winds increases as the average duration and number of thunderstorm events increases. According to the NCEI database, from January 2013 through July 31, 2021, the county averaged about 20.11 thunderstorm wind events a year totaling $4,217,300 in estimated damages. For that same period, approximately $4,526,300 million in damages were estimated for all wind events.

Although tornadoes occur less frequently, funnels clouds have been observed in recent years as well as landspout tornadoes which have occur approximately every two years within the planning area. Based on the historic record, the probability of tornadoes occurring in the county is limited. Since 1950, 24 tornadoes have been observed. While limited, tornadoes in the county have been rated at an EF2 or lower on the scale however three fatalities and 53 injuries have been attributed to tornadoes. Most tornadoes in southern Arizona last less than 15 minutes, have a path length of less than one mile, and are less than 100 yards in width.[13]

Vulnerability

Table 4-24: CPRI Results for Severe Wind

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Likely	Limited	6 to 12 hours	< 24 hours	2.60
Oro Valley	Likely	Limited	< 6 hours	< 6 hours	2.65
Pascua Yaqui Tribe	Likely	Limited	6 to 12 hours	< 6 hours	2.50
Sahuarita	Likely	Limited	< 6 hours	< 6 hours	2.85
Tucson	Likely	Limited	< 6 hours	< 6 hours	**2.65**
Unincorporated Pima County	Highly Likely	Critical	< 6 hours	< 6 hours	**3.40**

[13] National Centers for Environmental Information (NCEI). *Storm Events Database* (Search Parameters for Pima County Arizona - Event Type: Tornado, Search Period: 01/01/1950 – 07/31/2021). https://www.ncdc.noaa.gov/stormevents/.

Table 4-24: CPRI Results for Severe Wind					
Participating Jurisdiction	**Probability**	**Magnitude/ Severity**	**Warning Time**	**Duration**	**CPRI Score**
				County-wide average CPRI =	**2.78**
*Jurisdictions in **bold** chose to mitigate against the hazard*					

Town of Oro Valley: Most of the Town of Oro Valley's vulnerability to severe wind events typically occurs during thunderstorms and other types of intense rainfall events. Thunderstorms can bring in high winds, create funnel clouds, and microbursts. Resulting damages from winds are typically reflected through downed trees and branches, roof's, traffic signals, and power lines. Private property owners may not report wind impacts, making it difficult to estimate community losses. Post storm clean-up on public property, generally falls under a normal/routine activity unless there was significant damages or costs associated with a particular event. Severe wind events are often associated with wildfires, with wind driven wildfires being more unpredictable and cause a more severe rate of spread, leading to additional impacts.

City of South Tucson: Most of the South Tucson's vulnerability to severe wind events typically occurs during thunderstorms, summer monsoons and other types of intense rainfall events. Thunderstorms can bring in high winds, create funnel clouds, and microbursts. Resulting damages from winds are typically reflected through downed trees and branches, roofs, traffic signals, and power lines. Private property owners may not report wind impacts, making it difficult to estimate community losses. Post storm clean-up on public property, generally falls under a normal/routine activity unless there was significant damages or costs associated with a particular event. Severe wind events are often associated with wildfires, with wind driven wildfires being more unpredictable and cause a more severe rate of spread, leading to additional impacts.

City of Tucson: Severe wind in the City of Tucson usually follows closely on the tails of the summer monsoon season[14]. While heavy rainfall is predictable at that time of year and leads to short-term flash flooding, and the community is resilient to these weather events, severe wind is less predictable with these storms. Thunderstorm wind gusts here in the Southwest commonly exceed 40 mph, with stronger wind gusts exceeding 100 mph and capable of producing damage similar to a tornado.[15]

Other storms, especially during the beginning of the monsoon in late July when there is still substantial daily ground heating, produce what are called microbursts (rapid pressure changes in the upper atmosphere that lead to large air masses dropping rapidly to the ground creating wind damage in a radius around the storm). Other storms have been reported near Tucson, with funnel clouds, and while most do not touch the ground, if a funnel cloud were to touch down and become a tornado, residents and businesses would find themselves vulnerable for wind damage to their homes and buildings and there would potentially be extreme damage to above-ground infrastructure like power distribution systems.

Unincorporated Pima County: The County's is vulnerability to monsoon-type storms. The Pima County Department of Transportation is working to reduce the vulnerability of signs and signal poles to severe wind events such as microbursts. High winds and monsoonal outflows can also damage power lines leading to outages causing loss of cooling for thousands of residents.

Loss Estimations

Severe wind events are unpredictable, and the exposure area includes the entire county. A thunderstorm microburst wind may knock down miles of power poles and lines and cause economic losses due to the power outages. The economic impact from a large-scale dust storm that closes down the highways can affect the local and regional economy and is difficult to quantify. A whitepaper by the Making Action Possible at the University of Arizona, attempts to compare the economic impacts of severe weather events.[16] For severe winds, this is complicated due to

[14] As per the National Weather Service, the monsoon season starts to develop in the "U.S. Southwest in July" and ends "by early- to mid-September".

[15] National Weather Service. *Monsoon Safety Page*. https://www.weather.gov/psr/MonsoonSafety.

[16] Making Action Possible (MAP). (February 2, 2017). The Economic Impacts of Extreme Weather: Tucson and Southern Arizona's Current Risks and Future Opportunities | MAP AZ Dashboard

the reporting as thunderstorms in the NCEI datasets. Based on the historic record over the last eight years, it is feasible to expect a range of annual losses from approximately $160,000 to over $1,200,000 countywide. It is difficult to estimate losses for individual jurisdictions within the county due to the lack of discrete data.[4]

Changes in Development in the Hazard Area

There have been no major changes since the last plan update regarding development impacted by severe wind within most of the planning area. Future development will expand the exposure of life and property to thedamaging effects of severe wind events.

Town of Marana: The Town of Marana is one of the fastest growing communities in Arizona. The rapid residential and business growth of the Town has resulted in more structures vulnerable to loss from severe wind. Building regulation requires that all new structures adhere to current building code to include roof and structural tie-downs.

Unincorporated Pima County: As severe wind events are relatively unpredictable and imprecise by nature, any further development in the Pima County may lead to more exposures. New traffic signaling meets the latest standards from the United States Department of Transportation's (USDOT's) Manual on Uniform Traffic Control Devices (MUTCD) and should be less vulnerable to severe wind by its design. Continued enforcement and implementation of modern building codes to regulate new developments in conjunction with public education on how to respond to severe wind conditions are arguably the best way to mitigate against losses.

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4.4.8 Wildfire

Description

A wildfire is an unplanned fire that burns in a natural area such as a forest, grassland, or prairie.[17] Wildfires are often caused by human activity or a natural phenomenon such as lightning, and they can happen at any time or anywhere. Examples of human activity resulting in wildfire may include acts such as arson, campfires, or the improper burning of debris. They often begin unnoticed, spread quickly, and are usually signaled by dense smoke that may fill the area for miles around while also exposing and possibly consuming structures. Wildfires can be categorized into four types:

- ***Wildland fires*** occur mainly in areas under federal control, such as national forests and parks, and are fueled primarily by natural vegetation. Generally, development in these areas is nonexistent, except for roads, railroads, power lines, and similar features.
- ***Interface or intermix fires*** occur in areas where both vegetation and structures provide fuel. These are also referred to as wildland-urban interface (WUI) fires. The WUI is commonly described as the zone where structures and other features of human development meet and intermingle with undeveloped wildland or vegetative fuels.[18]
- ***Firestorms*** occur during extreme weather (e.g., high temperatures, low humidity, and high winds) with such intensity that fire suppression is virtually impossible. These events typically burn until the conditions change, or the fuel is exhausted.
- ***Prescribed fires and prescribed natural fires*** are intentionally set or natural fires that can burn for beneficial purposes.

The following three factors contribute significantly to wildfire behavior and, as detailed more fully later, they can be used to identify wildfire hazard areas:

- ***Topography***: As slope increases, the rate of wildfire spread increases. South-facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying wildfire behavior. However, ridgetops may mark the end of wildfire spread, since fire spreads more slowly or may even be unable to spread downhill.
- ***Fuel:*** Wildfires spread based on the type and quantity of available flammable material, referred to as the fuel load. The basic characteristics of fuel include size and shape, arrangement, and moisture content. Each fuel is assigned a burn index (the estimated amount of potential energy released during a fire), an estimate of the effort required to contain a wildfire, and an expected flame length.
- ***Weather:*** The most variable factor affecting wildfire behavior is the weather. Important weather variables are temperature, humidity, wind, and lightning. Weather events ranging in scale from localized thunderstorms to large fronts can have major effects on wildfire occurrence and behavior. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildfire activity. By contrast, cooling and higher humidity often signal reduced wildfire occurrence and easier containment. The wind has probably the largest impact on a wildfire's behavior and is the most unpredictable. Winds supply the fire with additional oxygen, further dry potential fuel, and push fire across the land at a quicker pace.

The frequency and severity of wildfires are also impacted by other hazards, such as lightning, drought, and infestations (e.g., Pine Bark Beetle). In Arizona, these hazards combined with the three other wildfire contributors noted above (topography, fuel, weather) present an ongoing and significant hazard across much of Arizona.

If not promptly controlled, wildfires may grow into an emergency or disaster. Even small fires can threaten lives, resources, and destroy improved properties. It is also important to note that in addition to affecting people, wildfires may severely affect livestock and pets. Such events may require emergency feeding, shelter, evacuation, and increased event-caused deaths and burying of animals.

The indirect effects of wildfires can also be catastrophic. In addition to stripping the land of vegetation and destroying forest resources and personal property, large, intense fires can harm the soil, waterways, and the land itself. Soil

[17] Wildfire-World Health Organization: www.who.int

[18] Pima County Community Wildfire Protection Plan, 2013: http://webcms.pima.gov/cms/One.aspx?pageId=45265

exposed to intense heat may temporarily lose its capability to absorb moisture and support life. Exposed soils in denuded watersheds erode quickly and are easily transported to rivers and streams thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased landslide hazards.

History

Wildfires have a prominent history in Pima County. Pima County has been included in 17 state and federal wildfire disaster declarations. Since 2017, the Coronado National Forest recorded over 130 wildfires reported in Pima County burning in excess of 172,000 acres and costing over $44.5 million dollars in fire suppression costs. [19] This data is not all inclusive nor a complete representation of all wildfires within Pima County due to multiple agencies having jurisdiction. For example, the Bureau of Land Management and Arizona Forestry and Fire Management maintain separate methodologies and platforms for archiving fire data. Accordingly, the following list of incidents provides a representative sample of moderate and major wildfire events that have impacted the County:

- May of 2002, the Bullock Fire started in Bullock Canyon in the Catalina Mountains on the Coronado National Forest. The fire started on May 21st and continued through June 10th. It was suspected to be human-induced. The fire burned 30,563 acres along with two cabins and several outbuildings. The residents of Summerhaven were evacuated on May 25th and Catalina Highway closed on May 22nd. The fire also threatened Mt. Bigelow which had several telecommunication towers and two telescopes; however, firefighters were able to contain the fire half of a mile away. The entire firefighting cost was estimated to be $11.5 million.[20]
- June of 2003, the Aspen Fire was started by human causes on June 17, 2003, and burned for about a month on Mount Lemmon, which is part of the Santa Catalina Mountains located in the Coronado National Forest north of Tucson. The fire burned 84,750 acres and destroyed 333 homes and businesses in the community of Summerhaven. Electric lines, phone lines, water facilities, streets, and sewers were also damaged. Total property damages were estimated to exceed $66 million. Firefight costs were estimated to exceed $17 million, and the Forest Service spent an estimated $2.7 million dollars to prevent soil loss. The losses in terms of timber for future lumber are estimated at $33 million. In 2002, the year before the fire started, Congress had been requested to allocate about $2,000,000 to cover the implementation of fire mitigation measures in the Coronado National Forest. However, that allocation was reduced to about $150,000 in the Congressional budget process. A presidential disaster declaration (FEMA-1477-DR) was made on July 14, 2003.[21]
- June of 2009, the Elk Horn Fire was started by human causes in an area 26 miles southwest of Three Points, Arizona. The fire started June 11th and was contained on June 22nd. The fire burned a total of 23,440 acres with five injuries reportedly associated with the fire. Firefighting costs were estimated at over $1 million.
- June of 2011, the Empire Fire located 8 miles North of Sonoita burned 1,100 acres.
- April of 2017, the human-caused Sawmill Fire located on the Coronado National Forest near the Empire Ranch and Arizona State Route 83, started 10 miles southeast of Green Valley near Box Canyon and quickly spread east northeast burning 28% of the Las Cienegas National Conservation Area. The fire burned from April 23rd to May 1st and consumed 46,991 acres. 400 people were evacuated and two Shelters were open including large animal shelter. No structures were damaged, however two miles of guard rails and supporting posts were destroyed including several power poles and road signs along State Route 83. The fire was managed by a Type 2 Incident Management Team. No injuries or fatalities were reported. Fire suppression costs were estimated at $8.6 million.
- May of 2017, the human-caused Mulberry Fire started on May 6th, eight miles southeast of Vail, east of State Route 83 in the Empire Mountains. The wildfire destroyed four structures including two homes as it spread rapidly northeast. A total of twenty rural residences were evacuated. The wildfire consumed 1,755 acres before being contained on May 9th. Property damages were estimated at $200,000.

[19] Data provide on spreadsheets constructed by the Coronado National Forest, Supervisor's Office. Coronado National Forest Fire History Occurrence 2017 - current (Pima County only) Excel file.
[20] National Wildfire Coordination Group, 2016, Historical ICS 209 reports at: http://fam.nwcg.gov/fam-web/hist_209/report_list_209
[21] Arizona Division of Emergency Management, 2013, State of Arizona Multi-Hazard Mitigation Plan; National Wildfire Coordination Group,2010, Historical ICS 209 reports at: http://fam.nwcg.gov/fam-web/hist_209/report_list_209

- June of 2017, the human-caused Burro Fire started in the foothills of the southeast side of the Santa Catalina Mountains on June 30, then quickly spread both northwest and southeast during July 19. Summerhaven and other residences on the mountain were evacuated for several days. Mt. Lemmon Highway and Redington Pass Road were both closed to traffic. The number of acres burned totaled 27,238 but no structures were lost. The cost is estimated at $9 million.
- May 2020, the human-caused Wentworth Fire started as two brush fires both south and north of Sahuarita Road and Wentworth Road merged. Corona de Tucson along with Corona de Tucson and Green Valley Fire provided initial attack and turned over command to the Department of Forestry and Fire Management.
- June of 2020, the Bighorn Fire was started by a lightning strike in the Catalina Mountains northwest of Tucson on the Coronado National Forest. The Big Horn Fire burned into the Pusch Ridge Wilderness in the Santa Catalina Mountains. The fire burned from June 5th to July 23rd and consumed 119,987 acres. The fire spread rapidly over the subsequent days and weeks, driven by multiple days of strong winds. The Town of Oro Valley, residents of Summerhaven, nearby mountain communities, those on the periphery of the mountains from the Catalina Foothills to southern Pinal County and near Redington Road were evacuated at times.

  The US Forest Service enacted the Burned Area Emergency Response (BAER) program to address the threat to life and property due to the large burn scar which encompassed upland watersheds. These watersheds drain rainfall and runoff into and through the urban area of Pima County. Segments of the population were now at greater risk of flooding, sediment, and debris runoff. The fire complexity escalated to the management of a Type 1 Incident Management Team, and at its peak, approximately 1,200 personnel fought the fire. No structures were destroyed. Estimated costs as reported by the National Interagency Coordination Center to fight the fire were $44.5 million.

  The Tortolita fire was started by a lightning strike after a thunderstorm rolled over the Tortolita Mountains, north of Oro Valley. The fire burned from June 11th to June 24th and consumed a total of 3,140 acres.

- July of 2020, the Fresnal Fire located on the Tohono O'odham Nation burned in an inaccessible area. The fire was monitored until it burned itself out. The Navarro Fire started July 11th, after a lightning storm moved across the area, approximately 14 miles west of Sahuarita and 10 miles northwest of Green Valley, in the Sierrita Mountains. The fire burned 2,306 acres and was contained on July 14th.
- August of 2020, there were multiple wildfires. The Spud Rock Fire and the Mica Bowl Fire were reported following a thunderstorm that passed through the Rincon Mountains on August 13th. The fires burned in remote and high elevation areas. The Spud Rock Fire burned 760 acres while fire activity for the Mica Bowl Fire was minimal. The Dove Fire started on August 27th in the Tortolita Mountains due to a lightning strike. The fire was contained on August 30 and burned 942 acres.
- October 6, 2020, the human-caused Encinos Fire started 11 miles northwest of Arivaca along the eastern slopes of the Baboquivari Mountains in southeast Pima County. The fire spread to over 10,000 acres by October 10th driven by strong winds, hot temperatures, and very dry fuel conditions. The fire consumed a total of 14,905 acres before becoming fully contained on October 26th. Fire suppression costs tallied $438,000.
- February of 2021, the West Fire burned west of the Elephant Head community with no evacuations or reported damage. The cause of the fire remains undetermined.
- March of 2021, the Cowboy Fire burned West of Freeport-McMoRan mine with no evacuations or reported damage. The cause of fire remains undetermined.
- May of 2021, the human-caused Sycamore Canyon Fire burned just north of the Baboquivari Peak on the Tohono O'odham Nation. The fire lasted from May 23rd to June 6th in southeast Pima County. The fire spread to approximately 1,858 acres onto the Bureau of Land Management, threatening fish and wildlife. The fire was managed by a Type 2 Incident Management Team. The cause of the fire remains undetermined.
- June of 2021, the human-caused Heavy Fire started June 16th in Santa Rita Mountains just north of the Rosemont Copper Mine. The fire spread to approximately 104 acres onto the Coronado National Forest, with no reported damage to structure. Nearby staff were evacuated temporarily. The fire lasted from June 16th through June 22nd. There were no evacuations nor reported damage.

Extent

The scale and complexity of any wildfire will determine the extent of the hazard. The extreme variability of precipitation across the southwest, combined with the trend of increasing temperatures, has led to extremely dry conditions within the forest and grasslands of Pima County. These dryer conditions will continue to increase the length and severity of wildfires. As the wildland/urban interface grows, the potential for catastrophic wildfire will increase as well. The increased wildfire damage will continue to devastate Pima County.

Probability of Future Events

In 2020, the National Interagency Fire Center ranked Arizona as number 3 in the top 10 states at risk for wildfires.[22] The probability and magnitude of wildfire incidents for Pima County are influenced by numerous factors including vegetation densities, previous burn history, hydrologic conditions, climatic conditions such as temperature, humidity, and wind, ignition source (human or natural), topographic aspect and slope, and remoteness of the area. It is the most threatening of the hazards within the County. Based on the historic data, wildfires will occur with near certainty on an annual basis. While the number of deaths, amount of property and other losses, and the acreage burned, are difficult to predict, the likelihood of substantial economic cost is extremely high.

The wildfire risk for Pima County was mapped based on the data revised for the 2013 Pima County Community Wildfire Protection Plan (PCCWPP).[23] Pima County and participating jurisdictions and organizations developed the PCCWPP to help local governments, fire departments, and districts, and residents identify at-risk public and private lands to protect those lands from a severe wildfire threat. Although the PCCWPP has not been recently updated, the base hazard data developed in the 2013 PCCWPP remains unchanged.

The PCCWPP identified two models of wildland fuel hazards to represent a typical year of rainfall and an extraordinarily heavy rainfall year to present a range of wildland fuel hazards across the county. Each model divided the fuel hazard into three categories, high, medium, and low, and accounted for previous burn areas and the major buffelgrass concerns.

Climate variability may have a positive or negative effect on wildfire risk in the future. Wildfire risk is intertwined with the risk of drought in Pima County as well. Figure 4-18 shows the Wildfire hazard potential for Pima County.

Vulnerability

Table 4-25: CPRI Results for Wildfire

Participating Jurisdiction	Probability	Magnitude/ Severity	Warning Time	Duration	CPRI Score
Marana	Possible	Critical	< 6 hours	> 1 week	**2.80**
Oro Valley	Likely	Critical	< 6 hours	> 1 week	**3.25**
Pascua Yaqui Tribe	Likely	Limited	< 6 hours	< 24 hours	**2.75**
Sahuarita	Possible	Limited	< 6 hours	< 24 hours	2.20
Tucson	Possible	Limited	< 6 hours	< 24 hours	2.30
Unincorporated Pima County	Highly Likely	Critical	< 6 hours	> 1 week	**3.70**
County-wide average CPRI =					**2.83**

*Jurisdictions in **bold** chose to mitigate against the hazard*

Town of Oro Valley: The Town of Oro Valley is susceptible to wildfires due to close proximity to the Santa Catalina Mountains to the east side of Oracle Road (SR77), Catalina State Park, and Tortolita Mountains. The difficult mountain terrain and higher elevation can make fighting fires in these areas much more challenging. As highlighted by the 2020 Bighorn Fire, the fire burned down the mountain and threatened hundreds of homes and businesses within Oro Valley. Current trends indicate a likely future of less precipitation, lengthy droughts, more days of extreme heat, and any high wind days will likely fuel more wildfires due to drier vegetation. Major fires also heighten the community's vulnerability to post-fire floods in burn scar areas for years afterward. Small, localized brush fires are fairly common throughout the year, due to vegetation overgrowth in washes, buffelgrass, and other available fuels. In

[22] Insurance Information Institute Facts + Statistics https://www.iii.org/fact-statistic/facts-statistics-wildfires

[23] Pima County Community Wildfire Protection Plan 2013, http://webcms.pima.gov/cms/One.aspx?pageId=45265

the urban/city environment setting, these are small and quickly extinguishable, limiting potential risk to people and structures. Wildfires also cause concern to Oro Valley residents on a macro level due to air quality concerns, proximity to the mountains, and the potential of high visibility fire resources and staging areas for fire crews.

Pascua Yaqui Tribe: The Tribe's vulnerability to wildland fire is mainly through the wildland fire urban interface. Tribal residences and businesses are situated within areas of natural desert vegetation. In general, brushfires are smaller than three acres. The Tribe is a signee on the PCCWPP and has mutual aid agreements with fire departments in the immediate area and maintains a cooperative agreement with the Bureau of Indian Affairs (BIA) in addition to having access to the Tribal Nations Response Team (TNRT).

Unincorporated Pima County: The County is vulnerable to WUI fires in addition to fires on Federal or state landholdings due to high populations living in unincorporated areas in or near the Coronado National Forest, Saguaro National Parks East, and West, and other open spaces where fuels are moderate to high. The PCCWPP highlights the high population of at-risk communities adjacent to public lands administered by the Bureau of Land Management, the National Park Service, and the Coronado National Forest as well as state and county properties. The Arizona Department of Forestry and Fire Management evaluates all Arizona communities to determine those areas that may have the most potential to be affected by wildfire. In 2019, the communities of Summerhaven, Catalina, Catalina Foothills, Arivaca Junction, and Oro Valley were the top 5 areas in Pima County ranked as "high-risk" per the Arizona at Risk Communities Assessment System (data for communities on federal or tribal land was not available).[24]

Loss Estimations

The analysis in the PCCWPP includes all risk factors required by the Arizona State Forestry Department. The areas of concern for wildland fuel hazards, risk of ignition and wildfire occurrence, local preparedness, and protection capabilities, and loss of community values are evaluated to determine areas of highest wildland fire risk within Pima County. The analysis area included all of Pima County, including tribal lands. The initial analysis depicted all areas within the county at risk for unwanted wildland fire.[25]

Risk-influencing factors of developed land and other infrastructures within the area of highest flammability were given the highest priority for protection. In areas where community values occur within or adjacent to areas of high risk due to the fuel hazards of vegetation associations, a cumulative risk from catastrophic wildland fire was created.

According to FEMA'S National Risk Index, expected annual loss represents the average economic loss in dollars resulting from natural hazards each year. It is calculated for each hazard type and quantifies loss for relevant consequence types: buildings, people, and agriculture. In Pima County, expected loss each year due to natural hazards is relatively high when compared to the rest of the U.S with an expected annual loss of about $16M.[26]

There is a potential for large economic impacts from wildland fires due to business loss, population displacement, and loss of habitat and recreational opportunities among other things. Wildfire suppression costs can be substantial. The recent Bighorn Fire in Pima County burned over 119,978 acres and costs were estimated at $4.7 million.[27]

Changes in Development in the Hazard Area

By its very definition, the Wildland Urban Interface (WUI) represents the fringe of urban development as it intersects with the natural environment. As previously discussed, wildfire risks are significant for a sizeable portion of the county. Any future development will only increase the WUI areas and expand the potential exposure of structures to wildfire hazards. In Pima County, developments tend to create a clear line of demarcation between the wildland fuels and the built environment. The 2013, PCCWPP analyzed community development throughout the county and found a mix of high-density, single-family, and multi-acre parcels. Development of isolated subdivisions or with more dispersed structure development, such as one-to-three-acre parcels, are at the highest risk.[28]

As the County's population continues to grow and more development occurs at the urban/wildland interface, the risk to loss of life and property are likely to increase across the entire planning area.

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[24] Arizona at Risk Communities https://dffm.az.gov/arizona-risk-communities
[25] Pima County Community Wildfire Protection Plan. (2013). Pima County Office of Emergency Management. http://webcms.pima.gov/cms/One.aspx?pageId=45265
[26] Map | National Risk Index (fema.gov)
[27] Sawmill Fire Executive Summary. (May 2, 2017). Southwest Area Incident Management Team#1. https://sites.google.com/site/swaimt1/
[28] Pima County Community Wildfire Protection Plan. (2013). Pima County Office of Emergency Management. http://webcms.pima.gov/cms/One.aspx?pageId=45265

Town of Oro Valley: Within the Town of Oro Valley, there has been an increase in commercial and residential development along the east side of Oracle Road (SR77) corridor, increasing the risk of wildfire due to the proximity to the Santa Catalina Mountains. This vulnerability was highlighted during the 2020 Bighorn Fire when certain neighborhoods impacted were being prepared for potential evacuation.

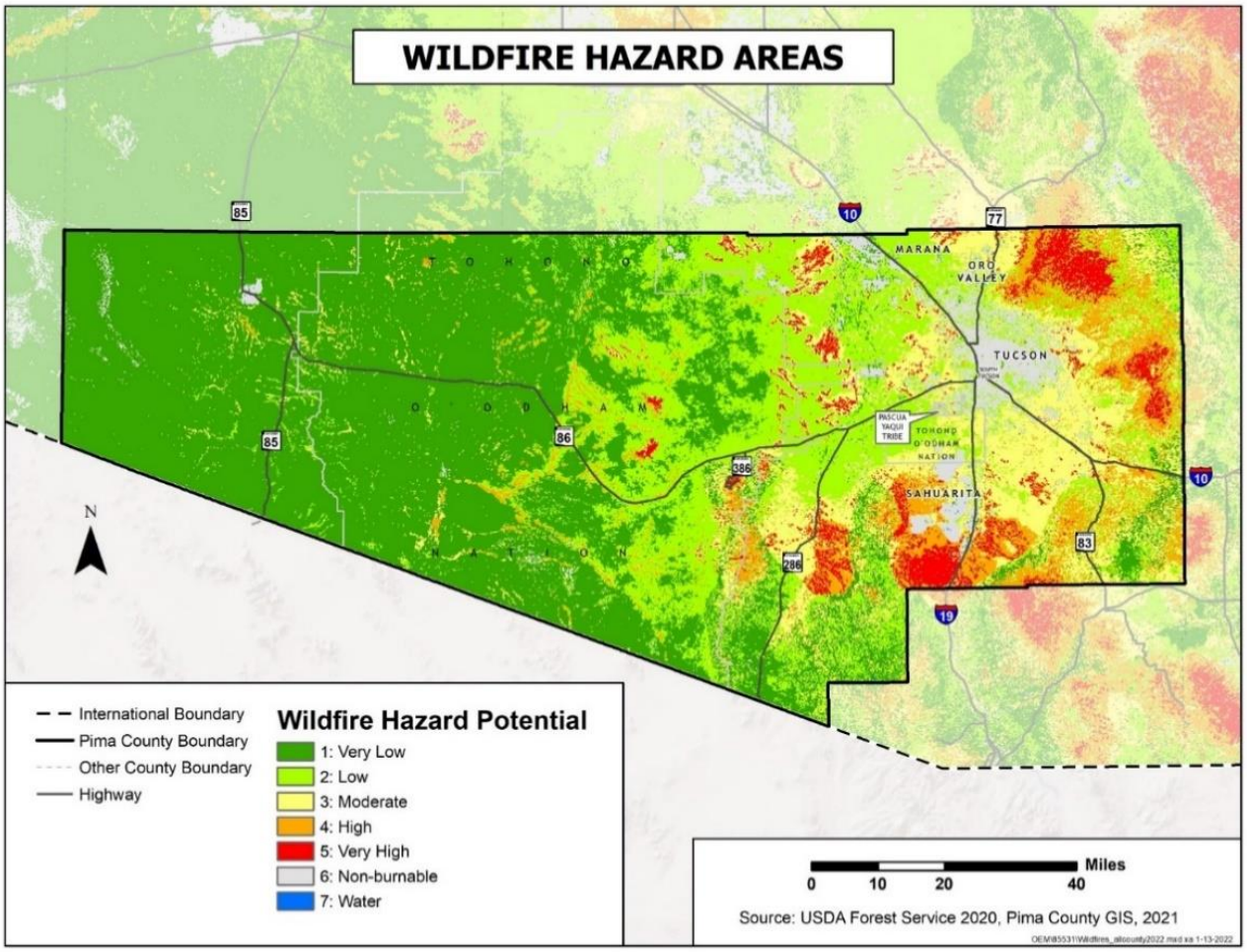
Vulnerability of homes and businesses increases as the distance of the property to wildfire-prone areas decreases; however, all residential or commercial construction projects in development within the Pascua Yaqui Tribe are required to follow Wildland Urban Interface standards. At minimum defensible firebreak lines are required; for areas with moderate fuel types, requires a 30'defensible space; for areas with high fuel types, requires a 50' defensible space; for areas with extreme fuel types, requires a 100' defensible space.

These firebreaks can be temporary or permanent and consist of fire-resistant vegetation, nonflammable materials, or bare ground. Firebreaks are to be located on the contour where practical to minimize the risk of soil erosion. Firebreak construction must comply with applicable local, tribal, state, and federal laws and regulations, including the state's Forest Practices Guidelines. Newly built infrastructure/built structures:

- An Assisted Living Center was created after the renovation was complete on the old Fire Department Station in New Pascua reservation proper.
- A Men's Path and Women's Path facilities were constructed, off Camino de Oeste, north of Jeffrey Road.
- A Boys and Girls Club is currently being constructed, south of the PYT - Wellness Center.
- In 2021, construction of a Food Pantry facility began, this facility will provide sustained community services for families/individuals in need of resources.
- Six 5-plex/Housing on Calle Torim, west of Ignacio Baumea.
- Construction of the Pascua Yaqui Health and Social Services Family Center was completed in 2021.

City of Tucson: The City of Tucson does have a limited susceptibility of damage and loss which could increase in the coming years with continued infrastructure expansion into the wildland-urban interface. The City of Tucson has identified urban interface hazard areas to the northeast, southeast, and west due to increased vegetation/fuel loads as well as existing and new infrastructure that has increased the risk and vulnerability profile. Due to the widespread propagation of non-native species, like buffelgrass, the Sonoran Desert has an unusually high fine dead fuel load that has never existed before.

In a response to the increased risk profile, the Tucson Fire Department has established a wildland firefighting program and purchased one Type 3 and two Type 6 apparatus as well as a team of personnel with specialized wildland firefighting training.



Source: USDA Forest Service Research Data Archive, 2020

Figure 4-18: Wildfire Hazard Potential Pima County

SECTION 5: MITIGATION STRATEGY

5.1 Hazard Mitigation Goal and Objectives

The three primary components of the mitigation strategy are:

Goals and Objectives

Capability Assessment

Mitigation Actions/Projects and Implementation Strategy

A reassessment of the goals and objectives was made with the planning team at the suggestion of the Arizona State Mitigation Planner. The Team considered the following before revising the goals for 2022:

1. Do the goals and objectives identified in the 2017 Plan reflect the updated risk assessment?
2. Did the goals and objectives identified in the 2017 Plan lead to mitigation projects and changes to policy that helped the jurisdiction(s) to reduce vulnerability?
3. Do the goals and objectives identified in the 2017 Plan support any changes in mitigation priorities?
4. Are the goals and objectives identified in the 2017 Plan reflective of current State goals?

Upon review of the 2017 goals and objectives, the planning team had no recommendations for modifications therefore the goals and objectives remain unchanged.

Goal

Reduce or eliminate the risk to people and property from natural hazards.

Objectives

- Reduce or eliminate risks that threaten life, critical facilities, and infrastructure.
- Promote hazard mitigation activities by increasing public awareness and education of hazards and risks.
- Integrate mitigation into planning efforts, capital improvement, grants and funding, multijurisdictional collaboration efforts, and training and exercising.

5.2 Capability Assessment

An important component of the Mitigation Strategy is a review of each participating jurisdictions' resources in order to identify, evaluate, and enhance the capacity of local resources to mitigate the effects of hazards. The capability assessment is comprised of several components:

- Legal and Regulatory Review: A review of the legal and regulatory capabilities, including ordinances, codes, plans, manuals, guidelines, and technical reports that address hazard mitigation activities.
- Technical Staff and Personnel: This assessment evaluated and describes the administrative and technical capacity of the jurisdiction's staff and personnel resources.
- Fiscal Capability: This element summarizes each jurisdiction's fiscal capability to provide the financial resources to implement the mitigation strategy.
- National Flood Insurance Program (NFIP) Participation- the NFIP contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments, but the program is promoted by FEMA as a basic first step for implementing and sustaining an effective flood hazard mitigation program and is a key indicator for measuring local capability as part of this assessment.

The planning team reviewed the information provided in the 2017 Plan. The planning team chose to keep the format of the tables summarizing the administrative, technical, and fiscal capabilities. Each jurisdiction listed their legal and regulatory capabilities by summarizing and identifying the codes, ordinances, plans, and studies/reports used by the

jurisdiction, as well as identify the appropriate agency/department with responsibility for maintaining and updating those documents. Each jurisdiction was asked to update its tables and pare down any unnecessary information. Additionally, each jurisdiction will continually seek opportunities for involvement in other planning, policy development, or ordinance development that could be beneficial to improving and implementing mitigation actions. Section 6.3 contains specific jurisdictional actions in the section discussing incorporation into future planning activities.

5.3 Jurisdictional Capabilities

Tables 5-1 through 5-24 summarize the legal and regulatory mitigation capability for each of the participating jurisdictions. The information provided includes a brief listing of current programs, polices, codes, mitigation relevant ordinances, plans, policies, and studies/reports. The tables summarize the legal and regulatory capabilities, financial resources, as well as staff and personnel resources for each jurisdiction.

Table 5-1: Pima County Programs & Policies

Regional Flood Control Program	Purpose	The Regional Flood Control District strives to use forward-looking floodplain management practices to minimize flood and erosion damage for all county residents, property and infrastructure via the initiatives of flood hazard mitigation, warning and response in unincorporated Pima County and along major rivers within incorporated areas.
	Responsible Agency	Pima County Regional Flood Control District
	Hazards	Flood
	Effect on Mitigation Efforts	Reduces property damage, fatalities and the need for evacuation.
	Opportunities for Enhancement	Continue to improve identification and mitigation of flood risk exposure, expand warning capability, provide all-weather access and expand flood response coordination.
Pima County Comprehensive Plan Flood Control Resource Area Policy	Purpose	Floodplain Avoidance
	Responsible Agency	Development Services Department
	Hazards	Flood
	Effect on Mitigation Efforts	Requires floodplain avoidance
	Opportunities for Enhancement	Include a hazard element and clarify floodplain avoidance policy
Stormwater Program	Purpose	Beneficial Use of Stormwater
	Responsible Agency	Pima County Regional Flood Control District
	Hazards	Flood, Heat, and Drought
	Effect on Mitigation Efforts	Reduces neighborhood scale flooding, urban heat islands, and landscaping water demand.
	Opportunities for Enhancement	Work with partners to select, install and maintain neighborhood scale Green Infrastructure.
Pima County RWRD Continuity of Operations Plan 2021	Purpose	Identifies lines of succession; provides for the maintenance or re-establishment of the control and direction of continuity actions. The plan provides implementation strategies for RWRD's continuity personnel to continue essential functions during any disruption for up to 30 days.
	Responsible Agency	PCRWRD
	Hazards	All-Hazards
	Effect on Mitigation Efforts	The COOP Plan is applicable to all-hazards threats, ensures preparedness to provide critical services in an environment that is threatened, diminished, or incapacitated, and establishes PCRWRD COOP capability to respond to extended disruptions (loss of access; loss of services due to workforce reduction, equipment or system failure).

Table 5-1: Pima County Programs & Policies		
	Opportunities for Enhancement	Incorporate lessons learned, checklists, etc.
Pima County Emergency Operations Plan	Purpose	Provides a whole community overview of the County's emergency management structure and the responsibilities assigned to various county departments, non-governmental agencies, and the private sector, during emergency incidents and disasters.
	Responsible Agency	PCOEM and All County Departments
	Hazards	All-Hazards
	Effect on Mitigation Efforts	Outlines Pima County's response to incidents to include the NIMS, ICS and ESF structure to limit hazard impacts related to FEMA Community Lifelines. County Department ESF incident response protocols are designed to mitigate impacts to public health, property and the environment.
	Opportunities for Enhancement	Periodic review and updates is critical to enhance operational coordination, reduce future losses, and assist with mitigating the community's exposure to the impacts of future hazard incidents.
Pima County Community Wildfire Protection Plan (2013)	Purpose	Identifies at-risk public and private lands for protection from severe wildfire threat, and establishes incentives for communities to develop comprehensive wildfire protection plans (improving fire prevention and suppression activities).
	Responsible Agency	Coordination led by PCOEM and supported by Local Fire Departments and Districts
	Hazards	Wildfire
	Effect on Mitigation Efforts	Creation/Update and utilization of the CWPP is also an effective way to outline fire preparedness and planning, helping communities prioritize high-risk projects and to expedite overall project planning and solicit acquire federal funding.
	Opportunities for Enhancement	Identify funding to support comprehensive plan update.
Pima County Integrated Infrastructure Plan 2019-2029	Purpose	Unifies the infrastructure planning process across multiple disciplines and departments planning areas. The Plan encapsulates guiding policy directives adopted by the Board of Supervisors in Pima Prospers, the County's Comprehensive Plan; Resolution 2007-84 in Support of County Sustainability Initiatives; and the Pima County Economic Development Plan
	Responsible Agency	Led by Pima Capital Program Office and supported by Pima County Departments
	Hazards	All-Hazards
	Effect on Mitigation Efforts	The investment in physical infrastructure is a core function of county government and essential for a healthy community. Infrastructure and capital assets allow for the delivery of key public services and the movement of people and goods across the County.
	Opportunities for Enhancement	Consider this Integrated plan as a tool to allow Pima County to plan ahead for short-term and long-term mitigation strategies in support of the one year annual adopted capital budget.
Sustainable Action Plan for County Operations 2018-2025 (SWIP)	Purpose	Decisive action to cut greenhouse gas emissions in operations and implement climate adaptation strategies are put forward as part of the County's efforts to build cross-sector resilience to current and future climate variability.
	Responsible Agency	Led by Pima County Office of Sustainability and Conservation and supported by Pima County Departments.
	Hazards	All

Table 5-1: Pima County Programs & Policies		
	Effect on Mitigation Efforts	Implements climate adaptation measures in Pima County operations to support climate change preparedness, mitigation and resiliency.
	Opportunities for Enhancement	Identify future projects to support the plan outline of specific targets and recommended mitigation strategies the County will pursue to reduce current greenhouse gas emissions from operations to 26%-28% below 2005 levels by 2025.
Sonoran Desert Conservation Plan (SDCP)	Purpose	The Plan for balancing the conservation and protection of our cultural and natural resource heritage with our efforts to maintain an economically vigorous and fiscally responsible community. The SDCP identified the types of development that improved the tax base, and the relationship of these with the sewer service area. The CLS covers approximately 2 million acres in eastern Pima County.
	Responsible Agency	Office of Sustainability and Conservation and supported by Pima County Departments including NRPR and RFCD who manage the majority of CLS open space lands.
	Hazards	All
	Effect on Mitigation Efforts	Opportunity for Nature Based Solutions. Pima County Comprehensive Land Use Plan, integrating the land-use policies and principles of conservation developed in the SDCP, including the Conservation Lands System or CLS. The CLS identifies lands necessary to achieve SDCP biological goals, while delineating areas suitable for development.
	Opportunities for Enhancement	Identify Nature Bases Solution opportunities (e.g., grants) to incorporate mitigation strategies that support the SDCP.
Pima County RWRD 2016 Wastewater Facility Plan	Purpose	To help project PCRWRD long-term capital expenditure needs. The purpose of this document is to answers questions about future system needs; to contrast future needs with forecasts from previous Facility Plan Updates; and to examine likely future changes that have the potential to affect system capacity and service operations.
	Responsible Agency	PCRWRD
	Hazards	All
	Effect on Mitigation Efforts	PCRWRD's goal is to minimize chemical and energy consumption in operations; maximize use of renewable water and energy; and maximize resource recovery from wastewater collection and treatment processes to benefit the environment and the community. Reclaimed water is a renewable, consistent source of water and is prominent in water planning and drought mitigation.
	Opportunities for Enhancement	Identify technological advances in the beneficial reuse of reclaimed water and byproducts.
Pima County Rangeland Standards and Guidelines	Purpose	Maintain healthy and sustainable rangelands, particularly the grasslands on Pima County ranch fee and leased acres.
	Responsible Agency	Pima County Natural Resources Park & Recreation
	Hazards	Wildfire, Flood
	Effect on Mitigation Efforts	NRPR's goal is to maintain healthy rangelands with sufficient vegetative cover to support water infiltration and reduce flood flows.
	Opportunities for Enhancement	Development of drought strategy for ranchlands; opportunities to work with ranch partners to update Ranch Management Agreements to incorporate responses to applicable hazards; eg. implementing fuel breaks and other strategies in the WUI areas in coordination with OEM and local Fire Departments
Pima County Resource	Purpose	RMPs are developed to comply with the terms of the Pima County Multi-Species Conservation Plan (MSCP) for lands that were or will be allocated as mitigation for impacts of development that has been

Table 5-1: Pima County Programs & Policies		
Management Plans (RMPs)		permitted elsewhere under the terms of Pima County's Endangered Species Act Section 10 permit from U.S. Fish and Wildlife Service. The RMPs are intended to conserve and enhance ecological structure and functions; maintain or improve proper functioning floodplains; maintain or enhance wildlife habitat connectivity; provide for recreational opportunities and public safety; and protect culturally significant resources including visual resources. RMPs provide a local framework to aid decision-making regarding fire suppression tactics and fuel management treatments. The RMPs also address Safety and Security for agency personnel and visitors including addressing any hazardous materials, law enforcement, natural hazards, and visitor safety information.
	Responsible Agency	NRPR, RFCD, OSC
	Hazards	All Hazards
	Effect on Mitigation Efforts	Outlines relevant mitigation actions at a local, watershed scale to reduce hazards such as wildfire and flood and to educate public regarding risks of recreating on/visiting natural resource parks and open space properties of the CLS.
	Opportunities for Enhancement	RMPs identify Management Objectives, Desired Future Conditions, Policies and Procedures, and Ongoing and New Management Actions; which include those applicable to All Hazards encountered in the Planning area. Actions will address, for example, control of invasive species such as buffelgrass which would reduce fire danger in Sonoran Desert Plant Communities, development of fuel breaks to manage wildland fire ignitions, and notification to/education of the public about wildfire, excessive heat, and flood hazards.
Pima County Health Department All-Hazards Public Health Emergency Response Plan	Purpose	Core plan of PCHD's all-hazards response for managing public health incidents and details the local coordinating structures and processes used during incidents of public health significance that may impact the public's health.
	Responsible Agency	PCHD
	Hazards	All Hazards
	Effect on Mitigation Efforts	Outlines PCHD's response to incidents utilizing NIMS and ICS structure under ESF 8, Public Health and Medical Services. Response protocols are designed to mitigate impacts on public health.
	Opportunities for Enhancement	Timely reviews are essential to ensure key coordination elements and response protocols are up-to-date and assist with mitigating the community's exposure to the impacts of future hazard incidents.

Table 5-2: Pima County Codes & Regulations		
2018 International Building Code as Amended	Purpose	Building Safety
	Responsible Agency	Development Services
	Hazards	All Hazards
	Effect on Mitigation Efforts	Establishes minimum building construction standards and enforcement procedure. Adoption of building codes creates more resilient infrastructure which is able to withstand significant impacts to natural hazards.
	Opportunities for Enhancement	Continue to advocate for current code adoptions as released which benefit and apply to residents of Pima County.

Table 5-2: Pima County Codes & Regulations		
PCC Title 16: Floodplain & Erosion Hazard Management Ordinance	Purpose	Minimize public and private losses due to flooding and erosion; preserve and enhance the beneficial functions of floodplains; and to enable its residents to participate in the National Flood Insurance Program (NFIP), receive federal disaster assistance, obtain flood insurance, and reduce the cost of flood insurance.
	Responsible Agency	Pima County Regional Flood Control District
	Hazards	Flood
	Effect on Mitigation Efforts	Establishes minimum construction and site design standards and enforcement procedures for mitigation of flood and erosion hazards.
	Opportunities for Enhancement	Establish additional standards that are higher than the National Flood Insurance Program minimums. Identify additional flood prone areas.
PCC Title 18: Pima County Comprehensive Plan Land Use Classification and Zoning	Purpose	Ensure land use compatibility with the beneficial functions of floodplains and ensure development does not occur in flood prone areas, or areas without access.
	Responsible Agency	Development Services Department
	Hazards	Flood
	Effect on Mitigation Efforts	Floodplain and riparian habitat avoidance and conservation offsets.
	Opportunities for Enhancement	Update maps, clarify when avoidance is appropriate, and enforce strictly.
PCC Title 7 Environmental Quality	Purpose	Identifies the incorporation of pertinent federal, state and local, regulatory authorizations, requirements, mitigation, use, disposal, permits and fees related to the solid, liquid and hazardous wastes, water potability for the protection of public health and the environment.
	Responsible Agency	Pima County Department of Environmental Quality
	Hazards	All
	Effect on Mitigation Efforts	Ensures standards are in place to protect public health and the environment.
	Opportunities for Enhancement	Consider review of emergency temporary response use, permissions, and limits in an incident.
PCC Title 8 Health and Safety §§ 8.16, 8.20; PCC Title 13 Public Services § 13.36	Purpose	Identifies the sewage disposal requirements and other related limits for hotels, motels, tourist courts, mobile home parks and industrial wastewater.
	Responsible Agency	PCDEQ, PCRWRD
	Hazards	All
	Effect on Mitigation Efforts	Ensures standards are in place to protect public health and the environmental protections from contamination.
	Opportunities for Enhancement	Consider review of emergency temporary response use, permissions, and limits in an incident.
PCC Title 8 Drought Response Plan And Water Wasting § 8.70	Purpose	To provide a drought response plan for the unincorporated areas of Pima County.
	Responsible Agency	Office of Sustainability, Pima County Health Department
	Hazards	Drought
	Effect on Mitigation Efforts	Set triggers for drought declaration stages and mitigates response to drought, and ensures that water resource allocations are put to maximum beneficial use to protect public health, safety and welfare.
	Opportunities for Enhancement	Review underserved and disadvantaged communities' impact from drought related hazards and provide water conservation assistance and water supplies, if necessary. Review drought response measures and revise according to drought severity and extent. Review emergency responses in the event drought affects water supplies and provide assistance.

Table 5-2: Pima County Codes & Regulations		
PCC Title 14 Renewable Energy Incentive Districts	Purpose	Pima County may create a renewable energy incentive district (REID) with specific sites and an incentive plan designed to promote the development of utility-scale solar energy systems on environmentally-suitable lands within unincorporated Pima County.
	Responsible Agency	Pima County Development Services, PCDEQ, PCDOT, PCRFCD
	Hazards	All
	Effect on Mitigation Efforts	Incentives to mitigate climate change hazards impacts to the environment and continuity of county operations in energy related incident.
	Opportunities for Enhancement	Incorporate incentives for Microgrids to include critical infrastructure facilities to serve as emergency support energy areas in a long-term, widespread power outage to mitigate the effect climate related hazards.
PCC Title 15, Buildings and Construction	Purpose	The Pima County building code adopts by reference the 2018 International Building Code as amended by the local amendments incorporated into Ordinance 2018-30 as Exhibit A, together listed national and international codes.
	Responsible Agency	Pima County Development Services
	Hazards	All-Hazards
	Effect on Mitigation Efforts	Current International Building Code requirements are required to be eligible for competitive grant projects (e.g., BRIC Grant). Set the standard for quality mitigation building requirements for potential significant natural hazard exposure.
	Opportunities for Enhancement	Ensure building code adopted are updated to meet grant eligibility requirements.
RWRD Engineering Design Standards 2022 and Standard Specifications and Details for Construction	Purpose	To provide the minimum acceptable standards for the design, modification or construction of Public Sewage Conveyance facilities and Public Sewers in Pima County.
	Responsible Agency	RWRD
	Hazards	Flood
	Effect on Mitigation Efforts	Public Sewage Conveyance facilities and Public Sewer design, modification and construction standards will serve to mitigate potential of significant natural hazard exposure.
	Opportunities for Enhancement	Monitor for continuous improvement and update as needed to improve upon hazard mitigation activities.
PCDOT Subdivision and Street Development Standards (2016)	Purpose	Provide engineering standards for roadway design.
	Responsible Agency	PCDOT
	Hazards	Flood
	Effect on Mitigation Efforts	Minimize impacts of floods, ensure emergency access.
	Opportunities for Enhancement	Review and update guidelines periodically to ensure compliance with federal standards and best practices.
Guidelines for Establishing Scour and Freeboard for Bridges (2012)	Purpose	Provide guidance for bridge design.
	Responsible Agency	PCDOT
	Hazards	Flood
	Effect on Mitigation Efforts	Minimize impacts of floods.
	Opportunities for Enhancement	Review and update guidelines periodically to ensure compliance with federal standards and best practices.

Table 5-3: Pima County Financial Resources		
	Purpose	Flood risk mitigation, warning and response.

Table 5-3: Pima County Financial Resources		
Pima County Property Tax	Responsible Agency	Pima County Regional Flood Control District
	Hazards	Flood
	Effect on Mitigation Efforts	Provides an annual budget for the Regional Flood Control Program to support floodplain management practices to minimize flood and erosion damages for all county residents, property and infrastructure.
Post Fire Hazard Mitigation Grant Program	Purpose	Post Fire Hazard Mitigation
	Responsible Agency	PCRFCD
	Hazards	Flood, Wildfire
	Effect on Mitigation Efforts	Provide property protection for post catastrophic wildfire flood conditions.
Grant Funding or other funding opportunities (e.g., BRIC, HMGP, Bipartisan Infrastructure Act, Other).	Purpose	Hazard mitigation grant funding opportunities for the Critical Infrastructure and Community Resiliency from All-Hazards (natural and/or human-caused, as applicable).
	Responsible Agency	Pima County Grants Management Innovation in coordination with Pima County Departments and Federal or State Funding Authority.
	Hazards	All Hazards
	Effect on Mitigation Efforts	Grants and other funding sources are essential to provide opportunities to mitigate the effects of all-hazards in projects that might otherwise be delayed due to lack of financial resources.
Arizona State Revolving Funds	Purpose	Provides financing for the design and construction of water and wastewater infrastructure projects. Arizona Water Infrastructure Finance Authority is authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, and other water quality facilities/projects.
	Responsible Agency	State of Arizona,
	Hazards	All-hazards
	Effect on Mitigation Efforts	Funding allows critical Water Sector infrastructure to reduce the risk of all-hazard cascading impacts through preparedness and hazard mitigation activities.
Pima County Capital Improvement Funding	Purpose	Provides comprehensive instructions designed to assist County departments' project management efforts, from project development through to successful project delivery (Exit Gate Process).
	Responsible Agency	All Pima County Departments
	Hazards	All
	Effect on Mitigation Efforts	All County departments are responsible for following the established CIP and Exit Gate procedures to successfully manage, develop, and deliver County CIP projects. Compliance with these County requirements is essential for completion of any large scale CIP project initiated as part of a hazard mitigation action or resiliency project.
Source/Name BRACE grant through ADHS(Arizona Department of Health Services)	Purpose	BRACE (Building Resilience Against Climate Effects) helps to build public health resilience against heat-related hazards.
	Responsible Agency	PCHD, NRPR, Pima County Library
	Hazards	Extreme Heat
	Effect on Mitigation Efforts	Interventions developed from BRACE partnership will help the community better prepare for heat-associated hazards.
Source/Name PHEP (Public Health Emergency Preparedness) grant	Purpose	Provides funding identify vulnerable populations for heat related illness, provide education targeted toward recreational activities, visitors/travelers, hospitality industry, unhoused populations, and build cooling center capacity.
	Responsible Agency	PCHD, PCOEM, Pima County Office of Sustainability
	Hazards	Extreme Heat

Table 5-3: Pima County Financial Resources		
	Effect on Mitigation Efforts	Education, outreach, and interventions will help mitigate heat-related effects to vulnerable populations.
Source/Name CDC Crisis Cooperative Agreement Grant	Purpose	PHEP domains include Strengthen Community Resilience and Strengthen Incident Management for Early Crisis Response. Both domains outline activities to identify and engage community partners and stakeholders in public-health risk mitigation efforts.
	Responsible Agency	PCHD
	Hazards	Extreme Heat
	Effect on Mitigation Efforts	Community partner and stakeholder engagement regarding risk mitigation efforts will help create effective measures to reduce both risk and disproportionate impacts to benefit the whole community.
FEMA	Purpose	Provides emergency funding for road repair.
	Responsible Agency	PCDOT
	Hazards	Flood, Landslides, Wildfire
	Effect on Mitigation Efforts	Funds road repair and reconstruction post incident to assist in reducing risk and the potential impact of future disasters.
Highway User Revenue Funds (HURF)	Purpose	Funds road construction and maintenance
	Responsible Agency	PCDOT
	Hazards	All
	Effect on Mitigation Efforts	Minimizes hazard risk through appropriate design and construction.
Regional Transportation Authority	Purpose	Funds road construction and maintenance
	Responsible Agency	PCDOT
	Hazards	All
	Effect on Mitigation Efforts	Minimizes hazard risk through appropriate design and construction.
Roadway Development Impact Fees	Purpose	Funds new road construction, not maintenance
	Responsible Agency	PCDOT
	Hazards	All
	Effect on Mitigation Efforts	Minimizes hazard risk through appropriate design and construction.

Table 5-4: Pima County Staff/Personnel Resources	
Department/Agency	**Involvement**
Planners	Provide flood risk assessment, property protection guidance and project management capability.
Planners/Resource Specialists/Program Managers (PCNRPR, RFCD, OSC)	Develop Resource Management Plans for local watershed areas to mitigate development impacts, conserve natural and cultural resources, manage public recreation and enhance safety by incorporating mitigation efforts from this Plan and others.
Geographic Information System Analysts	Knowledge and expertise on available technology, data, and GIS systems that can support hazard mitigation efforts.
Engineers	The Engineering Division delineates existing flood and erosion hazards to assist the Floodplain Management Division and undertakes activities intended to reduce flooding and erosion by designing and constructing improvements that will safely convey floodwaters and protect channel banks from erosion.
Hydrologists	Plan and collect surface water or groundwater and monitor data to support projects and programs that support hazard mitigation efforts directly or indirectly.

Table 5-4: Pima County Staff/Personnel Resources	
Department/Agency	**Involvement**
Communications Specialists and Public Information Officers	Provide community messaging and outreach through various media platforms and other activities that support hazard mitigation efforts.
RWRD Technical Services / Planning and Engineering Personnel	Wastewater treatment and conveyance systems design, capacity and hydraulic modeling, flow monitoring and other activities that support hazard mitigation efforts. Work with regulatory organizations to ensure all facilities and protocols meet strict environmental guidelines
PCRWRD Compliance and Data Acquisition Personnel: CRAO Laboratory, Hydrologist, Industrial Wastewater Control,	Analysis of water, wastewater, air and biosolids samples; Manage APP/AZPDES permits; Systems and asset mapping; Wastewater pretreatment program and industrial sampling to support projects and programs that support hazard mitigation efforts.
RWRD Capital Project staff assigned to mitigation improvements projects to include RWRD Subject Matter Experts (e.g. industrial electricians).	Mitigate hazard impact to sanitary sewage conveyance systems, pump stations, and treatment facilities and systems.
Public Works	Planning, permitting, engineering, inspections, and development services positions that know general plans, building and zoning codes, land use, land development, land management practices, construction practices, and other professional positions that know stormwater and floodplain management practices and other activities that support hazard mitigation efforts.
Information Technology	Use of technology, asset management systems, and other applications support and manage mitigation efforts.
Planning and Zoning Commission	Holds public meetings and makes recommendations to the Board of Supervisors on matters relating to zoning code amendments, rezoning, and other land use requests.
Emergency Management	Primary coordination role of hazard mitigation efforts across all county departments. Update the Hazard Mitigation Plan, Capability Assessment and Mitigation Strategies forms.
Grants Management & Innovation/Grant Writing	Grant support for the development, budget/finance and research/analysis of grant applications. Develops grant submissions to obtain funding for hazard mitigation efforts.
Program Managers and Coordinators	Engage with internal and external stakeholders to develop programs, education, and outreach to help mitigate hazards.
PCHD/Epidemiologists	Gather information and analyze data to inform heat-related mitigation efforts, including building cooling center capacity as well as other activities that support hazard mitigation efforts.

Table 5-5: Town of Marana Programs & Policies		
Marana General Plan/ Policy RS 10-1 through 10-5	Purpose	Proactively address wildfire hazards in the wildland-urban interface.
	Responsible Agency	Town of Marana
	Hazards	Wildfire
	Effect on Mitigation Efforts	Identify critical areas and manage areas to prevent wildfire.
	Opportunities for Enhancement	Identify a point of contact for this effort to ensure that someone is identifying the areas that the critical areas and/or working with the Northwest Fire District to identify these areas.
	Purpose	Identification and removal of invasive species including Buffelgrass.

Table 5-5: Town of Marana Programs & Policies		
Marana General Plan/ Policy RS 11-5	Responsible Agency	Town of Marana
	Hazards	Wildfire
	Effect on Mitigation Efforts	Minimize fire prone areas with removal of invasive species.
	Opportunities for Enhancement	Mapping of invasive species areas.
Marana General Plan/ Policy RS 3-3	Purpose	Encourage low-impact development standards along the Santa Cruz River Corridor that include habitat protection, flood control, and recreation.
	Responsible Agency	Town of Marana
	Hazards	Flood
	Effect on Mitigation Efforts	Minimize channelization of the Santa Cruz River increasing the flooding risk.
	Opportunities for Enhancement	Identify a point of contact for this effort to ensure that someone is working on low-impact development standards for flood control, recreation, and habitat protection. This effort needs a point of contact to progress this effort.
Marana General Plan/ Policy RS 7	Purpose	New developments are constructed in a manner that minimizes flooding.
	Responsible Agency	Town of Marana
	Hazards	Flood
	Effect on Mitigation Efforts	New developments are removed from floodplains as well as minimizing the effects on adjacent properties.
	Opportunities for Enhancement	Seek grant funding for regional drainage facilities. Drainage facilities will remove more property from the FEMA floodplains.
Marana General Plan/ Policy RS 8	Purpose	Stormwater is efficiently and sustainable managed in a way that reduces flood risks and respects water quality.
	Responsible Agency	Town of Marana
	Hazards	Flood
	Effect on Mitigation Efforts	Preserve the areas to convey water and preserve as open space to minimize flooding.
	Opportunities for Enhancement	Identify in a plan the areas of open space. If areas of open space are identified then the Town can work to preserve those. There is not currently any lands identified for preservation. Open spaces minimize flooding by having permeable areas where water can flow.

Table 5-6: Town of Marana Codes & Regulations		
Floodplain Management Ordinance	Purpose	To promote and protect the health, peace, safety, comfort, convenience, and general welfare of the residents within the jurisdictional area of Marana, Arizona; to minimize public and private losses due to flooding; and to enable its residents to participate in the National Flood Insurance Program (NFIP), receive federal disaster assistance, obtain flood insurance, and reduce the cost of flood insurance.
	Responsible Agency	Town of Marana
	Hazards	Flood
	Effect on Mitigation Efforts	Medium, this code was recently updated based on comments from ADWR. It has assisted in regulating building within flood prone areas.
	Opportunities for Enhancement	Was recently updated so the Town feels it is effective. This will be updated as necessary.
Town Code/ Title 17 Land Development	Purpose	Promote the health, safety, order, and general welfare of the present and future inhabitants of the Town.

Table 5-6: Town of Marana Codes & Regulations		
	Responsible Agency	Town of Marana
	Hazards	Flood and Fire
	Effect on Mitigation Efforts	Secure safety from fires, floods, traffic hazards, and other dangers.
	Opportunities for Enhancement	Update as necessary to stay current with issues.

Table 5-7: Town of Marana Financial Resources		
Development Agreements	Purpose	Provide infrastructure extensions serving new developments.
	Responsible Agency	Town of Marana/ Developers
	Hazards	Flooding and Erosion
	Effect on Mitigation Efforts	Minimize flooding with regional approaches and adequate infrastructure.
CIP/ General Fund/ Parks/ and Roads	Purpose	Provide funding for capital projects.
	Responsible Agency	Town of Marana/ Public Works
	Hazards	Flood and Erosion
	Effect on Mitigation Efforts	Construct large capital projects that address flood control and build necessary infrastructure.
Pima County Regional Flood Control CIP	Purpose	Fund Flood control projects.
	Responsible Agency	Pima County Regional Flood Control/ Town of Marana
	Hazards	Flooding
	Effect on Mitigation Efforts	Identify areas of flooding and minimize impacts with infrastructure projects.

Table 5-8: Town of Marana Staff/Personnel Resources	
Department/Agency	**Involvement**
Town of Marana Planning Commission	The Town of Marana Planning Commission is responsible for developing the Town's zoning ordinance, land use plan, Master Plan, and subdivision regulations.
Town of Marana Council	Act as Floodplain Board for floodplain decisions.
Town Engineer	Point of Contact to initiate flooding emergency. Reviews plans for flooding mitigation, Develops project recommendations to mitigate flooding.
GIS	Responsible for mapping hazards and mitigation stratifies.
Grants/ Finance	Responsible for identifying funding and applying for opportunities.
Risk Management Staff	Hazard Mitigation Planning.
Parks and Recreation	Wildland management for weeks and invasive.
CIP	Project design and construction of infrastructure to minimize flooding.

Table 5-9: Town of Oro Valley Programs & Policies		
Your Voice, Our Future General Plan (2016)	Purpose	The general plan is a community's "blueprint" for land use and development; it serves as the basis for decisions regarding a community's long-term development.
	Responsible Agency	Town of Oro Valley
	Hazards	All
	Effect on Mitigation Efforts	Medium. The general plan is another tool that can be used to help plan land use and development that can include considerations for hazards and potential methods to mitigate them.
	Opportunities for Enhancement	There is opportunity to expand the use the general plan goals, policies, and action items in the hazard mitigation planning process.
Parks and Recreation Master Plan	Purpose	The master plan sets a direction and meets program challenges relating to parks and recreation needs, services, concepts, next steps, and framework for the future.
	Responsible Agency	Town of Oro Valley Parks and Recreation
	Hazards	All
	Effect on Mitigation Efforts	Low. Parks and Recreation is at a time of considering future growth in programs, services, facilities, and capital improvement projects with the goal to integrate environmental design, safety, community needs with emerging trends in parks and recreation.
	Opportunities for Enhancement	As Parks and Recreation implements their master plan, opportunities may be identified for open and natural spaces, parks/walking trails, drainage, vegetation, and infrastructure improvements.
Stormwater Management Plan	Purpose	To ensure that water quality standards are being met.
	Responsible Agency	Stormwater Utility
	Hazards	Drought and Flood
	Effect on Mitigation Efforts	Medium. The plan promotes the reuse of groundwater resources through managing pollutants in stormwater runoff.
	Opportunities for Enhancement	Annual review of plan for opportunities for improvement.
Water Conservation Programs	Purpose	To provide the community with resources about water conservation efforts.
	Responsible Agency	Water Utility
	Hazards	Drought and Extreme Heat
	Effect on Mitigation Efforts	Medium. The program promotes water conservation through education, outreach, and the use of technology to reduce water waste.
	Opportunities for Enhancement	Expand use of technology as a tool to provide utility customers real-time data, trends, notifications (alerts) so they can better understand and manage their water usage.

Table 5-10: Town of Oro Valley Codes & Regulations		
Oro Valley Town Code • Chapter 6 - Building • Chapter 7- Streets, Highways, Public Ways- Subdivisions • Chapter 17- Floodplain and Erosion Hazard Management	Purpose	To promote the health, peace, safety, comfort, convenience, and general welfare of the residents within the jurisdictional area of the Town of Oro Valley.
	Responsible Agency	Town of Oro Valley
	Hazards	All
	Effect on Mitigation Efforts	Medium. The Town regularly updates codes to reflect changes in revised international building codes, development, best practices, and trends.
	Opportunities for Enhancement	Continue to update codes as needed to provide the town with modern and needed regulatory tools to mitigate exposure to the impacts of future hazards.
Oro Valley Town Code • Chapter 15 Water Code	Purpose	To promote the health, safety, order, and general welfare of the present and future inhabitants and those served outside of Town boundaries by the Water Utility.
	Responsible Agency	Water Utility
	Hazards	All
	Effect on Mitigation Efforts	Medium. Provides the Water Utility the authority to define water wasting, to enforce the water wasting policies, and establishes fines.
	Opportunities for Enhancement	Implementation of customer education and awareness about the code, possible fines, and benefits to reduce and mitigate water wasting.
Oro Valley Zoning Code • Chapter 27 – General Development Standards • Addendum C, Approved Native Plant List • Addendum A, Design Standards • Addendum D, Hydroseed List • Addendum E, Prohibited Plant List	Purpose	To promote the health, peace, safety, comfort, convenience, and general welfare of the residents within the jurisdictional area of the Town of Oro Valley.
	Responsible Agency	Town of Oro Valley
	Hazards	All
	Effect on Mitigation Efforts	Medium. The Town regularly updates codes to reflect changes in revised international building codes, development, best practices, and trends.
	Opportunities for Enhancement	Continue to update zoning codes as needed to provide the town with modern and needed regulatory tools to mitigate exposure to the impacts of future hazards.

Table 5-11: Town of Oro Valley Financial Resources		
Development and Impact Fees	Purpose	Development fees are one-time payments used to construct system improvements needed to accommodate new development. The fee represents future development's proportionate share of infrastructure costs and may be used for infrastructure improvements or debt service related to infrastructure.
	Responsible Agency	Town of Oro Valley
	Hazards	All
	Effect on Mitigation Efforts	Low. The Town manages the infrastructure improvements plan and development fees per the requirements, noting that improved infrastructure may also have the additional benefit of reducing impacts from hazards.

Table 5-11: Town of Oro Valley Financial Resources		
Town Capital Improvement Program (CIP)	Purpose	As part of the annual fiscal year budgeting and approval process, the capital improvement program may be used to identify and prioritize capital improvement projects.
	Responsible Agency	Town of Oro Valley
	Hazards	All
	Effect on Mitigation Efforts	Low. The Town identifies and completes capital improvement projects (CIP) on an annual basis, noting that certain types of projects may have added benefits of hazard mitigation.
Stormwater Utility Fees	Purpose	ADEQ requires municipalities of less than 100,000 people to implement programs and practices to meet various storm water quality and quantity standards. The fee supports street sweeping, vegetation control, culvert maintenance, minor repairs, and maintenance after storms. It also includes inspections, development of regulations and manuals, studies, and designs supporting mandated storm water activities.
	Responsible Agency	Stormwater Utility
	Hazards	Flooding, Wildfire
	Effect on Mitigation Efforts	High. The Stormwater Utility has an important role in the management of the community's flood risk to include identifying and implementing ways to eliminate, reduce, or minimize flood risks. Mitigation measures completed within stormwater systems also help minimize vegetation and invasive species in certain areas which support efforts to manage risk to wildfire.
Water Utility Enterprise Fund	Purpose	The Water Utility is a self-sustaining water enterprise fund, with revenues supporting and utility activities. The enterprise fund is separate than the general fund, so not supporting or receiving general fund dollars.
	Responsible Agency	Water Utility
	Hazards	All
	Effect on Mitigation Efforts	Medium. The Water Utility has an important role in the management of water resources to include identifying and implementing ways to eliminate, reduce or minimize delivery interruptions. The Utility has a diverse water resource portfolio, stores water for future use, has a robust water production and distribution system, and has a perpetual cycle of capital re-investments to ensure safe and reliable water delivery system.
Partnerships/ Grant Funding/Other	Purpose	To develop and maintain partnerships with other governmental, private, or nongovernmental organizations provide potential opportunities for projects and/or grant funding.
	Responsible Agency	Town of Oro Valley
	Hazards	All
	Effect on Mitigation Efforts	Medium. Partnerships and pursuing grant opportunities as applicable, help support larger projects that may for example involve flood mitigation, roadway and drainage system improvements, water conservation, vegetation management, and other projects that can support mitigation efforts.

Table 5-12: Town of Oro Valley Staff/Personnel Resources	
Department/Agency	**Involvement**
Emergency Management	Primary coordination role of hazard mitigation efforts across all town departments.
Community and Economic Development	Planning, permitting, engineering, inspections, and economic development positions that have knowledge of general plans, building and zoning codes, land use, land development, land management practices, construction practices, and other activities that support hazard mitigation efforts directly or indirectly.
Public Works	Engineers and other professional positions that have knowledge of engineering, construction, stormwater, and floodplain management practices.
Water Utility	Engineers and other professional positions that have knowledge of water conservation, drought plans, engineering, construction, and best practices relating to the management of water infrastructure and systems.
GIS	Knowledge and expertise on available technology, data, and GIS systems that can support hazard mitigation efforts.
Information Technology	Use of technology, asset management systems, and other applications support and manage mitigation efforts.
Police and Fire	Expertise relating to overall life and public safety considerations.
Planning and Zoning Commission	Holds public meetings and makes recommendations to the Town Council on matters relating to the General Plan, zoning code amendments, rezoning, and other land use requests.

Table 5-13: Pascua Yaqui Tribe Programs & Policies		
PYT – Emergency Operations Plan	Purpose	Provides Tribal government authorities, identifies roles and responsibilities, provides a framework for incorporating departments, divisions, and stakeholders.
	Responsible Agency	Office of Emergency Management, Tribal Administration
	Hazards	All
	Effect on Mitigation Efforts	Low. The plan provides a framework for tribal departments and stakeholders to come together to effectively to coordinate response and recovery activities and efforts.
	Opportunities for Enhancement	Updating the EOP is critical to capability building. Continuous education and awareness of the plan for tribal departments, stakeholders, and the public is equally important and will enhance operational coordination. The EOP is a just one component to a family of tribally developed plans to include its THIRA and MJHMP documents that assist with mitigating the community's exposure to the impacts of future hazard events.
PYT – Threat and Hazard Identification and Risk Assessment (THIRA)	Purpose	The Threat and Hazard Identification and Risk Assessment (THIRA) is a three-step risk assessment process that helps communities understand their risks and what they need to do to address those risks.
	Responsible Agency	Office of Emergency Management, supporting tribal departments
	Hazards	Flood, Extreme Heat, Extreme Cold, Wildfire
	Effect on Mitigation Efforts	Medium. The outputs from this process lay the foundation for determining a community's capability gaps.
	Opportunities for Enhancement	The THIRA is a three-step risk assessment completed every three years, as it enables communities to assess year-over-year trends in changes to their capabilities, while still periodically reviewing the capability targets to keep them relevant. Threats and hazards identified in the THIRA will be used to develop exercises and capability building processes for the Tribe.

The Tribe has used the Hazard Mitigation Planning Process to inform other planning efforts, such as an assessment and complimentary planning document for the Tribe's Master Drainage plan, land use plan, etc.

During the planning process of the hazard mitigation plan, the Tribal Local Planning Team utilized the information within its THIRA/SPR to assist with the development of the hazard profiles within the Risk Assessment. The Tribal Local Planning Team created scenarios based on the Tribe's core capabilities to assess which hazard poses a greater risk to its community. The Tribe also integrated the planning process through the Public Assistance Grant Program. In response to COVID-19 Pandemic, the Tribe received a declaration of emergency, which in turn activated categories within the Public Assistant Grant Program.

Table 5-14: Pascua Yaqui Tribe Codes & Regulations		
International Fire Code - 2018 Edition	Purpose	2018 Edition Code Requirements for Inspection updates and new construction.
	Responsible Agency	Fire Department
	Hazards	Wildfire, (Life safety, protection of property)
	Effect on Mitigation Efforts	Strict code ensures construction and occupancies are compliant by establishing criteria for building, processing, design, service, and installation.
	Opportunities for Enhancement	International Fire Code establishes set standards and regulatory tools to mitigate the community's exposure to the impacts of future hazard events. The Tribe is researching / planning updating our Current International Building Codes from 2018 version to the updated 2021 International Building Codes. Enhancing these codes will help ensure more stringent safety updates and will help mitigate damage from adverse weather as well as enhance fire codes.
NFPA Standards	Purpose	Establishes Standards of Practice.
	Responsible Agency	Fire Department
	Hazards	Wildfire, (Life Safety, Protection of property, Protection of land and natural resources)
	Effect on Mitigation Efforts	Data driven provides analysis for best practices to minimize risk to life and property.
	Opportunities for Enhancement	An opportunity for the Tribe to increase its future mitigation efforts is regular updates to the NFPA standards. The Tribe's codes will be updated and will continue to update to model codes with minor amendments. When the codes are amended or updated in their various cycles the Tribe will ensure it has the appropriate people available to consult on changes to make the codes more adapted to the mitigation needs.
Resolution establishing the Pascua Yaqui Office of Emergency Management and enacting Title Two, Part II, Chapter 2-23 the Pascua Yaqui Office of Emergency Management Ordinance **ORD 20-21**	Purpose	To establish the Office of Emergency Management of the Pascua Yaqui Tribe and to provide authorization and guidance for its operations.
	Responsible Agency	Office of Emergency Management, Attorney General's Office
	Hazards	All
	Effect on Mitigation Efforts	Establishes guidance and authorities necessary for the execution of its mission, performance, of its mandated functions.
	Opportunities for Enhancement	The Pascua Yaqui Tribe Office of Emergency Management Ordinance has been integrated to the Pascua Yaqui Code and can be amended and revised as needed by the jurisdiction.

Table 5-15: Pascua Yaqui Tribe Financial Resources		
Community Development Block Grants	Purpose	Supports community development activities to build stronger and more resilient communities. To support community development, activities are identified through an ongoing process.
	Responsible Agency	Grants and Contracts Department; Developmental Services; Housing
	Hazards	All
	Effect on Mitigation Efforts	Activities may address needs such as infrastructure, economic development projects, public facilities installation, community centers, housing rehabilitation, public services, clearance/acquisition, microenterprise assistance, code enforcement, homeowner assistance, etc.
Capital Improvements Project funding	Purpose	Developed based on availability of funds. Rolling 5-year basis.
	Responsible Agency	Developmental Services; Housing Department; Facilities Management
	Hazards	All
	Effect on Mitigation Efforts	Activities may address needs such as infrastructure, public facilities installation, public services, and clearance/acquisition.

Current and past financial sources available to the Tribe for hazard mitigation planning and projects include potential disaster and mitigation funds through FEMA (Public Assistance, HMGP, and PDM funds), programs established through the Indian Self Determination Act (Public Law 93-638), casino and tribal enterprise revenues, and various departmental operation budgets. Other potential sources of funds may include the U.S. Department of Interior (Bureau of Reclamation, Bureau of Indian Affairs, U.S. Geological Survey, Bureau of Land Management), U.S. Army Corps of Engineers, U.S. Housing and Urban Development, U.S. Department of Health and Human Services (Indian Health Service), and the U.S. Department of Agriculture (U.S. Forest Service, Natural Resources Conservation Service), State of Arizona (Governor's Office of Economic Development, Arizona Department of Transportation, Arizona Department of Housing, Arizona Department of Health Services), Pima Association of Governments, and other federal, state and local sources. All grants are tracked through the Grants Department at the Tribe and over 21 departments utilize grant funds of one type or another. While the Tribal Local Planning Team identified federal funding sources for mitigation activities, within the last five-years the Tribe has not been awarded or have received mitigation grant funding.

Tribal Pre- and Post-Disaster Hazard Management

In addition to the tables listed above, the Pascua Yaqui Tribe is required to summarize and evaluate pre- and post-disaster hazard management to satisfy the §201.7 Tribal Planning capability assessment requirements. Accordingly, Table 5-13 summarizes hazard mitigation and pre- and post-disaster hazard management practices and roles that are currently accomplished through several Pascua Yaqui Tribe departments and programs.

Table 5-16: Pascua Yaqui Tribe Staff/Personnel Resources	
Department/Agency	**Involvement**
Emergency Manager	Emergency Management Director – oversees emergency management program and staff.
Grant writer(s)	Tribal Grants/Contracts assists with identifying federal and state grant funding programs related to mitigation.
Office of the Chairman	• General mitigation oversight. • Emergency response oversight. • General development oversight.
Tribal Council	• Final approval for all mitigation and pre-disaster planning, projects and funding allocation for pre- and post-disaster hazard management activities.
Land Department	• Regulates land use and development including zoning and flood management. • Lead planning department for all tribal development including flood control, transportation, and other physical improvements on the reservation.
Fire Department	• Shared emergency management role with Police Department. • Emergency response and mitigation responsibilities regarding fire and HazMat. • Hazmat awareness and operations, but not technical response for removal or clean up. • Wildland fire awareness and operations. • CERT Team collaboration. • Part of the AZ Mutual Aid Compact (AZMAC). • Pima County Fire Chiefs Mutual Aid Agreement. • Pima County Community Wildfire Protection Plan. • Tribal Salt River Region Fuel Management Plan.
Police Department	• Shared emergency management role with Fire Department • Response and mitigation for many of the human-caused hazards related to the civil population and terrorism. • Enforcement of tribal law. • Participates in a regional SWAT team.
Office of Emergency Management	• Responsible for overseeing incidents caused by natural and or man-made disasters or emergencies. • Provide departmental and community education and assistance in conjunction with Emergency Response Organizations in providing services to governmental offices, the community at large and surrounding areas.
Health Department	• Control of disease and outbreak incidents. • Dispensing of medication and anti-viral vaccines through points of distribution and points of dispensing. • Public awareness and public service announcements in collaboration with the local radio station. • Conduct training for hazard related issues and incidents. • CERT Team leadership.
Facilities Department	• Maintain and operate heavy equipment for response to disaster related needs. • Maintain electricians on staff. • Responsibility for emergency shut-off of water mains. • Maintain a 24/7 on-call capability.
Procurement Department	• Emergency and other purchases. • Maintenance of emergency generators.
Indian Health Services – Office of Engineering & Environmental Health	• Emergency response and post-disaster needs assessments for mitigation and recovery.
BIA	• Mutual aid cooperative agreement with PYT for fire response and financial assistance.
Other(s)	• Tribal Public Safety personnel trained in NIMS and ICS, outside consultants

The Pascua Yaqui Tribe has several programs and policies in-place to include a newly established Office of Emergency Management to provide for effective hazard mitigation, as is summarized in the applicable tables. For the 2022 Plan, the Tribe pulled together a Local Planning Team consisting of its Facilities, Housing, Enrollment, Health, Law Enforcement, Procurement, and Land Departments. The Tribal Local Planning Team performed an evaluation/assessment of the information summarized, and noted the following regarding successes, gaps, opportunities and changes over the last planning cycle:

- Regarding pre- and post-disaster hazard management policies, programs, and capabilities, the Tribal Local Planning Team:
  - Identified the ongoing maintenance of its Emergency Operations Plan.
  - Identified processes and practices for coordinated and collaborative capability building to respond to a human-caused event at the AVA entertainment facility and casino.
  - The Tribe's ability to establish and maintain mutual aid agreements and partnerships were proving effective for expanding the response capacity for event taking place within tribal lands.
- Due to the COVID-19 Pandemic there has been no significant change in the Tribe's policies related to development in hazard prone areas over the 2022 planning cycle other than to regulate to the 100-year floodplain using the data and recommendations of the Pascua Yaqui Tribe Flood Control Project.
- Specific hazard management capabilities of the Tribe that have changed since approval of the previous plan include:
  - New BIA, Pima Fire Chiefs Association, PCCWPP, Arizona Mutual Aid Compact and SWAT cooperative/mutual aid agreements have been developed.
  - The Pascua Yaqui Tribe Flood Control Project Plan became available for flood management use. The plan is delivered in phases with completion of phase 2 concluding in October 2016 and activities will continue.
  - Community Emergency Response Team (CERT) collaboration.

Upon receipt of a presidential disaster declaration, the Tribe will work with FEMA to develop two (2) post-disaster hazard management tools:

1) Public Assistance Administration Plan; and
2) Hazard Mitigation Grant Program Administration Plan. Both plans will be used by the Tribe to identify the roles and responsibilities of the Tribe in administering the FEMA Public Assistance (PA) and Hazard Mitigation Grant Programs (HMGP), and to outline staffing requirements and the policies and procedures to be used. As result of developing these plans and revising this Plan, Tribal resources will improve hazard management and mitigation planning.

Table 5-17: Town of Sahuarita Programs & Policies		
2020-2025 Strategic Plan	Purpose	The 2020-2025 Strategic Plan is the Town's strategy of capitalizing on its financial position, organizational effectiveness, community involvement, and geographical location through innovative and managed risk.
	Responsible Agency	Town of Sahuarita – Mayor and Council
	Hazards	All
	Effect on Mitigation Efforts	The Strategic Plan foster an inclusive community with a unique identity where the residents can start, grow, and enjoy life.
	Opportunities for Enhancement	The Strategic Plan is a well-thought out process that will create various opportunities during the different phases as well as within different areas. The Strategic Plan can be improved through the inclusion of multi-hazard mitigation improvements, or multi-hazard mitigation techniques, within any planned Town capital improvement project.

Table 5-18: Town of Sahuarita Codes & Regulations		
Sahuarita Town Code, as amended	Purpose	To provide support and guidance to the present and future growth of the Town of Sahuarita in order to maximize the comfort and sustainability of both health and convenience of the community.
	Responsible Agency	Town of Sahuarita (Planning & Building Safety, Police, Public Works, Green Valley Fire District, Rural/Metro Fire District)
	Hazards	All
	Effect on Mitigation Efforts	Since the Town of Sahuarita is a fairly new community, the code helps minimize and possibly eliminate the potential dangers of hazards.
	Opportunities for Enhancement	Adding to the code as new laws and regulations are adopted and clarifying some of the standards such as those for construction and building will improve the process.
2018 Series of International Codes (Chapter 15.05of the Town Code), as amended 2017 National Electric Code, as amended	Purpose	To provide guidance for safe and acceptable standards for building.
	Responsible Agency	Planning & Building
	Hazards	All
	Effect on Mitigation Efforts	Since the Town of Sahuarita is a fairly new community, the code helps minimize and possibly eliminate the potential dangers of hazards.
	Opportunities for Enhancement	Adding to the code as new laws and regulations are adopted and clarifying some of the standards such as those for construction and building will improve the process.
Floodplain Management Ordinance, as amended Aquifer Protection permit #103602	Purpose	To promote and protect the health, peace, safety, comfort, convenience, and general welfare of the community; to minimize public and private losses due to flooding.
	Responsible Agency	Public Works; Water Reclamation
	Hazards	Flood
	Effect on Mitigation Efforts	The code was recently updated to help with the development along local washes outside of the FEMA Flood Zones.
	Opportunities for Enhancement	Mapping of Local Washes to determine Flood and Erosion Hazard Setback limits can possibly improve planning resources for development along local washes.

Table 5-19: Town of Sahuarita Financial Resources		
Capital Improvement Project Funding	Purpose	To improve upon existing civil infrastructures as well as the construction of new ones to not only promote safety but also meet and exceed national standards.
	Responsible Agency	Public Works
	Hazards	All
	Effect on Mitigation Efforts	Minimizes and possibly eliminates potential hazards by building per standards.
Development Fees	Purpose	To improve upon development around the community by making sure that builders adhere to adopted standards.
	Responsible Agency	Public Works, Planning & Building, Mayor & Council
	Hazards	All
	Effect on Mitigation Efforts	Minimizes and possibly eliminates potential hazards by building per standards.

Table 5-20: Town of Sahuarita Staff/Personnel Resources	
Department/Agency	**Involvement**
Town of Sahuarita Council	The Town of Sahuarita is responsible for developing the Town's Ordinance, Land Use Plan, Master Plan, and Subdivision regulations.
Department Heads	Responsible for planning and development of policies to support hazard mitigation programs and projects.
Town Engineer	Point of Contact to initiate flooding emergency. Reviews plans for flooding mitigation and develops project recommendations to mitigate flooding.
Public Works Department (CIP)	Project design and construction management of infrastructure to minimize flooding
Code Enforcement	Responsible for the enforcement and regulation of the Town's Ordinance, Code, Standards, and Guidelines.
Police and Fire	Expertise relating to overall life and public safety considerations.

Table 5-21: City of Tucson Programs & Policies		
Tucson Floodplain Management Plan (TSMS Phase Va)	Purpose	Tucson Floodplain Management Plan (FMP) identifies unique hazard conditions in the Tucson area and prioritizes action tasks to: a) lower flood and erosion hazard associated costs and b) reduce risks within City of Tucson.
	Responsible Agency	City of Tucson Floodplain Board (Mayor & Council), Floodplain Administration housed in Department of Transportation and Mobility (DTM)
	Hazards	All
	Effect on Mitigation Efforts	High, since it prioritizes action plan tasks and projects, and helps educate and emphasize importance of flood and erosion hazard management, regulating development in regulatory 100-year flood conditions and erosion hazard areas, as well as critical infrastructure in 500-year floodplain.
	Opportunities for Enhancement	Annual updates for the Tucson FMP provide opportunity to assess how action items are being achieved and prioritize action items for that year. Tucson FMP is important to be referenced and utilized when applying for FEMA hazard mitigation grants – projects identified in this adopted plan are given more weight for FEMA grant approval. Floodplain management staff is about 25% of what it used to be about 15 years ago; more certified floodplain managers would increase effectiveness of floodplain management at the City of Tucson and for

Table 5-21: City of Tucson Programs & Policies		
		applying for and managing grant projects. Annual FMP updates occur to reflect current identified needs to address flood and erosion related hazards.
Tucson Levee Manual	Purpose	Provides oversight for levee breach response for the levees impacting the City of Tucson and provides requirements for development of levees, as well as itemized maintenance for classic levees and levee floodwalls.
	Responsible Agency	Tucson PDSD, Tucson Floodplain Administration
	Hazards	Flood
	Effect on Mitigation Efforts	Having a City of Tucson levee manual assists floodplain administration develop specific emergency response plans for impacted areas next to levee and dams.
	Opportunities for Enhancement	Emergency response plans will be customized for each dam and levee during breach conditions that can assist with warning system planning and implementation.
Tucson Green Streets Active Practice Guidelines	Purpose	City of Tucson Green Streets Active Practice Guidelines provides guidance for public right-of-way improvements to incorporate green infrastructure features into Tucson roadways wherever possible.
	Responsible Agency	Tucson DTM Landscaping, Tucson Floodplain Administration, Tucson's City Engineer.
	Hazards	Extreme Heat
	Effect on Mitigation Efforts	Water harvesting provides efficient opportunities to capture storm runoff to irrigate onsite vegetation; and with more trees, less heat island effect.
	Opportunities for Enhancement	The current version needs to be updated to reflect other transportation planning documents and water harvesting regulations.
Drought Preparedness and Response Plan	Purpose	The Plan recognizes that drought impacts do not occur suddenly or without warning and acknowledges that with proper planning and review it is unlikely the community will find itself in an emergency caused solely by drought. It also ensures that Tucson Water staff will implement drought response measures early enough to avoid crisis-mode decision making and to help the community anticipate what measures will come next if drought impacts become more severe.
	Responsible Agency	City of Tucson Water Department – Tucson Water
	Hazards	Extreme Heat
	Effect on Mitigation Efforts	Medium: Diversifying water supplies and increasing water savings has made the Utility more drought resilient, not just now but well into the future. Integrating climate change adaptation into both long range and drought planning will be a key aspect of maintaining our drought resilience. The 2020 update of Tucson Water's drought plan also makes the thresholds for each drought level consistent with the Lake Mead water elevations used for each tier in the DCP.
	Opportunities for Enhancement	Annual review of Plan provides the opportunity to update and align the Plan with changing state and federal policy.
Tucson Water Emergency Response Plan	Purpose	The purpose of the Tucson Water (TW) Emergency Response Plan (ERP) is to protect the health of employees and the public, limit the impact of a crisis on services and resources, and ensure a quick recovery following an emergency. This ERP addresses emergencies that will be managed primarily by TW and describes situations where TW will provide support and cooperation with other agencies (the City of Tucson, Pima County, state, federal, and/or private sector supporting agencies) during large-scale emergencies.
	Responsible Agency	City of Tucson Water Department – Tucson Water

Table 5-21: City of Tucson Programs & Policies		
	Hazards	All
	Effect on Mitigation Efforts	High: The Emergency Response Plan provides Emergency Action Plans or Checklists that serve as procedures to follow for emergency response to individual incidents.
	Opportunities for Enhancement	Conduct risk and resilience assessment of potable distribution system infrastructure, annual review and updating of the Emergency Response Plan, annual tabletop emergency response exercise, EPA certification every five (5) years.
Tucson One Water 2100 Master Plan	Purpose	The Tucson One Water 2100 Master Plan is an integrated planning and implementation approach to managing finite water resources for long-term resilience and reliability, meeting both community and ecosystem needs.
	Responsible Agency	City of Tucson Water Department – Tucson Water
	Hazards	All
	Effect on Mitigation Efforts	High: The Tucson One Water 2100 Master Plan provides strategic planning and technical guidance that encompasses all water sources in long term mitigation planning.
	Opportunities for Enhancement	Technical memorandums provide direction on improving mitigation strategies to protect water sources from hazards that affect the water system.
Heat advisory protocol	Purpose	Parks and Recreation has numerous employees who spend a significant amount of time working outdoors all day. To ensure the safety of employees, a heat advisory protocol has been developed to define when employees will be restricted from working outdoors.
	Responsible Agency	Tucson Parks and Recreation
	Hazards	Extreme heat
	Effect on Mitigation Efforts	High. When the defined heat index elements are met, employees are moved to indoor activities.
	Opportunities for Enhancement	The City of Tucson Parks and Recreation will review the protocol on an annual basis to evaluate the effectiveness.
Heat advisory	Purpose	To open up recreation centers as cooling stations for citizens during periods of excess heat conditions.
	Responsible Agency	Tucson Parks and Recreation
	Hazards	Extreme heat
	Effect on Mitigation Efforts	High. Actions allow citizens access to cool indoor spaces.
	Opportunities for Enhancement	The City of Tucson Parks and Recreation will review the protocol on an annual basis to evaluate the effectiveness.
Cold weather protocols	Purpose	To protect park property and assets from freezing conditions. When freezing conditions are forecast, staff cover back flow valves and shut off drinking fountains to prevent freezing and broken pipes.
	Responsible Agency	Tucson Parks and Recreation
	Hazards	Extreme cold
	Effect on Mitigation Efforts	High. Actions prevent broken water pipes and preserve property.
	Opportunities for Enhancement	The City of Tucson Parks and Recreation will review the protocol on an annual basis to evaluate the effectiveness.
Plan Tucson	Purpose	Plan Tucson provides the Mayor and Council's expected focus and goals as the City of Tucson General & Sustainability Plan.
	Responsible Agency	All Tucson departments
	Hazards	All
	Effect on Mitigation Efforts	Provides City projects consistency in following Mayor and Council directives and ensures projects consider sustainable approaches, such

Table 5-21: City of Tucson Programs & Policies		
		as: reduces potential harm to life and property in natural hazard areas and from hazards resulting from human activities and development through preventive measures; rehabilitates and enhances natural drainage systems, water detention and retention basins, and other infiltration areas for multiple benefits, such as recreation, wildlife habitat, and stormwater management; protects groundwater, surface water, and stormwater from contamination; and creates, preserves, and manages biologically rich, connected open space; wildlife and plant habitat; and wildlife corridors, including natural washes and pockets of native vegetation, while working to eradicate invasive species.
	Opportunities for Enhancement	Refresher training for staff and revisiting the plan periodically (every 5 years), and including Floodplain Administration input, helps to ensure the plan's goals are applied to City drainage improvement projects.
Tucson GSI Program	Purpose	Since May 1, 2020, a new Green Stormwater Infrastructure fee was included on utility services statements for residents and businesses within the City of Tucson, generating $3 million each year to build and maintain projects throughout the city that capture stormwater runoff from public streets and parking lots, and divert it into vegetated water harvesting areas. GSI Program: provides a funding source for existing GSI maintenance and growing more trees and plants on streets, and in parks and public areas using stormwater runoff as a primary water source; reduces stormwater pollution; shade and cool streets, sidewalks, bikeways, and parking areas; reduces costs for needed underground storm drain systems.
	Responsible Agency	Tucson Water, Tucson DTM (Stormwater)
	Hazards	Extreme Heat
	Effect on Mitigation Efforts	Green infrastructure projects that include water harvesting provides efficient opportunities to capture storm runoff to irrigate onsite vegetation; and with more trees, less heat island effect.
	Opportunities for Enhancement	Tucson Water is working with other Tucson departments including PDSD, DTM, Stormwater Management / Floodplain Administration to identify ways to ensure an efficient sub-program for drainage facility maintenance is utilized.
Tucson Stormwater Management Program	Purpose	Funded primarily by Tucson DTM, Stormwater Management Program is an oversight program that prepares the annual report to Arizona Department of Environmental Quality (ADEQ) and collects stormwater management data from all City departments regarding their department's stormwater activities and responsibilities. Prior to the GSI fee, a stormwater fee is being used to help fund City of Tucson Stormwater Management, providing approximately $190,000 per year to the program managed by staff in Tucson DTM. Stormwater Management Program complies with the Municipal Separate Stormwater Sewer System MS4 Phase 1 ADEQ permit and complies with EPA Clean Water Act.
	Responsible Agency	Tucson DTM oversight for all departments.
	Hazards	Flood
	Effect on Mitigation Efforts	With the high density of potable wells (both private and public) within the City of Tucson area, the Tucson Stormwater Management program helps to protect the surface water quality, thereby also protecting Tucson's groundwater quality. The program covers illicit discharge inspections and resolution, industrial/commercial

Table 5-21: City of Tucson Programs & Policies		
		inspections, first flush sampling, annual reporting, and other tasks that support clean surface runoff.
	Opportunities for Enhancement	Standardized stormwater pollution prevention plan boiler plate for the City of Tucson could be created to help facilitate private and public development project grading plan submittals. The ordinance readability could be improved; ordinance enforcement could be clarified/enhanced and written to correlate with associated ADEQ issued MS4 permit. The use of Corrective Action Plans for addressing stormwater issues could be written under technical standards for better implementation of stormwater compliance request/response.
Tucson Stormwater Management Study	Purpose	Tucson Stormwater Management Study (TSMS) is the adopted original highly comprehensive floodplain management plan for the City of Tucson. Tucson reports annually and every five years to FEMA and ADWR on flood and erosion hazard mitigation and regulatory compliance to the City's adopted flood and erosion hazard management regulations. In 2016, TSMS Phase V was adopted after public input in 5 stakeholder meetings as the updated Tucson Floodplain Management Plan. The latest Tucson FMP was adopted in 2020, as TSMS Phase Va. Annual public meetings occur for annual updates.
	Responsible Agency	Tucson DTM Floodplain Administration oversees floodplain and erosion hazard management code compliance for all departments. Planning and Development Services Department (PDSD) applies TSMS regulations for private development review. DTM applies TSMS regulations for public stormdrain system, public properties and right-of-way.
	Hazards	Flood and Erosion
	Effect on Mitigation Efforts	Reduce flood and erosion hazard risk and reduction of flood insurance costs to the City of Tucson property owners that have a flood insurance policy. Also, this plan provides oversight to NFIP activities by annual and 5-year certification processes.
	Opportunities for Enhancement	The flood warning & response activity is identified for additional work for flood warning systems as it pertains to: upgrading/maintaining automated wash crossing systems; dam and levee breach hazards as well as obtaining additional rain gauges and stream sensors for flood stage data that can assist with warning systems. There is an opportunity for increased funding for flood and erosion hazard projects throughout the City. Floodplain management planning activities have additional effort opportunities that include: when reviewing annual FMP action items – with more staff and funding, more action items can be addressed

Table 5-22: City of Tucson Codes & Regulations		
Tucson Unified Development Code – Environmental Resource Zone (ERZ Overlay)	Purpose	ERZ Overlay code restricts disturbance within the 100-year flood limits to only necessary access, necessary utilities (that cross perpendicular to flow and are set below scour depth, protected against scour), bike paths and trails. The remaining 100-year floodplain is to be kept undisturbed (other than under modification request for up to 5% additional disturbance).
	Responsible Agency	Tucson Floodplain Administration, PDSD, Tucson DTM (for project review, inspections)
	Hazards	Flood

Table 5-22: City of Tucson Codes & Regulations		
	Effect on Mitigation Efforts	Natural function floodplain lowers flood and erosion hazard risks.
	Opportunities for Enhancement	City staff may benefit from periodic refresher training assuring all reviewers are familiar with existing code and understand how to apply codes.
Tucson Watercourse Amenities, Safety Habitat (W.A.S.H. Ordinance: Tucson Code Chapter 29 Article VIII)	Purpose	W.A.S.H. Ordinance protects the riparian floodplain within the area fifty feet from top of back on designated watercourses. Purpose per code: (a) Maximize opportunities for groundwater recharge through the preservation of specific washes with earthen channels and banks; (b) Protect existing vegetation found within and near specific washes; (c) Provide for the restoration of vegetation disturbed as a result of development in and adjacent to specific washes. (d) Assist in the reduction of the urban heat island effect by retaining existing vegetation and minimizing structural improvement of urban washes.
	Responsible Agency	Tucson Floodplain Administration, PDSD.
	Hazards	Extreme Heat and flood
	Effect on Mitigation Efforts	By protecting the riparian floodplain, flood risks are reduced and all or portion of required erosion hazard setbacks are provided using natural floodplain function of the riparian area. Increased natural vegetation helps reduce heat island effect.
	Opportunities for Enhancement	Currently, development projects are asked to have the riparian floodplain within the W.A.S.H. Study Area to remain as is, even when there is opportunity to add additional trees / vegetation. Since one of the intents of the W.A.S.H. Ordinance is to provide for the restoration of vegetation disturbed as a result of development in and adjacent to specific washes, additional guidelines or technical standards could be provided to clarify specifically how enhancement of 50-foot study area can be augmented with additional trees and vegetation to increase erosion protection potential as well as increase potential to lessen heat island effect.
Tucson Technical Standards Section 4-01	Purpose	Technical Standards 4-01: Commercial Rainwater Harvesting standards reduce dependency on potable and reclaimed water sources by providing regulations for development water harvesting requirements.
	Responsible Agency	Tucson PDSD, Tucson Water, Tucson Floodplain Administration
	Hazards	Extreme Heat
	Effect on Mitigation Efforts	Water harvesting provides efficient opportunities to capture storm runoff to irrigate onsite vegetation; and with more trees, less heat island effect.
	Opportunities for Enhancement	Periodic training for staff reviewers and providing training to development consultants could improve the ease of use of these standards. Water harvesting requirements for site plans can be more comprehensive than standard retention/detention basin volume requirements; an easier procedure for preparing water harvesting plans would benefit the development community.
Tucson Technical Standards Section 4-02	Purpose	Technical Standards 4-02 provides development review procedures for projects that have requirements under Tucson Code Article 1, Division 1, Floodplain and Hazard Area Regulations, Chapter 26, Tucson Code; Article VIII, Watercourse Amenities, Safety and Habitat (WASH), Chapter 29, Tucson Code; and Section 5.7, Environmental Resource Zone (ERZ), Unified Development Code (UDC), Chapter 23, all of the Tucson Code.
	Responsible Agency	Tucson PDSD, Tucson Floodplain Administration

Table 5-22: City of Tucson Codes & Regulations		
	Hazards	Flood
	Effect on Mitigation Efforts	Helps reviewers and development community apply the ERZ code and W.A.S.H Ordinance so that all designated W.A.S.H. and ERZ watercourses (Proposed, TSMS and Regulated designations) meet mitigation efforts by protecting riparian floodplain to lessen flood and erosion hazard risks and heat island effect.
	Opportunities for Enhancement	Refresher training for review staff to become more familiar with existing regulations and better understand how to apply codes.
Tucson Technical Standards Section 4-03	Purpose	Technical Standards 4-03: Detention and retention standards
	Responsible Agency	Tucson PDSD, Tucson Floodplain Administration
	Hazards	Flood
	Effect on Mitigation Efforts	Within the critical watershed management areas, a minimum 15% reduction in runoff flowrates from pre-developed conditions for 2-year, 10-year and 100-year storm events shall be achieved for development projects. In balanced watershed management areas, pre-developed conditions shall be achieved. In no case shall adverse impacts occur and post-developed flowrates shall be at or less than pre-developed conditions. These requirements which have been in place for several decades lessen the impact of flooding from new development.
	Opportunities for Enhancement	Considerations need to be identified for pumps and dry wells as these features have not been effective forms for infiltration in the City due to the unique soils in the City limits. Further education of staff and the public about the sustainable approach of detention is needed.
Tucson Technical Standards Section 4-04	Purpose	Technical Standards 4-04: City of Tucson Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona is a comprehensive drainage manual used by other jurisdictions. The manual covers flood peak calculations, drainage maintenance, erosion hazard setbacks, conduit and open channel design, bridge and scour depth requirements, and other drainage standards for preparing drainage reporting documents for public and private development.
	Responsible Agency	Tucson PDSD, Tucson Floodplain Administration
	Hazards	Flood
	Effect on Mitigation Efforts	High. Due to the comprehensive coverage of regulations, the manual is effective at covering all types of development requirements.
	Opportunities for Enhancement	Refresher training for review staff is needed.
Tucson Code Chapter 11 (Sections 58-63)	Purpose	Like Tucson's flood and erosion hazard management code (Chapter 26, Article I), this section of the Tucson Code (Section 11-58) provides restriction for storm drain systems making it illegal to deposit offensive matter, soapy water, sewerage, clothing washing wastewater, etc., or cause diversions or obstructions to rainwater runoff. Tucson Code Section 11-59 through 63 augments section 58 by explaining the duty to clean watercourses by property owner, issuing notices of violations and defines penalties.
	Responsible Agency	Tucson departments: Code Enforcement, DTM, PDSD, Tucson Floodplain Administration
	Hazards	Flood
	Effect on Mitigation Efforts	Provide legal reference for enforcing regulations that protect watercourses from illegal dumping, obstructions, diversions, and other adverse impacts. Enforcement of this code helps to improve surface and groundwater quality thereby improving water quality of public and private potable water wells.

Table 5-22: City of Tucson Codes & Regulations		
	Opportunities for Enhancement	Opportunities include: more staff and refresher training for Code Enforcement, Stormwater Management (Illicit Discharge and Elimination subprogram) by Floodplain Administration
Tucson Code Chapter 26 Article II	Purpose	City if Tucson has its own Stormwater Ordinance that provides regulations pertaining to surface water quality and complies with ADEQ, EPA Clean Water Act regulations.
	Responsible Agency	Tucson DTM, Engineering Division, Stormwater Management
	Hazards	Flood
	Effect on Mitigation Efforts	With the high density of potable wells (both private and public) within the City of Tucson area, the Tucson Stormwater Ordinance helps to protect the surface water quality, thereby also protecting Tucson's groundwater quality.
	Opportunities for Enhancement	Standardized stormwater pollution prevention plan boiler plate for the City of Tucson could be created to help facilitate private and public development project grading plan submittals. The ordinance readability could be improved; ordinance enforcement could be clarified/enhanced and written to correlate with associated ADEQ issued MS4 permit. The use of Corrective Action Plans for addressing stormwater issues could be written under technical standards for better implementation of stormwater compliance request/response.
Tucson Flood and Erosion Hazard Management Ordinance (Tucson Code Chapter 26 Article I)	Purpose	City of Tucson's floodplain ordinance provides regulations for the safe conveyance of floodwaters, to promote and protect the health, peace, safety, comfort, convenience, and general welfare of the residents within the jurisdictional area of City of Tucson, Arizona; to minimize public and private losses due to flooding and erosion hazards; and to enable its residents to participate in the National Flood Insurance Program (NFIP), receive federal disaster assistance, obtain flood insurance, and reduce the cost of flood insurance.
	Responsible Agency	City of Tucson Floodplain Board (Mayor & Council), Tucson Floodplain Administrator
	Hazards	Flood
	Effect on Mitigation Efforts	High. This code was recently updated January 2021, to reflect the changes of development within the City that are increasingly using more erosion and flood prone properties for development; updated code lessens development risk in the erosion hazard setback at top of bank of regional watercourses in the City limits. This code also assists in regulating utility work, building construction, and grading within flood prone areas, as well as defines requirements for Critical Facilities.
	Opportunities for Enhancement	City of Tucson continues to review and update the ordinance, last time being ins 2020. The City of Tucson intends to continue to update the ordinance to provide a higher standards for flood and erosion hazard management to ensure the ordinances is within guidelines of the NFIP updates.
Community Water System Planning and Reporting Requirements: A.R.S. §45-342	Purpose	Community Water Systems are required to complete annual water-use reports and system water plans. These requirements are part of a larger set of recommendations made by the Governor's Drought Task Force in 2005. The reports and plans are intended to reduce Community Water Systems' vulnerability to drought and ensure that water providers are prepared to respond to drought or water shortage conditions.
	Responsible Agency	Arizona Department of Water Resources
	Hazards	Extreme Heat

Table 5-22: City of Tucson Codes & Regulations		
	Effect on Mitigation Efforts	High: Reduction of Community Water Systems' vulnerability to drought and ensures that water providers are prepared to respond to drought or water shortage conditions.
	Opportunities for Enhancement	Mayor and Council review and approve updates to the Drought Plan Preparedness and Response Plan annually. The reviews are utilized to further increase mitigation efforts by rolling the drought plan up into the One Water 2100 master plan. All of the response measure/mitigation actions listed in the drought plan will go through a public engagement process and M&C review as the One Water 2100 master plan is developed.
America's Water Infrastructure Act of 2018 (AWIA) Section 2013	Purpose	Section 2013 of America's Water Infrastructure Act of 2018 (AWIA) requires community water systems1 that serve more than 3,300 people to complete a risk and resilience assessment and develop an emergency response plan.
	Responsible Agency	Environmental Protection Agency (EPA)
	Hazards	All
	Effect on Mitigation Efforts	High: AWIA provides specific emergency response guidance for all hazards
	Opportunities for Enhancement	Incorporating updates from EPA to the Emergency Response Plan and the Risk and Resiliency Assessment tool.

Table 5-23: City of Tucson Financial Resources		
FEMA grants	Purpose	To support the flood & erosion hazard mitigation projects.
	Responsible Agency	Tucson's Department of Transportation & Mobility (DTM) Floodplain Administration working with City Emergency Management staff in Tucson Fire Department (TFD), Business Services, and other City staff.
	Hazards	Flood, Drought, Extreme Heat, Severe Wind, and Wildfire
	Effect on Mitigation Efforts	Grants are the only resource at this time for funding the construction of flood / erosion hazard mitigation projects, aside from using limited other resources such as City's general fund, Army Corps of Engineer projects, and county flood control district projects. If DEMA/ FEMA awards the grant, then projects can improve safety and lower risks and costs associated with flood and erosion hazards.
Water Conservation Fund	Purpose	To offer Tucson Water customers high-quality conservation and education programs and robust efficiency incentives.
	Responsible Agency	City of Tucson Water Department – Tucson Water
	Hazards	Drought
	Effect on Mitigation Efforts	Medium: Conservation of potable water through multiple incentive and educational program.
Impact fees for homebuyers or new development/homes	Purpose	For new developments inside impact fee area-zones only. The impact fees are charged to new developments.
	Responsible Agency	Planning and Development
	Hazards	Flood and Erosion
	Effect on Mitigation Efforts	To support the flood & erosion hazard mitigation projects.
Capital Improvement Project Funding	Purpose	A Capital Improvement Plan (CIP) is a community planning and fiscal management tool used to coordinate the location, timing, and financing of capital improvements over a five-year period. Capital improvements refer to major, non-recurring physical expenditures such as land, buildings, public infrastructure, and equipment, all with a cost of $100,000 or more. The CIP is necessary to improve public facilities

Table 5-23: City of Tucson Financial Resources		
		and infrastructure assets for the economic, aesthetic, and functional viability to our City. The plan identifies our City's specific capital needs based on various long-range plans, goals, and policies and also provides analysis for decision making for City officials and strategic capital planning efforts with City departments.
	Responsible Agency	City of Tucson, Office of Budget
	Hazards	Flood
	Effect on Mitigation Efforts	To support the flood & erosion hazard mitigation projects.

Table 5-24: City of Tucson Staff/Personnel Resources	
Department/Agency	**Involvement**
City of Tucson Engineering Division staff (PDSD & DTM)	City of Tucson Floodplain Administration is responsible for: FEMA map revision review/approval; Flood/Erosion data management and map updates; Customer service/floodplain information; Drainage complaints and enforcement; Notices of Violations and variances; Public drainage infrastructure inspection; Public drainage infrastructure maintenance; Public outreach (on floodplain issues); CRS Coordinator activities; Grant writing and management. PDSD staff is responsible for the following floodplain management tasks: Development Review in flood and erosion hazard areas (subdivisions, commercial development, etc.); Managing and processing single-lot floodplain permits; FEMA map review for private development; Customer service/floodplain information; Drainage complaints and enforcement for private property; and Private drainage infrastructure inspections. City of Tucson Floodplain Administrator (also performing responsibilities of City Engineer and Engineering Administrator) and Community Rating System (CRS) Coordinator (Civil Engineer for floodplain and stormwater management) are positions located in DTM. Currently, two Planning and Development Services Department (PDSD) engineering division reviewers (used to be 8 reviewers about 15 years ago), and three DTM engineering division reviewers (with one of those as the primary reviewer, there used to be over 4 civil engineers in transportation department providing floodplain management about 15 years ago as well as several stormwater management engineers. Of those 3 engineers, there are two Certified Floodplain Managers in the City of Tucson (in DTM). The city floodplain management is understaffed; more certified floodplain managers would increase effectiveness of floodplain management plan action items and CRS tasks at the City of Tucson and increase effectiveness for applying for and managing grant projects.
Project Manager	Update the Hazard Mitigation Plan, Capability Assessment and Mitigation Strategies forms.
Lead Planner	Complete the One Water 2100 Master Plan
Water Conservation Staff	Fund, manage, and promote the water efficiency rebate programs, and the Zanjero residential water audit program; Participate, promote, and sponsor the SmartScape program in partnership with the University of Arizona Cooperative Extension; Review and update the City of Tucson Department Drought Preparedness and Response Plan.
Incident Management Team	Emergency response management to all hazardous incidents following the Emergency Response Plan's Emergency Action Plans/Checklists
Water Maintenance and Water Quality & Operations Staff	Emergency response in the field to all hazardous incidents following the Emergency Response Plan's Emergency Action Plans.
City of Tucson Park and Recreation Staff	Positions most likely impacted by hazard mitigation are: • Project managers while designing parks • Park supervisors during events • Recreation center supervisors during events • All management/leadership staff while drafting new policies and procedures

Table 5-24: City of Tucson Staff/Personnel Resources	
Department/Agency	**Involvement**
City of Tucson, City Council	City of Tucson in effort to address climate change has declared a climate action plan in efforts to be carbon neutral by 2030. The climate emergency actions plan will work with other departments in efforts to address different natural hazards, which are result of carbon emission to include extreme heat, which is reflected in Tucson City Policy and Codes.

5.4 Mitigation Measures

The process for defining the list of mitigation measures for the Plan was accomplished in three steps. First, an assessment of the actions and projects specified in the 2017 plan was performed. Second, a new list of measures for was developed by combining the carry forward results from the assessment with new measures. Third, an implementation strategy for the combined list of measures was formulated.

Previous Mitigation Measures/Projects Assessment

The Planning Team and Local Planning Team for each jurisdiction reviewed and assessed the actions and projects listed in the Mitigation Strategy section of the 2017 Plan. Any measure with a disposition classification of "Keep" or "Revise" was carried forward to become part of the measure list for the 2022 Plan. All measures identified as "Delete" were removed and are not carried forward in this Plan. The results of the assessment for each of the 2017 Plan measures is summarized by jurisdiction in Appendix A.

New Mitigation Measures

Upon completion of the assessment, each jurisdiction's LPT developed new measures using the 2022 goals and objectives, results of the vulnerability analysis and capability assessment, and the planning team's institutional knowledge of hazard mitigation needs in the community.

For each measure, the following elements were identified:

- **Description**
- **Hazard(s) Mitigated**
- **Estimated Cost**
- **Anticipated Completion Date**
- **Lead Agency**
- **Potential Funding Source**
- **Priority Ranking** – each measures was assigned a priority ranking of either "High", "Medium", or "Low". The assignments were subjectively made using a simple process that assessed how well the measure satisfied the following considerations:
    - A favorable benefit versus cost evaluation, wherein the perceived direct and indirect benefits outweighed the project cost.
    - A direct beneficial impact on the ability to protect life and property from natural hazards.
    - A mitigation solution with long-term effectiveness

  Tables 5-20 through 5-25 summarize the current mitigation activities and implementation strategy for each participating Plan jurisdiction

Table 5-25: Mitigation Measures for Unincorporated Pima County

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Continue to identify vulnerable populations for heat related illness, provide education targeted toward recreational activities, visitors/travelers, hospitality industry, homeless populations, and build cooling center capacity.	Extreme Heat	$100,000	Ongoing	PCHD, PCOEM, PCOSC	Mitigation Grants, Public Health Emergency Preparedness, BRACE	High
Building Resilience Against Climate Effects (BRACE) with support from the Arizona Department of Health Services ADHS to help prevent HRI	Extreme Heat	$10,000	Ongoing	PCHD	PCHD, Parks and Rec, University of Arizona, ADHS	High
Enforce Flood & Erosion Hazard Ordinance in accordance with the NFIP.	Flood	$1.2M	Ongoing	PCRFCD	Flood Control Tax Levy	High
Implement NFIP tasks such as LOMR submittals, maintaining a countywide map repository, performing master drainage studies, and coordinating to ensure the digital map is correct. Also included is post fire inundation area mapping studies including land and vegetation cover change and hydrology studies.	Flood	$600,000	Ongoing	PCRFCD	Flood Control Tax Levy	High
Provide flood risk mitigation through Capital Improvement Projects (CIP). Also included is maintenance and structural improvements to address post fire flood future conditions.	Flood	$8.0M	Ongoing	PCRDFD	Flood Control Tax Levy, USACOE, & FEMA PF-HGMP	High
Participate in Community Rating System to reduce insurance premiums.	Flood	$50,000	Ongoing	PCRFCD	Flood Control Tax Levy	
Cañada del Oro Levee Augmentation	Flood Wildfire	$2,308,604	2023	PCRFCD	PF-HGMP and Levy	High
Finger Rock Wash Critical Infrastructure Protection	Flood Wildfire	$2,630,000	2023	PCRFCD/PCDOT	PF-HGMP and Levy	High
Post Fire Flood Studies	Flood Wildfire	$350,000	2022	PCRFCD/NFS	PF-HGMP and Levy	High
Participate in coordination of water resiliency efforts through regional coordination of retention, recharge and beneficial use of stormwater.	Flood Drought	$4B	2025	PCRFCD	Water Recharge District	High
Implement the Drought Management Plan. If drought conditions worsen, the Board of Supervisors may consider increasing the drought stage that will trigger drought conservation measures.	Drought	Staff Time	Ongoing	OSC-Water Resources Unit	General Fund and RWRD Enterprise Fund	Medium

Table 5-25: Mitigation Measures for Unincorporated Pima County

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Identify and mitigate the risk of loss of treatment functionality due to All-hazards loss of power from the main utility grid at Tres Rios WRF through the creation of an internal, non-exporting facility microgrid utilizing existing solar resources and implementation of a back-up generator system.	All	$3M	Ongoing	RWRD	DOD-USACE	High
Mitigate effects of local area flooding due to monsoonal rain at the Avra Valley WRF facility, which prevents entry/exit to the facility.	Flooding	$3M	Ongoing	DOT, RFCD, RWRD	DOD-USACE	Medium
Mitigate bank protection breach resulting from local flash erosion event at the Schulte Pit Bank.	Flash Erosion	$750,000	Ongoing	RWRD	TBD	High
Treat soil surfaces with appropriate stabilization materials and vegetation control to reduce blowing dust.	Severe Wind	$2,000,000	Ongoing	PCDOT	Highway User Revenue Funds, Local Regional Transportation Authority Funds	Medium
Provide links on the Pima County Office of Emergency Management Website to sources of hazard mitigation educational materials encouraging private citizens to be prepared for hazard emergencies.	All	Staff Time	Ongoing	PCOEM	General Fund	Low
Promote wildfire awareness and education in the community through the use of website, social media, and printed materials. Awareness combined with education helps to reduce the risk of accidental human ignitions.	Wildfire	Staff Time	Ongoing	PCOEM	General Fund Grants	Low
Educate public officials on the need of the mitigation plan.	All	Staff Time	Ongoing	PCOEM	General Fund Grants	Medium
Work with jurisdictions, fire department/districts to update the Community Wildfire Protection Plan (CWPP). The CWPP identifies actions that will reduce the risk of wildfires tocommunities within wildland-urban interface zones.	Wildfire	60K Staff Time	2023-2024	PCOEM	General Fund Grants	Medium
South Houghton Road Widening Project - Widen from 2 lanes to 4 lanes with drainage improvements.	Flood	$30M	2022	PCDOT	Impact Fees	High
Kolb Road, Sabino Canyon to Sunrise Drive - Widen from 2 lanes to 3 lanes with drainage improvements.	Flood	$19.5M	2022	PCDOT	1997 HURF Bonds	High

Table 5-25: Mitigation Measures for Unincorporated Pima County

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Sahuarita Road and Wilmot Road Intersection - Traffic signal, turn lanes and drainage improvements.	Flood	$3M	2022	PCDOT	Pima County	High
Sunset Road, I-10 to River Road - New road and bridge over the Rillito River connecting Sunset Road west of I-10 to River Road.	Flood	$34.9M	2024	PCDOT	RTA	High
Buffelgrass and other Fire-Prone Invasive Species Mitigation – identify public outreach opportunities including pamphlets, community event participation, media outreach.	Wildfire	$5,000 Staff Time	Ongoing	PCOEM, PCNRPR	General Fund Grants	High
Buffelgrass and other Fire-Prone Invasive Species Mitigation – locate county areas for mitigation of fire-prone invasive species and administer grant funding for ongoing activities related to wildfire reduction through removal and reduction.	Wildfire, Flood	3M	Ongoing	PCNRPR, PCRFCD, PCDOT	Grants including BRIC, PF-HMGP and AZ-DFFM	High
Post-Fire Mitigation on Pima County Parks, Ranches, and Open Space - allows for livestock management ensuring rest/recovery for burned areas; replacing important watershed vegetation cover, mitigating floods, and dust impacts from high winds	Wildfire, Flood	$1M	Ongoing	PCNRPR	Grants including AZ-DFFM and FEMA Grants	High

Table 5-26: Mitigation Measures for Marana

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
LPR – update to Town floodplain code, implementing higher standards than FEMA requirements	Flood	No cost	4/2022	Keith Brann/ Town Engineering	Not required	High
SIP-reconstruction of phase 1 of Tangerine Road	Flood	$60.6M	Completed in 2019	Tom Houle/ Town Engineering	Town construction sales tax, impact fees, RTA, HURF, partner jurisdictions	Low
SIP-reconstruction of phase 2A of Tangerine Road	Flood	$25M	Winter 2024	Tom Houle/ Town Engineering	Town construction sales tax, impact fees, RTA, State AZ general funding	High
SIP-reconstruction of Twin Peaks Road over Rattlesnake Pass	Flood	$20M	Summer 2023	Tom Houle/ Town Engineering	Town construction sales tax, impact fees, developer funding	High
SIP-Adonis Road extension	Flood	$5M	Completed in 2020	Tom Houle/ Town Engineering	Town construction sales tax, developer funding	Low
SIP – De Anza subdivision interception channel improvements/LOMR	Flood	$304,298	Completed in 2021	Developer	Developer funded	Low
EAP-floodplain outreach information pamphlets to citizens living in the FEMA floodplain	Flood	$500	Completed fall 2021	Gus Myers/ Town Engineering	Town General funding	Low
NSP-Invasive Vegetation Pulls in the Tortolita Mountain Range	Wildfire	Employee time	Ongoing & Seasonal	Mary Grodman/ Parks and Recreation	Town General Funding	Low
NSP-Invasive vegetation removal along I-10	Wildfire	Employee time	Ongoing and Seasonal	Parks and Recreation	Town General Funding	Low

Table 5-26: Mitigation Measures for Marana

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
LPR) The Town of Marana Public Works Department has prepared a Storm Preparedness Plan and designated staff to certain areas throughout the Town for response and recovery following extreme flood events. The plan contains many elements and functions that are designated to work cohesively and seamlessly during flood events. Crews patrol the major streets and drainage channels to identify possible trouble conditions and make the necessary corrections in the shortest time possible. The Public Works Director is contacted directly for the inspection and possible closure of Town bridge structures during storm events.	Flood	Employee and equipment time	Ongoing and Seasonal	Public Works Team	Town General and HURF Funds	High
(SIP) Orange Grove Underpass Sump Pump Station Alert System. The sump pump is inspected periodically to ensure effective operations during storm events. The sump pump contains an alert system where malfunctions are reported to Streets and Traffic staff for quick response and barricading.	Flood	$10,000 Annual Contractor Services	Ongoing Annual	Public Works Supervisors	Town HURF Funds	Medium
(SIP) Annual Culvert Maintenance Program. Streets staff and contractor forces remove silt and debris from culverts and washes to improve storm water carrying capacity.	Flood	$50,000 Annual Contractor Services	Ongoing Annual	Public Works Team	Town HURF Funds	Medium
SIP) National Bridge Inspection Program. Every Town bridge is inspected by ADOT once every two years to ensure the bridges are structurally sound and to identify any flaws, defects, or potential problem areas that may require maintenance. The overall goal is to identify issues early, before they develop into problems. Streets staff follow up and schedule the required maintenance.	Flood	$10,000 Annual In-house / Contractor Services	Ongoing Annual	Public Works	Town HURF Funds	Low

Table 5-27: Mitigation Measures for Town of Oro Valley

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Install generator auto transfer switch to provide backup power to countryside service area in the event of power outage caused by any hazard.	All	$50,000	June 30, 2022	Oro Valley Water Utility	Oro Valley Water Utility Enterprise Fund	Medium
Develop and implement stormwater harvesting criteria design standards.	All	Staff Time	June 30, 2025	Stormwater Utility	Stormwater Utility	Medium
Incorporate hazard mitigation strategies into the General Plan and prioritized in the Strategic Leadership Plan.	All	$150,000	November 2026	Community and Economic Development	Community and Economic Development Department Budget	Low
Continue to update zoning codes as needed to provide the town with modern and needed regulatory tools to mitigate exposure to the impacts of future hazards.	All	Staff Time	December 2027	Community and Economic Development	Community and Economic Development Department Budget	Low
Identify and implement mitigation projects to reduce, minimize, and manage invasive vegetation found in parks, trails, and golf courses.	Wildfire	Staff and Volunteer Time	June 30, 2027	Parks and Recreation	Parks and Recreation Department Budget	Low
Mitigate and stabilize areas damaged by storm related activity in the Gravel Pit Wash Channel downstream of Lambert Lane by reconstructing 500 linear feet of channel bottom, and mitigate side slope to protect public and private property, public infrastructure and utilities from additional damage. Outlet improvements to the wash will be put in place to mitigate long term channel scour.	Flood	$800,000	July 30, 2023	Stormwater Utility	Pima County Regional Flood Control District and Town CIP	High
Identifying regulatory floodplain boundaries to help mitigate potential impacts from flooding.	Flood	Staff Time	June 30, 2027	Stormwater Utility	Stormwater Utility	Medium
Analyze NFIP CRS program for potential adoption and develop plan for future implementation.	Flood	Staff Time	June 30, 2024	Stormwater Utility	Stormwater Utility	Low
Partner with Pima County Regional Flood Control District and US Forest Service to identify, design, and construct any post-Bighorn fire flood mitigation projects	Flood	Staff Time	June 2026	Stormwater Utility	Stormwater Utility, Pima County Regional Flood Control District, US Forest Service	High

Table 5-27: Mitigation Measures for Town of Oro Valley

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
identified in post-fire analysis and/or high precipitation incidents.						
Implement updated water wasting code articles to support water conservation amid ongoing drought conditions fueled by more extreme heat days.	Extreme Heat, Drought	$20,000 (Staff Time and Printing)	June 30, 2027	Oro Valley Water Utility	Oro Valley Water Utility Enterprise Fund	Medium
Annual purchase of full Town CAP allocation and store unused CAP water in underground storage facilities for future use.	Drought	$11 M	June 30, 2027	Oro Valley Water Utility	Oro Valley Water Utility Enterprise Fund (Annual approved budget)	Medium
Identified in the General Plan and prioritized within the Strategic Leadership Plan, develop new design standards, technical bulletins, and educational programs to support best practices in plant transplant and replanting, vegetation and erosion management, energy conservation, and drought tolerant landscapes.	All	Staff time	December 2027	Community and Economic Development	Community and Economic Development Department (Annual approved budget)	Medium
Addition of fire breaks in critical locations identified in the wildland urban interface and locations identified for post-Bighorn Fire mitigation efforts within a constantly changing wildland fire risk and threat environment.	Wildfire	GRFD (Wildland division staff hours)	December 2023	Golder Ranch Fire District and US Forest Service	Golder Ranch Fire District, US Forest Service, Grants	High
Provide annual, public awareness and public outreach on local hazards, mitigation, prevention, plans, and other activities through presentations to homeowners and HOAs, newsletters, and website.	All	Staff Time	June 30, 2027	Emergency Management	Innovation and Technology Department, Stormwater Utility, Water Utility, Community Economic Development, Golder Ranch Fire District (Annual approved budgets)	Low

Table 5-27: Mitigation Measures for Town of Oro Valley

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Mitigate and stabilize areas damaged by storm related activity in the Catalina Ridge Drainage Channel by reconstructing 3,400 linear feet of channel bottom, improve wash degradation, and mitigate side slope to protect public and private property, public infrastructure and utilities from additional damage.	Flood	$1.9 M	June 30, 2025	Stormwater Utility	Stormwater Utility, Pima County Regional Flood Control District, FEMA Mitigation Grant Program	Low
Mitigate and stabilize areas damaged by storm related activity by: Designing and constructing of wash stabilization components to protect damaged areas from scour and deposition of sediment that is causing damage to existing properties. This includes three projects: 3 known projects: Sierra Wash/Naranja Ranch at Glover Road, Sierra Wash/Naranja Ranch at Via Mandarina, Highlands Wash/Highlands subdivision.	Flood	$4 M	July 30, 2025	Stormwater Utility	Pima County Regional Flood Control District and Town CIP	High

Table 5-28: Mitigation Measures for Pascua Yaqui Tribe

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Tetakusim Drainage Improvement Project at Calle Tetakusim	Flood	$14,000,000	Tentative completion of Dec. 2024	Land Department Facilities Department Tribal Council	BIA appropriated funds	High
Drainage Improvement Project - East of the Education Building. Continued Implementation of Pascua Yaqui Reservation Flood Control Project	Flood	$130,000	Tentative completion of Sep. 2022	Land Department Facilities Department Tribal Council	EPA appropriated funds	High

Table 5-28: Mitigation Measures for Pascua Yaqui Tribe

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Cemetery Bridge Project - Continued Implementation of Pascua Yaqui Reservation Flood Control Project. Project requires minor design for CMP's.	Flood	$350,000	February 2023	Land Department, Facilities Department, Tribal Council	FMD Capital Funds	High
Ignacio Baumea Improvement Project – Continued Implementation of Pascua Yaqui Reservation Road Improvement Project. Design has been completed. Sent to BIA for reviews but schedule impacted by COVID pandemic.	Flood	$5,000,000	Tentative completion date of Dec. 2023	Land Department, Facilities Department, Tribal Council	BIA appropriated funds	High
Black Mountain Hydrology study with Pima County, San Xavier District - Tohono O'odham Nation: Divert water from Black Mountain water shed to west San Xavier District initiated planning discussions and invited PYT departments. Next planned meeting will include Pima County Flood Control District	Flood	$800,000	Tentative completion date of Dec. 2027	Land Department, Facilities Department, Tribal Council, Fire Department	Based on eligibility of federal grant programs and or appropriated federal funds.	High
The Pascua Yaqui Tribes Master Drainage Report will be implemented within phases and serves as a guide for decision makers to minimize incompatible land use. It provides a balance of land uses that preserves and enhances the neighborhood, support in-fill strategies, promote economic development, and protect environmentally and culturally significant resources. - Oversee floodplain modeling - Review floodplain map revision - Assessments of flooding runoff in public gathering areas	Flood	Facilities Department Staff time	On-Going and Continuous	Facilities Management	General Fund	Medium
IGA between PYT and State Forestry Department - update and resume. Conduct Annual maintenance on established and identified critical fire break locations in the	Wildfire	Staff-time	Continuous	Fire Department.	General Fund	High

Table 5-28: Mitigation Measures for Pascua Yaqui Tribe

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
urban/wildland interface around all housing, neighborhoods projects and commercial buildings on the Pascua Yaqui Reservation. IGA is still intact. Current fire break locations are intact and identified for new housing projects. 2. Radio communication upgrades for improved regional interoperability and response. -Creating buffers around residential and non-residential structures through the removal or reduction of flammable vegetation, including vertical clearance of tree branches. -Creating defensible zones around power lines, oil and gas lines, and other infrastructure systems. -Performing arson prevention cleanup activities in areas of abandoned or collapsed structures, and accumulated trash or debris -Developing partnerships with neighborhood community groups, and others to conduct outreach activities.				Office of Emergency Management. Attorney General Office. Tribal Council		
Modify and continue to evaluate existing building codes to help mitigate hazards. Fire Code Enforcement Program passed through Tribal Council Resolution. PYT Attorney General Office is working on a Fire Code Enforcement Ordinance that enforces IFC and IBC Codes for any new and existing residential and commercial buildings and projects. Educate community on hazard via website, department brochures Evaluate material and installation of equipment to buildings and residence.	Extreme Heat	Staff-time	Continuous	Tribal Council. Fire Department. Land Department. Housing Department. Facilities Department. Office of Emergency Management	General Fund	High

Table 5-29: Mitigation Measures for Town of Sahuarita

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Review, update and modify NFIP requirements and make appropriate modifications to Floodplain Ordinance.	Flood	Staff Time	Ongoing	Public Works	None	Low
Review, update and modify NFIP requirements and make appropriate modifications to Floodplain Ordinance.	Flood	Staff Time	Ongoing	Public Works	None	Low
Educate the public to increase awareness of hazards, and potential opportunities for mitigation actions. Make Pima County's public information material sheets, websites, mitigation brochures, and media outlets available.	Extreme Heat; Flood	Staff Time	Ongoing	Public Works	Grant Funding	Low
Conduct pre-storm season inspections and debris removal for Town-owned roads and drainage crossings.	Flood	Staff Time	Ongoing	Public Works	HURF	High
Complete construction of the Quail Crossing Boulevard Extension Phase 2 Bridge at the Santa Cruz River.	Flood	$6M	December 31, 2022	Public Works	HURF	High
Partner with the Upper Santa Cruz Provider User Group (USCPUG) to educate the public to increase awareness of drought, and potential opportunities for mitigation actions. Provide outreach communications to increase community awareness of drought by providing updates on local water resources and new regulations.	Drought	Staff Time	Ongoing	Public Works	Grant Funding	Low
Complete Multi-Sector General Permit (Sahuarita Water Reclamation Facility) inspections and perform maintenance and repairs of control measures as identified during inspections.	Flood	Staff Time	Ongoing	Public Works	Enterprise	High

Table 5-30: Mitigation Measures for City of Tucson

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Christmas Watershed Flood Mitigation (NSP & SIP) - feasibility study and subsequent potential construction project for storm drain system and GI to reduce SFHA, and regional basins to help mitigate flood.	Flood / Erosion	FEMA funded 100% for feasibility study and $3,737,059 for construction costs	2024	Department of Transportation & Mobility / Director	DEMA grant, PCRFCD, plus potential partnership with gas company	High
Cushing Street Bridge Levee Extension – Feasibility study and subsequent potential construction project (SIP) for floodwall levee extension along Santa Cruz River, to include protection to hotel and electric substation (Critical Facility) servicing downtown area.	Flood / Erosion	$650,000 total ($162,500 – partners and City share)	Grant awarded for feasibility study May 2020, Project to be completed in 2025 if grant obtained	Department of Transportation & Mobility / Director	FEMA Region IX Reallocated Budget, Partnerships with hotel and utility	High
LOMR for removing parcels out of incorrectly mapped floodplain (including 6020 E LEE ST)	Flood	$50,000	2022	Department of Transportation & Mobility / Director	City of Tucson DTM Stormwater Management	High
Dip Crossing SIP Flood Mitigation Projects – including Neosha Project - safety improvements for residential access, including erosion, bank protection and guard rail, and dip crossing locations.	Erosion	$80,000 (Neosha)	2025	Department of Transportation & Mobility / Director	DEMA grant, plus $20,000 City	High
Downtown Links (SIP) - Roadway and drainage improvements for last phase of the Tucson Arroyo - Arroyo Chico master drainage project. (St Mary's Road storm drain phase completed already by City of Tucson, and Cherry Field & Park Avenue detention systems completed by PCRFCD in 2016.)	Flood	$53M	2023	Department of Transportation & Mobility / Director	RTA	Medium

Table 5-30: Mitigation Measures for City of Tucson

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Silvercroft Watershed SIP report – watershed study to determine base flood elevations and flowrates. Subsequent channel improvements to assure all weather access to vulnerable residential properties.	Flood / Erosion	$120,000	2027	Department of Transportation & Mobility / Director	DEMA grant, PCRFCD, plus potential partnership with gas company	High
Alamo Gabion NSP Project – design and construction of gabion infrastructure for erosion protection in W.A.S.H. Ordinance watercourse (riparian floodplain protected watercourse). Includes repetitive loss property protection.	Flood / Erosion / RLP Mitigation	$2M	2027	Department of Transportation & Mobility / Director	DEMA Grant (75% Federally funded, 25% City/PCRFCD funded)	High
Mojave - Aztec Flood mitigation project (NSP) along Silvercroft Wash downstream of new El Rio City Golf Course detention basin, lessening residential flood conditions downstream	Flood	$50,000	2025	Department of Transportation & Mobility / Director	PCRFCD / City of Tucson	Low
Gardner Lane Improvements Drainage infrastructure SIP improvements to provide relief for flood prone area east of UPRR railroad/I10.	Flood	$18,600	2022	Department of Transportation & Mobility Director	RTA / HURF	Medium
Grant Road Phased Road Project (SIP) - Road improvements with drainage features – box culvert/siphon structures, catch basins, and green infrastructure.	Flood	$1M	2023	Department of Transportation & Mobility / Director	PAG, HURF	High
Broadway Boulevard Corridor (Euclid to Country Club) SIP – Also known as SR3A / Broadway West, this phase includes six travel lanes and large diameter underground storm drain system will be installed throughout the project limits.	Flood	Cost just under $26.5M Drainage just over $8M	2022	Department of Transportation & Mobility / Director	RTA / HURF	Medium
Ponding Mitigation SIP Projects – including Euclid and 35th Street and other right-of-way projects to improve runoff.	Flood	$20,000	2022	Department of Transportation & Mobility / Director	City of Tucson DTM Stormwater Management	High

Table 5-30: Mitigation Measures for City of Tucson

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
Houghton Road, Valencia Road to Mary Ann Cleveland Way SIP - Roadway Widening - Drainage improvements with all-weather six lane divided roadway, multi-use lanes, median, multi-use paths, and drainage improvements improving cross town mobility, reducing congestion and improving safety.	Flood	Drainage Project Total Costs: $1,717,164	2022	Department of Transportation & Mobility / Director	PC Impact Fees, PC Bonds, PAG HURF, SE District Prior to 2012, & RTA	Medium
The Drought Preparedness and Response Plan recognizes that drought impacts do not occur suddenly or without warning and acknowledges that with proper planning and review it is unlikely the community will find itself in an emergency caused solely by drought. It also ensures that Tucson Water staff will implement drought response measures early enough to avoid crisis-mode decision making and to help the community anticipate what measures will come next if drought impacts become more severe.	Drought	$3,036,034	Annual/ On-going	Tucson Water Department	Water Conservation Fund	Medium
Develop water use reduction policy to implement during various levels of drought	Drought	Staff cost	Annual/ On-going	Parks and Recreation	Parks and Recreation Operating Budget	High
Develop park development standards for flood mitigation	Flood	Staff cost	Annual/On-going	Parks and Recreation	Parks and Recreation Operating Budget	Medium
Develop preventative tree maintenance program for implementation prior to monsoon season	Severe Wind	Staff cost	Annual/On-going	Parks and Recreation	Parks and Recreation Operating Budget	High
Develop park closing procedures for implementation during severe flooding incidents	Flood	Staff cost	Annual/On-going	Parks and Recreation	Parks and Recreation Operating Budget	Medium
Develop a wildland fire preparedness and response plan, which includes community educational component. The City of Tucson is an urban based community, and recognizes that wildland fires mainly impacts areas, which are outside the City limits. However, wildland fires outside the City limits has the potential to still influence the impacts on the residents of the City of Tucson. Tucson Fire is operating	Wildfire	$800,000	2024	Tucson Fire Department/ Wildland Fire Unit	Prop 101, COT Budget, State and Federal Deployment Reimbursement	High

Table 5-30: Mitigation Measures for City of Tucson						
Description	**Hazard(s) Mitigated**	**Estimated Cost**	**Anticipated Completion Date**	**Project Lead**	**Potential Funding Source(s)**	**Priority Ranking**
in an Auto-Aid response with Northwest Fire Department and Golder Ranch Fire Department. With the addition of the agreement, TFD could be called upon to assist in mitigation efforts within Pima County. In addition, the City of Tucson has wildland urban interface areas that would be considered high-risk within the City limits. These areas are densely populated and are surround by mature old growth vegetation and limited access, with traditional fire equipment. With proper wildland program implementation, proper equipment, crews, and planning response to wildland fires within the City limits will lessen the impact of such events. The City of Tucson is in the process of increasing the size of wildland fire response both by vehicles (Water Tender, Type 3 and Type 6) and manpower (doubling the response wildland crews)						
Identifying specific at-risk populations (homeless), which are vulnerable to periods of extreme heat and extreme cold to organize outreach efforts including establishing and promoting heating and cooling center in the community.	Extreme Heat, Extreme Cold	Staff Time	2024	Tucson Police Department/ Homeless Outreach Program	Community Partners, and COT Budget	High
Assess inventory, and map vulnerability within Tucson to seismic hazards. Conduct outreach efforts to property owners in high-seismic risk zones, or who own building at especially high ricks for seismic damage such as historic adobe homes, about retrofits that can be made to their structures to reduce seismic impact. Use vulnerability data gathered to perform analysis of current building codes and propose changes, as appropriate, to reduce seismic risk community wide.	Earthquakes	Staff Time	2024	Planning and Development Services	Department Budget	Medium
Assess the vulnerability of critical facilities to flooding from runoff and encourage reducing runoff and means for mitigating critical facilities when runoff cannot be reduced	Flood	Staff Time	Annual/On-going	Planning and Development Services	Department Budget	High
In compliance with the NFIP, the City will continue to require the preparation and submittal of a CLOMR or CLOMR-F for all proposed developments within FEMA delineated Special Flood Hazard Areas. The City will also	Flood	Staff Time	Annual/ On-going	Planning and Development Services	Department Budget and Fees for Developers	High

Table 5-30: Mitigation Measures for City of Tucson

Description	Hazard(s) Mitigated	Estimated Cost	Anticipated Completion Date	Project Lead	Potential Funding Source(s)	Priority Ranking
continue to prepare record drawings and submit LOMR's per NFIP requirements						
Maintain compliance with NFIP regulations by enforcement of the current flood and erosion hazard management codes through review of new development located in the regulatory flood prone and erosion hazard setback areas and with the issuance of floodplain use permits	Flood/ Erosion	Staff Time	Annual/ On-going	Planning and Development Services	Department Budget	High
City of Tucson is in partnership with the University of Arizona in a pilot project to collect and review data on the application of PlusTi from Pavement Technology Inc. on a section of roadway in the City of Tucson. The pilot project area is located on South Country Club Rd from Broadway Blvd to Aviation Hwy. The data collected will determine the effectiveness of PlusTi application in reducing surface temperature, ambient air temperatures, wind speeds and weather conditions.	Extreme Heat	$190,000	February 2021	Department of Transportation/ Sustainability Coordinator	Prop 101	High
Green Storm water Infrastructure Program. The program is designed to build and maintain projects throughout the City that capture storm water runoff from public streets and parking lots, and divert it into vegetated water harvesting area.	Flood	$3,000,000	2023	Water Department- Green Storm water Infrastructure Program	Green Storm water Infrastructure fee	High
The planting of 1 million trees is an initiative within the City of Tucson to increase tree canopy, which will decrease and mitigate both day and night the heat island effect. This is a result of the Arizona summer temperatures. The tree canopy and root system will assist with the increase of water retention, and water conservation within the City. With the increase tree density in the City of Tucson there will be a greater ground structural foundation, resulting in a reduction in the top soil erosion due to flooding.	Extreme Heat/ Flood	$10M	2030	Urban Forest Program Manager for the City of Tucson	Private donors and grant foundations	High

SECTION 6: PLAN MAINTENANCE PROCEDURES

Elements of this plan maintenance section include:

Monitoring, Evaluating, and Updating

Monitoring of Mitigation Measures

Incorporation into Other Planning Mechanisms

The participating jurisdictions in this Plan that reviewed this section recognized that it is intended to be a "living" document with regularly scheduled monitoring, evaluation, and updating. The 2017 Plan outlined specific steps in the Plan Maintenance; however, the 2022 MJPT found that few, if any, formal reviews occurred over the past five years. Reasons for the lack of formal review were discussed by the MJPT, and included:

- Staff turnover;
- Lack of funding for consultant plan reviews annually;
- Misunderstanding of the relationship between mitigation plans to anything other than grants eligibility;
- Lack of promotion of the Plan to the county departments, jurisdictions and the general public; and
- Inability of first responder agencies to understand the significance of mitigation planning to response priorities.

In an effort to avoid these issues again, the MJPT discussed ways to make sure that the Plan is active and treated as a living document which are listed in Section 6.1.

6.1 Monitoring, Evaluating and Updating

The Planning Team has established the following monitoring and evaluation procedures revised for this Plan:

- **Schedule** – The Plan shall be reviewed on at least an annual basis or following a major disaster. PCOEM will take the lead to reconvene the Planning Team annually near the anniversary of the official FEMA approval date. Participating jurisdictions have committed to providing resources to this effort annually. The PCOEM Planner and Operations Manager will be responsible for reconvening annually and initiation the next review cycle.
- **Review Content** – One month prior to the MJPT review meeting, a reminder questionnaire will be distributed to each jurisdictions' point of contact by the PCOEM Planner and will be returned by each jurisdiction within a minimum of three weeks. The approximate date of this review will be calendar year 2nd quarter in 2023, 2024, 2025 and 2026. The questionnaire will be comprised of the following questions:
    - **Hazard Identification:** Have the risks and hazards changed? Is there new information to include regarding the risks/hazards?
    - **Goals and objectives:** Are the goals and objectives still able to address current and expected conditions?
    - **Mitigation Projects and Actions:** What is the status of the mitigation measures in the current Plan?
    - **Capability Assessment:** Have there been any changes in capabilities in the past review year?
    - **FEMA HMP Programmatic Updates**: Have there been any changes to the FEMA HMP program that have occurred in the past review year?
    - **Incidents:** Have any incidents occurred in the past review year?

The PYT-OEM will coordinate with PCOEM. Prior to the updating requirements, the PYT-OEM will coordinate and work with the Tribal Local Planning Team before annual update and will provide report on information developed by the Tribal Local Planning Team.

The PYT-OEM is the lead agency for the Pascua Yaqui Tribe to track progress and send out meeting requests. Representatives of the Tribal Local Planning Team will report on the progress made by their respective departments or entities. Other PYT departments, programs and entities will be invited, as necessary to report or present data relative to the Plan or mitigation measures implemented by their departments. The implementation of mitigation measures will be monitored by the PYT-OEM on an on-going basis until implementation is complete.

6.2 Monitoring of Mitigation Measures

During the annual meeting, each jurisdiction and tribe will have the opportunity to provide a report to the group summarizing its review of the Plan. The report will include their responses to the above questions and any other items specific to their community. Documentation of the annual meeting may include notes on the results of the meeting as well as specific information on the reasoning for proposed changes to the Plan for the next update. Copies of the annual review report will be kept with the Plan for review and consideration in future reviews and the five-year update.

The Plan requires updating and approval from FEMA every five years. The Plan updates will adhere to that set schedule using the following procedure:

- One year prior to the plan expiration date, the PCOEM Planner will reconvene the MJPT to review and assess the materials accumulated from annual reviews and other documents related to hazards, disasters and mitigation actions taken.
- The MJPT will update the appropriate or affected portions of the plan and produce a new Plan.
- The new plan will be submitted to DEMA and FEMA for review, comment, and approval.
- The new Plan will be presented before the respective councils and boards for an official concurrence/adoption of the changes.

For FEMA supported projects, progress reports will be submitted to FEMA on a quarterly basis, or as required throughout the project duration. The degree of quarterly reporting will be dependent upon the type of mitigation activities, its funding source, and the associated requirements. The quarterly report may include:

- Project Completion Status;
- Project Challenges or Issues (if any);
- Budgetary Considerations (Cost Overruns or Underruns); and
- Detailed Documentation of Expenditures.

Upon completion of projects, the project location will be visited, and results viewed and documented. Closed projects will then be monitored for effectiveness of the intended mitigation action. FEMA supported project closeouts will include an audit of the financials as well as other guidelines and requirements set forth under the funding or grant rules, and any attendant administrative plans developed by the Pascua Yaqui Tribe.

6.3 Incorporation into Other Planning Mechanisms

Incorporation of the Plan into other planning mechanisms, either by content or by reference, enhances a community's ability to perform hazard mitigation by expanding the scope of the Plan's influence. The jurisdictions acknowledge that incorporation of the Plan into other planning mechanisms has improved over the prior plan. Additional ways in which the 2017 Plan has been incorporated or referenced into other planning mechanisms for each jurisdiction are summarized below.

Past Activities

Pima County

- The 2017 Plan is cited in the Annual Recertification and 5-yr Cycle Verification of the Community Rating System for the NFIP.

- The plan was used as a resource during the 2021 Pima County Emergency Operations Plan revisions.
- The plan was used as reference material for mitigation grant funding opportunities.

Marana

- The plan was used as a resource during the 2017 and 2020 Town of Marana Emergency Operations Plan revisions.
- The plan was used for reference to identify hazards and mitigation strategies for the Towns General Plan in 2020.
- The plan was used to define mitigation AP's for Town of Marana capital improvement projects and programming during the past five-year cycle.

Oro Valley

- Used as reference material for other emergency plans, procedures, and hazard analysis.
- Identified mitigation actions and projects correlate to planned capital improvement projects; water conservation program; stormwater management program; goals, policies, and action items identified in the General Plan; and community outreach activities.

Pascua Yaqui Tribe

- The 2017 plan was referenced in the Pascua Yaqui Tribe Master Land Use Plan which serves as a guide for tribal leadership and stakeholders to minimize incompatible land use. It provides a balance of land uses that preserves and enhances the community, support in-fill strategies, promotes economic development, and protects environmentally and culturally significant resources. Mitigation strategies were addressed in the development of this plan.
- The master drainage study is a critical component to the Tribe's economic well-being, as well health, safety, and general welfare of the community. It was initially adopted in 2004 to minimize the flooding and drainage problems and will be updated within the next reporting period. It requires no development zones set aside for conveyances of floodwaters and the construction of regional storm water retention facilities
- As a part of National Flood Insurance Program requirements, the plan will be used as a reference.
- The 2017 plan was provided to FEMA when the Tribe submitted its declaration request for Public Assistance Grant Program for the COVID-19 Pandemic.

Sahuarita

- The plan was used when developing the General Plan mainly in reference to the hazards and risks.

Tucson

- The plan was used as reference material for the update of the Emergency Operations Plan.
- The plan was used as reference material for the Threat and Hazard Identification and Risk Assessments processes.
- The plan was used as reference in the development of Continuity of Operations Plans for the City Departments.
- The plan was used as a reference in the development in the Tucson Floodplain Management Plan.

Future Activities

The Plan will continue to function as a standalone document subject to its own review and revision schedule. The Plan will serve as a reference for other mitigation and land planning needs of the jurisdictions. Whenever possible, the jurisdictions will endeavor to incorporate the risk assessment results, mitigation actions and projects identified in the Plan into existing and future planning mechanisms as appropriate.

As is demonstrated above, the typical ways to use and incorporate the Plan include:

- Use of, or reference to, Plan elements in general and comprehensive planning update documents;
- Addition of defined mitigation measures to capital improvement programming;
- Inclusion of Plan elements into development planning and practices; and
- Resource for developing and updating emergency operations plans.

Specific incorporation of the Plan risk assessment elements into the natural resources and safety elements of each jurisdiction/tribe's general plans (county comprehensive plan) and development review processes, adding or revising building codes, adding or changing zoning and subdivision ordinances, and incorporating mitigation goals and strategies into general and comprehensive plans, may help to ensure hazard mitigated future development. In addition to continuing the past incorporation activities, below are the methods of incorporation the jurisdictions intend to implement over the next five-year period.

Pima County

- An annual review of the plan will be scheduled by the Office of Emergency Management including all 2022 plan participants. This will be held in November of each year and include a review of the hazards and risks and evaluation of mitigation measures.
- The plan revision planning process will begin in the second calendar quarter of 2024 for the 2025 plan revision. The Office of Emergency Management Planner will coordinate planning activities.
- The plan will be referenced annually when updating the Pima County Emergency Operations Plan.
- PCOEM will continue outreach to county departments and committees to make them aware of the Plan and advice on how it can be incorporated into other planning activities.
- PCOEM will continue working with the Pima County Grants & Innovation department on funding opportunities for mitigation activities.

Marana

- Continue to pursue past activities as listed in table 3-3 as appropriate.
- Continue to have representatives participate in annual mitigation meetings with other jurisdictional partners.
- Continue to incorporate plan elements into the Town's implementation of the 2040 General Plan, zoning activities and CIP programmed projects.

Oro Valley

- Participate in annual review of plan, as coordinated by the Pima County Office of Emergency Management.
- Use as reference material for other emergency plans, procedures, and hazard analysis.
- Staff awareness of plan to use as reference material when identifying future capital improvement projects; water conservation program; stormwater management program; code amendments; goals, policies, and action items in the General Plan; and community outreach activities.

Pascua Yaqui Tribe

- The Tribe will participate in the annual reviews of the plan with the other jurisdictional partners.
- The plan will be referenced when working with other tribal departments on grants and plans development.
- The hazards and risks will be used in development of exercises for the Tribe.
- The 2022 plan will be used as a reference in the ongoing revisions of the Pascua Yaqui Tribe Emergency Operations Plan.
- The 2022 plan will be referenced in the development of a tribal continuity of operations plans.

Sahuarita

- The Town will participate in the annual plan reviews with other jurisdictions.
- The plan will be used as a resource when the Emergency Operations Plan is revised.

Tucson

- The Plan will be used as reference in the ongoing revision of the City of Tucson Emergency Operations Plan.
- Participate in the annual review of the plan, as part of the Pima County Multi-Jurisdiction Hazard Mitigation Planning Committee.
- The inclusion and reference of the plan in the review and revision of the City general and sustainability plan adopted in 2013.
- The Plan will be used as a reference in the development and revision of the City's improvement projects and programming.

Continued Public/Stakeholder Involvement

The jurisdictions were successful during the past five years in outreach to the public and jurisdictional stakeholders by keeping them informed and involved with activities related to the 2017 Plan. The jurisdictions are committed to continuing that effort and intend to implement the following activities during the next five-year period, whenever possible:

Table 6-1: Continued Public and Stakeholder Involvement	
Jurisdiction	**Activity or Opportunity**
Pima County	• Continue working with the Regional Flood Control District on the Community Rating System (CRS) Program for Public Information, Notification and Exercise requirements. • Schedule annual mitigation review meetings with jurisdictional partners. • Enhance public outreach on mitigation issues through the county's mass notification tool. • Maintain the Hazard Mitigation Plan accessible to the public on the website. • Assist jurisdictions and county departments with mitigation grant funding opportunities.
City of Tucson	• City of Tucson Office of Emergency Management webpages was dedicated to preparedness and mitigation topics. • Preformed annual "Operation Splash" outreach efforts to raise awareness of the dangers of driving through flooded washes and roadways. • Preformed annual "Operational Freeze" outreach effort to raised awareness of the dangers of cold and freezing weather. • Use to "Don't Get Swept Away, Find a Safer Place to Play" campaign to encourage people to avoid flooded washes and other storm water infrastructure during the monsoon season. • The Tucson Office of Emergency Management regularly used social media sites to share preparedness and mitigation information to the public. • Declaration signed by the Mayor and Council of September Preparedness Month, with public preparedness outreach at public events, via social media, on television etc. • Regular water conservation outreach efforts from Tucson Water Department via bill inserts, social media, television etc. • Monthly preparedness and safety tips via the Tucson Fire Department posted online and aired on television. • Provided preparedness and mitigation orientation for Council staff on the mission of emergency management including mitigation efforts. • Monthly safety tips via the Tucson Police Department posted on social media. • Outreach effort by Tucson Fire Department Reference Urban Interface Wildland education program. The outreach campaign encourages people to take proactive efforts to clear high dense brush and bushes from around residence and businesses in order to provide natural fire break.
Town of Marana	• Promote the Marana Citizens Water Academy program to increase customer awareness about water conservation. • Provide public alternate water conservation sources via links on Town website. • Providing drought response through Marana's Drought Preparedness Plan. • Provide Heat Index awareness information via newsletter, and email blasts. • Provide hazard awareness and preparedness information to the community through articles, social media, website, videos, meetings, youth outreach and education through the schools, and community presentations. • Continue collaboration with Pima County Regional Flood Control District and other regional partners on post fire flood risks, potential mitigation projects, annual sandbag program, and outreach activities. • Provide staff support and technical guidance to homeowners, businesses, and HOAs about flood mitigation projects on private property. Marana Water will work with regional partners and the Citizens' Water Academy to recommend updates to its Drought Preparedness Plan.

Table 6-1: Continued Public and Stakeholder Involvement	
Jurisdiction	**Activity or Opportunity**
Town of Oro Valley	• Provide hazard awareness and preparedness information to the community through articles, social media, PSAs, podcasts, website, newsletters, public surveys, videos, meetings, youth outreach and education through the schools, and community presentations. • Expand use of web-based tools and discussion forums. • Continue to implement General Plan public involvement components, as prioritized in the Strategic Leadership Plan. • Expand collaboration with regional partners on opportunities to engage the public through different methods. • Use of new technologies to increase customer awareness about water conservation. • Continue collaboration with Pima County Regional Flood Control District and other regional partners on post fire flood risks, potential mitigation projects, annual sandbag program, and outreach activities. • Provide staff support and technical guidance to homeowners, businesses, and HOAs about flood mitigation projects on private property.
Pascua Yaqui	• Development of a Training and Exercise program that will provide continued education, awareness of mitigation measures. • Interface and collaborate with Pima County Flood Control to include exercises and training opportunities. • Develop and cultivate a social media presence using relevant platforms and applications that focus on mitigations strategies and measures that individuals/families can use before fire season, monsoon, winter preparedness etc. • Attend and participate in community-based events and engage with the public on mitigation and preparation activities for all Yaqui communities. • Develop an internal working group/committee of stakeholders to address mitigation strategies. • Continue mitigation activities in correlation to the Pascua Yaqui Tribe Improvement Projects program. • Develop a Communication Plan for mass/targeted messaging before, during, and after emergencies. • Development of an annual preparedness/mitigation conference that includes the whole community.
Town of Sahuarita	• Town of Sahuarita website (https://sahuaritaaz.gov). • Town of Sahuarita Resident/Citizen Portal. • Town of Sahuarita Facebook.

APPENDIX A: ASSESSMENT OF PREVIOUS ACTION ITEMS

2017 Plan Mitigation Measures Assessment for Unincorporated Pima County								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Lead Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Enforce Flood & Erosion Hazard Ordinance in accordance with the NFIP.	Flood	Both	$1.2M Ongoing	High	PCRFCD / Floodplain Mgmt. Division	Flood Control Tax Levy	Keep	This activity is on-going. Since the last report, counter visits, permits and complaints were received by the District. Violations were resolved. Staff also processed site construction permits, development concept plans, tentative plats, habitat mitigation plans, and rezoning and comprehensive plan amendment cases.
Implement NFIP tasks such as LOMR submittals, maintaining a countywide map repository, performing master drainage studies, and coordinating to ensure the digital map is correct.	Flood	Both	$600,000 Ongoing	High	PCRFCD / Planning & Development Division	Flood Control Tax Levy	Keep	During FY2019/2020 "TDN" studies were completed for the Alamo Wash, Black Mountain, Bronx Wash, Carmack Wash, Christmas Wash, City of South Tucson, Lee Moore Wash, Navajo/Wilson Wash, North Ranch, Pistol Hill Watershed and the West Branch of the Santa Cruz River. The District continues to validate post Big Horn fire flood flow rates for notification purposes, maintenance and infrastructure improvement needs.
Provide flood risk mitigation through Capital Improvement Projects (CIP).	Flood	Both	$8M Ongoing	High	PCRDFD / Planning & Development Division	Flood Control Tax Levy & USACOE	Keep	FY2020/2021 CIP expenditures included acquisition, regional detention basins, bank protection, grade control structures, a railroad culvert, channel improvements, and

2017 Plan Mitigation Measures Assessment for Unincorporated Pima County								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Lead Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
								habitat restoration. An equivalent sum was expended on maintenance needs of existing improvements. This includes significant sediment management in major rivers which in part is due to fires in mountainous headwaters on federal land, as well as desert soil conditions and geomorphology. Major future needs identified for potential DMA funding include Post Fire Hazard Mitigation Grants for Cañada del Oro Levee Augmentation and enlarging the Finger Rock wash culvert under Skyline Drive. While these capital projects have been identified, another significant need are urban drainage improvements on a neighborhood scale. This includes upgrades to current standards, retrofit to address projected future conditions, and new smaller projects utilizing dispersed measures sometimes referred to as Green Infrastructure.
Participate in Community Rating System to reduce insurance premiums.	Flood	Both	$50,000 Ongoing	Medium	PCRFCD / Planning & Development Division	Flood Control Tax Levy	Keep	During 2021 Pima County improved its CRS Rating from 5 to 3. Improvements included adoption of a Floodplain

2017 Plan Mitigation Measures Assessment for Unincorporated Pima County								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Lead Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
								Management Plan and expansion of response activities.
Buffelgrass Mitigation – identify public outreach opportunities including pamphlets, community event participation, media outreach.	Wildfire	Both	$5,000 Ongoing	High	PCOEM, PCNRPR, PCRFCD	Mitigation Grants, General Funds, Donation	Keep and revise	NRPR and RFCD participate in Save our Saguaro events annually with a focus on educating residents on fire risk from buffelgrass invasion and impacts to native cactus including Saguaros. For the past 20 years, thousands of Pima County residents and visitors have received buffelgrass education materials and programs.
Buffelgrass Mitigation – locate county areas for mitigation of buffelgrass and administer grant funding for ongoing activities related to wildfire reduction through removal and reduction in Buffelgrass.	Wildfire	Both	$3M Ongoing	Medium	PCOEM, PCNRPR, PCRFCD	Mitigation Grants	Ongoing, roll into update and revise	The mitigation activities under the initial $3M PDM grant (PDM-09-AZ-2011) were completed in 2017. NRPR and RFCD continue to apply for and receive various grants to support bufflegrass control to reduce wildfire risks. Over 3,000 volunteer hours are harnessed annually for buffelgrass treatment on thousands of acres in Tucson Mountain Park. Staff and youth crews spend several months annually controlling buffelgrass in other areas
Treat soil surfaces with appropriate stabilization materials and vegetation control to reduce blowing dust.	Severe Wind	Both	$2M Ongoing	Medium	PCDOT	Highway User Revenue Funds, Local Regional Transportation Authority Funds	Roll into update	Continuing to implement standard operating procedures to reduce dust during construction.

2017 Plan Mitigation Measures Assessment for Unincorporated Pima County								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Lead Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Continue to identify vulnerable populations for heat related illness, provide education targeted toward recreational activities, visitors/travelers, hospitality industry, homeless populations, and build cooling center capacity.	Extreme Heat	Both	$100,000 Ongoing	High	PCHD, PCOEM, Parks & Recreation	Mitigation Grants, Public Health Emergency Preparedness	Keep and revise	PCHD will expand collaborations through a task force of multiple community sector representatives involved in climate-ready planning, mitigation and response.
Implement the Drought Management Plan. If drought conditions worsen, the Board of Supervisors may consider increasing the drought stage that will trigger drought conservation measures.	Drought	Both	None Ongoing	Medium	OSC/Water Resources Unit	General fund and RWRD enterprise fund	Keep	Pima County's Local Drought Impact Group continues to meet to monitor the status of drought and identify drought impacts.
Pima County DOT in conjunction with the AZGS and the US Forest Service will work to identify vulnerable slide areas and begin developing mitigation approaches and monitoring protocols.	Landslide	Existing	Staff Time Ongoing	Medium	PCDOT	Highway User Revenue Funds, Mitigation Funds, Bond Fund, Aid to Federal Highways	Delete	Landslides are relatively low risk to Pima County roads. DOT lacks staff and funding to evaluate slide risk at this time.

2017 Plan Mitigation Measures Assessment for Marana								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Provide training to the applicable Marana departments on the adopted hazard mitigation plan and its requirements.	All	Both	$500 2021	High	EM Coordinator	General Fund	Keep and roll into update	Towns EOP Current as reviewed. COVID mitigation measures in place. Town wide COVID 19 vaccination clinic scheduling and support completed. Vaccine awareness education conducted town wide. Audit of impacted department required NIMS training completed.
Conduct public education campaigns to increase awareness of natural hazards (such as wildfire, flooding, extreme heat and cold, and severe winds and landslides) by distributing DEMA and Pima County hazard awareness flyers at community events and public gathering opportunities. Event opportunities include events such as the Town of Marana Founders Day (Mar), the 4th of July Celebration (Jul), the Cotton Festival (Oct) and the Holiday Tree Lighting (Dec) and at community meetings sponsored by the Community Services Department.	All	Both	$500 2021	High	Community Development Director	General Fund	Keep and roll into update	COVID mitigation measures greatly minimized ability to continue outreach meetings. Plans to resume during the final quarter of 2021.
Encourage bridge or culvert construction where roads are susceptible to flooding. This will be accomplished as part of the Planning Process when Developers apply to build in Marana.	Flood	Both	Staff Time ongoing	High	Development Services/ General Manager	General Fund	Keep and roll into update	This will be accomplished as part of the Planning Process when Developers apply to build in Marana.

2017 Plan Mitigation Measures Assessment for Marana								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Marana will continue to participate in the National Flood Insurance Program by reviewing applications for buildings, ensuring they are properly designed.	Flood	Both	Staff Time	High	Development Services/ General Manager	General Fund	Keep and roll into update	Outreach efforts are still relevent and on-going.
On Rattlesnake Pass, from Saguaro Bloom to Twin Peaks Road, the Public Works Department and Planning Departments are installing infrastructure, making roadway drainage improvements, and grading the storm water conveyance systems to mitigate flooding hazards in the area.	Flood	Both	$29.8M Ongoing	High	Public Works / Planning Dept	Transportation Fund, General Fund	Keep and roll into update	The project is currently at 60% design, which will address/ mitigate many of the hazards of the current roadway.
Barnett Linear Park and Flood Control – Construct a 3-mile channel along Barnett Road to mitigate the drainage and flood hazard from the Santa Cruz River	Flood	Both	$16.5M 2022	High	Public Works Director	General Fund, Future MMPC Bonds	Delete	The project isn't currently funded.
Ina Road Bridge – Remove and replace the Ina Road bridge that crosses the Santa Cruz River	Flood	New	$17.5M TBD	High	Development Services Director	Transportation Fund, HURF Bonds, General Fund	Delete	This project has been completed and is being monitored for effectiveness.
Ina Road Improvements from Silverbell Road to I-10 – widening of Ina Road to 4-lane section with raised median, sidewalks, and drainage improvements	Flood	Both	$16.5M 2022	High	Public Works Director	Transportation Fund, Federal Grants	Delete	This project has been completed and is being monitored for effectiveness.
Tangerine Road Corridor - provide a minimum of 4 lanes with raised medians, drainage improvements, sidewalks, ADA facilities, multi-use path and lanes, Traffic Signals, Right-of-Way acquisitions, Utility relocations, Marana Water line extensions, and sewer modifications and additions.	Flood	Both	$95.5M Ongoing	High	Public Works Director	RTA, Future Bond Money	Keep and roll into update	The project is ongoing with phase one complete.
Ina Road TI – lower I-10 and construct a new overpass that will span both I-10 and the UPRR tracks. Project will mitigate flood issues and also improve access that will reduce accidents and HazMat incidents	Flood	New	$65M 2018	High	Public Works Director in coordination with ADOT	ADOT, RTA	Delete	This project has been completed and is being monitored for effectiveness.

2017 Plan Mitigation Measures Assessment for Marana								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Marana will continue to participate in the Flood Prone Land Acquisition Program and acquire properties located in flood hazard areas.	Flood	Both	Staff Ongoing	High	Development Services Gen Mgr	Grants, Partnership w/ Pima County	Keep and roll into update	Outreach efforts are still relevant and on-going.

2017 Plan Mitigation Measures Assessment for Oro Valley								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Conduct Floodplain Mapping to mitigate flood risk by delineating floodplains boundaries within existing subdivisions that were not required at the time of subdivision or commercial property platting. This includes subdivisions and commercial properties constructed prior to 1984 and falls within some recently annexed areas of the Town. This includes three projects: Carmack Wash/Shadow Mountain Estates subdivision, Peglar Wash/Suffolk Hills Subdivision/Rancho Catalina Subdivision, Highlands Wash/Highlands subdivision.	Flood	Existing Homes / Subdivisions/ Commercial Properties	$200K 2018	High	Oro Valley Stormwater Utility	PCRFCD CIP	Delete	Completed 2020
Mitigate and stabilize areas damaged by storm related activity by: Designing and constructing of wash stabilization components to protect damaged areas from scour and deposition of sediment that is causing damage to existing properties. This includes three projects: 3 known projects: Carmack Wash/Shadow Mountain Estates subdivision, Peglar Wash/Suffolk Hills Subdivision/Rancho Catalina Subdivision, Highlands Wash/Highlands subdivision.	Flood	Existing Homes / Subdivisions/ Commercial properties	$1-2M 2019	High	Oro Valley Stormwater Utility	PCRFCD CIP	Delete	Studies were completed. No progress on construction due to lack of funding.

2017 Plan Mitigation Measures Assessment for Oro Valley								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Lambert Lane (Rancho Sonora to La Cañada). All weather crossing, lowering hill profile and adding soil nail walls. Upgrading signal at Lambert Lane. Adding secondary access point to fire station from Lambert, currently only accessible from La Cañada Dr.	Flood	Existing road improvement	$5.5M Road $730K Utility 2017	High	Oro Valley Stormwater Utility	RTA, Water Utility, Town of Oro Valley	Delete	Completed 2017
Tangerine Rd. (Oro Valley portion of project is Shannon to La Cañada). All weather crossings, multi-use path, raised medians, curb and gutters, traffic signal improvement at La Cholla and Tangerine.	Flood	Existing road improvement	$95.5M (Total Tangerine Project) 2018	High	Marana	RTA, Marana, Pima County, and Oro Valley	Delete	Completed 2018
La Cholla (Oro Valley portion of project is Lucero Rd. to Tangerine). 4 lane divided with a raised median, separated multi-use path, all weather crossings. Traffic signal improvement at Lambert, Naranja, and Glover.	Flood	Existing road improvement	$20M 2020	High	Oro Valley	RTA, Pima County, and Oro Valley	Delete	Completed 2020
Purchase 2,000 acre-ft. of groundwater extinguishment credits in the Tucson Active Management Area (TAMA) to bolster the Town's groundwater allowance account for future use.	Drought	New	$400,000 2017	Medium	Water Utility	Water Utility Fees	Keep and revise	Additional purchases and storage is planned in the next five years.
Remove regulatory barriers and develop programs that support sustainable designs, landscapes, green infrastructure, and development practices. Update and develop new building codes and design standards that help reduce urban heat island effect.	Extreme Heat	Both	Staff Time $3,750/year 2021	Low	CDPW	Oro Valley	Keep and revise	Building codes adopted in 2019. The development of design standards is underway and highlighted in the Strategic Leadership Plan.

2017 Plan Mitigation Measures Assessment for Oro Valley								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Installation of hydrants in urban interface area targeting areas where there is a higher risk for brush fire.	Wildfire	New	$21,000/year 2021	Medium	Mountain Vista Fire District	MVFD general fund	Keep and roll into update	Addition of hydrants in strategic locations is part of managing wildfire risk in the WUI interface.
Annual maintenance on established and identified as critical fire break locations in the urban/wildland interface (Catalina State Park, Sun City Oro Valley, etc.).	Wildfire	Both	$10,000/year 2021	Medium	Golder Ranch Fire District	Golder Ranch Fire District	Keep and roll into revise	Have completed some of the rehab of the break around Sun City.
Provide annual, public awareness and public outreach on local hazards, mitigation, prevention, plans, and other activities through presentations to homeowners and HOAs, newsletters, and website.	All	Both	$500/year 2021	Medium	EM & Golder Ranch Fire District	Oro Valley & Golder Ranch Fire District	Keep and roll into update	Public education and outreach is an ongoing effort.
Mitigate and stabilize areas damaged by storm related activity in the Catalina Ridge Drainage Channel by reconstructing 3,400 linear feet of channel bottom, improve wash degradation, and mitigate side slope to protect public and private property, public infrastructure, and utilities from additional damage.	Flood	Existing	$1.9M 2021	High	Oro Valley Stormwater Utility	PCRFCD CIP, TOV, FEMA	Keep and roll into update	Development of mitigation projects based on highest risk properties.

2017 Plan Mitigation Measures Assessment for Pascua Yaqui							
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
The Pascua Yaqui Tribes Master Drainage Report overseen by Facilities Management Division will be implemented within phases • Oversee floodplain modeling • Review floodplain map revision • Assessments of flooding runoff in public gathering areas	Flood	Existing	Staff time Ongoing	Tribal Council, Facilities Dept, Land Dept	General Fund	Keep and roll into update	Design completed and project put out to bid; however, no bids were received. Will be re-advertising.
Complete and implement Phase 2 finalization of Master Drainage Report.	Flood	Existing	Staff time 2017	Tribal Council, Land Dept	General Fund	Delete	Complete
Update and resume the existing intergovernmental agreement between the Tribe and the State Forestry Department. Conduct Annual maintenance on established and identified critical fire break locations in the urban/wildland interface around all housing, neighborhoods projects and commercial buildings on the Pascua Yaqui Reservation.	Wildfire	Existing	Staff time Continuing	Fire Dept, Attorney General's, Office, Tribal Council	General Fund	Keep and roll into update	In-Progress The current Intergovernmental Agreement (IGA) between the Tribe and State Forestry was reviewed internally, by tribal representatives within the last planning cycle. As a result of the impacts of the COVID-19 pandemic an update/revision to the IGA between the Tribe and State Forestry was not

2017 Plan Mitigation Measures Assessment for Pascua Yaqui							
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
							completed and will be rolled into the 2022 planning cycle.
Modify and continue to evaluate existing building codes to help mitigate hazards. • Evaluate material and installation of equipment to buildings and residence • Educate community on hazard via website, department brochures	Extreme Heat	Existing	Staff Time Ongoing	Tribal Council, Fire Dept, Land Dept, Housing/Facilities Dept	General Fund	Keep and roll into update	On-going and continuous During the last planning cycle the Tribal Housing Department with the support of Tribal Council implemented requirements for the use of energy efficient building materials for tribal facilities and low income housing developments within the community. The upgrade of building materials include the use of double pane windows as opposed to single pane, the use of high "R" rated materials that improve the energy costs. In

2017 Plan Mitigation Measures Assessment for Pascua Yaqui							
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
							addition to the use of energy efficient materials, the Tribe has also implemented landscaping requirements for new developments that include native plants/vegetation that require less water. In the next planning cycle the Tribal Housing and Facilities Departments will be reviewing and updating the building codes/ordinance for the Tribe.

2017 Plan Mitigation Measures Assessment for Sahuarita								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Complete Multi-Sector General Permit (Wastewater facility) inspections and perform maintenance and repairs of control measures as identified during inspections.	Flood	Existing	Staff Time Quarterly	High	Public Works - Wastewater	Enterprise	Delete	Since the Town of Sahuarita does not discharge industrial stormwater off-site to a WOTUS (Santa Cruz River), an MSGP is not needed and the Town is covered under the No Discharge Certification (NDC). The NDC was issued on January 10, 2020.
Organize and host annual Southern Arizona Beat Back Buffelgrass community removal event.	Wildfire	Both	Staff Time Annually	Medium	Public Works, Planning and Zoning	None	Keep and revise	The risk of a wildfire in Sahuarita due to vegetation (buffelgrass in this case) is very low to minimal. Public Works will possibly partner with the Town of Sahuarita Parks and Recreation

2017 Plan Mitigation Measures Assessment for Sahuarita								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
								Department for a Buffelgrass community event. Currently, no event has been scheduled.
Review, update and modify NFIP requirement and make appropriate modifications to Floodplain Ordinance.	Flood	Both	Staff Time 2017	High	Public Works	General Fund	Delete	The Town of Sahuarita Floodplain and Erosion Hazard Ordinance was updated March of 2020. The Santa Cruz River is the only FEMA mapped Floodplain. NFIP requirements are set per FEMA Flood Maps of the Santa Cruz River.
Educate the public to increase awareness of hazards, and potential opportunities for mitigation actions. Make Pima County's public information material sheets, websites, mitigation brochures, and media outlets available.	Extreme Heat, Flood	Both	Staff Time 2018	Low	Town Clerk	None	Keep and revise	The Town of Sahuarita Department of Public Works sent out letters to local HOAs as a courtesy reminder to maintain

2017 Plan Mitigation Measures Assessment for Sahuarita								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
								washes and basins to minimize flooding possibilities. A manual in conjunction with Pima County was also included on the how, why, when, what, who of the drainage maintenance guidelines.
Conduct pre-storm season inspections and debris removal for Town-owned roads and drainage crossings.	Flood	Existing	Staff Time Ongoing	High	Public Works	HURF	Keep and revise	The Town of Sahuarita Department of Public Works Streets Division maintained all Town owned roads and drainage crossings. The recent event of the monsoon 2021 presented a lot of maintenance actions for our Streets Division. Overall, roads

2017 Plan Mitigation Measures Assessment for Sahuarita								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
								and drainage crossings are well-kept.
Complete construction of Sahuarita Road: I-19 to Eastern Town Limits including drainage improvements and a new 2-lane bridge over the Santa Cruz River.	Flood	Both	$47.7M Planning began 2106	High	Public Works	RTA, HURF, private	Delete	The Sahuarita Road Project from I-19 to Country Club Road has been completed for over a few years now.
Complete construction of the Pima Mine Road Bridge Replacement at the Santa Cruz River, which corrects structural deficiencies of the existing bridge, provides additional roadway capacity at the bridge, and provides additional capacity for delivery of CAP water to Sahuarita.	Flood, Drought	Both	$7.2M Planning began 2016	High	Public Works	RTA, HURF, private	Delete	The Pima Mine Road Bridge Replacement has been completed for over a few years now.
Finalize License Agreements allowing installation of CAP pipelines in Town rights-of-way to facilitate the delivery of CAP water to Sahuarita.	Drought, Extreme Heat, Flood	Both	Staff Time 2017	High	Public Works	None	Delete	CAP pipelines have been installed within the Town's ROW - from I-19 along the north side of Pima Mine Road all the way east the Nogales Highway.

2017 Plan Mitigation Measures Assessment for City of Tucson								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Identify funding source and construct two bridges and 50 box culverts with 380 back-up power units for signalized intersections at high flood hazard crossings in Tucson limits in accord with the Department of Transportation 5-yr plan. If a box culvert cannot be constructed an automated warning device, consisting of a barricade, signs and flashing lights would be installed.	Flood, Severe Wind	New	$100M Staff Time Ongoing	High	Transportation Dept Streets Administrator and Streets Chief Engineer	Grant Funds	Keep and Roll into update	The mitigation measures are still in progress and are being pursued based upon available funding.
Promote disaster-resistant water delivery system by constructing redundant water transmission lines (e.g., The Utility and the community will be less susceptible to loss of water delivery due to natural or human-caused disasters).	All	Both	$7.9M 2020	High	Water Dept Water Administrator Maintenance & Operations	Operations Budget	Keep and revise	Upgraded SCADA monitoring systems for water transmission lines
In compliance with the NFIP, Tucson will continue to require the preparation and submittal of a CLOMR or CLOMR-F for all proposed development within FEMA delineated Special Flood Hazard Areas.	Flood	Existing	Staff Time Annually	High	Planning and Development Services	Department Budget and Fees for Developers	Keep and roll into update	The City of Tucson requires CLOMR of CLOMR-F (as applicable) for all proposed development located within Special Flood Areas
Maintain compliance with NFIP regulations by enforcement of the current floodplain management ordinance through review of new development located in the floodplain and issuance of floodplain use permits.	Flood	Existing	Staff Time Annually	High	Planning and Development Services	Department Budget	Keep and roll into update	The City of Tucson requires a floodplain use permit for all proposed developments

2017 Plan Mitigation Measures Assessment for City of Tucson								
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								located within a floodplain
Improve floodplain administration under the NFIP program by sending inspectors into the field when we receive a flood warning from the NWS, to assess bridges, washes, and other critical infrastructures within Tucson.	Flood	Existing	Staff Time Annually	Medium	Transportation Dept	Department Budget	Keep, and roll into update	Staff worked with departments, committees, Ward offices, Developers, and Engineering Consultants to review and update the goals and changes to the Tucson Floodplain Management Plan (the Plan) in 2020. The updates to the Plan became effective December 2020 with a revised ordinance.
Continue to fund and promote the following rebate and incentive programs: residential and small commercial rainwater harvesting rebate program; residential high-efficiency clothes washer replacement rebate program; Single-family residential gray-water rebate program; Single-family residential high-efficiency toilet replacement; rainwater harvesting grant/loan	Drought	Existing	$1.4M Annually	Medium	Tucson Water	Conservation Utility Fee	Keep and roll into update	All of these programs continue as described

2017 Plan Mitigation Measures Assessment for City of Tucson								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
program for low-to-moderate income customers; free toilet replacement program for low-to-moderate income homeowners; commercial or multi-family high-efficiency toilet replacement program; commercial and industrial high-efficiency urinal replacement program.								
Continue to fund and promote the Tucson Water Zanjero (water manager) residential water audit program.	Drought	Existing	$271K Annually	Medium	Tucson Water	Department Budget	Keep and roll into update	Zanjero program continues to be funded
Continue to participate in, promote and sponsor the Pima County SmartScape program in partnership with the University of Arizona Cooperative Extension.	Drought	Existing	$239K Annually	Medium	Tucson Water	Conservatio n Utility Fee	Keep and roll into update	Smartscape Program continues to be funded by Tucson Water under IGA with University of Arizona
Review and update the City of Tucson Water Department Drought Preparedness and Response Plan.	Drought	Both	Staff Time Ongoing	Medium	Tucson Water	Department Budget	Keep and roll into update	Drought Plan was updated in 2020
Assess, inventory, and map vulnerability within Tucson to seismic hazards. Conduct outreach efforts to property owners in high-seismic risk zones, or who own building at especially high risk for seismic damage such as historic adobe homes, about retrofits that can be made to their structures to reduce seismic impact. Use vulnerability data gathered to perform analysis of current building codes and propose changes, as appropriate, to reduce seismic risk community wide.	Earthquake	Both	Staff time 2019	High	Planning and Development Services	Department Budget	Keep and revise	The City of Tucson is working to identify existing structures that may be at risk of damage as a result of seismic event

2017 Plan Mitigation Measures Assessment for City of Tucson								
Description	**Hazard(s) Mitigated**	**Assets Mitigated (Ex/New)**	**Estimated Cost Completion**	**Priority**	**Primary Agency Title**	**Potential Funding Source(s)**	**Status Disposition**	**Explanation**
Perform feasibility study of a downtown District Energy model that would create greater energy and water resiliency in downtown Tucson.	Drought, Extreme Heat, Extreme Cold	Both	$75K 2017	High	Environmental and General Services	City operating funds with matching county contribution	Delete	No additional work has been completed on the study upon its completion Date in 2017
Assess the vulnerability of critical facilities to flooding from runoff and encourage reducing runoff and means for mitigating critical facilities when runoff cannot be reduced.	Flooding	Both	Staff time Annually	Medium	Planning and Development Services	Department Budget		The City of Tucson is assessing the vulnerability of critical facilities.
Implement a severe wind risk awareness program with information about shelter locations, education for homeowners about retrofits, and education for professionals about wind mitigation.	Severe Wind	New	Staff time 2018	Medium	OEM and Homeland Security	Department Budget	Keep and roll into update	Due to current budget funding, and staffing available this project is still pending
Implement a winter weather risk awareness program to educate the public on the risks of severe cold during winter storms.	Extreme Cold	New	Staff time 2017	Medium	OEM and Homeland Security	Department Budget	Keep and roll into update	Office of Emergency Management (Tucson Police Department and Tucson Fire Department), collaborates with local nation weather representatives providing consent communicatio

2017 Plan Mitigation Measures Assessment for City of Tucson								
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								n and updates in order to insure programs such as "Operations Deep Freeze" and others similar programs.
Assess and identify specific at-risk populations vulnerable to long-term power outages and organize outreach efforts include establishing and promoting heating and cooling centers in the community.	Extreme Heat, Extreme Cold	Both	Staff time 2018	High	OEM and Homeland Security	Department Budget	Keep and roll into update	Colorations with NAOA, Tucson Fire Department, Voluntary Organization active in disasters.

Exhibit A to Marana Resolution No. 2022-116

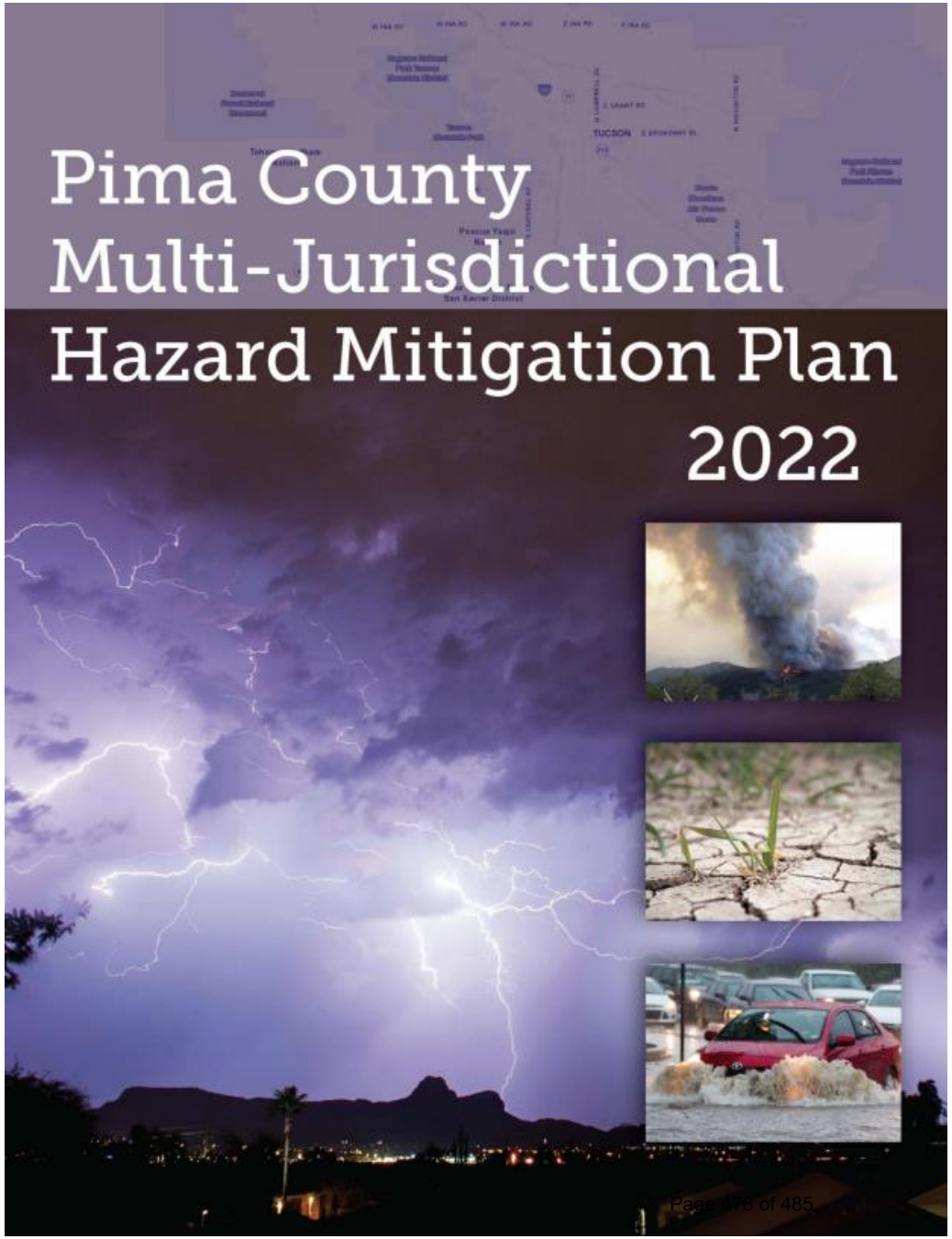
2022 Multi-Jurisdictional Hazard Mitigation Plan

Rita Lebsack – Safety & Emergency Management Coordinator

9/20/2022

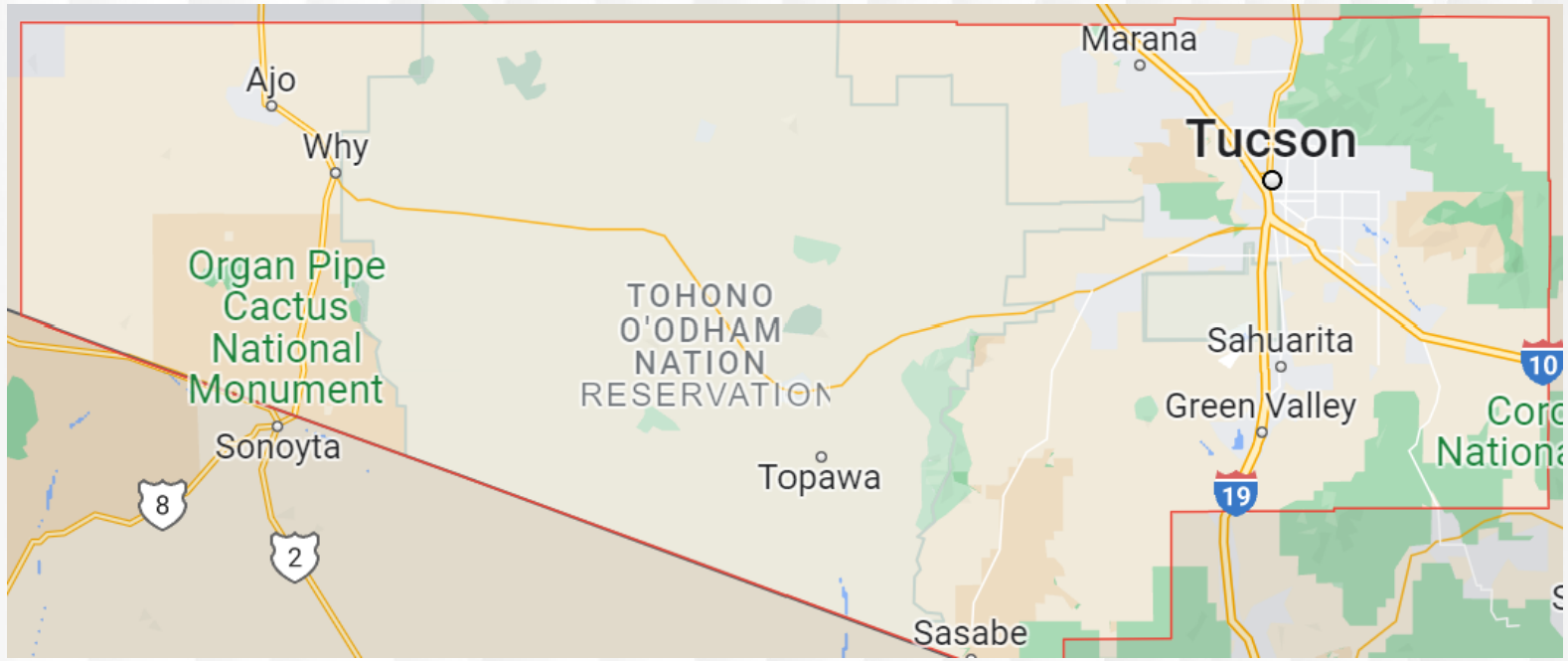
2022 Pima County Multi-Jurisdictional Hazard Mitigation Plan

The purpose of the Plan is to identify natural hazards that impact the various incorporated jurisdictions located within Pima County, assess the vulnerability and risk posed by those hazards to community-wide human and structural assets, develop strategies for mitigation of those identified hazards, present future maintenance procedures for the plan, and document the planning process.



The following jurisdictions participated in the planning process:

- Town of Marana
- Town of Oro Valley
- Town of Sahuarita
- City of Tucson
- Pascua Yaqui Tribe
- Pima County



Background and Scope

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.

Hazard mitigation planning is the process of identifying natural hazards likely to occur in a geographic location, measuring threat probability, analyzing the risk, setting mitigation goals and strategies to lessen impacts to the community associated, and implementing actions.

Developing hazard mitigation plans enables state, tribal, and local governments to:

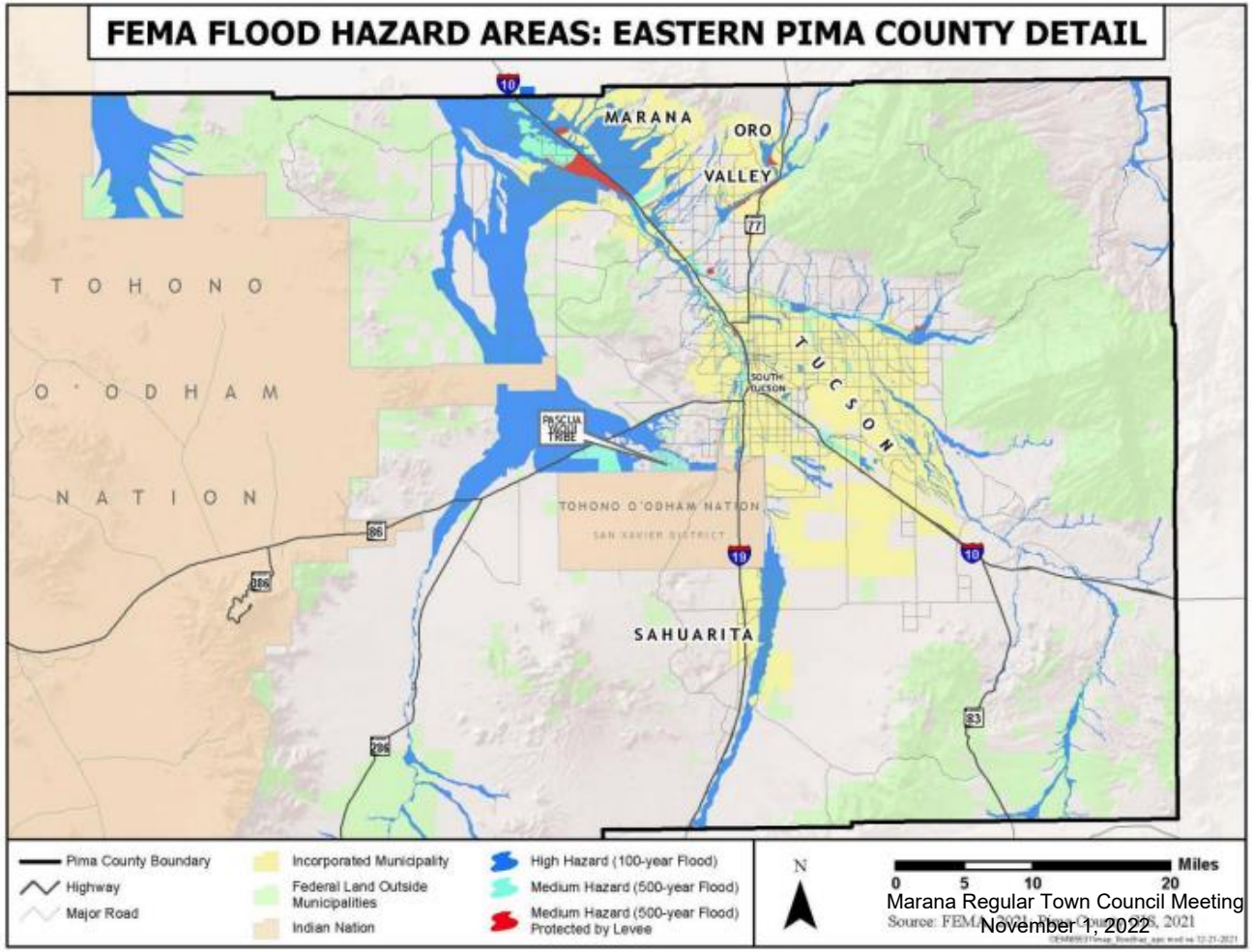
- Increase education and awareness around threats, hazards, and vulnerabilities.
- Build partnerships for risk reduction involving government, organizations, businesses, and the public

Federal Funding

- The federal government requires that a community have an approved hazard mitigation plan in order to qualify for federal funding programs.

- This plan shall be reviewed, updated and proposed for adoption, every five years.

Mitigation actions are presented for the following natural hazards:



- Flood
- Erosion
- Wild Fire
- Drought
- Extreme Heat
- Severe Wind
- Earthquake
- Extreme Cold
- Landslide

Union Pacific train derails between Twin Peaks and Avra Valley - July 10, 2018

Due to exceptionally heavy monsoon rains, a Union Pacific train derailed 27 freight cars in Marana requiring a major mitigation effort. Pre-existing mutual aid agreements aided local agencies to assist Northwest Fire with on-scene disaster management.

Marana Police Department, Tucson Fire Department, Golder Ranch Fire District, Town of Marana, Pima County Sheriff and the Arizona Department of Public Safety all joined the effort.

"Public safety is a team effort,". "No one person could take care of all of this, it requires a network."

- Brian Keeley, Deputy Chief of Preparedness Northwest Fire

Questions