Brawley Wash Watershed Plan and Environmental Assessment

Appendix E – Supporting Information

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Table 25 - Eliminated Alternatives and Rationale

Component Name	Rationale for Elimination
Retention/Detention Basins	Does not support the Purpose and Need Statement (i.e., restore natural drainage flow pattern). Also, based on the previous PL-566 (2008) study, such structures were found to be too costly. Therefore, this component was deemed not be efficient or acceptable.
Bank Stabilization	In general, within the limits of each problem area, this erosion countermeasure was found not to be practicable (e.g., did not meet completeness or effectiveness goals).
Conveyance Channels/Channelization	The consideration and construction of new channels within the limits of each problem area was found to be impracticable (e.g., did not meet completeness or effectiveness goals).
Floods Walls	Does not support the Purpose and Need Statement as this component is meant to encroach into floodplain of a given watercourse. Therefore, this component was not acceptable.
Levees	Does not support the Purpose and Need Statement as this component is meant to encroach into floodplain of a given watercourse. Therefore, this component was not acceptable.
Flood Proofing	In general, no residential dwellings and/or business structures exist within the limits of each problem area. Therefore, this component was considered not to be complete, effective or efficient.
Road Improvements	Curbs: This option within the component was deemed to be impracticable given the setting of each problem area (i.e., rural, agricultural fields). Therefore, this component was not acceptable.
	Inverted Crown: This option within the component was deemed to be impracticable given the setting of each problem area (i.e., rural, agricultural fields) and that this option has the tendency to divert natural flow patterns. Therefore, this component was not acceptable.
Component Name	Rationale for Elimination
Storm Drains	This component was deemed infeasible given the lack of “positive outflow” (i.e., constant negative hydraulic grade line) within each of the problem areas. Therefore, this component was not acceptable.
Low Flow Channels	Impracticable given that substantial constructed channels (i.e., those large enough to facilitate including a low flow or “pilot” channel) do not exist within the problem areas. Therefore, this component was not acceptable.
On-site Individual Lot Retention/Detention	Does not support the Purpose and Need Statement (i.e., does not restore natural drainage patterns). Therefore, this component was considered not to be complete, effective or efficient.
Delineate Additional Floodplains	A concurrent study, by the Pima County Regional Flood Control District, is already being performed and all problem areas identified within this Plan-EA are included within said study. Therefore, this component was considered not to be efficient.
Utilize Floodplain Regulations	This component was determined to be ineffective given that each problem area had been previously developed prior to County ordinance. Therefore, this component was considered not to be effective.
Infill Development Criteria	As the problem areas are all located within agency (City of Tucson) owned land, this component was deemed to be not acceptable by the SLO.
Open Space Regulations/ Preservation/Purchase	As the problem areas are all located within agency (City of Tucson) owned land, this component was deemed to be not acceptable by the SLO.
Flood Warning System	Property owners that would benefit from advanced warning do not exist within any of the identified problem areas (i.e., City or County owned lands). Therefore, this component was considered not to be effective.

Component Name	Rationale for Elimination
Public Education and Outreach	Deemed to be impracticable as the problem areas are located entirely on City or County owned lands. Therefore, this component was considered not to be effective and does not address the completeness goal.
Flood Insurance	Deemed to be impracticable as the problem areas are located entirely on City or County owned lands and that no structures are present or planned to be built. Therefore, this component was considered not to be effective.
Ground Surface Pitting, no planting or seeding	Was deemed to have elements already included within Natural Infrastructure for Dryland Streams and was therefore removed from further consideration.
Seeding - hydroseed	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals.
Seeding - hydroseed followed by Hydrostraw mulching	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals.
Seeding - broadcast or drill seeding with straw mulch	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals. This component meets the acceptability, and effectiveness goals.
Planting with Automatic Irrigation	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, and effectiveness goals.
Planting with Manual Irrigation	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, and effectiveness goals.
Planting with No Irrigation	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability and efficiency goals.
Planting - Resource Islands	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable.
Component Name	Rationale for Elimination
Mulching with Tree limbs / cuttings	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable.
Chemical Control	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the effectiveness and efficiency goals but is unclear if the component also addresses the acceptability goal.
Manual (Physical) Control	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals.
Fire (Mesquite and woody shrub) Control	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable.

Table 26 - Summary and Comparison of Alternative Plans

Problem Area	For all Problem Areas	PA 1 - Buckelew West		PA 2 - Tortugas Ranch		PA 3 and PA 4 - CAVSARP	PA 5 - Cactus Avra			PA 6 - Prickle Desert			PA 7 - Tucker Road	
Alternatives	**No Action (FWOFI)**	**Alt 1**	**Alt 2**	**Alt 1**	**Alt 2**	**Removed from further consideration by request by cooperating agency, given potential harm to existing critical facilities.**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**
SUMMARY OF COSTS														
Implementation:														
Federal	$0	-	-	$1,221,000	-	-	-	-	-	-	-	$2,770,500	$968,500	-
Non-Federal	$0	-	-	$25,800	-	-	-	-	-	-	-	$39,800	$21,500	-
Implementation Cost (no install period)	$0	$7,400,060	$7,762,783	$1,246,800	-	-	$6,891,825	$4,139,250	$7,520,250	$1,878,171	$2,236,851	$2,810,300	$990,000	$790,340
Operation and Maintenance:														
Total Annual O&M	$0	-	-	$0	-	-	-	-	-	-	-	$0	$0	-
Total Investment:														
Present Value (2.75%, 50-yrs)	-	-	-	$1,181,000	-	-	-	-	-	-	-	$2,661,900	$937,700	-
Annualized (2.75%, 50-yrs)	-	-	-	$47,453	-	-	-	-	-	-	-	$106,959	$37,679	-
Annualized Monetary Benefits														
Flood Protection - Structures and Vehicles	$0	$55,300	$55,300	$3,000	-	-	($12,500)	($9,600)	($12,500)	$43,700	$45,200	$43,700	$21,100	$26,400
Flood Protection - Infrastructure	$0	$10,244	$10,244	$52,500	-	-	($63,022)	$37,189	$22,846	$25,406	$22,846	$22,846	$57,703	$57,266
Insurance Administration Cost	$0	$8,100	$8,100	$800	-	-	$0	$0	$0	$10,400	$10,800	$10,400	$4,600	$5,000
Total Annualized Benefits	$0	$73,621	$73,261	$56,281	-	-	$24,689	($72,584)	$24,689	$76,994	$81,430	$76,994	$83,413	$88,672
Annual Remaining Flood Damage	$0	-	-	N/A	-	-	-	-	-	-	-	N/A	N/A	-
Monetized Benefit-Cost Analysis														
Annualized Net Benefits	$0	-	-	$8,847	-	-	-	-	-	-	-	($29,959)	$45,721	-
Benefit-Cost Ratio	0.0	-	-	1.19	-	-	-	-	-	-	-	0.72	2.21	-
PROJECT GOAL														
Restoration of Brawley Wash Watershed's natural waterways to address flood management to protect the surrounding community and restoration of ecosystem.	No	Yes	Yes	Yes	Yes	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes

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Alternatives	**No Action (FWOFI)**	**Alt 1**	**Alt 2**	**Alt 1**	**Alt 2**	**Removed from further consideration by request by cooperating agency, given potential harm to existing critical facilities.**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**
To provide erosion protection in County and City owned lands, reduce flooding, restoration of denuded abandoned farmland for wildlife habitat, and mitigation against invasive species.														
	No	Yes	Yes	No	No	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes
To provide a net benefit cost greater than 1.0 with a 20% benefit to agriculture.														
	No	No	No	Yes	No	No	No	No	No	No	No	No	Yes	No
SPONSOR PLANNING OBJECTIVES														
Restoration of Brawley Wash Watershed's natural floodplain will provide agricultural and wildlife benefits, while reducing flood related impacts to the public and surrounding infrastructure.														
	No	Yes	Yes	Yes	No	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes
Environmental Restoration														
	No	Yes	Yes	No	No	N/A	No	No	No	Yes	Yes	Yes	Yes	Yes
PLANNING CONSTRAINTS														
Permitting	No	Yes	Yes	Yes	Yes	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
ALTERNATIVE PLANS														
Non-Structural														
Locally Preferred				X								X	X	
National Economic Efficiency				X								X	X	
Socially Preferred														
Environmentally Preferred														
PR&G Criteria														
		X	X	X	-	-		X	X		X	X	X	X

Problem Area	For all Problem Areas	PA 1 - Buckelew West		PA 2 - Tortugas Ranch		PA 3 and PA 4 - CAVSARP	PA 5 - Cactus Avra			PA 6 - Prickle Desert			PA 7 - Tucker Road	
Alternatives	**No Action (FWOFI)**	**Alt 1**	**Alt 2**	**Alt 1**	**Alt 2**	**Removed from further consideration by request by cooperating agency, given potential harm to existing critical facilities.**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**
Effectiveness-alleviates the specified problems and achieves the specified opportunities	The No Action Alternative would not achieve specified opportunities or alleviate specific problems.	Would be highly effective and provide for a lower potential risk of major bank damage during large flood events with bank protected channel in high-risk areas versus Alternative without bank protection.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.	Would be highly effective and provide for a lower potential risk of major bank damage during large flood events with bank protected channel in high-risk areas versus Alternative without bank protection.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.	N/A	Would be highly effective and provide for a lower potential risk of major bank damage during large flood events with bank protected channel in high-risk areas versus Alternative without bank protection.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.	Would be highly effective and provide for a lower potential risk of major bank damage during large flood events with bank protected channel in high-risk areas versus Alternative without bank protection.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.	Would be highly effective and provide for a lower potential risk of major bank damage during large flood events with bank protected channel in high-risk areas versus Alternative without bank protection.	Would be highly effective but is at higher potential risk of major bank damage during large flood events because it lacks bank protection in high-risk areas.
Acceptability-viability and appropriateness of an alternative from the perspective of the Nation's general public and consistency with existing Federal laws, authorities, and public policies.		X		X	-	-	X	X	X	X	X	X	X	X
	The No Action Alternative would not alleviate specific problems and would not offer an acceptable solution.	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore, has designed the	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore, has designed the action to	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore,	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore,	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore, has designed the action to minimize	Most acceptable solution to align with the Federal Objective, purpose and need, and objectives. Stakeholders proposed to conduct or allow an action in a floodplain and has considered alternatives to avoid adverse effects and incompatible development in the floodplains. The only acceptable solution requires siting in a floodplain and therefore, has designed the

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Alternatives	**No Action (FWOFI)**	**Alt 1**	**Alt 2**	**Alt 1**	**Alt 2**	**Removed from further consideration by request by cooperating agency, given potential harm to existing critical facilities.**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**
		solution requires siting in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.	requires siting in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.	requires siting in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.	action to minimize potential harm to or within the floodplain.	minimize potential harm to or within the floodplain.	requires siting in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.		has designed the action to minimize potential harm to or within the floodplain.	has designed the action to minimize potential harm to or within the floodplain.	in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.	in a floodplain and therefore, has designed the action to minimize potential harm to or within the floodplain.	potential harm to or within the floodplain.	action to minimize potential harm to or within the floodplain.
Efficiency - alleviates the specified problems and realizes the specified opportunities at least cost.		X		X	-	-		X			X			
	The No Action Alternative would not alleviate specified problems in the project area.	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.		Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	A second alternative (i.e., combination of components) is not available for this problem area given that this is a linear feature and in general can only be slightly structurally modified based on the resulting ranked components.	N/A	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	N/A	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	N/A	Incorporates bank protection and efficiency at a reasonable cost, accommodates future responsible flood-wise development, and includes installation of bank protection in high-risk areas contributing to long-term sustainability, lower potential risk of major bank damage during large flood events, and anticipated less frequent or involved O&M.	N/A

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Alternatives	**No Action (FWOFI)**	**Alt 1**	**Alt 2**	**Alt 1**	**Alt 2**	**Removed from further consideration by request by cooperating agency, given potential harm to existing critical facilities.**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**
Completeness			X		-	-		X	X		X	X		
	No floodplain would be disturbed but no flood damage reduction would be achieved.	Would not be complete or effective as it does not address flooding on agricultural lands.	Would provide a complete flooding solution for the MMC and would include installation of bank protection in high-risk areas.	Would not be complete or effective as it does not address flooding on agricultural lands.	Would not be complete or effective as it does not address flooding on agricultural lands.	N/A	N/A	Would provide a complete flooding solution for the BW and would include installation of bank protection in high-risk areas.	Would provide a complete flooding solution for the BW and would include installation of bank protection in high-risk areas.	Would provide a complete flooding solution for BW and would include installation of bank protection in high-risk areas.	Would provide a complete flooding solution for the BW and would include installation of bank protection in high-risk areas.	Would provide a complete flooding solution for the BW and would include installation of bank protection in high-risk areas.	Would provide a complete flooding solution for the BW and would include installation of bank protection in high-risk areas.	Would provide a complete flooding solution for the BW and would include installation of bank protection in high-risk areas.
Public Safety					-	-								
	No floodplain would be disturbed but no flood damage reduction would be achieved.			Public safety would be improved by reducing flood risk to a subset of downstream residents in the 100-year floodplain.								Public safety would be improved by reducing flood risk to a subset of downstream residents in the 100-year floodplain.	Public safety would be improved by reducing flood risk to a subset of downstream residents in the 100-year floodplain.	
Sustainable Economic Development					-	-								
	No floodplain would be disturbed but no flood damage reduction would be achieved.	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water		N/A	N/A	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water quality and access.	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water quality and access.	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water quality and access.	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water quality and access.	Local economies would be positively impacted through improved infrastructure, due to flood damage reduction plans. Additionally, agriculturally based economies would benefit based on better water quality and access.

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		water quality and access	quality and access				quality and access.				quality and access.	quality and access.		
Healthy and Resilient Ecosystems					-	-								
	No floodplain would be disturbed but no flood damage reduction would be achieved.	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	Incorporation of Infrastructure for Drylands streams will provide long-term ecological benefits. Water infiltration will increase, and plant growth should correspondingly improve along these features.	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	N/A	N/A	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	Incorporation of Infrastructure for Drylands streams will provide long-term ecological benefits. Water infiltration will increase, and plant growth should correspondingly improve along these features.	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	Incorporation of Infrastructure for Drylands streams will provide long-term ecological benefits. Water infiltration will increase, and plant growth should correspondingly improve along these features.	Ecosystems would be positively impacted through reduced erosion, restoration with native plant species, and improved floodplain function.	Incorporation of Infrastructure for Drylands streams will provide long-term ecological benefits. Water infiltration will increase, and plant growth should correspondingly improve along these features.
Watershed Approach					-	-								
Floodplains					-	-								
	No floodplain would be disturbed but no flood damage reduction would be achieved.			Beneficial impact by reducing downstream flood damages to properties and infrastructure in the 100-year floodplain.								Beneficial impact by reducing downstream flood damages to properties and infrastructure in the 100-year floodplain.	Beneficial impact by reducing downstream flood damages to properties and infrastructure in the 100-year floodplain.	
ECOSYSTEM SERVICES (TRADE OFFS)														
Supporting														
No supporting services were evaluated for this project.														
Provisioning														
Wildlife Connectivity	There would be no disturbance	Temporary impacts from disturbance	Temporary impacts from disturbance	Temporary impacts from disturbance	N/A	N/A	Temporary impacts from disturbance	Temporary impacts from disturbance during construction	Temporary impacts from disturbance	Temporary impacts from disturbance	Temporary impacts from disturbance	Temporary impacts from disturbance	Temporary impacts from disturbance	Temporary impacts from disturbance

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	and therefore no impacts on wildlife connectivity.	during restoration. No effect on wildlife connectivity long-term.	during construction and restoration. No effect on wildlife connectivity long-term.	during restoration. No effect on wildlife connectivity long-term.			during restoration. No effect on wildlife connectivity long-term.	and restoration. No effect on wildlife connectivity long-term.	during construction and restoration. No effect on wildlife connectivity long-term.	during restoration. No effect on wildlife connectivity long-term.	during construction and restoration. No effect on wildlife connectivity long-term.	during construction and restoration. No effect on wildlife connectivity long-term.	during construction and restoration. No effect on wildlife connectivity long-term.	during construction and restoration. No effect on wildlife connectivity long-term.
Pollinator Habitat	There would be no disturbance but also no enhancement of pollinator habitat.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	N/A	N/A	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.	Beneficial impacts to pollinator habitat and pollinators.
Regulating														
Erosion Control	Erosion would continue at existing conditions.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	N/A	N/A	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.	Erosion would be reduced through floodplain restoration efforts.
Urban and Agricultural Flood Damage Reduction	Urban and agricultural flood risk would remain at existing conditions.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	N/A	N/A	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.	The risk of urban and agricultural floods would be reduced through floodplain restoration efforts.
Cultural														
Quality of Life	Quality of life would remain at existing levels as the flood risk would remain the same as existing conditions.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	N/A	N/A	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.	Quality of life would improve as flood risk would be reduced.
Recreation	Recreation opportunities and	The quality of the recreation	The quality of the recreation experience	The quality of the recreation experience	N/A	N/A	The quality of the recreation experience	The quality of the recreation experience would improve	The quality of the recreation experience	The quality of the recreation experience	The quality of the recreation experience	The quality of the recreation experience	The quality of the recreation experience would	The quality of the recreation experience

Problem Area	For all Problem Areas	PA 1 - Buckelew West		PA 2 - Tortugas Ranch		PA 3 and PA 4 - CAVSARP	PA 5 - Cactus Avra			PA 6 - Prickle Desert			PA 7 - Tucker Road	
Alternatives	**No Action (FWOFI)**	**Alt 1**	**Alt 2**	**Alt 1**	**Alt 2**	**Removed from further consideration by request by cooperating agency, given potential harm to existing critical facilities.**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 1**	**Alt 2**
	experience would remain the same as existing conditions.	experience would improve through floodplain restoration efforts.	would improve through floodplain restoration efforts.	would improve through floodplain restoration efforts.			would improve through floodplain restoration efforts.	through floodplain restoration efforts.	would improve through floodplain restoration efforts.	would improve through floodplain restoration efforts.	would improve through floodplain restoration efforts.	would improve through floodplain restoration efforts.	improve through floodplain restoration efforts.	would improve through floodplain restoration efforts.
Community Cohesion	Community cohesion would remain at existing levels because the risk of flooding would remain at existing conditions.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	N/A	N/A	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.	Community cohesion would improve through reduced flooding risk.

1 - Federal/non-federal cost share and total investment were calculated only for the Preferred Alternative (P2A1, P6A3, P7A1). The alternatives evaluation included preliminary benefit-cost ratios for all considered alternatives to aid in alternative selection. These ratios were based on construction cost. Final benefit cost ratios inclusive of all implementation costs were calculated only for the Preferred Alternative.
2 - Implementation costs for dismissed alternatives include construction costs only. Full implementation costs were calculated only for the Preferred Alternative.
*3 - The Locally Preferred Alternative and the NEE Alternative were identified as a combination of Alternatives P2A1, P6A3, and P7A. Please see **Section 5.4.2** for more information.*

Table 27 - Details for the Preferred Alternatives

Preferred Alternative	Interval of Opening (ft)	Base Width of Opening (ft)	Side Slope (ft)	Approximate Height of Opening (ft)	NID (L x W x D) (ft)
Problem Area No. 2 - Alternative 1	250	30	3:1	7	N/A
Problem Area No. 6 - Alternative 3	250	30	3:1	Varies: 5 to 7	60 x 60 x 1.5
Problem Area No. 7 - Alternative 1	250	30	3:1	7	N/A

**Note: Details provided in this table are based on the preliminary design plans (XXX 2024) (located in Appendix D.1) for the Preferred Alternatives and are subject to change in future design phases.*

Table 28 - Estimated Average Annual Costs (Brawley Wash Watershed, Arizona, 2024$) ^(/1)

	Public Law 83-566 Funds	Other, Non-Federal Funds	Total Costs
Stormwater Construction (Channels and Bank Rehab)	$0	$0	$0
Floodplain Easements (0 acres)	$0	$0	$0
Land Treatment Measures	$4,168,700	$0	$4,168,800
Mitigation	$555,300	$0	$555,300
Real Property Acquisition Cost	$0	$0	$0
Real Estate Appraisal Fees	$0	$0	$0
Relocation [2/]	$0	$0	$0
Sponsors Engineering Costs	$0	$18,500	$18,500
Non-Cost-Sharable Items [3/]	$4,724,000	$18,500	$4,742,500
NRCS Technical Assistance/Engineering	$0	$0	$0
Project Administration [4/]	$212,400	$0	$212,400
Water, Mineral, and Other Resource Rights [5/]	$23,600	$23,600	$34,100
Permits [5/]	$0	$0	$0
Real Property Rights [5/]	$0	$45,000	$45,000
Relocation, Beyond Required Decent, Safe Sanitary [6/]	$0	$0	$0
TOTAL	**$4,960,000**	**$87,100**	**$5,047,100**

[1/]Installation costs explanatory notes:

(a) The cost-share rate is the percentage of the average cost of installing the practice in the selected plan for the evaluation unit. During project implementation, the actual cost-share rate must not exceed the rate of assistance for similar practices and measures under existing national programs.

[2/]Relocation payments and assurances explanatory notes:

(b) Includes replacement in-kind, and payments necessary to meet decent, safe, and sanitary provisions. Percentages for cost-sharing will be based upon the cost-share rate of the project purpose requiring the relocation. The relocation assistance advisory services cost is to be included when computing the cost-sharing percentages. These percentages are to be used for the life of the project regardless of future changes or supplements.

(c) Investigation of the watershed project area indicates that no displacements will be involved under present conditions. However, in the event that displacement becomes necessary at a later date, the cost of relocation assistance and payments will be cost-shared in accordance with the percentages shown.

[3/]If actual non-cost-sharable item expenditures vary from these figures, the responsible party will bear the change.

[4/]The Sponsor(s) and NRCS will each bear the costs of project administration that each incurs. Sponsor costs for project administration include relocation assistance advisory service.

[5/]The Sponsor(s) will acquire, with other than Watershed Protection and Flood Prevention Act funds, such real property as will be needed in connection with the works of improvement. The value of real property is eligible as in-kind contributions toward the Sponsors' share of the works of improvement costs. In no case will the amount of an in-kind contribution exceed the Sponsors' share of the cost for the works of improvement. The maximum cost eligible for in-kind credit is the same as that for cost sharing.

[6/]Relocation payments for the cost of improvements beyond decent, safe and sanitary requirements is a non-project cost ineligible for assistance under the act.

Table 29 - Cost Details for the Preferred Alternatives

Works of Improvement	Unit	Number (Non-Federal Land)	Estimated Cost 1/		
			Public Law 83-566 Funds	Other Funds	Total
Problem Area No. 2 - Tortuga Ranch - Alternative 1	No.	1	$1,221,000	$25,800	$1,246,800
Problem Area No. 6 - Prickle Desert - Alternative 3	No.	2	$2,770,500	$39,800	$2,810,300
Problem Area No. 7 - Tucker Road, Alternative 1	No.	3	$968,500	$21,500	$990,000
Total Project			$4,960,000	$87,100	$5,047,100

Prepared: November 2024.

1/ Price base: 2024.

2/ Federal Funds include NRCS Engineering Services and Project Administration ($236,000 of $4,960,000 Public Law Funds), which are not included when calculating eligible federal cost-share. Permit costs ($45,000 of the $87,100 Other Funds) are also not included. Therefore, federal cost share is based on Total Eligible Project Cost of $4,766,100.

Table 30 - Table 4 - Estimated Average Annual Costs (Brawley Wash Watershed, Arizona, 2024$) /1

Works of Improvement	--------Project Outlays---------		
	Amortization of Installation Cost 2/	Operation, Maintenance and Replacement Cost 3/	Total
Problem Area No. 2- Tortuga Ranch- Alternative 1	$47,453	$0	$47,453
Problem Area No. 6- Prickle Desert-Alternative 3	$106,959	$0	$106,959
Problem Area No. 7- Tucker Road,Alternative 1	$37,679	$0	$37,679
TOTAL	**$192,090**	**$0**	**$192,090**

1/ Price Base: 2024.

Prepared: November 2024.

2/ Amortized for 50 years at 2.75 percent.

3/ Under current conditions, the City of Tuscon incurs approximately $360,000 annually in land management cost for invasive species management. This cost is comprised of $1,000 at P2A1, $120,000 at P6A3, and $239,000 at P7A1. Under proposed conditions, it is possible that Pima County would assume responsibility for annual O&M/land management. However, no new O&M cost is generated by the implementation of Preferred Alternative. Because there is no project specific O&M cost, O&M cost is shown as $0.

II. Supporting Information

Table 31 - Agency Consultation Record

Date	Contact, Agency	Communication
12/09/2020	Kathryn Leonard, State Historic Preservation Officer, Arizona State Historic Preservation Office (SHPO)	Initial Section 106 Consultation Letter notifying SHPO of Brawley Wash PL-566, Watershed Flood Prevention Operations (WFPO) Project.
12/09/2020	Native American Tribal Consultation • Honorable Robert Miguel, Chairman, Ak-Chin Community • Honorable Bernadine Burnette, President, Fort McDowell Yavapai Nation • Honorable Stephen Roe Lewis, Governor, Gila River Indian Community • Honorable Timothy L. Nuvangyaoma, Chairman, The Hopi Tribe • Honorable Gabe Aguilar, President, Mescalero Apache Tribe • Honorable Peter Yucupicio, Chairman, Pascua Yaqui Tribe • Honorable Terry Rambler, Chairman, San Carlos Apache Tribe • Honorable Martin Havier, President, Salt River Pima-Maricopa Indian Community • Honorable Ned Norris Jr., Chairman, Tohono O'odham Nation • Honorable Gwendena Lee-Gatewood, Chairwoman, White Mountain Apache Tribe • Honorable Jon Huey, Chairman, Yavapai-Apache Nation • Honorable Val R. Panteah, Sr., Governor, Pueblo of Zuni	Initial Section 106 Consultation Letter notifying Native American Tribes of Brawley Wash PL-566, Watershed Flood Prevention Operations (WFPO) Project.
08/05/2024	Kathryn Leonard, State Historic Preservation Officer, Arizona State Historic Preservation Office (SHPO)	Section 106 Consultation Letter notifying SHPO of Brawley Wash Class I Cultural Resources Study results.
08/05/2024	Ian M. Milliken, Cultural Resources & Heritage Preservation Manager, Pima County Conservation Lands & Resources	Section 106 Consultation Letter notifying Pima County Conservation Lands & Resources of Brawley Wash Class I Cultural Resources Study results.
08/05/2024	Jodie Brown, Historic Preservation Officer, City of Tucson	Section 106 Consultation Letter notifying City of Tucson of Brawley Wash Class I Cultural Resources Study results.
08/05/2024	Native American Tribal Consultation • Honorable Robert Miguel, Chairman, Ak-Chin Community • Honorable Bernadine Burnette, President, Fort McDowell Yavapai Nation • Honorable Stephen Roe Lewis, Governor, Gila River Indian Community • Honorable Timothy L. Nuvangyaoma, Chairman, The Hopi Tribe • Honorable Thora Walsh Padilla, President, Mescalero Apache Tribe • Honorable Peter Yucupicio, Chairman, Pascua Yaqui Tribe • Honorable Terry Rambler, Chairman, San Carlos Apache Tribe • Honorable Martin Havier, President, Salt River Pima-Maricopa Indian Community • Honorable Calvin Johnson, Chairman, Tonto Apache Tribe of Arizona • Honorable Verlon M. Jose., Chairman, Tohono O'odham Nation • Honorable Kasey Velasquez, Chairwoman, White Mountain Apache Tribe • Honorable Tanya Lewis, Chairwoman, Yavapai-Apache Nation	Section 106 Consultation Letter notifying Native American Tribes of Brawley Wash Class I Cultural Resources Study results.

	• Honorable Arden Kucate., Governor, Pueblo of Zuni	
01/03/2025	Kathryn Leonard, State Historic Preservation Officer, Arizona State Historic Preservation Office (SHPO)	Section 106 Consultation Letter notifying SHPO of Brawley Wash Class III Cultural Survey results.
01/03/2025	Ian M. Milliken, Cultural Resources & Heritage Preservation Manager, Pima County Conservation Lands & Resources	Section 106 Consultation Letter notifying Pima County Conservation Lands & Resources of Brawley Wash Class III Cultural Survey results.
01/03/2025	Jodie Brown, Historic Preservation Officer, City of Tucson	Section 106 Consultation Letter notifying the City of Tucson of Brawley Wash Class III Cultural Survey results.
01/03/2025	Patrick D. Lyons, Director Arizona State Museum, The University of Arizona	Section 106 Consultation Letter notifying the Arizona State Museum of Brawley Wash Class III Cultural Survey results.
01/03/2025	Native American Tribal Consultation • Honorable Robert Miguel, Chairman, Ak-Chin Community • Honorable Bernadine Burnette, President, Fort McDowell Yavapai Nation • Honorable Stephen Roe Lewis, Governor, Gila River Indian Community • Honorable Timothy L. Nuvangyaoma, Chairman, The Hopi Tribe • Honorable Thora Walsh Padilla, President, Mescalero Apache Tribe • Honorable Peter Yucupicio, Chairman, Pascua Yaqui Tribe • Honorable Terry Rambler, Chairman, San Carlos Apache Tribe • Honorable Martin Havier, President, Salt River Pima-Maricopa Indian Community • Honorable Calvin Johnson, Chairman, Tonto Apache Tribe of Arizona • Honorable Verlon M. Jose., Chairman, Tohono O'odham Nation • Honorable Kasey Velasquez, Chairwoman, White Mountain Apache Tribe • Honorable Tanya Lewis, Chairwoman, Yavapai-Apache Nation • Honorable Arden Kucate, Governor, Pueblo of Zuni	Section 106 Consultation Letter notifying Native American Tribes of Brawley Wash Class III Cultural Survey results.
05/16/2025	Kathryn Leonard, State Historic Preservation Officer, Arizona State Historic Preservation Office (SHPO)	Section 106 Consultation Letter notifying SHPO of Brawley Wash Additional Class III Cultural Survey results.
05/16/2025	Ian M. Milliken, Cultural Resources & Heritage Preservation Manager, Pima County Conservation Lands & Resources	Section 106 Consultation Letter notifying Pima County Conservation Lands & Resources of Brawley Wash Additional Class III Cultural Survey results.
05/16/2025	Jodie Brown, Historic Preservation Officer, City of Tucson	Section 106 Consultation Letter notifying the City of Tucson of Brawley Wash Additional Class III Cultural Survey results.
05/16/2025	Patrick D. Lyons, Director Arizona State Museum, The University of Arizona	Section 106 Consultation Letter notifying the Arizona State Museum of Brawley Wash Additional Class III Cultural Survey results.
05/16/2025	Native American Tribal Consultation • Honorable Gabriel Lopez, Chairman, Ak-Chin Community • Honorable Stephen Roe Lewis, Governor, Gila River Indian Community	Section 106 Consultation Letter notifying Native American Tribes of Brawley Wash Additional Class III Cultural Survey results.

Appendix A	• Honorable Timothy L. Nuvangyaoma, Chairman, The Hopi Tribe • Honorable Thora Walsh Padilla, President, Mescalero Apache Tribe • Honorable Julian Hernandez, Chairman, Pascua Yaqui Tribe • Honorable Martin Havier, President, Salt River Pima-Maricopa Indian Community • Honorable Calvin Johnson, Chairman, Tonto Apache Tribe of Arizona • Honorable Verlon M. Jose., Chairman, Tohono O'odham Appendix B Nation • Honorable Kasey Velasquez, Chairwoman, White Mountain Apache Tribe • Honorable Tanya Lewis, Chairwoman, Yavapai-Apache Nation • Honorable Arden Kucate, Governor, Pueblo of Zuni	Appendix C

Table 32 – Location of Problem Area APE

Identified Problem Area*	**Acres**	**Maximum Length × Width**	**Landownership**	**Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle**
Buckelew West			City of Tucson – Tucson Water	Township (T) 15 South (S), Range (R) 10 East , Sections (S) 21, 28, 33/Three Points
Tortuga Ranch	24.8	0.97 × 0.28 mile	Pima County; Private	T14S, R11E, S32/Brown Mountain
Cactus Avra	79.5	2.09 × 1.02 mile	City of Tucson – Tucson Water, Pima County, Private	T13S, R10E, S11, 13-15, 22-26/Avra
Prickle Desert	63.0	1.11 × 0.82 mile	City of Tucson – Tucson Water	T12S, R10E, S25/Avra
Tucker Road			City of Tucson – Tucson Water	T13S, R10E, S5/Avra

* From Stantec (2022)

Identified Problem Area*	**Acres**	**Maximum Length × Width**	**Landownership**	**Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle**
Tortuga Ranch	24.8	0.97 × 0.28 mile	City of Tucson; Pima County; Private	T14S, R11E, S29, S32, and S33/Brown Mountain
Prickle Desert	79.5	2.09 × 1.02 mile	City of Tucson; Private	T12S, R10E, S14, S23, S25, and S26/West of Avra, West of Marana
Tucker Road	63.0	1.11 × 0.82 mile	City of Tucson; Private	T13S, R10E, S5, and S8/West of Avra

* From Stantec (2022)

Tucker Road Problem Area APE

Problem Area Portion*	**Acres**	**Maximum Length × Width**	**Landownership**	**Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle**
Previously surveyed area	63.0	1.11 × 0.82 mile	City of Tucson; Private	Private T13S R10E S5 and S8/West of Avra
New survey area	35.2	0.57 × 0.35 mile	City of Tucson	T13S R10E S5 and S8/West of Avra

* From Stantec (2022)

Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

Appendix E – Supporting Information

CONTENTS:

Table 25 – Eliminated Alternatives and Rationale

Table 26 – Summary and Comparison of Alternative Plans

Table 27 – Details for the Preferred Alternatives

Table 28 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1)

Table 29 – Cost Details for the Preferred Alternatives

Table 30 – Table 4 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1))

Table 31 – Agency Consultation Record

Table 32 – Location of Problem Area APE

Attachment 14 – Preliminary Alternatives Selection Memo – Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – December 20, 2022)

Attachment 15 – Data Collection Technical Memorandum - Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – March 16, 2023)

Attachment 16 – Letter – NRCS Evaluation FPPA Ruling (May 21, 2024)

Attachment 17 – Class I Cultural Resources Inventory Results for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona, May 2024) (Revised July 2024)

Attachment 18 – Class III Cultural Resources Inventory Results Report (October 2024) (revised February 2025)

Attachment 19 – Letter – NRCS Section 12 Notification – Public Law 83-566 (February 10, 2025)

Attachment 20 – Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County Arizona, April 2025) Report

Preliminary Alternatives Selection Memo

To:	Carrie Olson Pima County Regional Flood Control District	From:	Joseph M. Alwin, PE Stantec Consulting Services Inc. One S. Church Avenue, Suite 2100 Tucson, Arizona 85701
File:	181301206	Date:	December 20, 2022

Reference: Brawley Wash Watershed Plan and Environmental Assessment

PCRFCD Contract: CT-FC-290

INTRODUCTION

This Alternatives Selection Technical Memorandum was prepared by Stantec Consulting Services Inc. (Stantec) with authorization from the Pima County Regional Flood Control District that serves as the Sponsoring Local Organization (SLO). This technical memorandum is provided under the scope of work for the Brawley Wash Watershed Plan-EA, Task 2.1 Formulate Alternatives and Workshops – SLO and NRCS, Contract Number PCRFCD CT-FC-290.

This memorandum summarizes the problem areas with the study limits, formulation of components used develop alternatives, feasibility evaluation and alternatives recommended for further evaluation (i.e., Task 2.2 Evaluate Alternatives). The memorandum includes:

- Purpose of the Project,
- Problem Area Identification,
- Formulation of Alternative Components,
- Feasibility Evaluation of Identified Components, and
- Alternatives Recommended for Further Evaluation.

PURPOSE OF PROJECT

The 198,000-acre (309 square miles) Brawley Wash Watershed project area is characterized by severe erosion and sedimentation, especially in areas where constructed embankments and canals from abandoned agricultural lands are no longer maintained and affect natural flow patterns. This causes the loss of wildlife habitat, as well as disruption of natural floodplains and drainage flow paths. The proposed PL-566 watershed plan will evaluate floodplain restoration, erosion control, structure removal and other conservation measures within the Planning Area and alternatives located only on County and City owned lands (see Figure 1). The Pima County Flood Control District (SLO) is the principal governmental entity charged with floodplain management, has managed projects of similar scope and size, and is a co-implementer of related conservation efforts, including Pima County's Sonoran Desert Conservation Plan (SDCP), Multi-Species Conservation Plan (MPSCP), and the Riparian In-Lieu Fee Mitigation Program.

The SLO is working in close coordination with Pima County, the City of Tucson, and the Altar Valley Conservation Alliance (AVCA) - a broad area stakeholder coalition. The SLO formulated the Floodplain Management Plan in coordination with a broad range of public stakeholders; including local governments, agricultural stakeholders and conservationists; over the course of a two-year public planning process. The project will also benefit small, farming and ranching agricultural communities such as BKW Farms, and will include the Tohono O'odham Nation - a Native American Tribe which includes Schuk Toak Farm.

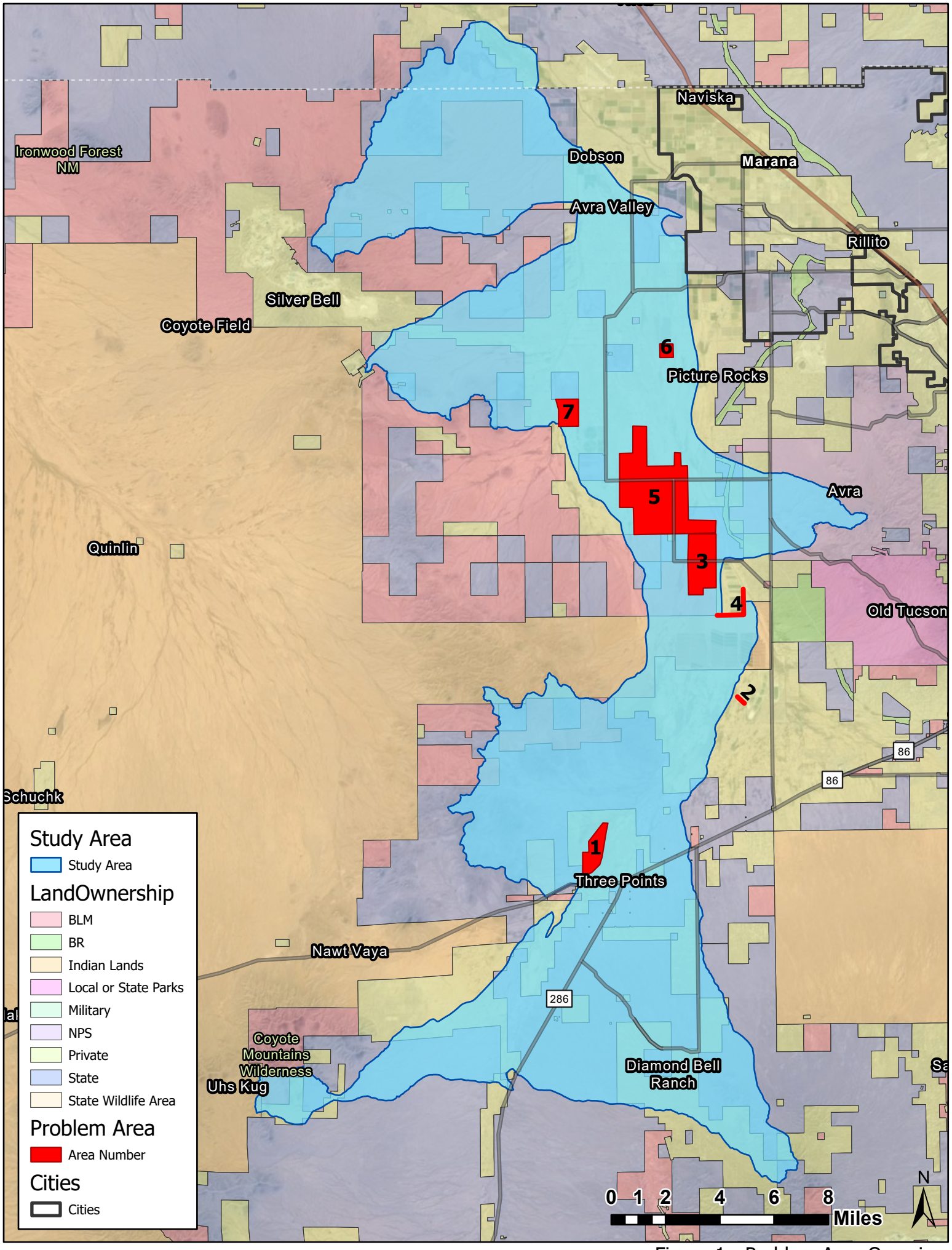


Figure 1 - Problem Area Overview

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

PROBLEM AREA IDENTIFICATION

In working with stakeholders and in accordance with the Purpose and Need Statement for this Plan-EA, support maps of the various resources of concern (e.g., invasive species, drainage complaints…etc.), the following are the identified problem areas for this study. Where a physical address could not be obtained, the latitude/longitude are provided.

Area No. 1 – Buckelew West

Location	Latitude 32.079252° North, Longitude 111.337623° West
Address	n/a
Access	Ajo Highway to Fuller Road, first right onto dirt access road, follow path northeast to access gate.
Area	616 acres
Classification	Abandoned agricultural field
Owner	City of Tucson (Tucson Water department)
Basic features	Terraced fields surrounded on the west-south-east by a constructed earthen embankment with an estimated height of between 2 to 5 feet.
Resources of Concern	ADEQ Wetlands on the northern and eastern boundary. Invasive species surrounding the area (e.g., Bermudagrass, Buffelgrass). School and police station to the southeast.
Observations	This abandoned field lies within the immediate left overbank of Brawley Wash and natural flow is diverted around the perimeter of the problem area, thereby increasing flow depths and potential erosive conditions within the main wash. Buffelgrass is present along the roadways, in areas where water collects at base of berms, and along remnant concrete irrigation canals.
Issues to be Addressed by Project	Restore natural drainage flow patterns by including a component within/along the existing perimeter berm thereby allowing flow to enter the abandoned agricultural field. This could also reduce flow depths to the west (private property). Mitigate invasive species within noted abandoned agricultural ditch.
Date*	March 10, 2021 [field visit no.1]

*the date that the noted location was identified as a potential problem area.

Several of the figures contained herein identify remanent structures (constructed berms, channels, diversion…etc.) that were the result of a terrain evaluation process (previous demonstration of this process was provided to the SLO and planning team) that, in general, have been abandoned.

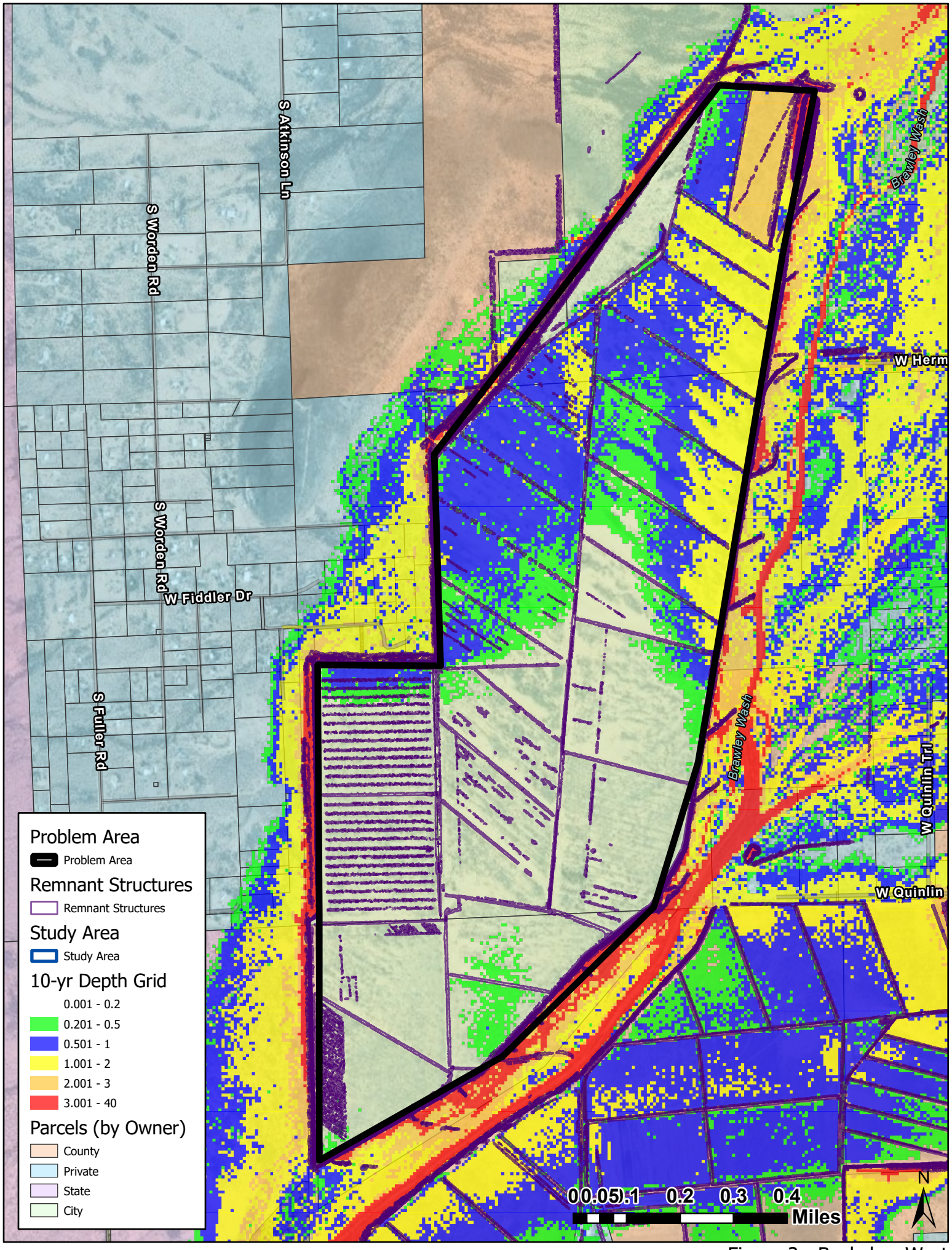


Figure 2 - Buckelew West

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Area No. 2 – Tortuga Ranch

Location	Latitude 32.175700° North, Longitude 111.243687° West
Address	3300 South Marstellar Road, Tucson, Arizona 85735
Access	Ajo Highway to Sandario Road, west on Snyder Hill Road, north on Marstellar Road, follow gravel road west into facility.
Area	n/a
Classification	Diversion embankment (at Latitude 32.173819° North, Longitude 111.246914° West)
Owner	Private/Pima County
Basic features	Constructed earthen embankment with an estimated maximum height of 6 feet.
Resources of Concern	ADEQ wetlands to the north and west. Invasive species to the west and south (e.g., Buffelgrass, Prickly Russian Thistle, Bermudagrass, and Mexican Palo Verde)
Observations	The noted diversion berm was constructed as part of access management needs during construction of the Southern Avra Valley Storage and Recovery Project (SAVSARP) facility. Flow is diverted toward the northwest thereby increasing flow depths into the ranch and potential erosive conditions. Flow depths resulting from slowly draining areas within/adjacent to the ranch have resulted in drainage conflicts and loss of livestock. Buffelgrass is present along back of diversion berm where water collects.
Issues to be Addressed by Project	Restore natural drainage flow patterns by including a component within/along the existing diversion berm thereby allowing flow to pass along the natural drainage path. Result could also reduce flow depths through the ranch and downstream active agricultural field(s) (Schuk Toak Farm). Mitigate noted invasive species within the limits of the County owned parcel(s).
Date*	May 25, 2022 [field visit no.3]

*the date that the noted location was identified as a potential problem area.

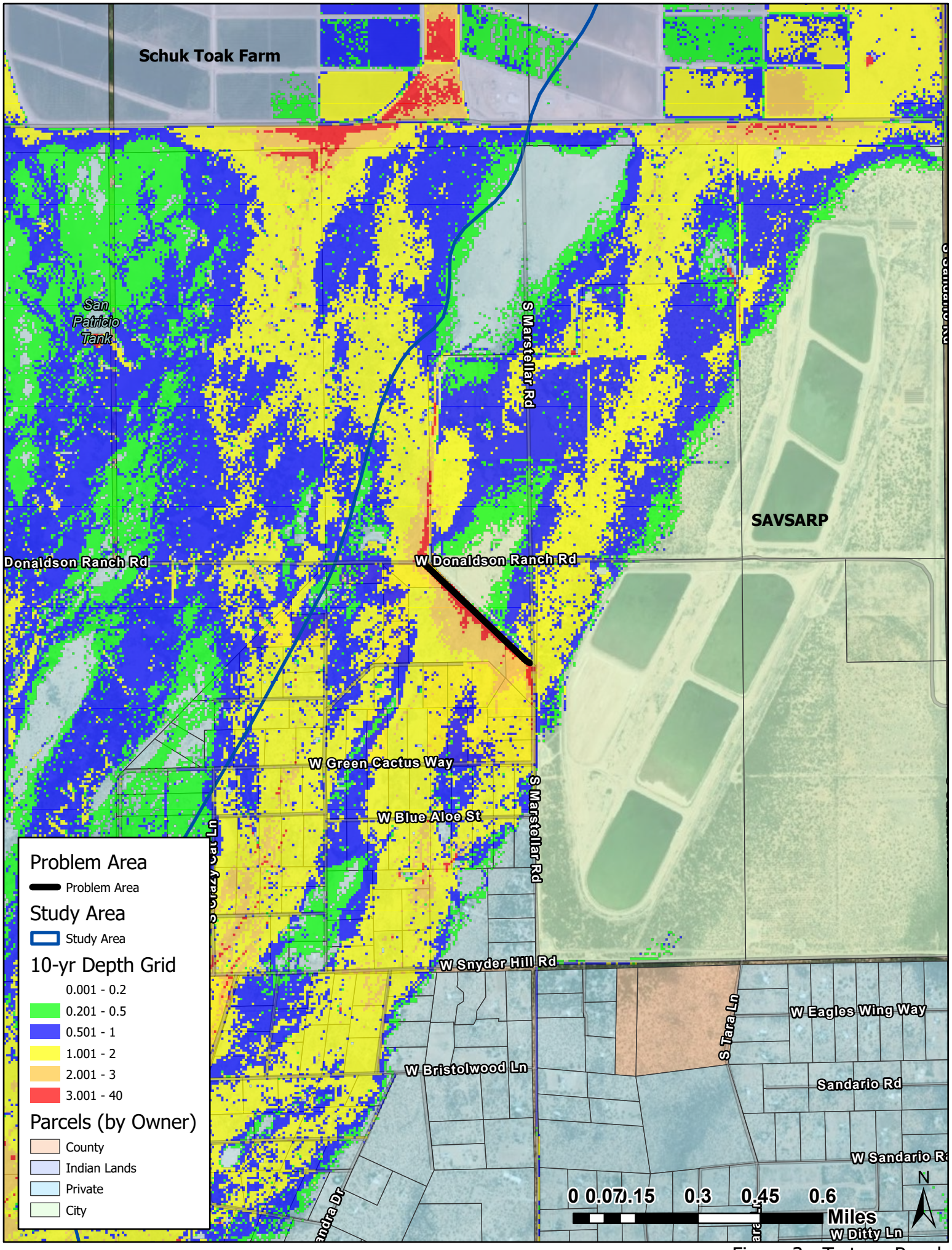


Figure 3 - Tortuga Ranch

Area No. 3 – CAVSARP (west)

Location	Latitude 32.236013° North, Longitude 111.260933° West
Address	13000 West Mile Wide Road, Tucson, Arizona 85743
Access	Ajo Highway to Sandario Road, west on Mile Wide Road approximately 1.8 miles to main entrance gate into facility.
Area	1,400 acres
Classification	Terraced fields surrounded on the west-south by a constructed earthen embankment(s).
Owner	City of Tucson (Tucson Water department)
Basic features	Constructed earthen embankment with an estimated height of between 2 to 5 feet.
Resources of Concern	Invasive species within area (e.g., Buffelgrass). Developer mapped erosion hazard areas to the east of site. Critical infrastructure.
Observations	The western and eastern boundary of this problem area collects and diverts surface flow along the perimeter of the facility. Increased erosion is likely a result of this condition. This facility is located on an abandoned agricultural field. Buffelgrass is present along the roadways, in areas where water collects at low points of site, and along remnant concrete irrigation canals.
Issues to be Addressed by Project	Summary provided herein as detailed descriptions of the issues are no longer required as the problem area has been dismissed as requested by Tucson Water. Restore natural drainage flow patterns. Reduce erosion potential. Mitigate invasive species.
Date*	March 10, 2021 [field visit no.1]

*the date that the noted location was identified as a potential problem area.

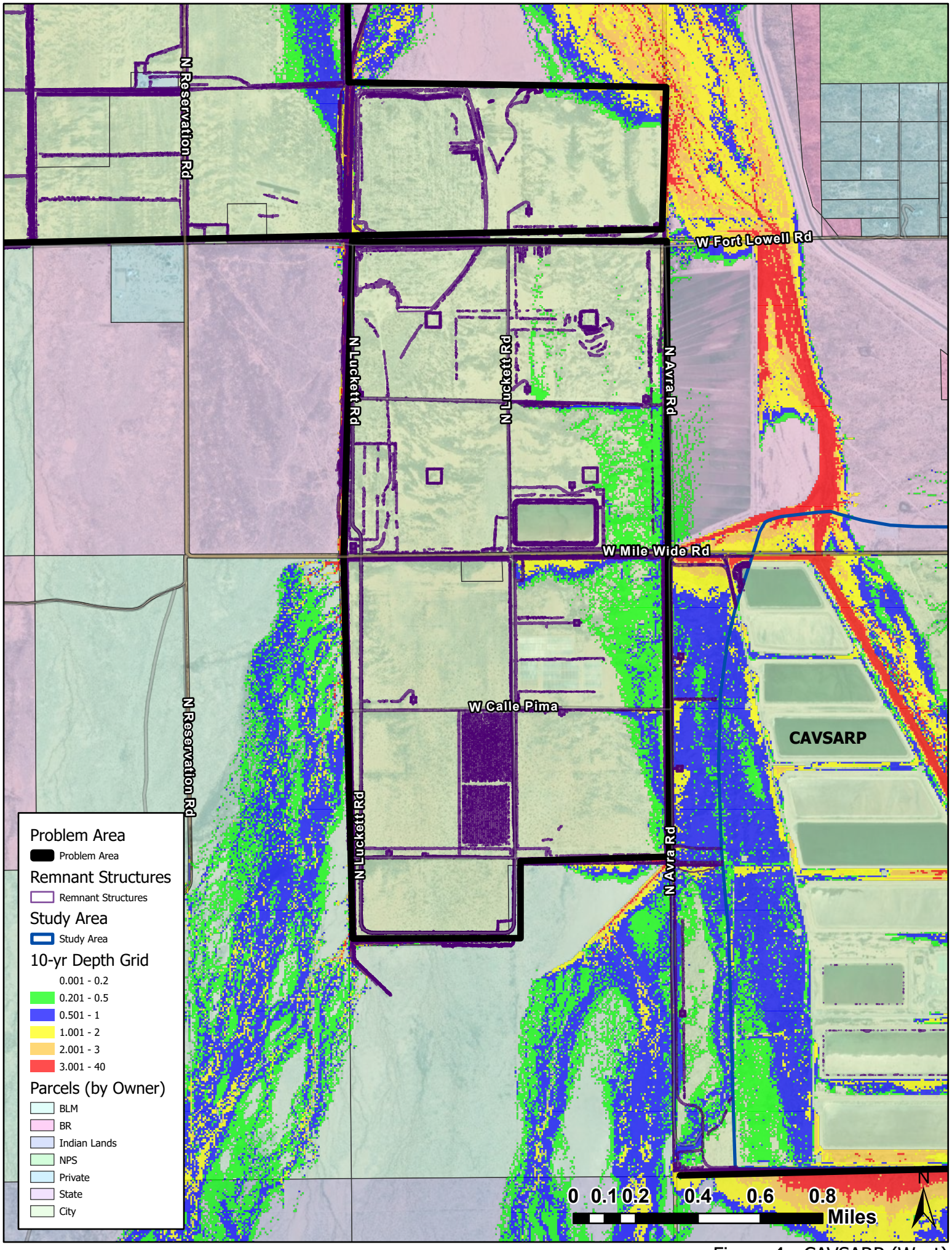


Figure 4 - CAVSARP (West)

Area No. 4 – CAVSARP (south)

Location	Latitude 32.236013° North, Longitude 111.260933° West
Address	13000 West Mile Wide Road, Tucson, Arizona 85743
Access	Ajo Highway to Sandario Road, west on Mile Wide Road approximately 1.8 miles to main entrance gate into facility.
Area	1,070 acres
Classification	Terraced fields surrounded on the south-east by a constructed earthen embankment.
Owner	City of Tucson (Tucson Water department)
Basic features	Constructed earthen embankment with an estimated height of between 4 to 6 feet.
Resources of Concern	ADEQ wetlands. Developer mapped erosion hazard to the north. Critical infrastructure.
Observations	The remanent structure located at the southern boundary of this problem area diverts surface flow along the perimeter of the facility. This results in increased flow depths and increased erosion. This facility is located on an abandoned agricultural field. Buffelgrass is present along the roadways, in areas where water collects at low points of site, and along remnant concrete irrigation canals.
Issues to be Addressed by Project	Summary provided herein as detailed descriptions of the issues are no longer required as the problem area has been dismissed as requested by Tucson Water. Restore natural drainage flow patterns. Reduce erosion potential. Mitigate invasive species.
Date*	May 25, 2022 [field visit no.3]

*the date that the noted location was identified as a potential problem area.

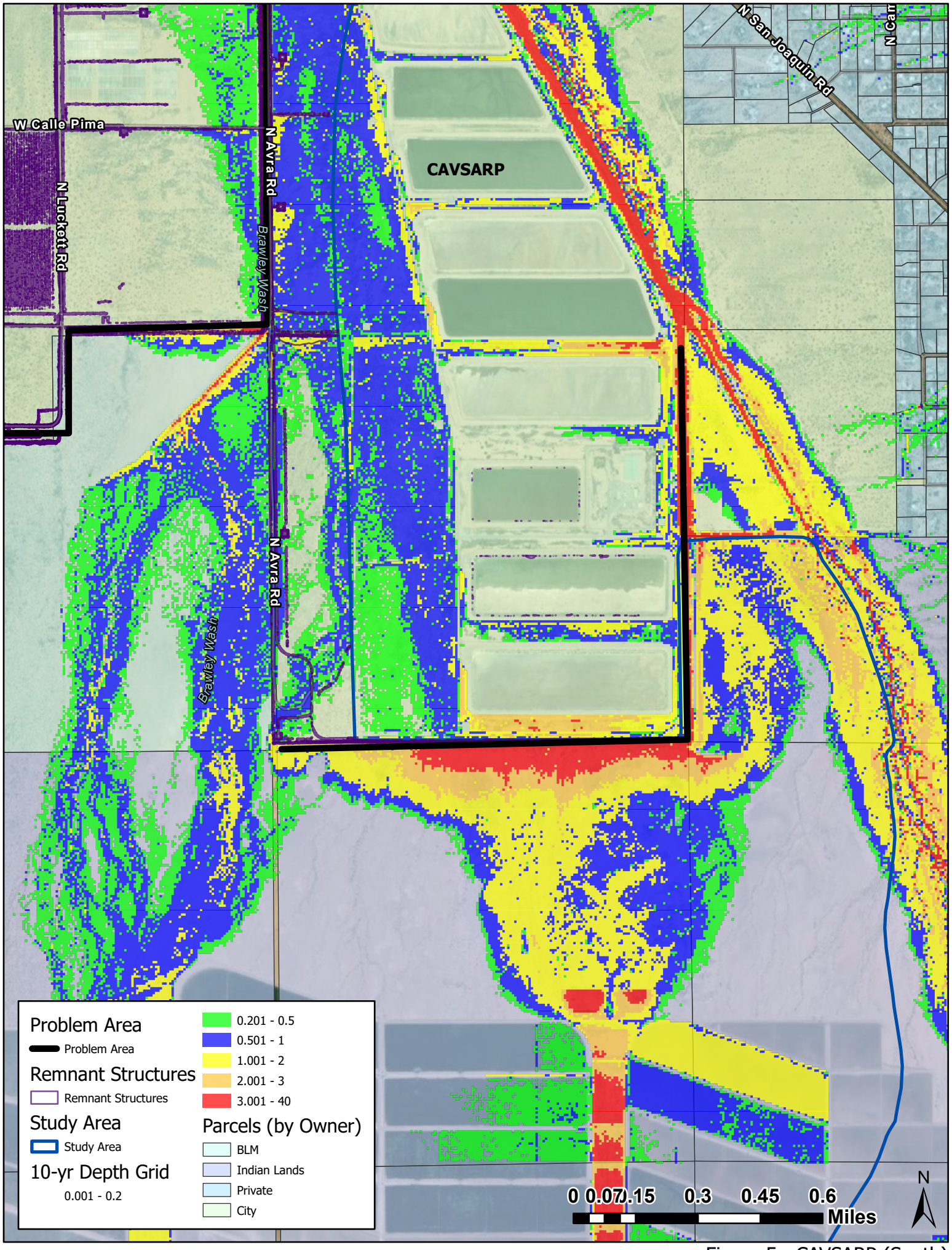


Figure 5 - CAVSARP (South)

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Area No. 5 – Cactus Avra

Location	Latitude 32.291813° North, Longitude 111.287615° West
Address	4400 North Little Cody Road, Picture Rocks, Arizona 85653
Access	Ajo Highway to Sandario Road, west on Manville Road approximately 4.5 miles to main entrance gate into facility.
Area	4,700 acres
Classification	Terraced fields surrounded with combinations of constructed earthen embankment(s) and/or irrigation/drainage channels.
Owner	City of Tucson (Tucson Water department)
Basic features	Constructed earthen embankment with an estimated height of between 3 to 4 feet. Channels with estimated depth of between 2 to 3 feet.
Resources of Concern	ADEQ wetlands. Invasive species (Buffelgrass, Maltese Star-Thistle, Bermuda Grass, Saharan Mustard, and Prickly Russian-Thistle). Developer mapped erosion hazard areas to the southeast.
Observations	Flows from Problem Area 3 continues along the eastern boundary of this problem area. Other internal potential drainage conflicts (e.g., west of Trico Road and south of Orange Grove Road) such as deep flow depth (e.g., > 6-feet) are known to also exist. This facility is located on an abandoned agricultural field. Buffelgrass is present along the roadways, in areas where water collects in low spots of former agricultural grading, and along remnant concrete irrigation canals.
Issues to be Addressed by Project	Restore natural drainage flow patterns by including a component within/along the existing perimeter berm(s) thereby allowing flow to enter the abandoned agricultural field. This approach may also reduce downstream flow depths and erosion potential. Mitigate invasive species as noted (Buffelgrass and Johnsongrass). Vegetation management. Need to maintain existing mesquites as such are an asset.
Date*	March 10, 2021 [field visit no.1]

*the date that the noted location was identified as a potential problem area.

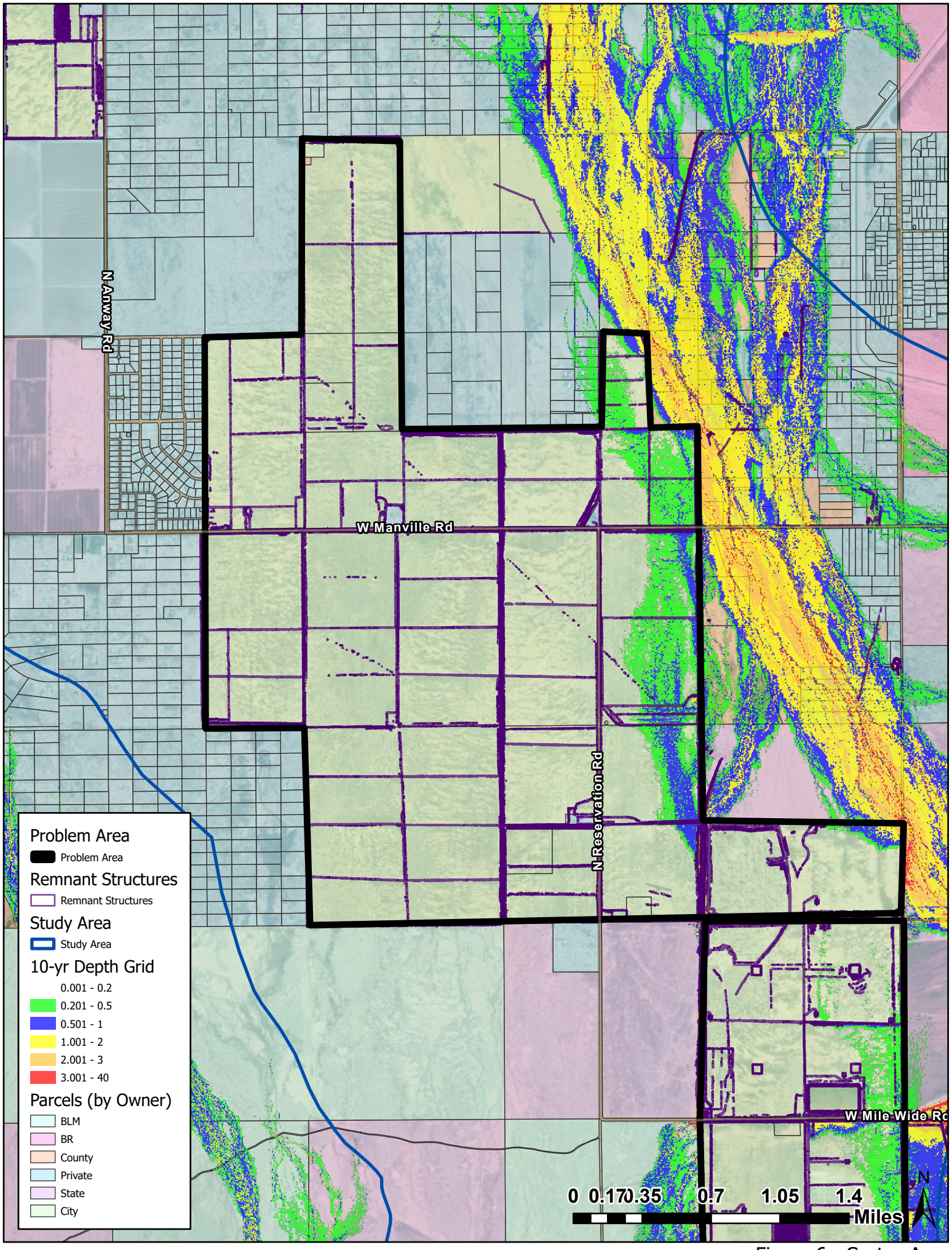


Figure 6 - Cactus Avra

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Area No. 6 – Prickle Desert

Location	Latitude 32.357567° North, Longitude 111.286423° West
Address	n/a
Access	Ajo Highway to Sandario Road, west on Avra Valley Road, south on Garvey Road approximately 2.5 miles into the fields.
Area	160 acres
Classification	Terraced fields surrounded with constructed earthen embankment(s).
Owner	City of Tucson (Tucson Water department)
Basic features	Constructed earthen embankment with an estimated height of between 1 to 4 feet.
Resources of Concern	Invasive species to the southwest (e.g., Bermudagrass).
Observations	Flows from the south are diverted toward the west and slightly toward the east. This results in increase flow depths and increased erosion conditions. As this area has not been directly reviewed, it is assumed that, based on other regional observations, Buffelgrass is likely occurring along the roadways, in areas where water collects in low spots within the abandoned agricultural field, and along remnant concrete irrigation canals.
Issues to be Addressed by Project	Restore natural drainage flow patterns by including a component within/along the existing perimeter berm(s) thereby allowing flow to enter the abandoned agricultural field. This approach may also reduce downstream flow depths and erosion potential. Mitigate invasive species where noted.
Date*	May 25, 2022 [identified prior to field visit no.1]

*the date that the noted location was identified as a potential problem area.

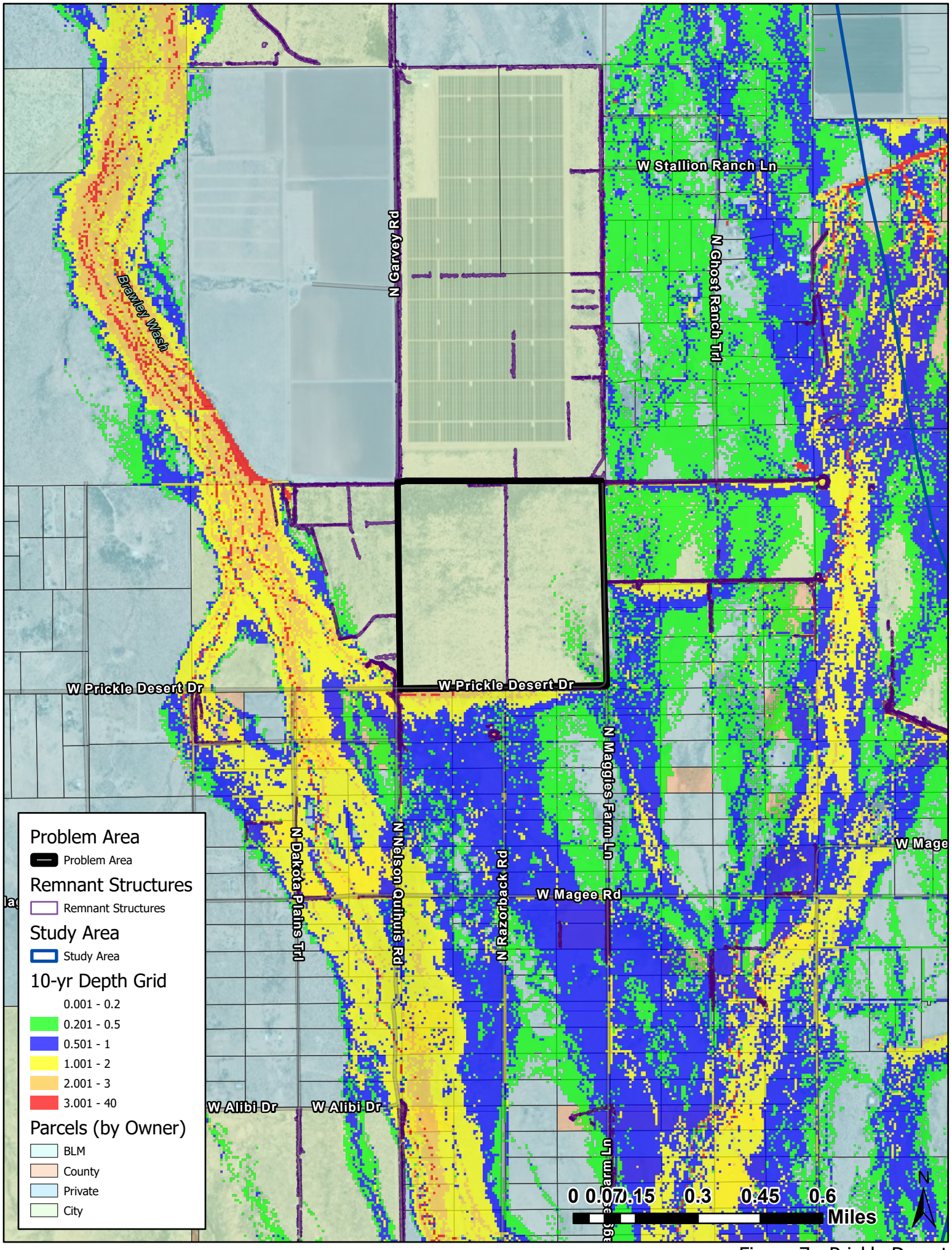


Figure 7 - Prickle Desert

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Area No. 7 – Tucker Road

Location	Latitude 32.335168° North, Longitude 111.352336° West
Address	n/a
Access	Ajo Highway to Sandario Road, west on Manville Road, north on Anway Road, west on Tucker Road approximately 1.8 miles to main entrance gate into facility.
Area	480 acres
Classification	Terraced fields surrounded with combinations of constructed earthen embankment(s) and/or irrigation/drainage channels.
Owner	City of Tucson (Tucson Water department)
Basic features	Constructed earthen embankment with an estimated height of between 3 to 4 feet. Channels with estimated depth of between 2 to 3 feet.
Resources of Concern	ADEQ wetlands south of Tucker Road. Erosion and head cutting at southwest corner.
Observations	Extensive erosion (i.e., head cutting) located along the western boundary of the facility within Blanco Wash (natural watercourse). Vertical difference of head cutting ~ maximum 20-25 feet. Buffelgrass is present along the roadways, in areas where water collects in low spots of former agricultural grading, and along remnant concrete irrigation canals.
Issues to be Addressed by Project	Restore natural drainage flow patterns by including a component within/along the existing perimeter berm(s) near the southwest corner thereby allowing flow to enter the abandoned agricultural field. This approach may also reduce downstream flow depths and erosion potential within Blanco Wash. Vegetation management – reduce grazing within the southern portion.
Date*	March 16, 2021 [identified during stakeholder meeting no.1]

*the date that the noted location was identified as a potential problem area.

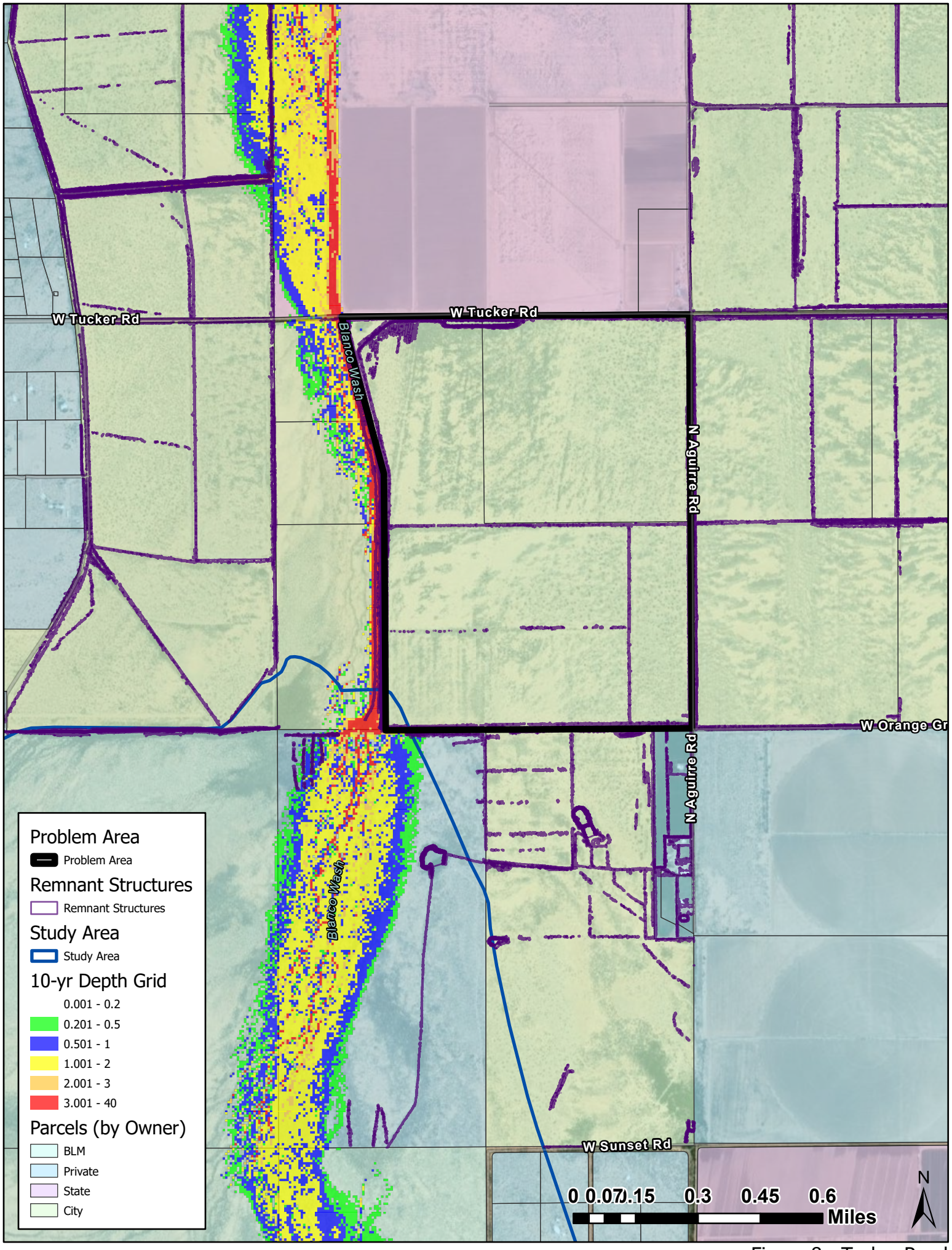


Figure 8 - Tucker Road

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

FORMULATION OF ALTERNATIVE COMPONENTS

On July 14, 2022, an Alternatives Workshop was held and was attended by stakeholders (see previously submitted meeting notes). The purpose of the workshop was to formulate a list of all components that could be applied to alternatives and are applicable to the general region (i.e., rural, arid environment), and considering the goals and objectives of the Purpose and Need Statement. The following components were presented along with supporting descriptions.

Component Name	Description
Retention/Detention Basins	Areas of excavation generally on public property that can be used for storage and/or controlled release of excess rainfall runoff. Retention provides no outlet for runoff whereas detention is designed to slowly discharge accumulated runoff.
Bank Stabilization	The addition of construction materials to channel banks to reduce erosion of bank material when the channel is conveying runoff.
Conveyance Channels/Channelization	Construction of new channels or improvement of existing channels (e.g., enlargement) to improve conveyance of stormwater.
Floods Walls	Construction of walls that block the conveyance of water through certain areas. Generally, consist of concrete or masonry units. With this feature it is important to note that blocking water to one area forces that water into another area.
Levees	Structures along conveyance features that keep floodwaters from overtopping those features. Generally, they are earthen structures. With this feature it is important to note that blocking water to one area may result in additional water into another area(s).
Flood Proofing	Additions, changes, or adjustments to a building that reduces or prevents flood damage to the structure and/or its contents.
Culverts	Structures that convey water underneath roads and other ground level features.
Road Improvements	Curbs: The construction of concrete curb to keep water in the street and off adjacent properties where existing curbs do not exist.
	Inverted Crown: The lowering of the centerline of a road below the curb line so water is conveyed in the roadway.
	Others: A number of improvements that can be made to roads to ease conveyance from pavement improvements to realignment.
Storm Drains	The construction of underground pipes to remove stormwater, or a portion thereof, from surface streets and convey that runoff downstream.
Diversion Channels/Structures	Structures designed to divert stormwater around negatively affected areas.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Component Name	Description
Low Flow Channels	Small channels included within an overall larger channel. They can be found in a large wash and convey small rainfall/flow events.
Restore Disturbed Areas	The restoration of areas that have been altered from their natural state that has resulted in increased runoff.
On-site Individual Lot Retention/Detention	Areas of excavation on private property designed to store excess runoff on-site.
Natural Infrastructure for Dryland Streams	Low impact development (LID) and green infrastructure (GI) includes a variety of solutions such as stormwater harvesting basins, vegetated or rock swales, bioretention systems, infiltration trenches, permeable pavements, and drywells. These solutions use natural materials and low impact construction to increase localized stormwater storage and infiltration.
Delineate Additional Floodplains	Perform studies with better techniques and technologies to add or remove properties from a FEMA or locally designated floodplain.
Delineate/Preserve Flow Corridors	Conservation or return of historical and natural flow paths to mitigate runoff issues.
Utilize Floodplain Regulations	Enforcement of laws regarding properties that are in a FEMA or locally designated floodplain.
Floodplain Land Acquisition Program (FLAP)	Public acquisition of private property in flood prone areas for use in mitigation.
Infill Development Criteria	Solutions to improve the quality and efficiency of underutilized or misused properties by developing amenities and drainage enhancements.
Open Space Regulations/ Preservation/Purchase	Preservation or return of properties to natural conditions.
Flood Warning System	Technology that monitors stormwater levels and issues advance warning of flood events so property owners can implement mitigation efforts/move to safety.
Public Education and Outreach	Disseminating information about the cause of flood events and mitigation techniques for flood prone areas.
Flood Insurance	Private property owners in flood prone areas may purchase insurance against flood damage for their property.
Ground Surface Pitting, no planting or seeding	Mechanical soil roughening / pitting is performed to form basins and irregularities in the soil surface. Relies on seed input from surrounding undisturbed native plant communities. Not recommended on sites with invasives.
Seeding - hydroseed	Mechanical soil roughening / pitting is performed on contour to form basins and irregularities in the soil surface. Ground is furrowed to a minimum depth of 6". Hydroseed with fertilizer, mulch, and tackifier is applied. Best applied during fall / winter rainy season.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Component Name	Description
Seeding - hydroseed followed by Hydrostraw mulching	Mechanical soil roughening / pitting is performed on contour to form basins and irregularities in the soil surface. Ground is furrowed to a minimum depth of 6". Hydroseed with fertilizer and mulch is applied. Best applied during fall / winter rainy season. Follow with Hydrostraw mulching, consisting of straw and tackifier.
Seeding - broadcast or drill seeding with straw mulch	Mechanical soil roughening / pitting is performed to form basins and irregularities in the soil surface. Ground is furrowed to a minimum depth of 4" and seed is applied by drill seeding or broadcast methods. Straw mulch is applied and crimped or tacked to retain in place. Best applied during fall / winter rainy season.
Planting with Automatic Irrigation	Hardened plants are installed with temporary drip irrigation system for a period of two years. Prior to planting, mechanical soil roughening / pitting is performed.
Planting with Manual Irrigation	Hardened plants receive infrequent watering by truck or hand. No irrigation system is installed. Berms / basins are installed around plants to facilitate watering. Prior to planting, mechanical soil roughening / pitting is performed.
Planting with No Irrigation	Hardened plants are watered upon planting. Planting is timed with either fall or summer rainy season. No irrigation system is installed. Prior to planting, mechanical soil roughening / pitting is performed.
Planting - Resource Islands	Concentrated Plantings (groupings of plants that will become seedbanks) that can be protected from predation and irrigated with temporary irrigation or a watering truck. Plantings are on a scale to make invasive species management practical.
Mulching with Tree limbs / cuttings	Placing tree branches (such as mesquite) on barren land to aid in seed germination. The branches help trap soil, provide shade, and feed microorganisms.
Chemical Control	Appropriate species-specific herbicides are applied seasonally. Timing of application is important and varies depending on target species. Multiple / ongoing treatments are required for established infestations.
Manual (Physical) Control	Invasive species are removed mechanically and disposed off site. After plants go to seed this method is not recommended--leads to dispersal of seed into 'worked' soil which can exacerbate the infestation. Multiple / ongoing treatments are required for established infestations.
Fire (Mesquite and woody shrub) Control	Tool to control undesirable perennial woody plants in grassland areas. Mimics historic, natural, grassland processes. Not useful to control invasive grasses and other invasive herbaceous plants. Not appropriate in desert scrub regions of the plan area.

In addition to the above, the NRCS provided a list of applicable Conservation Practice Standards (i.e., alternative components) and is summarized below.

Access Control (ac) 472 10/17 ESD-For 10

Access Road (ft) 560 09/20 CED-AE 10
Clearing and Snagging (ft) 326 05/16 CED-CE 5
Conservation Cover (ac) 327 09/14 ESD-Agron 5
Critical Area Planting (ac) 342 09/16 ESD-Agron & CED-LA 10
Dam (no) 402 10/20 CED-DE 15
Dam, Diversion (no) 348 10/20 CED-DE 15
Dike (ft) 356 11/02 CED-HE 20
Diversion (ft) 362 05/16 CED-AE 10
Drainage Water Management (ac) 554 10/20 CED-WME 1
Grade Stabilization Structure (no) 410 10/20 CED-DE 15
Grazing Land Mechanical Treatment (ac) 548 09/10 ESD-GLS 1
Heavy Use Area Protection (sf) 561 09/20 CED-AE 10
Herbaceous Weed Treatment (ac) 315 10/20 ESD-GLS 5
Hillside Ditch (ft) 423 10/17 CED-AE 10
Lined Waterway or Outlet (ft) 468 09/20 CED-AE 15
Mulching (ac) 484 10/17 ESD-Agron 1
Obstruction Removal (no) 500 09/20 CED-AE 10
Open Channel (ft) 582 09/15 CED-DE 15
Pond (no) 378 09/15 CED-DE 20
Pond Sealing or Lining, Compacted Soil Treatment (sf) 520 05/16 CED-SE 15
Pond Sealing or Lining, Concrete (sf) 522 05/16 CED-SE 20
Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner (sf)521 10/17 CED-CE 20
Range Planting (ac) 550 04/10 ESD-GLS 5
Restoration of Rare or Declining Natural Communities (ac) 643 03/17 ESD-WBio 1
Riparian Herbaceous Cover (ac) 390 09/10 ESD-WBio 5
Road-Trail-Landing Closure and Treatment (ft) 654 10/17 ESD-For & CED-AE 10
Rock Wall Terrace (ft) 555 09/20 CED-AE 10
Sediment Basin (no) 350 05/16 CED-DE 20
Sinkhole Treatment (no) 527 09/15 CED-EG 10
Spoil Disposal (cf) 572 09/20 CED-AE 1
Stormwater Runoff Control (ac) 570 09/20 CED-AE 1
Stream Crossing (no) 578 10/17 CED-EG & ESD-AqEco 10
Stream Habitat Improvement and Management (ac) 395 05/19 ESD-AqEco 5
Streambank and Shoreline Protection (ft) 580 10/20 CED-DE 20
Structure for Water Control (no) 587 10/17 CED-DE 20
Trails and Walkways (ft) 575 09/20 CED-AE & ESD-GLS 10
Tree/Shrub Establishment (ac) 612 05/16 ESD-For & CED-LA 15
Tree/Shrub Site Preparation (ac) 490 10/20 ESD-For 1

Underground Outlet (ft) 620 09/20 CED-AE 20
Vegetative Barrier (ft) 601 09/15 ESD-Agron 5
Vertical Drain (no) 630 09/15 CED-EG 10
Water and Sediment Control Basin (no) 638 10/17 CED-AE 10
Water Harvesting Catchment (no) 636 09/20 CED-WME 20
Waterspreading (ac) 640 09/20 CED-WME 15

RATIONALE FOR ELIMINATING ALTERNATIVE COMPONENTS

Several of the above alternative components were eliminated based on site-specific conditions, were found to be infeasible, did not support the Purpose and Need Statement, were not consistent with NRCS Principles, Requirements and Guidelines (PR&G) (*Guidance for Conducting Analysis Under Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments*, DM 9500-013, Section 6(b)(4)(a), January 5, 2017) or were deemed to be a feature or an enhancement of a given alternative and are explained in the following table.

Component Name	Rationale for Elimination
Retention/Detention Basins	Does not support the Purpose and Need Statement (i.e., restore natural drainage flow pattern). Also, based on the previous PL-566 (2008) study, such structures were found to be too costly. Therefore, this component was deemed not be efficient or acceptable.
Bank Stabilization	In general, within the limits of each problem area, this erosion countermeasure was found not to be practicable (e.g., did not meet completeness or effectiveness goals).
Conveyance Channels/Channelization	The consideration and construction of new channels within the limits of each problem area was found to be impracticable (e.g., did not meet completeness or effectiveness goals).
Floods Walls	Does not support the Purpose and Need Statement as this component is meant to encroach into floodplain of a given watercourse. Therefore, this component was not acceptable.
Levees	Does not support the Purpose and Need Statement as this component is meant to encroach into floodplain of a given watercourse. Therefore, this component was not acceptable.
Flood Proofing	In general, no residential dwellings and/or business structures exist within the limits of each problem area. Therefore, this component was considered not to be complete, effective or efficient.
Culverts	None. This is feasible component. The purpose of this component would be to install corrugated metal pipe(s) at a specific interval within existing abandoned agricultural embankments within a given problem area. This component meets the acceptability, effectiveness and efficiency goals.
Road Improvements	Curbs: This option within the component was deemed to be impracticable given the setting of each problem area (i.e., rural, agricultural fields). Therefore, this component was not acceptable.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Component Name	Rationale for Elimination
	Inverted Crown: This option within the component was deemed to be impracticable given the setting of each problem area (i.e., rural, agricultural fields) and that this option has the tendency to divert natural flow patterns. Therefore, this component was not acceptable.
	Others: None. This is a feasible component related to the Purpose and Need Statement and the conditions present within each problem area.
Storm Drains	This component was deemed infeasible given the lack of "positive outflow" (i.e., constant negative hydraulic grade line) within each of the problem areas. Therefore, this component was not acceptable.
Diversion Channels/Structures	None. This is a feasible component related to the Purpose and Need Statement and the conditions present within each problem area. In the context of each noted problem area, this component is meant to divert flow from the surrounding flood source into each abandoned agricultural field. This component meets the acceptability, effectiveness and efficiency goals.
Low Flow Channels	Impracticable given that substantial constructed channels (i.e., those large enough to facilitate including a low flow or "pilot" channel) do not exist within the problem areas. Therefore, this component was not acceptable.
Restore Disturbed Areas	None. This is a feasible component related to the Purpose and Need Statement and the conditions present within each problem area. This component meets the acceptability, effectiveness and efficiency goals.
On-site Individual Lot Retention/Detention	Does not support the Purpose and Need Statement (i.e., does not restore natural drainage patterns). Therefore, this component was considered not to be complete, effective or efficient.
Natural Infrastructure for Dryland Streams	None. This is a feasible component related to the Purpose and Need Statement and the conditions present within each problem area. This component meets the acceptability, effectiveness and efficiency goals.
Delineate Additional Floodplains	A concurrent study, by the Pima County Regional Flood Control District, is already being performed and all problem areas identified within this Plan-EA are included within said study. Therefore, this component was considered not to be efficient.
Delineate/Preserve Flow Corridors	None. This is a feasible component related to the Purpose and Need Statement and the conditions present within each problem area. This component meets the acceptability goal.
Utilize Floodplain Regulations	This component was determined to be ineffective given that each problem area had been previously developed prior to County ordinance. Therefore, this component was considered not to be effective.
Floodplain Land Acquisition Program (FLAP)	None. This is a feasible component related to the Purpose and Need Statement and the conditions present within each problem area. This component meets the acceptability goal.
Infill Development Criteria	As the problem areas are all located within agency (City of Tucson) owned land, this component was deemed to be not acceptable by the SLO.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Component Name	Rationale for Elimination
Open Space Regulations/ Preservation/Purchase	As the problem areas are all located within agency (City of Tucson) owned land, this component was deemed to be not acceptable by the SLO.
Flood Warning System	Property owners that would benefit from advanced warning do not exist within any of the identified problem areas (i.e., City or County owned lands). Therefore, this component was considered not to be effective.
Public Education and Outreach	Deemed to be impracticable as the problem areas are located entirely on City or County owned lands. Therefore, this component was considered not to be effective and does not address the completeness goal.
Flood Insurance	Deemed to be impracticable as the problem areas are located entirely on City or County owned lands and that no structures are present or planned to be built. Therefore, this component was considered not to be effective.
Ground Surface Pitting, no planting or seeding	Was deemed to have elements already included within Natural Infrastructure for Dryland Streams and was therefore removed from further consideration.
Seeding - hydroseed	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals.
Seeding - hydroseed followed by Hydrostraw mulching	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals.
Seeding - broadcast or drill seeding with straw mulch	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals. This component meets the acceptability, and effectiveness goals.
Planting with Automatic Irrigation	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, and effectiveness goals.
Planting with Manual Irrigation	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, and effectiveness goals.
Planting with No Irrigation	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability and efficiency goals.
Planting - Resource Islands	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable.
Mulching with Tree limbs / cuttings	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable.
Chemical Control	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the

Component Name	Rationale for Elimination
	effectiveness and efficiency goals but is unclear if the component also addresses the acceptability goal.
Manual (Physical) Control	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable. This component meets the acceptability, effectiveness and efficiency goals.
Fire (Mesquite and woody shrub) Control	Based on discussion with the SLO, this component would be included for each problem area where feasible and advisable.

The components identified within the NRCS Conservation Practice Standards were found to be included within the above tabular list of components based on consensus with the NRCS and SLO.

The outcome of the Alternatives Workshop led to the following alternative components being recommended by the project team and stakeholders for consideration during the Feasibility Workshop.

Culverts (NRCS Structure for Water Control (no) 587 10/17 CED-DE 20)

Road Improvements (NRCS Access Road (ft) 560 09/20 CED-AE 10)

Diversion Channels/Structures (NRCS Dike (ft) 356 11/02 CED-HE 20 and/or Diversion (ft) 362 05/16 CED-AE 10)

Restore Disturbed Areas (NRCS Obstruction Removal (no) 500 09/20 CED-AE 10)

Delineate/Preserve Flow Corridors (SLO management practice)

Floodplain Land Acquisition Program (FLAP) (SLO management practice)

Natural Infrastructure for Dryland Streams (NRCS Sediment Basin (no) 350 05/16 CED-DE 20)

Invasive Species and Vegetation Management (NRCS Herbaceous Weed Treatment (ac) 315 10/20 ESD-GLS 5…etc)

Two of the above components, Delineate/Preserve Flow Corridors and Floodplain Land Acquisition Program (FLAP), are known as non-structural practices whereby no physical change to the land or structures is performed and accomplished through administrative procedures only. This distinction is of note as the purpose of any hydraulic modeling is to evaluate impacts to flow resulting from the consideration of structural components (e.g., change to terrain).

FEASIBILITY EVALUATION OF ALTERNATIVES

On August 24, 2022, a Feasibility Workshop was held and was attended by stakeholders (submitted meeting notes under separate cover). The purpose of the workshop was to evaluate each recommended alternative component, during the meeting such was referred to merely as “the alternative”, for each noted problem area using evaluation criteria developed and agreed upon by the project team and stakeholders. The workshop included anonymous feedback forms completed online by each of the attendees and the result of the evaluation is summarized herein. Supporting information related to each alternative component was provided prior to the meeting and is attached to this memorandum as Appendix A.

Based on feedback from the City of Tucson (cooperating agency), Problems Areas 3 and 4 were removed from the evaluation given potential harm to existing critical facilities (e.g., potable water distribution system

components) located within/near those areas whereby surrounding diversion berms were to be partially or wholly removed.

The evaluation criteria used to solicit feedback from the attendees are:

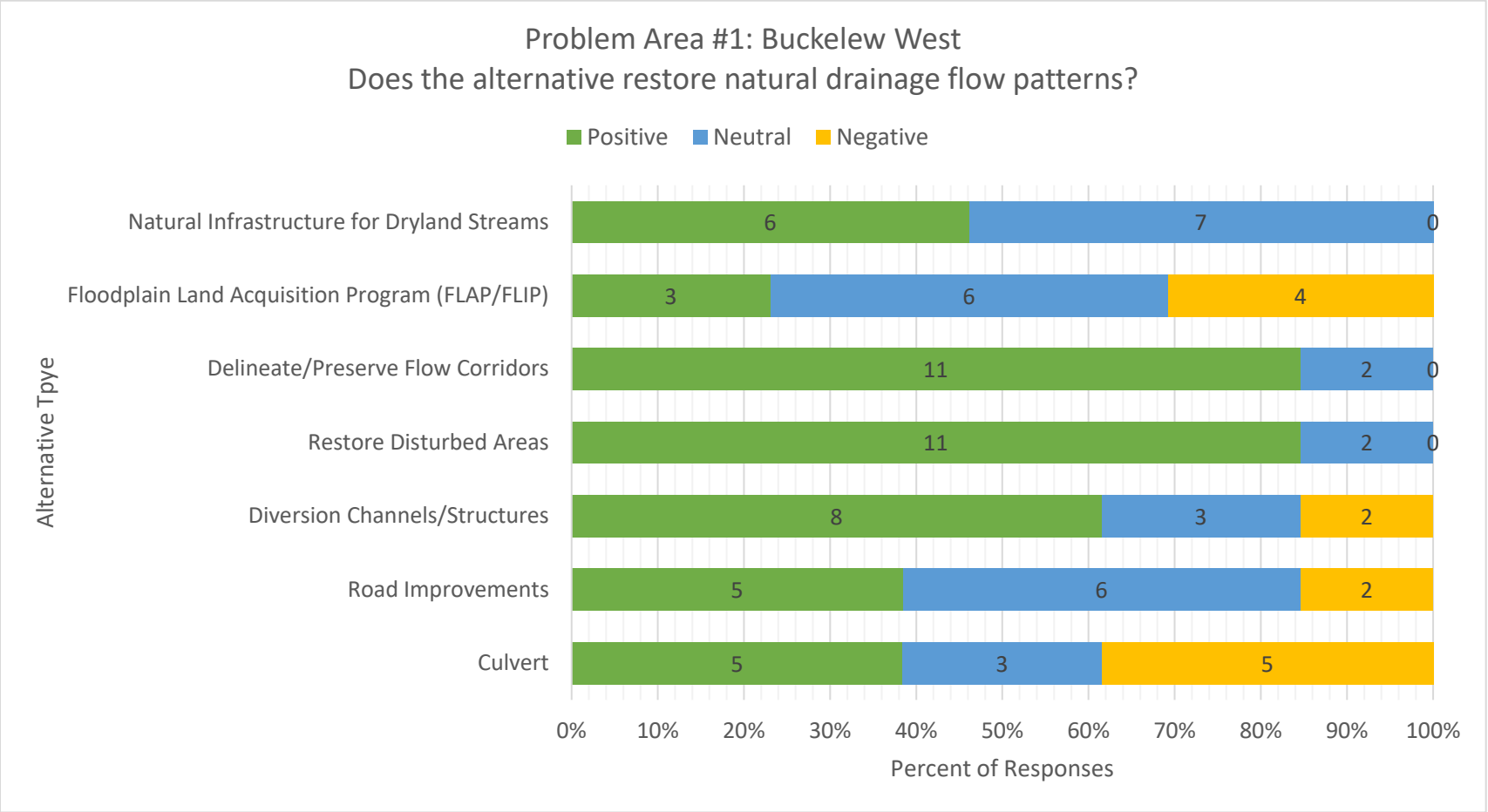
1. Does the alternative restore natural drainage flow patterns?
2. Does the alternative reduce potential flood and erosion damages to public and private infrastructure?
3. Does the alternative reduce potential flood and erosion damages to active agricultural lands?
4. Does the alternative enhance native habitat, rangeland health and soil health?
5. Does the alternative maintain access (e.g., site maintenance, emergency response)?

The above criteria were based on the Purpose and Need Statement for this project, and PR&G criteria (DM9500-013, 2017). Weighting factor(s) were not applied to any of the above criteria.
The feedback from attendees was limited to the following:

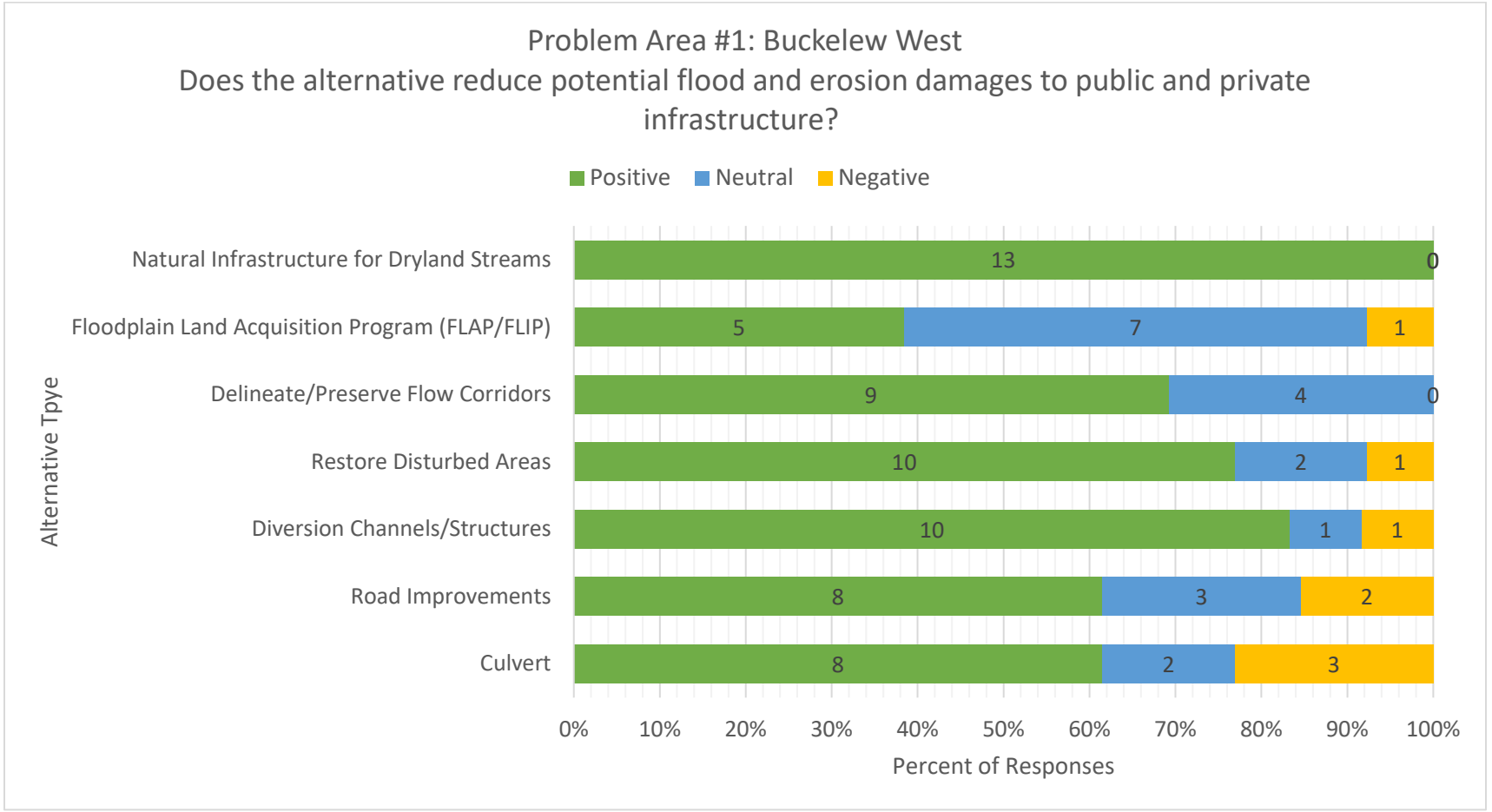
- Positive – does the alternative result in a positive benefit based on the noted criteria?
- Negative – does the alternative result in a negative benefit (e.g., adverse result) based on the noted criteria?
- Neutral - does the alternative result in essentially no change to the noted criteria?

The results of stakeholder feedback for each problem area and evaluation criteria are provided on the following figures.

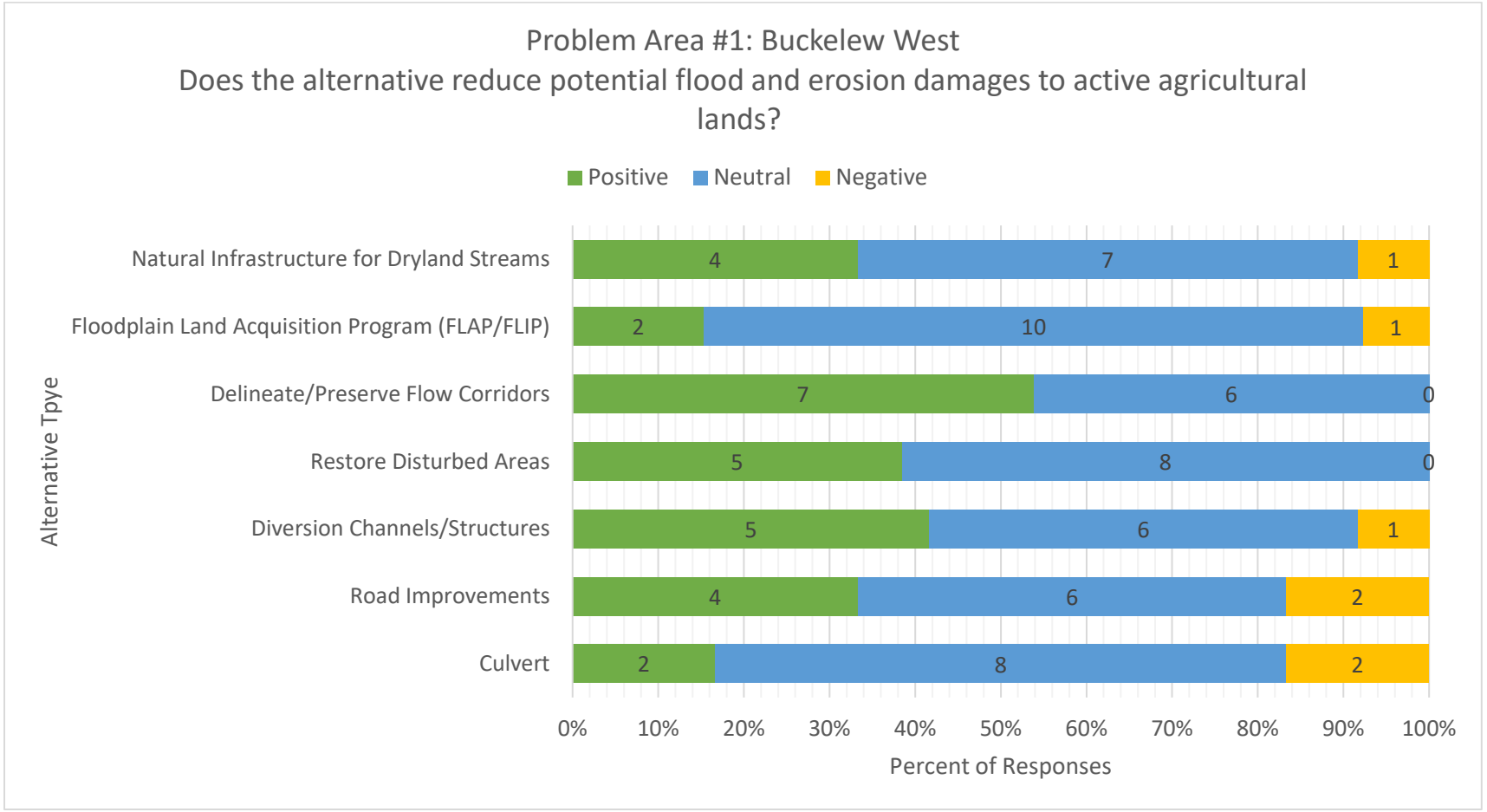
Area No. 1 – Buckelew West – Criteria No. 1



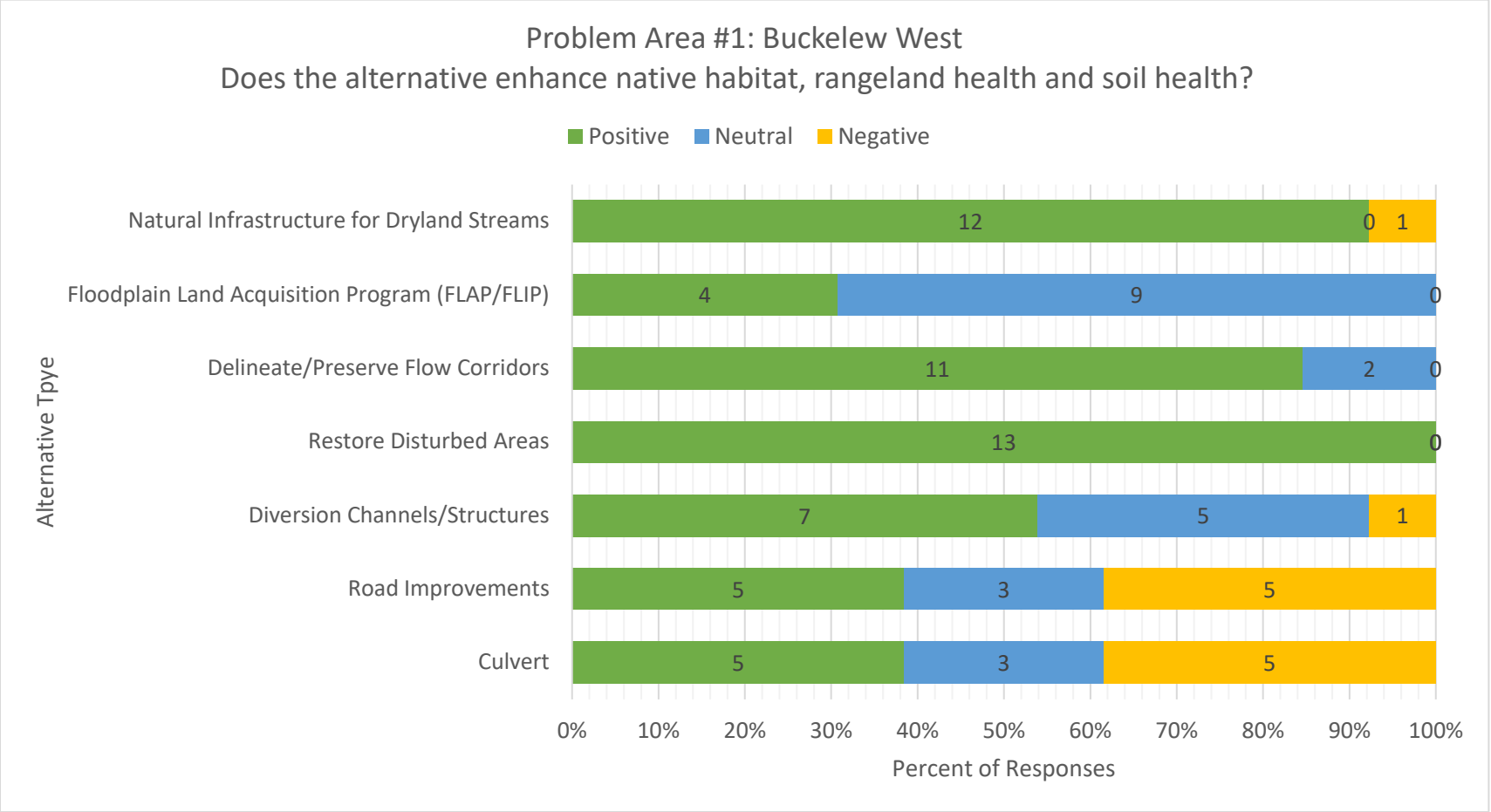
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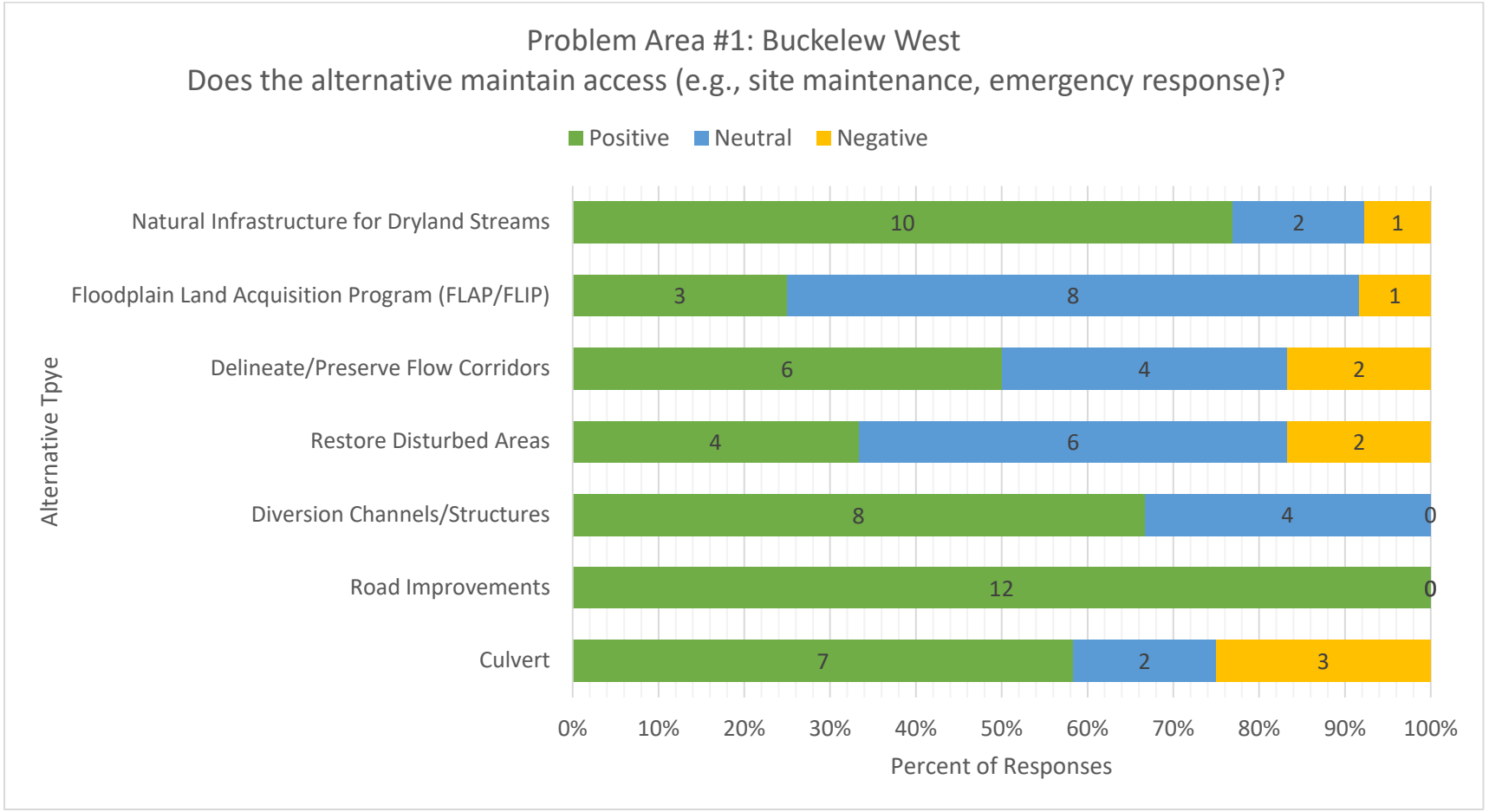
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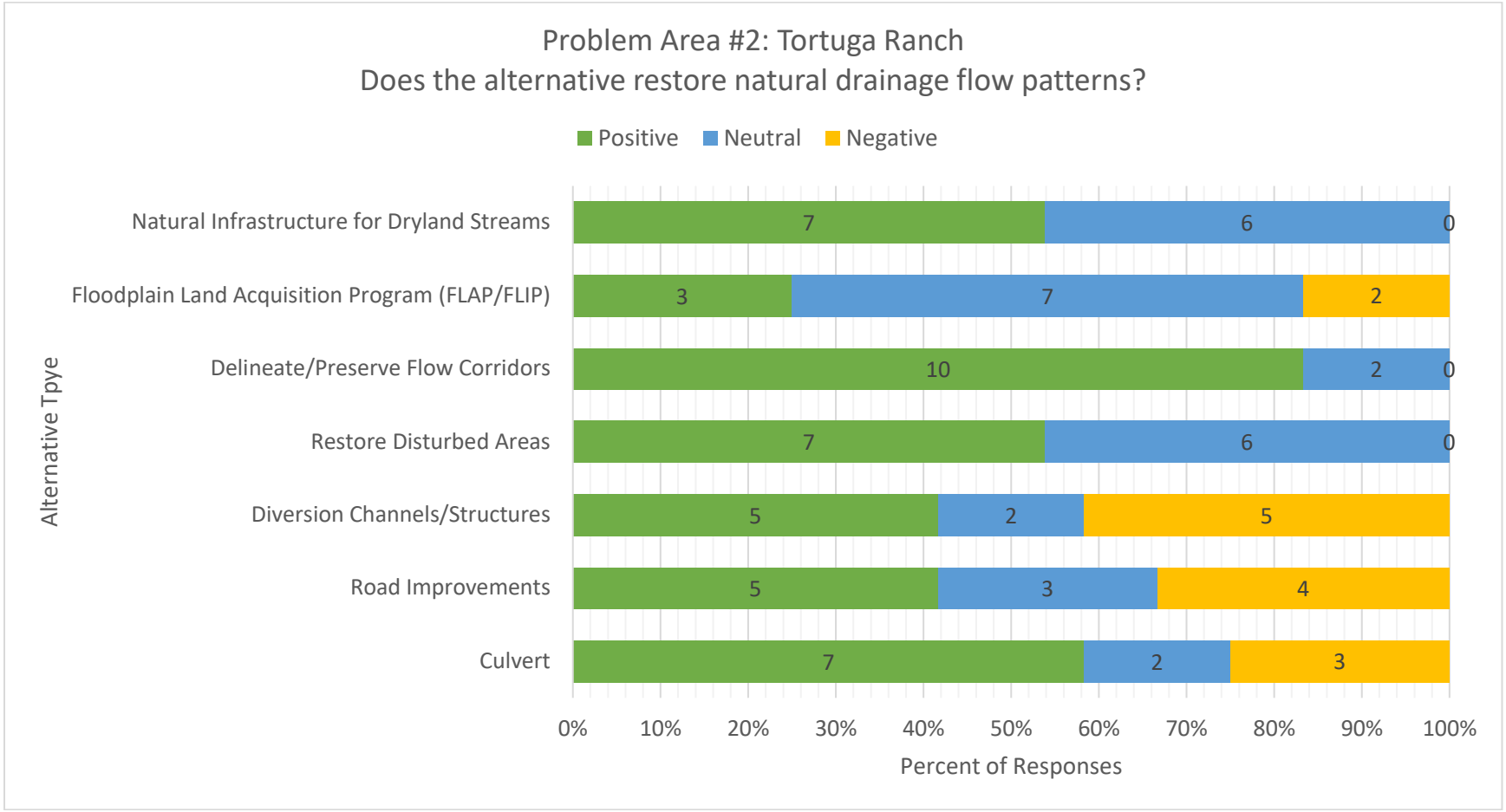
Area No. 1 – Buckelew West – Criteria No. 4



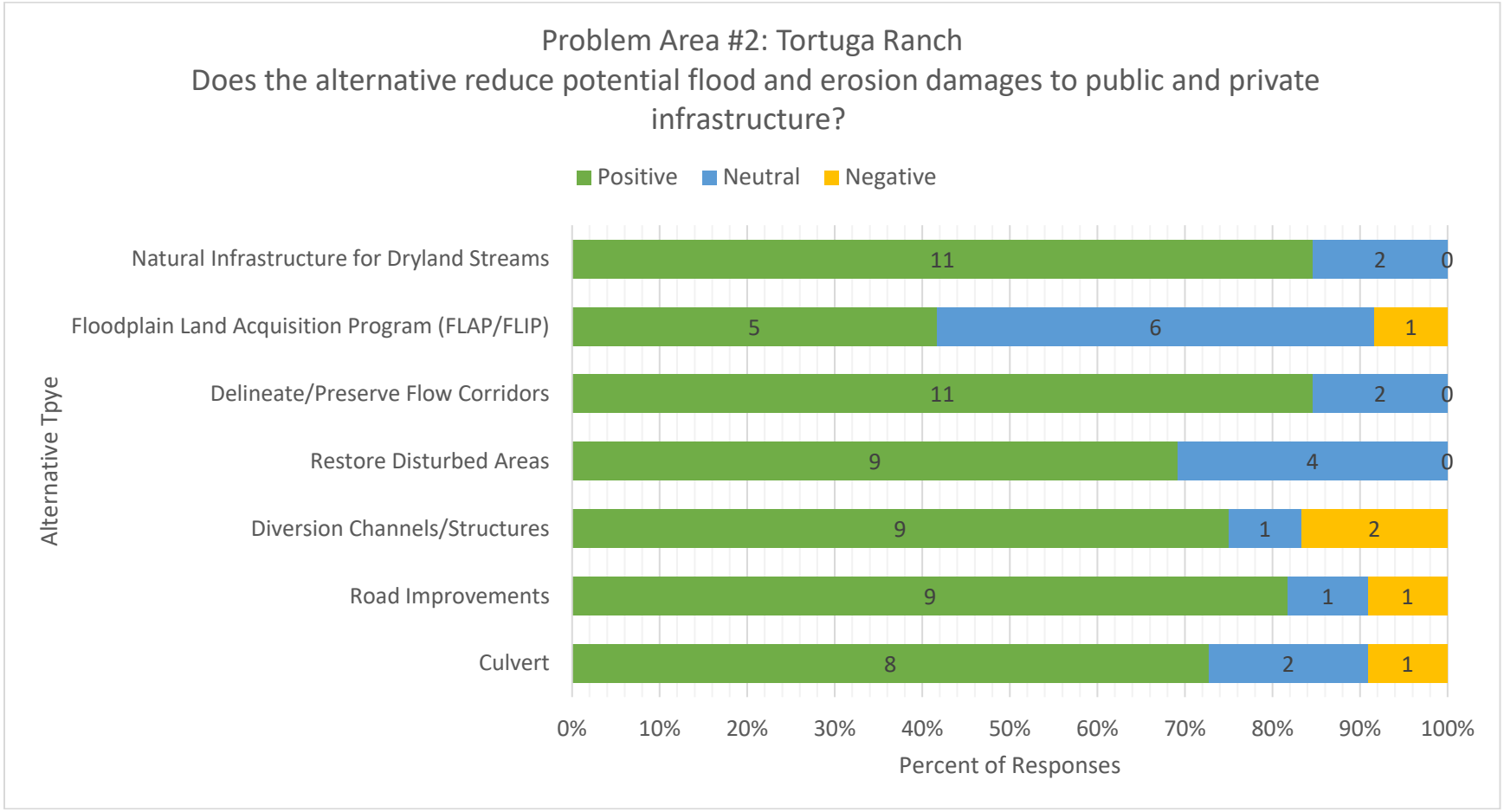
Area No. 1 – Buckelew West – Criteria No. 5



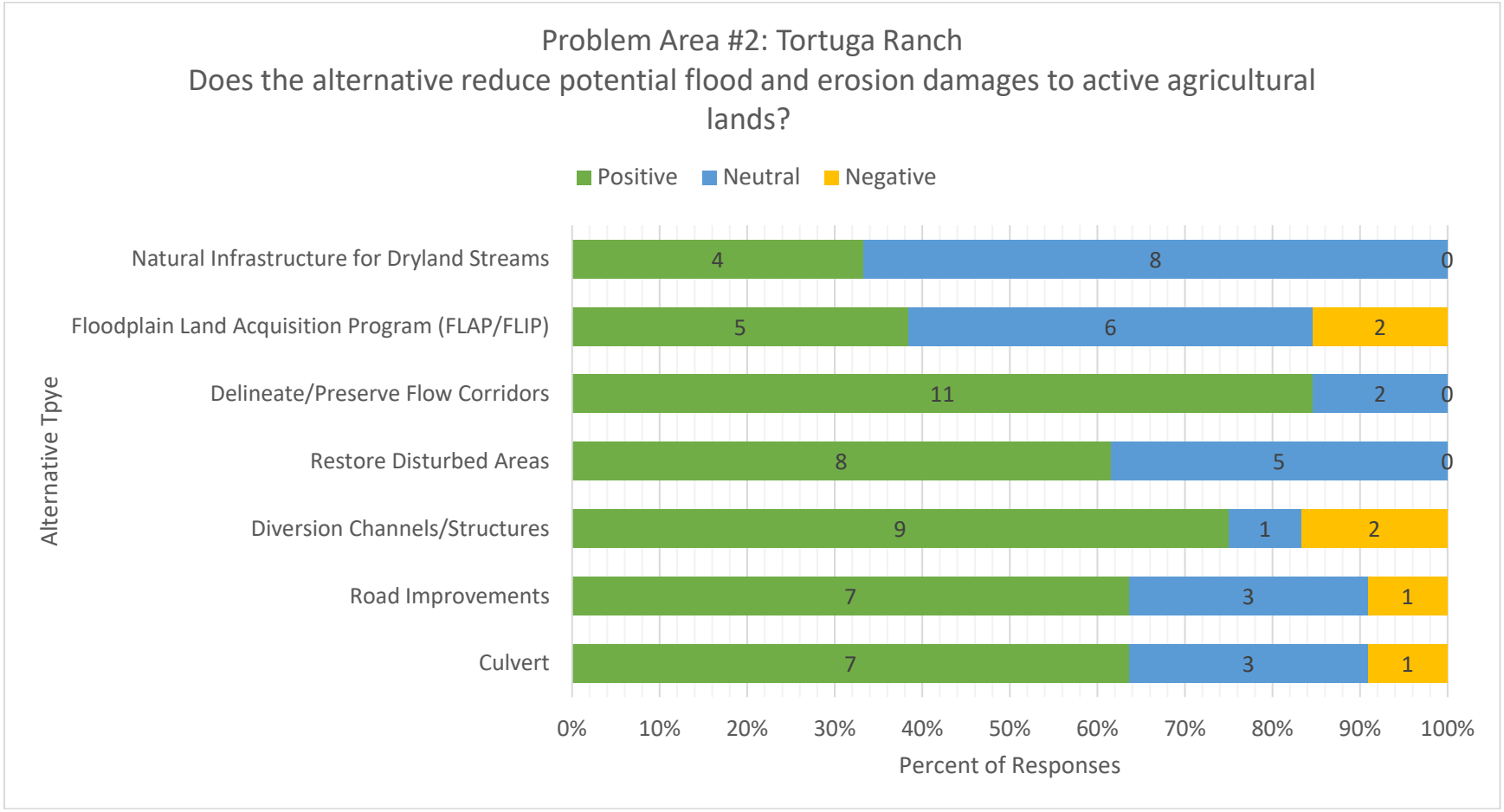
Area No. 2 – Tortuga Ranch – Criteria No. 1



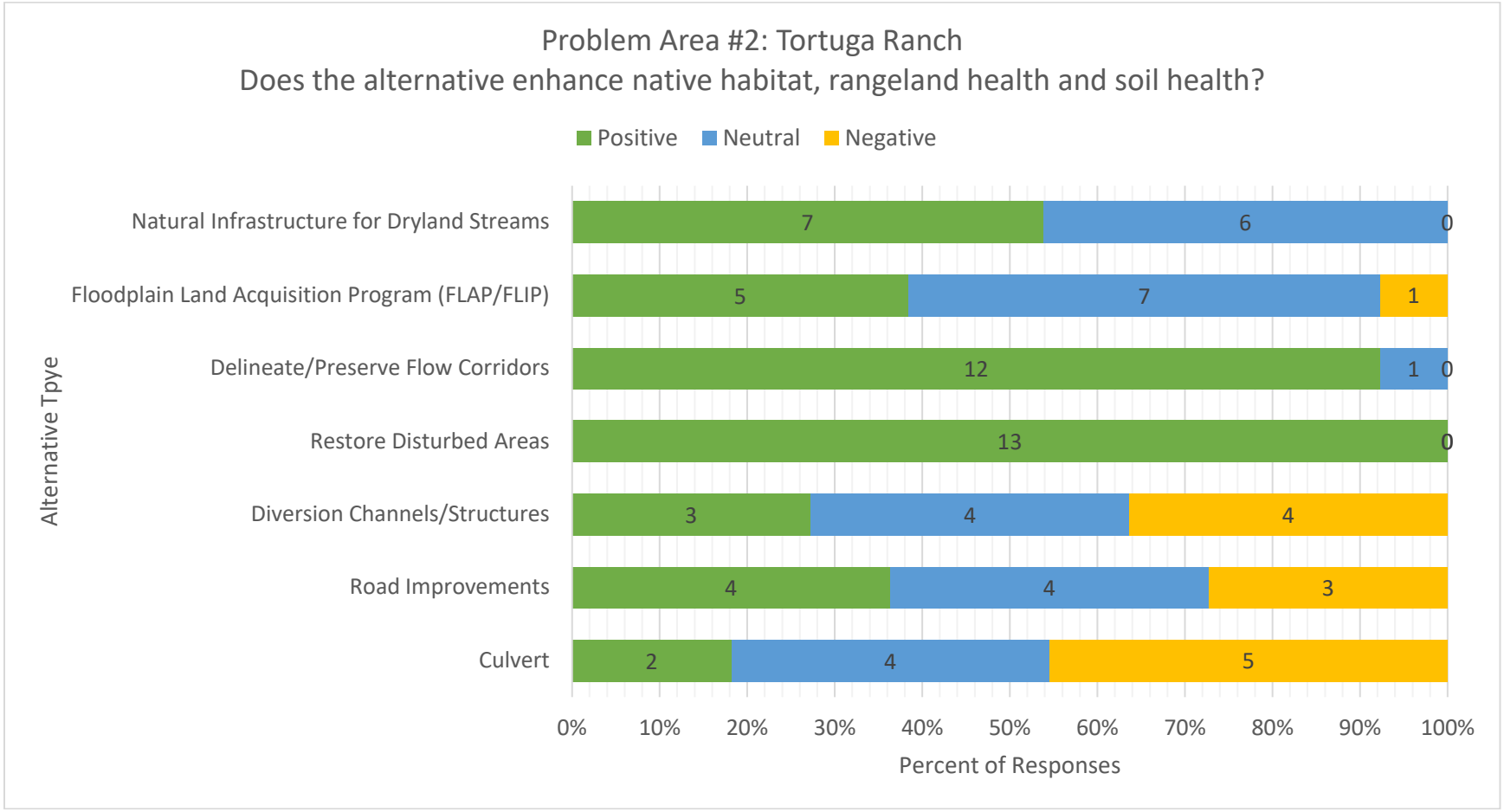
Area No. 2 – Tortuga Ranch – Criteria No. 2



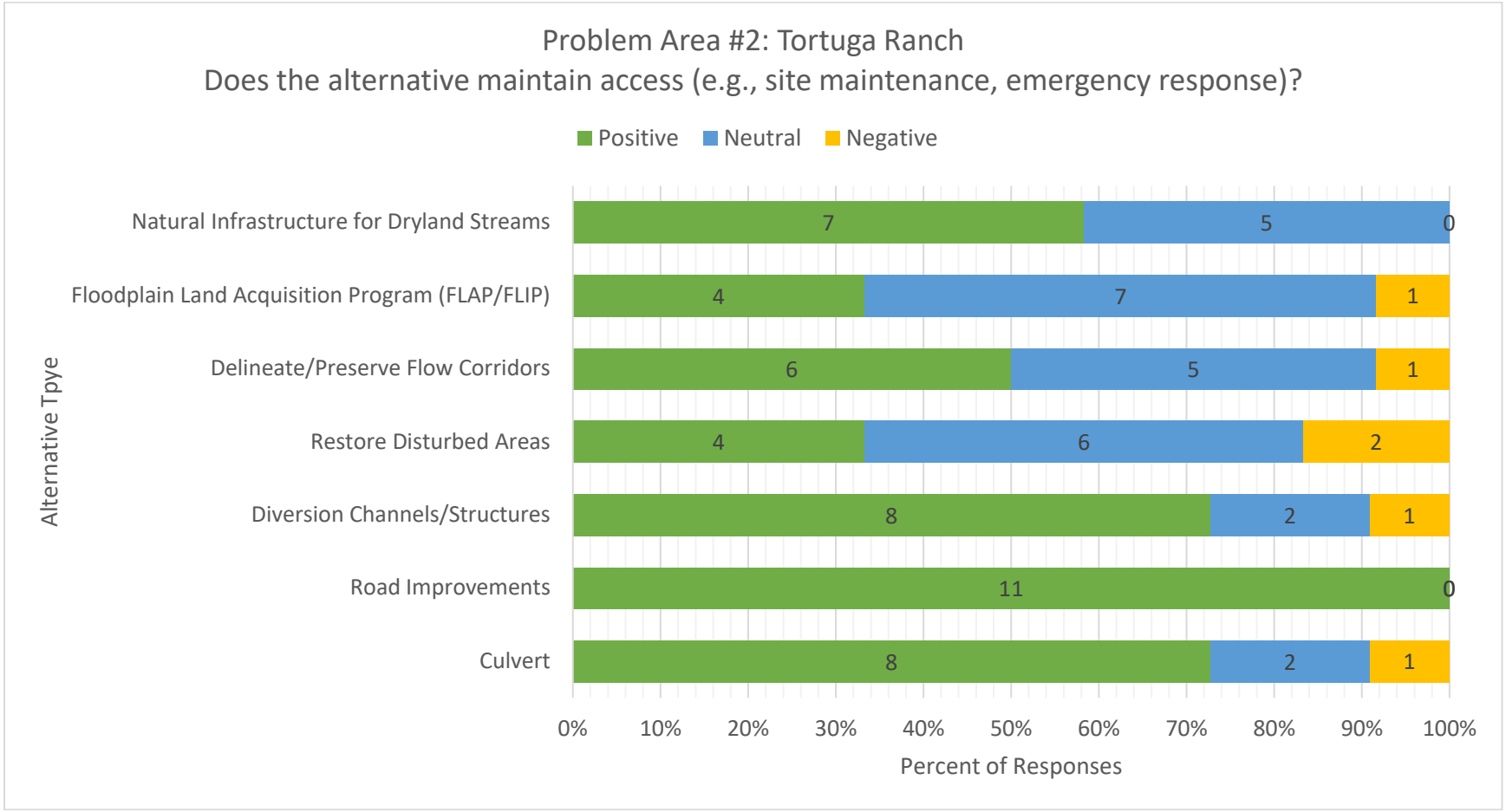
Area No. 2 – Tortuga Ranch – Criteria No. 3



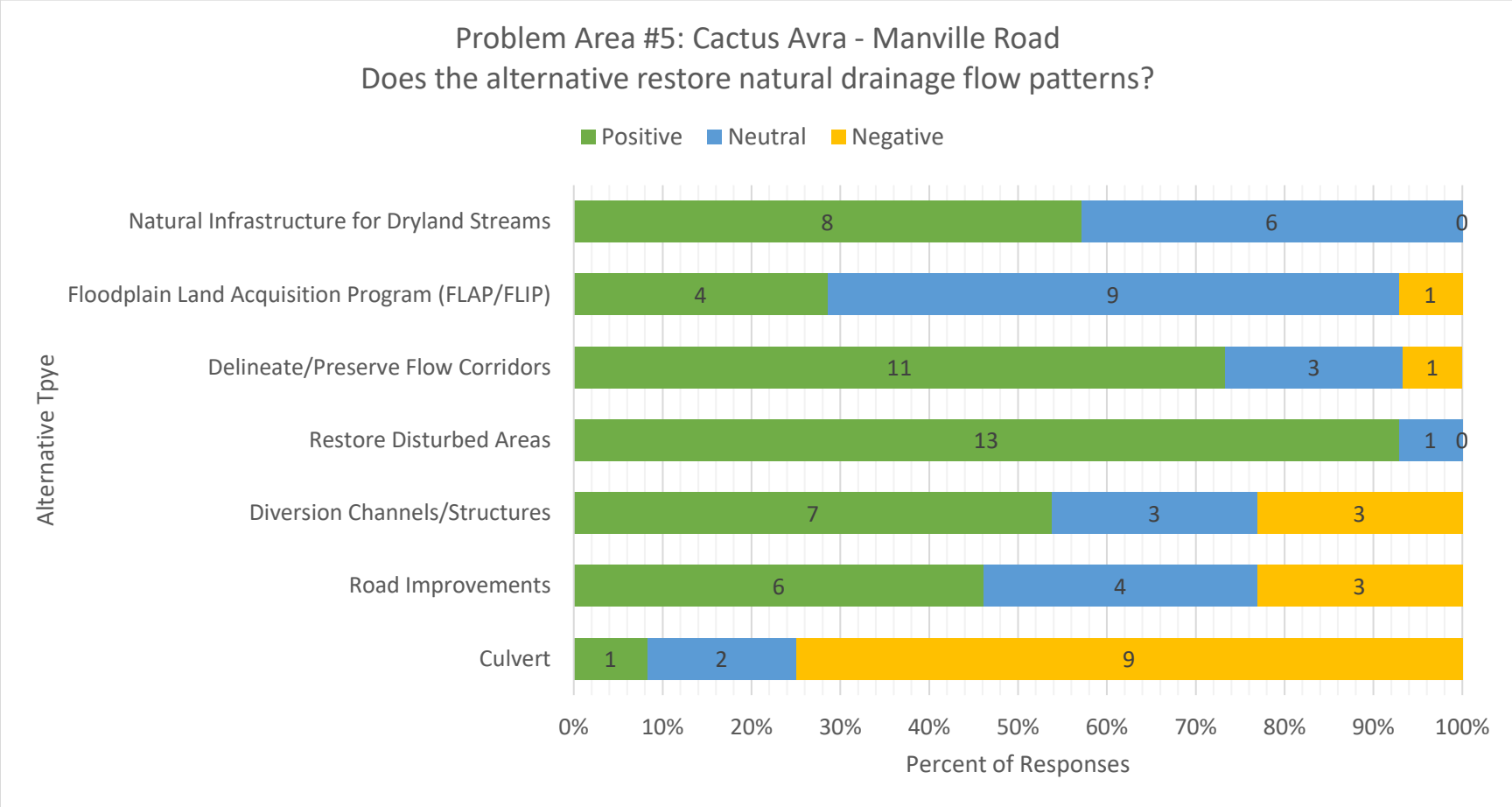
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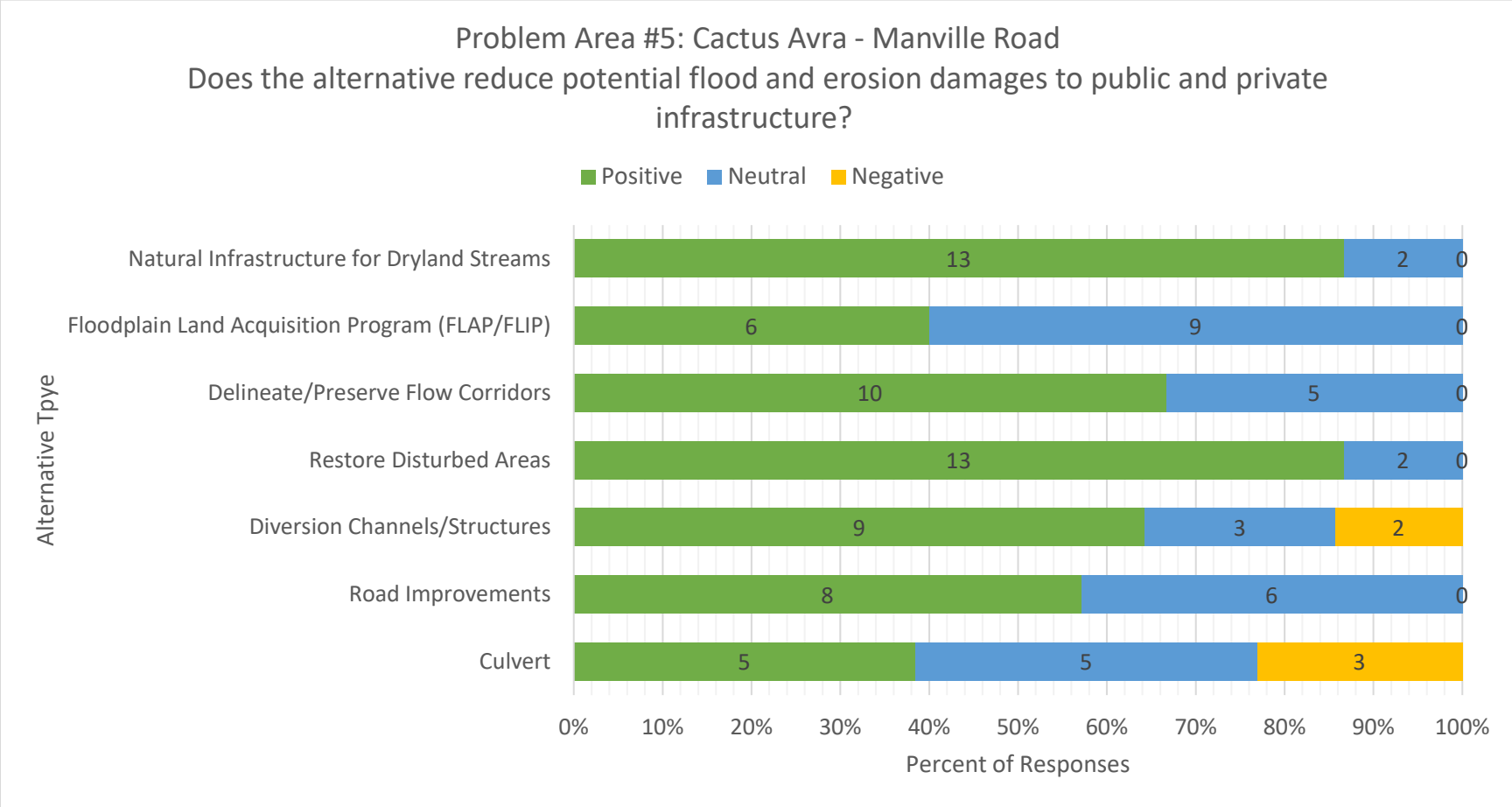
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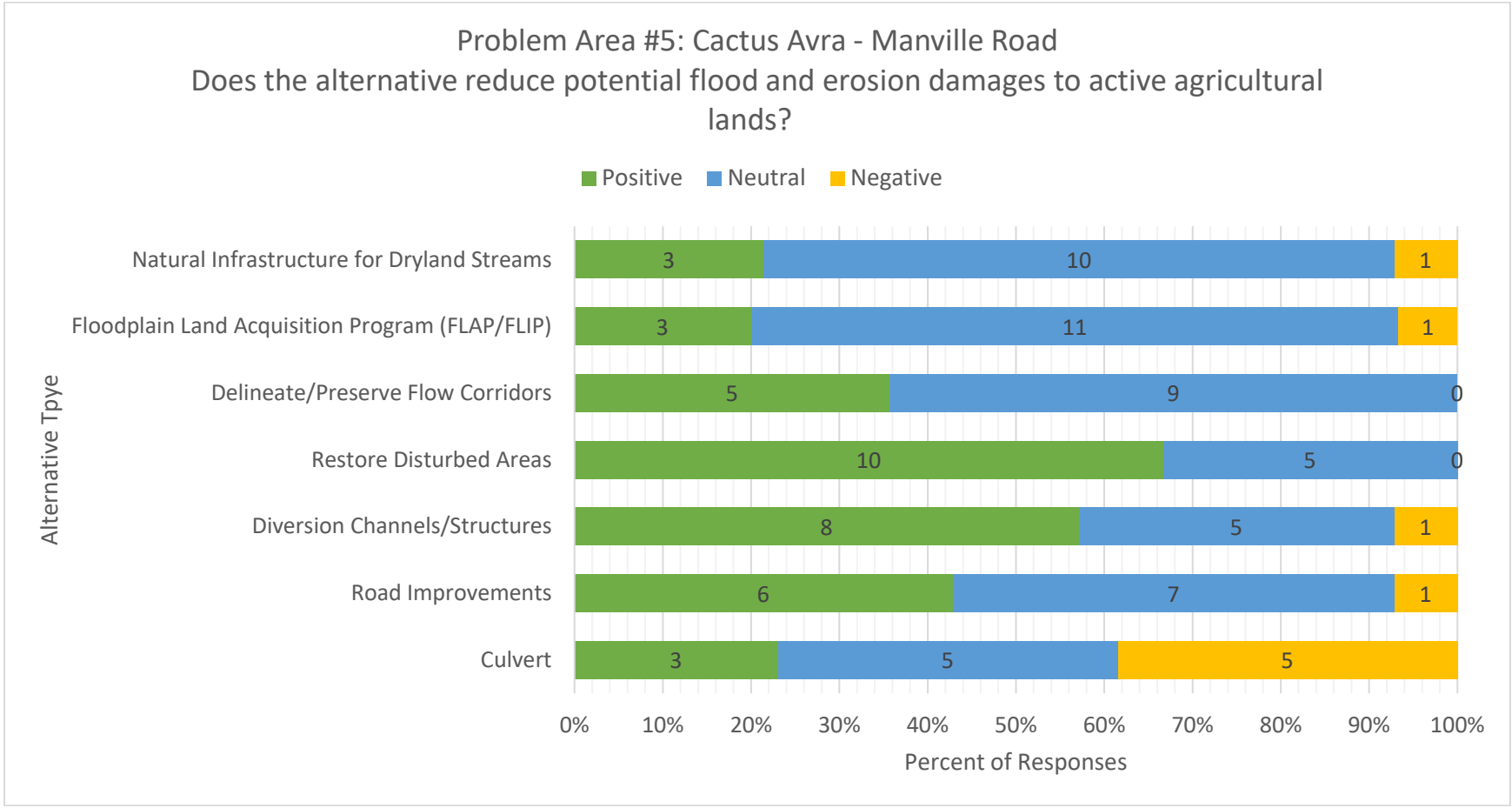
Area No. 5 – Cactus Avra – Criteria No. 1



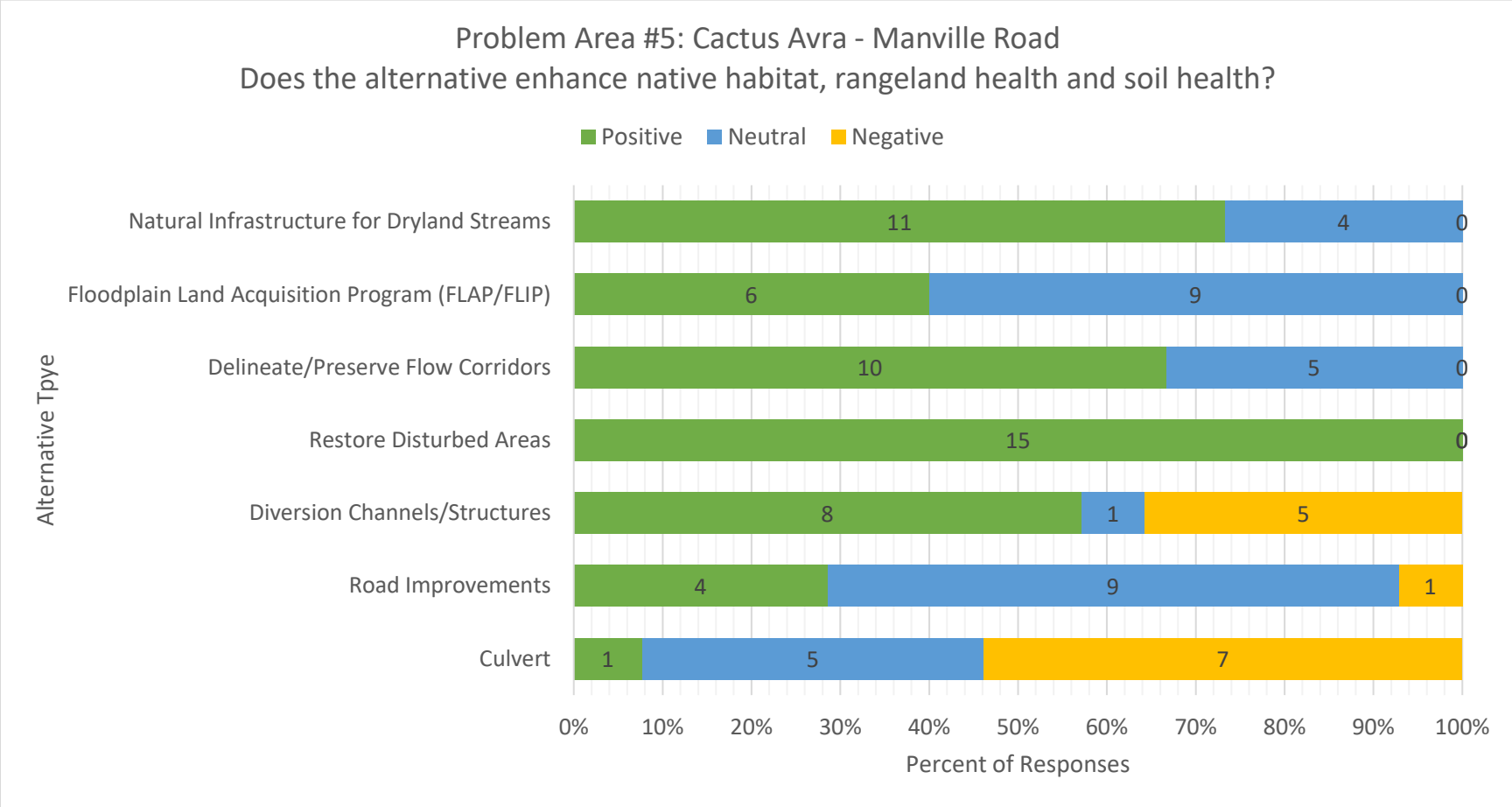
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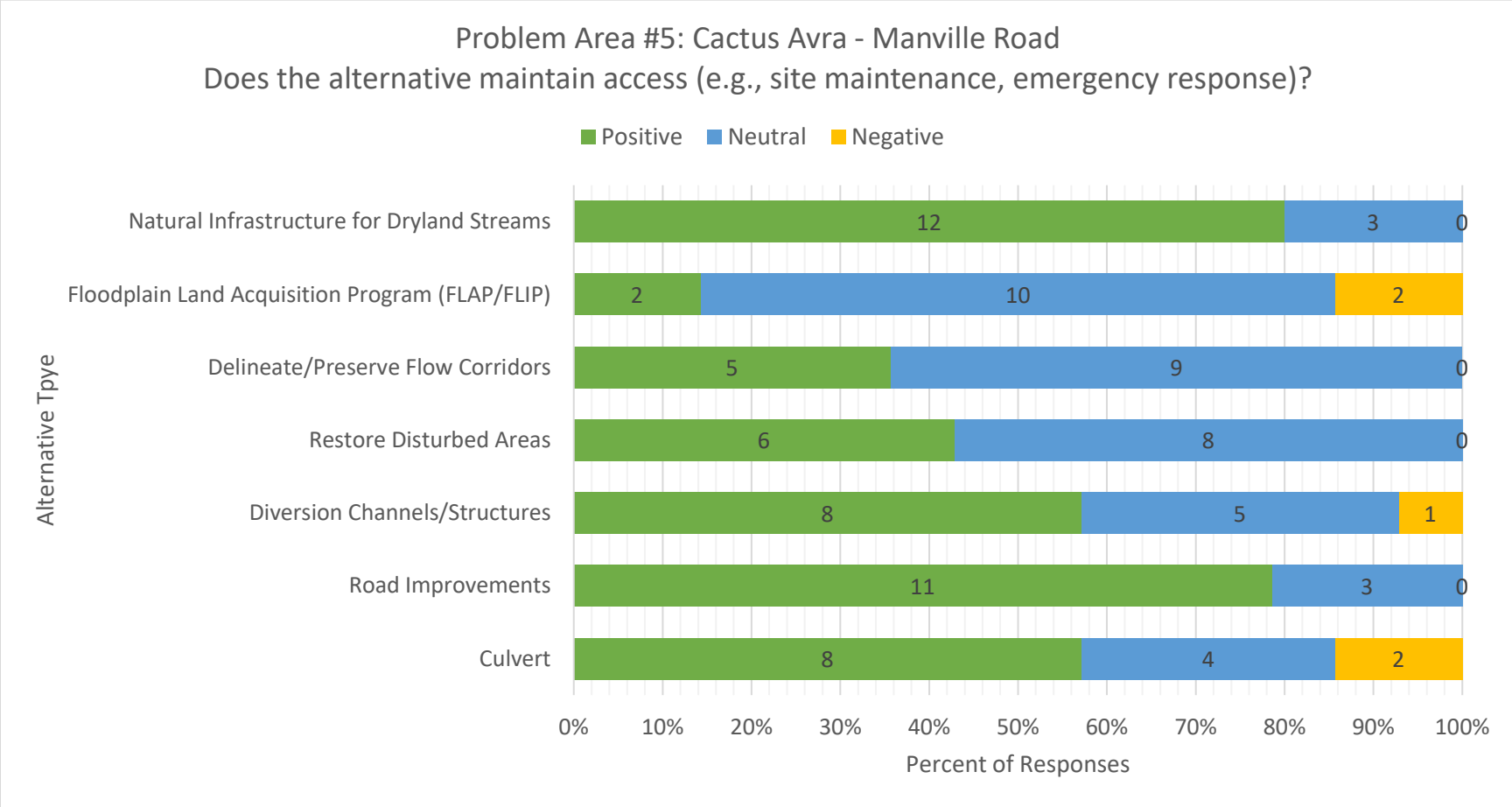
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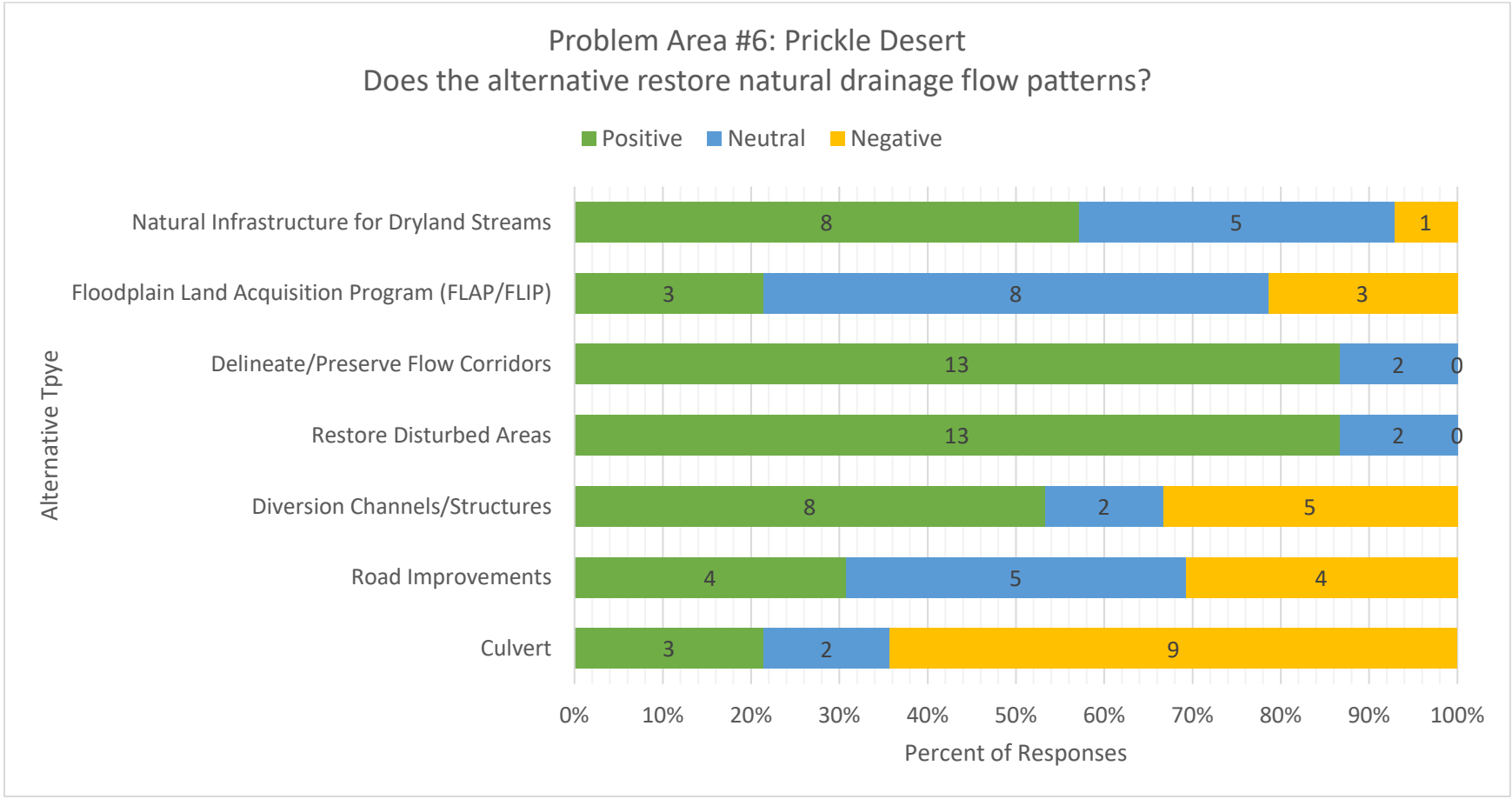
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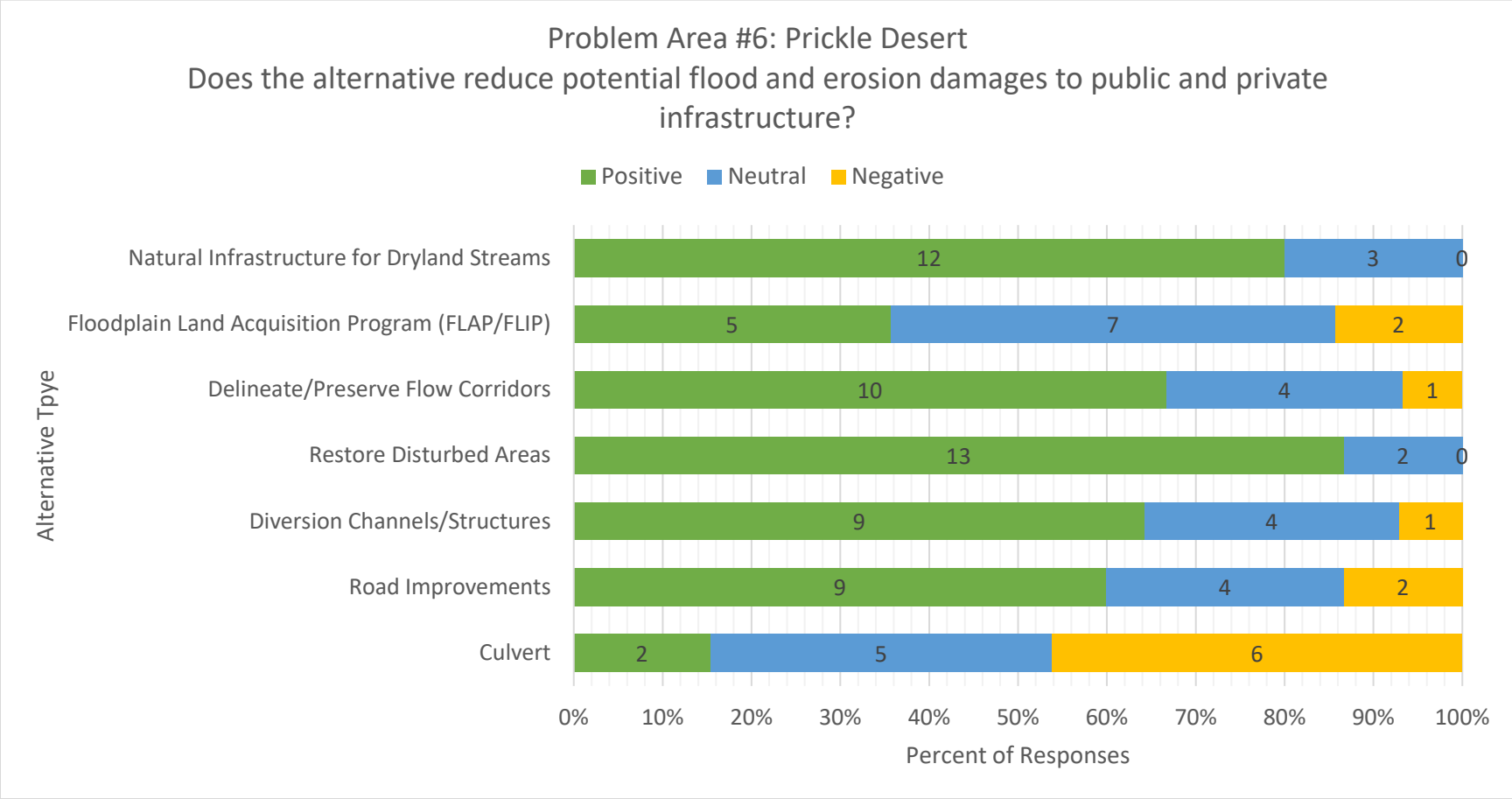
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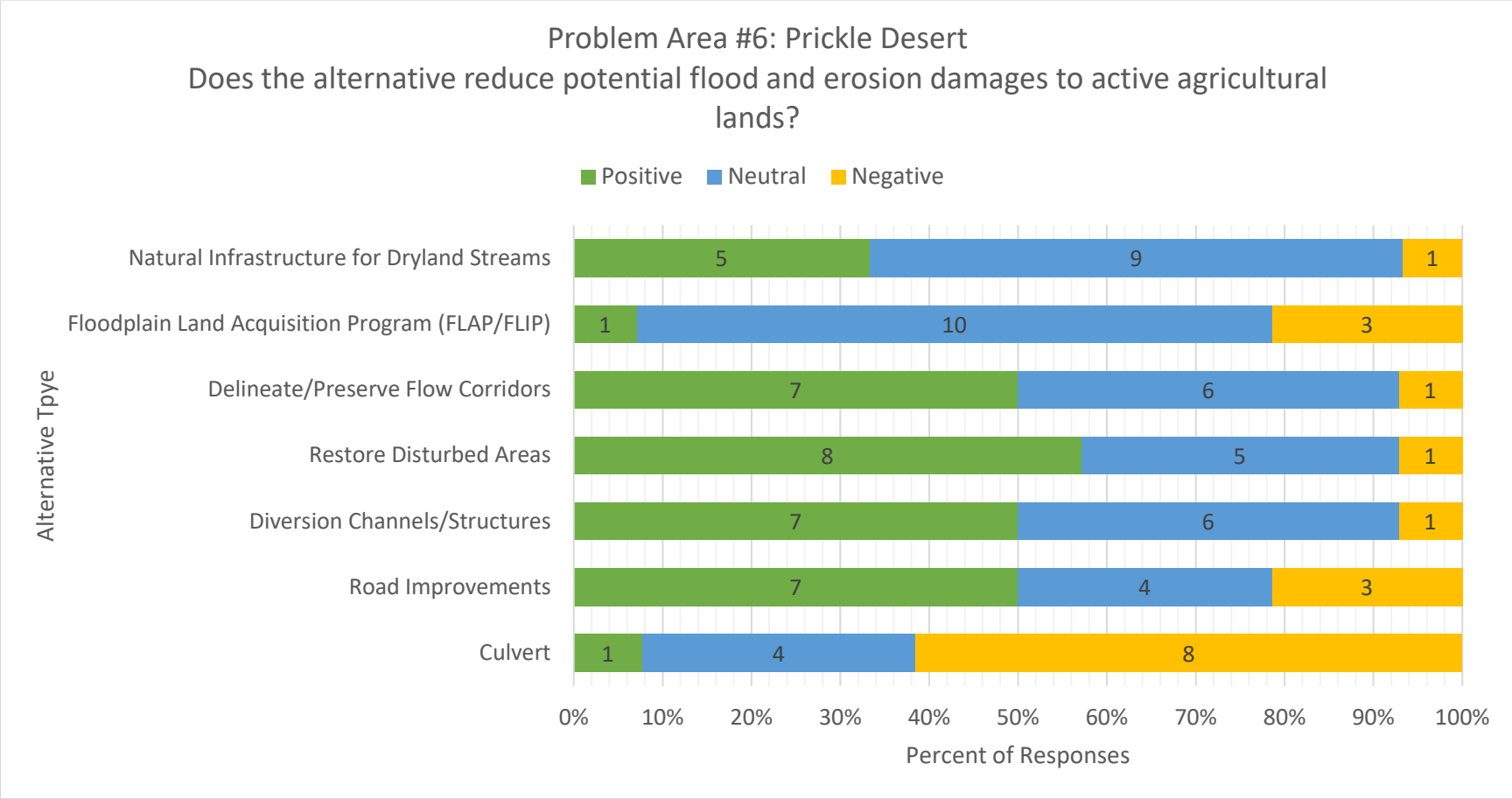
Area No. 6 – Prickle Desert – Criteria No. 1



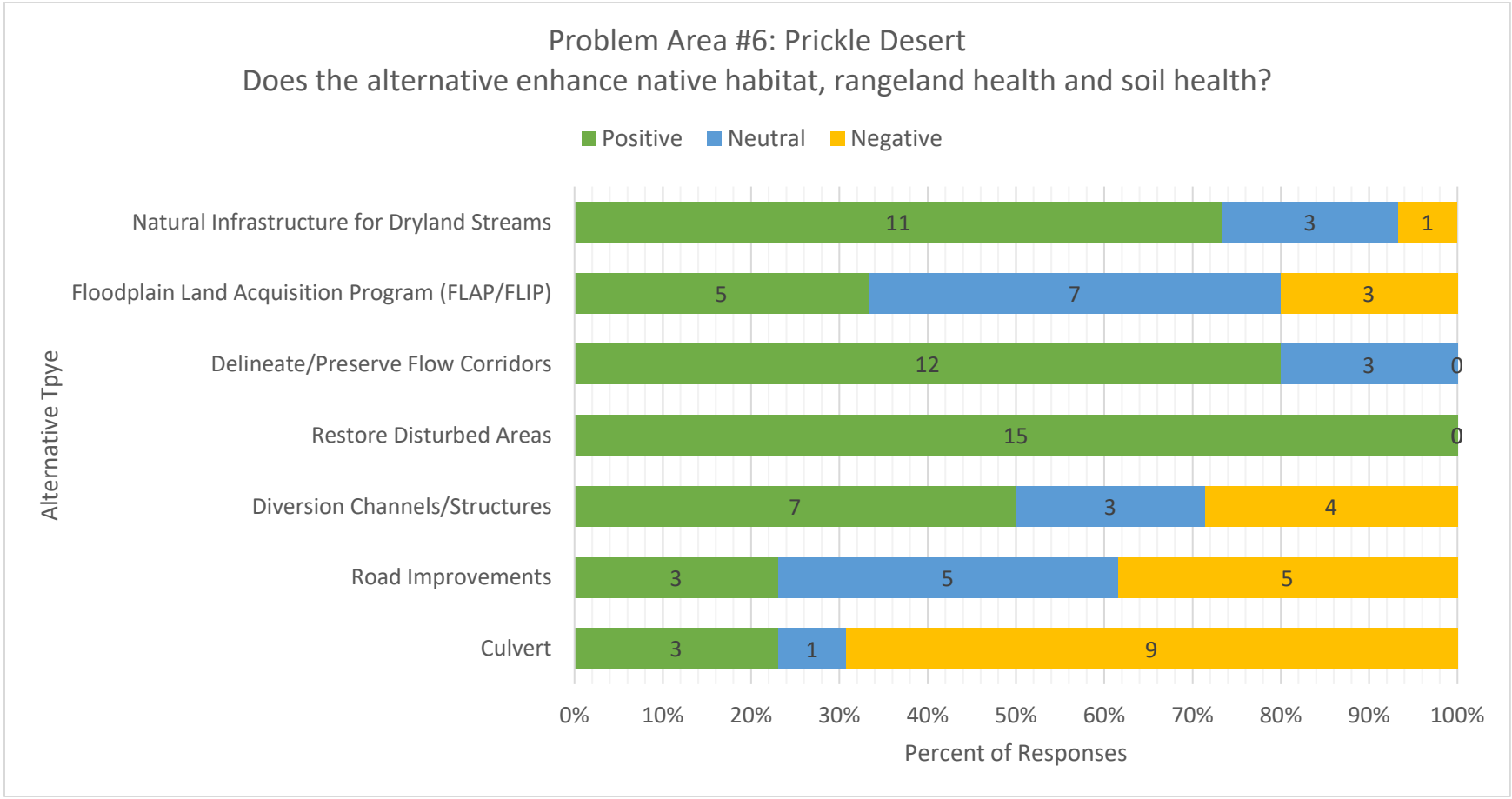
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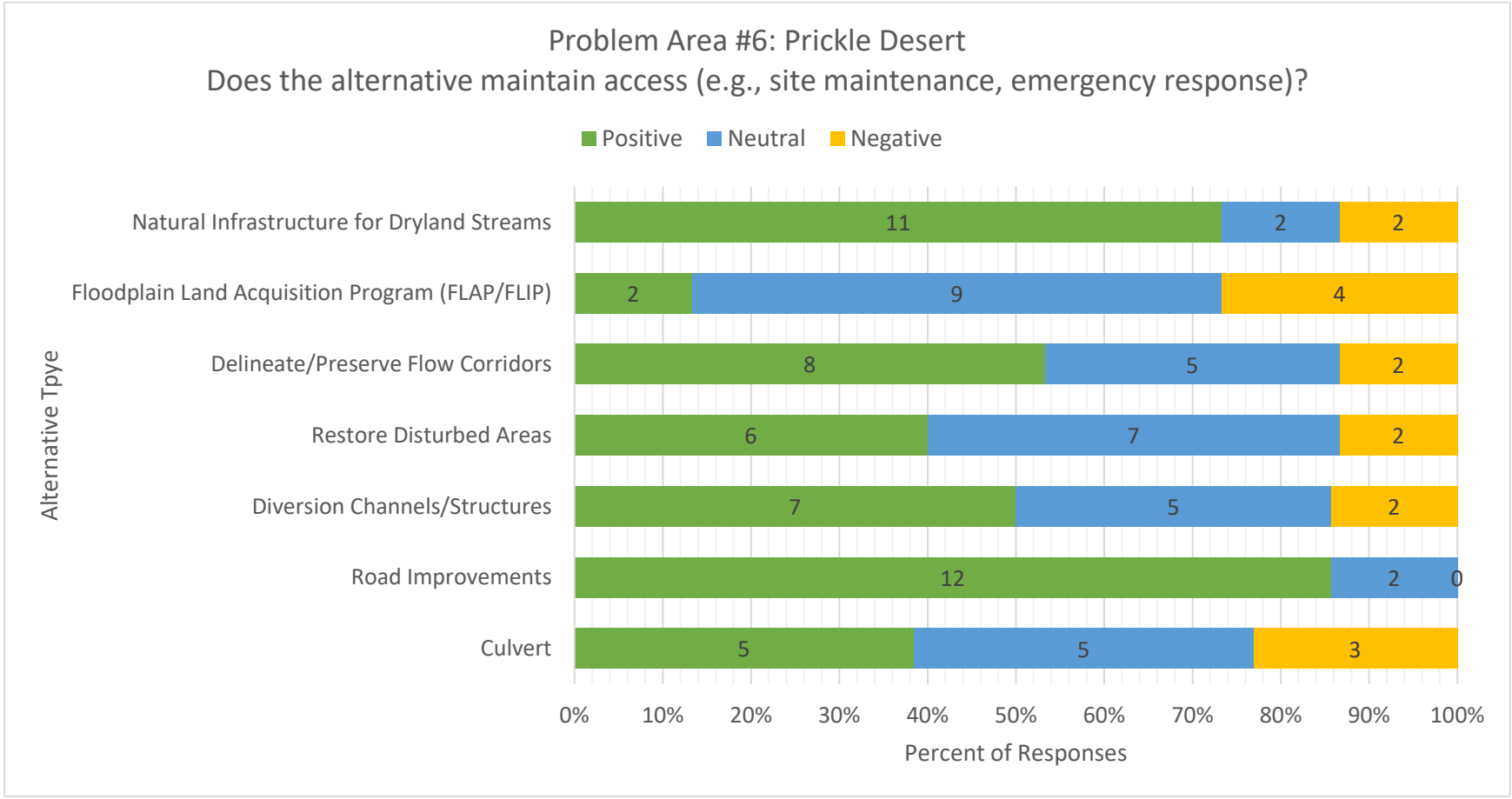
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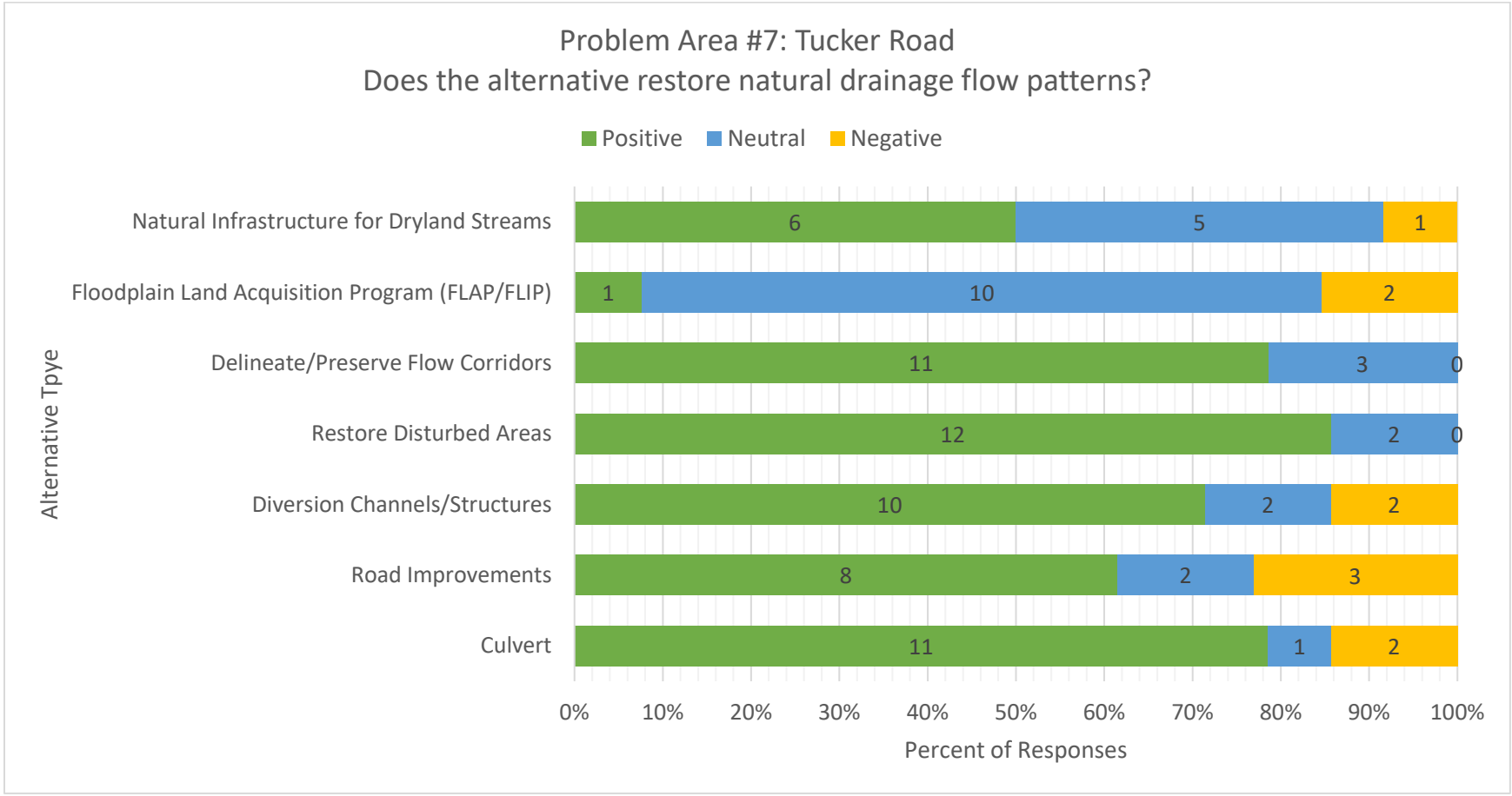
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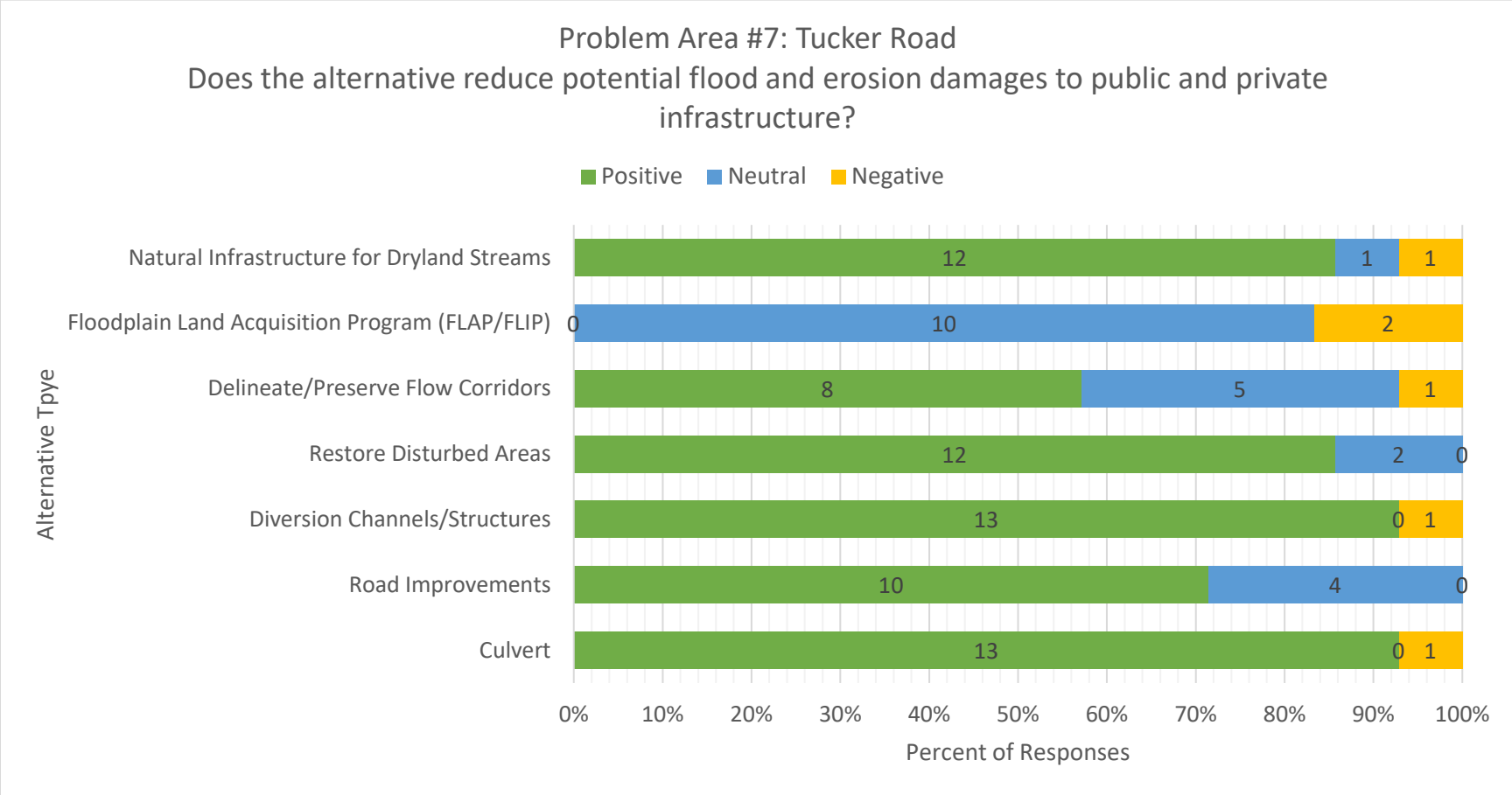
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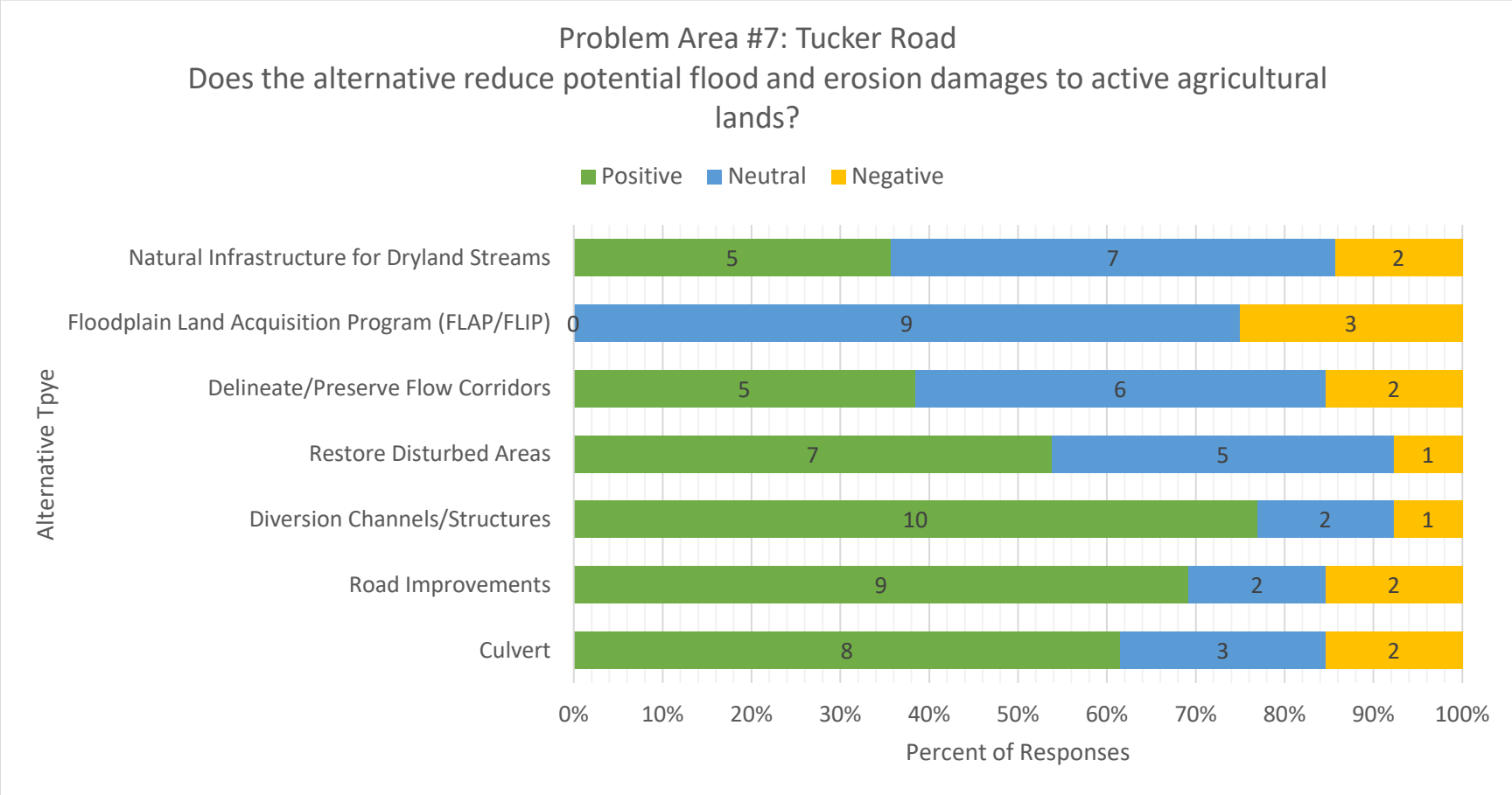
Area No. 7 – Tucker Road – Criteria No. 1



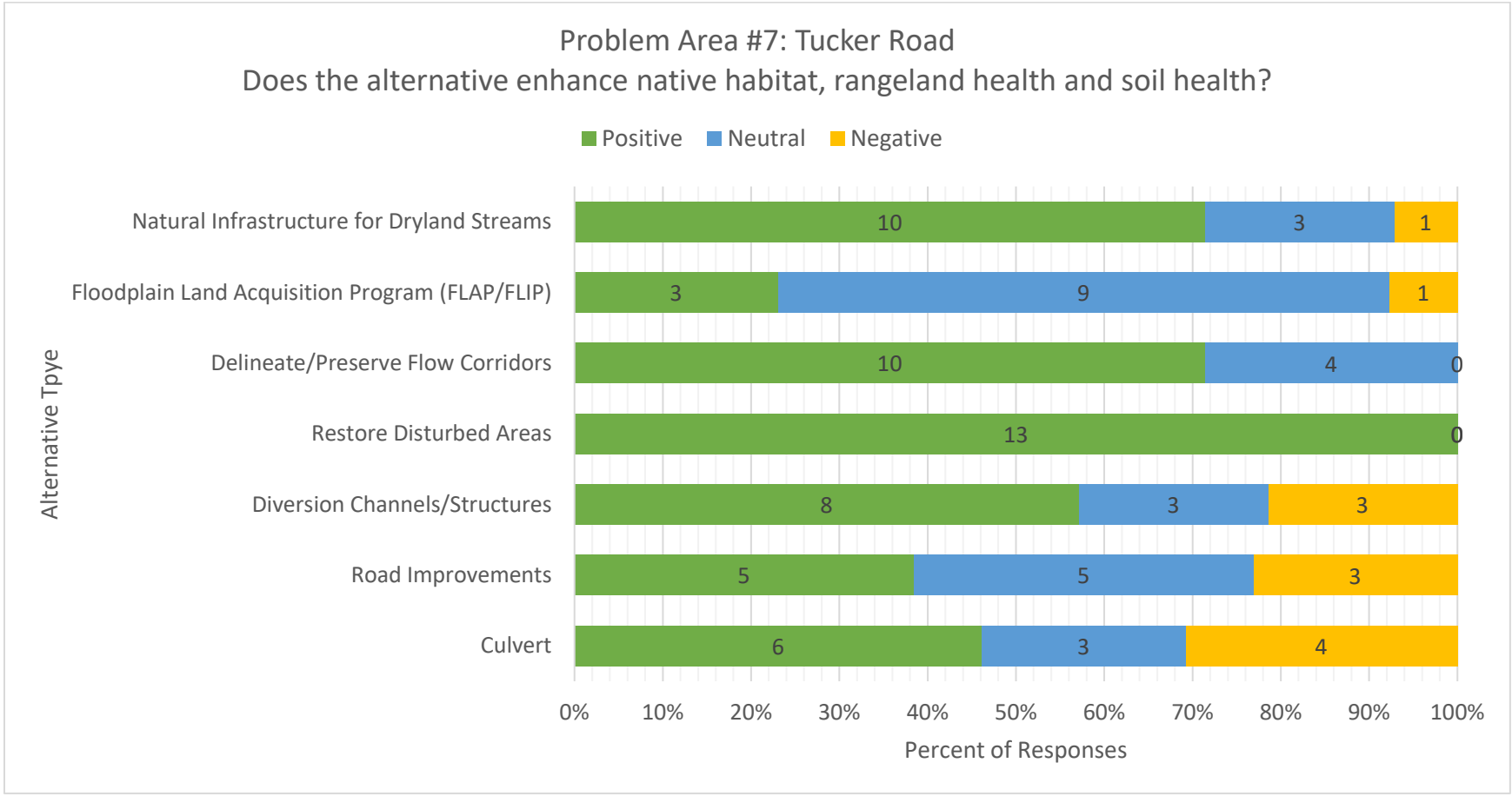
Area No. 7 – Tucker Road – Criteria No. 2



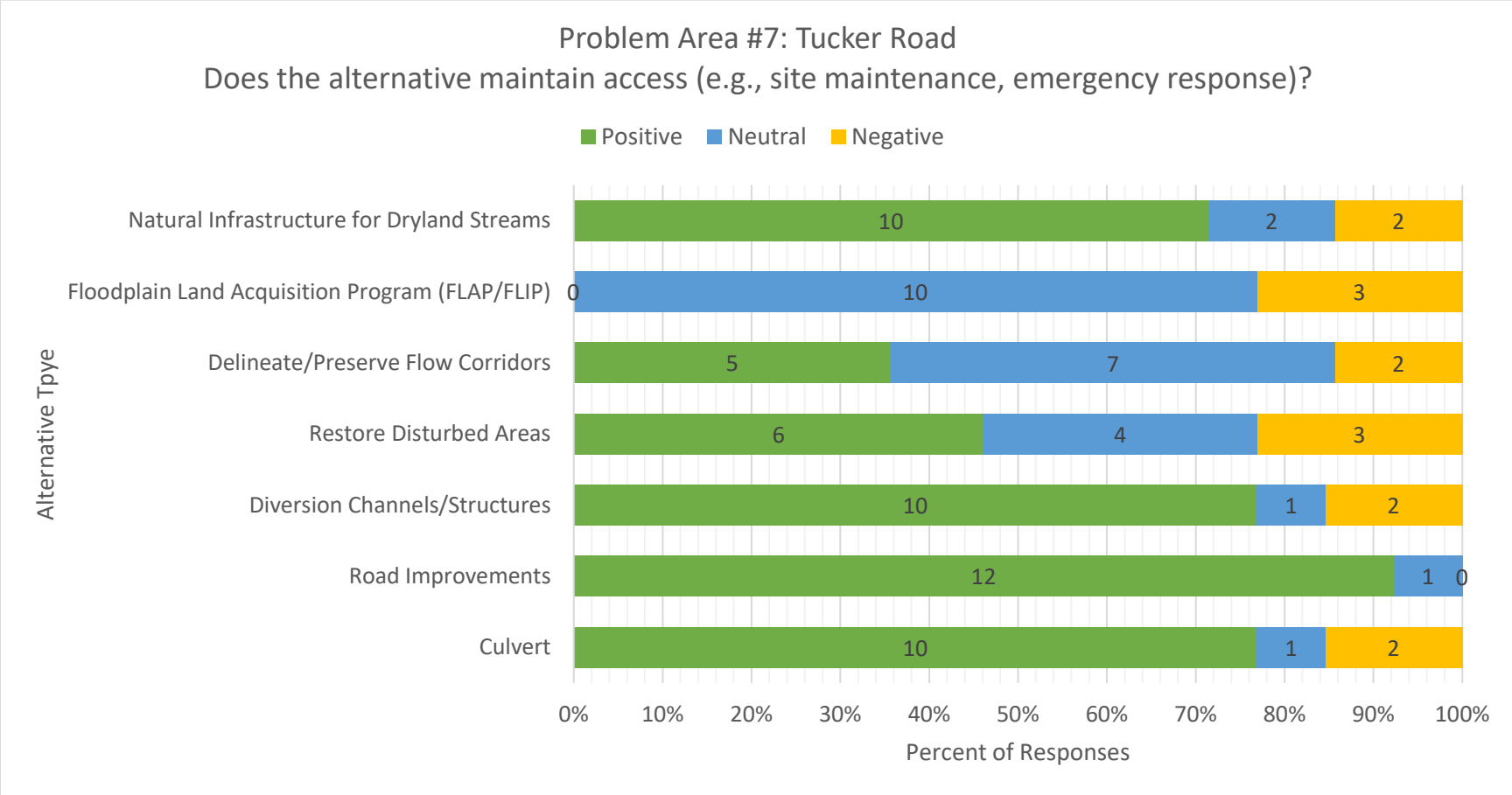
Area No. 7 – Tucker Road – Criteria No. 3



Area No. 7 – Tucker Road – Criteria No. 4



Area No. 7 – Tucker Road – Criteria No. 5



An overall table showing feedback results for all problem areas and all alternative components is included as Exhibit A.

ALTERNATIVE RECOMMENDED FOR FURTHER EVALUATION

Based on the results of the Alternatives and Feasibility Workshops the following are the recommended alternatives consisting of various ranked components to be further evaluated for each problem area. The following does not include the locally preferred alternative and/or the future without federal investment alternative (FWOP) which are still being determined by the SLO.

Common Components to all Alternatives

- Delineate flow corridor(s) (10-yr event)
- Invasive species management
- Vegetation management

Selected Structural Components

- Problem Area No.1 – Buckelew West
  - Alternative No.1
    - Restore Disturbed Areas (poke holes in the perimeter ag berms)
  - Alternative No.2
    - Restore Disturbed Areas
    - Natural Infrastructure for Dryland Streams

- Problem Area No.2 – Tortuga Ranch
  - Alternative No.1
    - Restore Disturbed Areas (poke holes in the constructed diversion berm)
    - Road Improvements (low water crossing)
  - Alternative No.2
    - A second alternative (i.e., combination of components) is not available for this problem area given that this is a linear feature and in general can only be slightly structurally modified based on the resulting ranked components.

- Problem Area No.3 – CAVSARP - removed from further consideration as request by cooperating agency (TW)

- Problem Area No.4 – CAVSARP - removed from further consideration as request by cooperating agency (TW)

- Problem Area No.5 – Cactus Avra
  - Alternative No.1
    - Restore Disturbed Areas
  - Alternative No.2
    - Restore Disturbed Areas
    - Diversion system(s) (diversion channels and/or berms)
  - Alternative No.3
    - Restore Disturbed Areas
    - Natural Infrastructure for Dryland Streams

- Problem Area No.6 – Prickle Desert
  - Alternative No.1

        - Restore Disturbed Areas
    - Alternative No.2
        - Restore Disturbed Areas
        - Diversion system(s) (diversion channels and/or berms)
    - Alternative No.3
        - Restore Disturbed Areas
        - Natural Infrastructure for Dryland Streams
- Problem Area No.7 – Tucker Road
    - Alternative No.1
        - Restore Disturbed Areas
        - Natural Infrastructure for Dryland Streams
    - Alternative No.2
        - Culverts
        - Natural Infrastructure for Dryland Streams

The following table provides as opinion of costs associated with each alternative and includes separate estimates of engineering costs and construction contingency. Also included are the list of goals that each alternative is believed to obtain but will be further considered during the evaluation process. A definition of the goals (DM 9500-013, Section 6(b)(4)(a), January 5, 2017) follows.

- Completeness is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects, including any necessary actions by others. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions to the objective. Completeness does not automatically mean that alternative actions need to be large in scope or scale.

- Effectiveness is the extent to which an alternative alleviates the specified problems and achieves the specified opportunities.

- Efficiency is the extent to which an alternative alleviates the specified problems and realizes the specified opportunities at least cost.

- Acceptability is the viability and appropriateness of an alternative from the perspective of the general public and consistency with existing Federal laws, authorities, and public policies. It does not include local or regional preferences for particular solutions or political expediency.

Several of the above goals cannot be completely assessed at this time without the results of hydraulic analysis such as does the recommended alternative obtain the “effectiveness” goal (i.e., does it restore the floodplain?). Therefore, the reader should note such subjectivity, at this time, when considering the goals obtained for each alternative in the following table.

	Cost Category							
Alternative	**Engineering**	**Construction**	**Contingency**	**Total**	**Completeness**	**Effectiveness**	**Efficiency**	**Acceptability**
Problem Area No.1 – Buckelew West								
No.1	$500,000	$5,040,000	$2,020,000	$7,560,000		X	X	X
No.2	$530,000	$5,370,000	$2,150,000	$8,050,000	X	X		X
Problem Area No.2 – Tortuga Ranch								
No.1	$30,000	$230,000	$100,000	$360,000		X	X	X
Problem Area No.3 – CAVSARP (west)								
N/A	- - -	- - -	- - -	- - -	-	-	-	-
Problem Area No.4 – CAVSARP (south)								
N/A	- - -	- - -	- - -	- - -	-	-	-	-
Problem Area No.5 – Cactus Avra								
No.1	$470,000	$4,790,000	$1,920,000	$7,180,000				X
No.2	$540,000	$5,470,000	$2,190,000	$8,200,000	X	X	X	X
No.3	$520,000	$5,210,000	$2,090,000	$7,820,000	X	X		X
Problem Area No.6 – Prickle Desert								
No.1	$130,000	$1,270,000	$510,000	$1,910,000				X
No.2	$80,000	$800,000	$320,000	$1,200,000	X	X	X	X
No.3	$140,000	$1,410,000	$570,000	$2,120,000	X	X		X
Problem Area No.7 – Tucker Road								
No.1	$60,000	$560,000	$230,000	$850,000		X		X
No.2	$60,000	$540,000	$220,000	$820,000		X		X

The opinion of cost of alternatives items and factors are summarized in the table below. Values shown within the opinion of cost summary table above were rounded up after applying each noted factor (e.g., Problem Area No.1, Alternative No.1, Contingency = $2,012,533 rounded to $2,020,000).

Category	Factor	Comment
Contingency	40%	Contingency = factor * cost of construction only. See Construction category for list of items considered.
Engineering	7%	Engineering fee = factor * (cost of construction and contingency).
Construction	Item Description	Cost source(s)/factors
	Earthwork-Excavation	Gannet-Fleming
	Earthwork-Embankment	Gannet-Fleming
	Riprap	Stantec (Buckeye FRS - 3/3/2022)
	Concrete	Stantec (Tucson local exp.)
	Culvert	Gannet-Fleming/ADOT Kingman District 8/2008 @$120/LF adjusted with CPI)
	Invasives	BKW Farms

NEXT STEPS

The following steps of the project are planned once concurrence from the NRCS, SLO and cooperating agencies is obtained for the above recommended alternatives.

- Revision of the SLO provided hydraulic model(s) to include the recommended structural alternatives,
- Comparative analysis of each alternative to the Future without Project (FWOP) alternative,
- Cost/benefit analysis of each alternative,
- Recommend a preferred alternative to the NRCS, SLO and cooperating agencies, and
- After concurrence of the preferred alternative, development of the Draft Plan-EA document.

During revision of the hydraulic model, Stantec will also include recommendations from a separate study undertaken by the SLO. Information related to the recommended structural components is included within *Altar Valley Watershed Plan Hydrologic Modeling Report*, August 5, 2022. This study contains recommendations for several locations within the Brawley Wash watershed south of Ajo Highway. Three of the locations (i.e., Nos. 2, 4 and 5) are located within the study limits of this Plan EA.

OTHER RECOMMENDATIONS

During the Feasibility Workshop, scoring of the local practice (i.e., Floodplain Land Acquisition Program or “FLAP”) was found not to rank among the recommended alternatives for further evaluation. However, it should be noted that 1) this is a beneficial program to remove parcels of land from flood prone areas, 2) the alternative did not result in any negative feedback from the stakeholders and 3) its consideration for all but

Problem Area No.2 (Tortuga Ranch) was found to be inapplicable given that the problems areas are owned by Tucson Water. The SLO is actively using this program to obtain portions of the private property where Problem Area No.2 crosses.

Stantec Consulting Services, Inc.



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Senior Project Engineer

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Attachments: Appendix A – Alternative Component Descriptions, Exhibit A – Feasibility Workshop Overall Feedback

C.C.. Carrie Olson, Pima County Regional Flood Control District
Brett Myers, Natural Resources Conservation Service
Julian Pallanes, Tucson Water, City of Tucson
Kris LaFleur, Tucson Water, City of Tucson

APPENDIX A
Description of Alternatives related to the Brawley Wash Watershed Plan-EA
Feasibility Workshop Meeting with Stakeholders

Culverts

- The installation/use of culverts for the noted problem areas is meant to include the following:
    - Material = corrugated metal circular pipe
    - End treatment = none (thin edge projecting)
    - Erosion control = downstream end (preformed scour hole) using dumped rock riprap (D_{50}=9", T=1.5-ft, over filter fabric)
    - Diameter = 3-ft unless resulting "cover" is less than 18-inches, 2-ft otherwise
    - Number of pipe barrels = 1
    - Length = site-specific but assume 40-ft
    - Interval = site-specific to be determined based on adjacent flow and its direction (assume 1 culvert/100-ft along embankment)

Road Improvements

- The development and/or rehabilitation of site access road for the noted problem areas is meant to include the following:
    - Surface material = existing
    - Surface width/elevation = existing, reshape as necessary to re-establish uniform access road
    - Erosion control = only applied at known low water crossings placed immediately downstream of edge of roadway using dumped rock riprap (D_{50}=9", T=1.5-ft, over filter fabric, 60 cubic yards est. per location [50-ftx20-ft])

Diversion Channels/Structures

- The development of new diversion channels for the noted problem areas is meant to include the following:
    - Depth ~ 1-2 feet
    - Side Slopes = 3:1
    - Lining = dumped rock riprap (D_{50}=9", T=1.5-ft, over filter fabric), ~ 1 cubic yard per linear foot of new diversion channel
    - Inlet/Outlet Treatment = none
- The development of new diversion structures (e.g., berms, embankments) for the noted problem areas is meant to include the following:
    - Height = site-specific but can assume 6-ft
    - Side Slopes = 3:1
    - Top width = 12-ft
    - Wash-side Erosion Control = dumped rock riprap (D_{50}=9", T=1.5-ft, over filter fabric), ~ 1.5 cubic yard per linear foot of new diversion embankment
    - End Treatment = none

Restore Disturbed Areas

- The restoration of disturbed areas for the noted problem areas is meant to include the following:
    - Agricultural Embankment Removal = 20-40 feet in width (individual openings, not entire embankment removal but may be revised during final evaluation)
    - Erosion Control = applied to newly exposed surfaces, dumped rock riprap (D_{50}=9", T=1.5-ft, over filter fabric), ~ 100 cubic yards per new opening
    - Interval = site-specific to be determined based on adjacent flow and its direction (assume 1 opening/250-ft along embankment)

Delineate/Preserve Flow Corridors

- Use of existing policy to identify flow corridors in the Brawley Wash area, promote stable flow and sediment transport conditions, maintain flood storage capacity, and preserve natural floodplain function. The policy directs development away from these high hazard areas and establishes continuous flow paths for the most hazardous areas within the large, distributary Brawley Wash floodplain.
- Pima County Regional Flood Control District Technical Policy, TECH-026 Regulation of development within Flow Corridors

Floodplain Land Acquisition Program (FLAP)

- "*Purchasing flood and erosion prone land is a cost-effective strategy for minimizing flood damages. By acquiring floodprone land, the District can eliminate future losses on the acquired parcels*." Another benefit is that the parcel's natural floodplain characteristics are preserved, which in turn helps reduce downstream flooding peaks.
- Pima County Regional Flood Control District - Floodprone Land Acquisition Program - Pima County

Natural Infrastructure for Dryland Streams

- Installation of Retention/Detention Basins following Pima County's Design Standards for Stormwater Detention and Retention Manual
- Green Infrastructure (GI) includes a variety of stormwater control solutions such as basins, vegetated or rock swales, bioretention systems, or infiltration trenches following Pima County's Low Impact Development and Green Infrastructure Guidance Manual
- Natural infrastructure in dryland streams (NIDS) restoration practices to slow drainage of water from the landscape, including: one rock dams, check dams, earthen berms, and trincheras.

EXHIBIT A

Evaluate Criteria Question	Alternative Method	Problem Area #1				Problem Area #2				Problem Area #5				Problem Area #6				Problem Area #7				Total Responses per Eval Criteria Question Across all Problem Area			
		Positive	Neutral	Negative	Total Reponses	Positive	Neutral	Negative	Total Reponses	Positive	Neutral	Negative	Total Reponses	Positive	Neutral	Negative	Total Reponses	Positive	Neutral	Negative	Total Reponses	Positive	Neutral	Negative	Total Reponses
1.) Does the alternative restore natural drainage flow patterns?	Culvert	5	3	5	13	7	2	3	12	1	2	9	12	3	2	9	14	11	1	2	14	41.5%	15.4%	43.1%	65
	Road Improvements	5	6	2	13	5	3	4	12	6	4	3	13	4	5	4	13	8	2	3	13	43.8%	31.3%	25.0%	64
	Diversion Channels/Structures	8	3	2	13	5	2	5	12	7	3	3	13	8	2	5	15	10	2	2	14	56.7%	17.9%	25.4%	67
	Restore Disturbed Areas	11	2	0	13	7	6	0	13	13	1	0	14	13	2	0	15	12	2	0	14	81.2%	18.8%	0.0%	69
	Delineate/Preserve Flow Corridors	11	2	0	13	10	2	0	12	11	3	1	15	13	2	0	15	11	3	0	14	81.2%	17.4%	1.4%	69
	Floodplain Land Acquisition Program (FLAP/FLIP)	3	6	4	13	3	7	2	12	4	9	1	14	3	8	3	14	1	10	2	13	21.2%	60.6%	18.2%	66
	Natural Infrastructure for Dryland Streams	6	7	0	13	7	6	0	13	8	6	0	14	8	5	1	14	6	5	1	12	53.0%	43.9%	3.0%	66
2.) Does the alternative reduce potential flood and erosion damages to public and private infrastructure?	Culvert	8	2	3	13	8	2	1	11	5	5	3	13	2	5	6	13	13	0	1	14	56.3%	21.9%	21.9%	64
	Road Improvements	8	3	2	13	9	1	1	11	8	6	0	14	9	4	2	15	10	4	0	14	65.7%	26.9%	7.5%	67
	Diversion Channels/Structures	10	1	1	12	9	1	2	12	9	3	2	14	9	4	1	14	13	0	1	14	75.8%	13.6%	10.6%	66
	Restore Disturbed Areas	10	2	1	13	9	4	0	13	13	2	0	15	13	2	0	15	12	2	0	14	81.4%	17.1%	1.4%	70
	Delineate/Preserve Flow Corridors	9	4	0	13	11	2	0	13	10	5	0	15	10	4	1	15	8	5	1	14	68.6%	28.6%	2.9%	70
	Floodplain Land Acquisition Program (FLAP/FLIP)	5	7	1	13	5	6	1	12	6	9	0	15	5	7	2	14	0	10	2	12	31.8%	59.1%	9.1%	66
	Natural Infrastructure for Dryland Streams	13	0	0	13	11	2	0	13	13	2	0	15	12	3	0	15	12	1	1	14	87.1%	11.4%	1.4%	70
3.) Does the alternative reduce potential flood and erosion damages to active agricultural lands?	Culvert	2	8	2	12	7	3	1	11	3	5	5	13	1	4	8	13	8	3	2	13	33.9%	37.1%	29.0%	62
	Road Improvements	4	6	2	12	7	3	1	11	6	7	1	14	7	4	3	14	9	2	2	13	51.6%	34.4%	14.1%	64
	Diversion Channels/Structures	5	6	1	12	9	1	2	12	8	5	1	14	7	6	1	14	10	2	1	13	60.0%	30.8%	9.2%	65
	Restore Disturbed Areas	5	8	0	13	8	5	0	13	10	5	0	15	8	5	1	14	7	5	1	13	55.9%	41.2%	2.9%	68
	Delineate/Preserve Flow Corridors	7	6	0	13	11	2	0	13	5	9	0	14	7	6	1	14	5	6	2	13	52.2%	43.3%	4.5%	67
	Floodplain Land Acquisition Program (FLAP/FLIP)	2	10	1	13	5	6	2	13	3	11	1	15	1	10	3	14	0	9	3	12	16.4%	68.7%	14.9%	67
	Natural Infrastructure for Dryland Streams	4	7	1	12	4	8	0	12	3	10	1	14	5	9	1	15	5	7	2	14	31.3%	61.2%	7.5%	67
4.) Does the alternative enhance native habitat, rangeland health and soil health?	Culvert	5	3	5	13	2	4	5	11	1	5	7	13	3	1	9	13	6	3	4	13	27.0%	25.4%	47.6%	63
	Road Improvements	5	3	5	13	4	4	3	11	4	9	1	14	3	5	5	13	5	5	3	13	32.8%	40.6%	26.6%	64
	Diversion Channels/Structures	7	5	1	13	3	4	4	11	8	1	5	14	7	3	4	14	8	3	3	14	50.0%	24.2%	25.8%	66
	Restore Disturbed Areas	13	0	0	13	13	0	0	13	15	0	0	15	15	0	0	15	13	0	0	13	100.0%	0.0%	0.0%	69
	Delineate/Preserve Flow Corridors	11	2	0	13	12	1	0	13	10	5	0	15	12	3	0	15	10	4	0	14	78.6%	21.4%	0.0%	70
	Floodplain Land Acquisition Program (FLAP/FLIP)	4	9	0	13	5	7	1	13	6	9	0	15	5	7	3	15	3	9	1	13	33.3%	59.4%	7.2%	69
	Natural Infrastructure for Dryland Streams	12	0	1	13	7	6	0	13	11	4	0	15	11	3	1	15	10	3	1	14	72.9%	22.9%	4.3%	70
5.) Does the alternative maintain access (e.g., site maintenance, emergency response)?	Culvert	7	2	3	12	8	2	1	11	8	4	2	14	5	5	3	13	10	1	2	13	60.3%	22.2%	17.5%	63
	Road Improvements	12	0	0	12	11	0	0	11	11	3	0	14	12	2	0	14	12	1	0	13	90.6%	9.4%	0.0%	64
	Diversion Channels/Structures	8	4	0	12	8	2	1	11	8	5	1	14	7	5	2	14	10	1	2	13	64.1%	26.6%	9.4%	64
	Restore Disturbed Areas	4	6	2	12	4	6	2	12	6	8	0	14	6	7	2	15	6	4	3	13	39.4%	47.0%	13.6%	66
	Delineate/Preserve Flow Corridors	6	4	2	12	6	5	1	12	5	9	0	14	8	5	2	15	5	7	2	14	44.8%	44.8%	10.4%	67
	Floodplain Land Acquisition Program (FLAP/FLIP)	3	8	1	12	4	7	1	12	2	10	2	14	2	9	4	15	0	10	3	13	16.7%	66.7%	16.7%	66
	Natural Infrastructure for Dryland Streams	10	2	1	13	7	5	0	12	12	3	0	15	11	2	2	15	10	2	2	14	72.5%	20.3%	7.2%	69
Percentage of Responses per Problem Area Across all Questions	Culvert	42.9%	28.6%	28.6%		57.1%	23.2%	19.6%		27.7%	32.3%	40.0%		21.2%	25.8%	53.0%		71.6%	11.9%	16.4%		Conditional formatting using a color scale has been applied. A color gradient has been applied to a select range of cells. The color indicates where each cell value falls within that range. More green = more responses = strong agreement. More red = fewer responses.			
	Road Improvements	54.0%	28.6%	17.5%		64.3%	19.6%	16.1%		50.7%	42.0%	7.2%		50.7%	29.0%	20.3%		66.7%	21.2%	12.1%					
	Diversion Channels/Structures	61.3%	30.6%	8.1%		58.6%	17.2%	24.1%		58.0%	24.6%	17.4%		53.5%	28.2%	18.3%		75.0%	11.8%	13.2%					
	Restore Disturbed Areas	67.2%	28.1%	4.7%		64.1%	32.8%	3.1%		78.1%	21.9%	0.0%		74.3%	21.6%	4.1%		74.6%	19.4%	6.0%					
	Delineate/Preserve Flow Corridors	68.8%	28.1%	3.1%		79.4%	19.0%	1.6%		56.2%	42.5%	1.4%		67.6%	27.0%	5.4%		56.5%	36.2%	7.2%					
	Floodplain Land Acquisition Program (FLAP/FLIP)	26.6%	62.5%	10.9%		35.5%	53.2%	11.3%		28.8%	65.8%	5.5%		22.2%	56.9%	20.8%		6.3%	76.2%	17.5%					
	Natural Infrastructure for Dryland Streams	70.3%	25.0%	4.7%		57.1%	42.9%	0.0%		64.4%	34.2%	1.4%		63.5%	29.7%	6.8%		63.2%	26.5%	10.3%					

Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

Appendix E – Supporting Information

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Table 25 – Eliminated Alternatives and Rationale

Table 26 – Summary and Comparison of Alternative Plans

Table 27 – Details for the Preferred Alternatives

Table 28 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1)

Table 29 – Cost Details for the Preferred Alternatives

Table 30 – Table 4 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1))

Table 31 – Agency Consultation Record

Table 32 – Location of Problem Area APE

Attachment 14 – Preliminary Alternatives Selection Memo – Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – December 20, 2022)

Attachment 15 – Data Collection Technical Memorandum - Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – March 16, 2023)

Attachment 16 – Letter – NRCS Evaluation FPPA Ruling (May 21, 2024)

Attachment 17 – Class I Cultural Resources Inventory Results for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona, May 2024) (Revised July 2024)

Attachment 18 – Class III Cultural Resources Inventory Results Report (October 2024) (revised February 2025)

Attachment 19 – Letter – NRCS Section 12 Notification – Public Law 83-566 (February 10, 2025)

Attachment 20 – Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County Arizona, April 2025) Report

Data CollectionTechnical Memorandum

To:	Carrie Olson Pima County Regional Flood Control District	From:	Joseph M. Alwin, PE Stantec, Tucson
File:	181301206	Date:	March 16, 2023

Reference: Brawley Wash Watershed Plan and Environmental Assessment

PCRFCD Contract: CT-FC-290

INTRODUCTION

This Data Collection Technical Memorandum was prepared by Stantec Consulting Services Inc. (Stantec) with authorization from the Pima County Regional Flood Control District (District), who is the Sponsoring Local Organization (SLO) for the Plan-EA. This technical memorandum is provided under the scope of work for the Brawley Wash Watershed Plan-EA, Task 1.3 Data Collection/Literature Review – District and NRCS, Contract Number PCRFCD CT-FC-290.

This Data Collection Technical Memorandum summarizes the available data, reports, studies, and investigations, including GIS shapefiles, for the watershed and current NRCS (Natural Resources Conservation Service) reference documents, guidelines and manuals/handbooks. Data to be collected from the District and NRCS includes but is not limited to the following:

- Hydrology and hydraulics studies, reports, models (previous, existing and on-going),
- Previous watershed planning studies (and GIS shapefiles),
- District and NRCS technical manuals, guidelines, handbooks and manuals,
- Land ownership maps, ranch and farm maps
- Soils data, layers, and classifications,
- GIS shapefiles from PCRFCD, NRCS-Tucson, and Pima County,
- Existing and Future land uses,
- Existing LiDAR and aerial photography.

The data sources and references collected will guide recommendations for additional planning-level investigations needed for development of the Plan-EA.

DATA SOURCES

The data collected was gathered from various sources as identified on the attached Data Inventory Spreadsheet. The majority of data collected for use in the Brawley Wash Watershed Plan and Environmental Assessment was collected from the Pima County Regional Flood Control District, Pima County, the Natural Resources Conservation Service (NRCS) Arizona state office and Tucson office, the Altar Valley Conservation Alliance, and others.

The contact references for the primary data resources are listed as follows:

Ms. Carrie Olson, Senior Hydrologist
Pima County Regional Flood Control District
201 N Stone Ave. 9th Floor, Tucson, AZ 85701
Carrie.Olson@pima.gov

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

(520) 724-4684

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Ms. Alisha Phipps, Rangeland Management Specialist
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(520) 989-5630

Mr. Robert Davis, CMS GIS/LIS, subconsultant
Quiet Creek
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(520) 428-4470

Ms. Julia Sittig, Conservation & Science Director
Altar Valley Conservation Alliance
14990 S Sasabe Road, Tucson, AZ 85736
julia@altarvalleyconservation.org
(412) 720-1811

Ms. Christina McVie
Coalition for Sonoran Desert Protection
738 N. 5th Ave., Suite 212, Tucson, Arizona 85705
christina.mcvie@gmail.com
(520) 388-9925

Mr. Julian Pallanes, Water Operations Supervisor
Tucson Water
310 W Alameda St, Tucson, AZ 85701
Julian.Pallanes@tucsonaz.gov
(520) 791-3242

METHODOLOGY

The majority of the data collected as part of the Brawley Wash Watershed Plan-EA was provided by the District, NRCS, and project planning team. The data collected was reviewed, organized, and inventoried into the data inventory spreadsheet prepared by Stantec. The data inventory is provided in **Appendix A** and is separated by discipline.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

DATA INVENTORY

Stantec developed a data inventory to summarize information of the data collected and displayed the inventory in a spreadsheet format. The inventory is organized by the related discipline category, such as, General, Geology, Geotechnical, Environmental, Hydrology, Hydraulics, Landscape Architecture, Plans, and Reference. Information identified for each reference includes a document number, author, description, document date, source, and reference format.

Stantec Consulting Services Inc.



Joseph M. Alwin, PE

Phone:
Fax: Fax Number

Attachment: Appendix A – Data Collection Inventory (summary table)

c. C.C.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

APPENDIX A – DATA COLLECTION INVENTORY

Column Heading Descriptions:

- **Doc. No:** The document number "D-1," "D-2," etc. assigned to each reference.
- **Discipline:** The main discipline branch(es) covered by the reference. The discipline categories are: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, and Reference.
- **General Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The general subdiscipline categories are: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct – CAP. If the cell is blank, the subdiscipline is not applicable.
- **Soil Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The soil subdiscipline categories are: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland. If the cell is blank, the subdiscipline is not applicable.
- **Water Resources Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The water resources subdisciplines are: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation. If the cell is blank, the subdiscipline is not applicable.
- **Air Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The air subdiscipline category is Air Quality. If the cell is blank, the subdiscipline is not applicable.
- **Vegetation Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The vegetation subdiscipline categories are: Vegetation Communities and Habitat, Special Status Species, Invasive Species. If the cell is blank, the subdiscipline is not applicable.
- **Wildlife Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The wildlife subdiscipline categories are: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species. If the cell is blank, the subdiscipline is not applicable.
- **Human Environment Subdiscipline:** The data provided in the reference is further categorized by a specific subdiscipline. The Human Environment Subdiscipline categories are: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics. If the cell is blank, the subdiscipline is not applicable.
- **Title:** Title of the data collected.
- **Description:** Brief description of the document contents.
- **Author:** The personnel or entity who authored the document.
- **Document Date:** The date the document was published, signed, or sealed.
- **Source:** The organization or individual who provided Stantec the document.
- **Format:** The format of the document Stantec received (paper, CD or electronic)
- **Date Requested:** The date Stantec requested the reference document.
- **Date Collected:** The date Stantec collected the reference document.
- **Collected By:** The Stantec personnel who collected the document.
- **Collected From:** Source contact information where applicable.
- **SharePoint File Location:** Name of the document's folder location on the SharePoint site**.**
- **Remarks:** Supplemental notes that further describe the document's contents, specify the file name or to define other unique qualities observed.

Reference: **Brawley Wash Watershed Plan and Environmental Assessment**

Abbreviations/Acronyms:

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
ASLD	Arizona State Land Department
AVCA	Altar Valley Conservation Alliance
AVWG	Altar Valley Watershed Working Group
AZGFD	Arizona Game and Fish Department
AZSL	Arizona State Land Department
BANWR	Buenos Aires National Wildlife Refuge
CNF	Coronado National Forest
COT	City of Tucson
CSDP	Coalition for Sonoran Desert Protection
FEMA	Federal Emergency Management Agency
GIS	Geographical Information System
LiDAR	Light Detection and Ranging
NRCS	Natural Resources Conservation Service
PCGISP	Pima County GIS Portal
PCNRPR	Pima County Natural Resources Parks and Recreation
PCOS	Pima County Office of Sustainability
PCRFCD	Pima County Regional Flood Control District
RFCD	[Pima County] Regional Flood Control District
SLO	Sponsoring Local Organization
USDA	United States Department of Agriculture
USGS	United States Geological Survey

Brawley Wash Watershed Plan and Environmental Assessment

Data Collection Technical Memorandum - Data Collection Inventory

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	**Doc. No.**	**Discipline**	**General Subdiscipline**	**Soil Subdiscipline**	**Water Resources Subdiscipline**	**Air Subdiscipline**	**Vegetation Subdiscipline**	**Wildlife Subdiscipline**	**Human Environment Subdiscipline**	**Title**	**Description**	**Author**	**Document Date**	**Source**	**Format**	**Date Requested**	**Date Collected**	**SharePoint File Location**	**Remarks**		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
3	D-1	Water Resources			Groundwater					GIS Data	NRCS GIS Data		22-Sep-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: wells.shp	Data includes: Name and location of roughly 170 wells located within the site
4	D-2	General	Fences							GIS Data	NRCS GIS Data		5-Aug-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: fences.shp	Data includes: Locations for fences in the lower 2/3 of the site area. Note that this does not include all fence lines, the shapefile is only showing data provided by NRCS.
5	D-3	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	NRCS GIS Data		22-Sep-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs	It has some overlapping information with allot2017_state_a_az shapefile	Shapefile name: allotments.shp	Data includes: Area, perimeter, allotment IDs
6	D-4	Human Environment							Land Use and Recreation	GIS Data	NRCS GIS Data		26-May-17	Natural Resources Conservation Service	Electronic	19-Feb-21	9-Jun-21	nrcs		Shapefile name: allot2017_state_a_az.shp	Data includes: Allotment name, ID, and area (in acres and miles) for a majority of the site area
7	D-5	Water Resources			Hydrology and Surface Water					GIS Data	NRCS GIS Data		22-Sep-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: watershed.shp	Data includes: Watershed area, HU 2 name, HU 4 name, HU 6 Name, HU 8 Name, HU 10 Name, HU 8 MOD, HU 10 MOD, HU 10 Type
8	D-6	General	Boundary							GIS Data	NRCS GIS Data		22-Dec-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: project boundary.shp	Data includes: Polyline of the project boundary and the acres of the area
9	D-7	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	NRCS GIS Data		13-Jan-06	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: landowner.shp	Data includes: Land category, area, and list of ownership
10	D-8	Human Environment							Land Use and Recreation	GIS Data	NRCS GIS Data		7-Jan-06	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: Farm_Parcels.shp	Data includes: Outlines of a few farm parcels located by Marana
11	D-9	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	NRCS GIS Data		25-Aug-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: cnf_boundary.shp	Data includes: Outline of a single area along the border with forest name, roads, acres, and length information
12	D-10	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	NRCS GIS Data		20-Sep-05	Natural Resources Conservation Service	Electronic	19-Feb-21	19-Feb-21	nrcs		Shapefile name: allotments_cnf.shp	Data includes: Allotment names (for 6 parcels)
13	D-11	Water Resources			Floodplain Management					GIS Data	AVCA GIS Data		21-Sep-05	AVCA	Electronic			nrcs		Shapefile name: tanks.shp	Data includes: Name and location of over 500 tanks. Also states if they are in the study area or not.
14	D-12	Human Environment							Land Use and Recreation	GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: transects.shp	Data includes: Location of transect and includes allotments as well as number and label information for each one.
15	D-13	Water Resources			Groundwater					GIS Data	AVCA GIS Data		21-Sep-05	AVCA	Electronic			nrcs		Shapefile name: wells.shp	Data includes: Location of well, type of well, and name as well as if it is located within the boundary of the site
16	D-14	General	Traffic/Roadways							GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: roads.shp	Data includes: Location and description of roads in lower 2/3 of the site area
17	D-15	General	Traffic/Roadways							GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: roads3.shp	Data includes: Location and street names for larger roads in the site area
18	D-16	General	Traffic/Roadways							GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: roads2.shp	Data includes: Polygon shapefile
19	D-17	General	Fences							GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: fences.shp	Data includes: Polylines showing the locations of fences
20	D-18	Soils		Soils and Geological Characteristics						GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: soilsgen.shp	Data includes: Soil type and total area for each polygon area denoted
21	D-19	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: ownership.shp	Data includes: List of who owns each parcel
22	D-20	Vegetation					Vegetation Communities and Habitat			GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: mlra.shp	Data includes: List of different major land resource areas (MLRA)
23	D-21	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: graz_allot.shp	Data includes: Name of allotment, allotment ID, and total acres
24	D-22	Soils, Vegetation		Soils and Geological Characteristics			Vegetation Communities and Habitat			GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: ecosites.shp	Data includes: Contains ecosite, group, and subgroup information as well as total area for each shape
25	D-23	General	Boundary							GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: StudyArea.shp	Data includes: Outline of the study area
26	D-24	Vegetation					Vegetation Communities and Habitat			GIS Data	AVCA GIS Data		5-Aug-05	AVCA	Electronic			nrcs		Shapefile name: vegetation.shp	Data includes: Major and minor vegetation classification as well as specific vegetation types seen for each area
27	D-25	General	Boundary							GIS Data	Boundary area		17-Jan-06	BANWR	Electronic			nrcs	Received an error saying there was no spatial reference data when the file was opened	Shapefile name: banwr_boundary05.shp	Data includes: Area and perimeter data
28	D-26	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data			14-Sep-05	BANWR	Electronic			nrcs		Shapefile name: fmu_shp.shp	Data includes: FMU ID, name, and number for each area as well as total area and perimeter data
29	D-27	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	Allotment Information		9-Jan-06	ASLD	Electronic			nrcs		Shapefile name: allot.shp	Data includes: Allotment information including area, perimeter, and ID for large portions of Arizona
30	D-28	Wildlife						Wildlife Communities		GIS Data	AGFD GIS Data		16-Sep-05	AGFD	Electronic			nrcs		Shapefile name: alter_hdms_eos.shp	Data includes: Data on animal sightings including scientific and common name, EO type, and county the observation occurred in
31	D-29	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	Parcel/ownership information		20-Oct-05	Pima County	Electronic			nrcs		Shapefile name: os_altar2.shp	Data includes: Some data on parcels, ownership, and who the area is managed by
32	D-30	General	Fire							GIS Data	Fire District Information		20-Oct-05	Pima County	Electronic			nrcs		Shapefile name: firedist.shp	Data includes: Name, area, perimeter, and fire district each area belongs to
33	D-31	General	Property Info							GIS Data	Parcel/ownership information		20-Oct-05	Pima County	Electronic			nrcs		Shapefile name: os_altar1.shp	Data includes: Parcel numbers, ownership information, plus area and perimeter data
34	D-32	Human Environment							Public Health and Safety	GIS Data	TUMA fire history information		25-Aug-05	CNF	Electronic			nrcs	All these shape files have data for an area that is right along the border with Mexico. The area is mostly in Santa Cruz County but some portions of it are in Pima County .	Shapefile name: TUMA_Fire_History.shp	Data includes: Information includes the name and date of the fire, size class, and cause
35	D-33	Human Environment							Land Use and Recreation	GIS Data	TUMA trail information		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Trails.shp	Data includes: Length and trail ID information
36	D-34	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA wilderness area information		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Wilderness.shp	Data includes: Area showing the location, size, shape, and name of a wilderness area
37	D-35	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA vegetation information		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Veg.shp	Data includes: Vegetation description, forest number, and location information for each area included
38	D-36	General	Property Info							GIS Data	TUMA ownership information		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Own.shp	Data includes: Information includes area, perimeter, and owner ID
39	D-37	Vegetation					Special Status Species			GIS Data	TUMA special management areas		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Other_Spec_Mgt_Areas.shp	Data includes: Two management areas outlined and information about the area name, perimeter and total area is included

Brawley Wash Watershed Plan and Environmental Assessment

Data Collection Technical Memorandum - Data Collection Inventory

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1	**Doc. No.**	**Discipline**	**General Subdiscipline**	**Soil Subdiscipline**	**Water Resources Subdiscipline**	**Air Subdiscipline**	**Vegetation Subdiscipline**	**Wildlife Subdiscipline**	**Human Environment Subdiscipline**	**Title**	**Description**	**Author**	**Document Date**	**Source**	**Format**	**Date Requested**	**Date Collected**	**SharePoint File Location**	**Remarks**		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
40	D-38	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA fuel loading information		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Fuel_Loading.shp	Data includes: Fuel load, vegetation, and fuel ID information given
41	D-39	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data	TUMA allotments		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Allotments.shp	Data includes: Allotment name, ID, and number as well as area and perimeter data
42	D-40	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA location		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA.shp	Data includes: Single area defined with forest and EMA information given
43	D-41	General	Traffic/Roadways							GIS Data	Road locations		25-Aug-05	CNF	Electronic			nrcs		Shapefile name: TUMA_Roads.shp	Data includes: Information on roads, length, and source
44	D-42	Vegetation					Vegetation Communities and Habitat			GIS Data	Arizona Grasslands		12-Sep-05	Nature Conservancy	Electronic			nrcs		Shapefile name: Arizona_grasslands.shp	Data includes: Class and class description for grassland areas. Data included for large portions of Arizona
45	D-43	Water Resources			Hydrology and Surface Water					GIS Data	HUC12's for our project	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: Pima_566_7HUCs.shp	Data includes: Wash name, area, length, and HUC Code for 7 different washes
46	D-44	Water Resources			Hydrology and Surface Water					GIS Data	ADEQ wetlands	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Data covers all of AZ.	Shapefile name: adeq_wet.shp	Data includes: Polygons with tank and Cowardin Wetland Classification System code (CowCode) information for each.
47	D-45	Water Resources			Floodplain Management					GIS Data	Agricultural flow diversions	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Data covers Pima County only	Shapefile name: fp_agfd.shp	Data includes: Points with coordinates and comments on ponds/berms/retention basins. Tank name and if it was breached included where applicable. Acreage information included for each point.
48	D-46	Wildlife					Vegetation Communities and Habitat			GIS Data	Amphibian species richness	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Data covers all of Pima County	Shapefile name: amphibs.shp	Data includes: Polygon shapes with grid code and species number information.
49	D-47	Water Resources			Irrigation					GIS Data	Avra Velley Irrigation Canals	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: avcanals.shp	Data includes: Polylines showing the locations of canals specifically in Avra Valley.
50	D-48	Wildlife						Wildlife Communities		GIS Data	Bird species richness by area	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Data covers all of Pima County	Shapefile name: birds_pc.shp	Data includes: Polygon shapes with grid code, PSYM, and species number information.
51	D-49	Human Environment							Land Use and Recreation	GIS Data	Built irrigated and mining environment	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Data covers all of AZ.	Shapefile name: builttnc.shp	Data includes: Polygon shapes with land type (rural, ag, developable, protected, developments)
52	D-50	General	Property Info							GIS Data	City of Tucson properties	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: COT_Clip7HUC.shp	Data includes: Object ID, acres, jurisdiction, address, parcel use, legal info, mail address, tax area, and Lat/Lon data.
53	D-51	Water Resources			Groundwater					GIS Data	Groundwater pollution	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Covers are around Marana and Tucson within the Pima County boundaries.	Shapefile name: drasagam.shp	Data includes: Polygon shapes with DI and symbol information.
54	D-52	Human Environment							Land Use and Recreation	GIS Data	Historical/Abandoned Ag	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: ag_hist.shp	Data includes: Vegetation, source, irrigation type, and acres information for each polygon.
55	D-53	Water Resources			Hydrology and Surface Water					GIS Data	HUC12's for our project	Pima County		Quite Creek	Electronic	18-Feb-21	18-Feb-21	quietcreek	Duplicate file/information. Same as D-43	Shapefile name: Pima_566_7HUCs.shp	Data includes: Wash name, area, length, and HUC Code for 7 different washes
56	D-54	General	Property Info							GIS Data	MSCP portfolio	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: mscpport.shp	Data includes: Property name and type, acres, owner, MSCP type, and RC type information.
57	D-55	Human Environment							Land Use and Recreation	GIS Data	MSCP urban growth model	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: mscpgrth.shp	Data includes: General information (suburbs/exurbs/urban), year, and more detailed form information (planned/unplanned/subdivided) for each area.
58	D-56	Water Resources			Hydrology and Surface Water					GIS Data	National wetlands inventory data for Arizona	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek	Data covers all of AZ.	Shapefile name: nwi.shp	Data includes: Object ID, wetland type, acres and the length and area for each polygon
59	D-57	General	Property Info							GIS Data	Pima county properties	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: parcpima.shp	Data includes: Area, parcel use, address, and legal information
60	D-58	General, Human Environment	Property Info						Cultural and Historic Resources	GIS Data	Pima Preserves	Pima County		Quite Creek	Electronic	18-Feb-21	12-Mar-21	quietcreek		Shapefile name: Protected_Lands_of_Pima_County.shp	Data includes: Parcel number, who the parcel is managed by, department, owner name, and management plan.
61	D-59	Wildlife						Wildlife Communities		GIS Data	Potential habitat for 34 evaluated species	Pima County		Quite Creek	Electronic	19-Feb-21	12-Mar-21	quietcreek	Data covers all of Pima County	Shapefile name: sp_rich2.shp	Data includes: Object ID, length, area, count information, and richness for each polygon shape defined.
62	D-60	Water Resources			Hydrology and Surface Water					GIS Data	Riparian Areas	Pima County		Quite Creek	Electronic	20-Feb-21	12-Mar-21	quietcreek		Shapefile name: Riparian_classification%2C_2005_FC2	Data includes: Object ID, ownership, acres, and IRA (Y/N) information for each area.
63	D-61	Vegetation					Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek		Shapefile name: AZ_IPTP_Master_Index.shp	Data includes: Object/grid/hex ID, fire risk, protected area, undeveloped area, wui index, riparian index, corridor index, master score, and master index information for each area.
64	D-62	Vegetation					Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek		Shapefile name: IPTP_Score___HDMS_observed_species_diversity.shp	Data includes: Object/grid/hex ID, state, fire and flood risk, miles of road, HDMS species information, and shape length and area.
65	D-63	Vegetation					Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek	Appears to be a duplicate file/information. Same as D-61	Shapefile name: IPTP_Score___mean_AZWRAP_Fire_Risk_Index.shp	Data includes: Object/grid/hex ID, fire risk, protected area, undeveloped area, wui index, riparian index, corridor index, master score, and master index information for each area.
66	D-64	Vegetation					Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek	Appears to be a duplicate file/information. Same as D-61	Shapefile name: IPTP_Score___mean_inverse_NLCD__imperviousness.shp	Data includes: Object/grid/hex ID, fire risk, protected area, undeveloped area, wui index, riparian index, corridor index, master score, and master index information for each area.
67	D-65	Water Resources, Vegetation			Hydrology and Surface Water		Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek		Shapefile name: IPTP_Score___riparian_wetland_flood_zone_acres.shp	Data includes: Object/grid/hex ID, fire risk, protected area, undeveloped area, wui index, riparian index, corridor index, master score, and master index information for each area.

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68	D-66	Vegetation					Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek		Shapefile name: IPTP_Score___spread_corridor_miles.shp	Data includes: Object/grid/hex ID, fire risk, protected area, undeveloped area, wui index, riparian index, corridor index, threat index, master score, and master index information for each area.
69	D-67	Vegetation					Invasive Species			GIS Data	State of AZ invasive dataset	Pima County		Quite Creek	Electronic	21-Feb-21	11-Mar-21	quietcreek		Shapefile name: IPTP_Score___acres_treated.shp	Data includes: Object/grid/hex ID, fire risk, protected area, acres treated, undeveloped area, wui index, riparian index, corridor index, threat index, master score, and master index information for each area.
70	D-68	Water Resources			Hydrology and Surface Water					GIS Data	CAP lines information			CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: cap_pts.shp	Data includes: CAP point ID, feature description, station, size, peak flow rate in, storage capacity, peak flow rate out, and storm duration.
71	D-69	Water Resources			Hydrology and Surface Water					GIS Data	CAP points information			CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: cap_lins.shp	Data includes: Polyline length, CAP line ID, and feature type.
72	D-70	Soils		Soils and Geological Characteristics						GIS Data	Soil hydraulic group information for Pima County			CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: soilshyd_clip.shp	Data includes: Soil hydraulic group precents for each area, description of soil and slope, dominant hydraulic soil group, and soil type.
73	D-71	Vegetation					Vegetation Communities and Habitat			GIS Data	Vegetation Descriptions			CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: hydroveg_clip.shp	Data includes: Multiple description of the vegetation in each area and a code number.
74	D-72	Water Resources, Human Environment			Hydrology and Surface Water, Floodplain Management				Public Health and Safety	GIS Data	Flood zone information			CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: FEMA_S_FLD_HAZ_AR_clip.shp	Data includes: Study type, flood zone, depth, velocity, and source information.
75	D-73	Human Environment							Land Use and Recreation	GIS Data	Land Use Intensity of Pima County			CMG	Electronic	8-Mar-21	10-Mar-21		Data covers all of Pima County	Shapefile name: Comprehensive_Plan_Land_Use_Intensity--Pima_Prospers_2015.shp	Data includes: Intensity name, intensity class, acres, and object ID for each area.
76	D-74	General	DEM							GIS Data				CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: Brawley_2015-2018_combo.tif	Data includes: Raster file covering the Brawley wash area.
77	D-75	Vegetation					Vegetation Communities and Habitat			GIS Data	Landcover information for Pima County			CMG	Electronic	8-Mar-21	10-Mar-21			Shapefile name: pima_landcover-noroads.shp	Data includes: An image with OID, value number, and count information.
78	D-76	Water Resources, Human Environment			Floodplain Management				Public Health and Safety	Flood Insurance Study	Flood Insurance Study for Pima County and incorporated areas	Federal Emergency Management Agency	28-Sep-12	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	There are five separate volumes for this study.		
79	D-77	Reference								National Planning Procedures Handbook, Edition 1	NRCS Planning Process	Natural Resources Conservation Service	6-Nov-14	Natural Resources Conservation Service	Electronic		4-Feb-21	nrcs			
80	D-78	Reference								Guidance for Conducting Analyses Under the Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies and Federal Water Resource Investments	US Agriculture department guidance on analyzing federal water resource investments.	US Department of Agriculture	5-Jan-17	Natural Resources Conservation Service	Electronic		4-Feb-21	nrcs			
81	D-79	Reference								National Watershed Program Handbook	Guidance for watershed projects to be used as a reference	Natural Resources Conservation Service	Jan-10	Natural Resources Conservation Service	Electronic		4-Feb-21	nrcs			
82	D-80	Reference								National Watershed Program Manual	Guidance for watershed projects to be used as a reference	Natural Resources Conservation Service	Dec-09	Natural Resources Conservation Service	Electronic		21-Jan-21	nrcs			
83	D-81	Reference								National Operation & Maintenance Manual	O&M Manual	Natural Resources Conservation Service	May-19	Natural Resources Conservation Service	Electronic		9-Feb-23	nrcs			
84	D-82	Reference								Principles, Requirements, and Guidelines for Water and Land Related Resources Implementation Studies (PR&G)		Natural Resources Conservation Service	10-May-18	Natural Resources Conservation Service	Electronic		21-Jan-21	nrcs			
85	D-83	Reference								National Resource Concern List and Planning Criteria	Resource concerns and planning criteria used by NRCS when looking at resource treatment levels.	Natural Resources Conservation Service	Oct-09	Natural Resources Conservation Service	Electronic		4-Feb-21	nrcs			
86	D-84	Soils		Prime and Unique Farmland						Brawley Wash Map	Map of the wash area with farms listed	Natural Resources Conservation Service	Jan-21	Natural Resources Conservation Service	Electronic		19-Jan-21	nrcs		File name: Brawley_PL566_Ranch_names(ortho).pdf	
87	D-85	Soils, Water Resources, Air, Vegetation, Human Environment		Soils and Geological Characteristics	Hydrology and Surface Water	Air Quality	Vegetation Communities and Habitat		Land Use and Recreation, Socioeconomics	Brawley Wash Figures	Maps of the Los Robles wash watershed with information such as resource area, streams & canals, etc.	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		30-Sep-20	nrcs	Contains 20 separate figures each with different information for that area.	File name: nrcs144p2_064842.pdf	
88	D-86	Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment		Soils and Geological Characteristics, Upland Erosion	Hydrology and Surface Water, Floodplain Management	Air Quality	Vegetation Communities and Habitat, Invasive Species	Special Status Species	Land Use and Recreation, Socioeconomics	Brawley Wash - Los Robles Wash Watershed - Arizona Rapid Watershed Assessment	Brawley Wash Assessment	Natural Resources Conservation Service	Jun-08	Natural Resources Conservation Service	Electronic		30-Sep-20	nrcs		File name: nrcs144p2_064911.pdf	
89	D-87	Reference								A Good Road Lies Easy on the Land	Water Harvesting from Low-Standard Rural Roads	The Quivira Coalition, Rio Puerco Management Committee, New Mexica Environment Department	Apr-06	Pima County Office of Sustainability and Conservation	Electronic		15-Mar-21	pcos			
90	D-88	Water Resources			Floodplain Management, Groundwater, Irrigation					Avra Valley Land Use Chronology	Chronology of rangeland conditions/practices in Avra Valley	Julia Fonseca, Pima County Office of Sustainability and Conservation	Aug-20	Pima County Office of Sustainability and Conservation	Electronic		15-Mar-21	pcos			
91	D-89	Water Resources			Hydrology and Surface Water					Preliminary assessment of the Buckelew property ephemeral waters	Buckelew Ephemeral Waters inspection/assessment	Pima County	2-Aug-19	Pima County Office of Sustainability and Conservation	Electronic		15-Mar-21	pcos			
92	D-90	Water Resources			Groundwater					GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: wells	Data includes: Well name and location within the boundary defined in the file.
93	D-91	General	Fences							GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: fences.shp	Data includes: Polylines of fence locations.
94	D-92	General	Property Info							GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: allotments.shp	Data includes: Parcel area, perimeter, allotment, allotment number, and name.
95	D-93	Water Resources			Hydrology and Surface Water					GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: watershed.shp	Data includes: Watershed area, HU 2 name, HU 4 name, HU 6 Name, HU 8 Name, HU 10 Name, HU 8 MOD, HU 10 MOD, and HU 10 Type for 16 different areas.
96	D-94	General	Boundary							GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: project boundary.shp	Data includes: Polygon shapefile denoting the project boundary and acres.
97	D-95	General	Property Info							GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: landowner.shp	Data includes: Category, description of land, and total acres for each area.
98	D-96	Vegetation					Vegetation Communities and Habitat			GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: cnf_boundary.shp	Data includes: A single polygon with forest number, name, and total acres.

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99	D-97	General	Property Info							GIS Data	New NRCS GIS Data			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs		Shapefile name: allotments_cnf.shp	Data includes: Allotment names for 6 areas along the border.
100	D-98	General	Traffic/Roadways							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: fireroads.shp	Data includes: Description, location, and code given for each road.
101	D-99	General	Fire							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: fmb.shp	Data includes: Type information and acres for each area.
102	D-100	General	Fire							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: fmb_Dissolve.shp	Data includes: Type (confined, contained, controlled) and location for 4 areas.
103	D-101	General	Fire							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs	Appears to be a duplicate file/information. Same as D-102	Shapefile name: fmb_Dissolve_Clip1.shp	Data includes: Type (confined, contained, controlled) and location for 4 areas.
104	D-102	General	Fire							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: pastfirepts.shp	Data includes: Fire point location, year, and cause.
105	D-103	General	Fire							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: pastfires.shp	Data includes: Fire area location, year, and cause.
106	D-104	Human Environment							Land Use and Recreation	GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: ranchhouses.shp	Data includes: Location of 137 ranch houses
107	D-105	Soils, Water Resources		Prime and Unique Farmland	Floodplain Management, Groundwater					GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: waterpts.shp	Data includes: Name/type of water (tank/wells/ranch) and location
108	D-106	Water Resources			Floodplain Management					GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: tanks.shp	Data includes: Take name and if it is in the boundary area defined.
109	D-107	Human Environment							Land Use and Recreation	GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: transects.shp	Data includes: Transect, allotment, label, and x and y location information for each point.
110	D-108	Water Resources			Groundwater					GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: wells.shp	Data includes: Well name and location within the boundary defined in the file.
111	D-109	General	Traffic/Roadways							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: roads.shp	Data includes: Street name and polyline location for each road.
112	D-110	General	Traffic/Roadways							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: roads3.shp	Data includes: Description and code for each polyline representing a trail.
113	D-111	General	Traffic/Roadways							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: roads2.shp	Data includes: Polygon shapefile with current and original data information.
114	D-112	General	Fences							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: fences.shp	Data includes: Polylines showing the locations of fences
115	D-113	Soils		Soils and Geological Characteristics						GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: soilsgen.shp	Data includes: Soil type and total area for each polygon area denoted
116	D-114	General	Property Info							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: ownership.shp	Data includes: Name of owner for each area defined.
117	D-115	Vegetation					Vegetation Communities and Habitat			GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: mlra.shp	Data includes: List of different major land resource areas (MLRA)
118	D-116	General	Property Info							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: graz_allot.shp	Data includes: Name of allotment, allotment ID, and total acres
119	D-117	Soils, Vegetation		Soils and Geological Characteristics			Vegetation Communities and Habitat			GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: ecosites.shp	Data includes: Contains ecosite, group, and subgroup information as well as total area for each shape
120	D-118	General	Boundary							GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: StudyArea.shp	Data includes: Outline of the study area
121	D-119	Vegetation					Vegetation Communities and Habitat			GIS Data	New AVCA GIS Data			AVCA	Electronic		22-Mar-21	nrcs		Shapefile name: vegetation.shp	Data includes: Major and minor grassland type, class number, vegetation type, and total acres for each area.
122	D-120	General	Boundary							GIS Data	Boundary area			BANWR	Electronic		22-Mar-21	nrcs	Received an error saying there was no spatial reference data when the file was opened	Shapefile name: banwr_boundary05.shp	Data includes: Area and perimeter data
123	D-121	Human Environment							Cultural and Historic Resources, Land Use and Recreation	GIS Data				BANWR	Electronic		22-Mar-21	nrcs	Received an error saying there was no spatial reference data when the file was opened	Shapefile name: fmu_shp.shp	Data includes: FMU ID, name, and number for each area as well as total area and perimeter data
124	D-122	General	Property Info							GIS Data	Allotment Information			ASLD	Electronic		22-Mar-21	nrcs	Information covers most of AZ	Shapefile name: allot.shp	Data includes: Area, perimeter, allotment IDs, name, lease information, and acres.
125	D-123	Wildlife						Wildlife Communities		GIS Data	AGFD GIS Data			AGFD	Electronic		22-Mar-21	nrcs		Shapefile name: alter_hdms_eos.shp	Data includes: Data on animal sightings including feature ID, EL Code, EO number, category, scientific and common name, town range, and quad.
126	D-124	General	Property Info							GIS Data	Parcel/ownership information			Pima County	Electronic		22-Mar-21	nrcs		Shapefile name: os_altar2.shp	Data includes: Area, perimeter, status, designation, reserve name, owner, who the area is managed by, and total acres.
127	D-125	General	Fire							GIS Data	Fire District Information			Pima County	Electronic		22-Mar-21	nrcs	Received an error saying there was no spatial reference data when the file was opened	Shapefile name: firedist.shp	Data includes: Name, area, perimeter, and fire district each area belongs to
128	D-126	General	Property Info							GIS Data	Parcel/ownership information			Pima County	Electronic		22-Mar-21	nrcs		Shapefile name: os_altar1.shp	Data includes: Parcel numbers, ownership information, plus area and perimeter data
129	D-127	Human Environment							Public Health and Safety	GIS Data	TUMA fire history information			CNF	Electronic		22-Mar-21	nrcs	There was an error message shown when trying to open this file.	Shapefile name: TUMA_Fire_History.shp	Data includes:
130	D-128	Human Environment							Land Use and Recreation	GIS Data	TUMA trail information			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Trails.shp	Data includes: Length and trail ID information
131	D-129	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA wilderness area information			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Wilderness.shp	Data includes: Area showing the location, size, shape, and name of a wilderness area
132	D-130	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA vegetation information			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Veg.shp	Data includes: Vegetation description, forest number, and location information for each area included
133	D-131	General	Property Info							GIS Data	TUMA ownership information			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Own.shp	Data includes: Information includes area, perimeter, and owner ID
134	D-132	Vegetation					Special Status Species			GIS Data	TUMA special management areas			CNF	Electronic		22-Mar-21	nrcs	All these shape files have data for an area that is right along the border with Mexico. The area is mostly in Santa Cruz County but some portions of it are in Pima County	Shapefile name: TUMA_Other_Spec_Mgt_Areas.shp	Data includes: Two management areas outlined and information about the area name, perimeter and total area is included
135	D-133	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA fuel loading information			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Fuel_Loading.shp	Data includes: Fuel load, vegetation, and fuel ID information given
136	D-134	General	Traffic/Roadways							GIS Data	Road locations			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Roads.shp	Data includes: Information on roads, length, and source
137	D-135	General	Property Info							GIS Data	TUMA Allotments			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA_Allotments.shp	Data includes: Area, perimeter, allotment id, forest number, allotment number, allotment name, past name if applicable, and acres for each location.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	**Doc. No.**	**Discipline**	**General Subdiscipline**	**Soil Subdiscipline**	**Water Resources Subdiscipline**	**Air Subdiscipline**	**Vegetation Subdiscipline**	**Wildlife Subdiscipline**	**Human Environment Subdiscipline**	**Title**	**Description**	**Author**	**Document Date**	**Source**	**Format**	**Date Requested**	**Date Collected**	**SharePoint File Location**	**Remarks**		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
138	D-136	Vegetation					Vegetation Communities and Habitat			GIS Data	TUMA location			CNF	Electronic		22-Mar-21	nrcs		Shapefile name: TUMA.shp	Data includes: Single area defined with forest and EMA information given
139	D-137	Vegetation					Vegetation Communities and Habitat			GIS Data	Arizona Grasslands			Nature Conservancy	Electronic		22-Mar-21	nrcs		Shapefile name: Arizona_grasslands.shp	Data includes: Class and class description for grassland areas. Data included for large portions of Arizona
140	D-138	Soils, Human Environment		Upland Erosion, Sedimentation, Prime and Unique Farmland					Land Use and Recreation	Historic Aerial Imagery	Images of the King 98 restoration test site			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs	There are 4 pdf files and one image file. All show different areas of the site.		
141	D-139	Soils		Upland Erosion, Sedimentation, Prime and Unique Farmland						98 Ranch Study Plan - Draft	USDA and NRCS Initial Evaluation study for 98 Ranch Revegetation	US Department of Agriculture and Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs			
142	D-140	Soils		Upland Erosion, Sedimentation, Prime and Unique Farmland						AV Working Restoration Map	Map of the Restoration area		13-May-15	Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs			
143	D-141	Soils, Vegetation		Upland Erosion, Sedimentation, Prime and Unique Farmland			Vegetation Communities and Habitat			AVCA Nawa Seeding acreage estimate	Worksheet for calculating seeding acreage and costs			Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs			
144	D-142	Soils, Vegetation		Upland Erosion, Sedimentation, Prime and Unique Farmland			Vegetation Communities and Habitat			Berm Transect Data 2018	Berms with seeded and unseeded area denoted		13-Sep-18	Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs			
145	D-143	Soils, Vegetation		Upland Erosion, Sedimentation, Prime and Unique Farmland			Vegetation Communities and Habitat			Pima County 98 Ranch, Northern Alter Wash Project Area Vegetation, soils, climate and management of abandoned farmland	Evaluation of solids, vegetation, and current conditions on 98 Ranch		24-Mar-15	Natural Resources Conservation Service	Electronic		22-Mar-21	nrcs			
146	D-144	Vegetation					Invasive Species			GIS Data	Invasive species Data from RFCD		8-Mar-21	RFCD	Electronic		22-Mar-21	pcrfcd		Shapefile name: imapinvasive_species_points_03_08_2021.shp	Data includes: Species scientific and common name, date of observation, number found, organization and name of observer, jurisdiction, county, and management area.
147	D-145	Vegetation					Invasive Species			GIS Data	Invasive species Data from RFCD		8-Mar-21	RFCD	Electronic		22-Mar-21	pcrfcd		Shapefile name: imapinvasive_species_polygons_03_08_2021.shp	Data includes: Species scientific and common name, species type, date of observation, number found, organization and name of observer, jurisdiction, county, management area, and length/area of the location where the species was found
148	D-146	General, Water Resources, Vegetation, Wildlife, Human Environment	Property Info		Floodplain Management, Groundwater		Vegetation Communities and Habitat, Special Status Species	Wildlife Communities, Special Status Species	Land Use and Recreation, Socioeconomics	COT Avra valley Land Use Study	Avra Valley land Use Study for City of Tucson Property Holdings	City of Tucson Planning Department	Mar-96	RFCD	Electronic		22-Mar-21	pcrfcd			
149	D-147	Water Resources			Hydrology and Surface Water					WBD 15 HU2 Shape file		USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs			
150	D-148	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDLine.shp	Data includes: Object ID, HU digit, line source, metasource, and shape length.
151	D-149	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs		Shapefile name: NonContruibutingDrainageLine.shp	No data seen in the attribute table
152	D-150	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs		Shapefile name: NWISDrainageLine.shp	No data seen in the attribute table
153	D-151	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU8.shp	Data includes: Area in square miles and acres, name of area, state it is in, and HUC8 information.
154	D-152	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU6.shp	Data includes: Area in square miles and acres, name of area, state it is in, and HUC6 information.
155	D-153	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU14.shp	No data seen in the attribute table
156	D-154	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU16.shp	No data seen in the attribute table
157	D-155	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU2.shp	Data includes: Area in square miles and acres, name of area, state it is in, and HUC2 information.
158	D-156	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU4.shp	Data includes: Area in square miles and acres, name of area, state it is in, and HUC4 information.
159	D-157	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU12.shp	Data includes: Area in square miles and acres, name of area, state it is in, and HUC12 information.
160	D-158	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs	Covers almost all of AZ some of NV, UT, CA, NM, and Mexico	Shapefile name: WBDHU10.shp	Data includes: Area in square miles and acres, name of area, state it is in, and HUC10 information.
161	D-159	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs		Shapefile name: NonContruibutingDrainageArea.shp	No data seen in the attribute table
162	D-160	Water Resources			Hydrology and Surface Water					GIS Data	USGS GIS Data	USGS	2-Apr-21	USGS	Electronic		2-Mar-21	usgs		Shapefile name: NWISDrainageArea.shp	No data seen in the attribute table
163	D-161	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_STN_START.shp	Data includes: Points with version ID, start ID, and description of the start information (stream distance above confluence/road/wash).
164	D-162	General	Traffic/Roadways							GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Information located around Casa Grande	Shapefile name: S_LABEL_PT.shp	Data includes: Points with location data, labels, and label types (wash/traffic lane/railroad).
165	D-163	Unknown								GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_WTR_AR	No data seen in the attribute table
166	D-164	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_FLD_HAZ_LN.shp	Data includes: Polyline ID, source, line type (flood zone boundary/limit lines/other)
167	D-165	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_BFE.shp	Data includes: Polylines with Base Flood Elevation (BFE) line ID information, elevation, and units for data.
168	D-166	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_PROFIL_BASLN.shp	Data includes: Wash name, profile type (baseline/stream centerline), study type, and a description of the area.
169	D-167	General, Water Resources	Traffic/Roadways		Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Information located around Casa Grande	Shapefile name: S_LABEL_LD	Data includes: Polylines with location data, labels, and label types (wash/traffic lane/flood hazard area).
170	D-168	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Columns also included for freeboard and construction data but it appears only placeholder data is included	Shapefile name: S_LEVEE.shp	Data includes: Levee type, name of the wash ,and bank location for 9 different levees.

Brawley Wash Watershed Plan and Environmental Assessment

Data Collection Technical Memorandum - Data Collection Inventory

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	Doc. No.	Discipline	General Subdiscipline	Soil Subdiscipline	Water Resources Subdiscipline	Air Subdiscipline	Vegetation Subdiscipline	Wildlife Subdiscipline	Human Environment Subdiscipline	Title	Description	Author	Document Date	Source	Format	Date Requested	Date Collected	SharePoint File Location	Remarks		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
171	D-169	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for area within Pinal County	Shapefile name: S_GEN_STRUCT.shp	Data includes: Structure ID, structure type (channel/dam/canal/bridge/culvert), structure name, and description.
172	D-170	General	Traffic/Roadways							GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_TRANSPORT_LN.shp	Data includes: Road locations, name, and type (local neighborhood/rural road/city street/private road/etc.)
173	D-171	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pinal County	Shapefile name: S_WTR_LN.shp	Data includes: Location and name for waterways
174	D-172	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_XS.shp	Data includes: Waterway name, stream station, XS letter and type (if it is lettered and mapped), length, and elevation.
175	D-173	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pinal County	Shapefile name: S_FLD_HAZ_AR.shp	Data includes: Flood zone areas and descriptions of each zone (chance of flood hazard).
176	D-174	Water Resources			Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_FIRM_PAN.shp	Data includes: Firm ID, panel number, panel type, and additional description of the area if applicable.
177	D-175	General	Property Info							GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_BASE_INDEX.shp	Data includes: Base ID, file name, and date for each area.
178	D-176	Water Resources			Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_LOMR.shp	Data includes: Letter of map revision (LOMR) ID, date effective, scale, status, and case number.
179	D-177	General	Property Info							GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_PLSS_AR.shp	Data includes: Public land survey system (PLSS) ID, range, section number, and source for each area defined.
180	D-178	General	Property Info							GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pinal County	Shapefile name: S_POL_AR.shp	Data includes: Information on what town/county/reservation each area is in.
181	D-179	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_SUBBASINS.shp	Data includes: 7 subbasins defined with ID numbers, names, descriptions, total area, and HUC8 information for each.
182	D-180	Water Resources			Floodplain Management					GIS Data	FEMA GIS Data for Pinal County		29-Oct-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_SUBMITTAL_INFO.shp	Data includes: Case number and description, who it was submitted by, study type, task type, hydraulic model used, effective date, and contract number.
183	D-181	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_NODES.shp	Data includes: 4 junction points identified with node ID, type, description, and name of waterway.
184	D-182	Unknown								GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_WTR_AR.shp	No data seen in the attribute table
185	D-183	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_STN_START.shp	Data includes: Points with version ID, start ID, and description of the start information (stream distance above confluence/road/wash).
186	D-184	Water Resources			Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_BFE.shp	Data includes: Base flood elevation (BFE) ID and elevation for each polyline.
187	D-185	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_PROFIL_BASLN.shp	Data includes: Waterway (wash/river) name, profile type (baseline/stream centerline and study type.
188	D-186	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_LEVEE.shp	Data includes: Levee type, name of the wash ,and bank location for 99 different levees.
189	D-187	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_GEN_STRUCT.shp	Data includes: Structure ID, structure type (channel/dam/canal/bridge/culvert), structure name, and description.
190	D-188	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_FLD_HAZ_LN.shp	Data includes: Flood zone boundary lines and descriptions of each line type(limit line/flood zone boundary).
191	D-189	General	Traffic/Roadways							GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_TRANSPORT_LN.shp	Data includes: Road locations, name, and type (Secondary road/state route)
192	D-190	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_WTR_LN.shp	Data includes: Location and name for waterways
193	D-191	Water Resources			Hydrology and Surface Water					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_XS.shp	Data includes: Waterway name, stream station, XS letter and type (if it is lettered and mapped), length, and elevation.
194	D-192	Water Resources			Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pima County	Shapefile name: S_FIRM_PAN.shp	Data includes: Firm ID, panel number and panel type.
195	D-193	General	Property Info							GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pima County	Shapefile name: S_POL_AR.shp	Data includes: Information on what town/county/reservation each area is in and a general description of the area.
196	D-194	General	Property Info							GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pima County	Shapefile name: S_BASE_INDEX.shp	Data includes: Base ID, file name, and date for each area.
197	D-195	General	Property Info							GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pima County	Shapefile name: S_PLSS_AR.shp	Data includes: Public land survey system (PLSS) ID, range and section number for each area defined.
198	D-196	Water Resources			Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema		Shapefile name: S_LOMR.shp	Data includes: Letter of map revision (LOMR) ID, date effective, scale, status, and case number.
199	D-197	Water Resources			Hydrology and Surface Water, Floodplain Management					GIS Data	FEMA GIS Data for Pima County		18-Nov-20	Federal Emergency Management Agency	Electronic		2-Mar-21	fema	Data for all of Pima County	Shapefile name: S_FLD_HAZ_AR.shp	Data includes: Flood zone areas and descriptions of each zone (chance of flood hazard).
200	D-198	Water Resources			Hydrology and Surface Water					GIS Data	Wildlife Linages ADOT 2006 Information	Arizona Department of Transportation	12-Mar-07	Arizona Department of Transportation	Electronic		23-Mar-21	pcrfcd		Shapefile name: CAP.shp	Data includes: Polygon showing where the Central Arizona Project is location. Information includes the perimeter, length, area, and square miles.
201	D-199	Unknown								GIS Data	Wildlife Linages ADOT 2006 Information	Arizona Department of Transportation	6-Sep-06	Arizona Department of Transportation	Electronic		23-Mar-21	pcrfcd	Data for most of AZ	Shapefile name: Habitat_Blocks.shp	Data includes: 125 Habitat areas defined.

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2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
202	D-200	General, Wildlife	Mountains					Wildlife Communities, Special Status Species		GIS Data	Wildlife Linages ADOT 2006 Information	Arizona Department of Transportation	12-Mar-07	Arizona Department of Transportation	Electronic		23-Mar-21	pcrfcd		Shapefile name: PLZ_across_HB.shp	Data includes: Name of Mountain area with length, area, and perimeter data included.
203	D-201	General, Wildlife	Mountains					Wildlife Communities, Special Status Species		GIS Data	Wildlife Linages ADOT 2006 Information	Arizona Department of Transportation	12-Mar-07	Arizona Department of Transportation	Electronic		23-Mar-21	pcrfcd		Shapefile name: Potential_Linkage_Zones.shp	Data includes: Description and name for each zone as well as area, perimeter, and length data.
204	D-202	Wildlife						Wildlife Communities, Special Status Species		GIS Data	Avra Valley GIS Information		21-Oct-20	Avra Valley Working Group	Electronic		23-Mar-21	avwg		Shapefile name: Ironwood-Picacho_LinkageDesign.shp	Data includes: A single polygon shape denoting the location.
205	D-203	Wildlife						Wildlife Communities, Special Status Species		GIS Data	Avra Valley GIS Information		21-Oct-20	Avra Valley Working Group	Electronic		23-Mar-21	avwg		Shapefile name: 80_Tucson-Tortolita_SantaCataline_LinkageDesign.shp	Data includes: A single polygon shape denoting the location.
206	D-204	Soils, Water Resources		Upland Erosion	Hydrology and Surface Water					Cooke and Reeves 1976 Excerpt	Pages form a document covering arroyos and environmental change in southern Arizona			Pima County Regional Flood Control District	Electronic		24-Mar-21	pcrfcd			
207	D-205	Reference	Fire							Brush Management Matrix - Working Draft- AVCA-SARE Brush Management Workshop	A practical guide to Brush Management	University of Arizona School of Natural Resources and the Environment and the Altar Valley Conservation Alliance	4-Oct-18		Electronic		24-Mar-21	pcrfcd			
208	D-206	Water Resources			Floodplain Management					Brawley Wash Action Plan Map	Map of the Brawley Wash noting planned private improvements, 2019 capital improvements, and other major restoration projects.	Pima County	17-Mar-20	Pima County	Electronic		24-Mar-21	pcrfcd			
209	D-207	Water Resources			Floodplain Management					Brawley Wash Watershed Flood Hazard Problem Assessment	Assessment for Brawley Wash as part of a Floodplain Management Plan	Pima County Regional Flood Control District		Pima County Regional Flood Control District	Electronic		24-Mar-21	pcrfcd			
210	D-208	Water Resources			Floodplain Management					Brawley Wash Map	Map of the Brawley Wash watershed	Pima County	11-Sep-19	Pima County	Electronic		24-Mar-21	pcrfcd			
211	D-209	Water Resources, Air, Vegetation, Wildlife, Human Environment			Hydrology and Surface Water	Air Quality	Vegetation Communities and Habitat	Wildlife Communities, Special Status Species	Cultural and Historic Resources, Land Use and Recreation, Socioeconomics	Environmental Assessment of the Avra Valley Habitat Conservation Plan	Draft Environmental Assessment for the Avra Valley area including a proposed action plan	The City of Tucson Office of Conservation and Sustainable Development	Oct-14	The City of Tucson	Electronic		24-Mar-21	cot			
212	D-210	General, Water Resources, Air, Vegetation, Wildlife	Traffic/Roadways		Hydrology and Surface Water, Floodplain Management	Air Quality	Vegetation Communities and Habitat	Wildlife Communities		The Intermountain West Corridor through Avra Valley	An environmental mitigation analysis for the area	Pima County	Jun-14		Electronic		25-Mar-21	avwg			
213	D-211	General, Water Resourcesm Human Environment	Traffic/Roadways		Hydrology and Surface Water				Socioeconomics	3rd Submittal Environmental Reevaluation	Environmental Reevaluation for I-10, Prince Road to Grant Road	Arizona Department of Transportation	29-Sep-05		Electronic		25-Mar-21	avwg			
214	D-212	General, Water Resources, Air, Vegetation, Wildlife, Human Environment	Traffic/Roadways		Hydrology and Surface Water	Air Quality	Invasive Species	Special Status Species	Cultural and Historic Resources, Socioeconomics	4th Submittal Environmental Reevaluation	Environmental Reevaluation for I-10,St. Mary's Road to 29th Street	Arizona Department of Transportation	29-Sep-05		Electronic		25-Mar-21	avwg			
215	D-213	General	Traffic/Roadways							I-10 Phoenix-Tucson Bypass Study	Description of study, current and future conditions in the area, and environmental factors	URS and Wilbur Smith Associates	Jan-08	Arizona Department of Transportation	Electronic		25-Mar-21	avwg			
216	D-214	General	Traffic/Roadways							I-10 Bypass Follow-up Report	Focus on the study in the Tucson Metropolitan Area	USR Corporation	11-Mar-09	Arizona Department of Transportation	Electronic		25-Mar-21	avwg			
217	D-215	Water Resources, Human Environment			Hydrology and Surface Water				Cultural and Historic Resources	Tohono O'Odham Nation Papago Water Supply Project	Environmental Assessment of the Schuk Toak Development Plan	Franzoy Corey at Franzoy Corey Engineers & Architects	May-88	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
218	D-216	General, Water Resources	Tucson Aqueduct - CAP		Floodplain Management					Draft Environmental Impact Statement Tucson Aqueduct Phase A	Environment Impact of phase A of the project which is a feature of the Central Arizona Project	Department of the Interior Bureau of Reclamation	23-Nov-81	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
219	D-217	General, Water Resources	Tucson Aqueduct - CAP		Floodplain Management					Final Environmental Impact Statement Tucson Aqueduct Phase A	Environment Impact of phase A of the project which is a feature of the Central Arizona Project	Department of the Interior Bureau of Reclamation	15-Jul-82	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
220	D-218	General, Water Resources	Tucson Aqueduct - CAP		Floodplain Management					Fish and Wildlife Coordination Act Report for Reaches 1 and 2 of the Tucson Aqueduct	Discussion of impact and mitigation recommendations	United Stated Department of the Interior Fish and Wildlife Service	1980	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
221	D-219	General	Tucson Aqueduct - CAP							Fish and Wildlife Coordination Act Report on Tucson Aqueduct Phase B	Detailed fish and wildlife report on effects of Phase B of the Tucson Aqueduct project.	United Stated Department of the Interior Fish and Wildlife Service	16-Mar-84	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
222	D-220	General, Water Resources	Tucson Aqueduct - CAP		Floodplain Management					Final Environmental Impact Statement Tucson Aqueduct Phase B	Environment Impact of phase B of the project which is a feature of the Central Arizona Project	Department of the Interior Bureau of Reclamation		Avra Valley Working Group	Electronic		25-Mar-21	avwg			
223	D-221	Water Resources, Wildlife			Floodplain Management			Wildlife Communities		Mitigation and Movement Corridors for Large Mammals Along the Tucson Aqueduct	Report on mitigation of environmental impacts of the Tucson Aqueduct	The University of Arizona School of Renewable Natural Resources	1998	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
224	D-222	Wildlife						Wildlife Communities		Saguaro National Park Connectivity Threats Assessment	Description of study methods, scope, and findings	The University of Arizona College of Architecture, Planning, and Landscape Architecture	1-Jul-15	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
225	D-223	General	Acoustic Monitoring							Saguaro National Park Acoustic Monitoring Report	Study on sound levels and predominant sound sources at Saguaro National Park	National Park Service, U.S. Department of the Interior	Dec-16	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
226	D-224	Vegetation					Vegetation Communities and Habitat			Saguaro National Park Boundary Expansion Study Act of 2009	Report from the Congressional Committee on Natural Resources	Mr. Rahall, from the Committee on natural Resources	21-Oct-09	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
227	D-225	Wildlife						Wildlife Communities		An Evaluation of Wildlife Crossings Over the Tucson Aqueduct	Thesis covering a study of wildlife movement around the Tucson Aqueduct	Ronald Popowski, The University of Arizona School of Renewable Natural Resources	1999	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
228	D-226	General	Civilian Conservation Corps							The Civilian Conservation Corps in Pima County	Work done by the Civilian Conservation Corps in Pima County between 1933-1942	Peter MacMillan Booth	1991	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
229	D-227	General, Water Resources, Air, Human Environment	Plan		Floodplain Management, Water Resources	Air Quality			Land Use and Recreation, Public Health and Safety, Socioeconomics	Pima Prospers Comprehensive Plan Initiative	An update to the Pima County Comprehensive Plan	The Planning Center, Laneen Advertising and Public Relations, ESI Corporation, and PSOMAS	19-May-15	Avra Valley Working Group	Electronic		25-Mar-21	avwg			
230	D-228	Wildlife						Wildlife Communities		The Pima County Wildlife Connectivity Assessment: Report on Stakeholder Input	Description of the process for developing GIS files covering animal crossings in Pima County and background information on the wildlife linkages present in the area.	Arizona Game and Fish Department, Regional Transportation Authority of Pima County	Feb-12	Arizona Game and Fish Department	Electronic		5-Apr-21	azgfd			
231	D-229	Wildlife						Wildlife Communities		The Pima County Wildlife Connectivity Assessment: Detailed Linkages	Information provided covers the Coyote-Ironwood-Tucson Linkage Design	Arizona Game and Fish Department, Regional Transportation Authority of Pima County	Aug-12	Arizona Game and Fish Department	Electronic		5-Apr-21	azgfd			

Brawley Wash Watershed Plan and Environmental Assessment

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232	D-230	Wildlife						Wildlife Communities		The Pima County Wildlife Connectivity Assessment: Detailed Linkages	Information provided covers the Kitt Peak Linkage Design	Arizona Game and Fish Department, Regional Transportation Authority of Pima County	Aug-12	Arizona Game and Fish Department	Electronic		5-Apr-21	azgfd			
233	D-231	Wildlife						Wildlife Communities		The Pima County Wildlife Connectivity Assessment: Detailed Linkages	Information provided covers the Santa Catalina/Rincon - Galiuro Linkage Design	Arizona Game and Fish Department, Regional Transportation Authority of Pima County	Aug-12	Arizona Game and Fish Department	Electronic		5-Apr-21	azgfd			
234	D-232	Wildlife						Wildlife Communities		The Pima County Wildlife Connectivity Assessment: Detailed Linkages	Information provided covers the Mexico Tumacacori - Baboquivari Design	Arizona Game and Fish Department, Regional Transportation Authority of Pima County	Aug-12	Arizona Game and Fish Department	Electronic		5-Apr-21	azgfd			
235	D-233	Wildlife						Wildlife Communities		The Pima County Wildlife Connectivity Assessment: Detailed Linkages	Information provided covers the Santa Rita - Sierrita Linkage Design	Arizona Game and Fish Department, Regional Transportation Authority of Pima County	Aug-12	Arizona Game and Fish Department	Electronic		5-Apr-21	azgfd			
236	D-234	Wildlife						Wildlife Communities		The Pinal County Wildlife Connectivity Assessment: Report on Stakeholder Input	Description of the process for developing GIS files covering animal crossings in Pinal County and background information on the wildlife linkages present in the area.	Arizona Game and Fish Department, Arizona Wildlife Linkages Workgroup	Apr-13	Arizona Game and Fish Department	Electronic		6-Apr-21	azgfd			
237	D-235	Soils, Vegetation		Soils and Geological Characteristics			Vegetation Communities and Habitat			Key to Ecological Sites, Major Land Resource Area 41, Southeastern Arizona Basin and Range	Description of MLRA 41, land resource units in the area, and an ecological site key.	Natural Resources Conservation Service	Jul-15	Natural Resources Conservation Service	Electronic		6-Apr-21	nrcs			
238	D-236	Vegetation					Vegetation Communities and Habitat			Common Plants 40-1	Plant list with common and scientific name and symbol included for each plant.	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		6-Apr-21	nrcs			
239	D-237	Soils, Vegetation		Soils and Geological Characteristics			Vegetation Communities and Habitat			Major land Resource Area 40 Sonoran basin and Range	Description of MLRA 40, land resource units in the area, and an ecological site key.	Natural Resources Conservation Service	8-Dec-15	Natural Resources Conservation Service	Electronic		6-Apr-21	nrcs			
240	D-238	Vegetation					Vegetation Communities and Habitat			Common Plants 41-3	Plant list with common and scientific name and symbol included for each plant.	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		6-Apr-21	nrcs			
241	D-239	Vegetation					Vegetation Communities and Habitat			BKIT2 Sandy Wash Summary Report	Ground cover and species information for site BKIT2	Vegetation/GIS DataSystem - University of Arizona	12-Nov-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
242	D-240	Vegetation					Vegetation Communities and Habitat			KA1 Sandy Wash Summary Report	Ground cover and species information for site KA1	Vegetation/GIS DataSystem - University of Arizona	28-Aug-17	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
243	D-241	Vegetation					Vegetation Communities and Habitat			KA2 Loamy Swale Summary Report	Ground cover and species information for site KA2	Vegetation/GIS DataSystem - University of Arizona	30-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
244	D-242	Vegetation					Vegetation Communities and Habitat			Three Points Summary Report	Ground cover and species information for Three Points site	Vegetation/GIS DataSystem - University of Arizona	1-Nov-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
245	D-243	Soils		Soils and Geological Characteristics, Upland Erosion						Using Soil Organic Amendments to Help Restore Dryland Ecological Function	Research proposal including objectives, proposed activities, and images of the study area at the North Altar Watershed Area	Dr. Blamkinship, Department of Soil, Water, and Environmental Science at the University of Arizona	Mar-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
246	D-244	Soils, Water Resources, Vegetation		Prime and Unique Farmland	Floodplain Management		Vegetation Communities and Habitat			Analysis Report NRPR 2019 aerial imagery	Analysis and imagery of the Kings98 berm area.	Quiet Creek		Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
247	D-245	Soils, Water Resources, Vegetation		Prime and Unique Farmland	Floodplain Management		Vegetation Communities and Habitat			Project Summary Packet 7.2016	Report on the Northern Altar Watershed Area Project - King 98 Ranch Abandoned AG Fields	Pima County Natural Resources	13-Jul-16	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr	Report includes project information, Rangeland Hands Inc. report, project area map, initial project tour report, and a project site BA		
248	D-246	Vegetation					Invasive Species			Summary of Activities at NAWA - 2019	General overview of work done at NAWA during 2019	Pima County Natural Resources		Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
249	D-247	Soils, Water Resources, Vegetation		Upland Erosion	Floodplain Management		Vegetation Communities and Habitat			NAWA Phase 2 Pima County Natural Resources Parks & Recreation Summary	NAWA Phase 1 Summary and Phase II proposal Outline	Pima County Natural Resources	26-Jun-17	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
250	D-248	Soils, Water Resources, Vegetation		Upland Erosion	Floodplain Management		Vegetation Communities and Habitat			NAWA Berm 3 Photo Comparison	Images of Berm 3 - east end, facing west	Pima County Natural Resources		Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
251	D-249	Soils, Water Resources, Vegetation		Upland Erosion	Floodplain Management		Vegetation Communities and Habitat			NAWA 24x36 Updated April 2018 red	Basemap of the NAWA area with fencing, access roads, soil test areas, rain gauges, and berms noted.	Pima County Natural Resources	12-Apr-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
252	D-250	Vegetation					Vegetation Communities and Habitat			King 98 K98IT4 Loamy Swale Summary Report	Ground cover and species information for King 98 site K98IT4	Vegetation/GIS DataSystem - University of Arizona	20-Nov-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
253	D-251	Vegetation					Vegetation Communities and Habitat			King 98 KA1 Sandy Loam Summary Report	Ground cover and species information for King 98 site KA1	Vegetation/GIS DataSystem - University of Arizona	13-Nov-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
254	D-252	Vegetation					Vegetation Communities and Habitat			King 98 K98IT5 Loamy Swale Summary Report	Ground cover and species information for King 98 site K98IT5	Vegetation/GIS DataSystem - University of Arizona	20-Nov-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
255	D-253	Vegetation					Vegetation Communities and Habitat			DBT1 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 1	Vegetation/GIS DataSystem - University of Arizona	2-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
256	D-254	Vegetation					Vegetation Communities and Habitat			DBT2 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 2	Vegetation/GIS DataSystem - University of Arizona	8-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
257	D-255	Vegetation					Vegetation Communities and Habitat			DBT3 Limy Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 3	Vegetation/GIS DataSystem - University of Arizona	8-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
258	D-256	Vegetation					Vegetation Communities and Habitat			DBT4 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 4	Vegetation/GIS DataSystem - University of Arizona	9-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
259	D-257	Vegetation					Vegetation Communities and Habitat			DBT5 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 5	Vegetation/GIS DataSystem - University of Arizona	9-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
260	D-258	Vegetation					Vegetation Communities and Habitat			DBT6 Loamy Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 6	Vegetation/GIS DataSystem - University of Arizona	9-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			

Brawley Wash Watershed Plan and Environmental Assessment

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261	D-259	Vegetation					Vegetation Communities and Habitat			DBT7 Loamy Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 7	Vegetation/GIS DataSystem - University of Arizona	10-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
262	D-260	Vegetation					Vegetation Communities and Habitat			DBT8 Sandy Wash VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 8	Vegetation/GIS DataSystem - University of Arizona	8-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
263	D-261	Vegetation					Vegetation Communities and Habitat			DBT11 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 11	Vegetation/GIS DataSystem - University of Arizona	3-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
264	D-262	Vegetation					Vegetation Communities and Habitat			DBT13 Limestone Hills VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 13	Vegetation/GIS DataSystem - University of Arizona	15-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
265	D-263	Vegetation					Vegetation Communities and Habitat			DBT14 Shallow Hills VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 14	Vegetation/GIS DataSystem - University of Arizona	21-Nov-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
266	D-264	Vegetation					Vegetation Communities and Habitat			DBT15 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 15	Vegetation/GIS DataSystem - University of Arizona	10-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
267	D-265	Vegetation					Vegetation Communities and Habitat			DBT16 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 16	Vegetation/GIS DataSystem - University of Arizona	10-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
268	D-266	Vegetation					Vegetation Communities and Habitat			DBT17 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 17	Vegetation/GIS DataSystem - University of Arizona	10-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
269	D-267	Vegetation					Vegetation Communities and Habitat			DBT18 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 18	Vegetation/GIS DataSystem - University of Arizona	11-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
270	D-268	Vegetation					Vegetation Communities and Habitat			DBT19 Sandy Loam Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 19	Vegetation/GIS DataSystem - University of Arizona	11-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
271	D-269	Vegetation					Vegetation Communities and Habitat			DBT20 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 20	Vegetation/GIS DataSystem - University of Arizona	11-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
272	D-270	Vegetation					Vegetation Communities and Habitat			DBT21 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 21	Vegetation/GIS DataSystem - University of Arizona	16-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
273	D-271	Vegetation					Vegetation Communities and Habitat			DBT22 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 22	Vegetation/GIS DataSystem - University of Arizona	16-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
274	D-272	Vegetation					Vegetation Communities and Habitat			DBT23 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 23	Vegetation/GIS DataSystem - University of Arizona	16-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
275	D-273	Vegetation					Vegetation Communities and Habitat			DBT24 Loamy Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 24	Vegetation/GIS DataSystem - University of Arizona	15-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
276	D-274	Vegetation					Vegetation Communities and Habitat			DBT26 Loamy Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 26	Vegetation/GIS DataSystem - University of Arizona	18-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
277	D-275	Vegetation					Vegetation Communities and Habitat			DBT27 Loamy Upland Limy VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 27	Vegetation/GIS DataSystem - University of Arizona	17-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
278	D-276	Vegetation					Vegetation Communities and Habitat			DBT28 Sandy Loam Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 28	Vegetation/GIS DataSystem - University of Arizona	17-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
279	D-277	Vegetation					Vegetation Communities and Habitat			DBT29 Granitic Shallow Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 29	Vegetation/GIS DataSystem - University of Arizona	17-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
280	D-278	Vegetation					Vegetation Communities and Habitat			DBT30 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 30	Vegetation/GIS DataSystem - University of Arizona	18-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
281	D-279	Vegetation					Vegetation Communities and Habitat			DBT31 Sandy Loam Upland Deep VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 31	Vegetation/GIS DataSystem - University of Arizona	16-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
282	D-280	Vegetation					Vegetation Communities and Habitat			DBT32 Sandy Wash VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 32	Vegetation/GIS DataSystem - University of Arizona	2-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
283	D-281	Vegetation					Vegetation Communities and Habitat			DBT33 Loamy Upland VGS Summary Report	Ground cover and species information for Diamond Bell Site DBT 33	Vegetation/GIS DataSystem - University of Arizona	3-Oct-18	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
284	D-282	Vegetation					Vegetation Communities and Habitat			Diamond bell KA1 Kings Well VGS Summary Report	Ground cover and species information for Diamond Bell Site KA1 Kings Well	Vegetation/GIS DataSystem - University of Arizona	24-Sep-19	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
285	D-283	Vegetation					Vegetation Communities and Habitat			Diamond bell KA2 Long VGS Summary Report	Ground cover and species information for Diamond Bell Site KA2 Long	Vegetation/GIS DataSystem - University of Arizona	24-Sep-19	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
286	D-284	Vegetation					Vegetation Communities and Habitat			Diamond bell KA3 Missile Well VGS Summary Report	Ground cover and species information for Diamond Bell Site KA3 Missile Well	Vegetation/GIS DataSystem - University of Arizona	24-Sep-19	Wilder Landscape Architects	Electronic		8-Apr-21	pcnrpr			
287	D-285	Unknown	Cannot locate document							Brawley Wash NRP	Natural Resource Restoration Plan for the Brawley Wash Watershed	USDA, Soil Conservation Service Program Planning Staff	Jun-92	Pima County Regional Flood Control District	Electronic		8-Apr-21	nrcs			
288	D-286	Water Resources			Floodplain Management					AVCA Floodplain Restoration Assessment	Altar Wash Restoration Conceptual Evaluation of Alternative Methods	JE Fuller Hydrology & Geomorphology Inc.	Nov-16	Pima County Regional Flood Control District	Electronic		8-Apr-21	nrcs			
289	D-287	Vegetation					Vegetation Communities and Habitat, Invasive Species			Meyers AVCA Watershed Assessment	Report Assessment done for the Altar Valley Conservation Alliance	Flying UW Ranch Consulting	10-Apr-00	Pima County Regional Flood Control District	Electronic		8-Apr-21	nrcs	There are many pages in the document that are upside down		
290	D-288	Soils		Soils and Geological Characteristics						Soil Test 98 Ranch	Soil Analysis for the 98 Ranch Site	AgSource Harris Laboratories	17-Jun-16	Natural Resources Conservation Service	Electronic		8-Apr-21	nrcs			
291	D-289	Soils		Soils and Geological Characteristics						Brawley PL566 Soil Survey Map	Brawley Wash Watershed Soil Survey Map	Natural Resources Conservation Service	9-Apr-21	Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils	Can be used as a key to shown what areas each soil survey covers		
292	D-290	Soils		Soils and Geological Characteristics						Soil Survey of Tohono O'odham Nation, Arizona Parts of Maricopa, Pima, and Pinal Counties	Soil survey includes prediction of soil behavior, soil limitations, improvements needed, and more	Natural Resources Conservation Service	1999	Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils			
293	D-291	Soils		Soils and Geological Characteristics						Soil Survey of Tucson-Avra valley Area, Arizona	Soil survey that reflects the conditions in the county in 1965	Natural Resources Conservation Service	Apr-72	Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils			
294	D-292	Soils		Soils and Geological Characteristics						Soil Survey of Pima County, Arizona, Eastern Part	Soil survey that reflects the conditions in the county in 1984	Natural Resources Conservation Service	2003	Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils			

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	**Doc. No.**	**Discipline**	**General Subdiscipline**	**Soil Subdiscipline**	**Water Resources Subdiscipline**	**Air Subdiscipline**	**Vegetation Subdiscipline**	**Wildlife Subdiscipline**	**Human Environment Subdiscipline**	**Title**	**Description**	**Author**	**Document Date**	**Source**	**Format**	**Date Requested**	**Date Collected**	**SharePoint File Location**	**Remarks**		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
295	D-293	Soils		Soils and Geological Characteristics						Soil Survey of Pima County, Arizona, Western Part	Soil survey that reflects the conditions in the county in 1983	Natural Resources Conservation Service	Nov-91	Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils			
296	D-294	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils	Corresponds to Soil Survey of Pima County, Arizona, Western Part	Shapefile name: soilmu_a_az659.shp	Data Includes: Soil areas defined with descriptions included for each area.
297	D-295	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils		Shapefile name: soilmu_l_az659.shp	No data seen in the attribute table
298	D-296	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils		Shapefile name: soilmu_p_az659.shp	No data seen in the attribute table
299	D-297	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils		Shapefile name: soilsa_a_az659.shp	Data Includes: Defined Study Area
300	D-298	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils		Shapefile name: soilsf_l_az659.shp	No data seen in the attribute table
301	D-299	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		9-Apr-21	nrcs_soils		Shapefile name: soilsf_p_az659.shp	No data seen in the attribute table
302	D-300	Water Resources			Floodplain Management					Brawley Wash Outreach Brochure	Brochure with map of Brawley Wash Floodplain area and information targeted for public outreach.	Pima County Regional Flood Control District		Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd			
303	D-301	Water Resources			Hydrology and Surface Water, Floodplain Management					Brawley Wash 2019	Watershed Map	Pima County Regional Flood Control District	5-Apr-19	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd			
304	D-302	Water Resources			Hydrology and Surface Water, Floodplain Management					Hydrologic and Hydraulic Analysis and Recommended Guidelines for Millstone Manor #6	Report covering the natural flood prone areas and recommendations for the area.	Pima County Department of Transportation and Flood Control District	20-Jun-88	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-008-1988_-_FP-Floodplain_Studies_-__-_HYDROLOGIC_AND_HYDRAULIC_ANALYSIS_AND_.pdf		
305	D-303	Water Resources			Hydrology and Surface Water, Floodplain Management					Hydrology Report for San Joaquin Estates - Improvement Plans Lots 268-290		Trimble Engineering, Inc. , CMG Drainage Engineering, Inc.	Mar-87	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-029-1987_-_-__-_HYDROLOGY_REPORT_FOR_SAN_JOAQUIN_ESTATES_IMPROVEMENT_PLANS_.pdf		
306	D-304	Water Resources			Hydrology and Surface Water, Floodplain Management					Brawley Wash Floodplain Study	Floodplain study for a portion of the Brawley Wash	Simons, Li & Associates, Inc.	6-Sep-96	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-031-1996_-_FP-Floodplain_Studies_-__-_BRAWLEY_WASH_FLOODPLAIN_STUDY_-_9-6-19		
307	D-305	Water Resources			Hydrology and Surface Water, Floodplain Management					Brawley Wash Primary Flood Corridor Study		Simons, Li & Associates, Inc.	Jun-99	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-042-1999_-_FP-Floodplain_Studies_-__-_BRAWLEY_WASH_PRIMARY_FLOOD_CORRIDOR_ST.pdf		
308	D-306	General	Tucson Aqueduct - CAP							Central Arizona Project Tucson Aqueduct	Flood routing data and maps for three reaches of the Tucson Aqueduct	Bureau of Reclamation, Department of the Interior	5/3/1982 - 6/4/1983	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-044-1982_-_FP-Floodplain_Studies_-__-_CENTRAL_ARIZONA_PROJECT_TUCSON_AQUEDUC.pdf		
309	D-307	Water Resources			Hydrology and Surface Water					Diamond Bell Ranch Hydrology		Psomas	12-Oct-07	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-049-2007_-_FP-Floodplain_Studies_-__-_HYDROLOGIC_MODELING_IN_THE_DIAMOND_BEL.pdf		
310	D-308	Water Resources			Hydrology and Surface Water					Diamon Bell Ranch Hydrology Support Data		Psomas	12-Oct-07	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-049-2007_-_FP-Floodplain_Studies_-__-_HYDROLOGIC_MODELING_IN_THE_DIAMOND_BEL (1)		
311	D-309	Soils, Water Resources		Upland Erosion, Sedimentation, Prime and Unique Farmland	Hydrology and Surface Water, Floodplain Management					Floodplain Study for Flecha Caida Ranch Estates #9		JE Fuller Hydrology & Geomorphology Inc.	8-Jan-08	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-050-2008_-_FP-Floodplain_Studies_-__-_FLOODPLAIN_STUDY_FOR_FLECHA_CAIDA_RANC.pdf		
312	D-310	Soils, Water Resources		Prime and Unique Farmland	Hydrology and Surface Water					Hydrologic Data Sheet for Flecha Caida Flood Improvement Study	Hydrologic data including runoff coefficient, time of concentration, rainfall intensity, and peak discharge for each of the areas.	JE Fuller Hydrology & Geomorphology Inc.	8-Apr-08	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-050-2008_-_FP-Floodplain_Studies_-__-_HYDROLOGIC_DATA_SHEET_CP_11_-_4-8-2008		
313	D-311	Soils, Water Resources		Prime and Unique Farmland	Hydrology and Surface Water					Summary of Scour Analysis - Input Parameters and Results	Scour analysis inputs for Flecha Caida Ranch Estates #1 and #2 and las Lomas de Catalina	JE Fuller Hydrology & Geomorphology Inc.		Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-050-2008_-_FP-Floodplain_Studies_-__-_SUMMARY_OF_SCOUR_ANALYSIS_-_INPUTS_PAR		
314	D-312	Soils, Water Resources		Prime and Unique Farmland	Hydrology and Surface Water					Hydrologic Data Sheet for Flecha Caida Flood Improvement Study	Hydrologic data including runoff coefficient, time of concentration, rainfall intensity, and peak discharge for each of the areas.	JE Fuller Hydrology & Geomorphology Inc.	Mar-86	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-050-2008_-_FP-Floodplain_Studies_-__-_HYDROLOGIC_DATA_SHEET_CP_11_(1986)_-_4		
315	D-313	Soils		Prime and Unique Farmland						Development Plans for Flecha Caida Rand Estates		JE Fuller Hydrology & Geomorphology Inc.	8-Apr-08	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-050-2008_-_FP-Floodplain_Studies_-__-_DEVELOPMENT_PLANS_-_4-8-2008_-_-_NO_-		
316	D-314	General	Topographic Survey							Topographic Survey for Flecha Caida Rand Estates	Topography survey drawings/images for study area	JE Fuller Hydrology & Geomorphology Inc.	8-Apr-08	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-050-2008_-_FP-Floodplain_Studies_-__-_TOPOGRAPHIC_SURVEY_-_4-8-2008_-_-_NO_		
317	D-315	Soils, Water Resources		Prime and Unique Farmland	Hydrology and Surface Water					Figures for Floodplain Study for Flecha Caida Ranch Estates #9	Figures that go with the Floodplain Study for Flecha Caida Ranch Estates #9	JE Fuller Hydrology & Geomorphology Inc.		Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd			
318	D-316	Water Resources			Floodplain Management					12-10 and 11-10 Area Special Study Memorandum	Memorandum from RFCD regarding the purpose of the 12-10 Special Study	Pima County Regional Flood Control District	13-Jun-07	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd	File name: FC_-_Basin_Studies_-_FP-070-2003_-_FP-Floodplain_Studies_-__-_12-10_&_11-10_AREA_SPECIAL_STUDY_-_6-1.pdf		
319	D-317	Water Resources, Vegetation, Human Environment			Hydrology and Surface Water, Floodplain Management		Vegetation Communities and Habitat		Public Health and Safety	Floodplain Management Plan - Brawley	Problem Assessment for Brawley Wash area	Pima County Regional Flood Control District		Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd			
320	D-318	General	Boundary							Brawley Wash Building Density Map	Map of the Brawley Wash area showing building density, floodplains, internal watershed boundaries, etc.	Pima County Regional Flood Control District	1-Nov-19	Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd			

Brawley Wash Watershed Plan and Environmental Assessment

Data Collection Technical Memorandum - Data Collection Inventory

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	Doc. No.	Discipline	General Subdiscipline	Soil Subdiscipline	Water Resources Subdiscipline	Air Subdiscipline	Vegetation Subdiscipline	Wildlife Subdiscipline	Human Environment Subdiscipline	Title	Description	Author	Document Date	Source	Format	Date Requested	Date Collected	SharePoint File Location	Remarks		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
321	D-319	Water Resources			Floodplain Management					FPM Goals	Proposed Floodplain Management Plan Goals for Brawley Wash	Pima County Regional Flood Control District		Pima County Regional Flood Control District	Electronic		12-Apr-21	pcrfcd			
322	D-320	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils	Corresponds to Soil Survey of Pima County, Arizona, Eastern Part	Shapefile name: soilmu_a_az668.shp	Data Includes: Soil areas defined with descriptions included for each area.
323	D-321	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilmu_l_az668.shp	No data seen in the attribute table
324	D-322	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilmu_p_az668.shp	No data seen in the attribute table
325	D-323	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsa_a_az668.shp	Data Includes: Polygon shape of the survey area
326	D-324	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsf_l_az668.shp	No data seen in the attribute table
327	D-325	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsf_p_az668.shp	No data seen in the attribute table
328	D-326	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils	Corresponds to Soil Survey of Tucson-Avra Valley Area	Shapefile name: soilmu_a_az669.shp	Data Includes: Soil areas defined with map unit descriptions included for each area.
329	D-327	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilmu_l_az669.shp	No data seen in the attribute table
330	D-328	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilmu_p_az669.shp	No data seen in the attribute table
331	D-329	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsa_a_az669.shp	Data Includes: Polygon shapes of the areas for this soil survey
332	D-330	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsf_l_az669.shp	No data seen in the attribute table
333	D-331	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsf_p_az669.shp	Data Includes: Special feature points
334	D-332	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils	Corresponds to Soil Survey of TON and parts of Maricopa, Pima & Pinal Counties	Shapefile name: soilmu_a_az703.shp	Data Includes: Soil areas defined with map unit descriptions included for each area.
335	D-333	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilmu_l_az703.shp	No data seen in the attribute table
336	D-334	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilmu_p_az703.shp	No data seen in the attribute table
337	D-335	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsa_a_az703.shp	Data Includes: Polygon shape of the survey area
338	D-336	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsf_l_az703.shp	No data seen in the attribute table
339	D-337	Soils		Soils and Geological Characteristics						GIS Data	NRCS Soil GIS Data	Natural Resources Conservation Service		Natural Resources Conservation Service	Electronic		15-Apr-21	nrcs_soils		Shapefile name: soilsf_p_az703.shp	Data Includes: Special feature points
340	D-338	General	Traffic/Roadways							GIS Data	Pima County roads	Pima County		Quite Creek	Electronic		19-Apr-21	quietcreek		Shapefile name: Street_Network_Clip.shp	Data Includes: Street length, name, road category, road category description (state, major/minor local route) and road ID.
341	D-339	Soils, Water Resources		Upland Erosion, Prime and Unique Farmland	Floodplain Management					Summary of 11-12-20 Duval	Memo about the field visit to Duval property 11-12-20 and Proposed Projects	Evan Canfield & Marisa Rice - Pima County Regional Flood Control District	18-Nov-20	Pima County Regional Flood Control District	Electronic		20-Apr-21	pcrfcd			
342	D-340	General	Property Info							Tucson Water Properties - all	Maps of Tucson Water properties with some Lat and long information for each property	Pima County		Pima County Regional Flood Control District	Electronic		20-Apr-21	pcrfcd			
343	D-341	Water Resources, Human Environment			Floodplain Management				Public Health and Safety	GIS Data	Location and description of complaints in Pima County from RFCD	Pima County Regional Flood Control District		Pima County Regional Flood Control District	Electronic		19-Apr-21	pcrfcd	Covers entire Pima County area	Shapefile name: complain.shp	Data Includes: Case number, date received, and a description of each complaint and action taken to address the complaint
344	D-342	Soils, Water Resources		Upland Erosion	Hydrology and Surface Water, Floodplain Management					Mary Nichols Altar Study	Focus area of the study is semiarid rangeland in the southwestern US. Paper is titled "The geomorphic legacy of water and erosion control structures in a semiarid rangeland watershed"	Mary Nichols, Christopher Magirl, Nathan Sayre, Jeremy Shaw.	30-Oct-17	Pima County Regional Flood Control District	Electronic		30-Apr-21	pcrfcd			
345	D-343	Water Resources			Floodplan Management					GIS Data	Remnant Features GIS Data			Quiet Creek	Electronic		30-Apr-21	quietcreek		Shapefile name: Remnantfeatures.shp	Data Includes: Feature type (ditch/berm), shape length and area.
346	D-344	Vegetation					Vegetation Communities and Habitat			2003 12 3 Riparian Restoration Lessons PAG Report	Report covering the December 3, 2003 Watershed forum which discussed riparian areas restoration and management in eastern Pima County. This report gives overviews of the seven presentations given during the forum.	Pima Association of Governments	Mar-04	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
347	D-345	Wildlife						Wildlife Communities		2007 Rattlesnake Pass Wildlife Linkages Research	Study evaluating wildlife presence within Rattlesnake Pass to identify potential linkage zones. Maps showing location and types of animals detected included at the end of the report.	Arizona Game and Fish Department	Nov-07	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
348	D-346	Vegetation					Invasive Species			2019 3 23 letter re COT IPM plan from CM and CC	Letter to Tucson Water Department discussing the City of Tucson Integrated Pest Management proposal. Includes a general description of COT IPM plans and feedback on the plans.	Coalition for Sonoran Desert Protection	23-Mar-19	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp	Document includes an attachment section with numerous links to reports and sites discussing plants of concern, applicable studies and Pima County Code, and City of Irvine methods for controlling the spread of non-native grasses.		
349	D-347	Wildlife						Wildlife Communities		2012 2 Pima County Wildlife Connectivity Assessment	Report discussing two workshops held in Tucson, AZ in 2011. The process for developing the corresponding GIS data is also reviewed.	Arizona Game and Fish Department	Feb-12	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp	Believe this is a duplicate of D-229.		
350	D-348	General, Soils	Property Info	Prime and Unique Farmland						2014 6 BKW Farms Contracted lands in Avra Altar Valley	Map showing Tucson Water farm property managed by BK Wong Farms and other Tucson Water property. Specifically looking at the Avra Valley area.		Jun-14	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
351	D-349	Vegetation					Vegetation Communities and Habitat			2006 8 Avra valley Corridors, Potential Preserve	A City of Tucson Maps looking at the Avra Valley habitat conservation priorities.	City of Tucson, Tucson Water	2-Aug-06	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp	Map denotes city, county, sate, and federal land (both protected and unprotected), COT Farm property, riparian habitat, suitable COT habitat conservation areas, and CAP features.		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	**Doc. No.**	**Discipline**	**General Subdiscipline**	**Soil Subdiscipline**	**Water Resources Subdiscipline**	**Air Subdiscipline**	**Vegetation Subdiscipline**	**Wildlife Subdiscipline**	**Human Environment Subdiscipline**	**Title**	**Description**	**Author**	**Document Date**	**Source**	**Format**	**Date Requested**	**Date Collected**	**SharePoint File Location**	**Remarks**		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
352	D-350	General, Wildlife	Traffic/Roadways					Wildlife Communities		File name is 2019_07_07_I-11_tier_1_DEIS_McVie_comments	Comments from Christina Mc Vie on the ADOT/FHWA Interstate 11 Tier 1 Draft Environmental Impact Statement specifically for the section that would run from Sahuarita to Casa Grande.	Christina Mc Vie	8-Jul-19	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp	Document includes a 2014 map from the City of Tucson Department of Urban Planning and Design covering the "City if Tucson Revised Shovel-nosed Snake Potential Suitable Habitat for the HCP Planning Area"		
353	D-351	General, Wildlife	Traffic/Roadways					Special Status Species		File name is 2019_0704_CSDPplus_I-11DEISComments_FINALwithattach	Comments from CSDP on the ADOT/FHWA Interstate 11 Tier 1 Draft Environmental Impact Statement specifically for the section that would run from Nogales to Wickenburg. Overall, the group states they are in strong opposition to the proposed route.	Coalition for Sonoran Desert Protection		Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp	Links to numerous government reports are included throughout the letter.	Attachments include: April 2019 Memo from Pima County Supervisors Richard Elias and Sharon Bronson Pima County Resolution No. 2007-343 City of Tucson Resolution No. 23051 May 2019 Letter from Rep. Raúl Grijalva (D-AZ)	
354	D-352	General	Property Info							Avra Valley HPPS and Owners	This document is a collection of maps (7 of which are hand drawn) that include locations of preservation lands, riparian areas, ownership, and total acres for some parcels.			Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp	The hand drawn maps focus on much smaller areas and highlight specific parcels. The first map looks at the entire City of Tucson.		
355	D-353	General, Wildlife	Traffic/Roadways					Wildlife Communities		File name: 2019 7 6 Tucson Herpetological Society I-11 DEIS comment	Comments from the THS on the ADOT/FHWA Interstate 11 Tier 1 Draft Environmental Impact Statement specifically for the section that would run from Nogales to Wickenburg. The letter details concerns from the group about the potential construction of a new freeway through Avra Valley.	The Tucson Herpetological Society	6-Jul-19	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
356	D-354	General	Traffic/Roadways							File name: 2019 5 11 JointStakeholder_I11_position_080318 revised header	This letter includes the position of stakeholders invited by ADOT and FHWA to discuss two routes for a proposed Interstate 11. The group of stakeholders concluded that a bypass through Avra Valley is not acceptable.	I-11 Joint Stakeholder Community Planning Group	11-May-19	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
357	D-355	General, Soils, Human Environment	Property Info	Prime and Unique Farmland					Land Use and Recreation	Cardon properties, Avra Valley	A collection of maps looking at different projects (Snyder Hill, Sandario 150, Hanna, and Maesteller). Maps include government land locations, noise contours, and conservation land areas.	Land Advisors Organization	9-Mar-08	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
358	D-356	General, Vegetation	Fire				Invasive Species			2019 5 8 I-11 Buffelgrass comments	Comments on buffelgrass and the potential for and consequence of fires from the proposed I-11 route through Avra valley.	Christina Mc Vie	8-Mar-19	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
359	D-357	Vegetation					Vegetation Communities and Habitat			Image file name: AvraValley.Ch5_County_and_Federal_protection_priorities_053008	Map looking at the Avra Valley Habitat Conservation Plan. Pima County acquisition priorities, HCP planning areas, biological corridors, County/federal preserves and HCP priority mitigation areas denoted.	City of Tucson Office of Conservation and Sustainable Development	May-08	Coalition for Sonoran Desert Protection	Electronic		1-May-21	csdp			
360	D-358	Vegetation, Wildlife, Human Environment					Vegetation Communities and Habitat	Wildlife Communities	Land Use and Recreation	Arizona landscape Integrity and Wildlife Connectivity Assessment	Discusses the development of a mapped data product looking at Arizona's landscape integrity that would be used in a statewide connectivity assessment.	Ryan Perkl, School of Landscape Architecture & Planning, The University of Arizona	1-Jan-13	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp			
361	D-359	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species, Invasive Species		Coyote Ironwood Tucson Linkage Design_lowres	Information provided in the report covers the Coyote-Ironwood-Tucson Linkage Design	Arizona Game and Fish Department	Aug-12	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	This appears to be a duplicate of D-230		
362	D-360	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		Ironwood-Picacho Linkage Design	Description of the Ironwood-Picacho linkage design, individual species analyses, recommendations, and the process used to develop this design	Paul Beier, Daniel Majka, Todd Bayless (Northern Arizona University, Arizona Game and Fish Department)	24-May-07	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Corresponding GIS data logged as D-374		
363	D-361	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		Tucson-Tortolita-Santa Catalina Linkage Design	Description of the Tucson-Tortolita-Santa Catalina Mountain linkage design, individual species analyses, recommendations, and the process used to develop this design	Paul Beier, Emily Garding, Daniel Majka (Northern Arizona University, Arizona Game and Fish Department)	2006	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Corresponding GIS data logged as D-367		
364	D-362	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		Tumacacori-Santa Rita Linkage Design	Description of the Tumacacori-Santa Rita linkage design, individual species analyses, recommendations, and the process used to develop this design	Paul Beier, Daniel Majka, Todd Bayless (Northern Arizona University, Arizona Game and Fish Department)	22-Jun-06	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Corresponding GIS data logged as D-364		
365	D-363	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		GIS Data	Linkage Design GIS Data		30-Mar-07	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Study area includes a large portion of Santa Cruz County and small areas of Pima County along I-19	Shapefile name: Tumacac-SantaRitas_LinkageDesign.shp	Data Includes: polygon shapefile of the linkage design area
366	D-364	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		Rincon – Santa Rita – Whetstone Linkage Design	Description of the Rincon – Santa Rita – Whetstone linkage design, individual species analyses, recommendations, and the process used to develop this design	Paul Beier, Daniel Majka, Todd Bayless (Northern Arizona University, Arizona Game and Fish Department)	30-Mar-07	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Corresponding GIS data logged as D-366		
367	D-365	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		GIS Data	Linkage Design GIS Data		20-Apr-06	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Study area includes a small portion of Pima county along the border with Cochise County. Area covers portions of the I-10.	Shapefile name: Rincson-SantaRita-Whetstone_LinkageDesign.shp	Data Includes: polygon shapefile of the linkage design area
368	D-366	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		GIS Data	Linkage Design GIS Data		7-Apr-08	Coalition for Sonoran Desert Protection	Electronic		3-May-21	csdp	Study area includes a small portion of Pima and Pinal counties around the I-10 and the 77.	Shapefile name: 80_Tucson-Tortolita-SantaCatalina_LinkageDesign.shp	Data Includes: polygon shapefile of the linkage design area
369	D-367	General	Field Visit Photos							Field Visit 2021 04 29	A collection of images from the 4/29/21 field visit. Images include land areas and candid photos of the group attending the site visit.		29-Apr-21	Natural Resources Conservation Service	Electronic		4-May-21	nrcs			
370	D-368	General	Field Visit Photos							Field Visit 2021 03 10	A collection of images from the 3/10/21 field visit. Images include land areas and candid photos of the group attending the site visit.		10-Mar-21	Natural Resources Conservation Service	Electronic		4-May-21	nrcs			
371	D-369	General	Property Info							GIS Data	Arizona's State Trust Land surface parcels		28-Sep-20	Arizona State Land Department	Electronic		4-May-21	azsl	Information covers the entire state of AZ	Shapefile name: AZ_State_Trust_Land_-_Surface_Parcels.shp	Data Includes: land number, parcel number, ownership, if the parcel is leased, information about the lease if applicable, full name, total acres, and shape area and length.

Brawley Wash Watershed Plan and Environmental Assessment

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1	Doc. No.	Discipline	General Subdiscipline	Soil Subdiscipline	Water Resources Subdiscipline	Air Subdiscipline	Vegetation Subdiscipline	Wildlife Subdiscipline	Human Environment Subdiscipline	Title	Description	Author	Document Date	Source	Format	Date Requested	Date Collected	SharePoint File Location	Remarks		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
372	D-370	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		Patagonia – Santa Rita Linkage Design	Description of the Patagonia – Santa Rita linkage design, individual species analyses, recommendations, and the process used to develop this design	Paul Beier, Emily Garding, Daniel Majka (Northern Arizona University, Arizona Game and Fish Department)	2008	Coalition for Sonoran Desert Protection	Electronic		4-May-21	csdp	Corresponding GIS data logged as D-372		
373	D-371	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		GIS Data	Linkage Design GIS Data			Coalition for Sonoran Desert Protection	Electronic		4-May-21	csdp	Linkage shapefile covers portions of Santa Cruz County	Shapefile name: 96_Patagonia-SantaRita_LinkageDesign.shp	Data Includes: polygon shapefile of the linkage design area
374	D-372	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		US 60 Superior to Globe Linkage Design	Description of the US 60 Superior to Globe linkage design, individual species analyses, recommendations, and the process used to develop this design	Paul Beier, Daniel Majka, Todd Bayless (Northern Arizona University, Arizona Game and Fish Department)	20-Mar-07	Coalition for Sonoran Desert Protection	Electronic		4-May-21	csdp	No corresponding GIS data		
375	D-373	General, Vegetation, Wildlife	Traffic/Roadways				Vegetation Communities and Habitat	Wildlife Communities, Special Status Species		GIS Data	Linkage Design GIS Data		9-Mar-06	Coalition for Sonoran Desert Protection	Electronic		4-May-21	csdp	Linkage design shapefile covers portions of Pima and Pinal counties.	Shapefile name: Ironwood-Picacho_LinkageDesign.shp	Data Includes: polygon shapefile of the linkage design area
376	D-374	General	Property Info							GIS Data	Arizona's State Trust Land surface parcels			Quiet Creek	Electronic		6-May-21	quietcreek	Data for a portion of Pima County starting near Marana.	Shapefile name: AZ_State_Trust_Land_-_Surface_ClippedHUC12.shp	Data Includes: land number, county, parcel, area, ownership, if the parcel is leased, lease information if applicable (date of lease, expiration data, if it's subleased, etc.), and legal information.
377	D-375	General	Traffic/Roadways							I-11 and Intermountain West Corridor Study	Overview of the I-11 project including overall purpose of the project and proposed project phases. This document also provides a summary of multiple technical documents created.	Arizona Department of Transportation, Nevada Department of Transportation	Nov-14		Electronic		6-May-21	adot	File name: I-11CCR_Report_2014-12_sm		
378	D-376	General	Traffic/Roadways							I-11 Brochure	Two page brochure showing high level project information including next steps, project vision, and project justification.	Arizona Department of Transportation, Nevada Department of Transportation	Nov-14		Electronic		6-May-21	adot	File name: I-11CCR_Brochure_11x17_Final_2014-11.pdf		
379	D-377	General	Traffic/Roadways							Planning and Environmental Linkages Questionnaire and Checklist: Arizona Corridor Segments	Planning and environmental linkages for the AZ sections of the proposed I-11 project. Includes questionnaires for transportation planners for different connectivity corridors.	Arizona Department of Transportation, Nevada Department of Transportation	Dec-14		Electronic		6-May-21	adot	File name: I-11_PEL_Questionnaire_and_Checklist_Arizona_v6_Signed		
380	D-378	General	Traffic/Roadways							Planning and Environmental Linkages Questionnaire and Checklist: Nevada Corridor Segments	Planning and environmental linkages for the Nevada sections of the proposed I-11 project. Includes questionnaires for transportation planners for different connectivity corridors.	Arizona Department of Transportation, Nevada Department of Transportation	Dec-14		Electronic		6-May-21	adot	File name: I-11_PEL_Questionnaire_and_Checklist_Nevada_v7_Signed		
381	D-379	General	Traffic/Roadways							Implementation Program	This document discusses actions needed to continue with the I-11 and Intermountain West Corridor projects.	AECOM and CH2MHILL	Oct-14		Electronic		6-May-21	adot	File name: Implementation-Program-Report_v17_Compressed.pdf		
382	D-380	General	Traffic/Roadways							I-11 and Intermountain West Corridor Study, Business Case	This document looks at the economic benefits and costs of the I-11 project.	HDR, AECOM, and CH2MHILL	Nov-14		Electronic		6-May-21	adot	File name: Business_Case_v21_withUpdatedAppendixA.pdf		
383	D-381	General	Traffic/Roadways							Southern Arizona Future Connectivity Corridor Feasibility Assessment Report	This document includes an overview of studies and their findings conducted for the Southern Arizona Future Connectivity Corridor.	AECOM and CH2MHILL	28-Jul-14		Electronic		6-May-21	adot	File name: I-11_Southern-Arizona-Feasibility-Assessment-Report_07-28-2014.pdf		
384	D-382	General	Traffic/Roadways							Northern Nevada Future Connectivity Corridor Feasibility Assessment Report	This document includes an overview of studies and their findings conducted for the Northern Nevada Future Connectivity Corridor.	AECOM and CH2MHILL	28-Jul-14		Electronic		6-May-21	adot	File name: I-11_Northern-Nevada-Feasibility-Assessment-Report_07-28-2014.pdf		
385	D-383	General	Traffic/Roadways							Technical Memorandum: Level 2 Evaluation Results Summary	This documents discusses the results from the second level evaluation for alternatives in the I-11 study.		30-Jun-14		Electronic		6-May-21	adot	File name: I-11_L2_Evaluation_Results_06-30-2014_Compressed.pdf		
386	D-384	General	Traffic/Roadways							Technical Memorandum: Level 1 Evaluation Results Summary	This documents covers the procedures and results for evaluating alternatives in the I-11 Study.		2-Jun-14		Electronic		6-May-21	adot	File name: I-11_L1_Evaluation_Results_06-02-2014_Compressed.pdf		
387	D-385	General	Traffic/Roadways							Project Engagement Summary Report	Summary of dates/locations of stakeholder and public meetings, and overall public feedback.	AECOM and CH2MHILL	Aug-14		Electronic		6-May-21	adot	File name: I11-Engagement-Report-v5.pdf		
388	D-386	General	Traffic/Roadways							Purpose and Need Statement	Outlines the purpose and need statement for the project and gives descriptions of proposed action		Aug-14		Electronic		6-May-21	adot	File name: I-11_Purpose-and-Need_v12_FINAL.pdf		
389	D-387	General	Traffic/Roadways							Corridor Justification Report – Summary Trifold	Trifold including background information on the proposed project, why it is necessary, and next steps.	Arizona Department of Transportation, Nevada Department of Transportation	Jan-14		Electronic		6-May-21	adot	File name: I-11_Trifold_2014_v21_sm.pdf		
390	D-388	General	Traffic/Roadways							Corridor Justification Report	This report looks at if sufficient justification exists for the construction a new highway and if so, what is the expected traffic demand in that area.	AECOM and CH2MHILL	21-Aug-13		Electronic		6-May-21	adot	File name: I11_CJR_08_21_13_FINAL.pdf		
391	D-389	General, Wildlife	Traffic/Roadways					Wildlife Communities, Special Status Species		Existing Natural and Built Environment Technical Memorandum	This report looks at the environmental recourses that could be impacted by the completion of the I-11 project within the proposed site area.		29-Aug-13		Electronic		6-May-21	adot	File name: I-11_Existing-Natural-and-Built-Environment-08_29_13_Compressed.pdf		
392	D-390	General	Traffic/Roadways							Resource Materials (Preliminary Identification of Relevant Ongoing and Past Plans, Studies, and Other Documents)	This document includes a list of relevant plans, studies, and reports, the agency they are from, the date created, and if the materials need any updates.	Arizona Department of Transportation, Nevada Department of Transportation			Electronic		6-May-21	adot	File name: I-11_Resource_Materials_3.pdf		
393	D-391	General	Traffic/Roadways							Corridor Vision Summary	This two page document includes information about the preliminary corridor vision, was for stakeholders to get involved, and a general timeline and study approach.	Arizona Department of Transportation, Nevada Department of Transportation	16-Oct-12		Electronic		6-May-21	adot	File name: I-11_CorridorVisionSumTrifold_2012_v12.pdf		
394	D-392	General, Human Environment	Traffic/Roadways						Land Use and Recreation, Public Health and Safety	Public Involvement Report for Phases 1 and 2	This document is a collection of notes and feedback from various stakeholder and public meetings. Additional comments submitted to the study website are also included.	AECOM and CH2MHILL	Jul-13		Electronic		6-May-21	adot	File name: I-11-Phase-II-Public-Involvement-Report.pdf		
395	D-393	General	Traffic/Roadways							Fact Sheet	Document includes a short project justification section, an overview of what the Corridor will look like, and a description for how decisions will be made.	Arizona Department of Transportation, Nevada Department of Transportation	16-Oct-12		Electronic		6-May-21	adot	File name: I-11_FactSheet_2012-10_v12.pdf		

Brawley Wash Watershed Plan and Environmental Assessment

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396	D-394	General	Traffic/Roadways							Frequently Asked Questions (FAQs)	Short document providing answers to frequently asked question for the I-11 and intermountain West Corridor Study.	Arizona Department of Transportation, Nevada Department of Transportation	4-Dec-12		Electronic		6-May-21	adot	File name: I-11_FAQ_2012-12-04.pdf		
397	D-395	General	Traffic/Roadways							Timeline of Key Decisions Leading to this Study	One page timeline of key decisions impacting the I-11 and intermountain West Corridor Study.	Arizona Department of Transportation, Nevada Department of Transportation			Electronic		6-May-21	adot	File name: I-11_Board_2012-10_Timeline_v07.pdf		
398	D-396	General	Traffic/Roadways							Work Program and Schedule	Table of the work program and schedule for the I-11 and intermountain West Corridor Study.	Arizona Department of Transportation, Nevada Department of Transportation			Electronic		6-May-21	adot	File name: I-11_Board_Program_Condensed.jpg		
399	D-397	General	Traffic/Roadways							Public Involvement Plan	An overview of the public involvement plan including goals, objectives, and a general timeline.	CH2MHILL			Electronic		6-May-21	adot	File name: I-11_PublicInvolvementPlan.pdf		
400	D-398	General, Vegetation	Property Info				Invasive Species			Avra Valley Land Management	15 slides about Avra Valley Land Management. Includes maintenance priorities, property integrity and security, and vegetation control and conservation.	City of Tucson		Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: AVLands_CWAC_Sept_4.pdf		
401	D-399	Soils, Vegetation		Prime and Unique Farmland	Groundwater					Avra Valley Retired Farm Properties	Tucson Water purchased many former agricultural parcels to acquire water rights and preserve groundwater for future use. Tucson Water also developed renewable water supply projects on the properties and developed a Habitat Conservation Plan.	City of Tucson		Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: Avra Valley Retired Farm Properties _ Official website of the City of Tucson.html		
402	D-400	Soils, Water Resources, Vegetation, Wildlife		Soils and Geological Characteristics	Hydrology and Surface Water		Vegetation Communities and Habitat	Wildlife Communities		Habitat Conservation Plan: Environmental Setting and Biological Resources	This section provides an overview of the environmental setting and biological resources in the City of Tucson and adjacent lands that are relevant to this HCP.	City of Tucson		Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: Habitat Conservation Plan_ Environmental Setting and Biological Resources _ Official website of the City of Tucson.html		
403	D-401	Vegetation, Wildlife					Special Status Species	Special Status Species		Habitat Conservation Plan: Covered Species	City of Tucson is covering 8 species in its HCP (Habitat Conservation Plan). The section presents the species-specific baseline conditions in the City HCP planning area.	City of Tucson		Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: Habitat Conservation Plan_ Covered Species _ Official website of the City of Tucson.html		
404	D-402	Soils, Water Resources		Soils and Geological Characteristics	Groundwater					Groundwater-Storage Change and Land-Surface Elevation Change in Tucson Basin and Avra Valley, South-Central Arizona—2003–2016	Estimates of land-surface elevation change and groundwater-storage change in Tucson Basin and Avra Valley	Robert L. Carruth, Libby M. Kahler, and Brian D. Conway	2018	Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: Groundwater-storage change and land-surface elevation change in Tucson Basin and Avra Valley, south-central Arizona--2003-2016.html		
405	D-403	Wildlife						Special Status Species		The City of Tucson HCP: Burrowing Owl Occupancy Surveys within the City of Tucson's Avra Valley Properties	This 25 page report provides information regarding the presence and distribution of burrowing owls within the Avra Valley planning sub-area.	Arizona Game and Fish Department	1-Oct-06	Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: 2006.10.AzGFD.AvraValleyBUOWSurveys.pdf		
406	D-404	Wildlife						Special Status Species		BURROWING OWL MANAGEMENT GUIDELINES FOR MUNICIPALITIES IN ARIZONA	This 11 page white paper report provides information and guidance for managing the translocation of burrowing owls, and design and management guidelines of burrowing owl management areas (BOMA)	Arizona Game and Fish Department	Jun-07	Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: 2007.6.AZGFD - BOMA - BUOWMunicipalitiesWhitePaper.pdf		
407	D-405	Wildlife						Special Status Species		Glyphosate Applications to Control Buffelgrass in Pima County: Effects on Burrowing Owls	Burrowing owls consume herbivorous insects and small mammals and hence the City of Tucson Technical Advisory Committee members have expressed concern that chemicals contained in glyphosate herbicides may bioaccumulate in owls and possibly cause deformities, mortalities, or reduced reproductive success. This 37 page research report studies the burrowing owls in the areas treated with glyphosate herbicides and compare to control areas.	USGS Arizona Cooperative Fish and Wildlife Research Unit	19-Dec-07	Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: 2007.GARCIA-CONWAY. PC herbicide app for BG - effect on BUOW.pdf		
408	D-406	Wildlife						Special Status Species		Burrowing Owl Project Clearance Guidance for Landowners	Guidelines in this 9 page report are intended to provide information and tools that can be applied when there is the potential for a project or action to adversely affect burrowing owls and the resources that support them.	Arizona Game and Fish Department	Jan-09	Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: 2009.1.AzGFD BOWKG GROUP.burrowingowlclearanceprotocol.pdf		
409	D-407	Wildlife						Special Status Species		Users Guide to Installation of Artificial Burrows for Burrowing Owls	This 34 page users guide provides a synthesis of material relevant to the use of Artificial Burrow Systems for Burrowing Owls, insights into the placement of the systems, design specifications and installation techniques, and fundamental anti-predator strategies.	David H. Johnson, Donald C. Gillis, Michael A. Gregg, James L. Rebholz, Jeffrey L. Lincer, and James R. Belthoff	19-Aug-10	Coalition for Sonoran Desert Protection	Electronic		13-May-21	csdp	File name: 2010.8.10.Johnson_et_al._2010._Users_guide_to_installation_of_artificial_burrows_for_BUOWs..pdf		
410	D-408	Water Resources			Floodplain Management					GIS Data	The PointPattern400feet_Polygon.shp is a polygon shapefile with attribute fields: headcut density, length and area.	Robert Davis		Quiet Creek	Electronic		1-Jun-21	quietcreek	File name: PointPattern400feet_Polygon.shp		
411	D-409	Water Resources			Floodplain Management					GIS Data	The CompleteFeaturesTopologic.shp is a polygon shapefile marking locations of berms, depressions, ditches, tanks and terrace edges. Associated attributes include road, ownership, GlobalID, length and area	Robert Davis		Quiet Creek	Electronic		1-Jun-21	quietcreek	File name: CompleteFeaturesTopologic.shp		
412	D-410	Vegetation, Human Environment					Vegetation Communities and Habitat		Land Use and Recreation	Altar Valley Vegetation Classification Map	Map of Altar Valley area with the following vegetation classifications: retired farmland, agriculture, encinal mixed oak/mesquite/pine/juniper, riparian mesquite forest, semi-desert grassland, Sonoran/Chihuahuan riparian/Reed-Cattail marsh, Sonoran Savanna Grassland, Sonoran Creosotebush-Bursage scrub, Sonoran Paloverde-mixed cacti-mixed scrub, urban, and low density housing	Pima County Natural Resources Parks & Recreation	29-Jan-18	Quiet Creek	Electronic		10-Jun-21	quietcreek	File name: Altar_Veg_map_1-18_red.pdf		

Brawley Wash Watershed Plan and Environmental Assessment

Data Collection Technical Memorandum - Data Collection Inventory

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	Doc. No.	Discipline	General Subdiscipline	Soil Subdiscipline	Water Resources Subdiscipline	Air Subdiscipline	Vegetation Subdiscipline	Wildlife Subdiscipline	Human Environment Subdiscipline	Title	Description	Author	Document Date	Source	Format	Date Requested	Date Collected	SharePoint File Location	Remarks		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
413	D-411	Vegetation, Human Environment					Vegetation Communities and Habitat		Land Use and Recreation	Avra Valley Vegetation Classification Map	Map of Avra Valley area with the following vegetation classifications: retired farmland, agriculture, intermittent water, riparian mesquite forest, Sonoran Savanna Grassland, Sonoran Creosotebush-Bursage scrub, Sonoran Paloverde-mixed cacti-mixed scrub, urban, and low density housing	Pima County Natural Resources Parks & Recreation	29-Jan-18	Quiet Creek	Electronic		10-Jun-21	quietcreek	File name: Avra_Veg_map_1-18_red.pdf		
414	D-412	Human Environment							Land Use and Recreation	allot2017_blm_a_az.shp	Shapefile that includes grazing allotment information such as allotment name and area			Natural Resources Conservation Service	Electronic		9-Jun-21	nrcs	File name: allot2017_blm_a_az.shp		
415	D-413	Vegetation, Human Environment					Vegetation Communities and Habitat		Land Use and Recreation	Brawley Wash - Vegetation and Land Use Cover	Email response from Robert Davis to Jennifer Patton regarding important data links to agriculture and developments	Pima County and Quiet Creek		Quiet Creek	Electronic		9-Jun-21	quietcreek	File name: Email_Links&InstructionsFromQuietCreek_received20210609_ BrawleyWatershed-Vegetation_LandUseCover.docx		
416	D-414	General, Vegetation, Human Environment	Property Info				Vegetation Communities and Habitat		Land Use and Recreation	Arizona Department of Revenue, Property Tax Division, Property Use Code Manual	Property use code manual		1-Jan-00	Quiet Creek	Electronic		9-Jun-21	quietcreek	File name: PROPERTY_useCodeManual.pdf		
417	D-415	Vegetation					Vegetation Communities and Habitat, Special Status Species, Invasive Species			2017_vegplot_data_BrawleyWatershed	Data indicates presence of invasive species and native species diversity by plot; vegetation cover is estimated by three heights: field (0.025-0.5m), sub-canopy (>0.5-2m), canopy (>2m)		2017	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: 2017_vegplot_data_Brawley Watershed.xlsx; For 2017 there are 4 plots within the Brawley Watershed planning area and 2 plots just outside of the planning area. There are line-point intercept data for plants along the 6 transects per plot. Estimate veg cover in three height categories: •Field (0.025-0.5m) •Sub-canopy (>0.5-2m) •Canopy (> 2m) •Points spaced every 0.5 meters o80 points per transect, 240 pts total (record species identity for each of the three heights) oThere are 5 subplots per plot (each subplot is between 2 consecutive transects Any perennial or nonnative not measured on the		
418	D-416	Vegetation					Vegetation Communities and Habitat, Special Status Species, Invasive Species			2018_vegplot_data_BrawleyWatershed	Data indicates presence of invasive species and native species diversity by plot; vegetation cover is estimated by three heights: field (0.025-0.5m), sub-canopy (>0.5-2m), canopy (>2m)		2018	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: 2018_vegplot_data_Brawley Watershed.xlsx; For 2018, only had one plot within the planning area. Estimate veg cover in three height categories: •Field (0.025-0.5m) •Sub-canopy (>0.5-2m) •Canopy (> 2m) •Points spaced every 0.5 meters o80 points per transect, 240 pts total (record species identity for each of the three heights) oThere are 5 subplots per plot (each subplot is between 2 consecutive transects Any perennial or nonnative not measured on the transect to the left is recorded in each subplot - Yields a within plot frequency of 0-5		
419	D-417	Vegetation					Vegetation Communities and Habitat			VegSoilPlots_20Plots_2017_UPDATED	2017 vegetation plot location and property info		2017	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: VegSoilPlots_20Plots_2017_UPDATED.xlsx		
420	D-418	Vegetation					Vegetation Communities and Habitat			VegSoilPlots_20CompletedPlots_2018	2018 vegetation plot location and property info		2018	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: VegSoilPlots_20CompletedPlots_2018.csv		
421	D-419	Soils, Vegetation		Soils and Geological Characteristics			Vegetation Communities and Habitat, Special Status Species, Invasive Species			SOP #5: Conducting Vegetation Cover and Frequency, Soil Cover and Fuel Load Sampling	This SOP describes the methods used to conduct plot sampling of vegetation. Vegetation sampling includes 2 components: monitoring the vegetative cover and the frequency. Soil cover data is also included		8/17/2017	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: Uplands_SOP05_Vegetation_sampling_v200.doc		
422	D-420	Vegetation					Vegetation Communities and Habitat			PICO_CompletedPlots2017.shp	2017 vegetation plot location and property info		2017	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: PICO_CompletedPlots2017.shp		
423	D-421	Vegetation					Vegetation Communities and Habitat			PICO_CompletedPlots2018.shp	2018 vegetation plot location and property info		2018	Pima County - Office of Sustainability	Electronic		24-Jun-21	pcos	File name: PICO_CompletedPlots2018.shp		
424	D-422	General, Wildlife	Fences					Wildlife Communities		Saguaro National Park Arizona	This is a map of the upcoming wildlife movemement planning process to inventory fences and other barriers and start to improve connectivity (i.e., removal of barriers)			Pima County - Natural Resources, Parks and Recreation	Electronic		16-Jul-21	pcnrpr	File name: AvraValley_FenceConnectivity_1.pdf		
425	D-423	Water Resources, Reference			Floodplain Management					List of Conservation Practices for Brawley Wash Watershed Plan; Purposes: Flood Prevention and Watershed Protection	A drafted list of NRCS practices specific to flood prevention and watershed protection			Natural Resources Conservation Service	Electronic		16-Jul-21	nrcs	File name: Brawley_DRAFT List of Cons Practices for Watershed Plan_7.16.2021_ver3.docx		
426	D-424	Reference								Desired Conditions and Indicators of Success	Altar Valley's desired conditions for their Watersehd Plan			Altar Valley Watershed Working Group	Electronic		16-Jul-21	avwg	File name: 4.0_Desired Conditions and Indicators of Success.docx		
427	D-425	Vegetation					Invasive Species			Brawley_invasives	Shapefile of invasive plant species observed on District lands in the Brawley Wash. The data is collected from the SLM Incidental Observations database, collected during regular inspections of the District's open space lands.			Pima County - Flood Control District	Electronic		19-Jul-21	pcrfcd	File name: Brawley_invasives.shp		
428	D-426	Soil		Prime and Unique Farmland						Brawley_PrimeUnique_clip	Shapefile of the Prime and Unique Farmland status inside the Brawley Wash watershed.			Natural Resources Conservation Service	Electronic		28-Jul-21	nrcs	File name: Brawley_PrimeUnique_clip.shp		
429	D-427	Vegetation					Invasive Species			InvasivePlants	Standardized species list for the invasive plant species that Pima County collects.			Pima County - Flood Control District	Electronic		30-Aug-21	pcrfcd	File name: InvasivePlants.xlsx		

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	T	V	W	X
1	Doc. No.	Discipline	General Subdiscipline	Soil Subdiscipline	Water Resources Subdiscipline	Air Subdiscipline	Vegetation Subdiscipline	Wildlife Subdiscipline	Human Environment Subdiscipline	Title	Description	Author	Document Date	Source	Format	Date Requested	Date Collected	SharePoint File Location	Remarks		
2	D-#	For sorting purposes, use these categories: General, Soils, Water Resources, Air, Vegetation, Wildlife, Human Environment, Reference	Subdisciplines: Traffic/Roadways, Fire, Property Info, Boundary, Fences, DEM, Mountains, Tucson Aqueduct - CAP	Subdisciplines: Soils and Geological Characteristics, Upland Erosion, Sedimentation, Prime and Unique Farmland	Subdisciplines: Hydrology and Surface Water, floodplain management, groundwater, Waters of the U.S., Irrigation	Subdiscipline: Air Quality	Subdisciplines: Vegetation Communities and Habitat, Special Status Species, Invasive Species	Subdisciplines: Wildlife Communities, Fish/Essential Fish Habitat, Special Status Species	Subdisciplines: Cultural and Historic Resources, Land Use and Recreation, Scenic Beauty and Visual Resources, Public Health and Safety, Socioeconomics	Title of the object collected	Brief Description	Who Wrote the Document	The date the report was completed	From who did we receive the document?	CD, Paper, Electronic	The date WE asked for the information	Date we received the information	Where is it located in the filing system?	Any special notes		
430	D-428	Reference								Altar Valley Watershed Plan	This document contains input gathered on components of the Altar Valley Watershed Plan through meetings of the Watershed Working Group, Technical Teams, and individual partners. The components include the Project List (with project descriptions), Desired Conditions, Strategies, Toolbox Concepts, and Informational Needs.		3/1/2022	AVCA	Electronic		2/8/2023	avwg	File name: Altar Valley Watershed Plan V1 March 2022.pdf		
431	D-429	Reference								Desired Conditions and Indicators of Success	This document contains the principles and goals of collaborative conservation of the watershed. Specifically, it discussed the desired conditions of successful watershed productivity, human community wellbeing, and ongoing outreach and education.		8/1/2021	AVCA	Electronic		10/19/2021	avwg	File name: 4.0_Desired Conditions and Indicators of Success (1)_highlight.docx		
432	D-430	Water Resources			Hydrology and Surface Water, Waters of the U.S.					Wetlands	This gis polygon shapefile contains the nearby wetland boundary data with shape length and area attributes.		4/20/2016	ADEQ	Electronic		8/2/2022	adeq	File name: wetlands.shp		
433	D-431	Soils		Soils and Geographical Characteristics						Pima Landcover No Roads	This gis polygon shapefile contains boundary information on Pima County landcover.		4/3/2018	Pima County	Electronic		6/1/2022	pcgisp	File name: pima_landcover_noroads.img		
434	D-432	General	Property Info, Boundary							Historic Parcels Non-tax Codes	This gis polygon shapefile contains historical parcel non-tax coded areas.		5/1/2022	Pima County	Electronic		6/1/2022	pcgisp	File name: Historical_Parcels_-_Non-Taxcoded_Areas.shp		
435	D-433	General	Traffic/Roadways							Primitive Roads	This gis line shapefile contains primitive roadway location information.		4/22/2022	Pima County	Electronic		6/1/2022	pcgisp	File name: Primitive_Roads.shp		
436	D-434	General	Property Info							Police Stations	This gis point shapefile contains location and contact information for police stations within the general area.		4/23/2022	Pima County	Electronic		8/24/2022	pcgisp	File name: Police_Stations.shp		
437	D-435	General	Property Info							Building Footprint	This gis polygon shapefile contains building footprint information for Pima County.		4/24/2022	Pima County	Electronic		8/24/2022	pcgisp	File name: Building_Footprints_-_BING.shp		
438	D-436	Vegetation					Special Status Species			Conservation SSMA	This gis polygon shapefile delineates the Special Species Management Areas (SSMAs)		5/1/2022	Pima County	Electronic		6/1/2022	pcgisp	File name: Conservation_Lands_System_Special_Species_Management_Areas_(SSMAs).shp		
439	D-437	Soils		Upland Erosion						Developer Mapped Erosion Hazard Areas	This gis polygon shapefile delineates locations of developer mapped erosion hazard areas.		5/1/2022	Pima County	Electronic		6/29/2022	pcgisp	File name: Developer_Mapped_Erosion_Hazard_Areas.shp		
440	D-438	Soils		Upland Erosion						RFCD Local Erosion Hazard Areas	This gis polygon shapefile delineates locations of local erosion hazard areas.		5/2/2022	Pima County	Electronic		6/29/2022	pcgisp	File name: RFCD_Local_Erosion_Hazard_Areas.shp		
441	D-439	Vegetation					Vegetation Communities and Habitat			Conservation Lands System Categories	This gis polygon shapefile delineates and categorizes areas for the Conservation Lands System.		5/2/2022	Pima County	Electronic		6/1/2022	pcgisp	File name: Conservation_Lands_System_Categories.shp		
442	D-440	Vegetation					Vegetation Communities and Habitat			Riparian Classifications 2005	This gis polygon shapefile provides riparian classifications across the watershed and surrounding area.		5/4/2022	Pima County	Electronic		6/1/2022	pcgisp	File name: Riparian_classifications%2C_2005_FC2.shp		
443	D-441	General	Traffic/Roadways							Streets	This gis line shapefile contains roadway information.		5/25/2022	Pima County	Electronic		9/9/2022	pcgisp	File name: Street_Network.shp		
444	D-442	General	Property Info							Schools	This gis point shapefile contains location and contact information for schools within the general area.		5/26/2022	Pima County	Electronic		8/24/2022	pcgisp	File name: Schools.shp		
445	D-443	General	Property Info							Fire Stations	This gis point shapefile contains location information of fire stations within the general area.		6/7/2022	Pima County	Electronic		8/24/2022	pcgisp	File name: Fire_Stations.shp		
446	D-444	General	Traffic/Roadways							Street Maintenance	This gis line shapefile contains roadway information.		7/5/2022	Pima County	Electronic		7/5/2022	pcgisp	File name: Street_Maintenance.shp		
447	D-445	Water Resources			Hydrology and Surface Water					Altar Valley Watershed Plan Hydrologic Modeling Report	This report summarizes the methods, assumptions, inputs and results of hydraulic and hydrologic modeling of potential project areas within the Altar Valley watershed.	JE Fuller Hydrology & Geomorphology Inc.	8/5/2022	Pima County - Flood Control District	Electronic		8/17/2022	pcrfcd	File name: AVCA_Hydrology_Modeling 8-5-2022.pdf		
448	D-446	Water Resources			Hydrology and Surface Water					Altar Wash Floodplain Enhancement #5 Concept Plans	Preliminary concept plans of the Altar Wash Floodplain Enhancement #5	JE Fuller Hydrology & Geomorphology Inc.		JE Fuller/Hydrology & Geomorphology, Inc.	Electronic		5/3/2022	pcrfcd	File name: AFP_5_PLAN_PRELIM_4-29-2022.pdf		
449	D-447	General	Property Info							Arizona Shapefile	This gis polygon shapefile delineates the state of Arizona.		11/24/2021		Electronic		6/1/2022	azgfd	File name: Arizona.shp		
450	D-448	Vegetation					Vegetation Communities and Habitat			AZ Riparian Shapefile	This gis polygon shapefile delineates riparian areas.		11/24/2021		Electronic		6/1/2022	azgfd	File name: AZ_Riparian.shp		
451	D-449	Vegetation					Vegetation Communities and Habitat			AZ Riparian Project Metadata Shapefile	This gis polygon shapefile delineates riparian project areas with links to metadata and supplemental map information.		11/24/2021		Electronic		6/1/2022	azgfd	File name: AZ_Riparian_Project_Metadata.shp		
452	D-450	Water Resources			Hydrology and Surface Water					AZ Wetlands Shapefile	This gis polygon shapefile delineates and categorizes riparian areas.		11/24/2021		Electronic		6/1/2022	azgfd	File name: AZ_Wetlands.shp		
453	D-451	Water Resources			Hydrology and Surface Water					AZ Wetlands Historic Map Info Shapefile	This gis polygon shapefile contains links to AZ wetlands historic information.		11/24/2021		Electronic		6/1/2022	azgfd	File name: AZ_Wetlands_Historic_Map_Info.shp		
454	D-452	Water Resources			Hydrology and Surface Water					AZ Wetlands Project Metadata Shapefile	This gis polygon shapefile delineates wetland project areas with links to metadata and supplemental map information.		11/24/2021		Electronic		6/1/2022	azgfd	File name: AZ_Wetlands_Project_Metadata.shp		
455	D-453	Water Resources			Hydrology and Surface Water					SAVSARP Site Plan	Figure of SAVSARP site plan and raw water pipeline		8/15/2008		Electronic		4/19/2021	cot	File name: SAVexpansionBasinMap.pdf		
456	D-454	Vegetation					Invasive Species			Pima County NRPR Open Space Invasive Plant Species Management Strategy	This preliminary draft report provides a framework for organizing invasive species management on NRPR Open Space Lands.	Tucson Audubon Society	12/1/2020		Electronic		5/13/2021	pcnrpr	File name: TAS_preliminary strategy_edited_SENSITIVE.pdf		
457	D-455									Flo2D Duvall Models	Flo2D Duvall Models				Electronic		9/20/2022	pcrfcd			
458	D-456									Hydraulic Model of Brawley Wash, North of Ajo Hwy, for FEMA Study	Superseeded version of the hydraulic model of Brawley Wash, north of Ajo Hwy, for the FEMA Study. Information from this model was presented at the alternatives and feasibility workshops.			JE Fuller/Hydrology & Geomorphology, Inc.	Electronic		9/20/2022	pcrfcd			
459	D-457	Water Resources			Hydrology and Surface Water					Xsec Q10	This gis line shapefile contains cross-sections for Q10 cfs		7/11/2022		Electronic			pcrfcd	File name: Xsec_Q10.shp		
460																					

Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

Appendix E – Supporting Information

CONTENTS:

Table 25 – Eliminated Alternatives and Rationale

Table 26 – Summary and Comparison of Alternative Plans

Table 27 – Details for the Preferred Alternatives

Table 28 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1)

Table 29 – Cost Details for the Preferred Alternatives

Table 30 – Table 4 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1))

Table 31 – Agency Consultation Record

Table 32 – Location of Problem Area APE

Attachment 14 – Preliminary Alternatives Selection Memo – Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – December 20, 2022)

Attachment 15 – Data Collection Technical Memorandum - Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – March 16, 2023)

Attachment 16 – Letter – NRCS Evaluation FPPA Ruling (May 21, 2024)

Attachment 17 – Class I Cultural Resources Inventory Results for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona, May 2024) (Revised July 2024)

Attachment 18 – Class III Cultural Resources Inventory Results Report (October 2024) (revised February 2025)

Attachment 19 – Letter – NRCS Section 12 Notification – Public Law 83-566 (February 10, 2025)

Attachment 20 – Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County Arizona, April 2025) Report

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE
Arizona State Office
230 North 1st Avenue
Suite 509
Phoenix, Arizona 85003

May 21, 2024

Brett Myers
Water Resources Planning Specialist
USDA NRCS AZ

Dear Brett Myers:

The Farmland Protection Policy Act (FPPA) evaluates the impacts to farmland for projects where federal technical or financial assistance is requested. The FPPA process determines the relative value of prime or important farmlands that are being considered for permanent conversion to non-agricultural uses. The Natural Resource Conservation Service (NRCS) acts as the national FPPA steward in reviewing and documenting conversion of farmland (i.e., Prime, Statewide Importance, and /or Local Importance) to non-agricultural use when the project utilizes federal funds.

NRCS has reviewed your project, Brawley Wash, dealing with FPPA. After reviewing your project proposal, the following is noted:

The proposed project is not subject to FPPA due to not involving irreversible conversion (7 CFR 658.3 (a)). Therefore, no further action is needed.

If you have any questions or concerns, please contact Jamilah McCoy at Jamilah.McCoy@usda.gov.

Sincerely,

Jamilah McCoy

Jamilah McCoy
NRCS Arizona State Resource Conservationist

Cc:
Emily Yulga, Resource Soil Scientist, NRCS Arizona

Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

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Class I Cultural Resources Inventory for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona

MAY 2024 (REVISED JULY 2024)

PREPARED FOR

Natural Resources Conservation Service

ON BEHALF OF

Pima County Regional Flood Control District

PREPARED BY

SWCA Environmental Consultants

CLASS I CULTURAL RESOURCES INVENTORY FOR THE BRAWLEY WASH WATERSHED PLAN ALTERNATIVES, PIMA COUNTY, ARIZONA

Prepared for

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230 North 1st Avenue, Suite 509
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SWCA Project No. 63720

SWCA Cultural Resources Report No. 24-313

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ABSTRACT

Report Title: Class I Cultural Resources Inventory for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona

Project Name: Brawley Wash Watershed Plan and Environmental Assessment

Project Location: Brawley Wash Watershed, Pima County

Project Locator UTM: 472827 mE, 3571449 mN NAD 83 Zone 12

Project Sponsor: Pima County Regional Flood Control District (PCRFCD)

Sponsor Project Number: PCRFCD Contract: CT-FC-290

Federal Agency: Natural Resources Conservation Service (NRCS)

Other Agencies: Pima County, City of Tucson

Applicable Regulations: Section 106 of the National Historic Preservation Act and its implementing regulations, defined in 36 Code of Federal Regulations 800 as a federal undertaking; Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566); Pima County policy regarding the protection of cultural resources (Board of Supervisors Resolution 1983-104; Board of Supervisors Policy C3.17); City of Tucson Resolution No. 12443; Administrative Directive for the Protection of Archaeological and Historical Resources in City Projects, City of Tucson, May 1999.

Funding Source: This Class I cultural resources inventory was prepared by SWCA Environmental Consultants (SWCA) as a subcontractor to Stantec Consulting, Inc. (Stantec), under contract to PCRFCD, using county and federal funding. Future project construction may use federal, state, or local funds.

ASLD Application Number: Not applicable

Description of the Project/Undertaking: PCRFCD is the sponsoring local organization for the preparation of the Brawley Wash Watershed Plan and Environmental Assessment in southern Arizona. The NRCS is providing technical and financial assistance for the plan. Stantec is assisting with preparation of the Brawley Wash Watershed Plan and Environmental Assessment under contract with Pima County. The Brawley Wash Watershed Plan considers 198,000 acres in the Avra and Altar Valleys west of the Tucson metropolitan area. The watershed is characterized by severe erosion and sedimentation in areas where constructed embankments and canals from abandoned agricultural lands are no longer being maintained, which affects natural flow patterns. This causes a loss of wildlife habitat and disrupts natural floodplains and drainage flow paths. The Brawley Wash Watershed Plan will evaluate floodplain restoration, erosion control, structure removal, and other conservation measures on County-, City-, and privately-owned lands within the Planning Area.

PCRFCD is developing the plan in cooperation with Pima County, the City of Tucson, the Altar Valley Conservation Alliance, and a broad range of public stakeholders, including local governments, the Tohono O'odham Nation, agricultural and ranching interests, and conservation groups, through a public planning process. Under contract with Stantec, SWCA previously prepared a cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021) to assist in the formulation of project alternatives and to begin to allow involved agencies to consider the potential for the project to impact cultural resources. In working with stakeholders and in accordance with the Purpose and Need Statement for the Brawley Wash Watershed Plan Environmental Assessment, five "Problem Areas" have been identified in which future project activities may occur. These are described in *Preliminary Alternatives Selection Memo: Brawley Wash Plan and Environmental Assessment* (Stantec 2022). Stantec requested that SWCA prepare a Class I cultural resources inventory to provide specific information regarding previously conducted archaeological surveys and previously recorded cultural

resources for each of these Problem Areas. The Class I cultural resources inventory is intended to facilitate further evaluation of project alternatives and assist the involved agencies in continuing the process of considering the potential for the project to impact cultural resources. It is also intended to allow NRCS to initiate Section 106 consultation with the State Historic Preservation Office, Tribes, and other consulting parties.

Class I Study Area: The Class I study area corresponds to the five currently identified "Problem Areas" listed below. An area of potential effects (APE) has not yet been defined. The APE will be determined when design plans are further developed and alternatives are selected.

Location of Problem Areas

Identified Problem Area*	Landownership	Location (Township, Range, Section)/ U.S. Geological Survey 7.5-minute quadrangle
Buckelew West	City of Tucson—Tucson Water	Township (T) 15 South (S), Range (R) 10 East (E), Sections (S) 21, 28, 33/Three Points
Tortuga Ranch	Pima County, Private	T14S, R11E, S32/Brown Mountain
Cactus Avra	City of Tucson—Tucson Water, Pima County, Private	T13S, R10E, S11, 13–15, 22–26/Avra
Prickle Desert	City of Tucson—Tucson Water	T12S R10E S25/Avra
Tucker Road	City of Tucson—Tucson Water	T13S R10E S5/Avra

* From Stantec (2022)

Land Jurisdiction: Municipal and private land

Consultant Firm/Organization: SWCA

Project Number: 63720 (SWCA)

Comments: The results of the Class I records search indicate the following:

- Very few previous surveys have been conducted within the Problem Areas, and almost all the known research is more than 10 years old. Therefore, Class III survey of the future defined Area of Potential Effects will be required, and previous survey is unlikely to contribute to this coverage.
- There are few recorded sites in the Problem Areas (the only known ones are in the extensive Cactus Avra Problem Area). However, this may reflect the sparse previous survey coverage.
- The recorded archaeological sites in the surrounding area are Archaic period and Hohokam artifact scatters, including some with features. Site descriptions regularly note disturbance from agriculture. Buried deposits have been documented in some of the limited number of sites that have been tested.
- Based on available data, the archaeological sensitivity of the Problem Areas varies and is high in some areas. However, there is no indication that an abundance of known sites precludes the development of alternatives within these areas.
- Late Historic period agricultural features are likely to be present in the Problem Areas, and some documentation of this built environment will be required in potential future survey. These are common features like earthworks, canals, and roads that existed in historic times. These are most likely not significant historic properties based on available data.

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INTRODUCTION

Pima County Regional Flood Control District (PCRFCD) is the sponsoring local organization for the preparation of the Brawley Wash Watershed Plan and Environmental Assessment (EA) in southern Arizona. The Natural Resources Conservation Service (NRCS) is providing technical and financial assistance for the plan. Stantec Consulting Services, Inc. (Stantec), is assisting with preparation of the Brawley Wash Watershed Plan and EA under contract with Pima County. The Brawley Wash Watershed Plan considers 198,000 acres in the Avra and Altar Valleys west of the Tucson metropolitan area (Figure 1). The watershed is characterized by severe erosion and sedimentation in areas where constructed embankments and canals from abandoned agricultural lands are no longer being maintained, which affects natural flow patterns. This causes a loss of wildlife habitat and disrupts natural floodplains and drainage flow paths. The Brawley Wash Watershed Plan will evaluate floodplain restoration, erosion control, structure removal, and other conservation measures on County-, City-, and privately-owned lands within the Planning Area.

PCRFCD is developing the plan in cooperation with Pima County, the City of Tucson, the Altar Valley Conservation Alliance, and a broad range of public stakeholders, including local governments, the Tohono O'odham Nation, agricultural and ranching interests, and conservation groups, through a public planning process. Under contract with Stantec, SWCA Environmental Consultants (SWCA) previously prepared a cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021) to assist in the formulation of project alternatives and to allow involved agencies to begin to consider the potential for the project to impact cultural resources. An area of potential effects (APE) has not yet been defined. The APE will be determined when design plans are further developed, and alternatives are selected. In working with stakeholders and in accordance with the purpose and need statement for the Brawley Wash Watershed Plan and EA, five "Problem Areas" have been identified in which future project activities may occur. These are described in *Preliminary Alternatives Selection Memo: Brawley Wash Plan and Environmental Assessment* (Alternatives Selection Technical Memorandum) (Stantec 2022). Stantec requested that SWCA prepare a Class I cultural resources inventory to provide specific information regarding previously conducted archaeological surveys and previously recorded cultural resources for each of these Problem Areas. The Class I Inventory is intended to facilitate further evaluation of project alternatives and assist the involved agencies in continuing the process of considering the potential for the project to impact cultural resources. It is also intended to allow NRCS to initiate Section 106 consultation with the State Historic Preservation Office (SHPO), Tribes, and other consulting parties.

PROBLEM AREA LOCATIONS

The Class I study area corresponds to the five currently identified "Problem Areas" listed in Table 1.

Table 1. Locations of Problem Areas

Identified Problem Area*	Acreage	Landownership	Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle
Buckelew West	616 acres	City of Tucson (Tucson Water)	Township (T) 15 South (S), Range (R) 10 East (E), Sections (S) 21, 28, 33/Three Points
Tortuga Ranch	<1 acre	Pima County, Private	T14S, R11E, S32/Brown Mountain
Cactus Avra	4,700 acres	City of Tucson (Tucson Water), Pima County, Private	T13S, R10E, S11, 13–15, 22–26/Avra
Prickle Desert	160 acres	City of Tucson (Tucson Water)	T12S R10E S25/Avra
Tucker Road	480 acres	City of Tucson (Tucson Water)	T13S R10E S5/Avra

* From Stantec (2022)



Figure 1. Project location overview.

Buckelew West

The Buckelew West Problem Area is on the north side of Brawley Wash, north of State Route (SR) 86 in the Three Points/Robles Junction community (Figure 2). The Buckelew West Problem Area encompasses approximately 616 acres of terraced former agricultural fields owned by the City of Tucson (Tucson Water) (Figure 3). An earthen embankment was constructed between the fields and Brawley Wash to protect the agricultural land but has the effect of increasing flow depth and erosive conditions in the main wash channel. Invasive plant species, including bermudagrass and buffelgrass, are found in the area. Potential future project alternatives may include modification of the embankment to allow overbank floodwater to enter the abandoned agricultural fields, restoring natural flow patterns and reducing flood risk to other in-use lands in the area. Action would also be taken to remove invasive plants in the area.

Tortuga Ranch

The Tortuga Ranch Problem Area is a 0.35-mile linear earthwork on County and private land at 3300 South Marstellar Road, west of Marstellar Road and south of Schuck Toak Farm (Figures 4 and 5). No acreage is defined in the Alternatives Selection Technical Memorandum (Stantec 2022), but the earthwork encompasses less than 1 acre. The Tortuga Ranch Problem Area is 4.3 miles north of SR 86, northwest of Ryan Airfield and east of Brawley Wash. Stantec (2022) associates the earthwork with construction of the Southern Avra Valley Storage and Recovery Project (SAVSARP), a storage and recharge facility supplied with Central Arizona Project (CAP) water that was completed in 2009. The earthwork currently diverts water onto the Tortuga Ranch. There are also invasive plant species in the area. Potential future project alternatives may include modification of the earthwork to restore natural flow in the older drainage channel and treatment of invasive species. Note that this problem area is immediately outside (east of) the defined watershed boundary and the study area considered in the 2021 overview of cultural resources.

Cactus Avra

Cactus Avra is the largest of the defined Problem Areas, encompassing 4,700 acres of terraced fields, earthwork embankments, and abandoned irrigation canals in retired farmland owned almost entirely by the City of Tucson (Tucson Water) (Figures 6a–6d). The Cactus Avra Problem Area is in the middle of Avra Valley, west of Sandario Road on Manville Road (Figures 7a–7d). Stantec (2022) associates it with street address 4400 North Little Cody Road in Picture Rocks (a Census-designated place). The redundant structures divert and collect water, causing drainage conflicts and erosion. There are also invasive plant concerns. Potential future project alternatives may include modification of the redundant structures to restore natural flow and disperse floodwater across the abandoned fields. Vegetation management would target invasive weeds while preserving mesquite trees in the area.

Prickle Desert

Prickle Desert is the most northern of the Problem Areas and is northwest of Picture Rocks on the east side of Brawley Wash (Figure 8). The Prickle Desert Problem Area consists of 160 acres of terraced fields and earthworks in retired farmland owned by the City of Tucson (Tucson Water) (Figure 9). As with Cactus Avra, the redundant structures divert and collect water, causing drainage conflicts and erosion. Invasive plant issues are anticipated but unconfirmed (Stantec 2022). Potential future project alternatives may include modification of the earthworks to restore natural flow and disperse floodwater across the abandoned fields. Vegetation management would be applied if required.

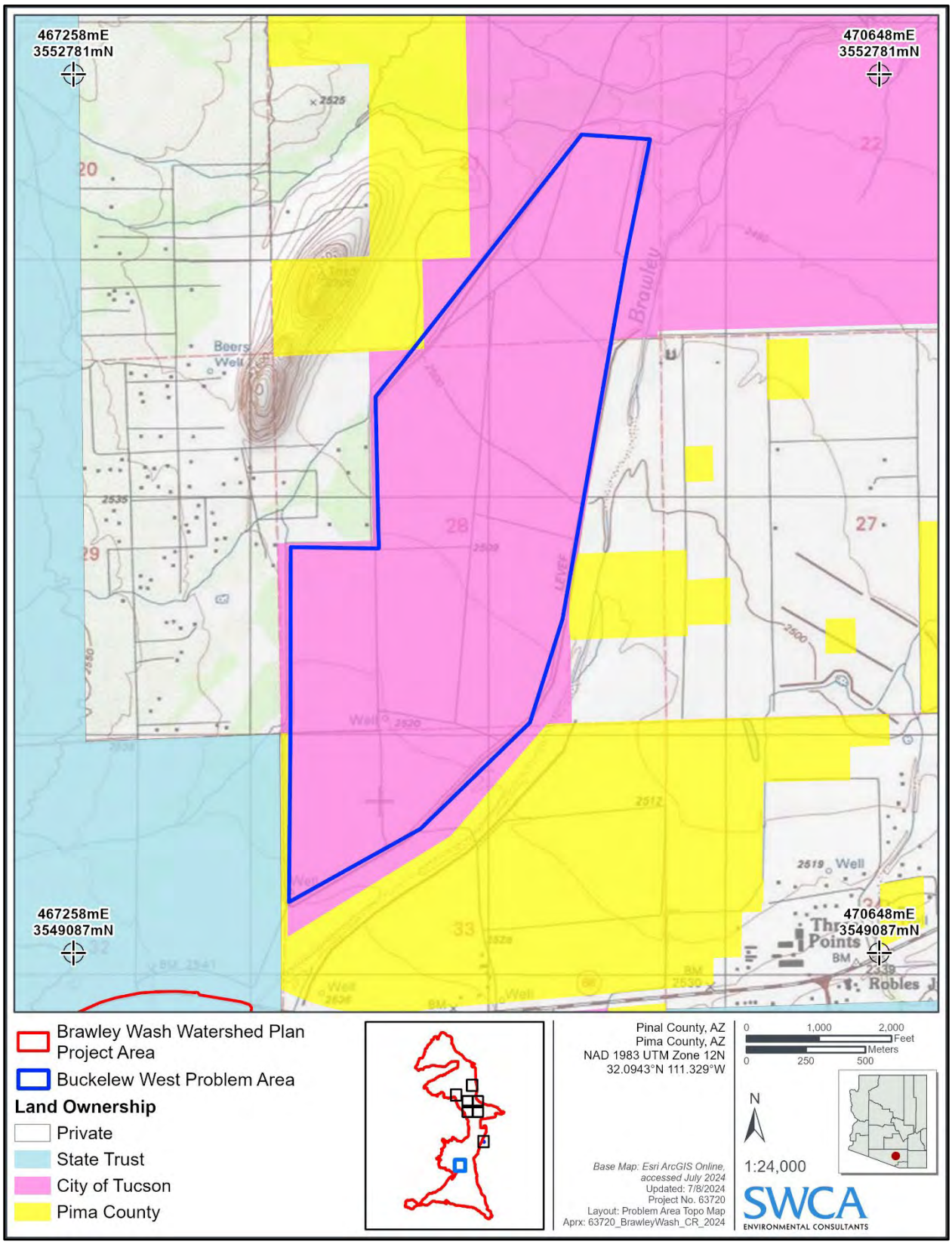


Figure 2. Buckelew West Problem Area location.

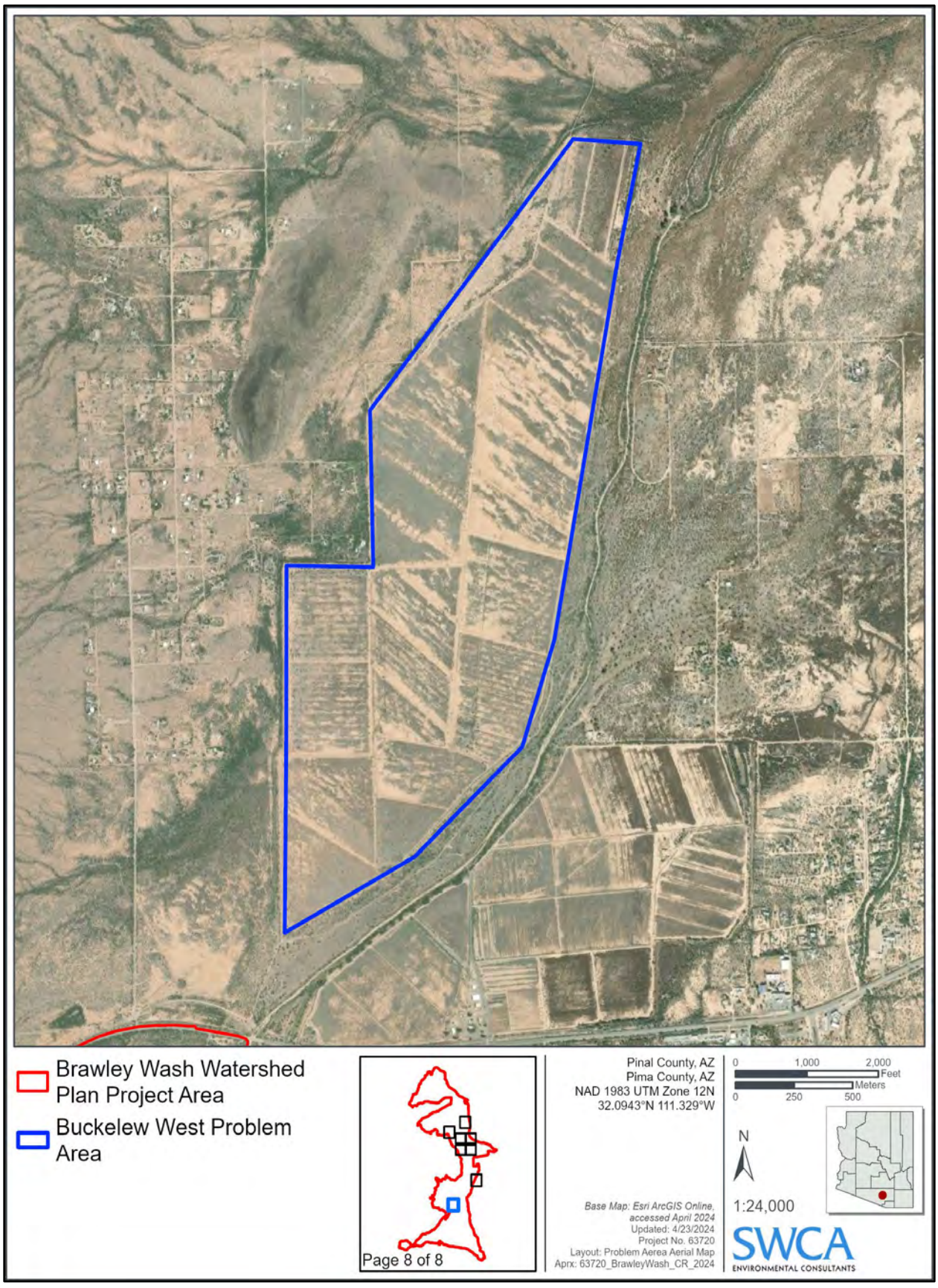


Figure 3. Aerial view of the Buckelew West Problem Area.

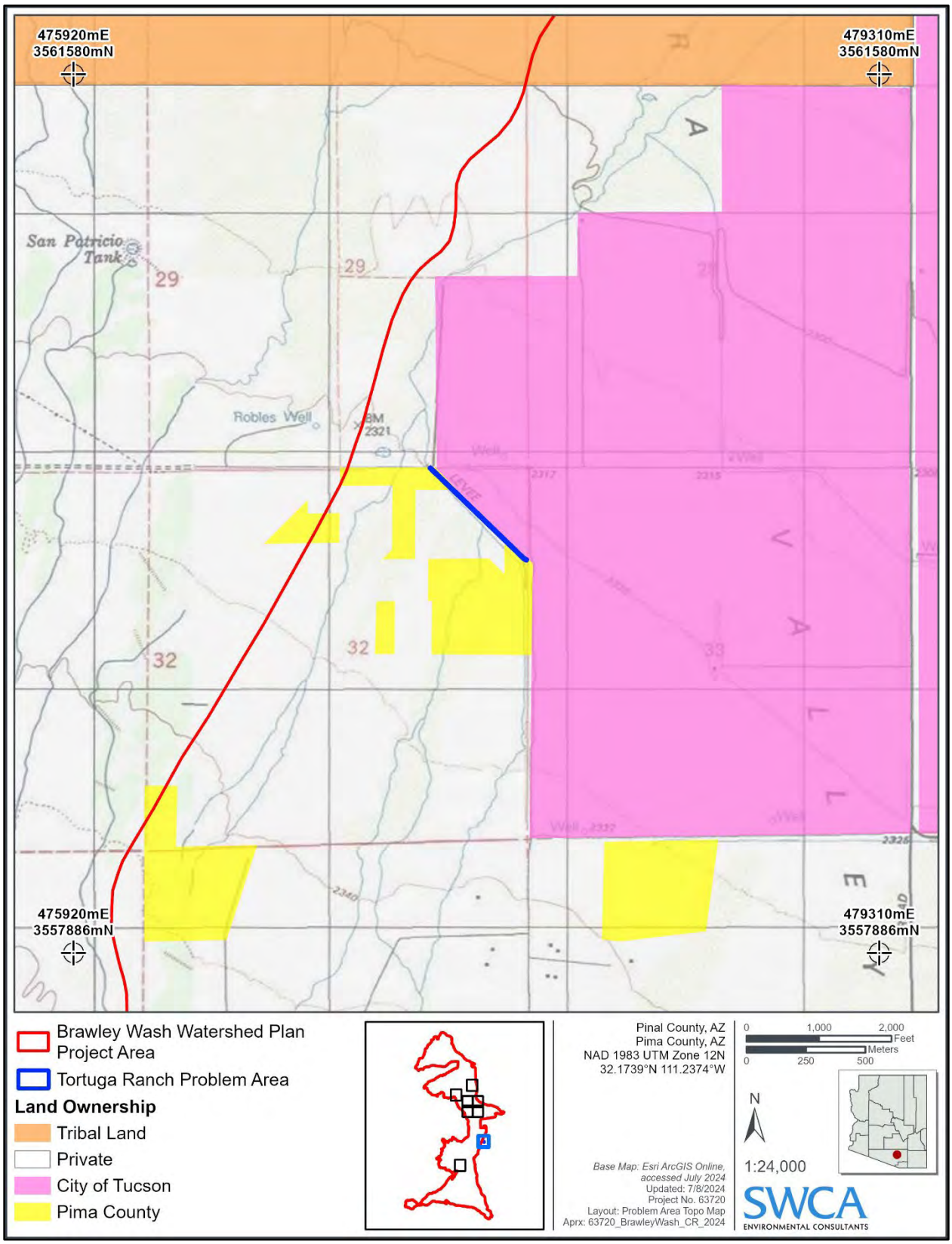


Figure 4. Tortuga Ranch Problem Area location.

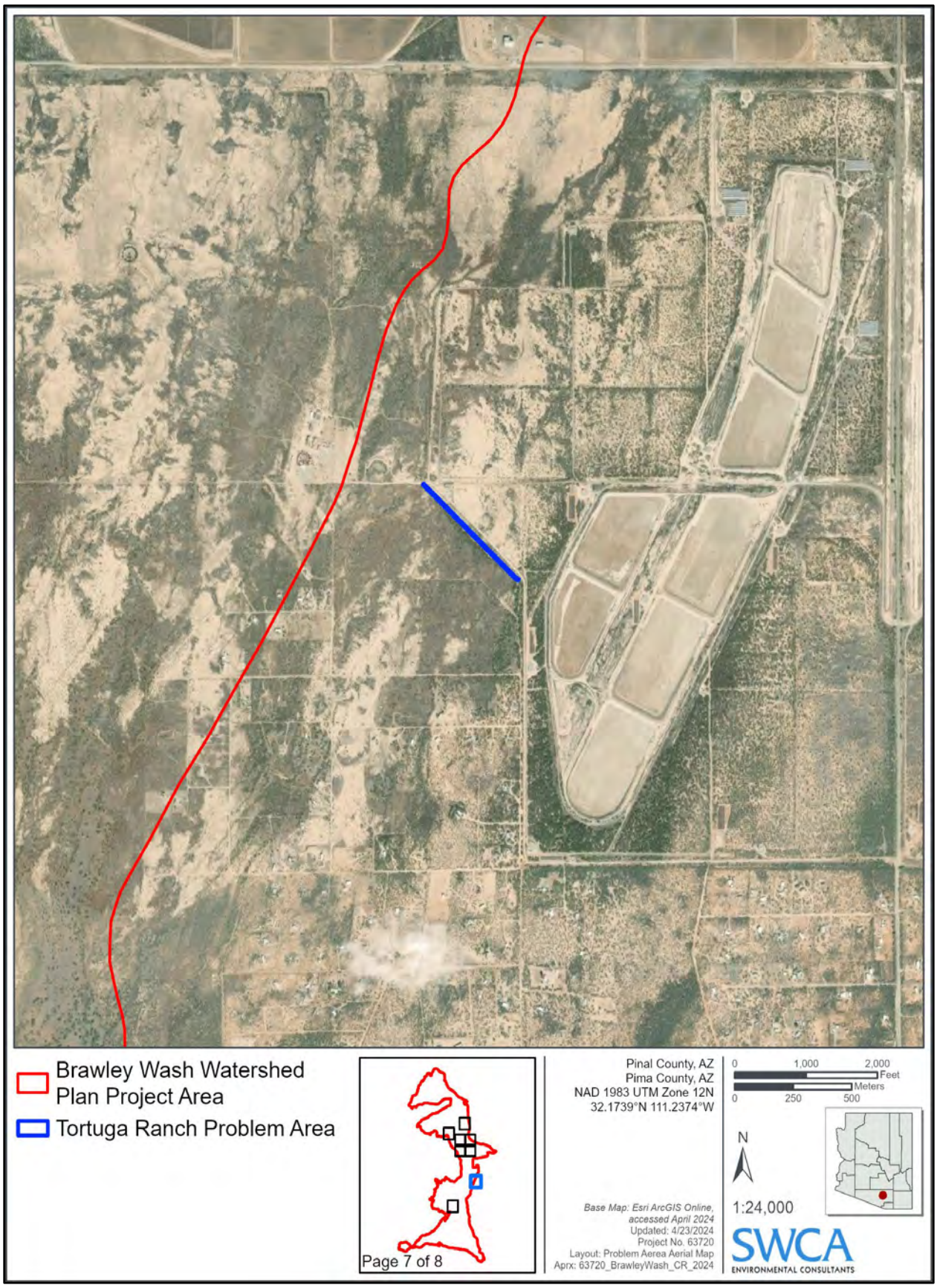


Figure 5. Aerial view of the Tortuga Ranch Problem Area.

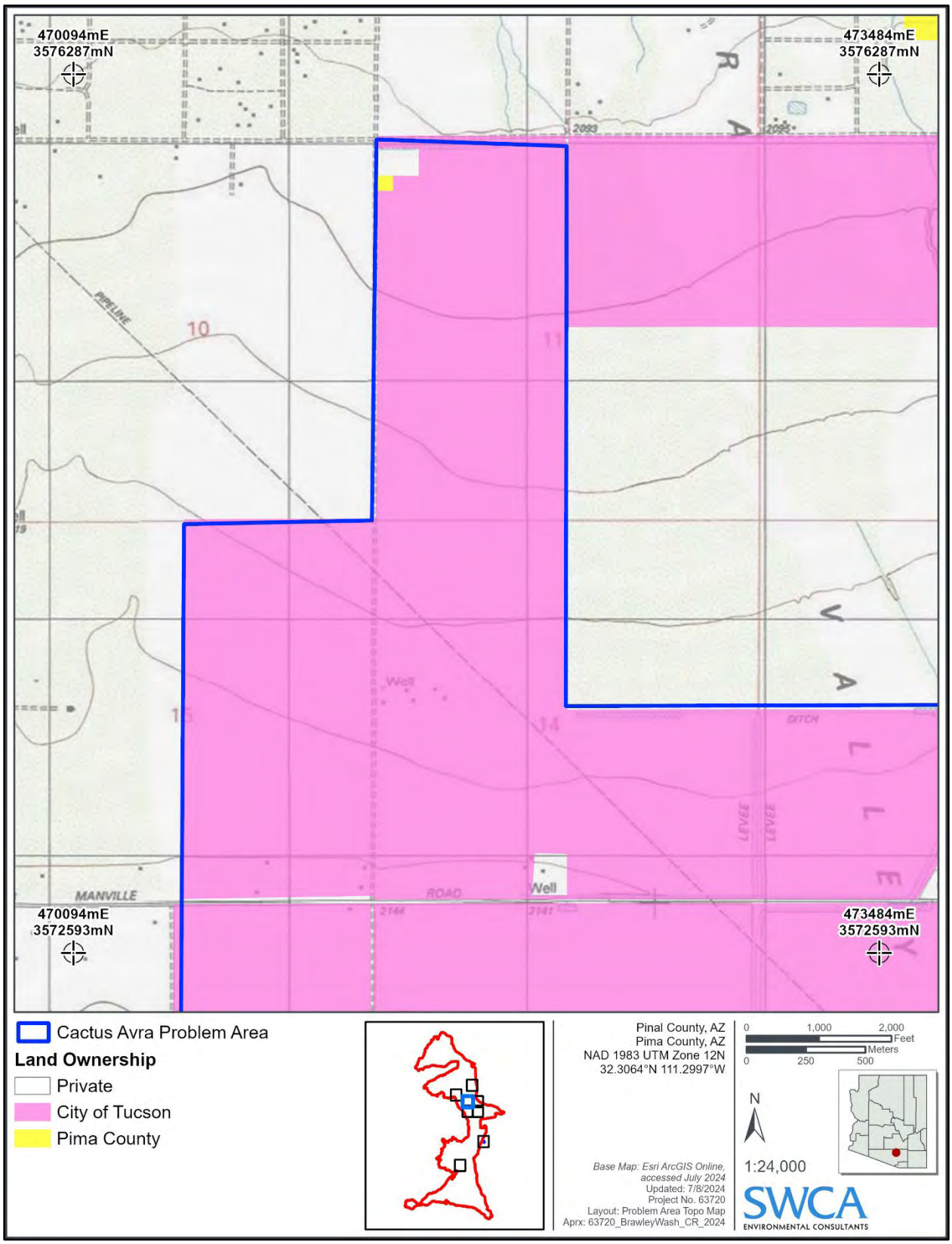


Figure 6a. Cactus Avra Problem Area location (northwest).

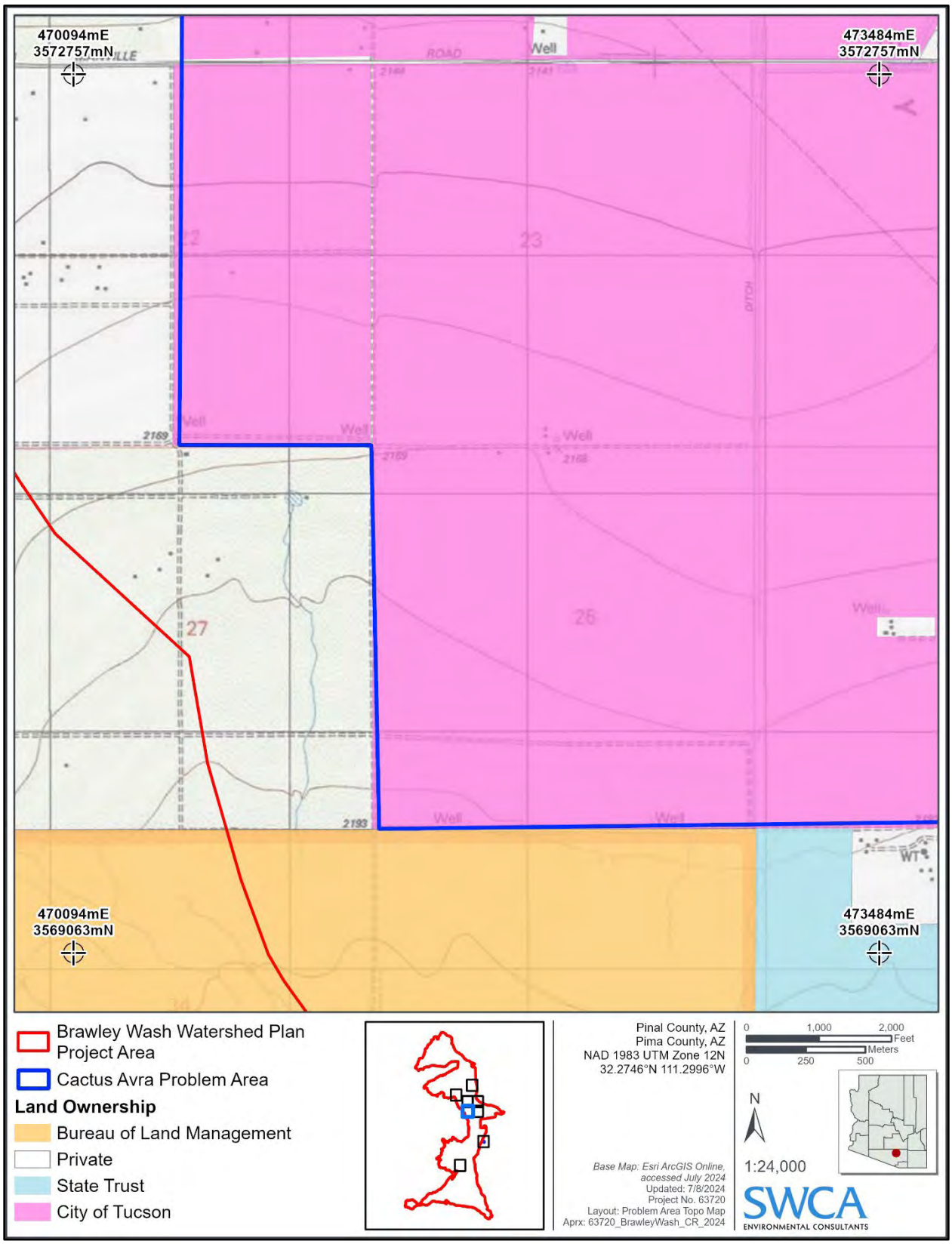


Figure 6b. Cactus Avra Problem Area location (southwest).

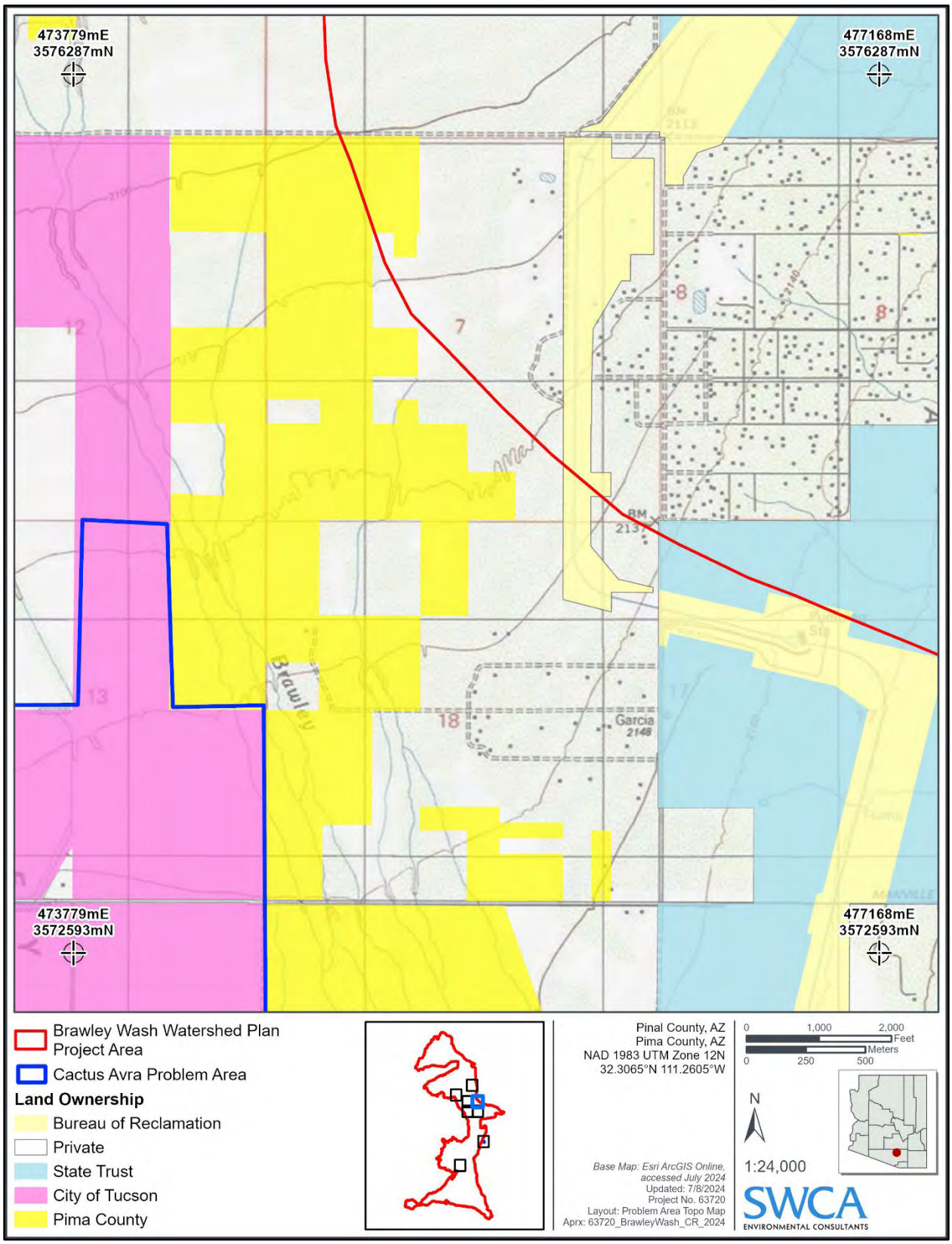


Figure 6c. Cactus Avra Problem Area location (northeast).

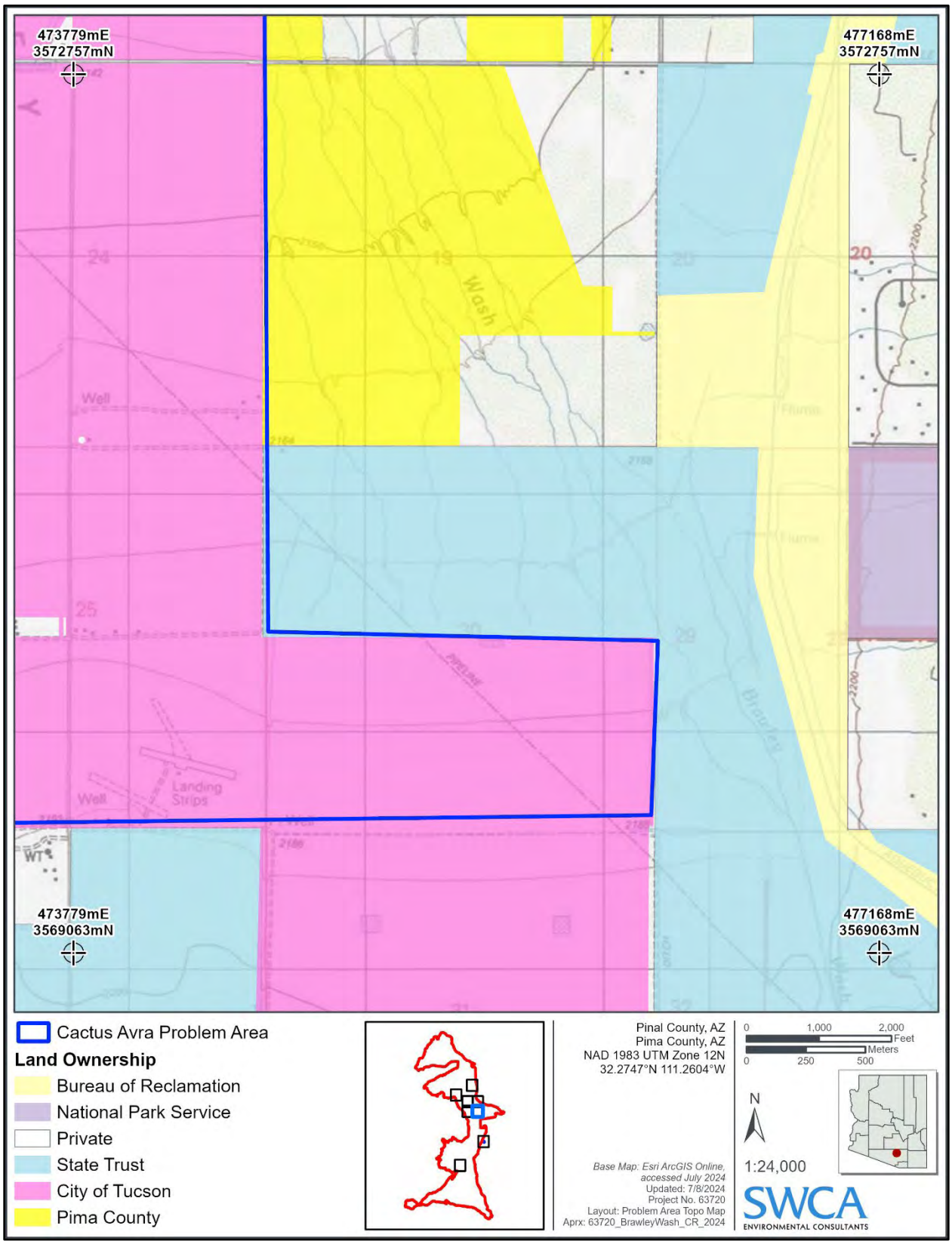


Figure 6d. Cactus Avra Problem Area location (southeast).

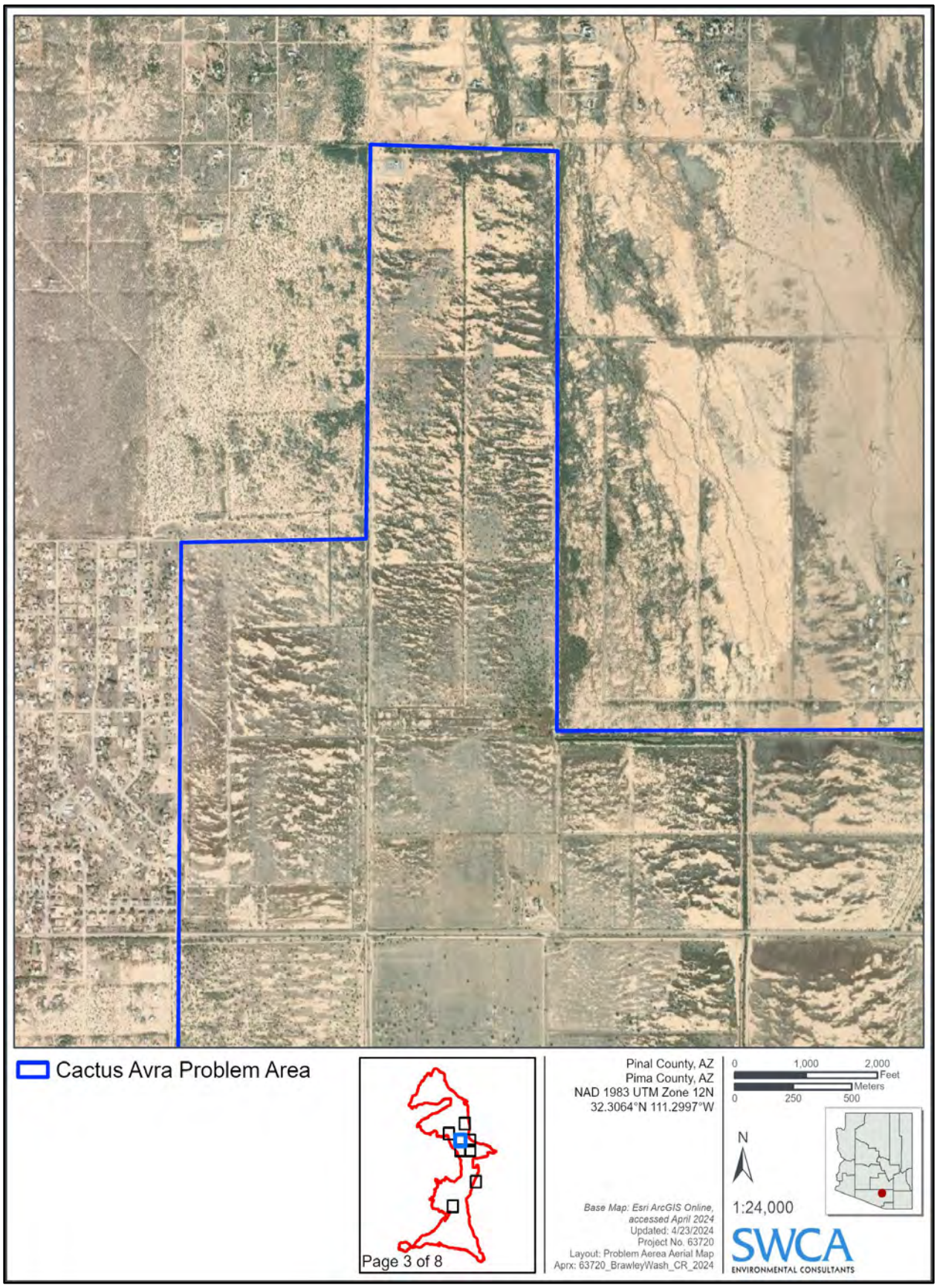


Figure 7a. Aerial view of Cactus Avra Problem Area location (northwest).

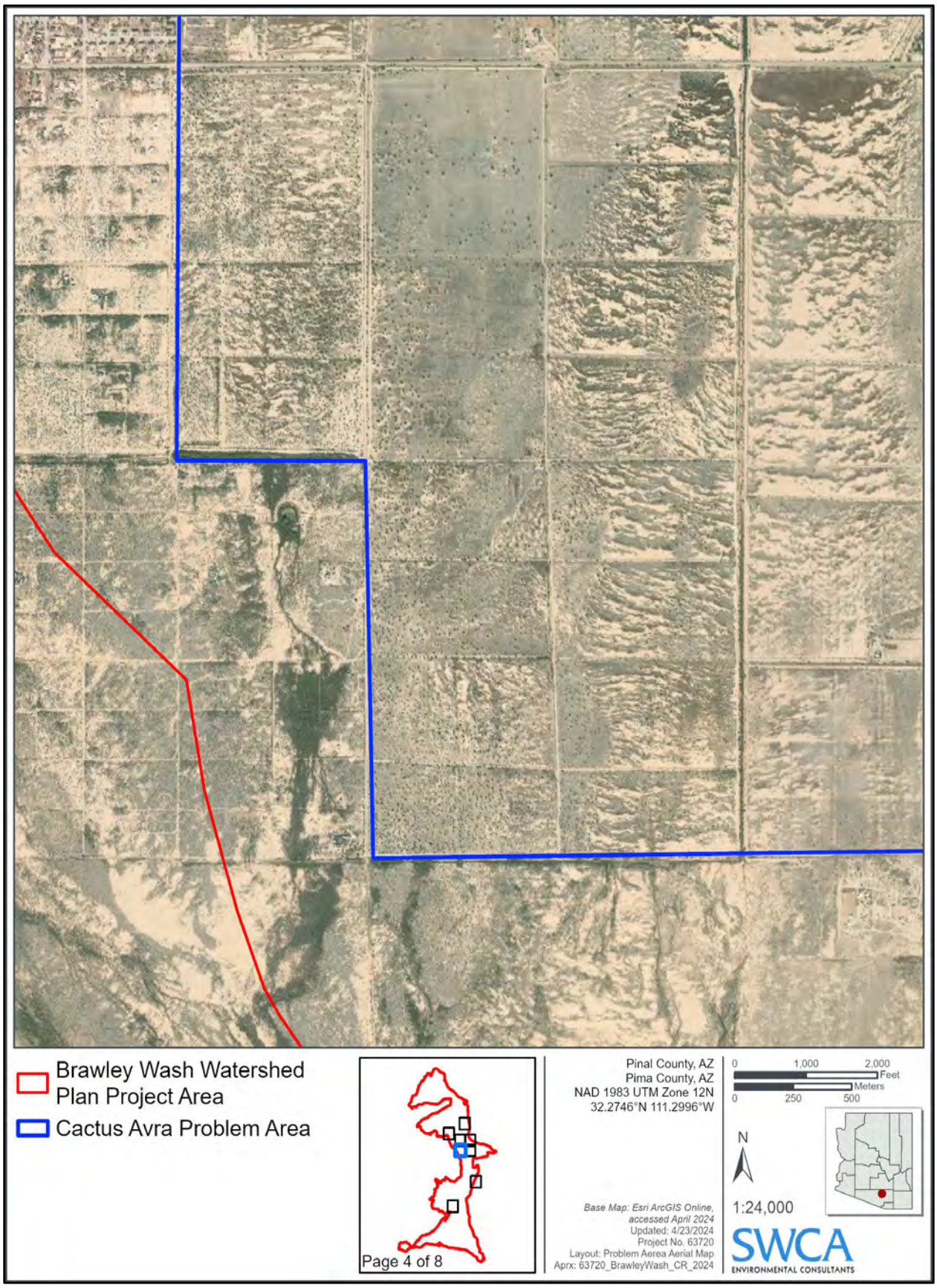


Figure 7b. Aerial view of Cactus Avra Problem Area location (southwest).

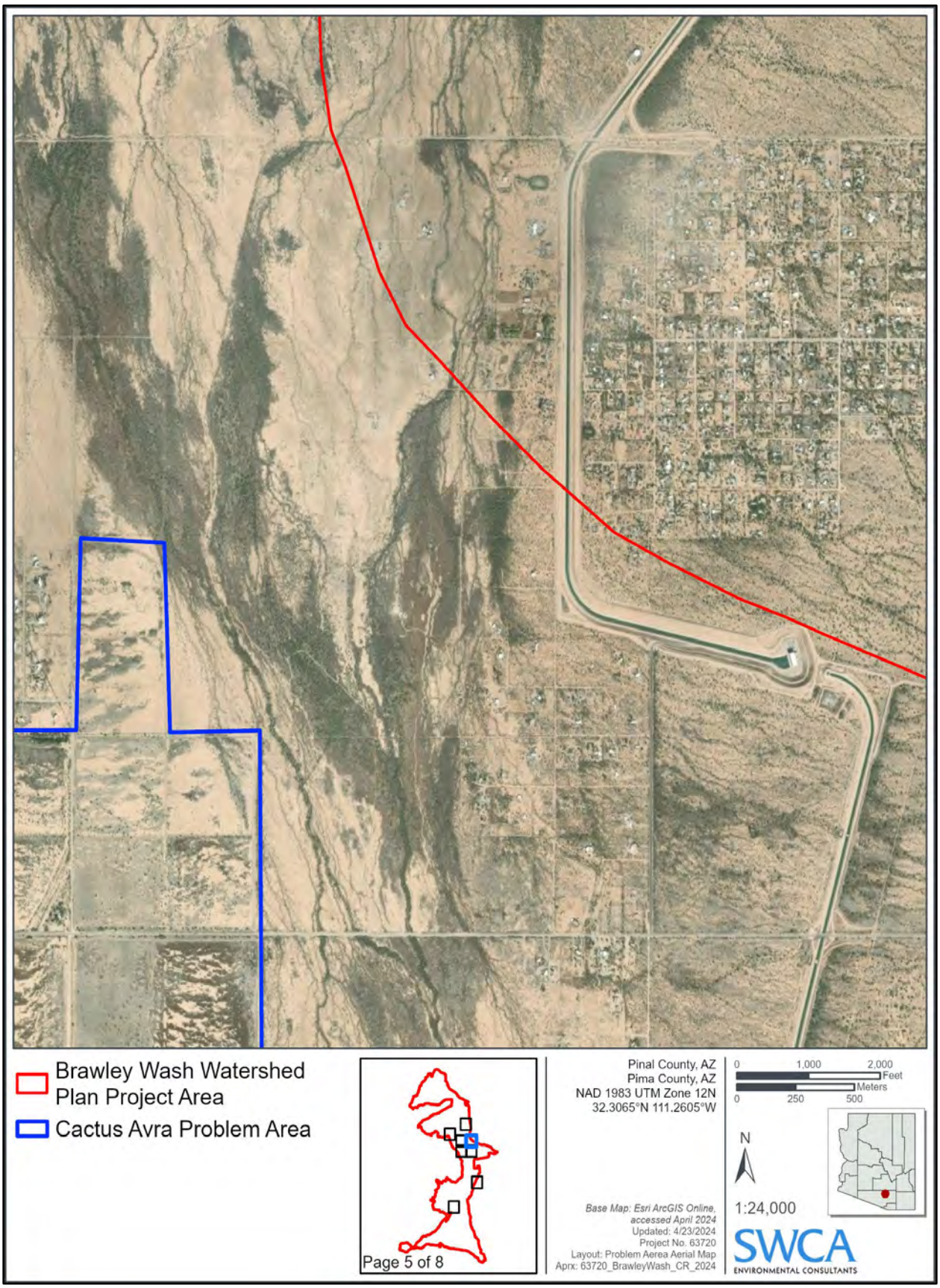


Figure 7c. Aerial view of Cactus Avra Problem Area location (northeast).

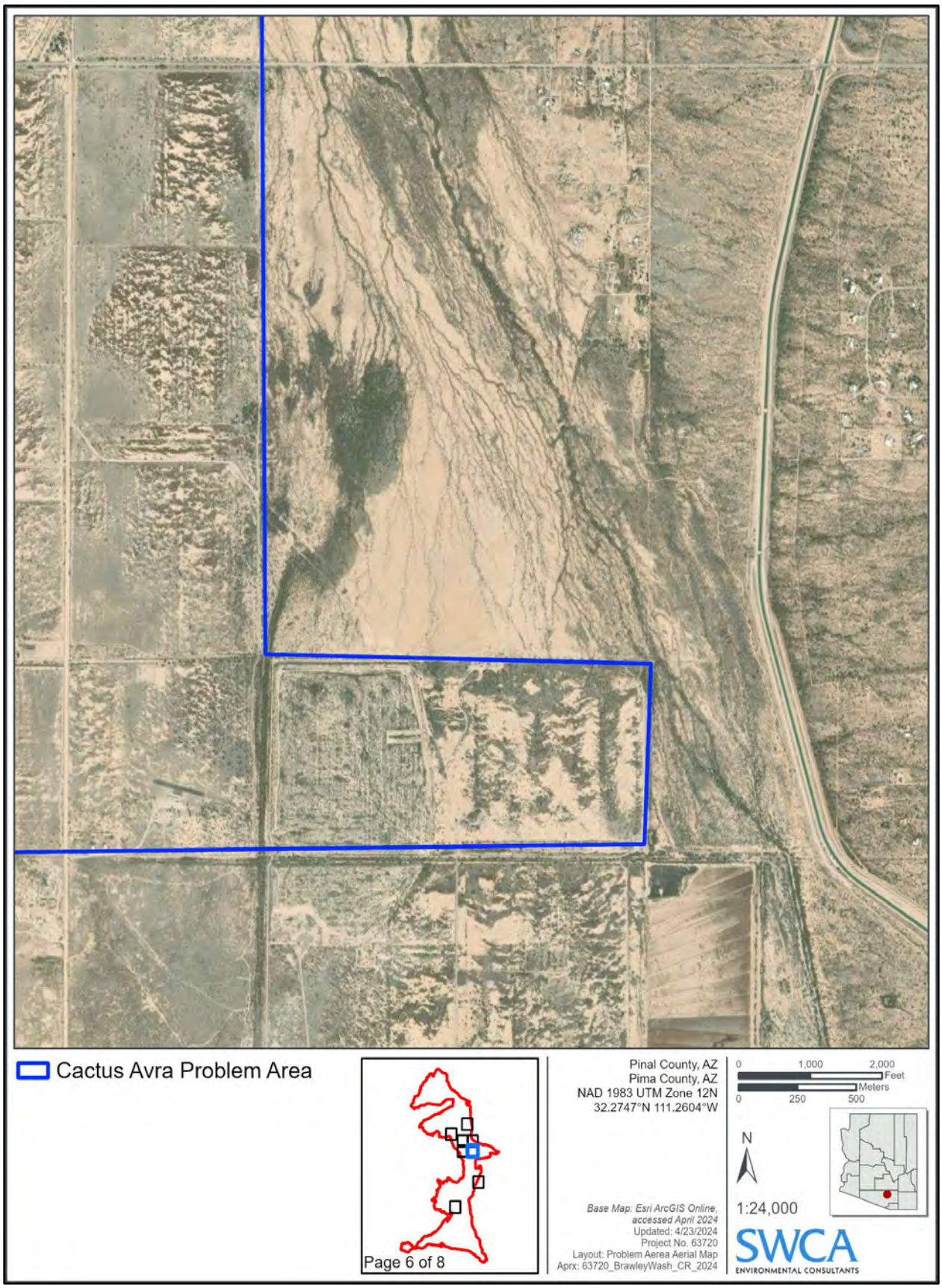


Figure 7d. Aerial view of Cactus Avra Problem Area location (southeast).

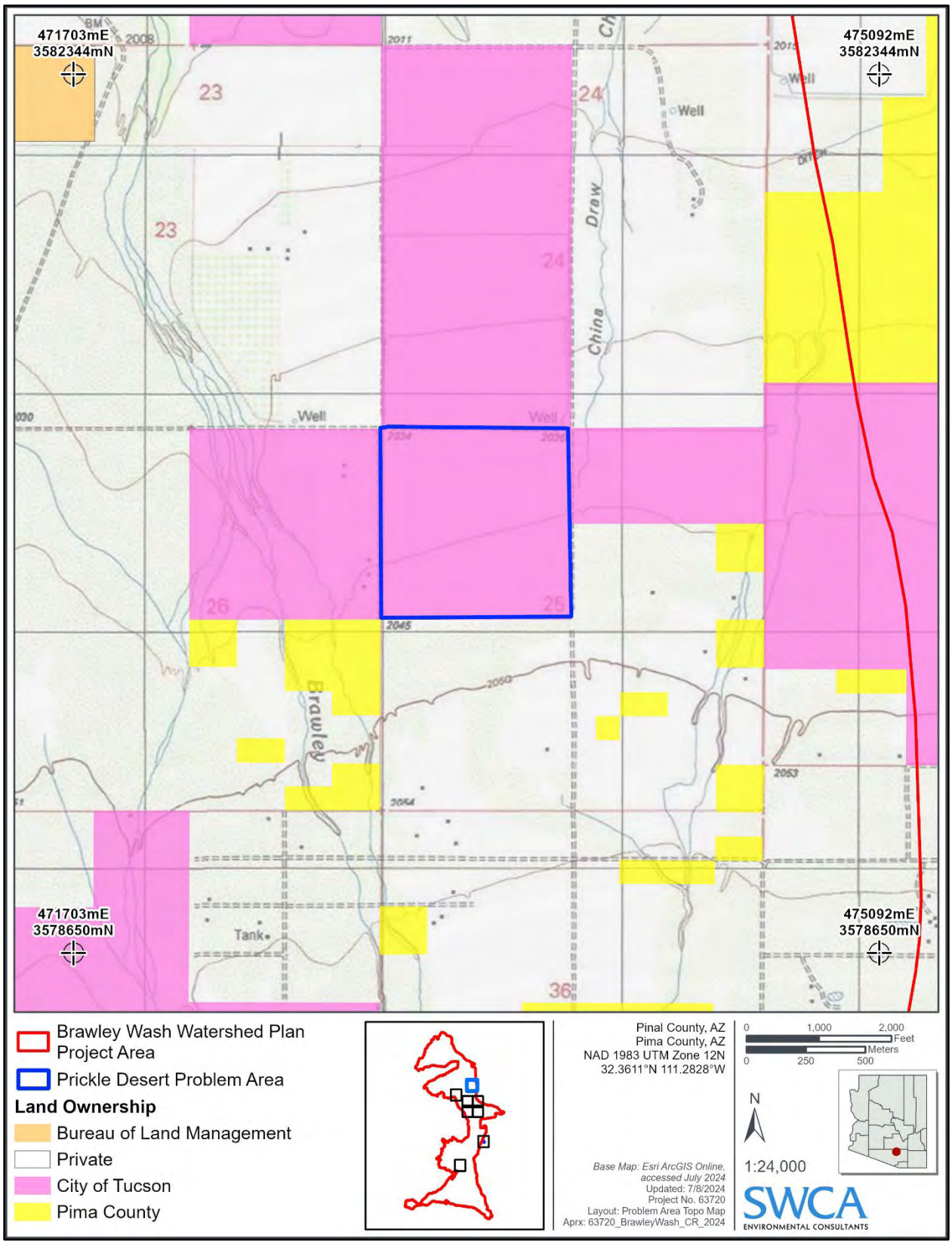


Figure 8. Prickle Desert Problem Area location.

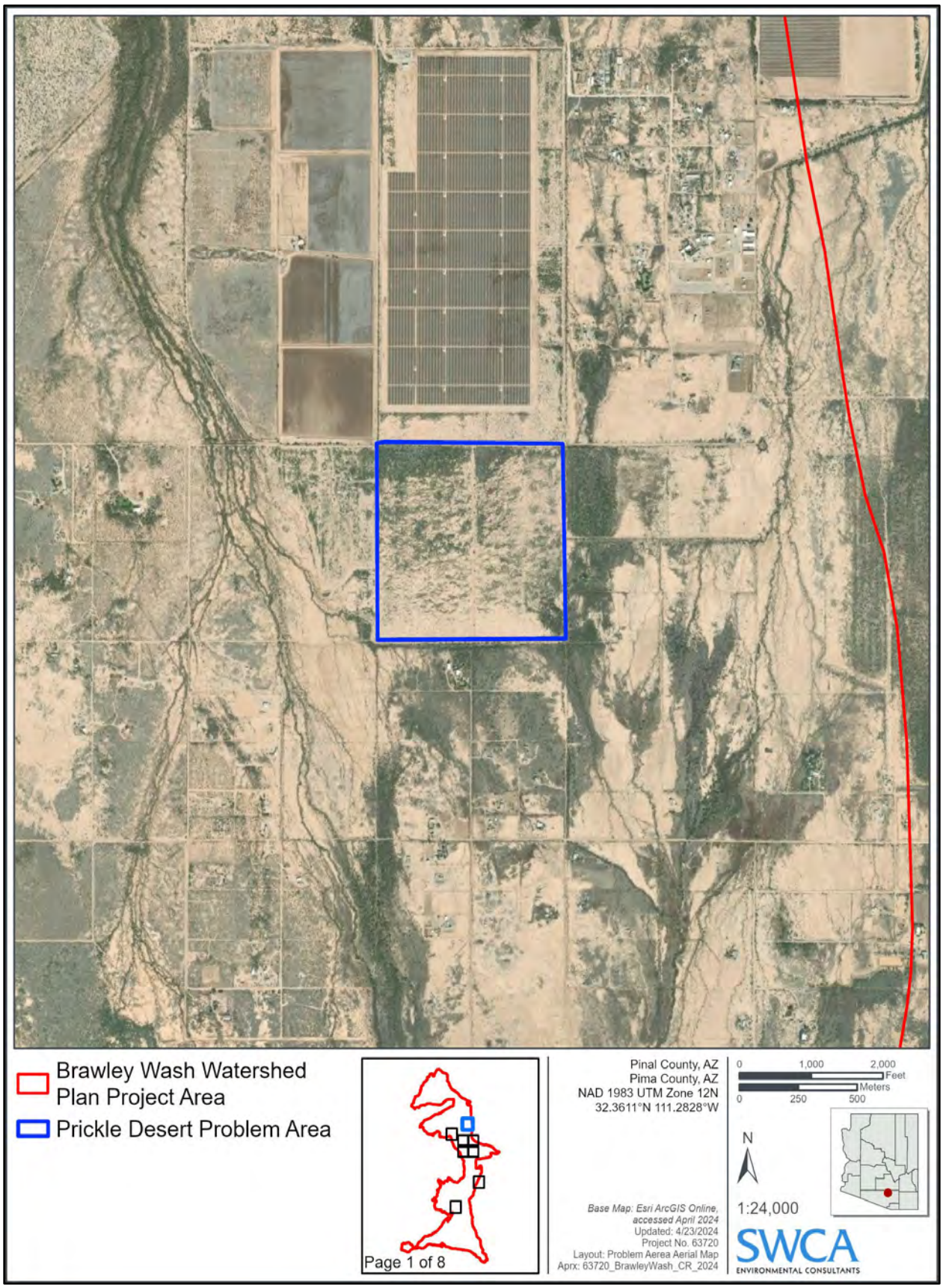


Figure 9. Aerial view of the Prickle Desert Problem Area.

Tucker Road

The Tucker Road Problem Area is in the western part of the watershed, on the east side of Blanco Wash, 1.4 miles east of Pan Quemado, a volcanic hill (Figure 10). The Tucker Road Problem Area encompasses 480 acres within retired farmland owned by the City of Tucson (Tucson Water) (Figure 11). It contains terraced fields with embankments and artificial channels that retain water in some areas and that concentrate flow within the Blanco Wash channel. Areas of head cutting erosion up to 20 to 25 feet deep have been documented along this reach of Blanco Wash (Stantec 2022). There are also invasive plant species. Potential future project alternatives may include modification of the earthworks to restore natural flow and disperse floodwater across the abandoned fields. Reduced stock grazing may also be proposed as a vegetation management strategy.

ENVIRONMENTAL SETTING

The Brawley Wash Watershed

The Brawley Wash watershed extends from Fresnal Wash in the Altar Valley in Pima County north to Los Robles Wash in Pinal County. It surrounds a landform that defines the Avra and Altar Valleys. Altar Valley is a broad, north-south-trending alluvial basin that drains northward into Avra Valley. It is bounded on the east by the San Luis, Las Guijas, Cerro Colorado, and Sierrita Mountains, and on the west by the Pozo Verde, Baboquivari, Quinlan, and Coyote Mountains. Altar Wash is the axial drainage of Avra Valley, flowing into and becoming Brawley Wash at the north end of the valley. Avra Valley is a broad, north-draining alluvial basin that is bounded on the east by the Tucson Mountains, on the west by the Roskruge, Waterman, and Silver Bell Mountains, and on the south by the Sierrita Mountains. Brawley Wash is the axial drainage of Avra Valley, ultimately flowing into and forming Los Robles Wash, a tributary of the Santa Cruz River.

Brawley Wash drains the southern Tucson Mountains and the northeastern part of the Sierrita Mountains (Figure 12). Most of the Brawley Wash watershed is on what the statewide Arizona Geological Survey map (Arizona Geological Survey 2000) identifies as “Quaternary surficial deposits, undivided” (0–2 Ma). These include alluvial fan and terrace deposits on middle and upper piedmonts and along large drainages. The Brawley Wash watershed includes areas within five biotic communities as mapped by Brown (1994), including small areas of interior chaparral shrubland and Madrean evergreen woodland at higher elevations.

The five identified Problem Areas are at lower elevations in desert environments, specifically the Arizona Upland Subdivision of Sonoran Desertscrub and the Lower Colorado Subdivision of Sonoran Desertscrub. These are mostly differentiated by climate: the Lower Colorado Subdivision has less summer rainfall. Vegetation in these subdivisions often takes on the appearance of scrubland or low woodland, with leguminous trees, shrubs, and perennial succulents. One Problem Area extends into the semidesert grassland found at the south end of the Avra valley and in Altar Valley. These are dry grasslands, characterized by sparse, short, grasses interspersed with cacti and shrubs. Most of the Problem Areas consist of abandoned farmland. Studies cited by Brown (1994:197) show that abandoned farmland in Avra Valley is colonized by a succession of mostly nonnative plants, beginning with Russian thistle, followed by mustards and introduced grasses. Table 2 provides a summary of the environmental setting of the Problem Areas.

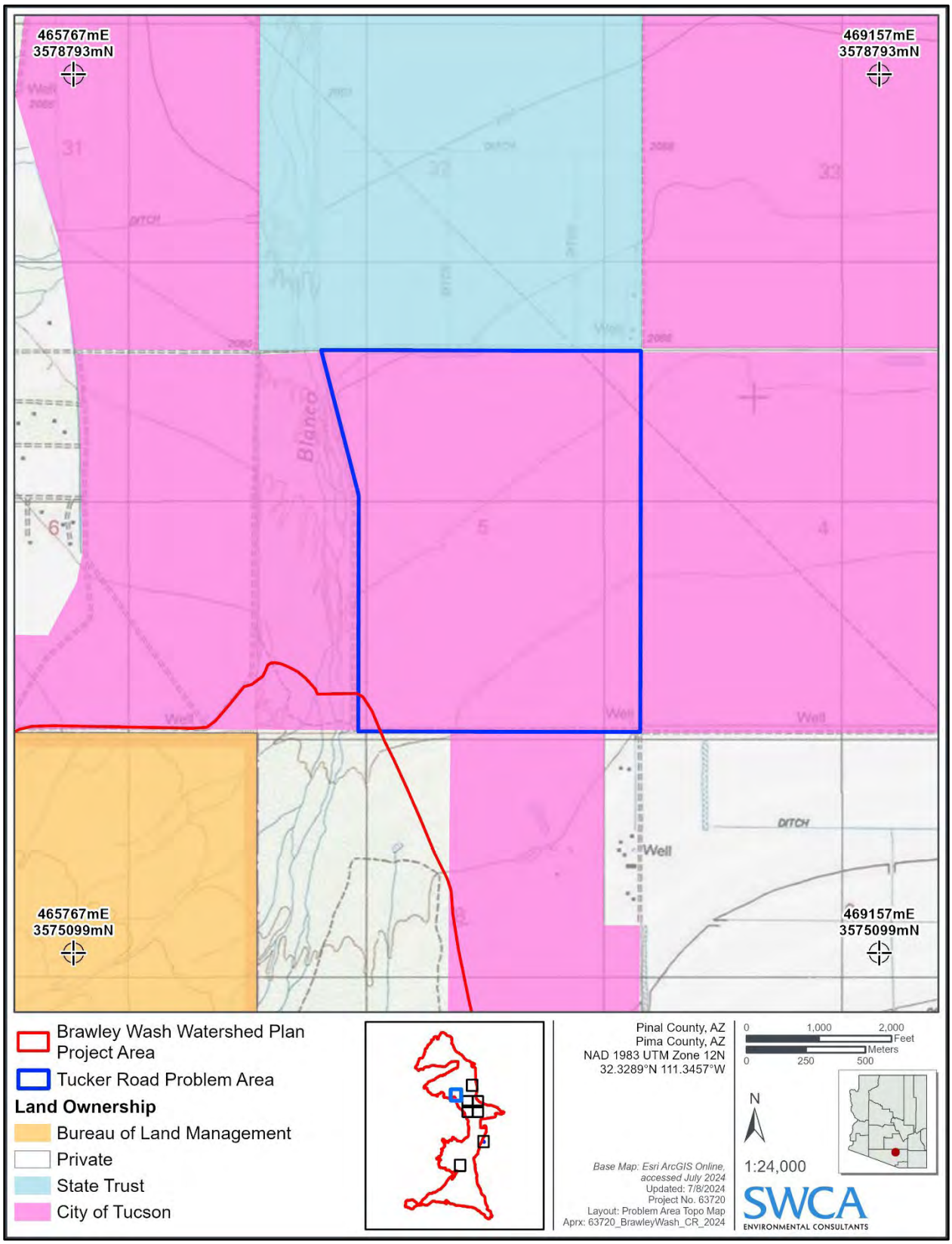


Figure 10. Tucker Road Problem Area location.

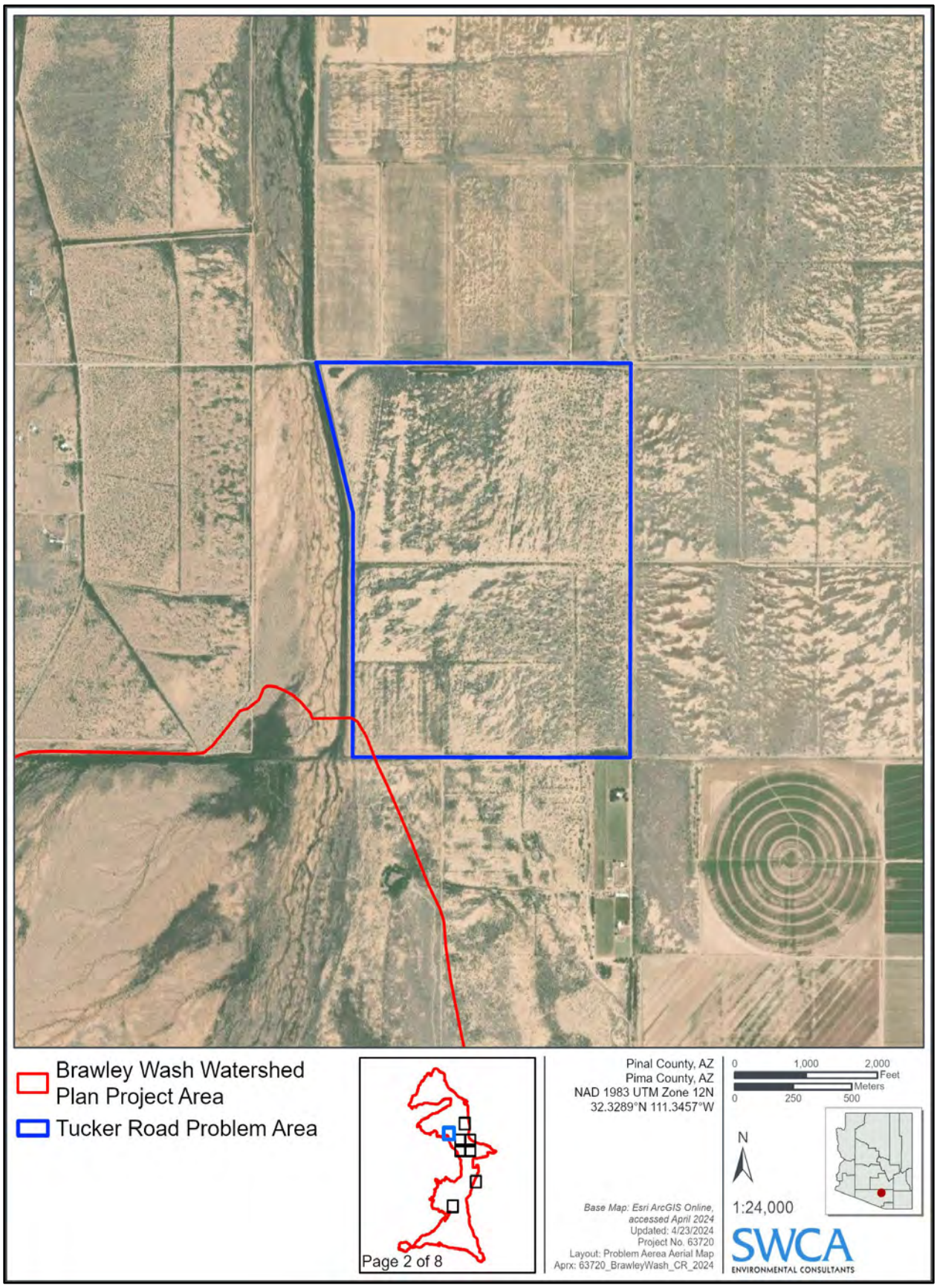


Figure 11. Aerial view of the Tucker Road Problem Area.

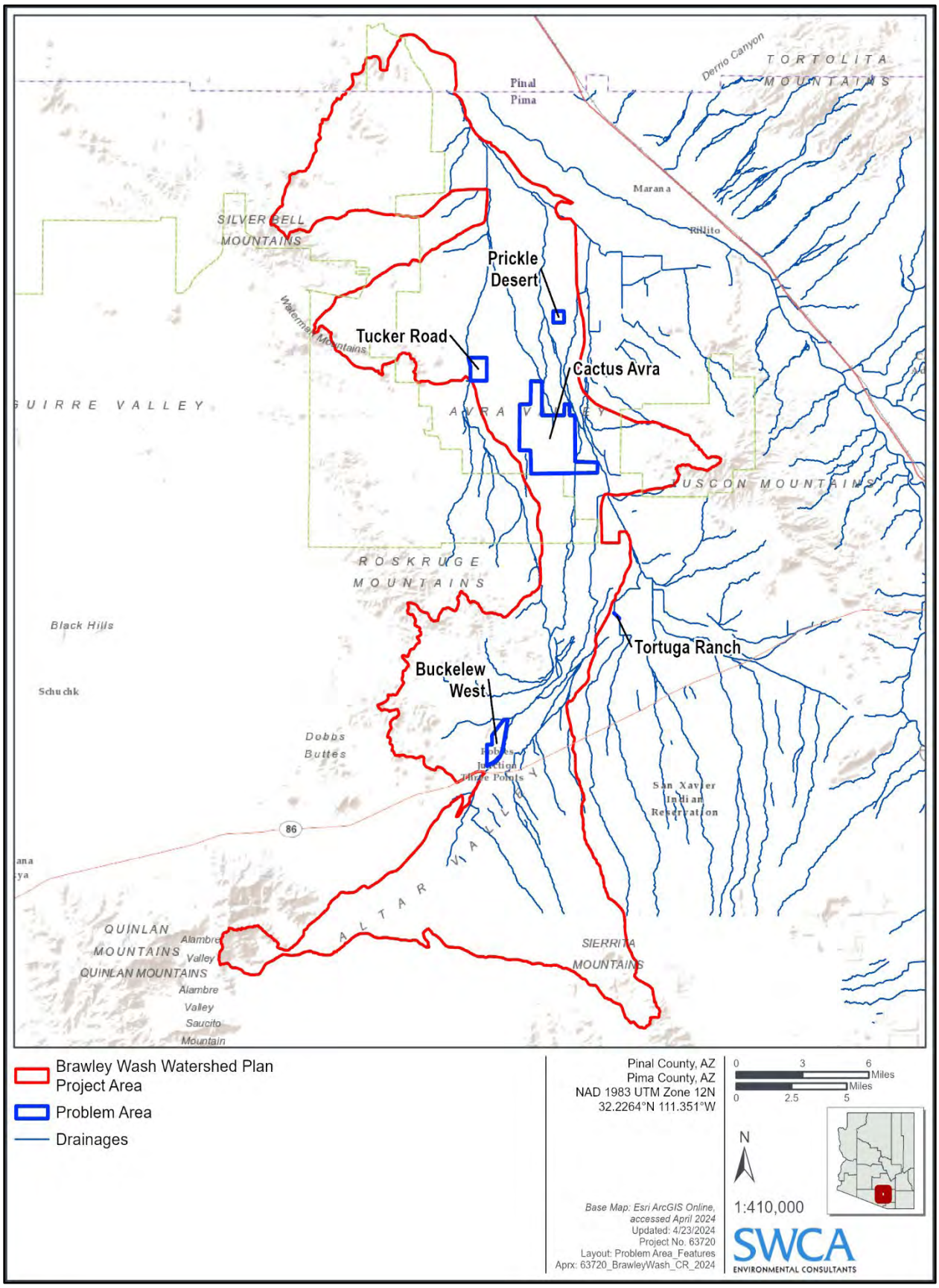


Figure 12. Geographical features of the Brawley Wash Watershed Plan project area.

Table 2. Environmental Setting of Problem Areas

Problem Area	Geological Setting*	Biotic Community†	Elevation‡	Surface Condition
Buckelew West	Quaternary surficial deposits, undivided	Arizona Upland Subdivision of Sonoran Desertscrub/semidesert grassland	2,536–2,486 feet	Abandoned farmland
Tortuga Ranch	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	2,339–2,335 feet	Disturbed, undeveloped
Cactus Avra	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	2,194–2,092 feet	Abandoned farmland
Prickle Desert	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	2,050–2,036 feet	Abandoned farmland
Tucker Road	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	2,088–2,064 feet	Abandoned farmland

* Arizona Geological Survey (2000)

† Brown (1994)

‡ Above mean sea level

CULTURAL CONTEXT

Cultural Background

A culture history for the Brawley Wash Watershed Plan is provided in Rawson et al. (2021). A summary is provided here as a guide to the type of sites that might be expected in the Problem Areas and to inform the development of historic contexts. Archaeologically visible human occupation of the Avra and Altar Valleys spans approximately 12,000 years, from the Paleoindian period to the present. The cultural sequence is divided into five time periods based on regional chronologies by Huckell (1984) and Doelle and Wallace (1991). These periods are labeled the Paleoindian (10,000–7500 B.C.), Archaic (7500 B.C.–A.D. 300), Ceramic (A.D. 200–1450), Protohistoric (A.D. 1450–1700), and Historic (A.D. 1700–1971) periods.

Paleoindian Period (10,000–7500 B.C.)

During the Paleoindian period, small groups of people crossed wide territories hunting large, now-extinct mammals such as mammoths. The most recognizable artifacts from this period are the large fluted projectile points of the Clovis and Folsom traditions. Evidence for Paleoindian occupation of the Avra Valley is sparse, but isolated projectile points have been found (Huckell 1982, 1984), including a fragment of a fluted point at AZ AA:15:162(ASM) on the Ironwood Forest National Monument (Heilen and Reid 2006). Pleistocene fauna have been found in Avra Valley, including horse bone at a site on Brawley Wash and mammoth remains in Los Robles Wash (Haynes and Huckell 1986:15–16).

Archaic Period (7500 B.C.–A.D. 300)

The Archaic period is the traditional name for the time between the Paleoindian period and the appearance of pottery-container technology. This long span of time used to be divided into Early, Middle, and Late stages, but the Late Archaic in southeastern Arizona has more recently been called the Early Agricultural period. Projectile points continue to be distinctive indicators of Early Archaic presence: three Early Archaic period tapering-stemmed projectile points were found on the surface of a large multicomponent site on the upper bajada of the Silver Bell Mountains (Hesse 2004). Middle Archaic period sites are better represented in the record and have been identified on the bajada slopes of the mountain ranges surrounding Avra Valley (Dart 1987). Late Archaic–Early Agricultural sites are associated with evidence of increasing sedentism and less-mobile subsistence strategies that emphasized farming (Roth 1988). Extensive settlements have been documented on the Santa Cruz River floodplain in this period (Mabry 2007), but it is likely that the population remained mobile in most settings.

Ceramic Period (A.D. 300–1450)

Sometime around A.D. 200, perhaps as much as two centuries earlier, true ceramic containers appeared in the Tucson Basin. The Agua Caliente phase was characterized by plain brown ware ceramics and vessel shapes that include primarily seed jars and occasionally bowls (Deaver and Ciolek-Torrello 1995; Whittlesey 1998). These sand-tempered ceramics were made over broad areas of the Southwest, which suggests that ceramic-container technology may have been introduced from a single source and that the cultural differentiation characteristic of later periods had yet to take place (Whittlesey 1995).

By around A.D. 650, the archaeological culture we recognize as the Hohokam of the Tucson and Gila-Salt Basins had appeared. The Hohokam practiced agriculture dependent on large-scale irrigation, lived in villages, and developed a regional ideology and ceremonialism. Ball courts, platform mounds, craft style, and imported artifacts indicate Hohokam interaction with societies as far south as Mesoamerica (Doyel 2007:87). Most of the Ceramic period material reported from the Avra Valley is very similar to that of the Tucson Basin Hohokam, indicating ongoing interaction between the precontact populations of the two areas. However, ceramic wares attributed to the Trincheras culture, which likely developed in the valleys of the Río Altar and Río Magdalena in northern Sonora, Mexico, are also found. The earlier part of the Hohokam trajectory is characterized by large ball court villages like AZ AA:11:12(ASM), AZ AA:12:57(ASM]), and AZ AA:11:25(ASM) (Barr and Hesse 2010). Later, the Classic period was a time of change in much of the Hohokam world. Environmental change may offer a partial explanation; flooding became more problematic in the Hohokam core area, washing out canals on the Salt and Gila Rivers (Doyel 2007). Pottery from the Papaguería region (west and south of the study area) has been found at Classic period sites in Avra Valley, which suggests increased interaction between populations living in the two areas (Dart and Gibson 1988). One sites from the period is AZ AA:7:11(ASM) on Cerro Prieto, a peak in the Samaniego Hills. This was a large, complex, hillside *trincheras* village with more than 250 masonry rooms and numerous stone compounds, terraces, walls, and other features (Downum 1993; Pailes 2014).

Protohistoric Period (A.D. 1450–1700)

The Hohokam cultural trajectory reached a hiatus in the mid-1400s, and the large, aggregated communities of the Late Classic period dispersed about A.D. 1450. Some Tohono O'odham people associate this time with their overthrow of the headmen Sivañ Maakai and Jenashad at Sivañ Va'aki (the Great House at Casa Grande) (Winters 2021). To archaeologists specifically studying the Hohokam tradition, it marks a clear point of change. In the regional perspective of Southwest archaeology, the Classic period was marked by periodic reorganizations and migrations, and the events of ca. A.D. 1450 form the last chapter of this era. The O'odham people are among those who identify the Hohokam as ancestors. The Hopi people also trace some of their clans through the Hohokam. Following the Hohokam, Tohono O'odham/Sobaípuri and Apache groups are known to have occupied the Santa Cruz Valley and Avra Valley. The Protohistoric period populations of southern Arizona may have adapted to post-Classic period conditions by returning to a subsistence strategy involving more wild-food gathering, more mobility, and less farming. Erickson (1994:104) states that the whole Avra Valley had been O'odham lands, but the lack of permanent water sources meant there were no villages there.

Historic Period (A.D. 1700–1971)

The Historic period in south-central Arizona was marked by the arrival of Europeans in the late 1600s. Spanish colonization of what is now known as southern Arizona began in the 1690s with the travels of the Jesuit missionary Eusebio Francisco Kino. Kino first traveled as far north as the Tucson Basin in 1692 and 1694 (Doelle 1984). Father Kino established missions at Tumacacori and Tubac in the Santa Cruz Valley in 1691. The mission at San Xavier del Bac in the southern Tucson Basin was established under Kino's influence in 1700. In 1775, a presidio was established in Tucson to protect the missions at San

Xavier and San Agustín from Apache attack (Harry and Ciolek-Torrello 1992). Juan Bautista de Anza led a Spanish expedition from Sonora, Mexico, to the San Francisco Bay area of California in 1775–1776. The expedition made camp one night at an abandoned O'odham village called Oytaparts, near Marana (Guerrero 2006:96). O'odham people continued a very Hohokam-like subsistence strategy in the Tucson Basin at this time (Castetter and Bell 1942) and occupied villages along the Santa Cruz River. It is not known how intensively they occupied Avra Valley. Historic O'odham ceramic types, most notably Papago Red and Papago Plain, are considered quite distinctive, with a dark carbon core. Sherds are occasionally found in Avra Valley.

During the late 1800s, cattle and mining industries were established in Avra Valley. For example, Pedro Aguirre pioneered ranching in the Altar Valley, and Bernabé Robles's ranch was established in 1882 in Avra Valley. Copper deposits in the Silverbell Mountains attracted a succession of prospectors and mining companies between the 1870s and 1925 (Briggs 2017). In the twentieth century, technological innovations, such as pumps, and improvements in irrigation methods led to intensified agricultural development in Avra Valley. Cotton and alfalfa were the most frequently planted crops and required large numbers of seasonal laborers, including Mexican, Yaqui, African American, and Euro-American migrants. Six thousand acres of land was irrigated near Marana in 1920, mostly using privately supplied water from Cortaro, in the Santa Cruz Valley (White et al. 1966). Additional water was provided from wells. By 1950, the population of Tucson had grown to nearly 120,000, and the irrigated area of farmland near Marana had reached 30,000 acres (White et al. 1966:9). The expansion of farmland was curtailed in 1954, when it was declared a critical groundwater area. Within the past 20 years, large tracts of agricultural land in Avra Valley have been converted to housing developments to meet the needs of the population influx in southern Arizona.

Archaeological Records Search

The archaeological records search aimed to identify previously conducted surveys and previously recorded sites in each Problem Area and, for additional context, within a 1-mile (1.6-kilometer [km]) radius of each Problem Area. The records search was compiled using the AZSITE database, which includes records from the Arizona State Museum (ASM), Arizona State University, Bureau of Land Management, and SHPO. Additional research was conducted on April 9, 2024, at the ASM Archaeological Records Office (ARO). Pima County's Office of Sustainability and Conservation contributed information to the previous cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021). No additional information was identified in County records for the five Problem Areas. The City of Tucson Historic Preservation Office maintains an interactive map of historic properties and defined archaeological sensitivity areas, but none of the resources are in Brawley Wash Watershed Plan project area. Appendix A presents a series of maps showing the confidential results of the records search. The National Park Service National Register Information Systems Database was also consulted for properties or districts within a 1-mile (1.6-km) radius of the project area that are listed in the National Register of Historic Places (NRHP). No NRHP-listed properties were identified.

Previous Research in the Brawley Wash Watershed Plan Study Area

The largest archaeological projects conducted within the Brawley Wash Watershed Plan study area have been associated with the CAP. These began in the 1980s with the Tucson Aqueduct Phase B Survey Project (Downum et al. 1986) and subsequent data recovery investigation at 13 archaeological sites. The CAP effort also included a water supply project intended to deliver and apply water to farmland on the Tohono O'odham Indian Reservation in response to the Southern Arizona Water Rights Settlement Act of 1982. The project involved construction of a water delivery system and development of new agricultural fields in the Schuk Toak and San Xavier Districts of the Tohono O'odham Nation. Tucson Water sponsored further archaeological work in the 1990s during planning for the Central Avra Valley Storage

and Recovery Project (CAVSARP) underground water storage facilities and more recently for the companion SAVSARP facilities. Site testing was conducted (Lindeman 2000), but these projects—which occupy a considerable area in the middle of Avra Valley—do not appear to have led to the discovery of large numbers of sites or significant data recovery excavations. The previous research identified in the Problem Areas sections, below, includes tasks within these large projects; however, previous research in the Problem Areas is dominated by linear surveys, notably along electrical power lines.

Record Search by Problem Area

BUCKELEW WEST

No previously conducted surveys were identified within the Buckelew West Problem Area. Twelve survey projects were identified within 1 mile of the Problem Area. Less than 5 percent of the buffered search radius has been included in previous surveys. Most of the identified projects followed segments of SR 86 south of the Buckelew West Problem Area. Six of these projects were commissioned by the Arizona Department of Transportation in support of maintenance activities; the seventh was associated with a utility project in the right-of-way. Other surveys have been conducted by the Bureau of Land Management Phoenix Field Office for a proposed materials pit south of the Problem Area in 1979; by the Arizona State Land Department following unauthorized range improvements on a small parcel west of the Problem Area in 1991; and around the Three Points-Altar Valley Middle School southeast of the Problem Area in 2001. In 2006, Desert Archaeology, Inc. (Desert Archaeology), surveyed 120 acres of City-owned land northeast of the Problem Area on the north side of Brawley Wash (Cook 2006, 2007). The project (2006-681.ASM) consisted of two distinct components: a survey of a parcel being considered for sale (Cook 2006) and a survey of a second parcel in response to the discovery of artifacts by a Tucson Water employee grading an access road (Cook 2007). The project area included dense patches of amaranth where no effective survey was possible. Evidence of sediment and artifacts moving downslope in the project area was also observed (Cook 2007:7). Desert Archaeology later surveyed two private inholdings in this area, finding numerous isolated occurrences (IOs) of artifacts but no artifact concentrations (Herr 2004b).

There are no previously recorded sites within the (unsurveyed) Buckelew West Problem Area. Five ASM site numbers have been assigned to resources in the 1-mile search area. Four of these resources are archaeological sites, all associated with the Hohokam culture. One site was recorded in a context that is unlike the Problem Area. AZ AA:15:1(ASM) is a room block habitation site on the top of a low volcanic hill called Toad Butte, west of the Problem Area. It was briefly described in an article in *The Kiva* in 1936 (Tanner 1936). AZSITE shows that volunteers from the ASM revisited the site in the late 1980s and identified diagnostic Hohokam Tanque Verde ceramics. The other sites might be more representative of resources that could be found in the Problem Area. AZ AA:15:118(ASM), AZ AA:15:126(ASM), and AZ AA:15:181(ASM) all consist of rock features, rock piles, and thermal features, associated with artifact scatters, including Hohokam ceramic sherds. The largest of these sites (as shown on AZSITE and the ARO map) is AZ AA:15:181(ASM). This site was recorded in 2006 by Desert Archaeology on the north side of Brawley Wash (Cook 2006, 2007). AZSITE shows two smaller boundaries from the legacy SHPO topo map in essentially the same location (one entirely within AZ AA:15:118(ASM) and one partially overlapping it), but no additional information is available for these recordings. The physical setting of AZ AA:15:181(ASM) appears comparable to the conditions found within the Problem Area. However, aerial imagery shows clearly defined fields in the Problem Area, and the area in which the site was recorded shows no such disturbance.

In addition to the archaeological sites, SR 86 has been designated AZ AA:16:377(ASM). SR 86 currently extends 119 miles from Why, near Ajo, in western Arizona to Tucson. The original route designation was applied to a road east of Tucson and then extended from Tucson to the New Mexico state line. This east road was superseded by Interstate 10. The in-use western route from Tucson to Why was established

relatively recently, becoming part of the State Highway System in 1943 (Arizona Department of Transportation 2021), although it followed the path of earlier roads. SR 86 is primarily an in-use structure, although abandoned segments may exist.

TORTUGA RANCH

The Tortuga Ranch Problem Area is within the area surveyed by Desert Archaeology in 2003–2004 prior to the construction of SAVSARP (Herr 2004a). The survey was assigned the ASM accession number 2003-1544.ASM. It was a systematic survey with transect spacings of 15–20 m. This extensive (2,370 acres) survey included approximately 50 percent of the 1-mile radius around the Tortuga Ranch Problem Area. Desert Archaeology subsequently conducted another project related to SAVSARP in 2004 and recorded a small site on the edge of the former east channel of Brawley Wash (Herr 2004b). Seven other surveys were identified in the search radius. This list includes one of the CAP projects (1984-191.ASM), conducted within an uncharacteristically small project area small project area around a series of drill holes (Lincoln 1985). The other previous surveys in the search radius were linear studies in support of utility line projects. None of these surveys covered large areas in the search radius. Work was undertaken in the Problem Area vicinity periodically from the early 1980s until recent time. Surveys were conducted in 1980 and 1981 for a Tucson Electric Power electrical line. Another electrical line was surveyed along Bopp Road in 1991 for Trico and a Comcast Cable communications line was surveyed in 2002. SWCA surveyed a Trico electrical line north of the Three Points substation in 2003, and most recently, another Trico electrical line was surveyed from Sandario Road to El Toro Road.

No known archaeological sites intersect the Tortuga Ranch Problem Area. The only recorded site in the search radius is AZ AA:16:473(ASM), the artifact scatter recorded by Desert Archaeology in 2004. AZ AA:16:473(ASM) was characterized as a small Hohokam artifact scatter, including a concentration of plain brown ceramics, a single piece of flaked stone, and one ground stone. The modest site inventory totaled 46 artifacts. The sherds appeared to represent at least three vessels, and the site was interpreted as a limited-activity area (Herr 2004b:22).

CACTUS AVRA

Cactus Avra is the most expansive Problem Area. Fourteen previous projects were identified intersecting the Problem Area (Table 3), and approximately 10 percent of the area has been surveyed. The previous research is dominated by linear surveys conducted for electrical lines and other infrastructure extending through the area, typically following or paralleling existing roads. The listed projects were undertaken between 1992 and 2020, although only one project, a survey for a Trico electrical line was completed in the past 10 years. Twenty-four other projects were identified in the file search radius outside the Problem Area. Consistent with previous research in the project area, most of these projects were linear utility surveys, conducted regularly since 1980 but including only a few projects in the past 10 years. The presence of ASM Advanced Site Number markers in the search radius indicates that additional projects from 2015–2017 are awaiting curation and processing by the ASM ARO.

Some information is available regarding the potential for buried cultural deposits in the Catus Avra Problem Area as previous projects have included limited testing and monitoring. Desert Archaeology tested nine sites for the CAVSARP Project, including two within the Problem Area. Of the nine sites tested, six were found to include significant buried deposits, and three had effectively been destroyed by agriculture, with plow zone extending down to sterile deposits (Lindeman 2000). SWCA monitored construction of a transmission line through the Problem Area in 2005. Monitoring was required because the area along Brawley Wash was considered archaeologically sensitive (Hesse 2006). There were no known sites in the locations where monitoring was conducted, and no archaeological sites were discovered during the work. Three metates were uncovered at one location. These did not constitute a site discovery and were considered an IO. No other artifacts or features were found during monitoring (Hesse 2006:ii).

Table 3. Previously Conducted Archaeological Surveys in the Cactus Avra Problem Area

Agency Number	Survey Name	Reference
1992-250.ASM	AEPCO Three Points to Marana Survey	Slaughter et al. (1992)
1996-162.ASM	Avra Valley Testing, Survey, and Monitoring	Lindeman (2000)
1996-239.ASM	AEPCO on Call Avra Valley	Euler (1996)
1997-135.ASM	Trico Avra Valley Tie Line Survey	Schumaker (1997)
2000-621.ASM	Trico Marana Circ. 15 & 16 Rebuild and Avra Valley Tie Line	Hesse and Archer (2000)
2002-4.ASM	Comcast Cable Picture Rocks/Sandario to Valencia/Camino de Oeste ca. 31-Mile Cultural Resources Survey	Jones and Dart (2002)
2002-61.ASM	Southwest Gas Corporation Reservation Road Survey	Klune (2002)
2002-201.ASM	Trico Reservation and Mile Wide Survey	Hesse (2002)
2005-2.ASM	Trico Circuit 107 Tie Line	Barr (2005)
2005-868.ASM	SWTC Sandario Substation Monitoring	Hesse (2006)
2006-58.ASM	SWTC Sandario Substation and Transmission Line Project	Bassett (2004)
2010-539.ASM	Marana to Sandario Tap Inventory	Buckles et al. (2009)
2011-504.ASM	Three Points - Sandario TAP SWTC	Luchetta and Moses (2012)
2020-400.ASM	**Trico Project 300.145 – Avra Valley Sub to Reservation Road/Trico 2021 Environmental Services**	**Petersen (2021)**

Note: Bold type indicates recent survey.

Five ASM site numbers have been assigned within the Cactus Avra Problem Area (Table 4). There are four recorded archaeological sites in the area. The first site recorded was AZ AA:11:4(ASM), documented in 1965 (Zahniser 1965). AZSITE associates it with the 1965 Saguaro National Monument Survey, which does not have an agency-assigned project number in the database and does not appear in the record search results. The site location is shown as approximate on AZSITE and the ARO maps. The site was described as a Hohokam occupation site, campsite, or village, with many ground stone artifacts, some of which had been collected by local residents. There is no indication that this site has been rerecorded since 1965, but no project area is shown intersecting the mapped site location on AZSITE. Three sites were recorded in this Problem Area in 1986 during the CAP Tucson Aqueduct project. AZ AA:11:36(ASM) was originally described as a dense scatter of lithic artifacts in a plowed field. The site appeared to retain concentrations of artifacts, and it was thought it might be relatively intact (Seymour 1986a). This was later confirmed when the site was tested for the CAVSARP Project (Lindeman 2000). AZ AA:11:37(ASM) was also originally described as an artifact scatter in a plowed field. The original recorder suggested that, although there were two concentrations of artifacts within the scatter, plowing had disturbed the site and moved and dispersed the artifacts (Seymour 1986b). When this site was tested for CAVSARP, no significant buried deposits were found (Lindeman 2000). AZ AA:11:38(ASM) was described as an extensive artifact scatter with five concentrations and evident disturbance from plowing (Halbirt 1986). There is no indication more recent work has been undertaken at this site. The fifth ASM site number was assigned to the in-use alignment of Manville Road, which would currently not be considered an archaeological site. The road was built between 1932 and 1937 and has been continually maintained since that time (Buckles et al. 2009).

Twenty-one archaeological sites have been recorded in the 1-mile search radius surrounding the Cactus Avra Problem Area. All of these have been considered precontact sites, Archaic and Ceramic period, and almost all are artifact scatters. Four sites had rock features or, in one instance, what was interpreted as a burned structure, and one site consisted only of rock features. The site descriptions frequently refer to disturbance from agriculture, roads, and powerlines. One site was tested in the 1980s during the CAP Tucson Aqueduct Project, but this appears to have been a limited exploration of a surface with charcoal seen eroding from a wash cut (Downum and Maldonado 1983). Generally, these sites are only known from surface survey data.

Table 4. Previously Recorded Sites in the Cactus Avra Problem Area

Site Number	Site Description/Affiliation	NRHP Eligibility*	Reference
AZ AA:11:4(ASM)	Habitation site/Hohokam	Not evaluated	Zahniser (1965)
AZ AA:11:36(ASM)	Artifact scatter /Archaic	Determined Eligible	Lindeman (2000)
AZ AA:11:37(ASM)	Artifact scatter /Hohokam	Not evaluated	Lindeman (2000)
AZ AA:11:38(ASM)	Artifact scatter/Hohokam	Not evaluated	Halbirt (1986)
AZ AA:11:238(ASM)	Manville Road/Euro-American	Recommended Ineligible	Buckles et al. (2009)

* Eligibility as indicated on AZSITE

PRICKLE DESERT

No previous survey was identified within the Prickle Desert Problem Area. Three projects were found in the 1-mile search radius. A substantial survey of 320 acres of retired farmland owned by the City of Tucson immediately north of the problem area was conducted in 2011. The survey methodology included transects spaced less than 20 m apart, use of GPS devices, and ASM site recording criteria (King 2011). The survey resulted in the documentation of two archaeological sites and 38 IOs. Two other survey projects followed electrical lines almost exactly 1 mile west of the Problem Area in 1992 and 2010. One archaeological site was recorded in the 1992 survey (Slaughter et al. 1992).

There are no previously recorded sites within the (unsurveyed) Prickle Desert Problem Area. Three sites have been recorded within the 1-mile file search radius in the projects described above. AZ AA:11:109(ASM) was recorded in 1992, at which time it was described as a historic-age trash deposit including pottery, glass, and evaporated milk cans (Slaughter et al. 1992:15). The other two sites were recorded in 2011 north of the Problem Area. One of these sites, AZ AA:11:241(ASM), consisted of agricultural features resulting from Historic period farming. These included an irrigation system and a domestic structure. These features were in poor condition, with elements intentionally removed in a remediation project following purchase of the land by the City of Tucson. The second site, AZ AA:12:242(ASM), was described as a light-density artifact scatter with possible Archaic and Ceramic period material. The site was evaluated as in fair condition, despite impacts from plowing and grazing. The recorders stated that testing would be required to evaluate the site significance, specifically to identify potential subsurface cultural deposits. Testing was subsequently undertaken at AZ AA:11:242(ASM). Diagnostic artifacts collected from the site surface indicated that the site was used in the Late Archaic period, but no intact subsurface features or deposits were found. It was suggested that leveling and cultivation had destroyed any subsurface deposits that were once present (Buckles 2011). Aerial imagery shows that the proposed solar facility was then developed on the parcel, including the mapped site area.

TUCKER ROAD

Three previous survey projects have minimally intersected the Tucker Road Problem Area but included only 1 or 2 percent of the area (Table 5). Two surveys followed a proposed transmission line along the east edge of the Problem Area in 1980–1981, and a small gas supply installation was surveyed on the northern edge of the parcel in 1992. Four other linear surveys along electrical lines and a gas pipeline were conducted in the 1-mile search radius (1997–2017); these surveys covered a small percentage of the search radius and did not result in the discovery of any sites. There are no recorded sites within the 1-mile search radius around the Tucker Road Problem Area, although a cluster of sites has been recorded farther south along Blanco Wash.

Table 5. Previously Conducted Archaeological Surveys in the Tucker Road Problem Area

Agency Number	Survey Name	Reference
1980-242.ASM	TEP Tortolita-South Utility Corridor and Alternate Routes	Wilson (1980)
1981-154.ASM	TEP Tortolita-South Realignment Survey	Wilson (1981)
1992-13.ASM	Kai Farms Tap Delivery Point	Kisselburg (1992)

Reliability of Previous Surveys

The SHPO has produced guidance on how to evaluate old survey data for adequacy; old survey data is defined as projects completed more than 10 years ago (SHPO 2004). Under the 2004 guidance, surveys more than 10 years old can be considered reliable if they meet several criteria, including past experience with the data (did more recent surveys find sites not recorded in the older survey?); survey methodology; survey personnel qualifications; an assessment of the likelihood of late historic resources being found that were not of historic age when the older survey was conducted; and tribal consultation that may have been undertaken. Some of the previous research in the Problem Areas would be defensible under the SHPO criteria; for example, the surveys for SAVSARP in 2004 are 20 years old but used corrected GPS with submeter accuracy, transect spacing of 15 to 20 m, and ASM site recording criteria (Herr 2004b). Effective July 1, 2024, the ASM will require resurvey of city, county, or state lands that were last surveyed more than 10 years ago, and no survey data more than 10 years old will be considered reliable on these lands (ASM 2024). NRCS will follow this policy for certain jurisdictions, including private land. The only survey identified in the file search results that was completed less than 10 years ago covered a small area within the Cactus Avra Problem Area (Project 2020-400.ASM).

Archaeological Sensitivity

The cultural resources overview of the Brawley Wash Watershed Plan study area prepared in 2021 used two methods to evaluate the archaeological potential of the project area: an existing sensitivity model developed by Pima County; and a geographic information system (GIS) analysis of recorded site frequency by quarter township (Rawson et al. 2021).

Pima County Archaeological Sensitivity Model

Pima County developed a County-wide model of archaeological sensitivity as part of the cultural resources studies for the Sonoran Desert Conservation Plan. Research was undertaken in 1999–2000 with the intent of compiling cultural resources knowledge to inform future planning decisions. The first phase of work included creation of a specific County database from available AZSITE data. At that time, there were more than 4,000 recorded sites in Pima County, and only 12.1 percent of the county had been formally investigated (Pima County 2000:7). The sensitivity model was intended to address the knowledge gaps created by limits in the known survey coverage. It was developed at a workshop attended by two teams of experts, who divided the eastern and western portions of the county between them. The experts were drawn from the ASM and from private consultancies. Over the course of 1 day, each team drew a map of their area using knowledge and experience to predict where archaeological resources were more or less likely to be found. The specialists caution, “This exercise was not intended to be objective or scientific, but rather a subjective expression of current expert opinion on where the County could expect to find archaeological sites in the future” (Pima County 2000:9). Proximity to water, topography, and elevation were the main variables used. Soils and vegetation were also considered in some areas. Areas with known archaeological resources were coded primarily on that basis. The model used a three-tier Low/Moderate/High probability scale. It was also thought (there has been limited research) that sites are likely along Brawley Wash, based on proximity to water.

The five Problem Areas were plotted on the County Archaeological Sensitivity model overlaid on the Brawley Wash Watershed Plan Project Area (Figure 13). Based on the County model, the Buckelew West and Tucker Road Problem Areas are considered to have high archaeological sensitivity. The Tortuga Ranch Problem Area is outside the Brawley Wash Watershed Plan study area as evaluated for the cultural resources overview prepared in 2021 (Rawson et al. 2021) but is modeled by the County in an area with high archaeological sensitivity. The extensive Cactus Avra Problem Area extends across areas in all tiers of sensitivity, with sites considered more likely in the western portion of the Problem Area. The Prickle Desert Problem Area is mapped as an area of low archaeological sensitivity.

Recorded Archaeological Site Frequency

The GIS analysis of site frequency by quarter township (9 square miles, nominally 5,760 acres) produced in 2021 used data from AZSITE. There will be additional recorded sites in the study area that were known only as advance site numbers, i.e., information had not been uploaded to AZSITE in 2021. Sites will also have been recorded since 2021. However, the recorded site frequency provides another guide to the probability of sites being found in the problem areas. The site frequency is based on the number of actual recorded sites, rather than on a model. The weakness in this approach is that the number of recorded sites is functionally related to the amount of past archaeological surveys that have been conducted. Site frequency is of limited value in areas where few projects have attempted to find them. In part because the study area has not been intensely studied or extensively surveyed, recorded site density is low almost throughout the Brawley Wash Watershed Plan study area.

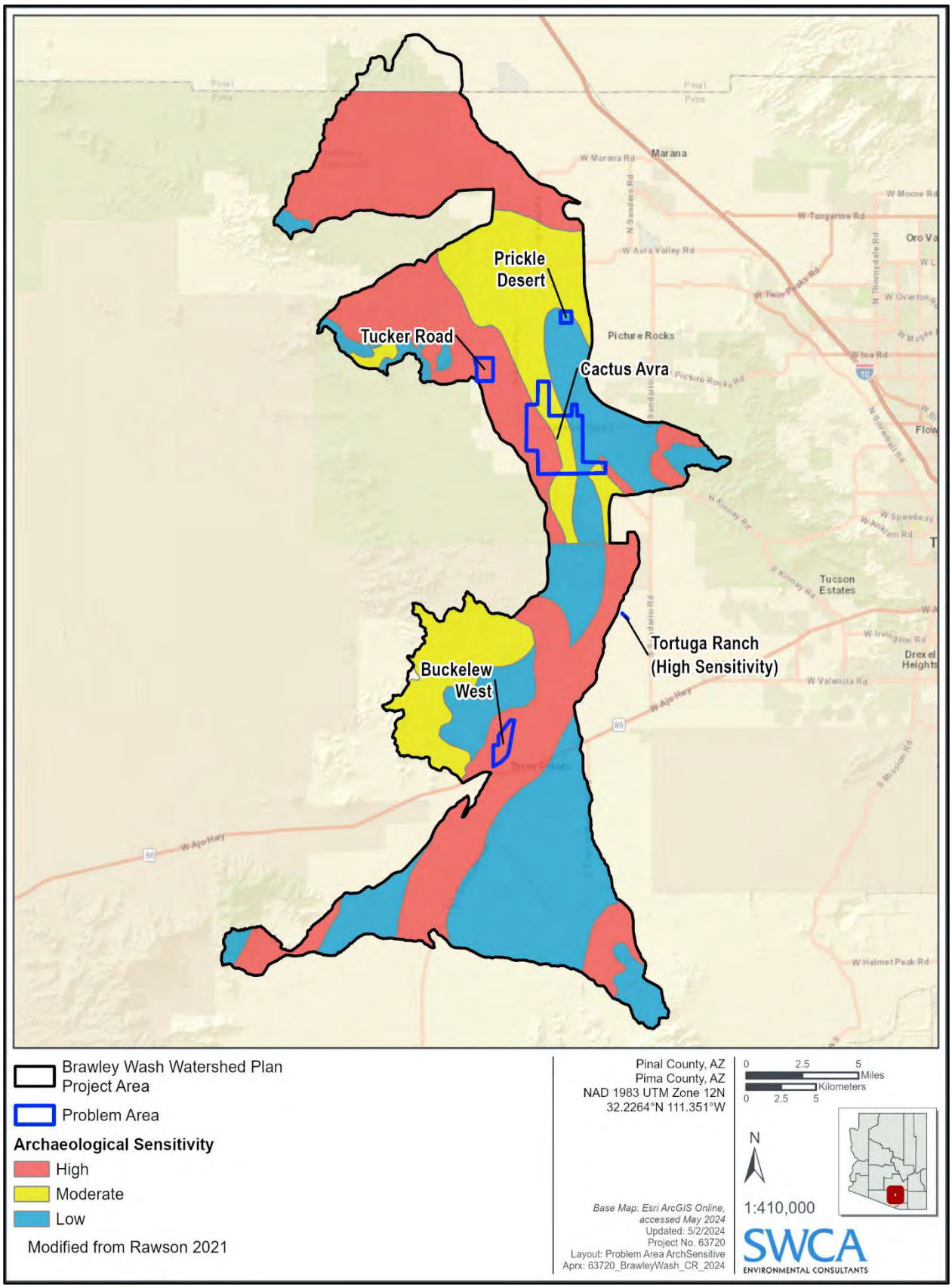


Figure 13. Problem Areas projected on the Pima County Archaeological Sensitivity Model.

The five Problem Areas were plotted on the Archaeological Site Frequency map from the Brawley Wash Watershed Plan Project Area (Figure 14). Based on data from 2021, Buckelew West and most of the large Cactus Avra Problem Areas are in quarter townships with 6 to 15 recorded sites, in the median of the frequencies defined in the 2021 study. The southeastern portion of the Cactus Avra Problem Area extends to an area with higher site frequency, which may reflect proximity to surveyed areas in Saguaro National Park West and sites on the bajada of the Tucson Mountains. The Tortuga Ranch, Prickle Desert, and Tucker Road Problem Areas are in quarter townships with 1 to 5 recorded sites. Prickle Desert and Tucker Road are in areas with few previous surveys. The Tortuga Ranch Problem Area is within the area of SAVSARP, and here relatively extensive previous survey has resulted in quite low numbers of recorded sites.

Historical Map Research

Historical maps were consulted to identify historic-era features that may be present in the survey area. The main sources of historical information are General Land Office (GLO) maps drawn when Townships were surveyed and platted. The surveys were ultimately intended to support land sales or other land claims (homesteads, mining claims), and the mapping process often prioritized areas where land was more desirable. The Problem Areas were surveyed between 1883 and 1922. The surveys in 1922 were among the last original GLO surveys in Avra Valley, in more remote areas. The U.S. Geological Survey quadrangle maps are generally more recent. The rural areas that characterize the study area were mapped in a sequence of 15-minute, or larger, quadrangles in the middle of the twentieth century. More detailed 7.5-minute quadrangles were developed later, in the modern era for some of the Problem Areas.

Buckelew West

The GLO map of Township 15 South, Range 10 East was filed in 1888, based on surveys performed from 1883 through 1886 (Figure 15). Three features were mapped within the Problem Area. A road labeled HAY ROAD extended northwest from ROBLES' HOUSE, crossing the Problem Area in Section 28. A segment of a second, unnamed, road was shown in the northeast quarter of Section 28. A communication line marked TELEGRAPH LINE FROM QUIJOTOA TO TUCSON was shown crossing the north half of Section 33. Quijotoa was a short-lived mining town west of Tucson. The 1942 Cocoraque Butte 15-minute quadrangle showed a stock tank in the north of the Problem Area, in Section 21. No other cultural features were shown in the Problem Area. SR 86 was shown to the south, with a school and a few buildings in Three Points. No cultural features were shown in the Problem Area on the 1956 Tucson 30-minute quadrangle; there was an unnamed ranch to the northwest of the area. In 1979, the 7.5-minute Three Points Quadrangle showed dirt roads, a well, and a stock tank (which does not correspond to the feature mapped in 1942) in the Problem Area. Generally, the Problem Area environs appeared as undeveloped land northwest of the small community of Three Points. Modern imagery (Google Earth 2024) shows the Problem Area as a field system. The Buckelew Family purchased property in this area in the 1950s. It was used to grow cotton, raise cattle, and, until recent years, host an annual pumpkin patch festival. Portions of the farm have been acquired by the City of Tucson and other agencies for water rights, preservation of open space, and other goals (Rangelands Gateway 2024).

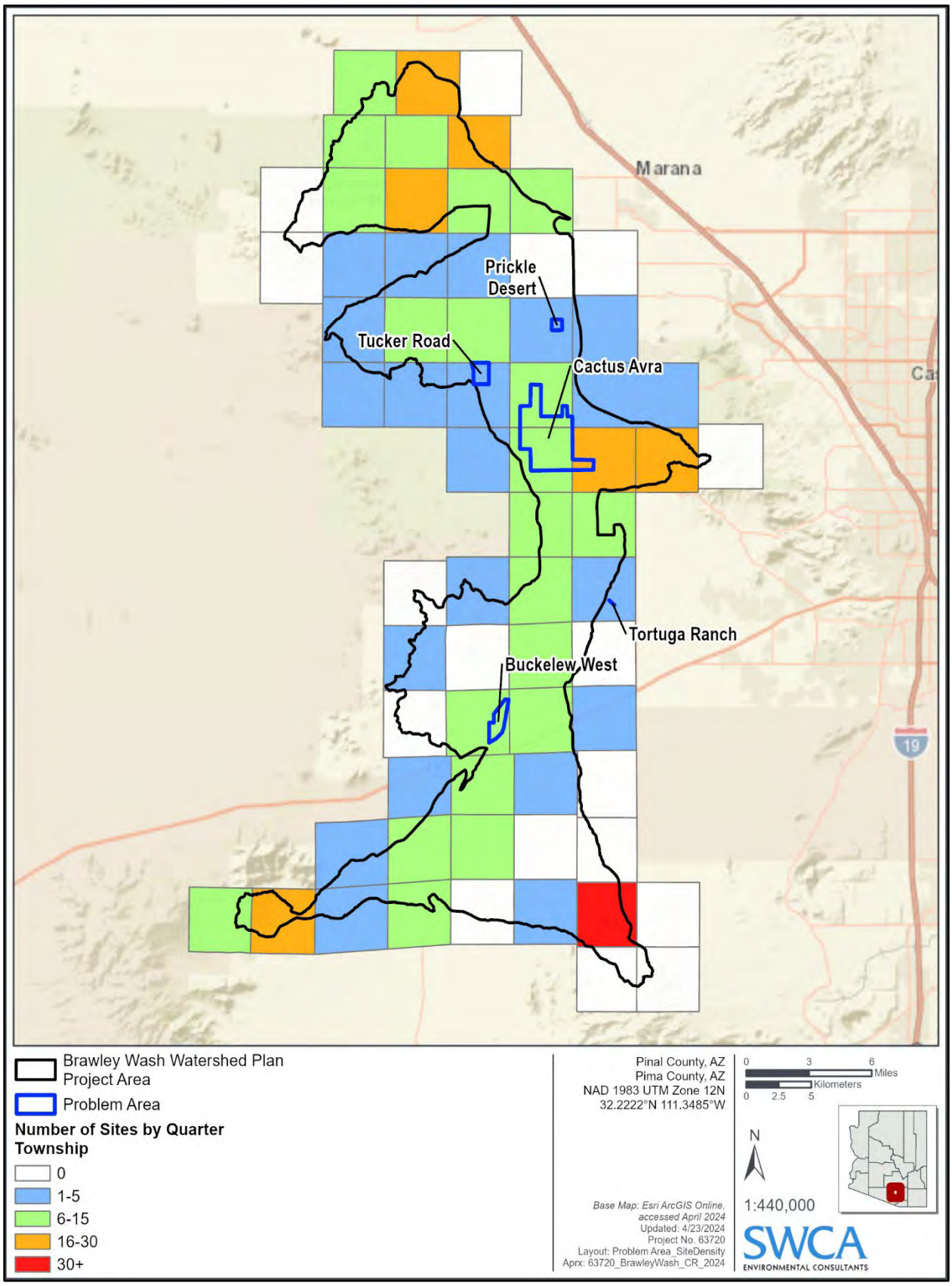


Figure 14. Recorded known site frequency around the Problem Areas.

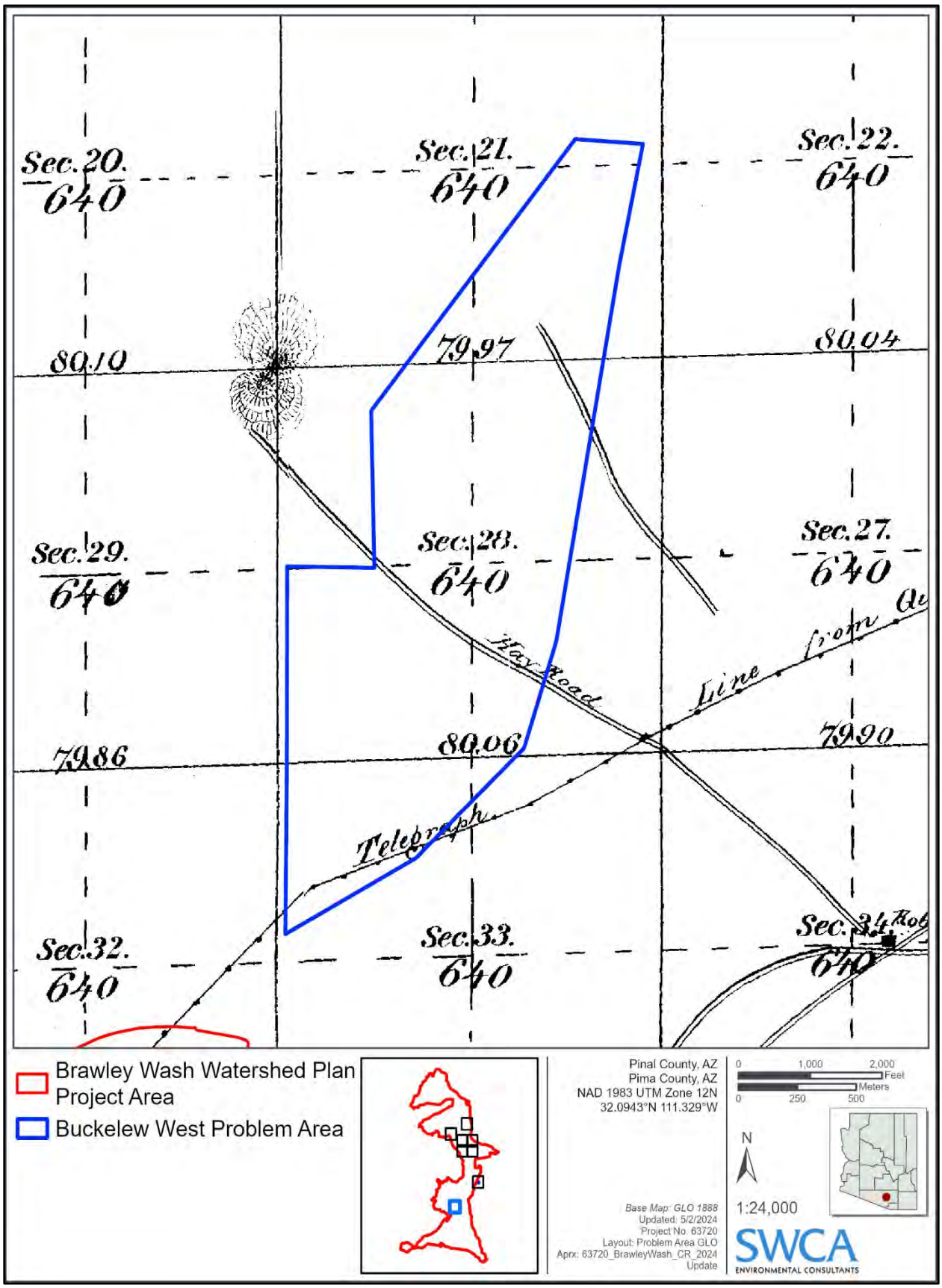


Figure 15. GLO map of the Buckelew West Problem Area.

Tortuga Ranch

The GLO map of Township 14 South, Range 11 East was filed in 1904, based on surveys performed from 1895 through 1903 (Figure 16). No cultural features were shown in Section 32. The 1925 San Xavier 15-minute quadrangle showed a road crossing the Problem Area between ranches owned by COX and RODRIGUEZ. Both ranches were depicted with fenced enclosures and a well. The 1934 Tucson Mountains 30-minute quadrangle showed two roads in the Problem Area within a network that connected ranches owned by BURREUL, COX, and RODRIGUEZ. These roads were not shown on the 1925 San Xavier 15-minute quadrangle. Brawley Wash (unnamed on the map) was depicted as two converging channels crossing the current location of the diversion berm. There was a dirt road along the north edge of Section 32, ROBLES WELL to the west, and a stock tank to the north. The diversion berm that constitutes the Problem Area was shown on the 1968 Brown Mountain 7.5-minute quadrangle (therefore, it is older than SAVSARP, although it may have been repaired at that time [cf. Stantec 2022]). This map shows several braided channels of Brawley Wash, two of which are intercepted by a berm and diverted northwest toward Robles Well and the modern Tortuga Ranch. There was a stock tank near the ranch and a road along the north edge of Section 32. Modern imagery identifies the section line road as West Donaldson Ranch Road and the ranch to the west as Tortuga Ranch. Tortuga Ranch is a ranch and farm owned by the Pascua Yaqui Tribe that houses Sewa U'usim (health and social service) programs (Pascua Yaqui Tribe 2024).

Cactus Avra

The GLO map of Township 13 South, Range 10 East was filed in 1904, based on surveys performed from 1895 through 1903 (Figures 17a–17d). A network of trails was shown throughout the Problem Area. Two segments of more defined unnamed roads were shown in Sections 23 and 24 and in Sections 25 and 26. No other features were mapped in the Problem Area. No cultural features were shown in the Problem Area on the 1934 Tucson Mountains 30-minute quadrangle, but a drainage trending southwest-northeast through the area was labeled MUSTANG DRAW. This drainage is not shown on more recent maps. Two small-scale maps show the Problem Area in the 1950s, with limited detail. It is probable that irrigated farmland was developed in the area around this time. Both the 1956 1:250,000 Tucson and 1959 30-minute Tucson maps showed roads, including Manville Road, generally aligned with the section lines. Features in the surrounding area included AVRA GIN south of the area; GARCIA RANCH east of the area; and an unnamed cotton gin, a gas pipeline, an airfield, and ranches north of the area. The 1964 edition of the 1:250,000 Tucson map was consistent with the earlier edition. A 7.5-minute quadrangle was not produced for this area until modern times. The land in this Problem Area was included in 13,000 acres of irrigated fields bought and retired by the City of Tucson to secure associated water rights. The program began in 1959, but most land was retired in the 1970s. The Cactus Avra parcel was last farmed in 1976 (Karpiscak et al. 1981:Table 1).

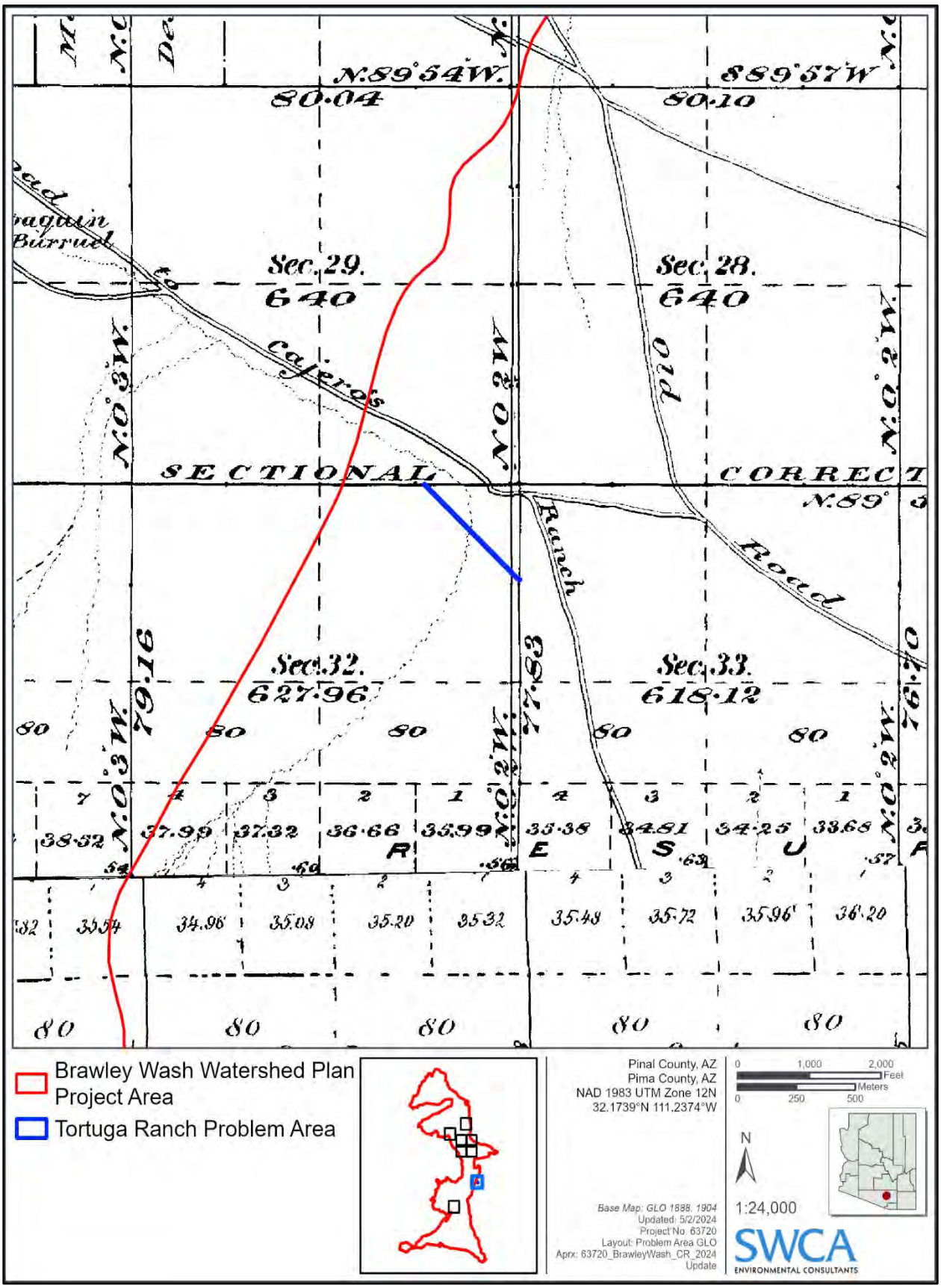


Figure 16. GLO map of the Tortuga Ranch Problem Area.

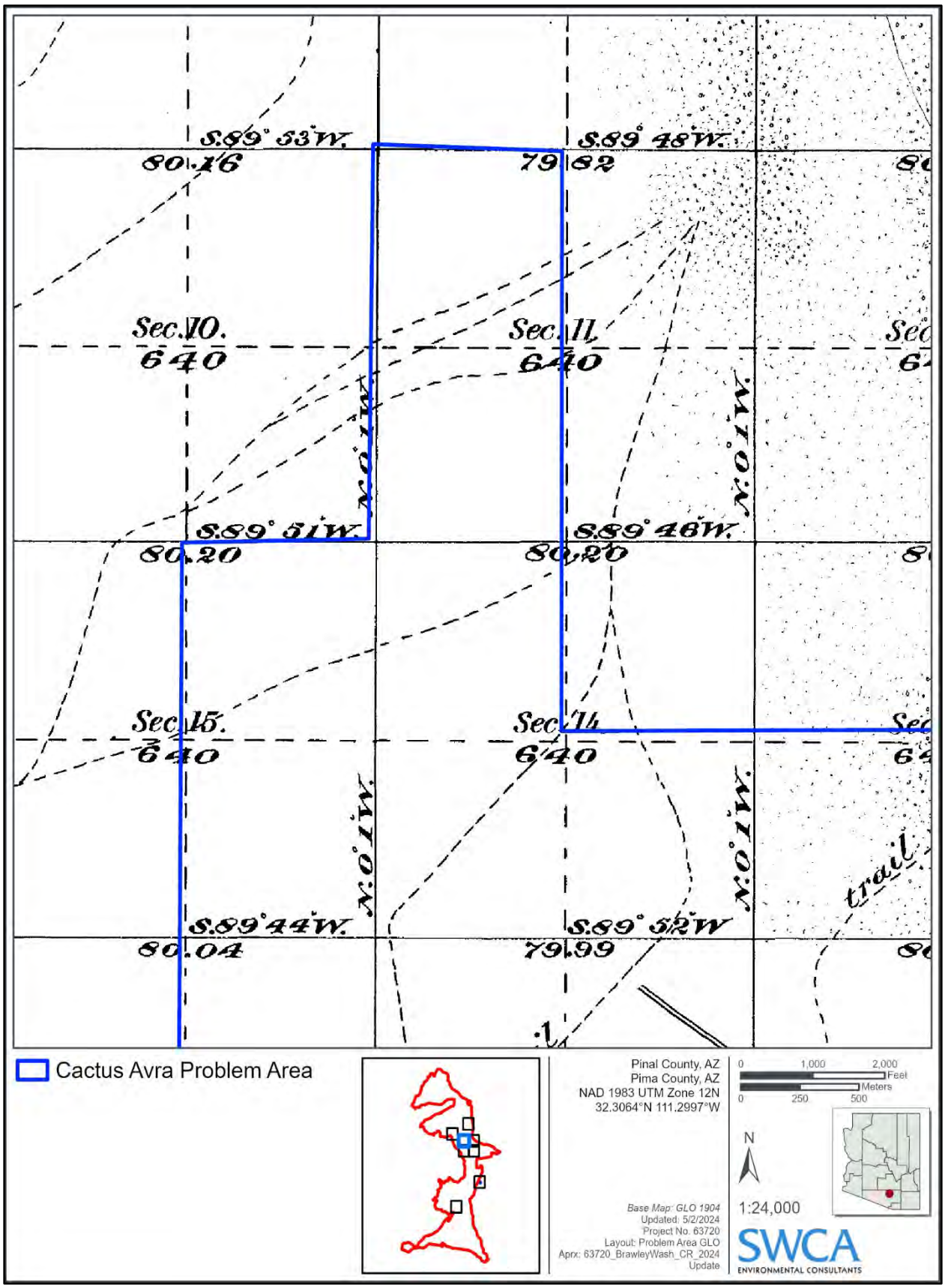


Figure 17a. GLO map of the Cactus Avra Problem Area (northwest).

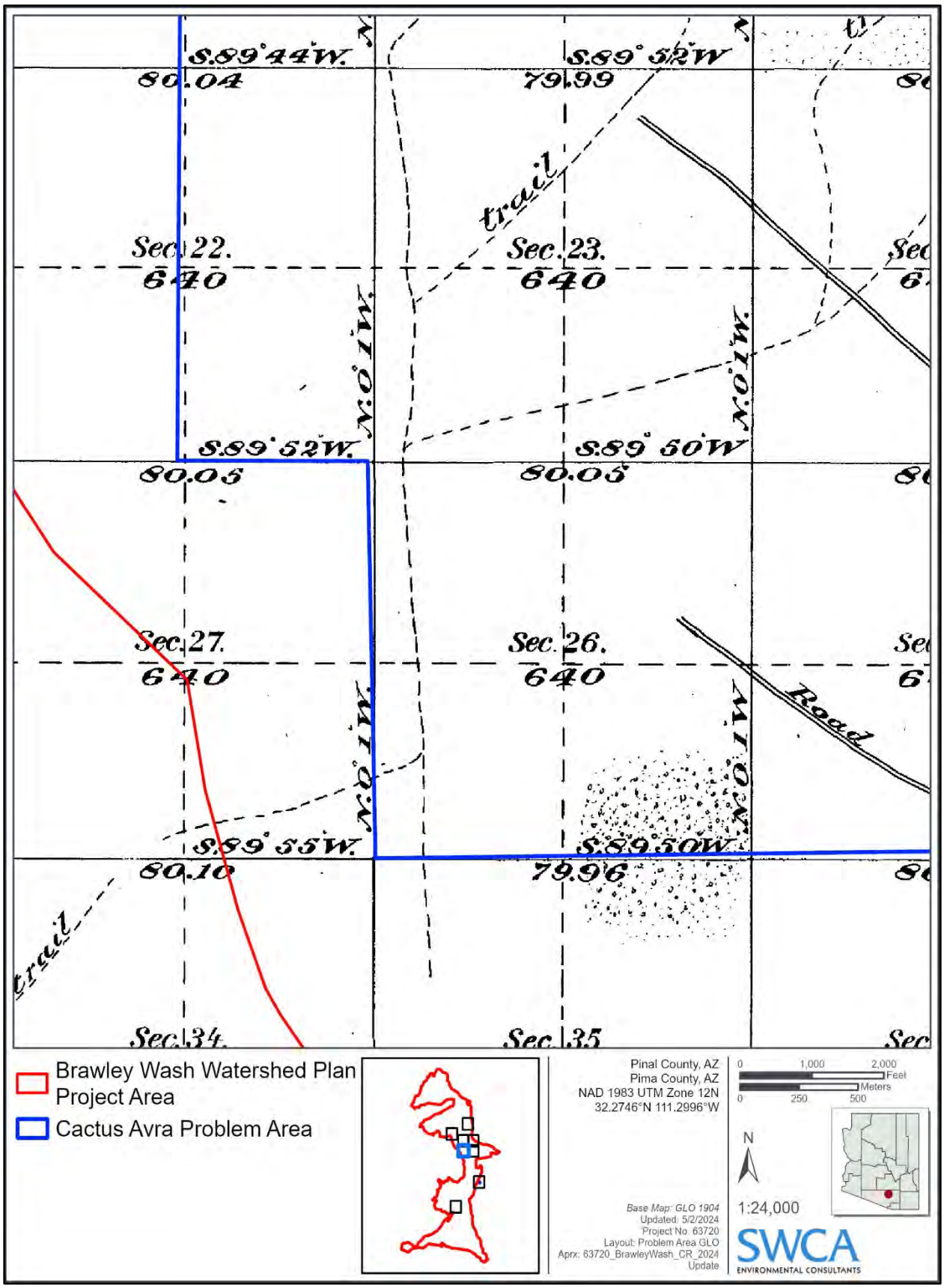


Figure 17b. GLO map of the Cactus Avra Problem Area (southwest).

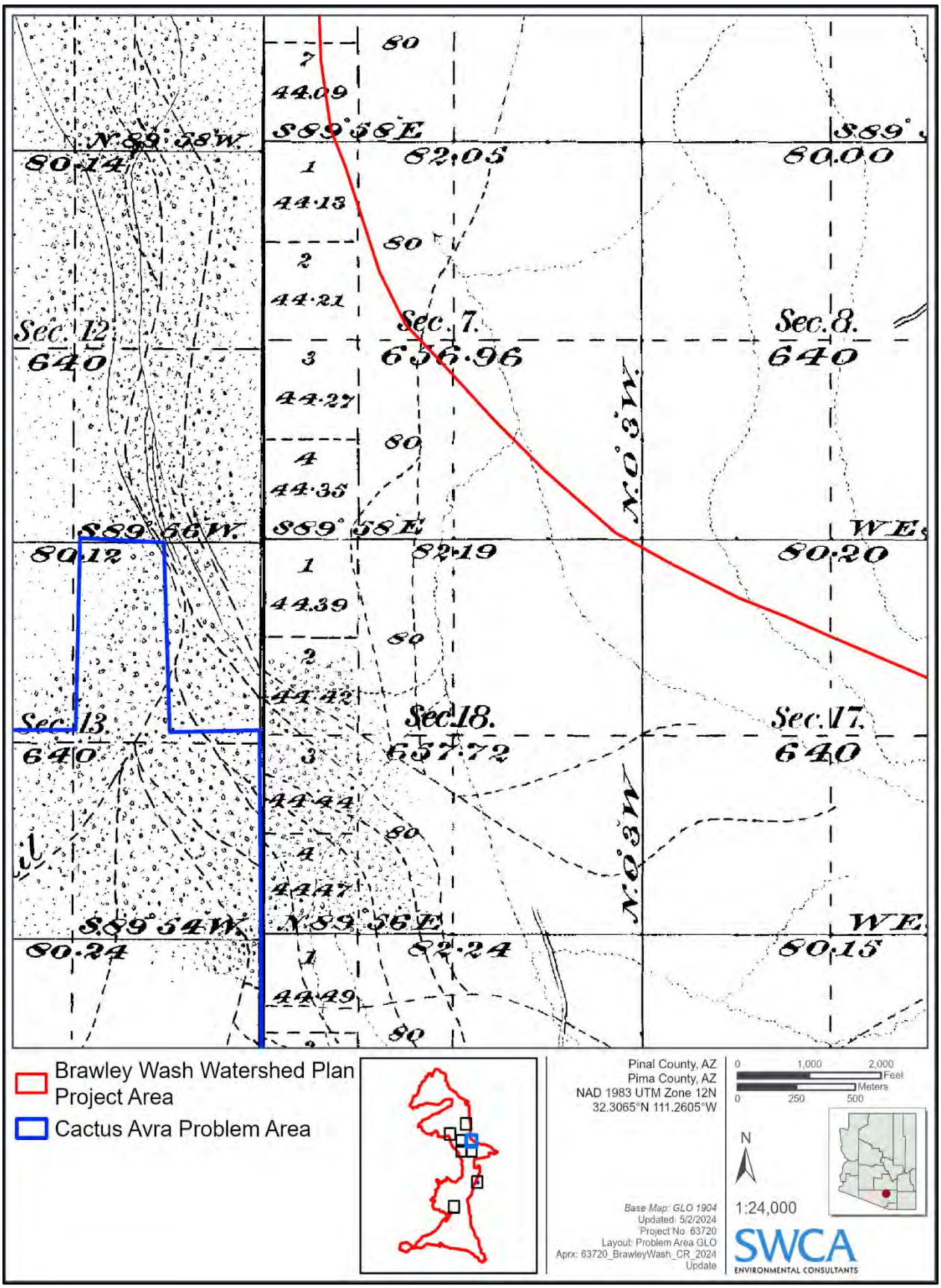


Figure 17c. GLO map of the Cactus Avra Problem Area (northeast).

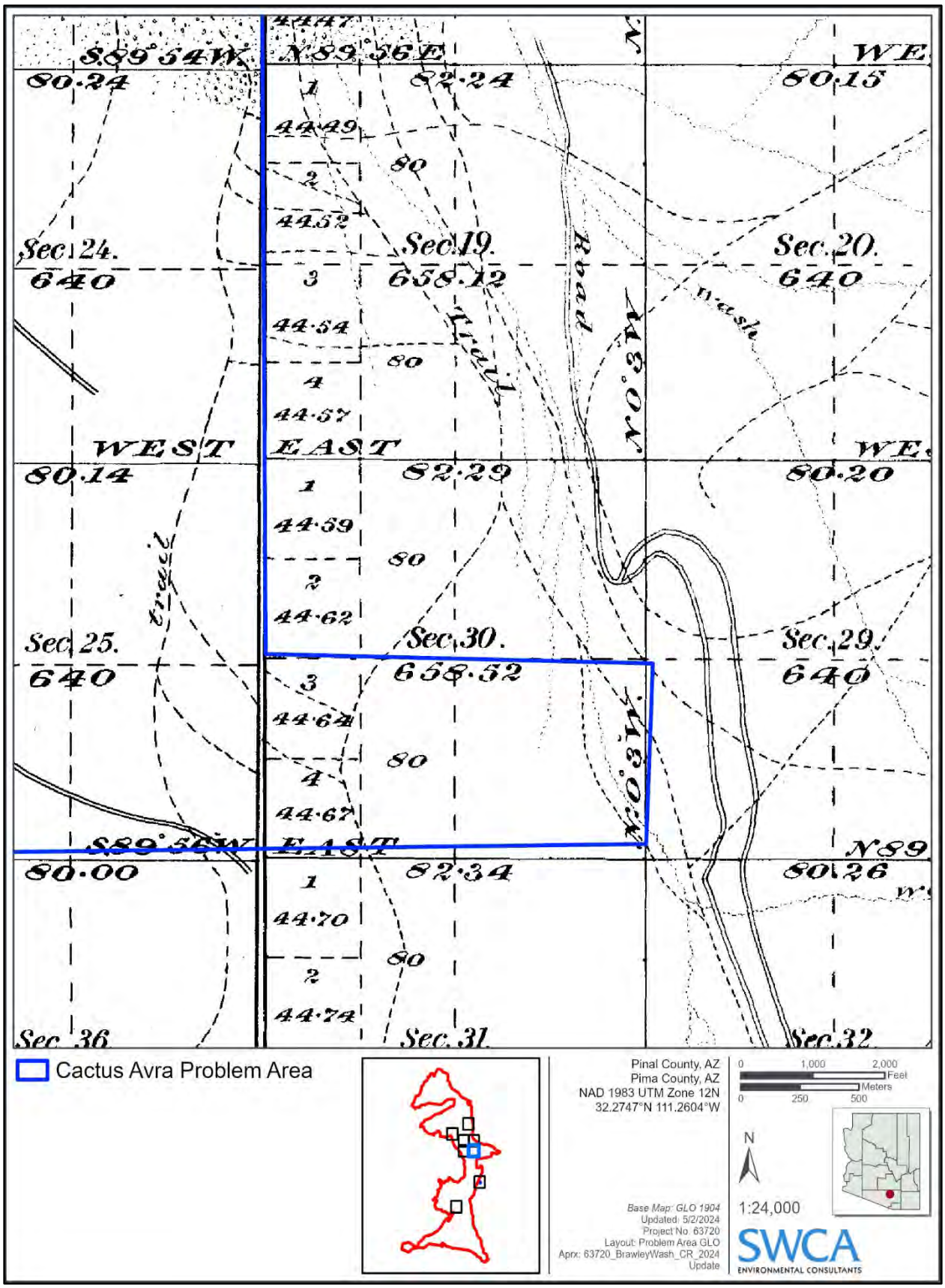


Figure 17d. GLO map of the Cactus Avra Problem Area (southeast).

Prickle Desert

The GLO map of Township 12 South, Range 10 East was filed in 1924, based on surveys performed from 1911 through 1922 (Figure 18). No cultural features were shown in the Problem Area. An unnamed road extending northwest from YSABEL GARCIA HOUSE crossed Section 25 northeast of the Problem Area. The 1934 Tucson Mountains 30-minute quadrangle showed a road crossing the Problem Area near GARCIA RANCH, which was located immediately south of the area. The 1956 1:250,000 Tucson and 1959 30-minute Tucson maps showed a ranch (unnamed) just outside the northwest corner of the Problem Area. The 1959 Silverbell Peak 15-minute quadrangle showed a windmill on the western edge of the Problem Area. Dirt roads and a cluster of buildings were shown at the ranch location just outside the area. The 1964 edition of the 1:250,000 Tucson map was consistent with the earlier edition, and no 7.5-minute quadrangle was produced in historic times. The Problem Area appears undeveloped in modern imagery. There are more evident field systems to the north and a new solar facility. There is some dispersed residential development around the area. Some structures west of the parcel may be ranch features. There was a house with associated buildings just outside the northwest corner of the Problem Area, which may have been the ranch mapped in the 1950s. Google Earth (2024) historical imagery shows that most of these were removed in 2012 and only a foundation remains.

Tucker Road

The GLO map of Township 12 South, Range 10 East was filed in 1924, based on surveys performed from 1911 through 1922 (Figure 19). It showed a north-south fence dividing Section 5 within the Problem Area and two unnamed dirt roads. One road trended north-south and the other northeast-southwest. They intersected within the Problem Area. No cultural features were shown in the Problem Area on the 1934 Tucson Mountains 30-minute quadrangle. The 1956 1:250,000 Tucson and 1959 30-minute Tucson maps showed an UNDERGROUND PIPELINE extending southeast from a NATURAL GAS STATION (compressor station) to the edge of the Problem Area. This is the El Paso Natural Gas California Mainline (Line Nos. 1100 and 1103), which crosses the northeast corner of the Problem Area. It has been recorded as a site and/or in-use structure in many other locations (Hesse 2007). Features outside the Problem Area included a cotton gin to the east and unnamed ranches. The 1959 Silverbell Peak 15-minute quadrangle showed the pipeline extending continuously through the area. This map also showed a system of irrigation canals within the Problem Area and TUCKER ROAD is identified by name. The WESTERN AVRA COTTON GIN was 1 mile east of the Problem Area. Modern aerial imagery (Google Earth 2024) shows the Problem Area as an abandoned field system.

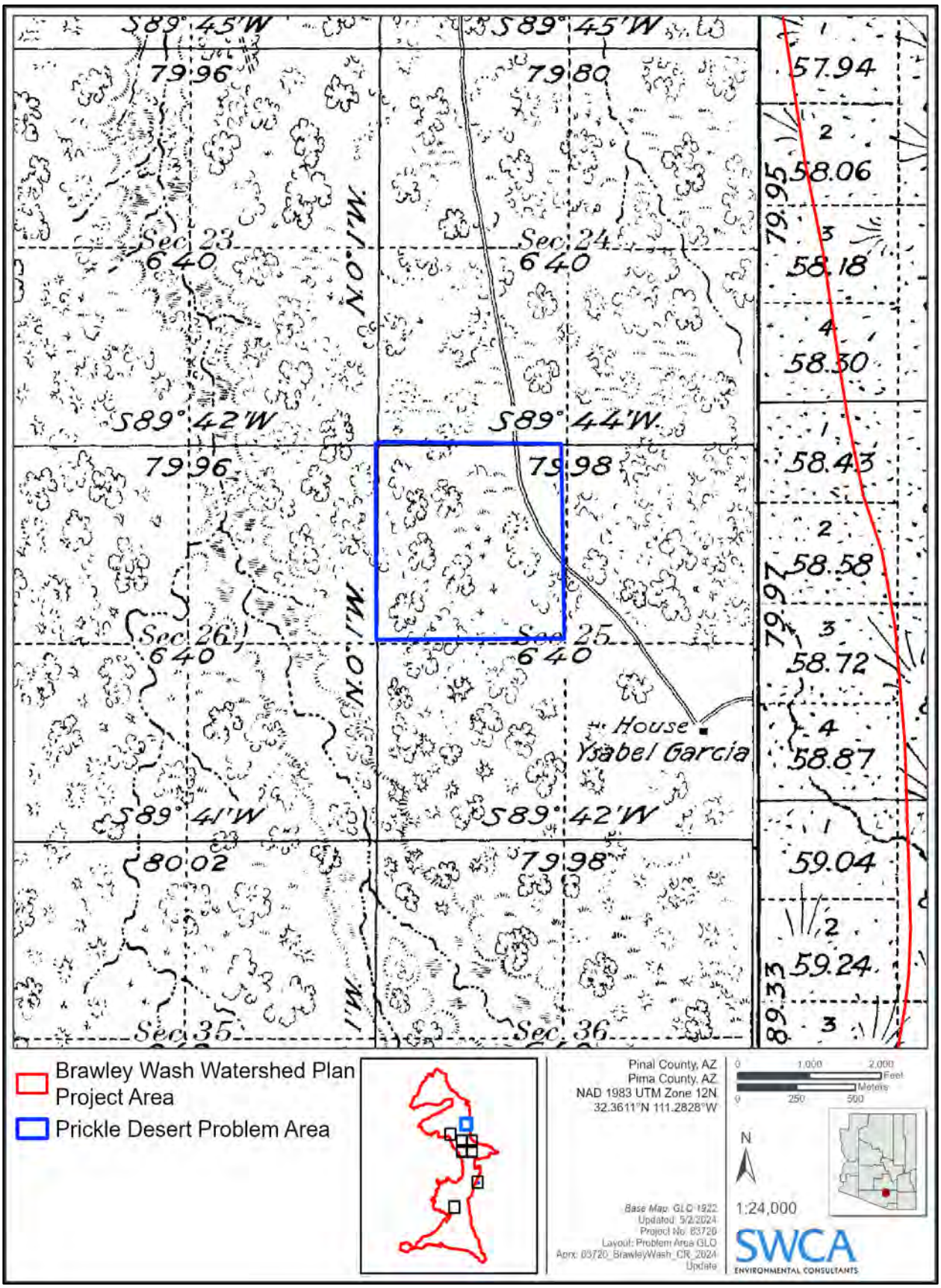


Figure 18. GLO map of the Prickle Desert Problem Area.

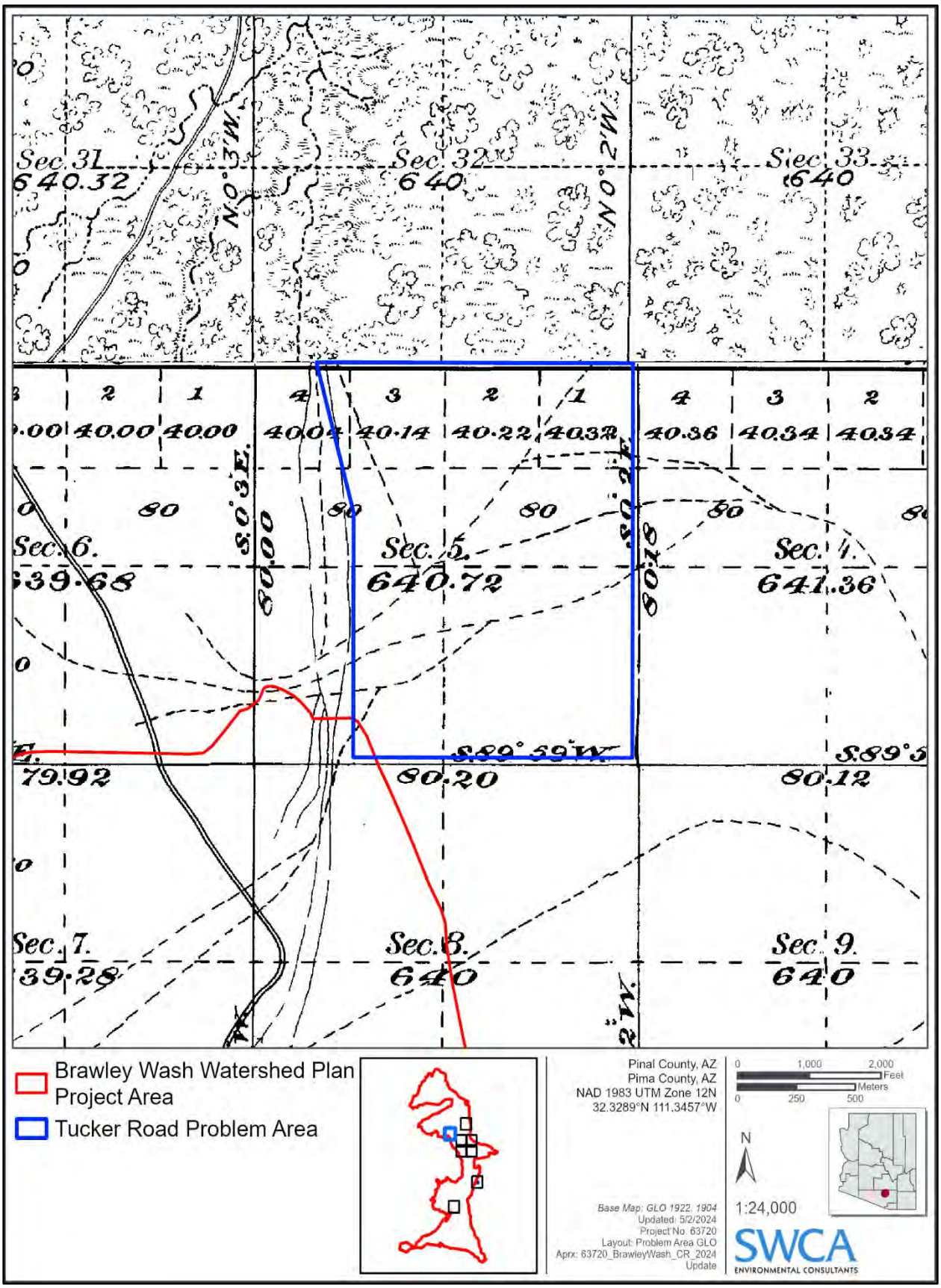


Figure 19. GLO map of the Tucker Road Problem Area.

Historic Contexts

The cultural background and the known recorded sites in the 1-mile file search radius suggest that the following historic contexts are likely to be applicable to sites that could be found in the Problem Areas.

Archaic Period Settlement in Avra Valley

Site Type: Artifact scatter

Cultural Affiliation: precontact Native American

Temporal Affiliation: Archaic period (7500 B.C.–A.D. 300)

Background Research: Surrounding sites include artifact scatters consisting exclusively of lithic artifacts or with diagnostic Archaic period artifacts.

Location: Avra Valley, Pima County, Arizona

Culture History: Avra Valley and Tucson Basin Archaic and Early Agricultural periods

Historic Context Statement

Archaic period settlement in Avra Valley, ca. 7500–A.D. 300

Hohokam Settlement in Avra Valley

Site Type: Artifact scatter with or without features
Cultural Affiliation: Hohokam
Temporal Affiliation: Ceramic period (A.D. 300–1450)
Background Research: Surrounding sites include Hohokam sites consisting of artifact scatters and artifact scatters associated with rock features, rock piles, and thermal features.
Location: Avra Valley, Pima County, Arizona
Culture History: Avra Valley and Tucson Basin Hohokam

Historic Context Statement

Hohokam settlement in Avra Valley, ca. A.D. 650–1450

Late Historic Agriculture in Avra Valley

Site Type: Field systems, roads, irrigation features, and trash deposits

Cultural Affiliation: Euro-American

Temporal Affiliation: Late Historic period (A.D. 1945–1974)

Background Research: Agricultural features were recorded at AZ AA:11:241(ASM), north of the Prickle Desert Problem Area. These types of features are likely in the Problem Areas on farmland developed after World War II and abandoned in the 1970s.

Location: Avra Valley, Pima County, Arizona

Culture History: Euro-American agricultural development in Avra Valley

Historic Context Statement

Euro-American agriculture in Avra Valley, ca. A.D. 1945–1974

Expectations

The records search data provide some indication of the numbers and types of sites that might be found in each Problem Area.

Buckelew West

The Buckelew West Problem Area has not been surveyed for cultural resources and contains no known sites. Four Hohokam sites have been recorded in the 1-mile file search radius. One of these was a room block on a hill and unlike the context of the Problem Area. The others were artifact scatters, in one case associated with rock features. Sites of these types could be expected in the Problem Area. The Pima County Archaeological Sensitivity Model suggests that sites are likely in this area. If sites were present, they would have been subject to disturbance by recent and historic agricultural activities. Intact cultural deposits could be buried below the plow zone, but eligibility testing would likely be required to confirm this. The Problem Area is in a field system in retired agricultural land, and Late Historic period agricultural features are likely to be present.

Tortuga Ranch

The Tortuga Ranch Problem Area is small, compared with the other areas. It was surveyed in 2003–2004, before the construction of SAVSARP. The survey was completed more than 10 years ago, and the areas would require resurvey. It seems unlikely that there is a significant precontact site in the Problem Area that was not recorded during the previous survey. The Pima County Archaeological Sensitivity Model suggests that sites are likely in this area, but there is no known site in the Problem Area, and the number of recorded sites is low in the surrounding search radius. The Problem Area is not within retired fields; however, the diversion berm that constitutes the Problem Area was shown on the 1968 Brown Mountain 7.5-minute quadrangle and therefore appears to be of historic age. It is not known who built this structure. Currently, there is no indication that a potentially historically significant agency like the Civilian Conservation Corps or the Soil Conservation Service was involved.

Cactus Avra

Approximately 10 percent of the extensive Cactus Avra Problem Area has been included in previous surveys. All but one of these were completed more than 10 years ago, and the area would require resurvey. The modeled archaeological sensitivity varies across the large Problem Area. There are four recorded precontact archaeological sites in the Problem Area. Two of the sites were tested during CAVSARP and would be disturbed by this previous work. Testing demonstrated that one site included buried cultural deposits and one did not. The other two sites were recorded in survey projects and are not known to have been excavated. Archaic and Ceramic period artifact scatters are well represented in the surrounding area, although their site descriptions frequently refer to disturbance from agriculture, roads, and powerlines. The Problem Area is in a field system in retired agricultural land, and Late Historic period agricultural features are likely to be present. The in-use alignment of Manville Road has also been identified as a historic-age structure.

Prickle Desert

The Prickle Desert Problem Area has not been surveyed. The modeled archaeological sensitivity is low, and few sites have been recorded in the surrounding area. One precontact site was recorded north of the Problem Area in a solar development. Late Historic period agricultural features were also documented in this area. The Problem Area is retired agricultural land, and Late Historic period agricultural features are likely to be present.

Tucker Road

There has been minimal previous survey which included approximately 2 percent of the Tucker Road Problem Area, and none of that was conducted in the past 10 years. The archaeological sensitivity of this area is high in the Pima County model, but few sites have been recorded (possibly reflecting limited research). There are no recorded sites in or within the 1-mile search radius around the Tucker Road Problem Area.

SUMMARY AND CONCLUSIONS

The results of the Class I records search indicate the following:

- Very few previous surveys have been conducted within the Problem Areas, and almost all the known research is more than 10 years old. Therefore, Class III survey of the future defined Area of Potential Effects will be required, and previous survey is unlikely to contribute to this coverage.
- There are few recorded sites in the Problem Areas (the only known ones are in the extensive Cactus Avra Problem Area). However, this may reflect the sparse previous survey coverage.
- The recorded archaeological sites in the surrounding area are Archaic period and Hohokam artifact scatters, including some with features. Site descriptions regularly note disturbance from agriculture. Buried deposits have been documented in some of the limited number of sites that have been tested.
- Based on available data, the archaeological sensitivity of the Problem Areas varies and is high in some areas. However, there is no indication that an abundance of known sites precludes the development of alternatives within these areas.
- Late Historic period agricultural features are likely to be present in the Problem Areas, and some documentation of this built environment will be required in potential future survey. These are common features like earthworks, canals, and roads that existed in historic times. They likely do not constitute historic properties (eligible for the NRHP) and would probably not require further treatment.

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APPENDIX A

Class I Records Search Maps

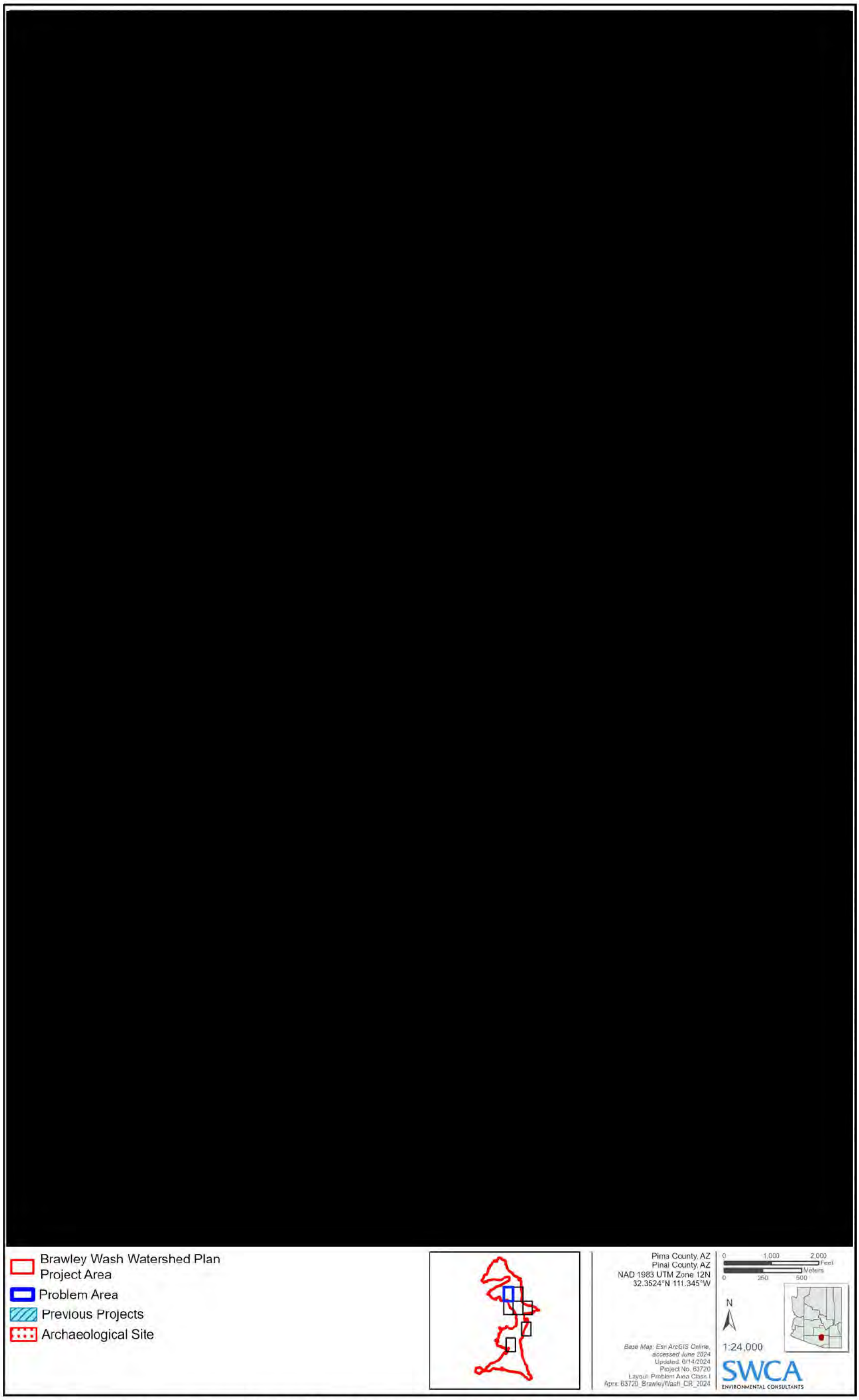


Figure A-1. Previous Research: Tucker Road and Cactus Avra (northwest) Problem Areas.

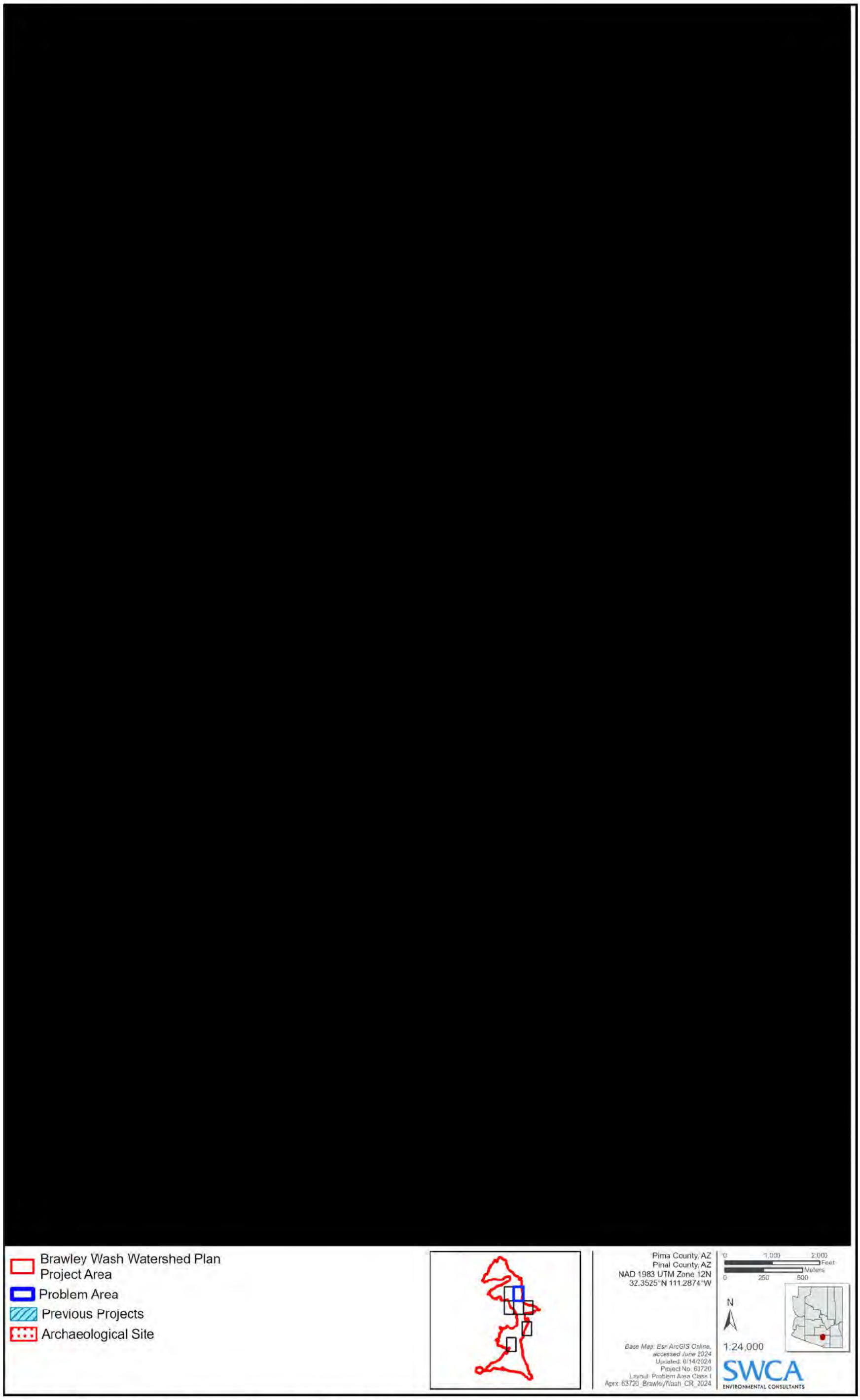


Figure A-2. Previous Research: Prickle Desert and Cactus Avra (northeast) Problem Areas.

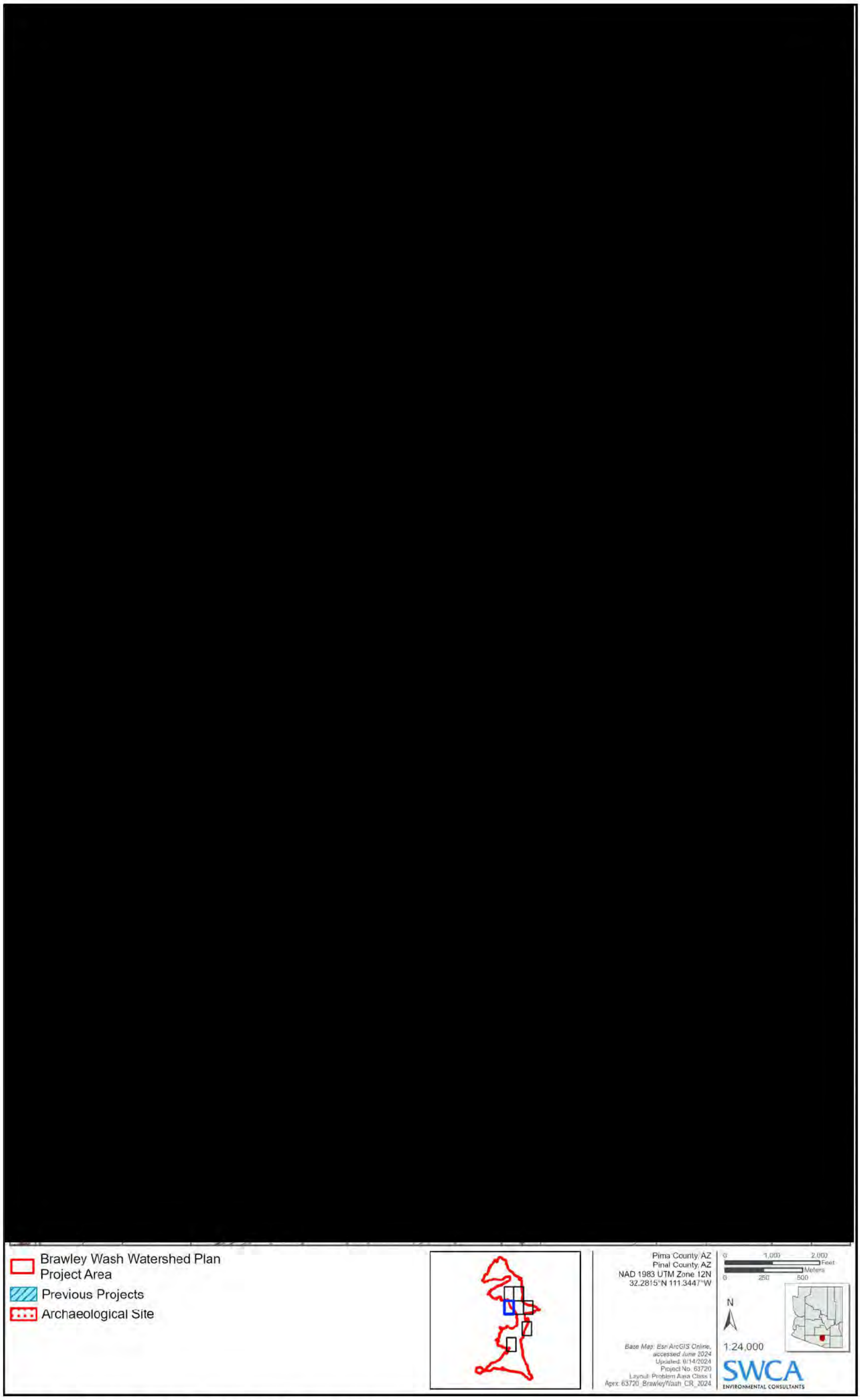


Figure A-3. Previous Research: Cactus Avra Problem Area (southwest).

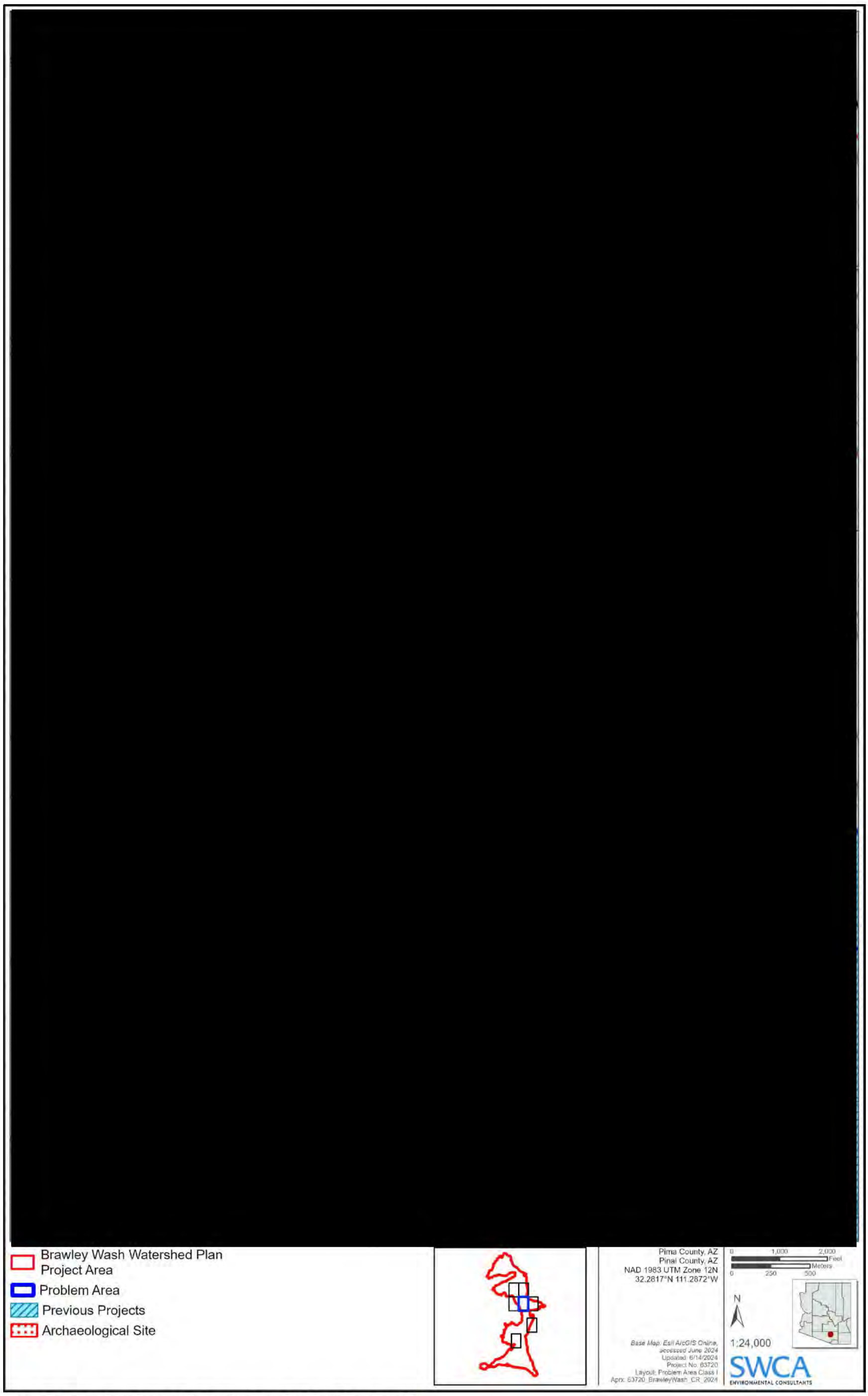


Figure A-4. Previous Research: Cactus Avra Problem Area (south).

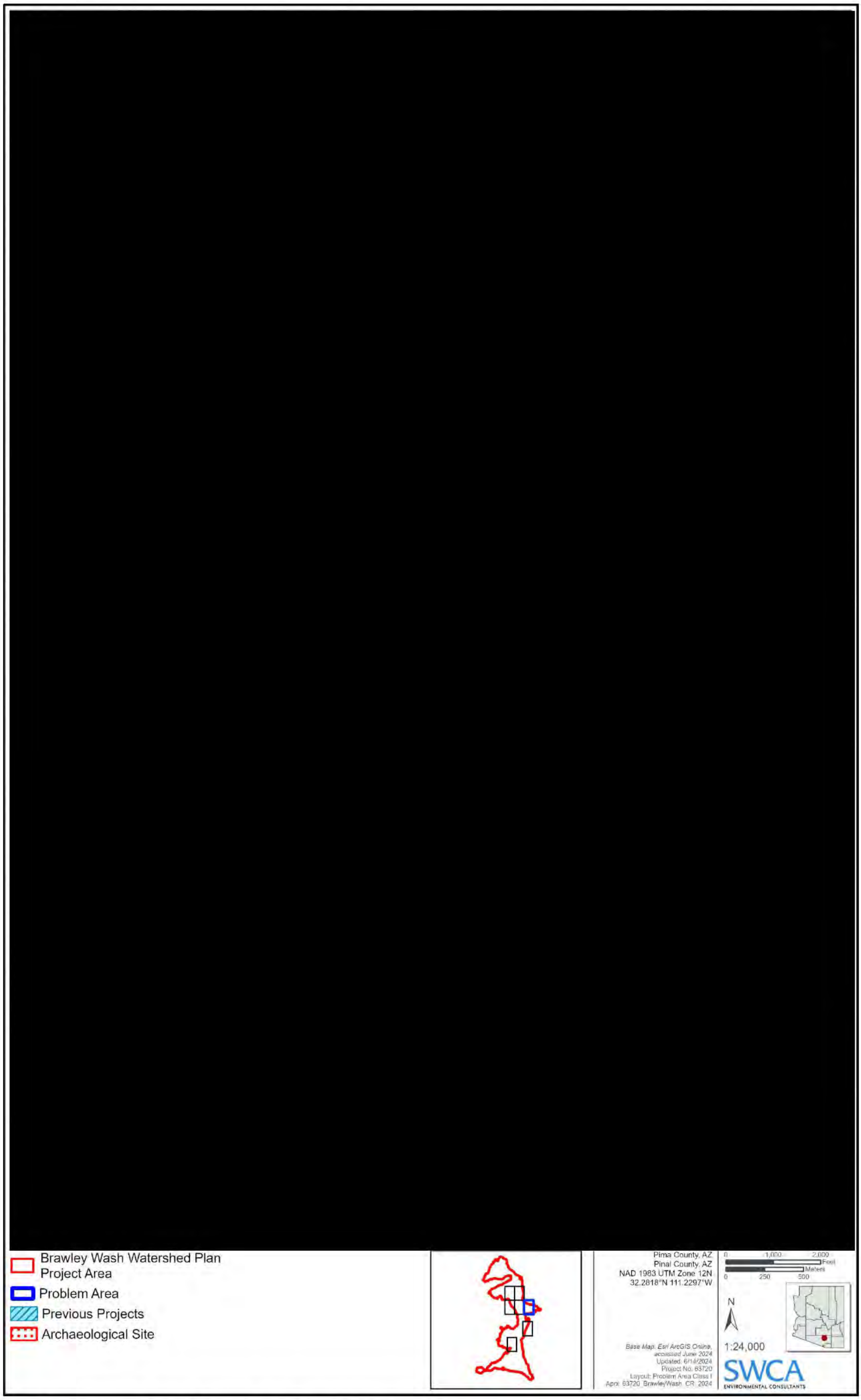


Figure A-5. Previous Research: Prickle Desert Problem Area (Southeast).

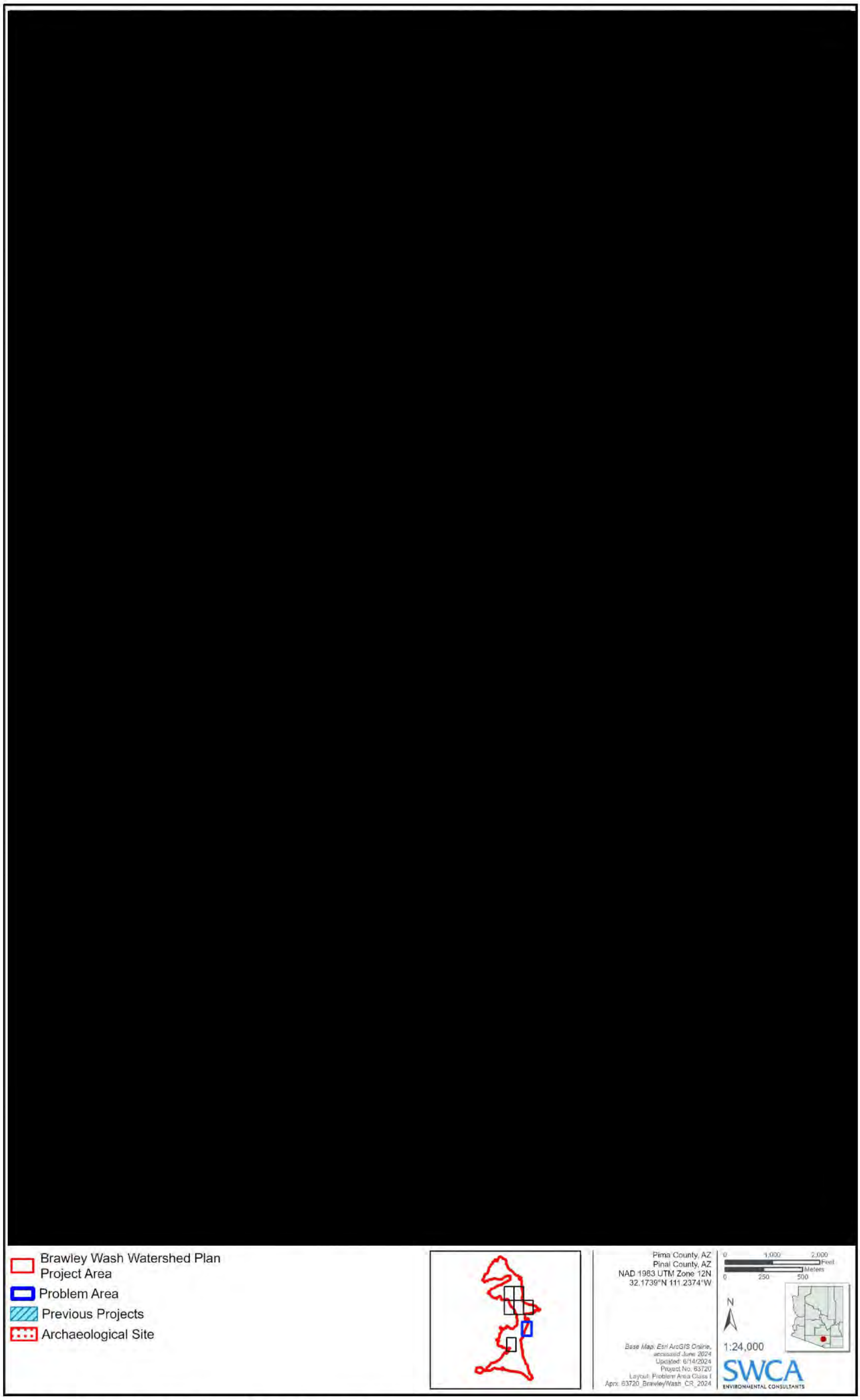


Figure A-6. Previous Research: Tortuga Ranch Problem Area.

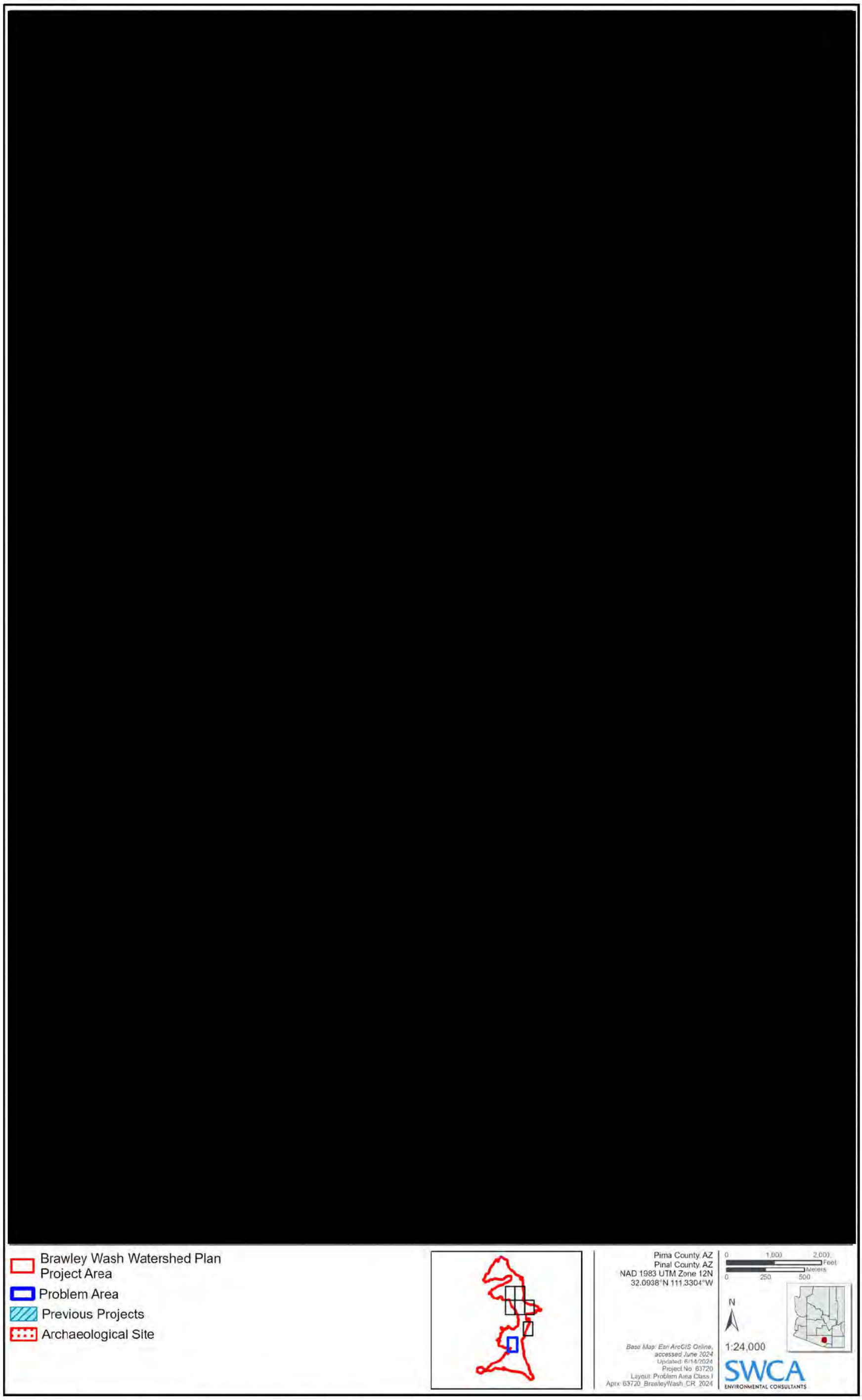


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Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

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Attachment 15 – Data Collection Technical Memorandum - Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – March 16, 2023)

Attachment 16 – Letter – NRCS Evaluation FPPA Ruling (May 21, 2024)

Attachment 17 – Class I Cultural Resources Inventory Results for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona, May 2024) (Revised July 2024)

Attachment 18 – Class III Cultural Resources Inventory Results Report (October 2024) (revised February 2025)

Attachment 19 – Letter – NRCS Section 12 Notification – Public Law 83-566 (February 10, 2025)

Attachment 20 – Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County Arizona, April 2025) Report

CLASS III CULTURAL RESOURCES INVENTORY OF THREE PROBLEM AREAS OF THE BRAWLEY WASH WATERSHED PLAN ALTERNATIVES, WEST OF TUCSON, PIMA COUNTY, ARIZONA

OCTOBER 2024 (REVISED FEBRUARY 2025)

PREPARED FOR

Natural Resources Conservation Service

ON BEHALF OF

Pima County Regional Flood Control District

PREPARED BY

SWCA Environmental Consultants

Arizona State Museum Accession No. AP-2024-0455

CLASS III CULTURAL RESOURCES INVENTORY OF THREE PROBLEM AREAS OF THE BRAWLEY WASH WATERSHED PLAN ALTERNATIVES, WEST OF TUCSON, PIMA COUNTY, ARIZONA

Prepared for

Natural Resources Conservation Service
230 North 1st Avenue, Suite 509
Phoenix, Arizona 85003

On Behalf of

Pima County Regional Flood Control District
Public Works Building
201 North Stone Avenue, 9th Floor
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SWCA Project No. 63720

SWCA Cultural Resources Report No. 24-786

Arizona State Museum Accession No. AP-2024-0455

October 2024 (Revised February 2025)

ABSTRACT

Report Title: Class III Cultural Resources Inventory of Three Problem Areas of the Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County, Arizona

Project Name: Brawley Wash Watershed Plan and Environmental Assessment

Project Location: Brawley Wash Watershed, Pima County

Project Locator UTM: 468147 mE, 3577600 mN NAD 83 Zone 12

Project Sponsor: Pima County Regional Flood Control District (PCRFCD)

Sponsor Project Number: PCRFCD Contract: CT-FC-290

Lead Federal Agency: Natural Resources Conservation Service (NRCS)

Other Agencies: Pima County, City of Tucson, Arizona State Museum

Applicable Regulations: Section 106 of the National Historic Preservation Act and its implementing regulations, defined in 36 Code of Federal Regulations 800; Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566); Arizona Antiquities Act (Arizona Revised Statutes [ARS] 41-841 et seq.); Arizona's burial law (private lands) (ARS 41-865); Pima County policy regarding the protection of cultural resources (Board of Supervisors Resolution 1983-104; Board of Supervisors Policy C3.17); City of Tucson Resolution No. 12443; Administrative Directive for the Protection of Archaeological and Historical Resources in City Projects, City of Tucson, May 1999.

Funding Source: This Class III cultural resources inventory was prepared by SWCA Environmental Consultants (SWCA) as a subcontractor to Stantec Consulting, Inc. (Stantec), under contract to PCRFCD. Future project construction may use federal, state, or local funds.

ASLD Application Number: Not applicable

Description of the Project/Undertaking: PCRFCD is the sponsoring local organization for the preparation of the Brawley Wash Watershed Plan and Environmental Assessment in southern Arizona. The NRCS is providing technical and financial assistance for the plan. Stantec is assisting with the preparation of the Brawley Wash Watershed Plan and Environmental Assessment under contract with Pima County. The Brawley Wash Watershed Plan considers 198,000 acres in the Avra and Altar Valleys west of the Tucson metropolitan area. The watershed is characterized by severe erosion and sedimentation in areas where constructed embankments and canals from abandoned agricultural lands are no longer being maintained, which affects natural flow patterns. This causes a loss of wildlife habitat and disrupts natural floodplains and drainage flow paths. The Brawley Wash Watershed Plan will evaluate floodplain restoration, erosion control, structure removal, and other conservation measures on County- and City-owned lands within the Planning Area.

PCRFCD is developing the plan in cooperation with Pima County, the City of Tucson, the Altar Valley Conservation Alliance, and a broad range of public stakeholders, including local governments, the Tohono O'odham Nation, agricultural and ranching interests, and conservation groups, through a public planning process. Under contract with Stantec, SWCA previously prepared a cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021) to assist in the formulation of project alternatives and to begin to allow involved agencies to consider the potential for the project to impact cultural resources. In working with stakeholders and in accordance with the Purpose and Need Statement for the Brawley Wash Watershed Plan Environmental Assessment, five "Problem Areas" have been identified in which future project activities may occur. These are described in *Preliminary Alternatives Selection Memo: Brawley Wash Plan and Environmental Assessment* (Stantec 2022). At the request of Stantec, SWCA prepared a Class I cultural resources inventory to provide specific information regarding previously conducted archaeological surveys and previously recorded

cultural resources for each of these Problem Areas (Rawson 2024). The Class I determined that very few previous surveys had been conducted within the Problem Areas, and almost all the known research was more than 10 years old.

Upon further analysis three Problem Areas were selected for additional study, including the Tortuga Ranch, Prickle Desert, and Tucker Road problem areas. For each of these three problem areas, the NRCS, PCRFCD, and Stantec defined an Area of Potential Effects (APE) as the area in which ground-disturbing project activities would take place should the alternatives move forward. SWCA was then contracted to conduct this Class III cultural resources inventory to assist in identifying the potential for the project to impact cultural resources that are listed in or eligible for listing in the Arizona Register of Historic Places (ARHP) and National Register of Historic Places (NRHP). It is also intended to allow NRCS to continue Section 106 consultation with the State Historic Preservation Office, Tribes, and other consulting parties.

Area of Potential Effects: The APE for the three problem areas include areas in which ground-disturbing activities may take place, including road improvements needed to access the problem areas.

Location of Problem Areas

Identified Areas of Potential Effects*	Acres	Maximum Length × Width	Landownership	Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle
Tortuga Ranch	24.8	0.97 × 0.28 mile	City of Tucson; Pima County; Private	T14S, R11E, S 29, S32, and S33/Brown Mountain
Prickle Desert	79.5	2.09 × 1.02 mile	City of Tucson; Private	T12S R10E S14, S23, S25, and S26/West of Avra, West of Marana
Tucker Road	63.0	1.11 × 0.82 mile	City of Tucson; Private	T13S R10E S5 and S8/West of Avra

* From Stantec (2022)

Land Jurisdiction: City of Tucson, Pima County, Private

Total Acres of the Project Area: 167.3 acres (City of Tucson 142.4 acres, Pima County 3.3 acres, Private 21.6 acres)

Total Acres Surveyed: 167.3 acres

Acres Not Surveyed: 0

Consultant Firm/Organization: SWCA

Project Number: 63720 (SWCA)

Permit Number: Arizona Antiquities Act Blanket Permit No. 2024-052bl

ASM Accession Number: AP-2024-0455

Dates of Fieldwork: September 9–20, 2024

Number of Properties Recorded: 21: two archaeological sites (AZ AA:11:268[ASM] and AZ AA:16:680[ASM]); 19 isolated occurrences (IOs) of archaeological materials, features, or historic structures (IOs 1–19).

Eligible Properties: 2: AZ AA:11:268(ASM) and AZ AA:16:680(ASM)

Ineligible Properties: 19: IOs 1–19

Unevaluated Properties: 0

Sites/Properties Not Relocated: 0

Comments: The cultural resources survey resulted in the identification of two newly recorded archaeological sites and 19 IOs. The two archaeological sites are Hohokam artifact scatters (AZ AA:11:268[ASM] and AZ AA:16:680[ASM]), one (AZ AA:11:268[ASM]) with an associated rock feature. Both sites are recommended eligible for inclusion in the NRHP and the ARHP. The artifact assemblages observed during the current survey project at AZ AA:16:680(ASM) indicates multiple site activities, and the presence of a thermal feature at AZ AA:11:268(ASM) may indicate additional intact subsurface thermal features are present. Both sites have the potential to provide information important to our understanding of Hohokam land use and settlement patterns in the Avra Valley. PCRFCD should avoid ground-disturbing activities within these sites when developing and implementing the Brawley Wash Watershed Plan. Alternatively, a plan should be developed and implemented to mitigate the potential adverse effects to the sites that would result from project activities if they are not avoided. No further cultural resources work is recommended outside the boundaries of these two sites.

In the event that previously unreported cultural resources are encountered during ground disturbing activities, all work must immediately cease within 30 m (100 ft) and the discovery must be reported to the project sponsor who will notify NRCS's Arizona State Cultural Resources Specialist (SCRS); the SCRS will then notify the land managing agency, SHPO, and the Tribes, as appropriate, of the discovery within 24 hours. The ASM must also be notified if the previously unreported cultural resources are on city, county, or state lands. A qualified archaeologist must then document the discovery and evaluate its eligibility for the NRHP/ ARHP in consultation with the lead agency, the SHPO, and Tribes, as appropriate. Work must not resume in this area without approval of the lead agency.

If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 m (100 ft) of the encounter and the area must be secured. The ASM, lead agency, SHPO, and appropriate Tribes must be notified of the encounter. All encounters will be treated in accordance with Arizona Revised Statutes 41-844 or 41-865, as appropriate, and work must not resume in this area without authorization from ASM and the lead agency.

Management Summary

Site Number/Name	Identification Status	Land Jurisdiction	Eligibility Status	Recommended Treatment
AZ AA:11:268(ASM)	Newly recorded	City of Tucson and private	Recommended eligible, Criterion D	Avoid
AZ AA:16:680(ASM)	Newly recorded	City of Tucson	Recommended eligible, Criterion D	Avoid

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INTRODUCTION

Pima County Regional Flood Control District (PCRFCD) is the sponsoring local organization for the preparation of the Brawley Wash Watershed Plan and Environmental Assessment in southern Arizona. The NRCS is providing technical and financial assistance for the plan. Stantec is assisting with the preparation of the Brawley Wash Watershed Plan and Environmental Assessment under contract with Pima County. The Brawley Wash Watershed Plan considers 198,000 acres in the Avra and Altar Valleys west of the Tucson metropolitan area (Figure 1). The watershed is characterized by severe erosion and sedimentation in areas where constructed embankments and canals from abandoned agricultural lands are no longer being maintained, which affects natural flow patterns. This causes a loss of wildlife habitat and disrupts natural floodplains and drainage flow paths. The Brawley Wash Watershed Plan will evaluate floodplain restoration, erosion control, structure removal, and other conservation measures on County- and City-owned lands within the Planning Area.

PCRFCD is developing the plan in cooperation with Pima County, the City of Tucson, the Altar Valley Conservation Alliance, and a broad range of public stakeholders, including local governments, the Tohono O'odham Nation, agricultural and ranching interests, and conservation groups, through a public planning process. Under contract with Stantec, SWCA previously prepared a cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021) to assist in the formulation of project alternatives and to begin to allow involved agencies to consider the potential for the project to impact cultural resources. In working with stakeholders and in accordance with the Purpose and Need Statement for the Brawley Wash Watershed Plan Environmental Assessment, five "Problem Areas" have been identified in which future project activities may occur. These are described in *Preliminary Alternatives Selection Memo: Brawley Wash Plan and Environmental Assessment* (Stantec 2022). At the request of Stantec, SWCA prepared a Class I cultural resources inventory to provide specific information regarding previously conducted archaeological surveys and previously recorded cultural resources for each of these Problem Areas (Rawson 2024). The Class I determined that very few previous surveys had been conducted within the Problem Areas, and almost all the known research was more than 10 years old.

Upon further analysis three Problem Areas were selected for additional study, including the Tortuga Ranch, Prickle Desert, and Tucker Road problem areas. These three problem areas are dispersed within a 15.5-mile by 5.8-mile area (see Figure 1). For each of these three problem areas, the NRCS, PCRFCD, and Stantec defined an Area of Potential Effects (APE) as the area in which ground-disturbing project activities would take place. SWCA was then contracted to conduct this Class III cultural resources inventory to assist in identifying the potential for the project to impact cultural resources that are listed in or eligible for listing in the Arizona Register of Historic Places (ARHP) and the National Register of Historic Places (NRHP). It is also intended to allow NRCS to continue Section 106 consultation with the State Historic Preservation Office, Tribes, and other consulting parties.

The applicable regulations for this project include: Section 106 of the National Historic Preservation Act and its implementing regulations, defined in 36 Code of Federal Regulations 800; Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566); Arizona Antiquities Act (Arizona Revised Statutes [ARS] 41-841 et seq.); Arizona's burial law (private lands) (ARS 41-865); Pima County policy regarding the protection of cultural resources (Board of Supervisors Resolution 1983-104; Board of Supervisors Policy C3.17); City of Tucson Resolution No. 12443; Administrative Directive for the Protection of Archaeological and Historical Resources in City Projects, City of Tucson, May 1999.

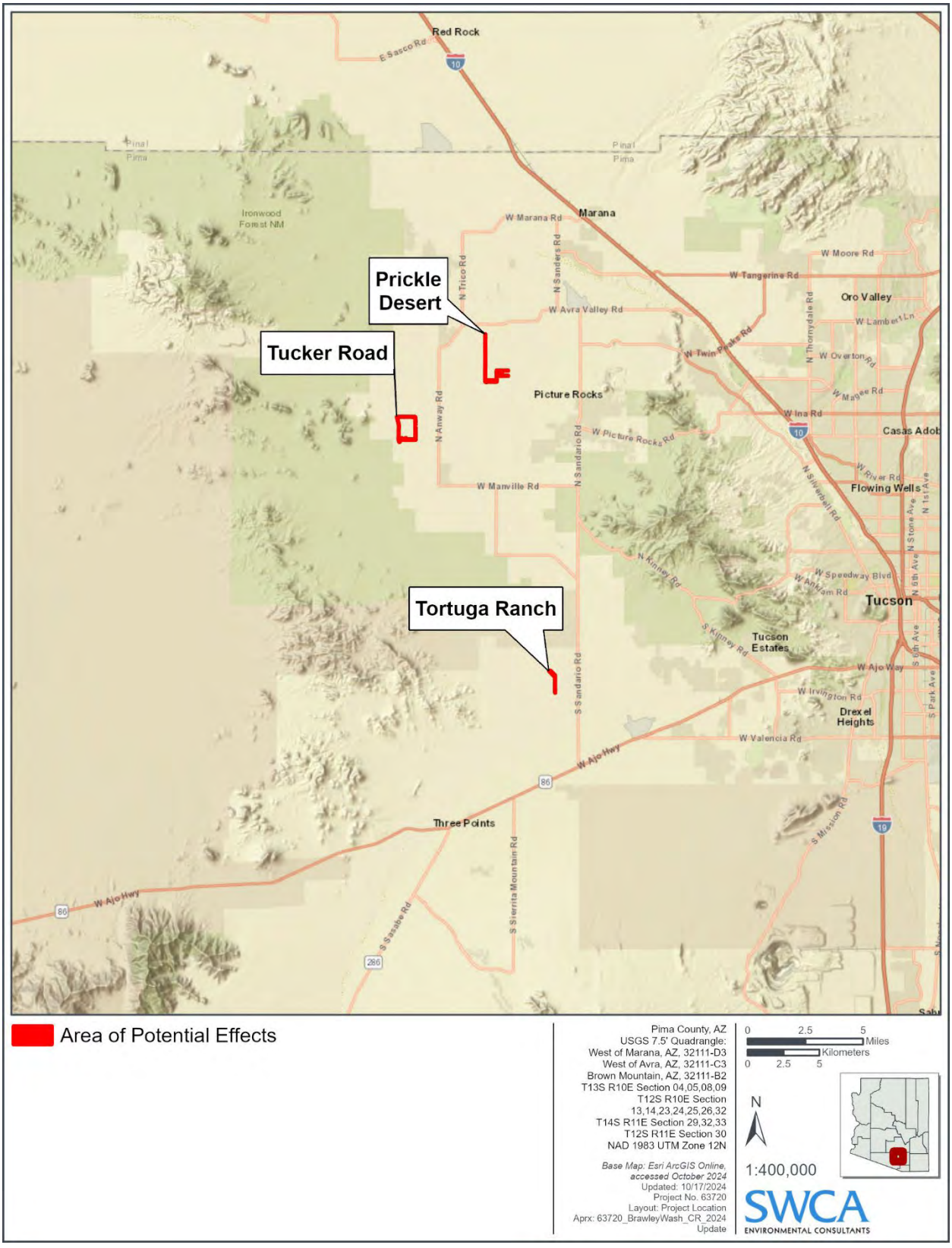


Figure 1. Project location overview.

PROBLEM AREA LOCATIONS

The location and land ownership of the APE for the Tortuga Ranch, Prickle Desert, and Tucker Road problem areas are listed below (Table 1).

Table 1. Location of Problem Areas

Identified Areas of Potential Effects*	Acres	Maximum Length × Width	Landownership	Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle
Tortuga Ranch	24.8	0.97 × 0.28 mile	City of Tucson; Pima County; Private	T14S, R11E, S29, S32, and S33/Brown Mountain
Prickle Desert	79.5	2.09 × 1.02 mile	City of Tucson; Private	T12S R10E, S14, S23, S25, and S26/West of Avra, West of Marana
Tucker Road	63.0	1.11 × 0.82 mile	City of Tucson; Private	T13S R10E, S5 and S8/West of Avra

* From Stantec (2022)

Tortuga Ranch

The Tortuga Ranch Problem Area addressed by Rawson (2024) is a 0.35-mile linear earthwork on County and private land at 3300 South Marstellar Road, west of Marstellar Road and south of Schuck Toak Farm. No acreage is defined in the Alternatives Selection Technical Memorandum (Stantec 2022), but the earthwork encompasses less than 1 acre. The Tortuga Ranch Problem Area is 4.3 miles north of State Route 86, northwest of Ryan Airfield and east of Brawley Wash. Stantec (2022) associates the earthwork with construction of the Southern Avra Valley Storage and Recovery Project (SAVSARP), a storage and recharge facility supplied with Central Arizona Project (CAP) water that was completed in 2009. The earthwork currently diverts water onto the Tortuga Ranch. There are also invasive plant species in the area. Potential future project alternatives may include modification of the earthwork to restore natural flow in the older drainage channel and treatment of invasive species.

The APE that was considered for this report includes a buffered area surrounding the Class I Tortuga Ranch Problem Area (1,900 × 400 feet) and 0.7 mile of Marstellar Road south of the levee (Figure 2). The APE in this Problem Area is 24.8 acres, including 17.9 acres of City of Tucson land, 3.6 acres of private land, and 3.3 acres of Pima County land.

Prickle Desert

Prickle Desert Problem Area addressed by Rawson (2024) is the most northern of the Problem Areas and is northwest of Picture Rocks on the east side of Brawley Wash. The Prickle Desert Problem Area consists of 160 acres of terraced fields and earthworks in retired farmland owned by the City of Tucson (Tucson Water). The redundant structures divert and collect water, causing drainage conflicts and erosion. Invasive plant issues are anticipated but unconfirmed (Stantec 2022). Potential future project alternatives may include modification of the earthworks to restore natural flow and disperse floodwater across the abandoned fields. Vegetation management would be applied if required.

The APE that was considered for this report includes the buffered access roads surrounding the Class I Prickle Desert Problem Area to the east, west, and south as well as 1.6 miles of Garvey Road to the northwest and 0.25 mile of two unnamed road east of the problem area (Figure 4). The APE in this Problem Area is 79.5 acres and measures 2.09 × 1.02 miles, including 67.8 acres of City of Tucson land and 11.7 acres of private land.

Tucker Road

The Tucker Road Problem Area is in the western part of the watershed, on the east side of Blanco Wash, 1.4 miles east of Pan Quemado, a volcanic hill (Figure 10). The Tucker Road Problem Area encompasses 480 acres within retired farmland owned by the City of Tucson (Tucson Water). It contains terraced fields with embankments and artificial channels that retain water in some areas and that concentrate flow within the Blanco Wash channel. Areas of head cutting erosion up to 20 to 25 feet deep have been documented along this reach of Blanco Wash (Stantec 2022). There are also invasive plant species. Potential future project alternatives may include modification of the earthworks to restore natural flow and disperse floodwater across the abandoned fields. Reduced stock grazing may also be proposed as a vegetation management strategy.

The APE that was considered for this report includes the buffered access roads surrounding the Class I Tucker Road Problem Area (Figure 4). The APE in this Problem Area is 63.0 acres and measures 1.11 × 0.82 miles, including 56.7 acres of City of Tucson land and 6.3 acres of private land.

ENVIRONMENTAL SETTING

The Brawley Wash Watershed

The Brawley Wash watershed extends from Fresnal Wash in the Altar Valley in Pima County north to Los Robles Wash in Pinal County. It surrounds a landform that defines the Avra and Altar Valleys. Altar Valley is a broad, north-south-trending alluvial basin that drains northward into Avra Valley. It is bounded on the east by the San Luis, Las Guijas, Cerro Colorado, and Sierrita Mountains, and on the west by the Pozo Verde, Baboquivari, Quinlan, and Coyote Mountains. Altar Wash is the axial drainage of Avra Valley, flowing into and becoming Brawley Wash at the north end of the valley. Avra Valley is a broad, north-draining alluvial basin that is bounded on the east by the Tucson Mountains, on the west by the Roskruge, Waterman, and Silver Bell Mountains, and on the south by the Sierrita Mountains. Brawley Wash is the axial drainage of Avra Valley, ultimately flowing into and forming Los Robles Wash, a tributary of the Santa Cruz River.

Brawley Wash drains the southern Tucson Mountains and the northeastern part of the Sierrita Mountains. Most of the Brawley Wash watershed is on what the statewide Arizona Geological Survey map (Arizona Geological Survey 2000) identifies as “Quaternary surficial deposits, undivided” (0–2 Ma). These include alluvial fan and terrace deposits on middle and upper piedmonts and along large drainages. The Brawley Wash watershed includes areas within five biotic communities as mapped by Brown (1994), including small areas of interior chaparral shrubland and Madrean evergreen woodland at higher elevations.

The three problem areas are at lower elevations in desert environments, specifically the Lower Colorado Subdivision of Sonoran Desertscrub (Figure 5). Much of the APE locations consist of abandoned farmland. Studies cited by Brown (1994:197) show that abandoned farmland in Avra Valley is colonized by a succession of mostly nonnative plants, beginning with Russian thistle, followed by mustards and introduced grasses. Table 2 provides a summary of the environmental setting of the APE locations.

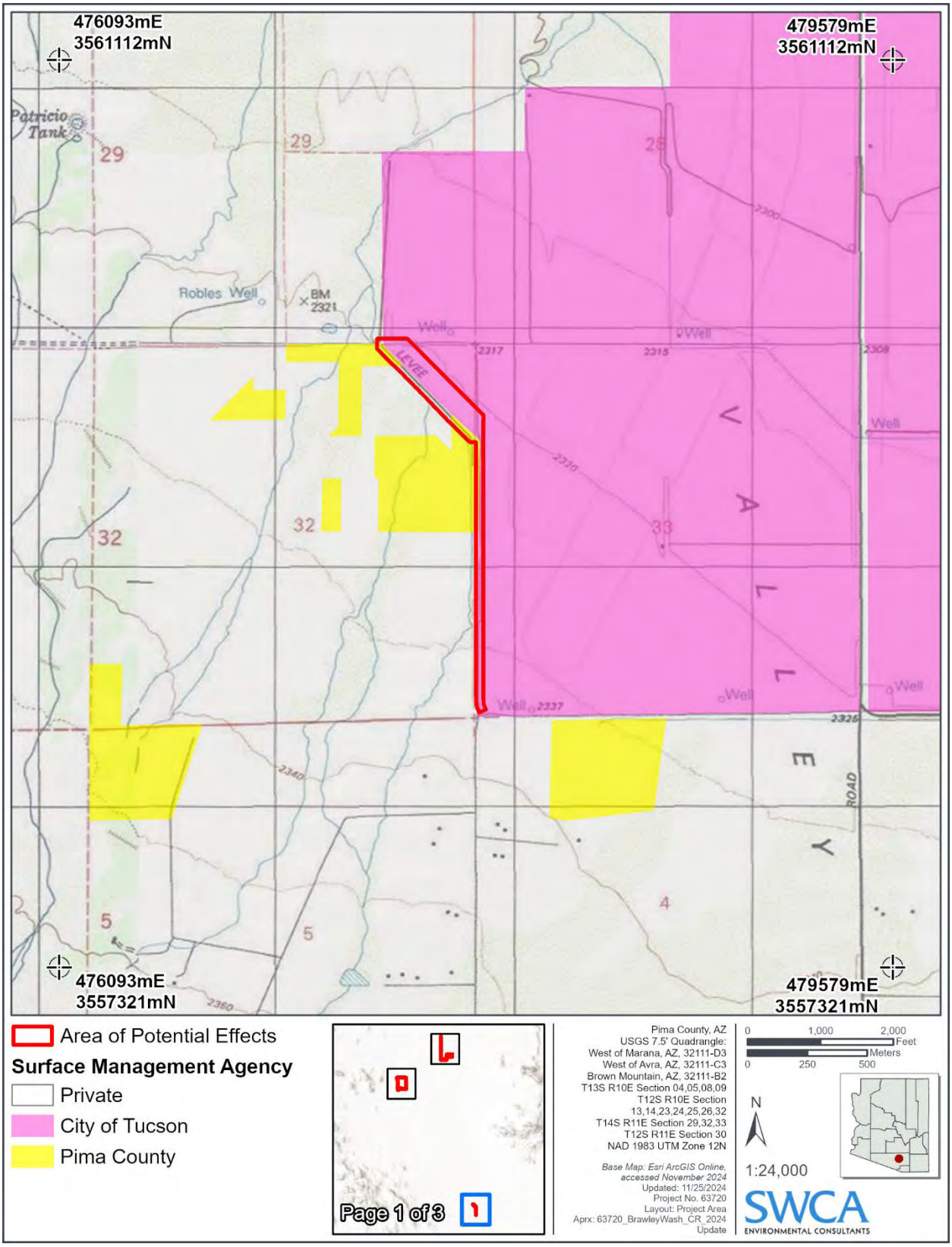


Figure 2. Tortuga Ranch Problem Area location.

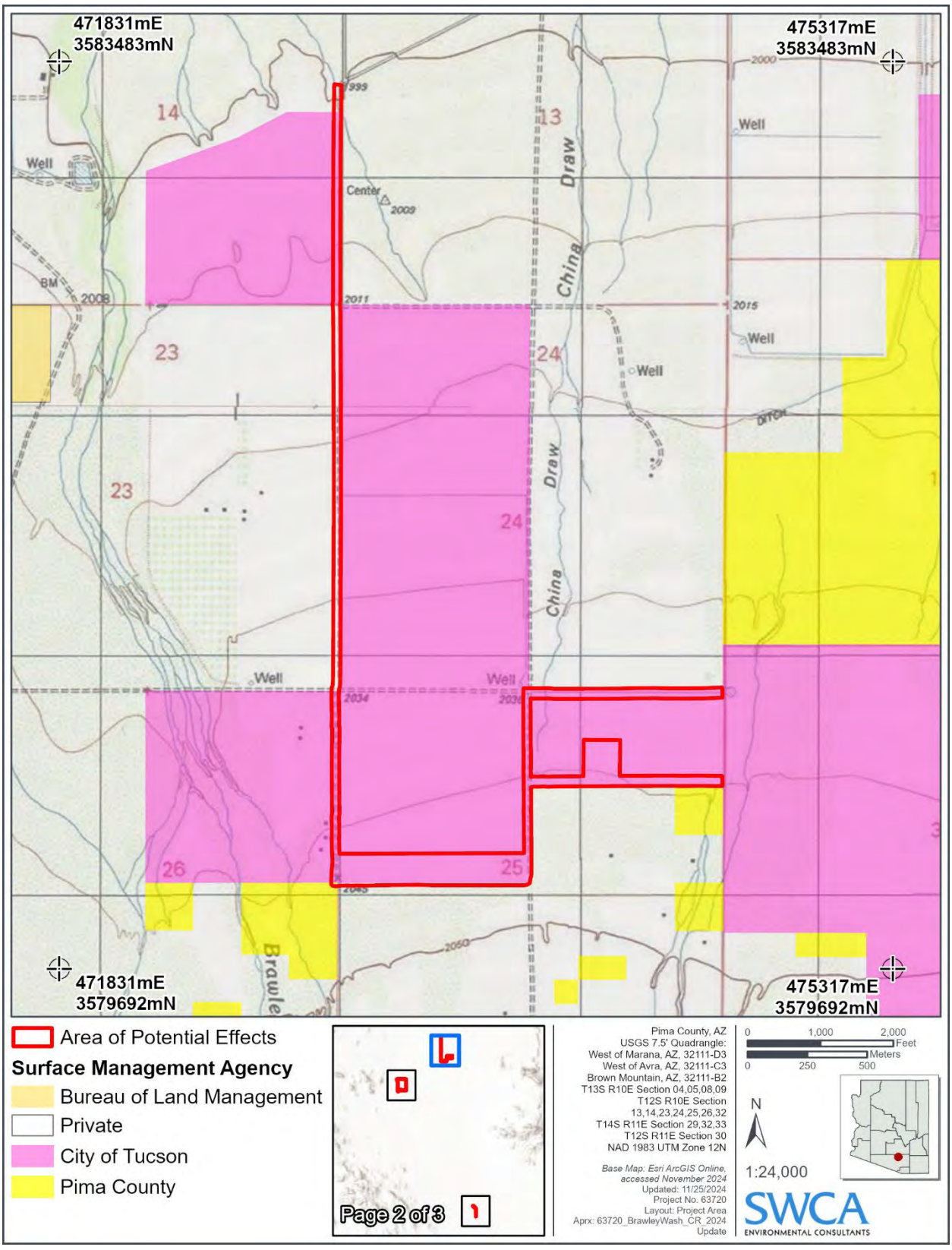


Figure 3. Prickle Desert Problem Area location.

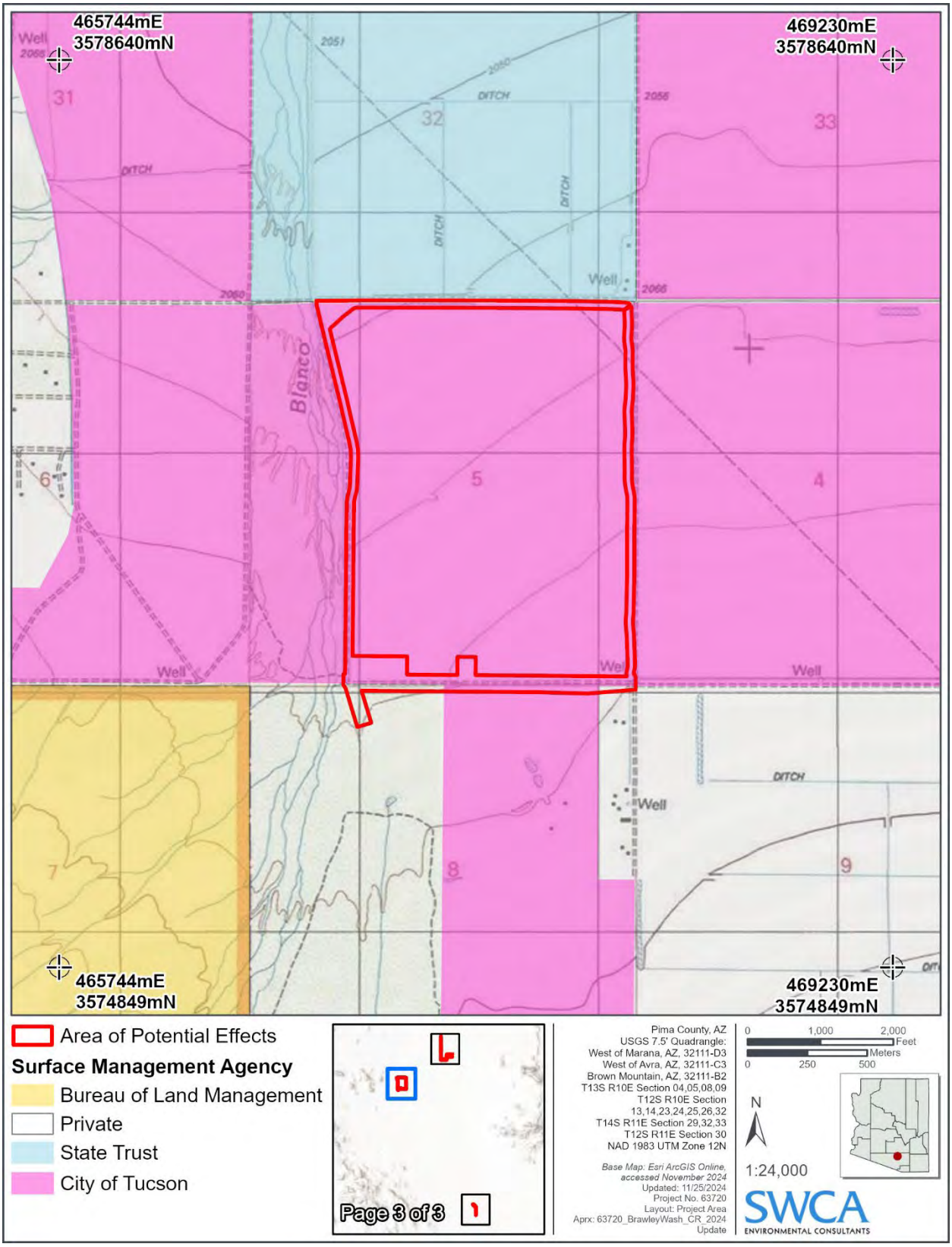


Figure 4. Tucker Road Problem Area location.

Table 2. Environmental Setting of Problem Areas

Problem Area	Geological Setting*	Biotic Community†	Elevation‡	Surface Condition
Tortuga Ranch	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	2,339–2,320 feet	Disturbed, undeveloped
Prickle Desert	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	1,999–2,045 feet	Abandoned farmland
Tucker Road	Quaternary surficial deposits, undivided	Lower Colorado Subdivision of Sonoran Desertscrub	2,088–2,064 feet	Abandoned farmland

* Arizona Geological Survey (2000)

† Brown (1994)

‡ Above mean sea level



Figure 5. Representative APE overview—Prickle Desert Problem Area; view facing south.

CULTURAL CONTEXT

Cultural Background

A culture history for the Brawley Wash Watershed Plan is provided in Rawson et al. (2021). A summary is provided here as a guide to the type of sites that might be expected in the Problem Areas and to inform the development of historic contexts. Archaeologically visible human occupation of the Avra and Altar Valleys spans approximately 12,000 years, from the Paleoindian period to the present. The cultural sequence is divided into five time periods based on regional chronologies by Huckell (1984) and Doelle and Wallace (1991). These periods are labeled the Paleoindian (10,000–7500 B.C.), Archaic (7500 B.C.–A.D. 300), Ceramic (A.D. 200–1450), Protohistoric (A.D. 1450–1700), and Historic (A.D. 1700–1971) periods.

Paleoindian Period (10,000–7500 B.C.)

During the Paleoindian period, small groups of people crossed wide territories hunting large, now-extinct mammals such as mammoths. The most recognizable artifacts from this period are the large fluted projectile points of the Clovis and Folsom traditions. Evidence for Paleoindian occupation of the Avra Valley is sparse, but isolated projectile points have been found (Huckell 1982, 1984), including a fragment of a fluted point at AZ AA:15:162(ASM) on the Ironwood Forest National Monument (Heilen and Reid 2006). Pleistocene fauna have been found in Avra Valley, including horse bone at a site on Brawley Wash and mammoth remains in Los Robles Wash (Haynes and Huckell 1986:15–16).

Archaic Period (7500 B.C.–A.D. 300)

The Archaic period is the traditional name for the time between the Paleoindian period and the appearance of pottery-container technology. This long span of time used to be divided into Early, Middle, and Late stages, but the Late Archaic in southeastern Arizona has more recently been called the Early Agricultural period. Projectile points continue to be distinctive indicators of Early Archaic presence: three Early Archaic period tapering-stemmed projectile points were found on the surface of a large multicomponent site on the upper bajada of the Silver Bell Mountains (Hesse 2004). Middle Archaic period sites are better represented in the record and have been identified on the bajada slopes of the mountain ranges surrounding Avra Valley (Dart 1987). Late Archaic–Early Agricultural sites are associated with evidence of increasing sedentism and less-mobile subsistence strategies that emphasized farming (Roth 1988). Extensive settlements have been documented on the Santa Cruz River floodplain in this period (Mabry 2007), but it is likely that the population remained mobile in most settings.

Ceramic Period (A.D. 300–1450)

Sometime around A.D. 200, perhaps as much as two centuries earlier, true ceramic containers appeared in the Tucson Basin. The Agua Caliente phase was characterized by plain brown ware ceramics and vessel shapes that include primarily seed jars and occasionally bowls (Deaver and Ciolek-Torrello 1995; Whittlesey 1998). These sand-tempered ceramics were made over broad areas of the Southwest, which suggests that ceramic-container technology may have been introduced from a single source and that the cultural differentiation characteristic of later periods had yet to take place (Whittlesey 1995).

By around A.D. 650, the archaeological culture we recognize as the Hohokam of the Tucson and Gila-Salt Basins had appeared. The Hohokam practiced agriculture dependent on large-scale irrigation, lived in villages, and developed a regional ideology and ceremonialism. Ball courts, platform mounds, craft style, and imported artifacts indicate Hohokam interaction with societies as far south as Mesoamerica (Doyel 2007:87). Most of the Ceramic period material reported from the Avra Valley is very similar to that of the Tucson Basin Hohokam, indicating ongoing interaction between the precontact populations of the two areas. However, ceramic wares attributed to the Trincheras culture, which likely developed in the valleys of the Río Altar and Río Magdalena in northern Sonora, Mexico, are also found. The earlier part of the Hohokam trajectory is characterized by large ball court villages like AZ AA:11:12(ASM), AZ AA:12:57(ASM]), and AZ AA:11:25(ASM) (Barr and Hesse 2010). Later, the Classic period was a time of change in much of the Hohokam world. Environmental change may offer a partial explanation; flooding became more problematic in the Hohokam core area, washing out canals on the Salt and Gila Rivers (Doyel 2007). Pottery from the Papaguería region (west and south of the study area) has been found at Classic period sites in Avra Valley, which suggests increased interaction between populations living in the two areas (Dart and Gibson 1988). One sites from the period is AZ AA:7:11(ASM) on Cerro Prieto, a peak in the Samaniego Hills. This was a large, complex, hillside *trincheras* village with more than 250 masonry rooms and numerous stone compounds, terraces, walls, and other features (Downum 1993; Pailes 2014).

Protohistoric Period (A.D. 1450–1700)

The Hohokam cultural trajectory reached a hiatus in the mid-1400s, and the large, aggregated communities of the Late Classic period dispersed about A.D. 1450. Some Tohono O'odham people associate this time with their overthrow of the headmen Sivañ Maakai and Jenashad at Sivañ Va'aki (the Great House at Casa Grande) (Winters 2021). To archaeologists specifically studying the Hohokam tradition, it marks a clear point of change. In the regional perspective of Southwest archaeology, the Classic period was marked by periodic reorganizations and migrations, and the events of ca. A.D. 1450 form the last chapter of this era. The O'odham people are among those who identify the Hohokam as ancestors. The Hopi people also trace some of their clans through the Hohokam. Following the Hohokam, Tohono O'odham/Sobaípuri and Apache groups are known to have occupied the Santa Cruz Valley and Avra Valley. The Protohistoric period populations of southern Arizona may have adapted to post-Classic period conditions by returning to a subsistence strategy involving more wild-food gathering, more mobility, and less farming. Erickson (1994:104) states that the whole Avra Valley had been O'odham lands, but the lack of permanent water sources meant there were no villages there.

Historic Period (A.D. 1700–1974)

The Historic period in south-central Arizona was marked by the arrival of Europeans in the late 1600s. Spanish colonization of what is now known as southern Arizona began in the 1690s with the travels of the Jesuit missionary Eusebio Francisco Kino. Kino first traveled as far north as the Tucson Basin in 1692 and 1694 (Doelle 1984). Father Kino established missions at Tumacacori and Tubac in the Santa Cruz Valley in 1691. The mission at San Xavier del Bac in the southern Tucson Basin was established under Kino's influence in 1700. In 1775, a presidio was established in Tucson to protect the missions at San Xavier and San Agustín from Apache attack (Harry and Ciolek-Torrello 1992). Juan Bautista de Anza led a Spanish expedition from Sonora, Mexico, to the San Francisco Bay area of California in 1775–1776. The expedition made camp one night at an abandoned O'odham village called Oytaparts, near Marana (Guerrero 2006:96). O'odham people continued a very Hohokam-like subsistence strategy in the Tucson Basin at this time (Castetter and Bell 1942) and occupied villages along the Santa Cruz River. It is not known how intensively they occupied Avra Valley. Historic O'odham ceramic types, most notably Papago Red and Papago Plain, are considered quite distinctive, with a dark carbon core. Sherds are occasionally found in Avra Valley.

During the late 1800s, cattle and mining industries were established in Avra Valley. For example, Pedro Aguirre pioneered ranching in the Altar Valley, and Bernabé Robles's ranch was established in 1882 in Avra Valley. Copper deposits in the Silverbell Mountains attracted a succession of prospectors and mining companies between the 1870s and 1925 (Briggs 2017). In the twentieth century, technological innovations, such as pumps, and improvements in irrigation methods led to intensified agricultural development in Avra Valley. Cotton and alfalfa were the most frequently planted crops and required large numbers of seasonal laborers, including Mexican, Yaqui, African American, and Euro-American migrants. Six thousand acres of land was irrigated near Marana in 1920, mostly using privately supplied water from Cortaro, in the Santa Cruz Valley (White et al. 1966). Additional water was provided from wells. By 1950, the population of Tucson had grown to nearly 120,000, and the irrigated area of farmland near Marana had reached 30,000 acres (White et al. 1966:9). The expansion of farmland was curtailed in 1954, when it was declared a critical groundwater area. Within the past 20 years, large tracts of agricultural land in Avra Valley have been converted to housing developments to meet the needs of the population influx in southern Arizona.

Archaeological Records Search

The archaeological records search aimed to identify previously conducted surveys and previously recorded sites in each Problem Area and, for additional context, within a 1-mile (1.6-kilometer [km]) radius of each Problem Area. The records search was compiled using the AZSITE database, which includes records from the Arizona State Museum (ASM), Arizona State University, Bureau of Land Management, and SHPO. Additional research was conducted on April 9, 2024, at the ASM Archaeological Records Office (ARO). Pima County's Office of Sustainability and Conservation contributed information to the previous cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021). No additional information was identified in County records for the five Problem Areas. The City of Tucson Historic Preservation Office maintains an interactive map of historic properties and defined archaeological sensitivity areas, but none of the resources are in Brawley Wash Watershed Plan project area. Appendix A presents a series of maps showing the confidential results of the records search. The National Park Service National Register Information Systems Database was also consulted for properties or districts within a 1-mile (1.6-km) radius of the project area that are listed in the NRHP. No NRHP-listed properties were identified.

Previous Research in the Brawley Wash Watershed Plan Study Area

The largest archaeological projects conducted within the Brawley Wash Watershed Plan study area have been associated with the CAP. These began in the 1980s with the Tucson Aqueduct Phase B Survey Project (Downum et al. 1986) and subsequent data recovery investigation at 13 archaeological sites. The CAP effort also included a water supply project intended to deliver and apply water to farmland on the Tohono O'odham Indian Reservation in response to the Southern Arizona Water Rights Settlement Act of 1982. The project involved construction of a water delivery system and development of new agricultural fields in the Schuk Toak and San Xavier Districts of the Tohono O'odham Nation. Tucson Water sponsored further archaeological work in the 1990s during planning for the Central Avra Valley Storage and Recovery Project (CAVSARP) underground water storage facilities and more recently for the companion SAVSARP facilities. Site testing was conducted (Lindeman 2000), but these projects—which occupy a considerable area in the middle of Avra Valley—do not appear to have led to the discovery of large numbers of sites or significant data recovery excavations. The previous research identified in the Problem Area APE sections, below, includes tasks within these large projects; however, previous research in the Problem Area APE is dominated by linear surveys, notably along electrical power lines.

Record Search by Problem Area APE

TORTUGA RANCH

The Tortuga Ranch Problem Area APE is within the area surveyed by Desert Archaeology in 2003–2004 prior to the construction of SAVSARP (Herr 2004a) (Appendix A:Figure A-1). The survey was assigned the ASM accession number 2003-1544.ASM. It was a systematic survey with transect spacings of 15–20 m. This extensive (2,370 acres) survey included approximately 30 percent of the 1-mile radius around the Tortuga Ranch Problem Area APE. Desert Archaeology subsequently conducted another project related to SAVSARP in 2004 and recorded a small site on the edge of the former east channel of Brawley Wash (Herr 2004b). Additionally, two surveys conducted in 1980 and 1981 for a Tucson Electric Power electrical line cross the southern end of the APE (1980-242.ASM and 1981-154.ASM) (Wilson 1980 and Wilson 1981). Seven other surveys were identified in the search radius. This list includes one of the CAP projects (1984-191.ASM), with an uncharacteristically small project area small project area around a series of drill holes (Lincoln 1985). The other previous projects in the search radius were linear studies in support of utility lines. None of these surveys covered large areas in the search radius. Work was undertaken in the Problem Area vicinity periodically from the early 1980s until recent time. Another electrical line was surveyed along Bopp Road in 1991 for Trico and a Comcast Cable communications

line was surveyed in 2002. SWCA surveyed a Trico electrical line north of the Three Points substation in 2003, and most recently, another Trico electrical line was surveyed from Sandario Road to El Toro Road.

No known archaeological sites intersect the Tortuga Ranch Problem Area (see Appendix A:Figure A-1). The only recorded site in the search radius is AZ AA:16:473(ASM), the artifact scatter recorded by Desert Archaeology in 2004. AZ AA:16:473(ASM) was characterized as a small Hohokam artifact scatter, including a concentration of plain brown ceramics, a single piece of flaked stone, and one ground stone. The modest site inventory totaled 46 artifacts. The sherds appeared to represent at least three vessels, and the site was interpreted as a limited-activity area (Herr 2004b:22).

PRICKLE DESERT

One previous survey was identified within the Prickle Desert Problem Area APE (Appendix A:Figure A-2). The survey of 320 acres of retired farmland owned by the City of Tucson conducted in 2011 and covered the current APE along Garvey Road. The survey methodology included transects spaced less than 20 m apart, use of GPS devices, and ASM site recording criteria (King 2011). The survey resulted in the documentation of two archaeological sites and 38 IOs. Neither of the sites were recorded within the current APE. Three additional projects were found in the 1-mile search radius. Two other survey projects followed electrical lines almost exactly 1 mile west of the APE in 1992 and 2010 and the third followed an electrical line 1 mile east of the APE in 2001. One archaeological site was recorded in the 1992 survey (Slaughter et al. 1992).

There are no previously recorded sites within the Prickle Desert Problem Area APE (see Appendix A:Figure A-2). Eight sites have been recorded within the 1-mile file search radius. AZ AA:11:109(ASM) was recorded in 1992, at which time it was described as a historic-age trash deposit including pottery, glass, and evaporated milk cans (Slaughter et al. 1992:15). The other two sites were recorded in 2011 north and east of the Problem Area. One of these sites, AZ AA:11:241(ASM), consisted of agricultural features resulting from Historic period farming. These included an irrigation system and a domestic structure. These features were in poor condition, with elements intentionally removed in a remediation project following purchase of the land by the City of Tucson. The second site, AZ AA:12:242(ASM), was described as a light-density artifact scatter with possible Archaic and Ceramic period material. The site was evaluated as in fair condition, despite impacts from plowing and grazing. The recorders stated that testing would be required to evaluate the site significance, specifically to identify potential subsurface cultural deposits. Testing was subsequently undertaken at AZ AA:11:242(ASM). Diagnostic artifacts collected from the site surface indicated that the site was used in the Late Archaic period, but no intact subsurface features or deposits were found. It was suggested that leveling and cultivation had destroyed any subsurface deposits that were once present (Buckles 2011). Aerial imagery shows that the proposed solar facility was then developed on the parcel, including the mapped site area. AZ AA:11:239(ASM) is a mile west of the APE and represents the remains of an abandoned military airfield that was utilized between 1942 and 1945, during World War II (Buckles et al. 2010). The remaining four sites are newly recorded sites east of the APE and have yet to be reported to ASM.

TUCKER ROAD

Three previous survey projects have minimally intersected the Tucker Road Problem Area APE but included only 10 percent of the area (Table 3; Appendix A:Figure A-3). Two surveys followed a proposed transmission line along the east edge of the Problem Area in 1980–1981, and a small gas supply installation was surveyed on the northern edge of the parcel in 1992. Four other linear surveys along electrical lines and a gas pipeline were conducted in the 1-mile search radius (1997–2017); these surveys covered a small percentage of the search radius and did not result in the discovery of any sites. Two previously recorded sites are within the 1-mile search radius around the Tucker Road Problem Area APE (see Appendix A; Figure A-3), which are the two northernmost sites in a cluster of sites that has been

recorded farther south along Blanco Wash. Both AZ AA:11:3(BLM) and AZ AA:11:4(BLM) are Hohokam artifact scatters.

Table 3. Previously Conducted Archaeological Surveys in the Tucker Road Problem Area

Agency Number	Survey Name	Reference
1980-242.ASM	TEP Tortolita-South Utility Corridor and Alternate Routes	Wilson (1980)
1981-154.ASM	TEP Tortolita-South Realignment Survey	Wilson (1981)
1992-13.ASM	Kai Farms Tap Delivery Point	Kisselburg (1992)

Historical Map Research

Historical maps were consulted to identify historic-era features that may be present in the survey area. The main sources of historical information are General Land Office (GLO) maps drawn when Townships were surveyed and platted. The surveys were ultimately intended to support land sales or other land claims (homesteads, mining claims), and the mapping process often prioritized areas where land was more desirable. The three Problem Area APEs were surveyed between 1895 and 1922. The surveys in 1922 were among the last original GLO surveys in Avra Valley, in more remote areas. The U.S. Geological Survey quadrangle maps are generally more recent. The rural areas that characterize the study area were mapped in a sequence of 15-minute, or larger, quadrangles in the middle of the twentieth century. More detailed 7.5-minute quadrangles were developed later, in the modern era for some of the Problem Area APEs. A selection of historical maps is provided in Appendix B.

Tortuga Ranch

The GLO map of Township 14 South, Range 11 East was filed in 1904, based on surveys performed from 1895 through 1903. No cultural features were shown in the APE (Appendix B:Figure B-1). The 1925 San Xavier 15-minute quadrangle showed a road crossing the APE between ranches owned by COX and RODRIGUEZ. Both ranches were depicted with fenced enclosures and a well. The 1934 Tucson Mountains 30-minute quadrangle showed two roads in the APE within a network that connected ranches owned by BURREUL, COX, and RODRIGUEZ (Appendix B:Figure B-2). These roads were not shown on the 1925 San Xavier 15-minute quadrangle. Brawley Wash (unnamed on the map) was depicted as two converging channels crossing the current location of the diversion berm. There was a dirt road along the north edge of Section 32, ROBLES WELL to the west, and a stock tank to the north. The diversion berm that constitutes the southwest edge of the APE was shown on the 1968 Brown Mountain 7.5-minute quadrangle (therefore, it is older than SAVSARP, although it may have been repaired at that time [cf. Stantec 2022]) (Appendix B:Figure B-3). A north-south aligned unnamed dirt road is also noted in the APE matching the current alignment of Marstellar Road. This map shows several braided channels of Brawley Wash, two of which are intercepted by a berm and diverted northwest toward Robles Well and the modern Tortuga Ranch. There was a stock tank near the ranch and a road along the north edge of Section 32. Modern imagery identifies the section line road as West Donaldson Ranch Road and the ranch to the west as Tortuga Ranch. Tortuga Ranch is a ranch and farm owned by the Pascua Yaqui Tribe that houses Sewa U'usim (health and social service) programs (Pascua Yaqui Tribe 2024).

Prickle Desert

The GLO map of Township 12 South, Range 10 East was filed in 1924, based on surveys performed from 1911 through 1922. An unnamed road extending northwest from YSABEL GARCIA HOUSE crossed Section 25 near the eastern end of the APE (Appendix B:Figure B-4). The 1934 Tucson Mountains 30-minute quadrangle showed a road crossing the APE near GARCIA RANCH, which was located immediately south

of the area (Appendix B:Figure B-5). The 1956 1:250,000 Tucson and 1959 30-minute Tucson maps showed a ranch (unnamed) just outside APE to the west and an unnamed north-south trending road near the APE. The 1959 Silverbell Peak 15-minute quadrangle showed a windmill on the western edge of the APE (Appendix B:Figure B-6). Dirt roads and a cluster of buildings were shown at the ranch location just outside the area and an unnamed dirt road that follows the current alignment of Garvey Road runs along the northern portion of the APE. The 1964 edition of the 1:250,000 Tucson map was consistent with the earlier edition, and no 7.5-minute quadrangle was produced in historic times. The APE appears undeveloped in modern imagery. There are more evident field systems to the north and a new solar facility. There is some dispersed residential development around the area. Some structures west of the parcel may be ranch features. There was a house with associated buildings just outside the northwest corner of the APE, which may have been the ranch mapped in the 1950s. Google Earth (2024) historical imagery shows that most of these were removed in 2012 and only a foundation remains.

Tucker Road

The GLO map of Township 12 South, Range 10 East was filed in 1924, based on surveys performed from 1911 through 1922 (Appendix B:Figure B-7). It showed a north-south fence dividing Section 5 within the APE and two unnamed dirt roads. One road trended north-south and the other northeast-southwest. No cultural features were shown in the Problem Area on the 1934 Tucson Mountains 30-minute quadrangle (Appendix B:Figure B-8). The 1956 1:250,000 Tucson and 1959 30-minute Tucson maps showed an UNDERGROUND PIPELINE extending southeast from a NATURAL GAS STATION (compressor station) to the edge of the APE. This is the El Paso Natural Gas California Mainline (Line Nos. 1100 and 1103), which crosses the northeast corner of the APE. It has been recorded as a site and/or in-use structure in many other locations (Hesse 2007). Features outside the APE included a cotton gin to the east and unnamed ranches. The 1959 Silverbell Peak 15-minute quadrangle showed the pipeline extending continuously through the area (Appendix B:Figure B-9). This map also showed a system of irrigation canals within the APE and TUCKER ROAD is identified by name directly north of the APE. The WESTERN AVRA COTTON GIN was 1 mile east of the APE. Modern aerial imagery (Google Earth 2024) shows the APE as an abandoned field system.

Survey Expectations

The records search data provide some indication of the numbers and types of sites that might be found in each Problem Area APE.

Tortuga Ranch

The Tortuga Ranch Problem Area APE is small, compared with the other areas. It was surveyed in 2003–2004, before the construction of SAVSARP. The survey was completed more than 10 years ago, and the areas would require resurvey. It seems unlikely that there is a significant precontact site in the Problem Area that was not recorded during the previous survey. The Pima County Archaeological Sensitivity Model suggests that sites are likely in this area, but there is no known site in the APE, and the number of recorded sites is low in the surrounding search radius. The APE is not within retired fields; however, the diversion berm that constitutes the southwest edge of the APE was shown on the 1968 Brown Mountain 7.5-minute quadrangle and therefore appears to be of historic age.

Prickle Desert

The Prickle Desert Problem Area APE has not been surveyed, except for the Garvey Road portion. The modeled archaeological sensitivity is low, and few sites have been recorded in the surrounding area. One precontact site was recorded north of the Problem Area in a solar development. Late Historic period

agricultural features were also documented in this area. The Problem Area is retired agricultural land, and Late Historic period agricultural features are likely to be present.

Tucker Road

There has been minimal previous survey in the Tucker Road Problem Area, and none of that was conducted in the past 10 years. The archaeological sensitivity of this area is high in the Pima County model, but few sites have been recorded (possibly reflecting limited research). There are no recorded sites in or within the 1-mile search radius around the Tucker Road Problem Area.

PROJECT METHODS

SWCA archaeologist Eric Petersen surveyed the project area on September 12, 13, and 20, 2024. General conditions for the survey were good, but visibility in some areas was limited in places by dense vegetation. Systematic survey was conducted within the project area, with parallel transects walked spaced no more than 20 m apart. Evidence for cultural resources was sought in the form of artifacts (e.g., ceramics, lithics, historical metals, or glass) or features (concentrations of fire-affected rock, charcoal-stained soil, prehistoric or historic structures, or other cultural anomalies).

The ASM has established standards for evaluating materials identified during archaeological surveys (Fish 1995). Briefly, properties of archaeological interest must contain the remains of past human activity that are at least 50 years old. Beyond this, two classes of findings are recognized, the site and the isolated occurrence (IO). To qualify as a site, a property must contain, within an area no more than 50 feet in diameter, 30 or more artifacts of a single type, unless all pieces originate from a single source (e.g., one broken bottle or ceramic vessel); 20 or more artifacts when multiple types are present; any number of artifacts when a single fixed feature is present; or multiple fixed features, with or without any associated artifacts. The site can be larger than 50 feet in diameter as long as any 50-foot-diameter portion of the site meets one of these conditions. Artifact finds that do not meet these criteria but that are over 50 years old may be designated as IOs. Archaeological sites are accurately mapped and plotted using a handheld GPS device, photographed, and recorded using a standard ASM form. The precise locations of the IOs are point-located and recorded using a handheld GPS unit. Standard survey methodology in Arizona is non-collection survey (i.e., artifacts are field-analyzed and then returned to their original locations).

National and Arizona Registers Criteria for Evaluation

Four criteria are applied in the evaluation of cultural properties for inclusion in the National Register of Historic Places (NRHP) (36 Code of Federal Regulations 60.4). The same criteria are used to evaluate properties for inclusion in the Arizona Register of Historic Places (ARHP) (Arizona Administrative Code R12-8-302). Normally, a significant property must be at least 50 years old and meet at least one of these four criteria to be considered eligible for listing in the NRHP. According to the NRHP criteria, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

A. that are associated with events that have made a significant contribution to the broad patterns of our history;

B. that are associated with the lives of persons significant in our past;

C. that embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguished entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory or history.

SURVEY RESULTS

The survey of the project area resulted in the documentation of two newly recorded archaeological sites and 19 IOs. Survey results maps showing the locations of the archaeological sites and IOs are in Appendix C, and archaeological site descriptions and a table of IOs is provided in Appendix D.

The survey of Tortuga Ranch Problem Area APE resulted in the recording of one newly identified Hohokam archaeological site (AZ AA:16:680[ASM]), consisting of a loose cluster of thermally fractured rock and 10 pieces of flaked stone, 21 ceramic pottery sherds, and three ground stone artifacts The site is recommended eligible for listing in the ARHP and the NRHP under Criterion D, for its potential to yield information on Hohokam land use and settlement patterns in Avra Valley. Four IOs were found in the Tortuga Ranch Problem Area APE, including one flake, one ground stone mano fragment, one in-historic road, and one earthen diversion structure.

The survey of the Prickle Desert Problem Area APE resulted in no discoveries of archaeological sites. Seven IOs were found in this Problem Area, including five pieces of flaked stone, the remnants of historic concrete-lined irrigation canals, and one in-use historic road.

The survey of Tucker Road Problem Area APE resulted in the recording of one newly identified Hohokam archaeological site (AZ AA:11:268[ASM]), consisting of an estimated 1,000 to 5,000 Hohokam artifacts, including ceramic pottery sherds, flaked stone tools and debitage, and ground stone. The site is recommended eligible for listing in the ARHP and the NRHP under Criterion D, for its potential to yield information on Hohokam land use and settlement patterns in Avra Valley. Eight IOs were found in the Tucker Road Problem Area APE, including five flakes, two occurrences of Hohokam ceramic pottery sherds, and the remnants of historic concrete-lined irrigation canals.

SUMMARY AND MANAGEMENT RECOMMENDATIONS

The cultural resources survey resulted in the identification of two newly recorded archaeological sites and 19 IOs. The two archaeological sites are Hohokam artifact scatters (AZ AA:11:268[ASM] and AZ AA:16:680[ASM]), one (AZ AA:11:268[ASM]) with an associated rock feature. Both sites are recommended eligible for inclusion in the NRHP and the ARHP. The artifact assemblages observed during the current survey project at AZ AA:16:680(ASM) indicates multiple site activities, and the presence of a thermal feature at AZ AA:11:268(ASM) may indicate additional intact subsurface thermal features are present. Both sites have the potential to provide information important to our understanding of Hohokam land use and settlement patterns in the Avra Valley. PCRFCD should avoid ground-disturbing activities within these sites when developing and implementing the Brawley Wash Watershed Plan. Alternatively, a plan should be developed and implemented to mitigate the potential adverse effects to the sites that would result from project activities if they are not avoided. No further cultural resources work is recommended outside the boundaries of these two sites.

In the event that previously unreported cultural resources are encountered during ground disturbing activities, all work must immediately cease within 30 m (100 ft) and the discovery must be reported to the project sponsor who will notify NRCS's Arizona State Cultural Resources Specialist (SCRS); the SCRS will then notify the land managing agency, SHPO, and the Tribes, as appropriate, of the discovery within

24 hours. The ASM must also be notified if the previously unreported cultural resources are on city, county, or state lands. A qualified archaeologist must then document the discovery and evaluate its eligibility for the NRHP/ ARHP in consultation with the lead agency, the SHPO, and Tribes, as appropriate. Work must not resume in this area without approval of the lead agency.

If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 m (100 ft) of the encounter and the area must be secured. The ASM, lead agency, SHPO, and appropriate Tribes must be notified of the encounter. All encounters will be treated in accordance with Arizona Revised Statutes 41-844 or 41-865, as appropriate, and work must not resume in this area without authorization from ASM and the lead agency.

Table 4. Management Summary

Site Number/Name	Identification Status	Land Jurisdiction	Eligibility Status	Recommended Treatment
AZ AA:11:268(ASM)	Newly recorded	City of Tucson and private	Recommended eligible, Criterion D	Avoid
AZ AA:16:680(ASM)	Newly recorded	City of Tucson	Recommended eligible, Criterion D	Avoid

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APPENDIX A

Class I Records Search Maps

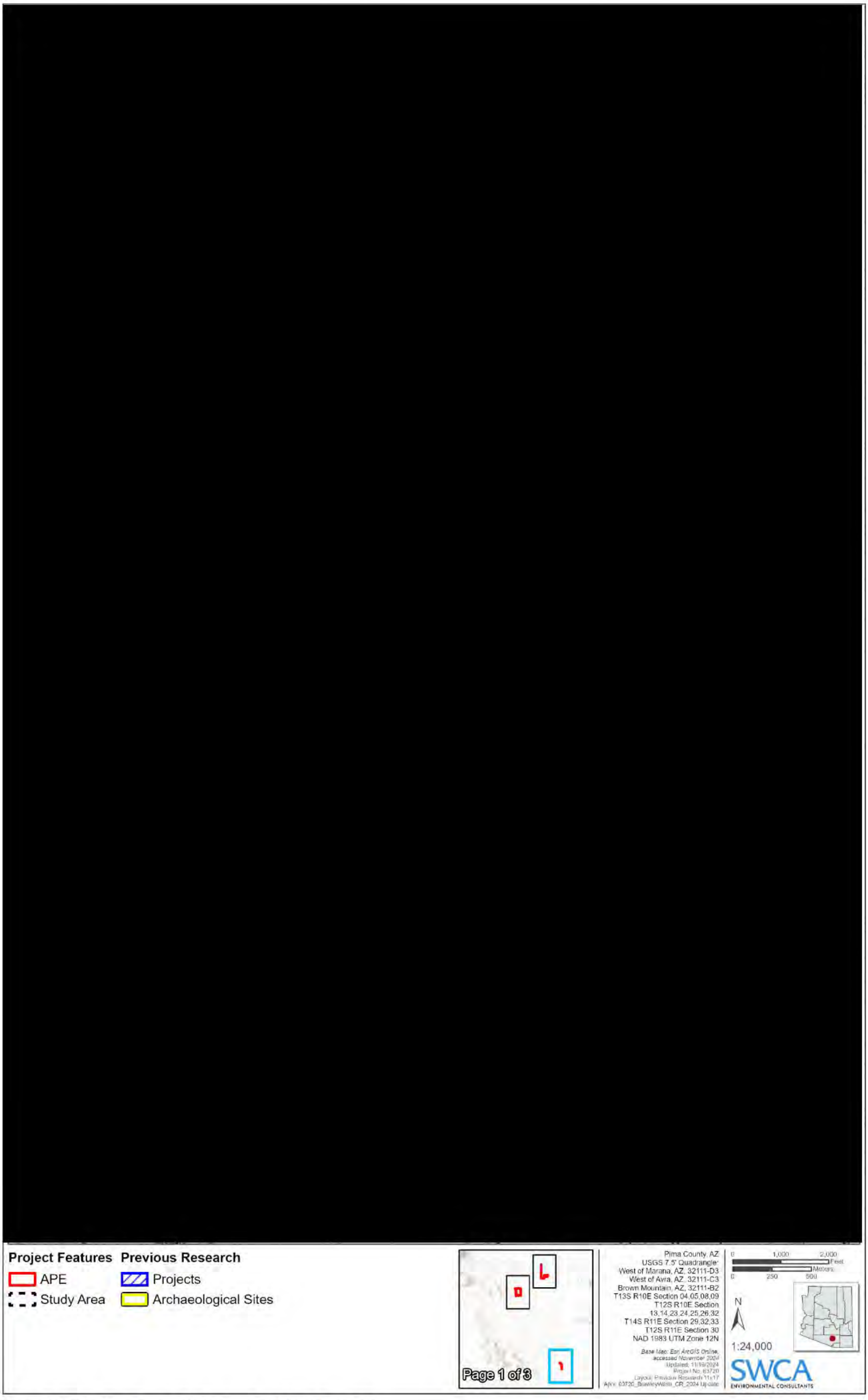


Figure A-1. Previous Research: Tortuga Problem Area APE.

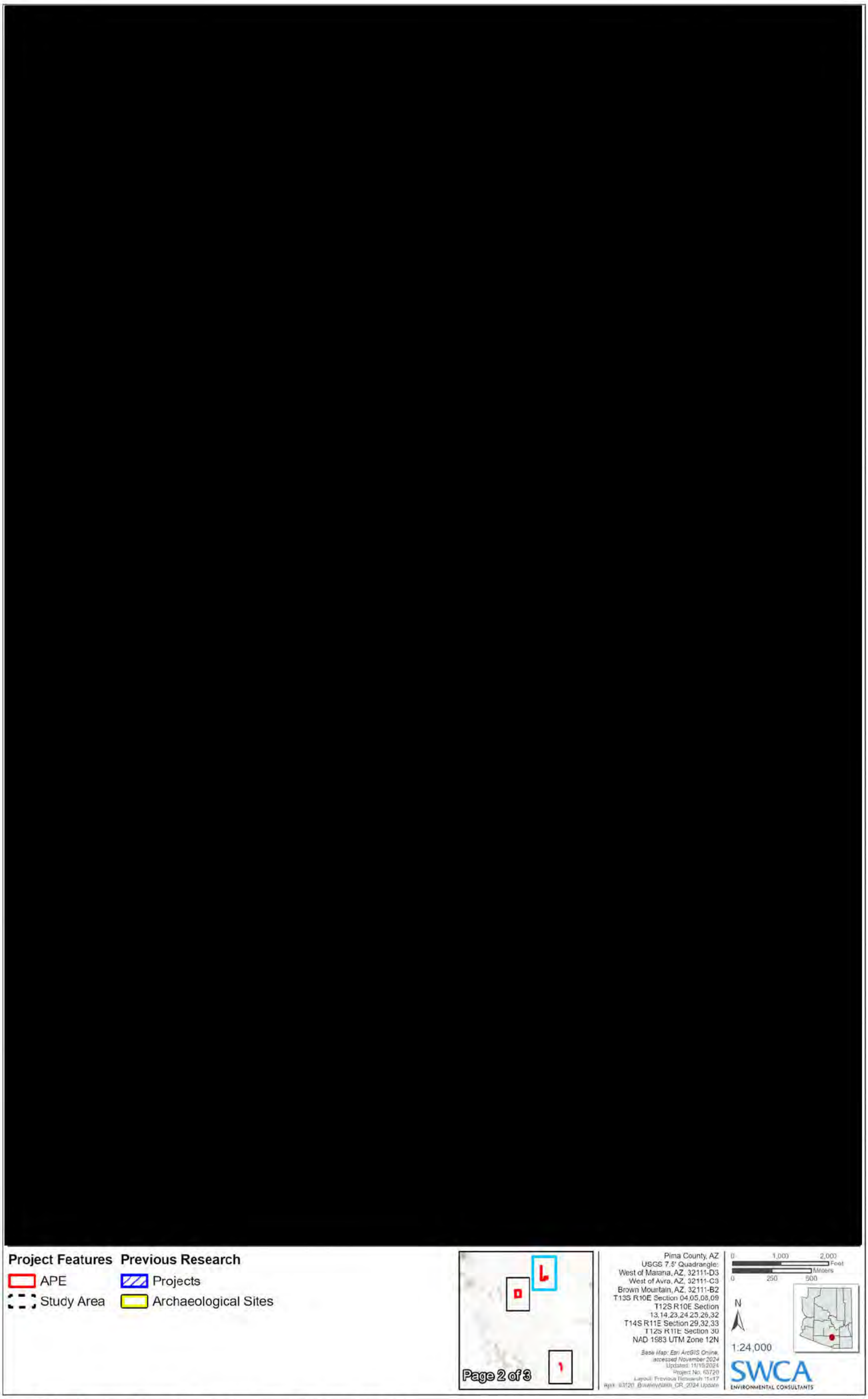


Figure A-2. Previous Research: Prickle Desert Problem Area APE.

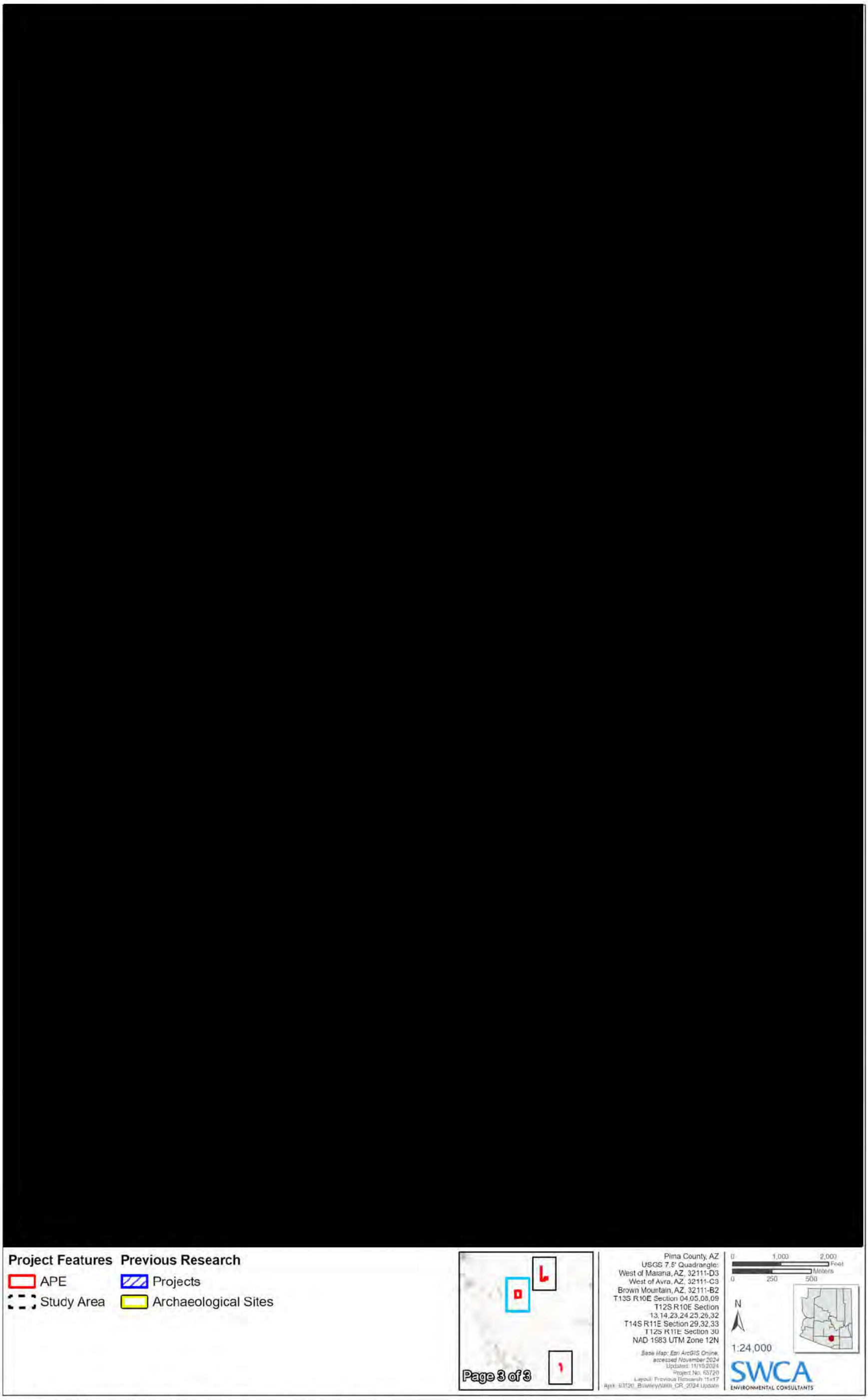


Figure A-3. Previous Research Tucker Road Problem Area APE.

APPENDIX B

Historical Maps

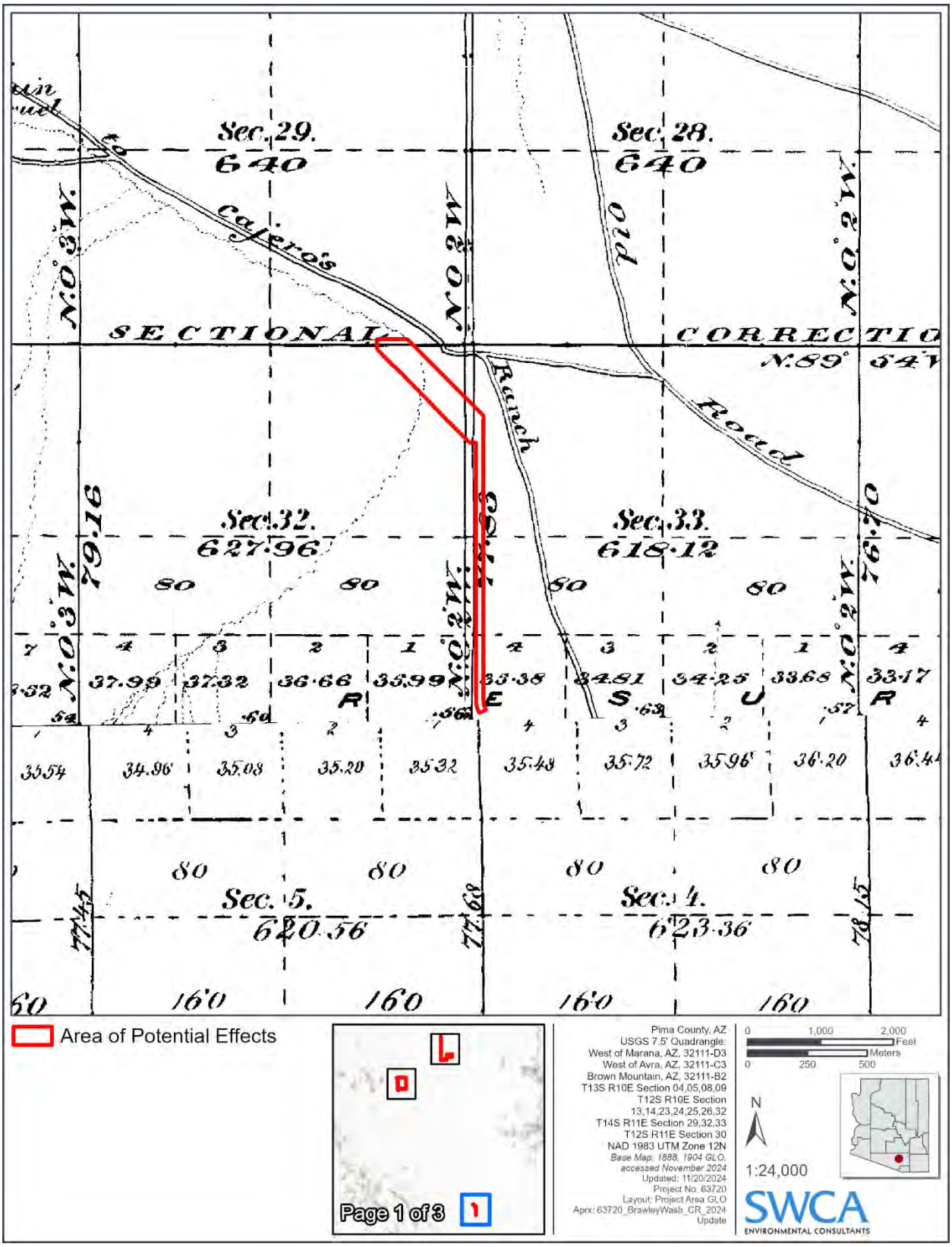


Figure B-1. Tortuga Ranch Problem Area on the 1888 and 1904 GLO maps.

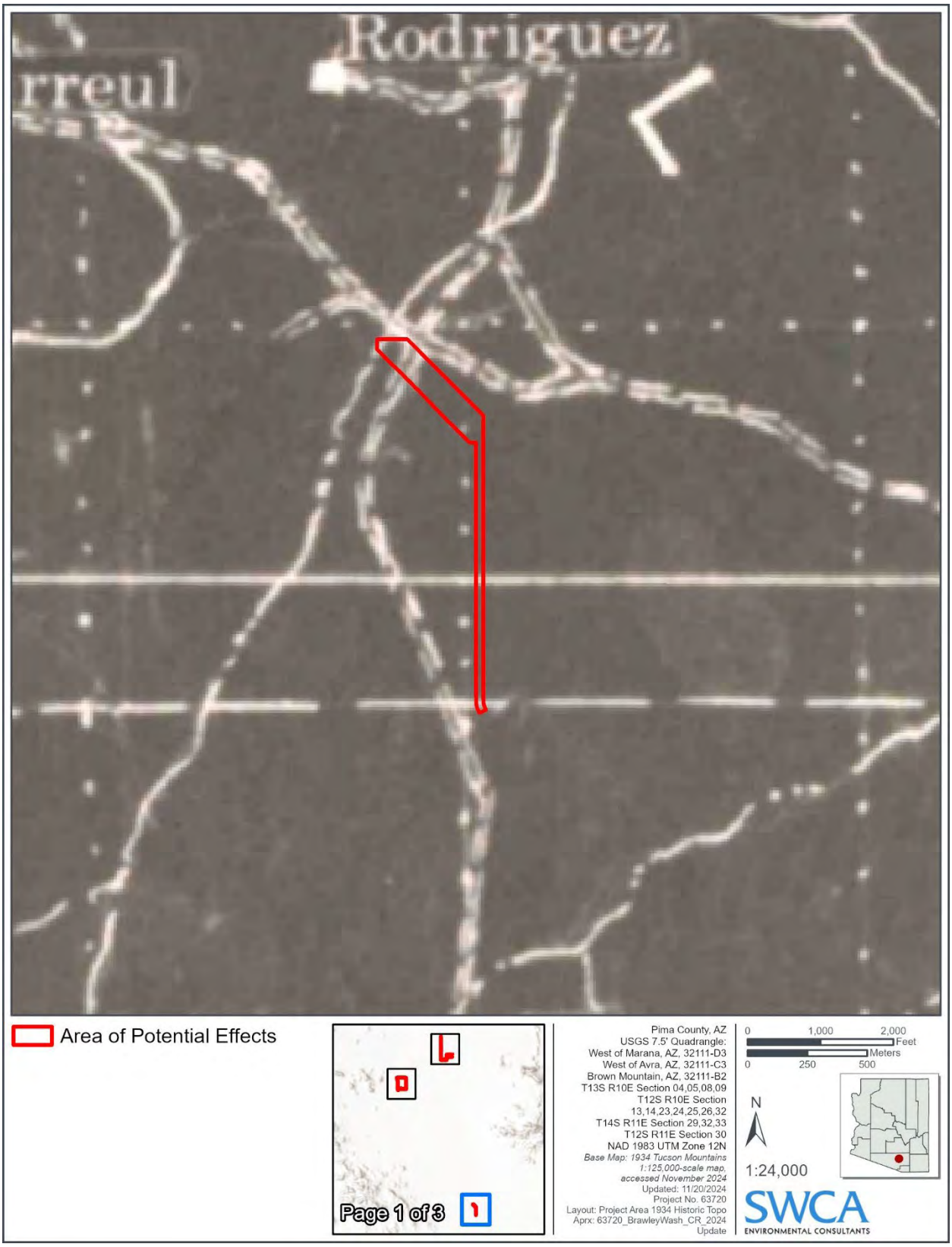


Figure B-2. Tortuga Ranch Problem Area on the 1934 Tucson Mountains 30-minute quadrangle.

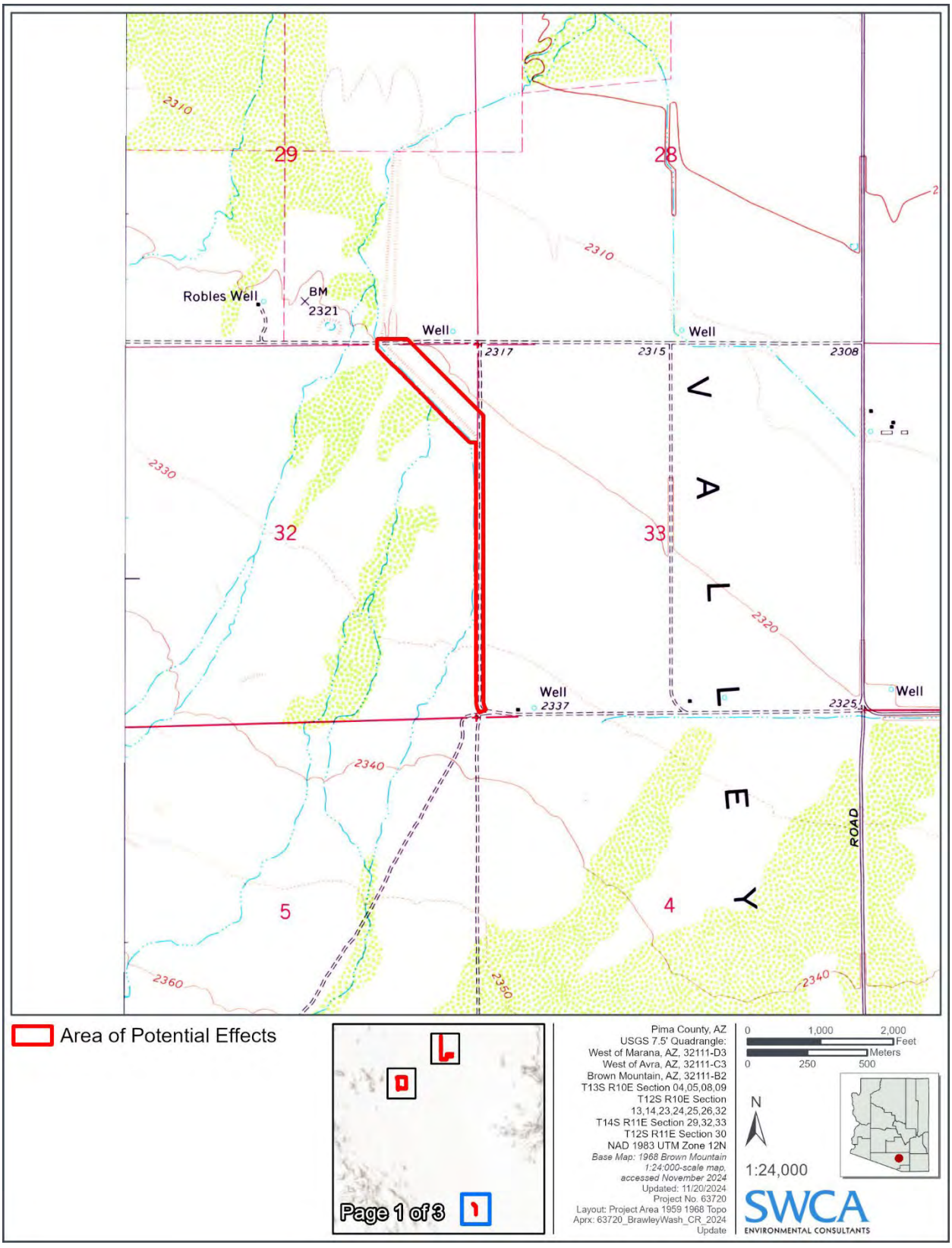


Figure B-3. Tortuga Ranch Problem Area on the 1968 Brown Mountain 7.5-minute quadrangle.

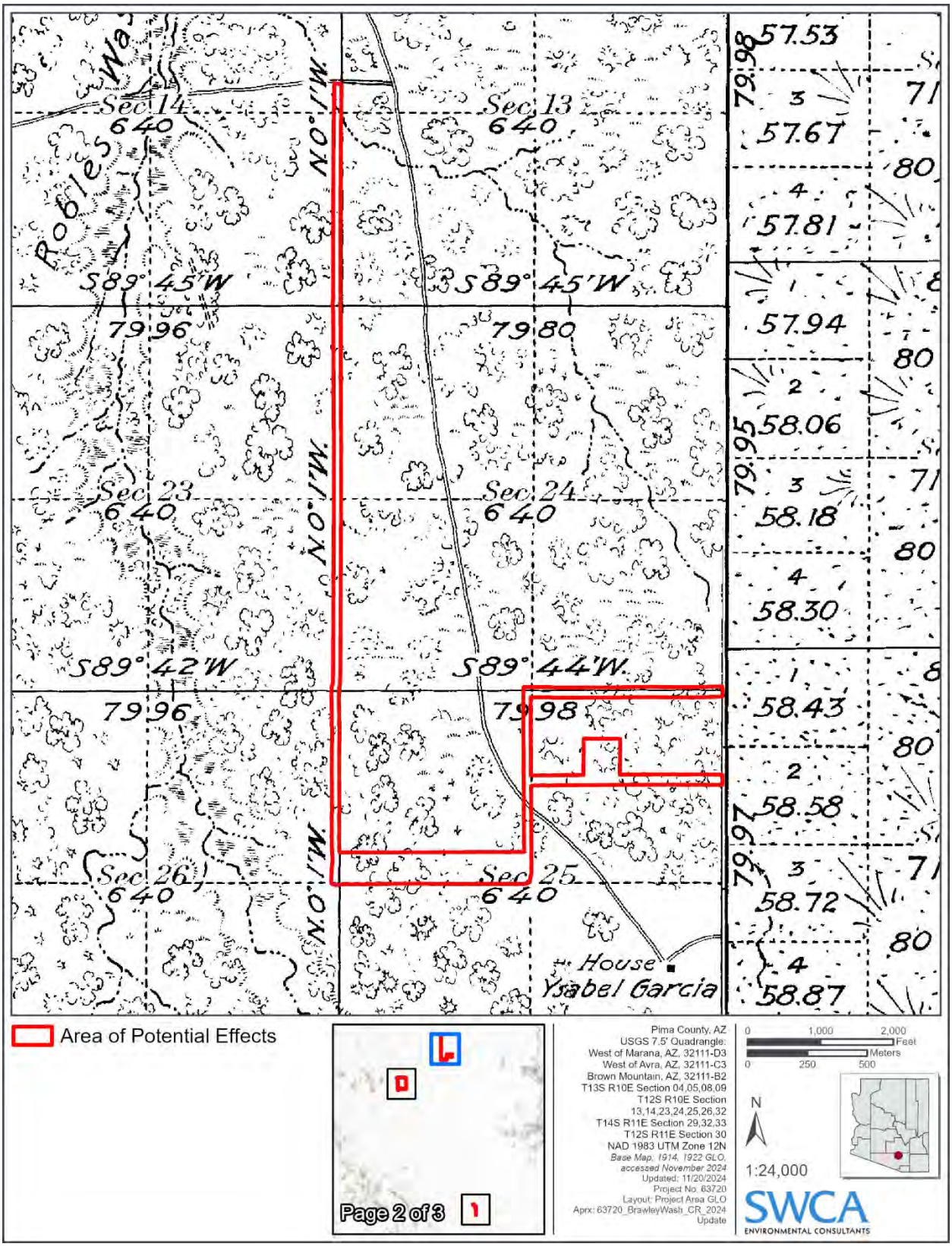


Figure B-4. Prickle Desert Problem Area on the 1914 and 1922 GLO maps.

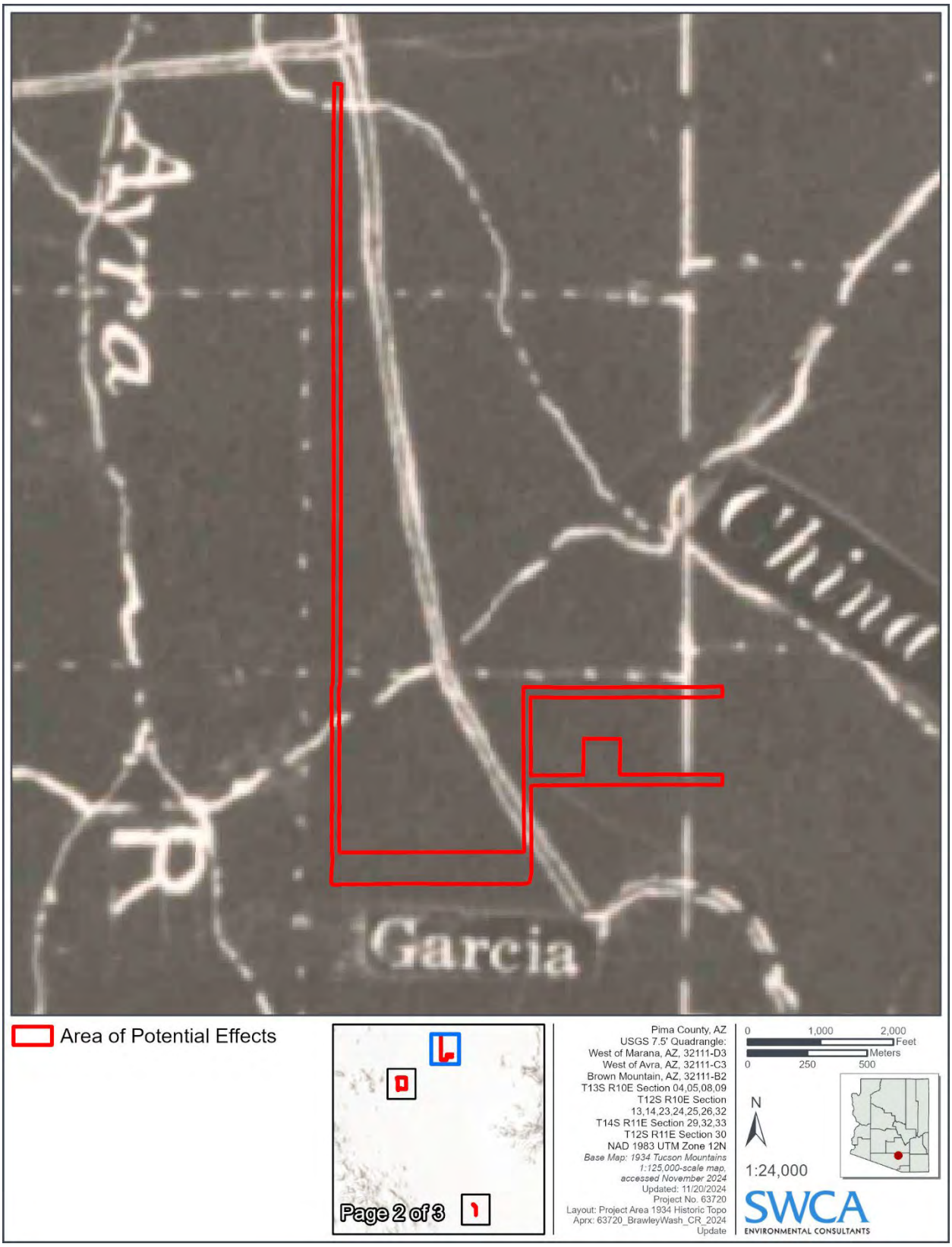


Figure B-5. Prickle Desert Problem Area on the 1934 Tucson Mountains 30-minute quadrangle.

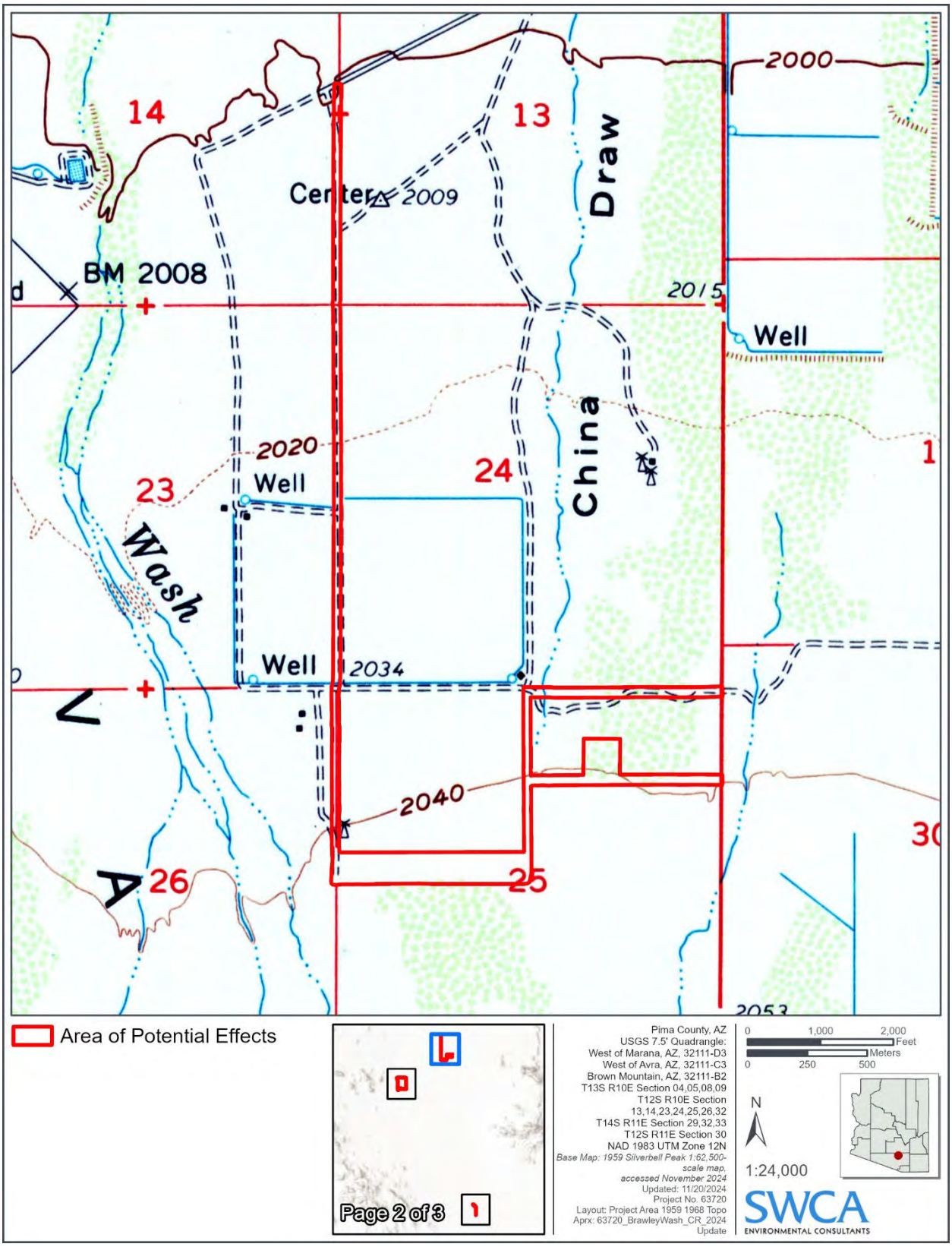


Figure B-6. Prickle Desert Problem Area on the 1959 Silverbell Peak 15-minute quadrangle.

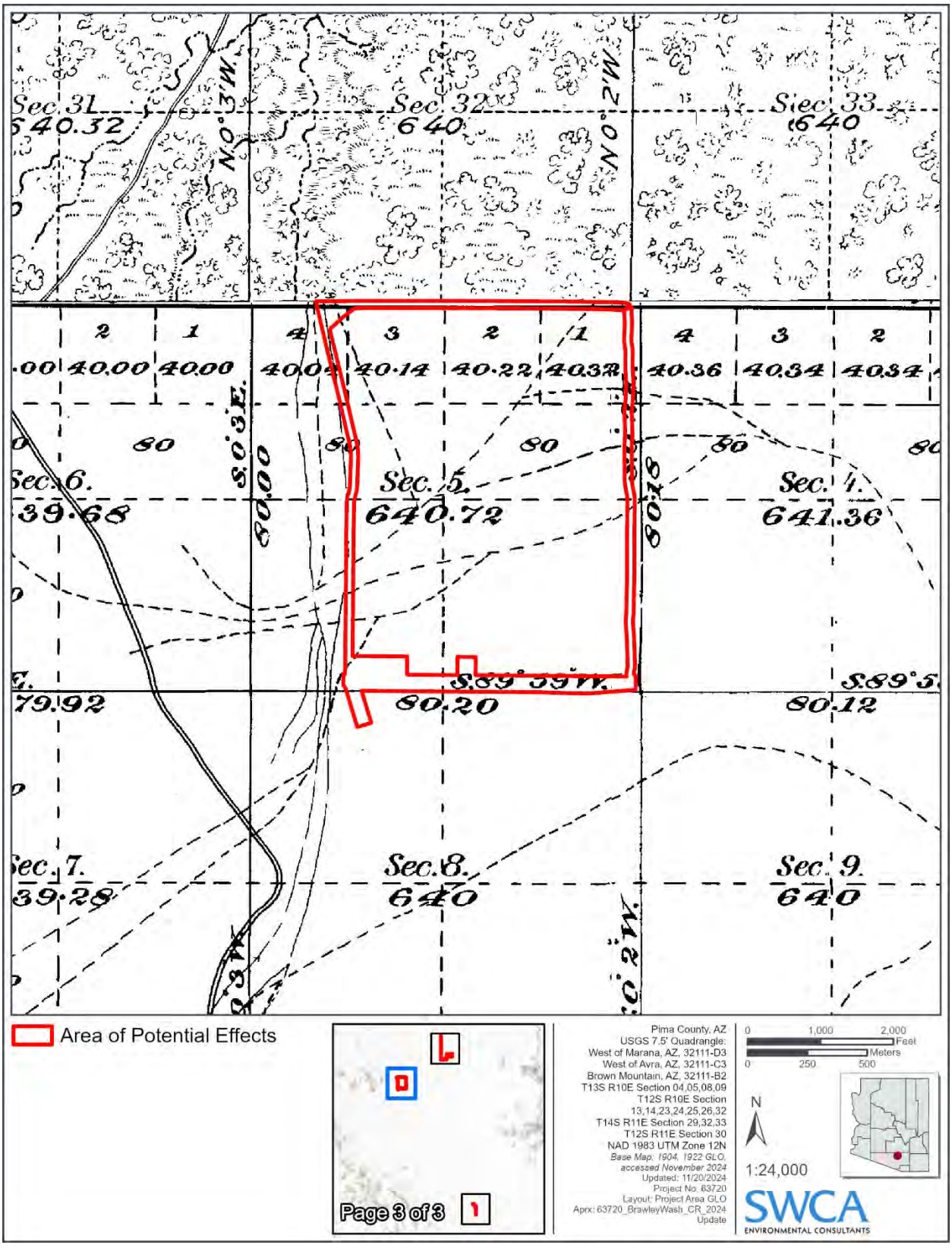


Figure B-7. Tucker Road Problem Area on the 1904 and 1922 GLO maps.



Figure B-8. Tucker Road Problem Area on the 1934 Tucson Mountains 30-minute quadrangle.

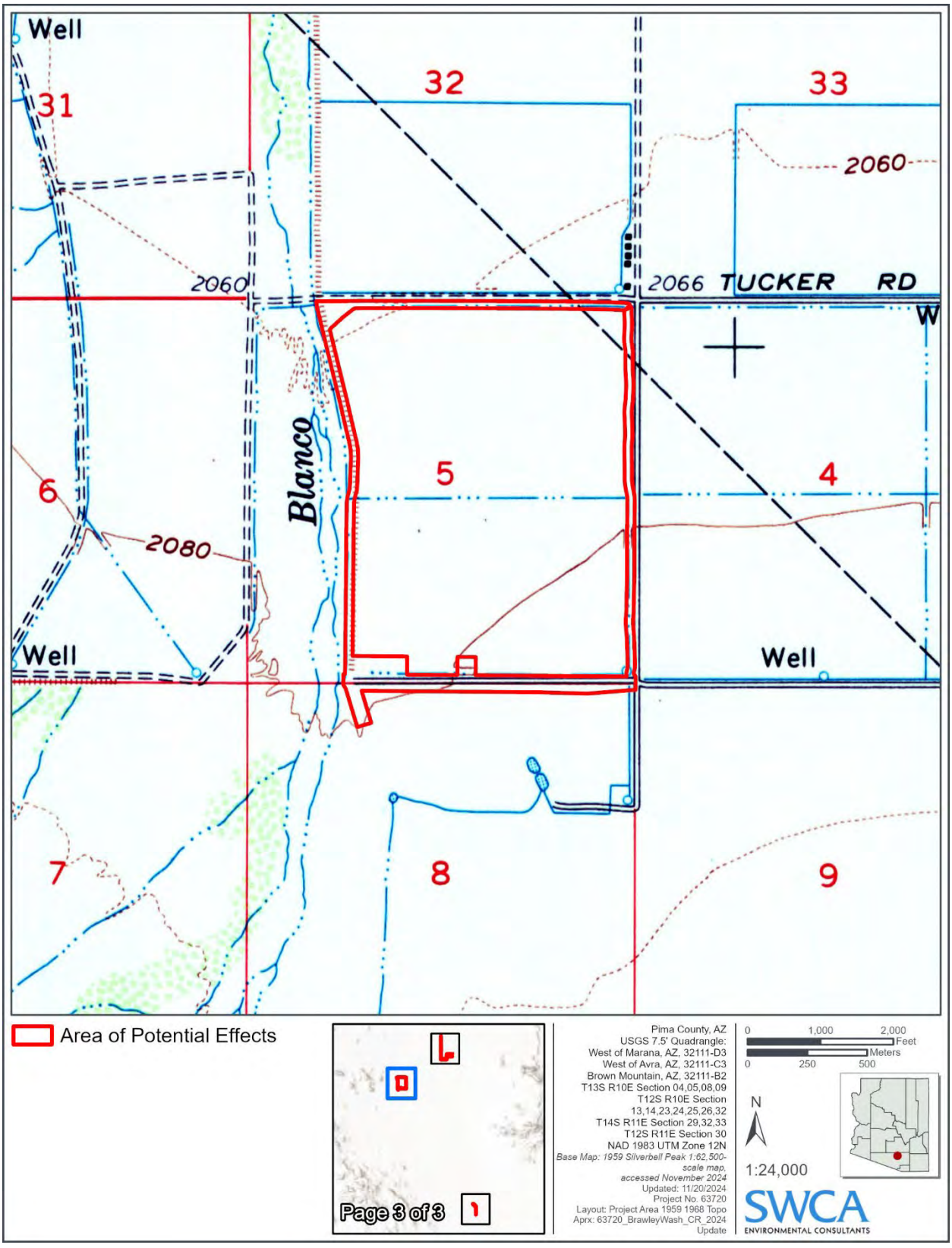


Figure B-9. Tucker Road Problem Area on the 1959 Silverbell Peak 15-minute quadrangle.

APPENDIX C

Results of Survey Maps

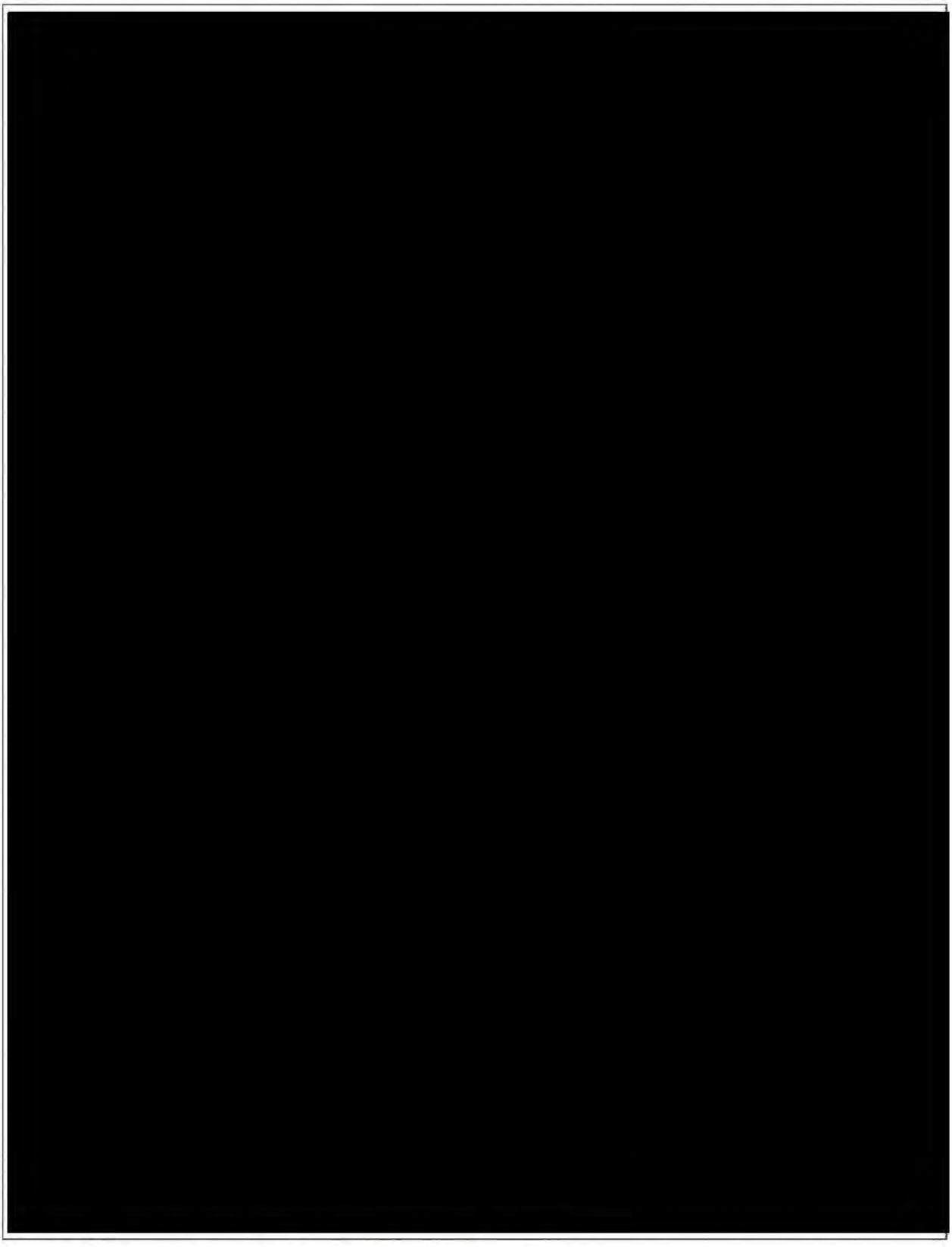


Figure C-1. Tortuga Ranch Problem Area results of survey.

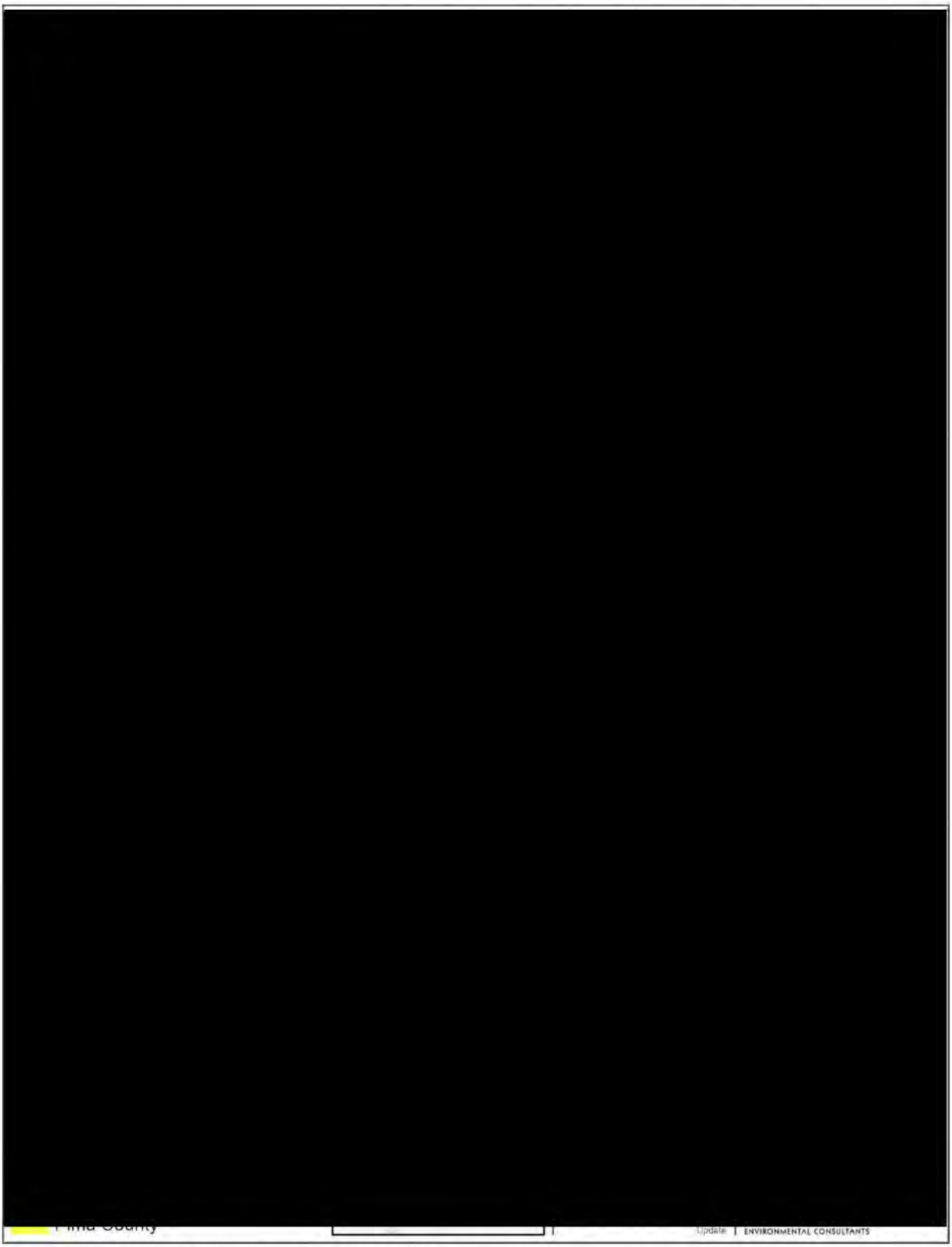


Figure C-2. Prickle Desert Problem Area results of survey.

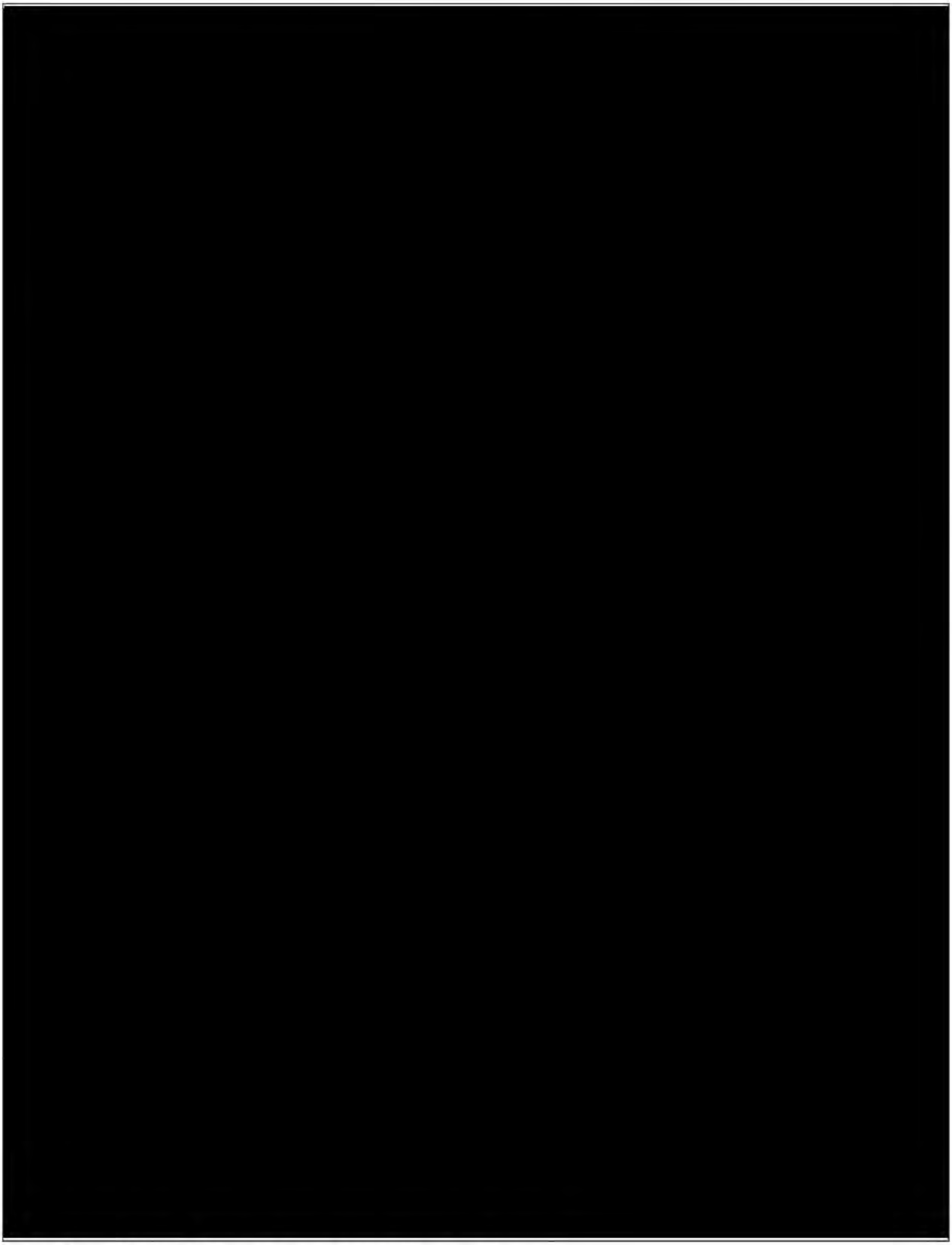


Figure C-3. Tucker Road Problem Area results of survey.

APPENDIX D

Site Descriptions and Isolated Occurrences

Archaeological Sites

AZ AA:11:268(ASM)

Site Type: Artifact scatter

Cultural Affiliation: Hohokam

Temporal Affiliation: Ceramic (A.D. 700–1450)

Dimensions/Area: 885 × 445 m / 211,433 m^2 [52.2 acres] (56,636 m^2 [14.0 acres] in APE)

Land Ownership: City of Tucson, Private

Problem Area: Tucker Road

UTM Coordinates: (NAD 83, Zone 12) [redacted]

Legal Description: Sections 5 and 8, Township 13 South, Range 10 East, Pima County, on the USGS West of Avra, Arizona, 7.5-minute quadrangle

A/NRHP Eligibility: Recommended eligible (Criterion D)

OVERVIEW

AZ AA:11:268(ASM), located in the Tucker Road Problem Area, is a newly recorded surface artifact scatter with ground stone, chipped stone, and ceramic artifacts (Figure D-1). The site is roughly 0.5 mile west of the closest previous survey in an area previously determined to be a high archaeological sensitivity (Rawson et al. 2021:Figure 7). SWCA archaeologists estimated 1,000 to 5,000 artifacts within the site. Within the project area APE, SWCA identified 344 flaked stone, 120 ceramics, and at least three ground stone artifacts. The flakes and cores are indicative of core reduction of rhyolite, chert, quartzite, silicified siltstone, and metasediment materials. One metasediment projectile point preform was also noted in the project area (PL 1). The ceramic assemblage noted within the project area was entirely plainware body sherds of jar and bowl vessel forms. The ground stone artifacts noted in the project area include a granitic shaped mano fragment (PL 2), and two vesicular basalt metate fragments. A rhyolite pestle fragment was also noted outside of the current project area (PL 3). No features were noted. The site has been highly disturbed within the APE from past agricultural use on City of Tucson property; outside the APE, cattle grazing, erosion, and a cattle tank have affected the site on private property. Erosional sheet-washing is evident throughout the site. Vegetation consists of mesquite, creosote, cholla cacti, and various grasses and shrubs (Figure D-2).

ELIGIBILITY

Due to the sheet-washing, agricultural, and ranching activities, some uncertainty exists regarding whether the site contains intact buried archaeological deposits; however, the quantity and diversity of artifact material types is indicative of multiple site activities; therefore, AZ AA:11:268(ASM) appears to be eligible for the NRHP under Criterion D for its potential to yield information on Hohokam land use and settlement patterns in Avra Valley.

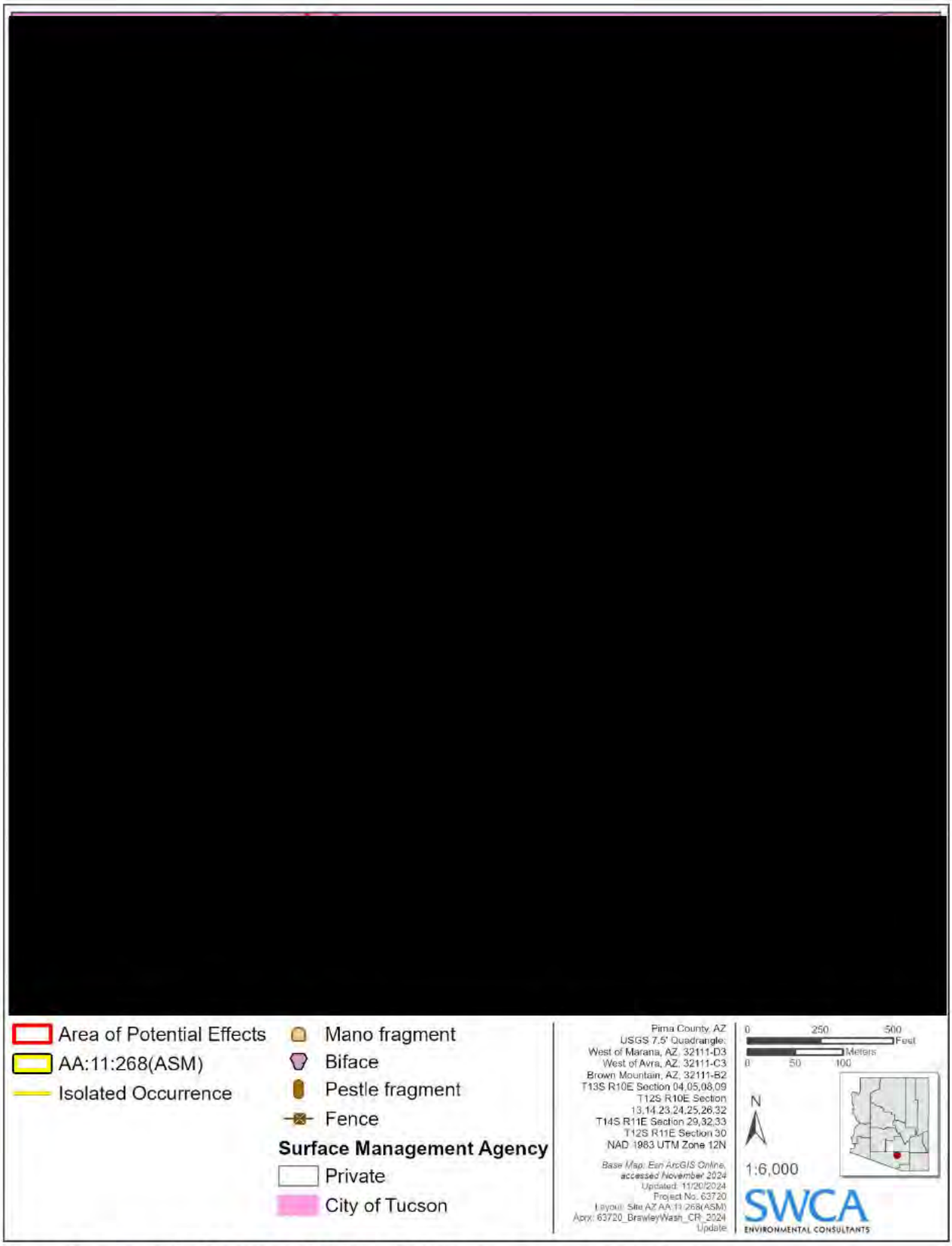


Figure D-1. Map of AZ AA:11:268(ASM) within Tucker Road Problem Area.



Figure D-2. Site overview of AZ AA:11:268(ASM), view facing south.

AZ AA:16:680(ASM)

Site Type: Artifact scatter with associated feature

Cultural Affiliation: Hohokam

Temporal Affiliation: Ceramic (A.D. 700–1450)

Dimensions/Area: 55 × 28 m / 1,045 m^2 (0.3 acre)

Land Ownership: City of Tucson

Problem Area: Tortuga Ranch

UTM Coordinates: (NAD 83, Zone 12) [redacted]

Legal Description: Section 32, Township 14 South, Range 11 East, Pima County, on the USGS Brown Mountain, Arizona, 7.5-minute quadrangle

A/NRHP Eligibility: Recommended eligible (Criterion D)

OVERVIEW

AZ AA:16:680(ASM), located entirely within the Tortuga Ranch Problem Area, is a newly recorded surface artifact scatter associated with a fire-cracked rock (FCR) scatter (Figure D-3). The site is in an area previously surveyed in 2003-2004 (Herr 2004a) in an area previously determined to be a high archaeological sensitivity (Rawson et al. 2021:Figure 7). SWCA identified 10 flaked stone, 21 ceramics, and three ground stone artifacts. The flaked stone artifacts include five non-cortical flakes, three cortical flakes, two core fragments, and a chopper (PL 1). The flaked materials included chert, metasediment, silicified siltstone, and rhyolite. The ceramic assemblage noted within the project area was entirely plainware body sherds of jar and bowl vessel forms. The ground stone artifacts noted in the project area include a vesicular basalt shaped mano (PL 2), and two vesicular basalt metate fragments that are fire-cracked. Feature 1 is a deflated FCR concentration. It currently measures 7.9 × 4.3 m and consists of 54

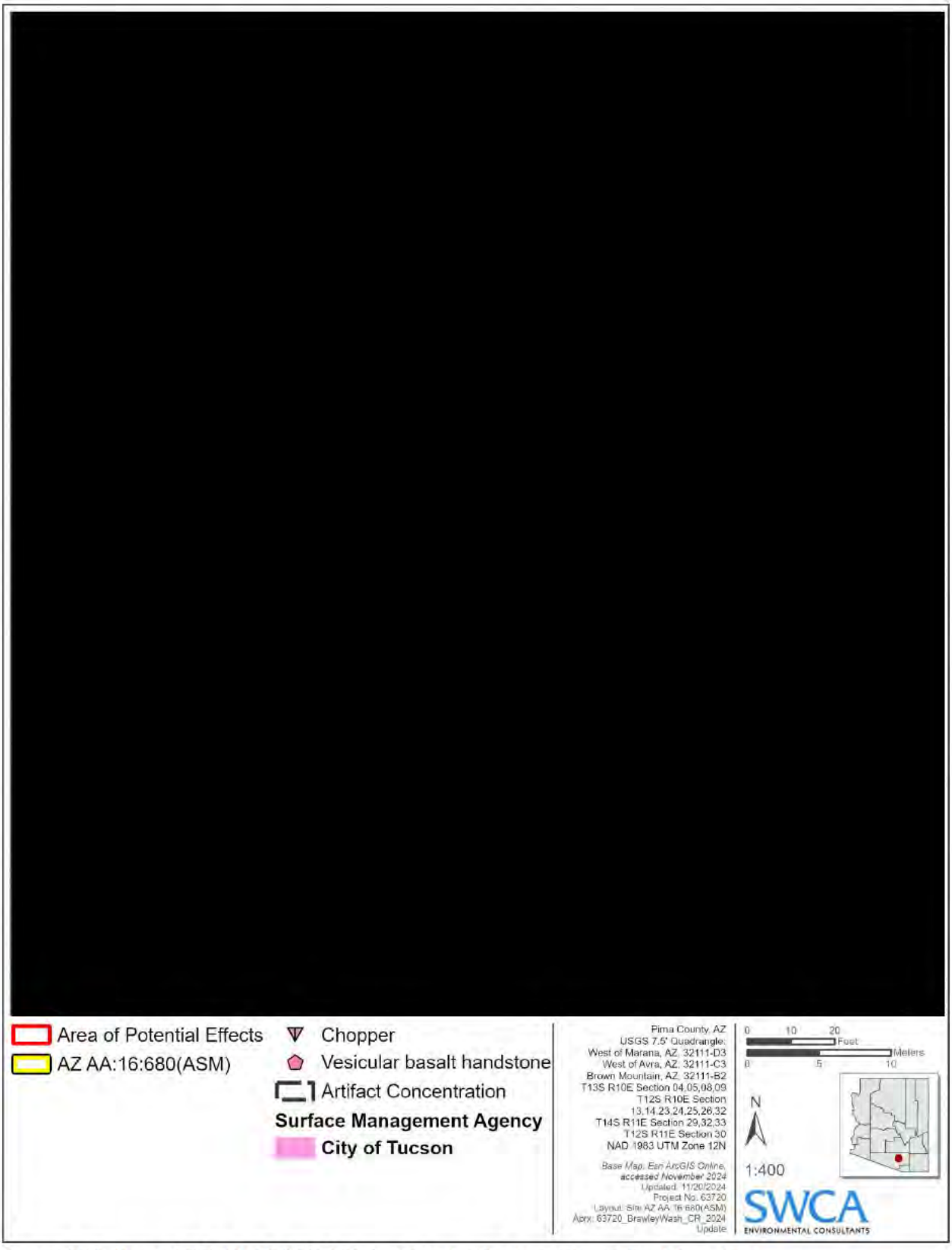


Figure D-3. Map of AZ AA:16:680(ASM) within the Tortuga Ranch Problem Area.

rhyolite, granite, quartzite, metasediment, and vesicular basalt cobbles that range from 3 to 8 cm in diameter (Figure D-4). Only two of the cobbles are currently embedded. The site has been highly disturbed by past erosional sheet-washing. Vegetation consists of mesquite, creosote, cholla cacti, and various grasses and shrubs (Figure D-5).

ELIGIBILITY

Due to the sheet-washing in the APE, some uncertainty exists regarding whether the site contains intact buried archaeological deposits; however, the quantity and diversity of artifact material types is indicative of multiple site activities; therefore, AZ AA:16:680(ASM) appears to be eligible for the NRHP under Criterion D for its potential to yield information on Hohokam land use and settlement patterns in Avra Valley.



Figure D-4. Feature 1 at AZ AA:16:680(ASM); view facing west-northwest.



Figure D-5. Site overview for AZ AA:16:680(ASM); view facing southwest.

Isolated Occurrences

Fourteen IOs of Native American artifacts and five IOs of historic-era Euro-American features were identified within the project area (Table D-1).

Table D-1. Isolated Occurrences

IO No.	Problem Area	IO Description	Cultural-Temporal Affiliation	Easting*	Northing*
1	Tucker Road	One chert cortical flake	Native American, unknown age	[redacted]	[redacted]
2	Tucker Road	One quartzite non-cortical flake	Native American, unknown age	[redacted]	[redacted]
3	Tucker Road	One quartzite biface fragment	Native American, unknown age	[redacted]	[redacted]
4	Tucker Road	One metasediment non-cortical flake	Native American, unknown age	[redacted]	[redacted]
5	Tucker Road	One Hohokam plainware sherd	Hohokam, ceramic period	[redacted]	[redacted]
6	Tucker Road	Two Hohokam plainware sherds found 2 meters apart	Hohokam, ceramic period	[redacted]	[redacted]
7	Tucker Road	One chert non-cortical flake	Native American, unknown age	[redacted]	[redacted]

IO No.	Problem Area	IO Description	Cultural-Temporal Affiliation	Easting*	Northing*
8	Tucker Road	An irrigation system consisting of concrete lined canals that are 3 feet wide and 2.5 feet deep. The canals are in an area measuring 1.5 × 1.25-km. These features are in poor condition, with many segments intentionally removed (Figure D.6). The irrigation canals appear on the 1959 Silverbell Peak 15-minute quadrangle (see Appendix B:Figure B-9).	Euro-American, post-1934 and 1959 or earlier	[redacted]	[redacted]
9	Prickle Desert	An irrigation system consisting of concrete lined canals that are 3 feet wide and 2.5 feet deep. The canals are in an area measuring 0.8 × 0.6-km. These features are in poor condition, with many segments intentionally removed (Figure D.7). Unlike the canals associated with AZ AA:11:241(ASM), these canals do not appear on the 1959 Silverbell Peak 15-minute quadrangle (see Appendix A: Figure A-2 and Appendix B:Figure B-6); an aerial photograph from www.historicaerials.com dating to 1967 is the earliest to show agricultural fields that would have been irrigated by these canals.	Euro-American, post-1959 and 1967 or earlier	[redacted]	[redacted]
10	Prickle Desert	One metasediment cortical flake	Native American, unknown age	[redacted]	[redacted]
11	Prickle Desert	One chert non-cortical flake	Native American, unknown age	[redacted]	[redacted]
12	Prickle Desert	One petrified wood non-cortical flake	Native American, unknown age	[redacted]	[redacted]
13	Prickle Desert	One metasediment cortical flake	Native American, unknown age	[redacted]	[redacted]
14	Prickle Desert	One rhyolite cortical flake	Native American, unknown age	[redacted]	[redacted]
15	Tortuga Ranch	One vesicular basalt shaped mano fragment	Native American, unknown age	[redacted]	[redacted]
16	Tortuga Ranch	One rhyolite cortical flake	Native American, unknown age	[redacted]	[redacted]
17	Tortuga Ranch	Present-day Marstellar Road, depicted on 1968 Brown Mountain 7.5-minute quadrangle as an unnamed, unimproved road and currently classified by Pima County as a minor local road. The dirt road is 4.7 miles long, 22 feet wide, and it runs between Donaldson Ranch Road and Ajo Highway (Figure D.8). The segment of the road within the APE is not Pima County-maintained, nor does it occupy a designated Pima County road right-of-way.	Euro-American, post-1934 and 1959 or earlier	[redacted]	[redacted]
18	Tortuga Ranch	One 7-foot-tall and 30-foot-wide earthen diversion structure, which is depicted, unlabeled, on the 1968 Brown Mountain 7.5-minute quadrangle. Historic aerial photography from www.historicaerials.com depicts this feature dating as far back as 1958. The feature would have diverted northeast-flowing waters around farm fields to the northeast.	Euro-American, 1958 or earlier	[redacted]	[redacted]
19	Prickle Desert	Present-day Garvey Road, depicted on the 1959 USGS Silverbell Peak 15-minute quadrangle as an unnamed, unimproved road and currently classified by Pima County as a minor local road. The dirt road south from Avra Valley Road for 2 miles; it is 25 feet wide (Figure D.9). The segment of the road within the APE is not Pima County-maintained, nor does it occupy a designated Pima County road right-of-way.	Euro-American, post-1934 and 1959 or earlier	[redacted]	[redacted]

* UTM coordinates (NAD 83), Zone 12



Figure D-6. IO 8; irrigation canal, view facing south.



Figure D-7. IO 9; irrigation canal, view facing east.



Figure D-8. IO 17; in-use historic-era road, view facing north.



Figure D-9. IO 19; in-use historic-era road, view facing south.

Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

Appendix E – Supporting Information

CONTENTS:

Table 25 – Eliminated Alternatives and Rationale

Table 26 – Summary and Comparison of Alternative Plans

Table 27 – Details for the Preferred Alternatives

Table 28 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1)

Table 29 – Cost Details for the Preferred Alternatives

Table 30 – Table 4 – Estimated Average Annual Costs (Brawley Watershed, Arizona, 2024$) ^(/1))

Table 31 – Agency Consultation Record

Table 32 – Location of Problem Area APE

Attachment 14 – Preliminary Alternatives Selection Memo – Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – December 20, 2022)

Attachment 15 – Data Collection Technical Memorandum - Brawley Wash Watershed Plan and Environmental Assessment (PCRFCD Contract: CT-FC290 – March 16, 2023)

Attachment 16 – Letter – NRCS Evaluation FPPA Ruling (May 21, 2024)

Attachment 17 – Class I Cultural Resources Inventory Results for the Brawley Wash Watershed Plan Alternatives, Pima County, Arizona, May 2024) (Revised July 2024)

Attachment 18 – Class III Cultural Resources Inventory Results Report (October 2024) (revised February 2025)

Attachment 19 – Letter – NRCS Section 12 Notification – Public Law 83-566 (February 10, 2025)

Attachment 20 – Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County Arizona, April 2025) Report

USDA Natural Resources Conservation Service
U.S. DEPARTMENT OF AGRICULTURE

Arizona State Office
230 N. 1st Avenue
Suite 509
Phoenix, Arizona, 85003

February 10, 2025

Heather Whitlaw
U.S. Fish and Wildlife Service
9828 North 31st Ave.
Phoenix, AZ 85051

RE: Brawley Watershed Plan-Environmental Assessment (Plan-EA)
Section 12 Notification--Public Law 83-566

Dear Heather Whitlaw,

The Natural Resources Conservation Service (NRCS) is currently preparing the Brawley Wash Watershed Plan-EA for flood protection measures in Pima County, Arizona. In accordance with Section 12 of the Watershed Protection and Flood Prevention Act, Public Law 83-566 (U.S.C. Section 1008), this letter serves to notify the U.S. Fish and Wildlife Service (USFWS) that NRCS invites the USFWS to submit survey reports or investigations regarding wildlife resources that will be considered in development of the Brawley Wash Watershed Plan-EA. Additionally, the NRCS welcomes USFWS participation in the preparation of the Plan-EA in accordance with Section 12 of Public Law 83-566.

If you have any questions or comments, please contact Mr. Brett Myers at (520) 989-5629 or via email at brett.myers@usda.gov.

Sincerely,

KEITH LARSON Digitally signed by KEITH LARSON
Date: 2025.02.13 10:24:41 -07'00'

Keith Larson
Assistant State Conservationist – Water Resources

USDA is an equal opportunity provider, employer, and lender.

Brawley Wash Watershed Plan and Environmental Assessment – Preliminary

Appendix E – Supporting Information

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Attachment 20 – Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County Arizona, April 2025) Report

ADDITIONAL CLASS III CULTURAL RESOURCES INVENTORY OF THE TUCKER ROAD PROBLEM AREA, BRAWLEY WASH WATERSHED PLAN ALTERNATIVES, WEST OF TUCSON, PIMA COUNTY, ARIZONA

APRIL 2025

PREPARED FOR

Natural Resources Conservation Service

ON BEHALF OF

Pima County Regional Flood Control District

PREPARED BY

SWCA Environmental Consultants

Arizona State Museum Accession No. AP-2025-0130

ADDITIONAL CLASS III CULTURAL RESOURCES INVENTORY OF THE TUCKER ROAD PROBLEM AREA, BRAWLEY WASH WATERSHED PLAN ALTERNATIVES, WEST OF TUCSON, PIMA COUNTY, ARIZONA

Prepared for

Natural Resources Conservation Service
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On Behalf of

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SWCA Project No. 63720

SWCA Cultural Resources Report No. 25-252

Arizona State Museum Accession No. AP-2025-0130

April 2025

ABSTRACT

Report Title: Additional Class III Cultural Resources Inventory of the Tucker Road Problem Area, Brawley Wash Watershed Plan Alternatives, West of Tucson, Pima County, Arizona

Project Name: Brawley Wash Watershed Plan and Environmental Assessment

Project Location: Brawley Wash Watershed, Pima County

Project Locator UTM: 467434 mE, 357791 mN NAD 83 Zone 12

Project Sponsor: Pima County Regional Flood Control District (PCRFCD)

Sponsor Project Number: PCRFCD Contract: CT-FC-290

Lead Federal Agency: Natural Resources Conservation Service (NRCS)

Other Agencies: Pima County, City of Tucson, Arizona State Museum

Applicable Regulations: Section 106 of the National Historic Preservation Act and its implementing regulations, defined in 36 Code of Federal Regulations 800; Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566); Arizona Antiquities Act (Arizona Revised Statutes 41-841 et seq.); Pima County policy regarding the protection of cultural resources (Board of Supervisors Resolution 1983-104; Board of Supervisors Policy C3.17); City of Tucson Resolution No. 12443; Administrative Directive for the Protection of Archaeological and Historical Resources in City Projects, City of Tucson, May 1999.

Funding Source: This Class III cultural resources inventory was prepared by SWCA Environmental Consultants (SWCA) as a subcontractor to Stantec Consulting, Inc. (Stantec), under contract to PCRFCD. Future project construction may use federal, state, or local funds.

ASLD Application Number: Not applicable

Description of the Project/Undertaking: PCRFCD is the sponsoring local organization for the preparation of the Brawley Wash Watershed Plan and Environmental Assessment in southern Arizona. The NRCS is providing technical and financial assistance for the plan. Stantec is assisting with the preparation of the Brawley Wash Watershed Plan and Environmental Assessment under contract with Pima County. The Brawley Wash Watershed Plan considers 198,000 acres in the Avra and Altar Valleys west of the Tucson metropolitan area. The watershed is characterized by severe erosion and sedimentation in areas where constructed embankments and canals from abandoned agricultural lands are no longer being maintained, which affects natural flow patterns. This causes a loss of wildlife habitat and disrupts natural floodplains and drainage flow paths. The Brawley Wash Watershed Plan will evaluate floodplain restoration, erosion control, structure removal, and other conservation measures on County- and City-owned lands within the Planning Area.

PCRFCD is developing the plan in cooperation with Pima County, the City of Tucson, the Altar Valley Conservation Alliance, and a broad range of public stakeholders, including local governments, the Tohono O'odham Nation, agricultural and ranching interests, and conservation groups, through a public planning process. Under contract with Stantec, SWCA previously prepared a cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021) to assist in the formulation of project alternatives and to begin to allow involved agencies to consider the potential for the project to impact cultural resources. In working with stakeholders and in accordance with the Purpose and Need Statement for the Brawley Wash Watershed Plan Environmental Assessment, five "Problem Areas" have been identified in which future project activities may occur. These are described in *Preliminary Alternatives Selection Memo: Brawley Wash Plan and Environmental Assessment* (Stantec 2022). At the request of Stantec, SWCA prepared a Class I cultural resources inventory to provide specific information regarding previously conducted archaeological surveys and previously recorded cultural resources for each of these Problem Areas (Rawson 2024). The Class I determined that very few

previous surveys had been conducted within the Problem Areas, and almost all the known research was more than 10 years old.

Upon further analysis, three Problem Areas were selected for additional study, including the Tortuga Ranch, Prickle Desert, and Tucker Road Problem Areas. For each of these three Problem Areas, the NRCS, PCRFCD, and Stantec defined an Area of Potential Effects (APE) as the area in which ground-disturbing project activities would take place should the alternatives move forward. SWCA conducted a Class III cultural resources inventory of these three Problem Areas to assist in identifying the potential for the project to impact cultural resources that are listed in or eligible for listing in the Arizona Register of Historic Places (ARHP) and National Register of Historic Places (NRHP) (Petersen and Hesse 2025). The survey was conducted under Arizona Antiquities Act permit number 2024-052bl. Archaeological sites eligible for inclusion in the ARHP/NRHP were found in the Tortuga Ranch and Tucker Road Problem Areas. The site found in the Tortuga Ranch Problem Area is small and can be avoided by future project development within the APE. The site found within the Tucker Road Problem Area is much larger and cannot be avoided without expanding the APE to accommodate the relocation of various future design components. Because site avoidance is a priority, additional areas adjacent to the area originally surveyed by SWCA were added to the Tucker Road APE. SWCA then conducted a Class III cultural resources inventory of these areas to determine whether they contain ARHP/NRHP-eligible properties and whether these areas would be suitable in accomplishing the goals of the Tucker Road Problem Area without adversely affecting ARHP/NRHP-eligible properties.

Area of Potential Effects: The APE for the Tucker Road Problem Area includes the previously surveyed portion of the Problem Area and three newly added, newly surveyed rectangular parcels that abut the original APE. The APE includes the areas where ground-disturbing activities may take place; however, not all of the APE would be subjected to ground disturbing activities.

Tucker Road Problem Area APE

Problem Area Portion*	Acres	Maximum Length × Width	Landownership	Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle
Previously surveyed area	63.0	1.11 × 0.82 mile	City of Tucson; Private	T13S R10E S5 and S8/West of Avra
New survey area	35.2	0.57 × 0.35 mile	City of Tucson	T13S R10E S5 and S8/West of Avra

* From Stantec (2022)

Land Jurisdiction (this survey): City of Tucson

Total Acres of the Tucker Road Problem Area: 98.2 acres (City of Tucson 91.9 acres, Private 6.3 acres)

Total Acres Surveyed (this survey): 35.2 acres (City of Tucson)

Acres Not Surveyed: 0 (63.0 acres previously surveyed by Petersen and Hesse [2025])

Consultant Firm/Organization: SWCA

Project Number: 63720 (SWCA)

Permit Number: Arizona Antiquities Act Blanket Permit 2025-061bl

ASM Accession Number: AP-2025-0130

Dates of Fieldwork: March 14, 2025

Number of Properties Recorded: 17: two archaeological sites (AZ AA:11:268[ASM] and AZ AA:11:270[ASM]; 15 isolated occurrences (IOs) of archaeological materials, features, or historic structures (IOs 8, 20–33).

Eligible Properties: 1: AZ AA:11:268(ASM)

Ineligible Properties: 15: IOs 8, 20–33

Unevaluated Properties: 1: AZ AA:11:270(ASM)

Sites/Properties Not Relocated: 0

Comments: The cultural resources survey resulted in the identification of a newly recorded portion of a previously recorded site, one newly recorded archaeological site, and 15 IOs. The two archaeological sites are Hohokam artifact scatters (AZ AA:11:268[ASM] and AZ AA:11:270[ASM]). AZ AA:11:268(ASM) is recommended eligible for inclusion in the NRHP and the ARHP under Criterion D. The artifact assemblage observed at AZ AA:11:268(ASM) indicates multiple site activities. The site has the potential to provide information important to our understanding of Native American land use and settlement patterns in the Avra Valley. The artifact assemblage is less diverse at AZ AA:11:270(ASM), and, although one ceramic pottery sherd was found that suggests Hohokam use, the flaked stone assemblage contains a wide variety of stone materials as well as bifacial thinning flakes, hinting to possibly earlier, Archaic period use. However, the limited number of surface artifacts makes NRHP/ARHP-eligibility determination problematic. AZ AA:11:270(ASM) remains unevaluated, and NRHP/ARHP-eligibility testing would be needed to appropriately evaluate the site's NRHP/ARHP eligibility. PCRFCD should avoid ground-disturbing activities within both sites when developing and implementing the Brawley Wash Watershed Plan. Alternatively, plans should be developed and implemented to determine the NRHP/ARHP-eligibility of AZ AA:11:270(ASM) and to mitigate the potential adverse effects to the sites that would result from project activities at AZ AA:11:268(ASM) and AZ AA:11:270(ASM), if the later were to be determined eligible, if the sites cannot be not avoided. No further cultural resources work is recommended outside the boundaries of these two sites.

In the event that previously unreported cultural resources are encountered during ground disturbing activities, all work must immediately cease within 30 m (100 ft) and the discovery must be reported to the project sponsor who will notify NRCS's Arizona State Cultural Resources Specialist (SCRS); the SCRS will then notify the land managing agency, SHPO, and the Tribes, as appropriate, of the discovery within 24 hours. A qualified archaeologist must then document the discovery and evaluate its eligibility for the NRHP/ ARHP in consultation with the lead agency, the SHPO, and Tribes, as appropriate. Work must not resume in this area without approval of the lead agency.

If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 m (100 ft) of the encounter and the area must be secured. The ASM, lead agency, SHPO, and appropriate Tribes must be notified of the encounter. All encounters will be treated in accordance with Arizona Revised Statutes 41-844 or 41-865, as appropriate, and work must not resume in this area without authorization from ASM and the lead agency.

Management Summary

Site Number/Name	Identification Status	Land Jurisdiction	Eligibility Status	Recommended Treatment
AZ AA:11:268(ASM)	Previously recorded	City of Tucson and private	Recommended eligible, Criterion D	Avoid
AZ AA:11:270(ASM)	Newly recorded	City of Tucson	Unevaluated	Avoid

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INTRODUCTION

Pima County Regional Flood Control District (PCRFCD) is the sponsoring local organization for the preparation of the Brawley Wash Watershed Plan and Environmental Assessment in southern Arizona. The NRCS is providing technical and financial assistance for the plan. Stantec is assisting with the preparation of the Brawley Wash Watershed Plan and Environmental Assessment under contract with Pima County. The Brawley Wash Watershed Plan considers 198,000 acres in the Avra and Altar Valleys west of the Tucson metropolitan area. The watershed is characterized by severe erosion and sedimentation in areas where constructed embankments and canals from abandoned agricultural lands are no longer being maintained, which affects natural flow patterns. This causes a loss of wildlife habitat and disrupts natural floodplains and drainage flow paths. The Brawley Wash Watershed Plan will evaluate floodplain restoration, erosion control, structure removal, and other conservation measures on County- and City-owned lands within the Planning Area.

PCRFCD is developing the plan in cooperation with Pima County, the City of Tucson, the Altar Valley Conservation Alliance, and a broad range of public stakeholders, including local governments, the Tohono O'odham Nation, agricultural and ranching interests, and conservation groups, through a public planning process. Under contract with Stantec, SWCA previously prepared a cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021) to assist in the formulation of project alternatives and to begin to allow involved agencies to consider the potential for the project to impact cultural resources. In working with stakeholders and in accordance with the Purpose and Need Statement for the Brawley Wash Watershed Plan Environmental Assessment, five "Problem Areas" have been identified in which future project activities may occur. These are described in *Preliminary Alternatives Selection Memo: Brawley Wash Plan and Environmental Assessment* (Stantec 2022). At the request of Stantec, SWCA prepared a Class I cultural resources inventory to provide specific information regarding previously conducted archaeological surveys and previously recorded cultural resources for each of these Problem Areas (Rawson 2024). The Class I determined that very few previous surveys had been conducted within the Problem Areas, and almost all the known research was more than 10 years old.

Upon further analysis, three Problem Areas were selected for additional study, including the Tortuga Ranch, Prickle Desert, and Tucker Road Problem Areas. For each of these three Problem Areas, the NRCS, PCRFCD, and Stantec defined an Area of Potential Effects (APE) as the area in which ground-disturbing project activities would take place should the alternatives move forward. SWCA conducted a Class III cultural resources inventory of these three Problem Areas to assist in identifying the potential for the project to impact cultural resources that are listed in or eligible for listing in the Arizona Register of Historic Places (ARHP) and National Register of Historic Places (NRHP) (Petersen and Hesse 2025). The survey was conducted under Arizona Antiquities Act permit number 2024-052bl. Archaeological sites eligible for inclusion in the ARHP/NRHP were found in the Tortuga Ranch and Tucker Road Problem Areas. The site found in the Tortuga Ranch Problem Area is small and can be avoided by future project development within the APE. The site found within the Tucker Road Problem Area is much larger and cannot be avoided without expanding the APE to accommodate the relocation of various future design components. Because site avoidance is a priority, additional areas adjacent to the area originally surveyed by SWCA were added to the Tucker Road APE. SWCA then conducted a Class III cultural resources inventory of these areas to determine whether they contain ARHP/NRHP-eligible properties and whether these areas would be suitable in accomplishing the goals of the Tucker Road Problem Area without adversely affecting ARHP/NRHP-eligible properties. (Figure 1).

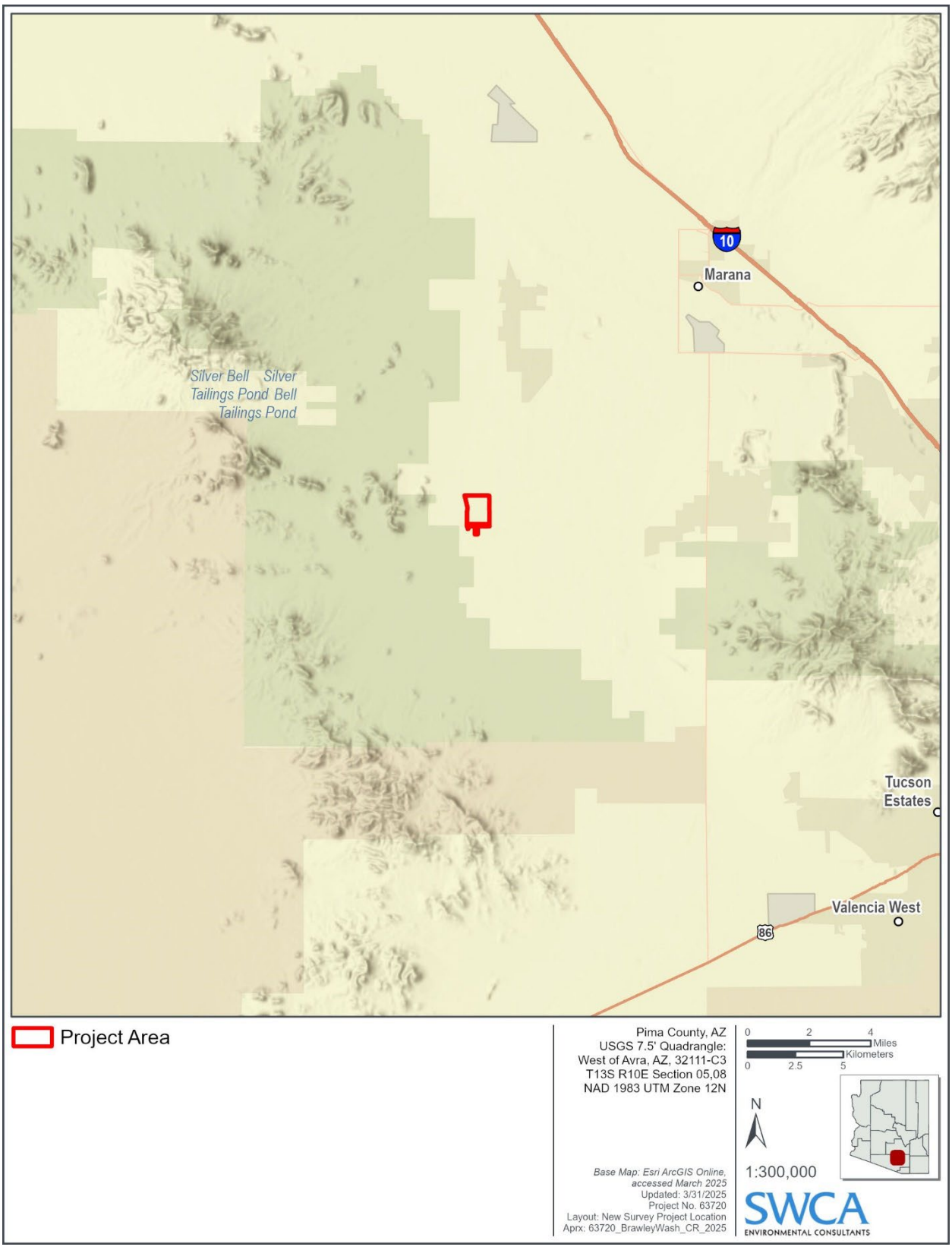


Figure 1. Project location overview.

The applicable regulations for this project include: Section 106 of the National Historic Preservation Act and its implementing regulations, defined in 36 Code of Federal Regulations 800; Watershed Protection and Flood Prevention Act of 1954 (Public Law 83-566); Arizona Antiquities Act (Arizona Revised Statutes 41-841 et seq.); Pima County policy regarding the protection of cultural resources (Board of Supervisors Resolution 1983-104; Board of Supervisors Policy C3.17); City of Tucson Resolution No. 12443; Administrative Directive for the Protection of Archaeological and Historical Resources in City Projects, City of Tucson, May 1999.

PROBLEM AREA LOCATION

The APE for the Tucker Road Problem Area includes the previously surveyed portion of the Problem Area and three newly added, newly surveyed rectangular parcels that abut it. The APE includes the areas where ground-disturbing activities may take place; however, not all of the APE would be subjected to ground disturbing activities (Table 1). The current survey covers 35.2 acres of City of Tucson land.

Table 1. Tucker Road Problem Area APE

Problem Area Portion of APE	Acres	Maximum Length × Width	Landownership	Location (Township, Range, Section)/U.S. Geological Survey 7.5-minute quadrangle
Previous survey area	63.0	1.11 × 0.82 mile	City of Tucson; Private	T13S R10E S5 and S8/West of Avra
New survey area	35.2	0.57 × 0.35 mile	City of Tucson	T13S R10E S5 and S8/West of Avra

Tucker Road

The Tucker Road Problem Area is in the western part of the watershed, on the east side of Blanco Wash, 1.4 miles east of Pan Quemado, a volcanic hill. The Tucker Road Problem Area encompasses 480 acres within retired farmland owned by the City of Tucson (Tucson Water). It contains terraced fields with embankments and artificial channels that retain water in some areas and that concentrate flow within the Blanco Wash channel. Areas of head cutting erosion up to 20 to 25 feet deep have been documented along this reach of Blanco Wash (Stantec 2022). There are also invasive plant species. Potential future project alternatives may include modification of the earthworks to restore natural flow and disperse floodwater across the abandoned fields. Reduced stock grazing may also be proposed as a vegetation management strategy.

The APE that was originally considered included the buffered access roads surrounding the Class I Tucker Road Problem Area (Petersen and Hesse 2025). The original APE in for this Problem Area was 63.0 acres and measured 1.11 × 0.82 miles, including 56.7 acres of City of Tucson land and 6.3 acres of private land. This first survey identified a large site in the southwest corner of the APE [AZ AA:11:268(ASM)]. To avoid this site, three additional areas were added to the Problem Area APE and required survey. These new areas consist of 35.2 acres of City of Tucson land, bringing the total acreage of the Tucker Road APE 98.2 acres (Figure 2).

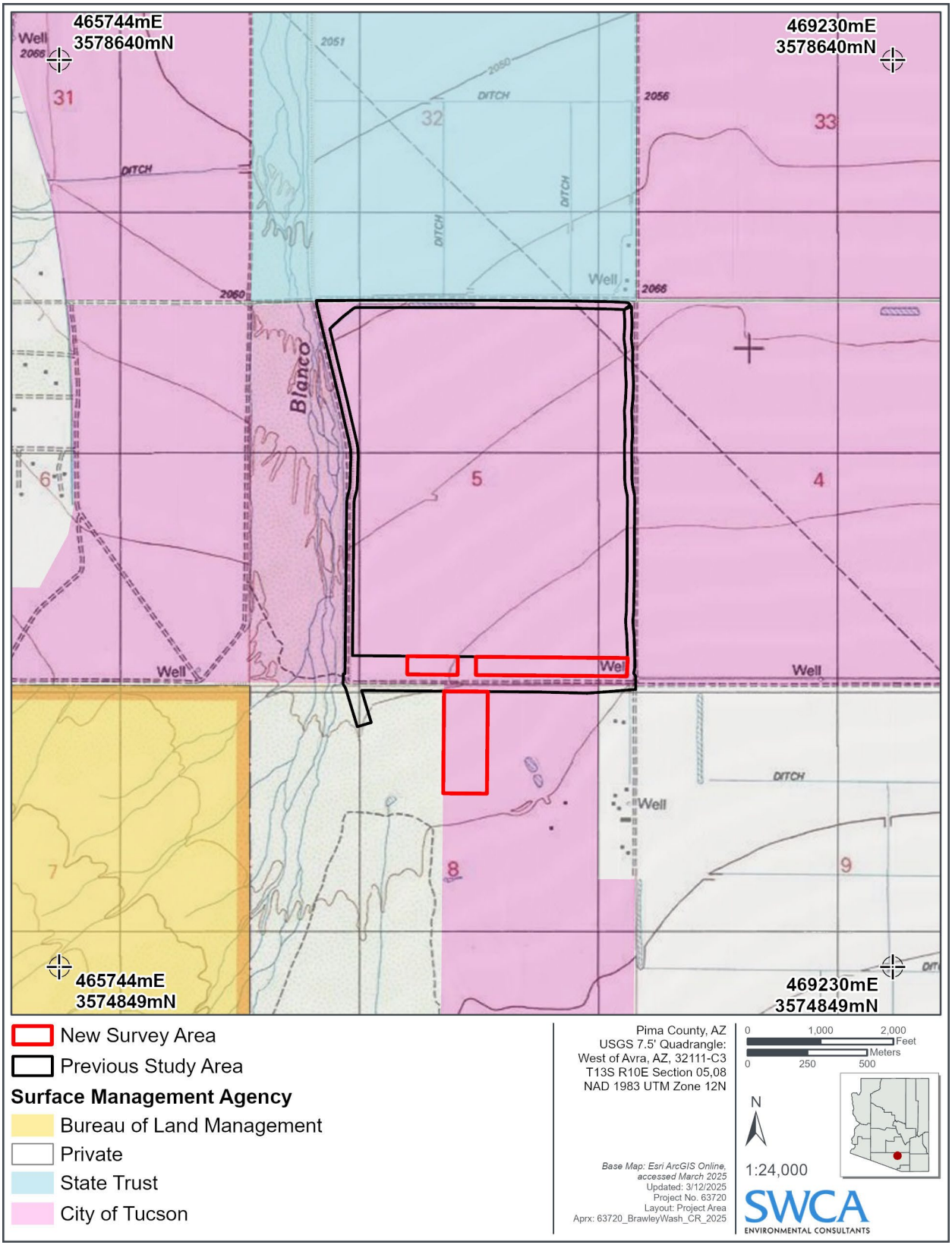


Figure 2. Tucker Road Problem Area location.

ENVIRONMENTAL SETTING

The Brawley Wash Watershed

The Brawley Wash watershed extends from Fresnal Wash in the Altar Valley in Pima County north to Los Robles Wash in Pinal County. It surrounds a landform that defines the Avra and Altar Valleys. Altar Valley is a broad, north-south-trending alluvial basin that drains northward into Avra Valley. It is bounded on the east by the San Luis, Las Guijas, Cerro Colorado, and Sierrita Mountains, and on the west by the Pozo Verde, Baboquivari, Quinlan, and Coyote Mountains. Altar Wash is the axial drainage of Avra Valley, flowing into and becoming Brawley Wash at the north end of the valley. Avra Valley is a broad, north-draining alluvial basin that is bounded on the east by the Tucson Mountains, on the west by the Roskruge, Waterman, and Silver Bell Mountains, and on the south by the Sierrita Mountains. Brawley Wash is the axial drainage of Avra Valley, ultimately flowing into and forming Los Robles Wash, a tributary of the Santa Cruz River.

Brawley Wash drains the southern Tucson Mountains and the northeastern part of the Sierrita Mountains. Most of the Brawley Wash watershed is on what the statewide Arizona Geological Survey map (Arizona Geological Survey 2000) identifies as "Quaternary surficial deposits, undivided" (0–2 Ma). These include alluvial fan and terrace deposits on middle and upper piedmonts and along large drainages. The Brawley Wash watershed includes areas within five biotic communities as mapped by Brown (1994), including small areas of interior chaparral shrubland and Madrean evergreen woodland at higher elevations.

The Tucker Road Problem Area is at lower elevations in desert environments, specifically the Lower Colorado Subdivision of Sonoran Desertscrub (Figure 3). Much of the APE locations consist of abandoned farmland. Studies cited by Brown (1994:197) show that abandoned farmland in Avra Valley is colonized by a succession of mostly nonnative plants, beginning with Russian thistle, followed by mustards and introduced grasses. The geological setting for the Tucker Road Problem Area is undivided Quaternary surficial deposits (Arizona Geological Survey 2000). It is within the Lower Colorado subdivision of the Sonoran Desertscrub biotic community (Brown 1994) and between 2,064 and 2,088 feet above mean sea level.



Figure 3. Tucker Road Problem Area APE overview; view facing west.

CULTURAL CONTEXT

Cultural Background

A culture history for the Brawley Wash Watershed Plan is provided in Rawson et al. (2021). A summary is provided here as a guide to the type of sites that might be expected in the Problem Areas and to inform the development of historic contexts. Archaeologically visible human occupation of the Avra and Altar Valleys spans approximately 12,000 years, from the Paleoindian period to the present. The cultural sequence is divided into five time periods based on regional chronologies by Huckell (1984) and Doelle and Wallace (1991). These periods are labeled the Paleoindian (10,000–7500 B.C.), Archaic (7500 B.C.–A.D. 300), Ceramic (A.D. 200–1450), Protohistoric (A.D. 1450–1700), and Historic (A.D. 1700–1974) periods.

Paleoindian Period (10,000–7500 B.C.)

During the Paleoindian period, small groups of people crossed wide territories hunting large, now-extinct mammals such as mammoths. The most recognizable artifacts from this period are the large fluted projectile points of the Clovis and Folsom traditions. Evidence for Paleoindian occupation of the Avra Valley is sparse, but isolated projectile points have been found (Huckell 1982, 1984), including a fragment of a fluted point at AZ AA:15:162(ASM) on the Ironwood Forest National Monument (Heilen and Reid 2006). Pleistocene fauna have been found in Avra Valley, including horse bone at a site on Brawley Wash and mammoth remains in Los Robles Wash (Haynes and Huckell 1986:15–16).

Archaic Period (7500 B.C.–A.D. 300)

The Archaic period is the traditional name for the time between the Paleoindian period and the appearance of pottery-container technology. This long span of time used to be divided into Early, Middle,

and Late stages, but the Late Archaic in southeastern Arizona has more recently been called the Early Agricultural period. Projectile points continue to be distinctive indicators of Early Archaic presence: three Early Archaic period tapering-stemmed projectile points were found on the surface of a large multicomponent site on the upper bajada of the Silver Bell Mountains (Hesse 2004). Middle Archaic period sites are better represented in the record and have been identified on the bajada slopes of the mountain ranges surrounding Avra Valley (Dart 1987). Late Archaic–Early Agricultural sites are associated with evidence of increasing sedentism and less-mobile subsistence strategies that emphasized farming (Roth 1988). Extensive settlements have been documented on the Santa Cruz River floodplain in this period (Mabry 2007), but it is likely that the population remained mobile in most settings.

Ceramic Period (A.D. 300–1450)

Sometime around A.D. 200, perhaps as much as two centuries earlier, true ceramic containers appeared in the Tucson Basin. The Agua Caliente phase was characterized by plain brown ware ceramics and vessel shapes that include primarily seed jars and occasionally bowls (Deaver and Ciolek-Torrello 1995; Whittlesey 1998). These sand-tempered ceramics were made over broad areas of the Southwest, which suggests that ceramic-container technology may have been introduced from a single source and that the cultural differentiation characteristic of later periods had yet to take place (Whittlesey 1995).

By around A.D. 650, the archaeological culture we recognize as the Hohokam of the Tucson and Gila-Salt Basins had appeared. The Hohokam practiced agriculture dependent on large-scale irrigation, lived in villages, and developed a regional ideology and ceremonialism. Ball courts, platform mounds, craft style, and imported artifacts indicate Hohokam interaction with societies as far south as Mesoamerica (Doyel 2007:87). Most of the Ceramic period material reported from the Avra Valley is very similar to that of the Tucson Basin Hohokam, indicating ongoing interaction between the precontact populations of the two areas. However, ceramic wares attributed to the Trincheras culture, which likely developed in the valleys of the Río Altar and Río Magdalena in northern Sonora, Mexico, are also found. The earlier part of the Hohokam trajectory is characterized by large ball court villages like AZ AA:11:12(ASM), AZ AA:12:57(ASM]), and AZ AA:11:25(ASM) (Barr and Hesse 2010). Later, the Classic period was a time of change in much of the Hohokam world. Environmental change may offer a partial explanation; flooding became more problematic in the Hohokam core area, washing out canals on the Salt and Gila Rivers (Doyel 2007). Pottery from the Papaguería region (west and south of the study area) has been found at Classic period sites in Avra Valley, which suggests increased interaction between populations living in the two areas (Dart and Gibson 1988). One sites from the period is AZ AA:7:11(ASM) on Cerro Prieto, a peak in the Samaniego Hills. This was a large, complex, hillside *trincheras* village with more than 250 masonry rooms and numerous stone compounds, terraces, walls, and other features (Downum 1993; Pailes 2014).

Protohistoric Period (A.D. 1450–1700)

The Hohokam cultural trajectory reached a hiatus in the mid-1400s, and the large, aggregated communities of the Late Classic period dispersed about A.D. 1450. Some Tohono O'odham people associate this time with their overthrow of the headmen Sivañ Maakai and Jenashad at Sivañ Va'aki (the Great House at Casa Grande) (Winters 2021). To archaeologists specifically studying the Hohokam tradition, it marks a clear point of change. In the regional perspective of Southwest archaeology, the Classic period was marked by periodic reorganizations and migrations, and the events of ca. A.D. 1450 form the last chapter of this era. The O'odham people are among those who identify the Hohokam as ancestors. The Hopi people also trace some of their clans through the Hohokam. Following the Hohokam, Tohono O'odham/Sobaípuri and Apache groups are known to have occupied the Santa Cruz Valley and Avra Valley. The Protohistoric period populations of southern Arizona may have adapted to post-Classic period conditions by returning to a subsistence strategy involving more wild-food gathering, more

mobility, and less farming. Erickson (1994:104) states that the whole Avra Valley had been O'odham lands, but the lack of permanent water sources meant there were no villages there.

Historic Period (A.D. 1700–1974)

The Historic period in south-central Arizona was marked by the arrival of Europeans in the late 1600s. Spanish colonization of what is now known as southern Arizona began in the 1690s with the travels of the Jesuit missionary Eusebio Francisco Kino. Kino first traveled as far north as the Tucson Basin in 1692 and 1694 (Doelle 1984). Father Kino established missions at Tumacacori and Tubac in the Santa Cruz Valley in 1691. The mission at San Xavier del Bac in the southern Tucson Basin was established under Kino's influence in 1700. In 1775, a presidio was established in Tucson to protect the missions at San Xavier and San Agustín from Apache attack (Harry and Ciolek-Torrello 1992). Juan Bautista de Anza led a Spanish expedition from Sonora, Mexico, to the San Francisco Bay area of California in 1775–1776. The expedition made camp one night at an abandoned O'odham village called Oytaparts, near Marana (Guerrero 2006:96). O'odham people continued a very Hohokam-like subsistence strategy in the Tucson Basin at this time (Castetter and Bell 1942) and occupied villages along the Santa Cruz River. It is not known how intensively they occupied Avra Valley. Historic O'odham ceramic types, most notably Papago Red and Papago Plain, are considered quite distinctive, with a dark carbon core. Sherds are occasionally found in Avra Valley.

During the late 1800s, cattle and mining industries were established in Avra Valley. For example, Pedro Aguirre pioneered ranching in the Altar Valley, and Bernabé Robles's ranch was established in 1882 in Avra Valley. Copper deposits in the Silverbell Mountains attracted a succession of prospectors and mining companies between the 1870s and 1925 (Briggs 2017). In the twentieth century, technological innovations, such as pumps, and improvements in irrigation methods led to intensified agricultural development in Avra Valley. Cotton and alfalfa were the most frequently planted crops and required large numbers of seasonal laborers, including Mexican, Yaqui, African American, and Euro-American migrants. Six thousand acres of land was irrigated near Marana in 1920, mostly using privately supplied water from Cortaro, in the Santa Cruz Valley (White et al. 1966). Additional water was provided from wells. By 1950, the population of Tucson had grown to nearly 120,000, and the irrigated area of farmland near Marana had reached 30,000 acres (White et al. 1966:9). The expansion of farmland was curtailed in 1954, when it was declared a critical groundwater area. Within the past 20 years, large tracts of agricultural land in Avra Valley have been converted to housing developments to meet the needs of the population influx in southern Arizona.

Archaeological Records Search

The archaeological records search aimed to identify previously conducted surveys and previously recorded sites in each Problem Area and, for additional context, within a 1-mile (1.6-kilometer [km]) radius of each Problem Area. The records search was compiled using the AZSITE database, which includes records from the Arizona State Museum (ASM), Arizona State University, Bureau of Land Management, and SHPO. Additional research was conducted on April 9, 2024, at the ASM Archaeological Records Office (ARO). Pima County's Office of Sustainability and Conservation contributed information to the previous cultural resources overview of the Brawley Wash Watershed Plan study area (Rawson et al. 2021). No additional information was identified in County records for the five Problem Areas. The City of Tucson Historic Preservation Office maintains an interactive map of historic properties and defined archaeological sensitivity areas, but none of the resources are in Brawley Wash Watershed Plan project area. Appendix A presents a series of maps showing the confidential results of the records search. The National Park Service National Register Information Systems Database was also consulted for properties or districts within a 1-mile (1.6-km) radius of the project area that are listed in the NRHP. No NRHP-listed properties were identified.

Previous Research in the Brawley Wash Watershed Plan Study Area

The largest archaeological projects conducted within the Brawley Wash Watershed Plan study area have been associated with the CAP. These began in the 1980s with the Tucson Aqueduct Phase B Survey Project (Downum et al. 1986) and subsequent data recovery investigation at 13 archaeological sites. The CAP effort also included a water supply project intended to deliver and apply water to farmland on the Tohono O'odham Indian Reservation in response to the Southern Arizona Water Rights Settlement Act of 1982. The project involved construction of a water delivery system and development of new agricultural fields in the Schuk Toak and San Xavier Districts of the Tohono O'odham Nation. Tucson Water sponsored further archaeological work in the 1990s during planning for the Central Avra Valley Storage and Recovery Project (CAVSARP) underground water storage facilities and more recently for the companion SAVSARP facilities. Site testing was conducted (Lindeman 2000), but these projects—which occupy a considerable area in the middle of Avra Valley—do not appear to have led to the discovery of large numbers of sites or significant data recovery excavations.

TUCKER ROAD PROBLEM AREA

Three previous survey projects minimally intersected the revised Tucker Road Problem Area APE but included only 10 percent of the area (Table 2; Appendix A:Figures A-1 and A-2). The new portions of the APE have not been previously surveyed. Two surveys followed a proposed transmission line along the east edge of the original portion of the Problem Area in 1980–1981, and a small gas supply installation was surveyed on the northern edge of the parcel in 1992. The original Tucker Road Problem Area APE was surveyed in 2024 by SWCA (Petersen and Hesse 2025). Four other linear surveys along electrical lines and a gas pipeline were conducted in the 1-mile search radius (1997–2017); these surveys covered a small percentage of the search radius and did not result in the discovery of any sites. One site [AZ AA:11:268(ASM)] was recorded within the original boundary for the Tucker Road Problem Area (Petersen and Hesse 2025). It is a large Hohokam artifact scatter. Additionally, two previously recorded sites are within the 1-mile search radius around the Tucker Road Problem Area APE (see Appendix A; Figure A-3), which are the two northernmost sites in a cluster of sites that has been recorded farther south along Blanco Wash. Both AZ AA:11:3(BLM) and AZ AA:11:4(BLM) are Hohokam artifact scatters.

Table 2. Previously Conducted Archaeological Surveys in the Tucker Road Problem Area

Agency Number	Survey Name	Reference
1980-242.ASM	TEP Tortolita-South Utility Corridor and Alternate Routes	Wilson (1980)
1981-154.ASM	TEP Tortolita-South Realignment Survey	Wilson (1981)
1992-13.ASM	Kai Farms Tap Delivery Point	Kisselburg (1992)
2024-786.ASM	Brawley Wash Watershed Problem Areas	Petersen and Hesse (2025)

Historical Map Research

Historical maps were consulted to identify historic-era features that may be present in the survey area. The main sources of historical information are General Land Office (GLO) maps drawn when Townships were surveyed and platted. The surveys were ultimately intended to support land sales or other land claims (homesteads, mining claims), and the mapping process often prioritized areas where land was more desirable. The three Problem Area APEs were surveyed between 1895 and 1922. The surveys in 1922 were among the last original GLO surveys in Avra Valley, in more remote areas. The U.S. Geological Survey quadrangle maps are generally more recent. The rural areas that characterize the study area were mapped in a sequence of 15-minute, or larger, quadrangles in the middle of the twentieth

century. More detailed 7.5-minute quadrangles were developed later, in the modern era for some of the Problem Area APEs.

Tucker Road

The GLO map of Township 12 South, Range 10 East was filed in 1904, based on surveys performed in 1903 (Appendix B:Figure B-1). It showed several trails that crisscross Section 5. No cultural features were shown in the Problem Area on the 1934 Tucson Mountains 30-minute quadrangle. The 1956 1:250,000 Tucson and 1959 30-minute Tucson maps showed an UNDERGROUND PIPELINE extending southeast from a NATURAL GAS STATION (compressor station) to the edge of the APE. This is the El Paso Natural Gas California Mainline (Line Nos. 1100 and 1103), which crosses the northeast corner of the APE. It has been recorded as a site and/or in-use structure in many other locations (Hesse 2007). Features outside the APE included a cotton gin to the east and unnamed ranches. The 1959 Silverbell Peak 15-minute quadrangle showed the pipeline extending continuously through the area. This map also showed a system of irrigation canals within the APE and TUCKER ROAD is identified by name directly north of the APE. The WESTERN AVRA COTTON GIN was 1 mile east of the APE. Modern aerial imagery (Google Earth 2024) shows the APE as an abandoned field system.

Survey Expectations

The records search data provide some indication of the numbers and types of sites that might be found in each Problem Area APE. Except for the survey in 2024 for the original APE (Petersen and Hesse 2025), there has been minimal previous survey in the Tucker Road Problem Area, and most of these surveys were conducted more than 10 years ago. The archaeological sensitivity of this area is high in the Pima County model, but few sites have been recorded (possibly reflecting limited research). Except for the Hohokam artifact scatter (AZ AA:11:268[ASM]) recorded during the original Tucker Road Problem Area APE, no sites have been recorded in the Tucker Road Problem Area APE.

PROJECT METHODS

SWCA archaeologist Eric Petersen surveyed the new portion of the Tucker Road Problem Area APE on March 14, 2025. General conditions for the survey were good, but visibility in some areas was limited in places by dense vegetation. Systematic survey was conducted within the project area, with parallel transects walked spaced no more than 20 m apart. Evidence for cultural resources was sought in the form of artifacts (e.g., ceramics, lithics, historical metals, or glass) or features (concentrations of fire-affected rock, charcoal-stained soil, prehistoric or historic structures, or other cultural anomalies).

The ASM has established standards for evaluating materials identified during archaeological surveys (Arizona State Museum 1995). Briefly, properties of archaeological interest must contain the remains of past human activity that are at least 50 years old. Beyond this, two classes of findings are recognized, the site and the isolated occurrence (IO). To qualify as a site, a property must contain, within an area no more than 50 feet in diameter, 30 or more artifacts of a single type, unless all pieces originate from a single source (e.g., one broken bottle or ceramic vessel); 20 or more artifacts when multiple types are present; any number of artifacts when a single fixed feature is present; or multiple fixed features, with or without any associated artifacts. The site can be larger than 50 feet in diameter as long as any 50-foot-diameter portion of the site meets one of these conditions. Artifact finds that do not meet these criteria but that are over 50 years old may be designated as IOs. Archaeological sites are accurately mapped and plotted using a handheld GPS device, photographed, and recorded using a standard ASM form. The precise locations of the IOs are point-located and recorded using a handheld GPS unit. Standard survey methodology in Arizona is non-collection survey (i.e., artifacts are field-analyzed and then returned to their original locations).

National and Arizona Registers Criteria for Evaluation

Four criteria are applied in the evaluation of cultural properties for inclusion in the National Register of Historic Places (NRHP) (36 Code of Federal Regulations 60.4). The same criteria are used to evaluate properties for inclusion in the Arizona Register of Historic Places (ARHP) (Arizona Administrative Code R12-8-302). Normally, a significant property must be at least 50 years old and meet at least one of these four criteria to be considered eligible for listing in the NRHP. According to the NRHP criteria, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

A. that are associated with events that have made a significant contribution to the broad patterns of our history;

B. that are associated with the lives of persons significant in our past;

C. that embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguished entity whose components may lack individual distinction; or

D. that have yielded, or may be likely to yield, information important in prehistory or history.

SURVEY RESULTS

The March 2025 survey of the new portion of the Tucker Road Problem Area APE resulted in documentation of two archaeological sites and 15 IOs. Survey results maps showing the locations of the archaeological sites and IOs are in Appendix C, and archaeological site descriptions and a table of IOs is provided in Appendix D. One of the archaeological sites (AZ AA:11:268[ASM]) was previously recorded by SWCA in September 2024 (Petersen and Hesse 2025) and was expanded as a result of the current survey. It consists of an estimated 1,000 to 5,000 Hohokam artifacts, including ceramic pottery sherds, flaked stone tools and debitage, and ground stone. AZ AA:11:268(ASM) is recommended eligible for listing in the ARHP and the NRHP under Criterion D, for its potential to yield information on Hohokam land use and settlement patterns in Avra Valley. The other site, newly recorded in March 2025, is also likely a Hohokam archaeological site (AZ AA:11:270[ASM]), consisting of 45 artifacts, including flaked stone debitage and tools and a single ceramic pottery sherd. AZ AA:11:270(ASM) is unevaluated due to the paucity of surface artifacts. A total of 15 IOs were found in the Tucker Road Problem Area APE, including seven occurrences of flaked stone artifacts, five occurrences of ground stone artifacts, one occurrence of ceramic pottery sherds, one occurrence of both ceramic pottery sherds and flaked stone, and the remnants of a historic concrete-lined irrigation canal.

SUMMARY AND MANAGEMENT RECOMMENDATIONS

The cultural resources survey resulted in the identification of a newly recorded portion of a previously recorded site, one newly recorded archaeological site, and 15 IOs. The two archaeological sites are Hohokam artifact scatters (AZ AA:11:268[ASM] and AZ AA:11:270[ASM]). AZ AA:11:268(ASM) is recommended eligible for inclusion in the NRHP and the ARHP under Criterion D. The artifact assemblage observed at AZ AA:11:268(ASM) indicates multiple site activities. The site has the potential to provide information important to our understanding of Native American land use and settlement patterns in the Avra Valley. The artifact assemblage is less diverse at AZ AA:11:270(ASM), and, although one ceramic pottery sherd was found that suggests Hohokam use, the flaked stone assemblage contains a wide variety of stone materials as well as bifacial thinning flakes, hinting to possibly earlier, Archaic period use. However, the limited number of surface artifacts makes NRHP/ARHP-eligibility

determination problematic. AZ AA:11:270(ASM) remains unevaluated, and NRHP/ARHP-eligibility testing would be needed to appropriately evaluate the site's NRHP/ARHP eligibility. PCRFCD should avoid ground-disturbing activities within both sites when developing and implementing the Brawley Wash Watershed Plan. Alternatively, plans should be developed and implemented to determine the NRHP/ARHP-eligibility of AZ AA:11:270(ASM) and to mitigate the potential adverse effects to the sites that would result from project activities at AZ AA:11:268(ASM) and AZ AA:11:270(ASM), if the later were to be determined eligible, if the sites cannot be not avoided. No further cultural resources work is recommended outside the boundaries of these two sites.

In the event that previously unreported cultural resources are encountered during ground disturbing activities, all work must immediately cease within 30 m (100 ft) and the discovery must be reported to the project sponsor who will notify NRCS's Arizona State Cultural Resources Specialist (SCRS); the SCRS will then notify the land managing agency, SHPO, and the Tribes, as appropriate, of the discovery within 24 hours. A qualified archaeologist must then document the discovery and evaluate its eligibility for the NRHP/ ARHP in consultation with the lead agency, the SHPO, and Tribes, as appropriate. Work must not resume in this area without approval of the lead agency.

If human remains are encountered during ground-disturbing activities, all work must immediately cease within 30 m (100 ft) of the encounter and the area must be secured. The ASM, lead agency, SHPO, and appropriate Tribes must be notified of the encounter. All encounters will be treated in accordance with Arizona Revised Statutes 41-844 or 41-865, as appropriate, and work must not resume in this area without authorization from ASM and the lead agency.

Table 3. Table Management Summary

Site Number/Name	Identification Status	Land Jurisdiction	Eligibility Status	Recommended Treatment
AZ AA:11:268(ASM)	Previously recorded	City of Tucson and private	Recommended eligible, Criterion D	Avoid
AZ AA:11:270(ASM)	Newly recorded	City of Tucson	Unevaluated	Avoid

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APPENDIX A

Class I Records Search Maps

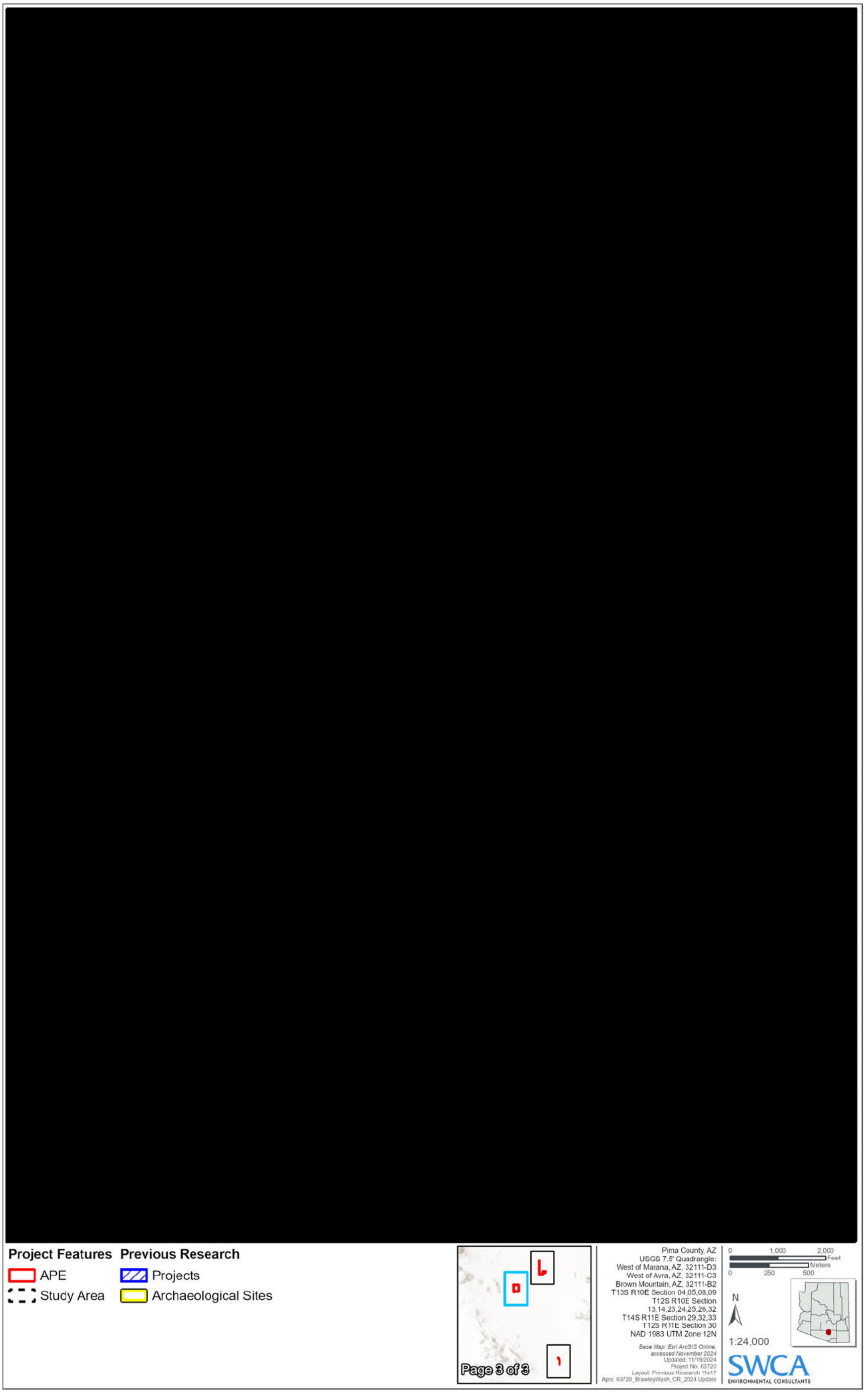


Figure A-1. Previous Research: Original Tucker Road Problem Area APE.

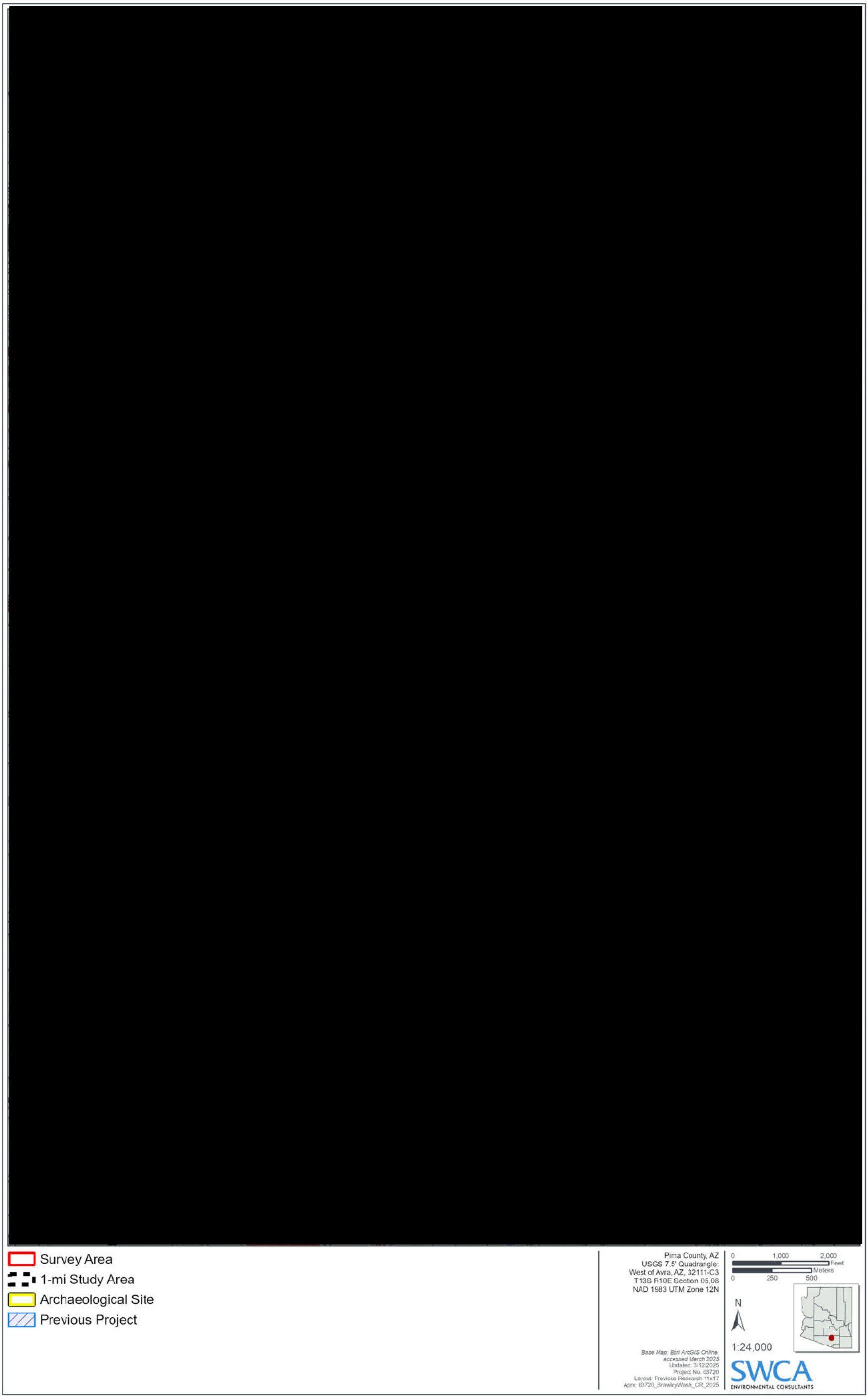


Figure A-2 Previous Research: Additions to the Tucker Road Problem Area APE.

APPENDIX B

General Land Office Map (1904)

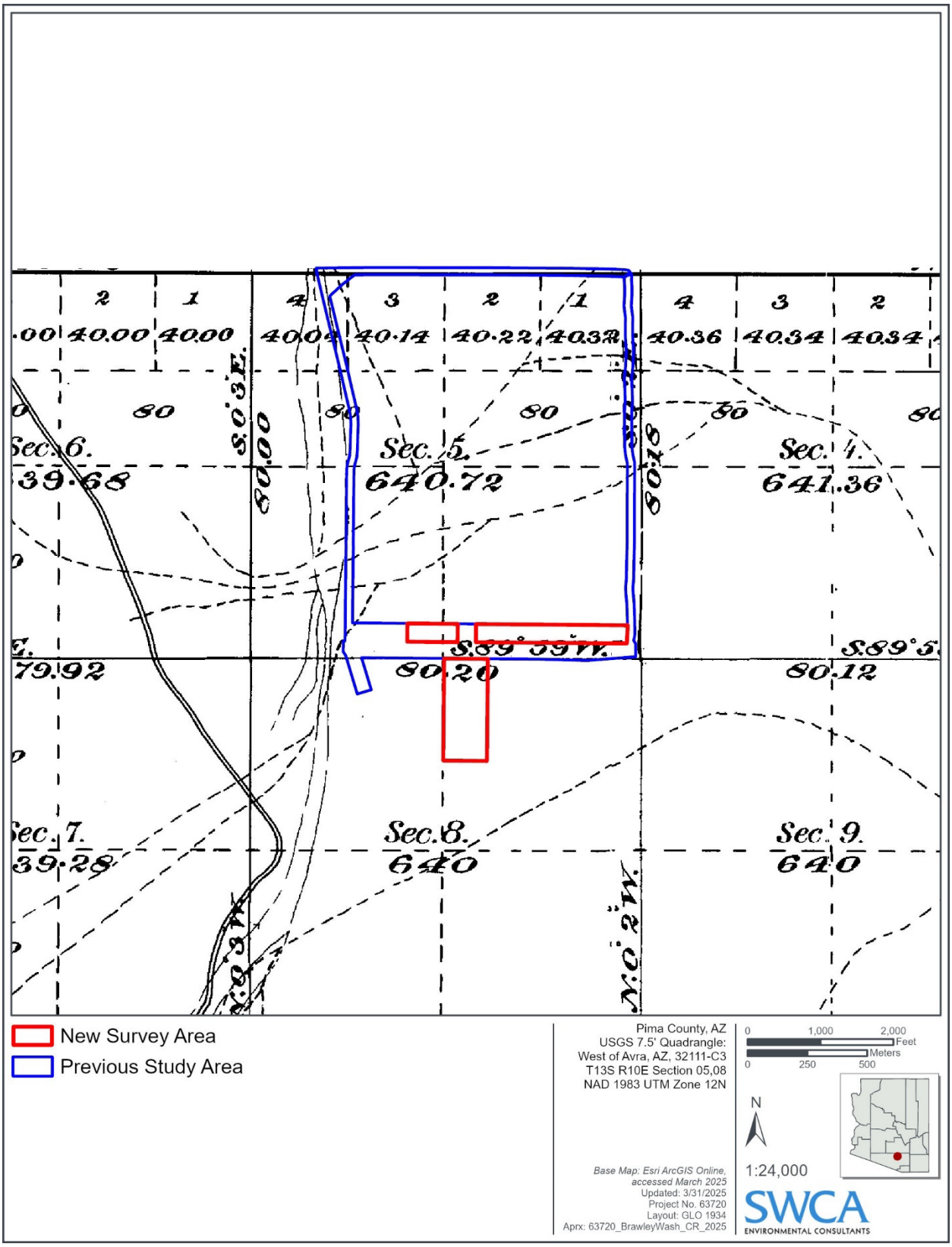


Figure B-1. Tucker Road Problem Area APE on the 1904 GLO map.

APPENDIX C

Results of Survey Map

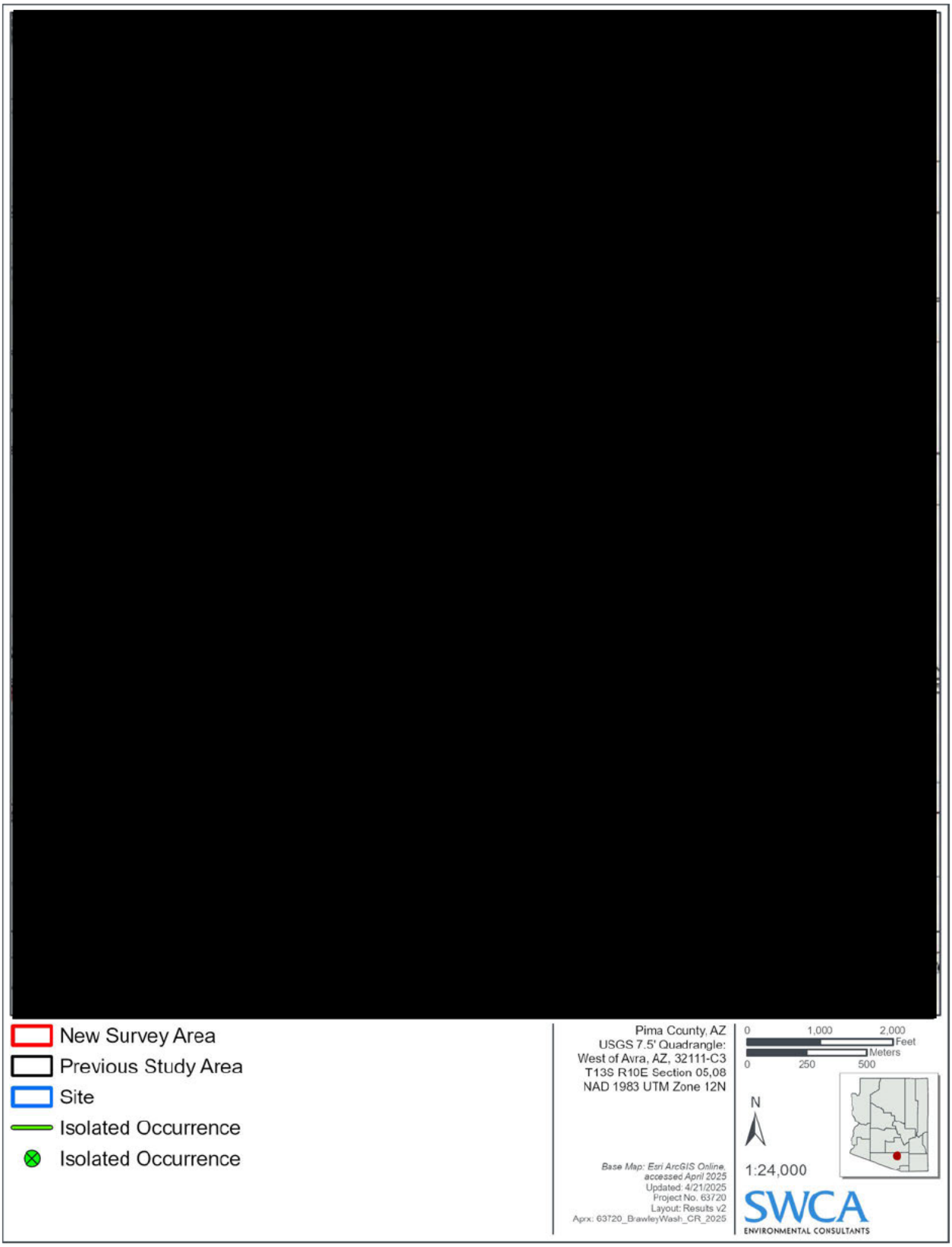


Figure C-1. Tucker Road Problem Area results of survey.

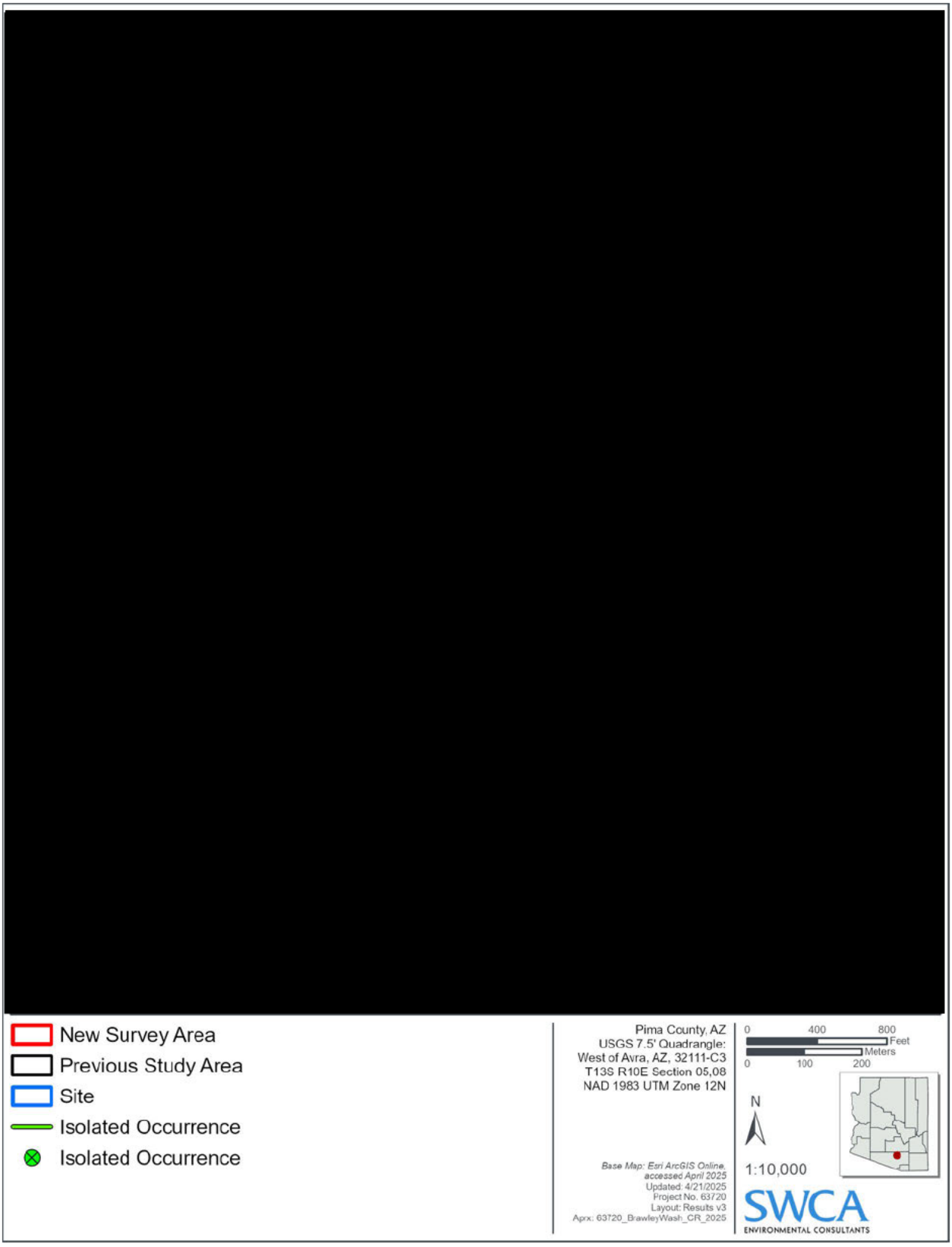


Figure C-2. Tucker Road Problem Area results on aerial.

APPENDIX D

Site Descriptions and Isolated Occurrences

Archaeological Sites

AZ AA:11:268(ASM)

Site Type: Artifact scatter

Cultural Affiliation: Hohokam

Temporal Affiliation: Ceramic (A.D. 700–1450)

Dimensions/Area: 885 × 555 m / 237,430 m^2 [58.67 acres] (86,529 m^2 [21.43 acres] in APE)

Land Ownership: City of Tucson, Private

Problem Area: Tucker Road

UTM Coordinates: (NAD 83, Zone 12) [redacted]

Legal Description: Sections 5 and 8, Township 13 South, Range 10 East, Pima County, on the USGS West of Avra, Arizona, 7.5-minute quadrangle

A/NRHP Eligibility: Recommended eligible (Criterion D)

OVERVIEW

AZ AA:11:268(ASM), located in the Tucker Road Problem Area, was originally recorded by SWCA during the survey of the original Tucker Road Problem Area APE, and was expanded as a result of the survey of the additions to the APE. The site is a surface artifact scatter with ground stone, chipped stone, and ceramic artifacts (Figure D-1). The site is roughly 0.5 mile west of the closest previous survey in an area previously determined to be a high archaeological sensitivity (Rawson et al. 2021:Figure 7). SWCA archaeologists estimated 2,000 to 5,000 artifacts within the site. Within the new survey area, SWCA identified 179 flaked stone, 24 ceramic, and five ground stone artifacts. The flakes and cores are indicative of core reduction of rhyolite, chert, quartzite, silicified siltstone, and metasediment materials. Three metasediment projectile point preforms (PL 1, 8, 9), two chert bifaces (PL 10 and 11), one rhyolite drill fragment (PL 6) were also noted in the APE. The ceramic assemblage within the APE is entirely plainware body sherds of jar and bowl vessel forms. The ground stone artifacts noted in the APE include four granitic, strategically designed 1-handed manos (PLs 2, 5, 7, and 12); one cobble rhyolite mano (PL 13); a granitic metate fragment (PL 4), and two vesicular basalt metate fragments. A rhyolite pestle fragment was also noted outside of the APE (PL 3). PLs 4–7 and 10–13 are within the new survey area. No features were noted. The site has been highly disturbed within the APE from past agricultural use on City of Tucson property; outside the APE, cattle grazing, erosion, and a cattle tank have affected the site on private property. Erosional sheet-washing is evident throughout the site. Vegetation consists of mesquite, creosote, cholla cacti, and various grasses and shrubs (Figure D-2).

ELIGIBILITY

Due to the sheet-washing, agricultural, and ranching activities, some uncertainty exists regarding whether the site contains intact buried archaeological deposits; however, the quantity and diversity of artifact material types is indicative of multiple site activities; therefore, AZ AA:11:268(ASM) appears to be eligible for the NRHP under Criterion D for its potential to yield information on Hohokam land use and settlement patterns in Avra Valley.

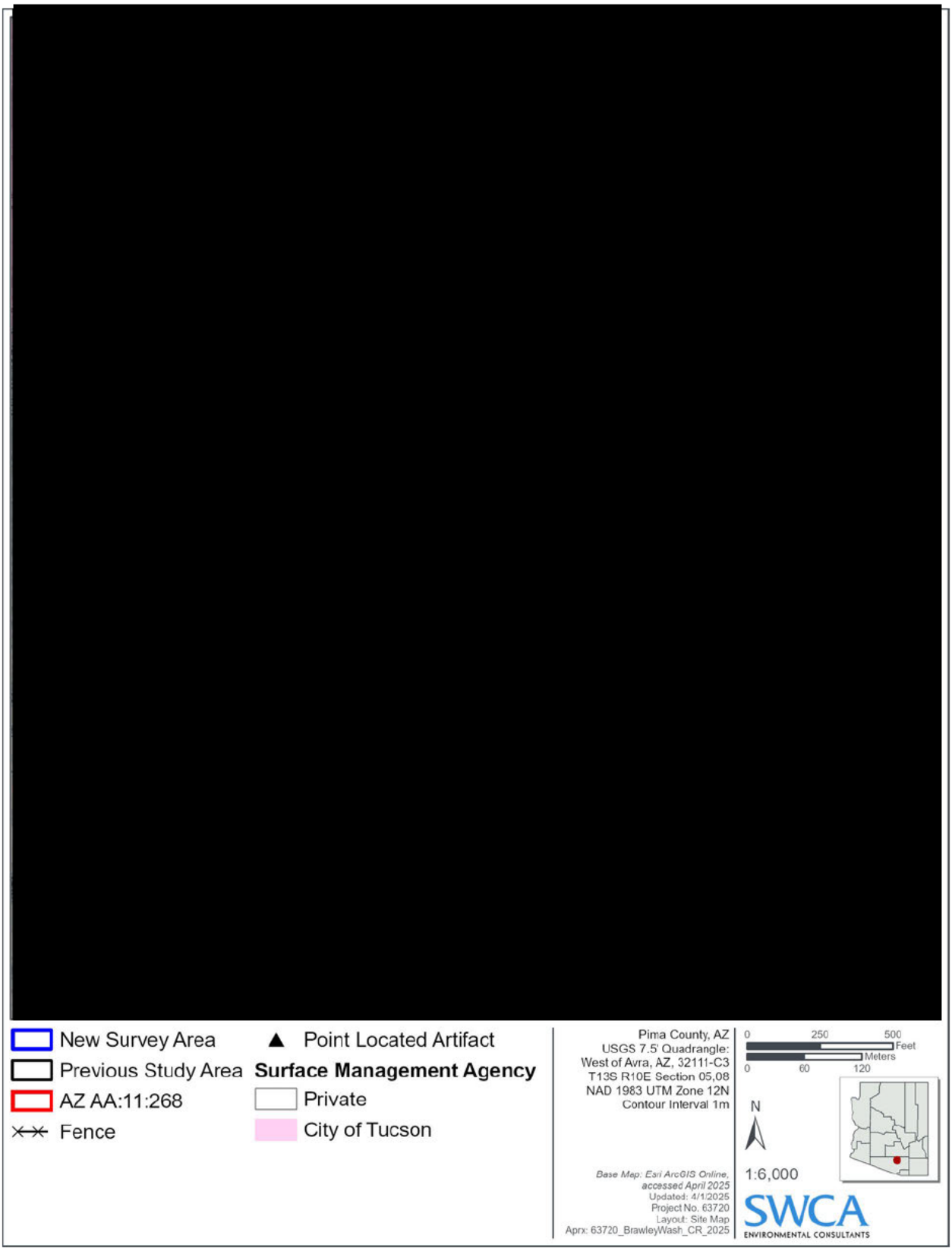


Figure D-1. Map of AZ AA:11:268(ASM) within Tucker Road Problem Area.



Figure D-2. Site overview of AZ AA:11:268(ASM), view facing south.

AZ AA:11:270(ASM)

Site Type: Artifact scatter

Cultural Affiliation: Hohokam, possibly Archaic period Native American

Temporal Affiliation: Ceramic (A.D. 700–1450)

Dimensions/Area: 46 × 41 m / 978 m^2 (0.24 acre)

Land Ownership: City of Tucson

Problem Area: Tucker Road

UTM Coordinates: (NAD 83, Zone 12) [redacted]

Legal Description: Section 8, Township 13 South, Range 10 East, Pima County, on the USGS West of Avra, Arizona, 7.5-minute quadrangle

A/NRHP Eligibility: Unevaluated

OVERVIEW

AZ AA:11:270(ASM), located entirely within the addition to the Tucker Road Problem Area, is a newly recorded artifact scatter (Figure D-3). The site is in an area previously determined to be a high archaeological sensitivity (Rawson et al. 2021:Figure 7). SWCA identified 43 flakes, two bifaces, and one Hohokam plainware sherd (PL 3). The bifaces are obsidian (PL 1) and rhyolite (PL 2). Flaked stone materials included metasediment, chert, rhyolite, and quartzite. A total of 37 flakes are noncortical, some of which are bifacial thinning flakes. Six flakes retain some cortex. Vegetation consists of mesquite, creosote, cholla cacti, and various grasses and shrubs (Figure D-4).



Figure D-3. Map of AZ AA:11:270(ASM) within the Tucker Road Problem Area.



Figure D-4. Site overview for AZ AA:11:270(ASM); view facing northwest.

ELIGIBILITY

Due to the sheet-washing in the APE, some uncertainty exists regarding whether the site contains intact buried archaeological deposits. The limited number of surface artifacts also makes NRHP/ARHP-eligibility determination problematic. AZ AA:11:270(ASM) remains unevaluated and further NRHP/ARHP-eligibility testing would be needed to make an eligibility determination.

Isolated Occurrences

Fourteen IOs of Native American artifacts and one IOs of historic-era Euro-American feature were identified as a result of SWCA's March 2025 survey of the new survey area of the Tucker Road Problem Area APE (Table D-1).

Table D-1. Isolated Occurrences

IO No.	IO Description	Cultural-Temporal Affiliation	Easting*	Northing*
1–7	IOs in the original survey for the Tucker Road Problem Area	Various	Various	Various
8	An irrigation system consisting of concrete lined canals that are 3 feet wide and 2.5 feet deep. The canals are in an area measuring 1.5 × 1.25-km. These features are in poor condition, with many segments intentionally removed (Petersen and Hesse 2025: Figure D.5). The irrigation canals appear on the 1959 Silverbell Peak 15-minute quadrangle (Petersen and Hesse 2025: Appendix B:Figure B-9).	Euro-American, post-1934 and 1959 or earlier	[redacted]	[redacted]

IO No.	IO Description	Cultural-Temporal Affiliation	Easting*	Northing*
9–19	IOs located in the other two Problem Areas	Various	Various	Various
20	One Hohokam plainware sherd	Hohokam, ceramic period	[redacted]	[redacted]
21	One metasediment non-cortical flake	Native American, unknown age	[redacted]	[redacted]
22	One rhyolite non-cortical flake	Native American, unknown age	[redacted]	[redacted]
23	One metasediment non-cortical flake	Native American, unknown age	[redacted]	[redacted]
24	One vesicular basalt metate fragment	Native American, unknown age	[redacted]	[redacted]
25	One vesicular basalt metate fragment	Native American, unknown age	[redacted]	[redacted]
26	One rhyolite non-cortical flake	Native American, unknown age	[redacted]	[redacted]
27	One granitic slab metate fragment	Native American, unknown age	[redacted]	[redacted]
28	One 1-handed oval-shaped granitic mano with two well-worn use surfaces	Native American, unknown age	[redacted]	[redacted]
29	One rhyolite metate fragment	Native American, unknown age	[redacted]	[redacted]
30	One metasediment non-cortical flake	Native American, unknown age	[redacted]	[redacted]
31	Four metasediment non-cortical flakes and one Hohokam plainware sherd within a 15-m area	Hohokam, ceramic period	[redacted]	[redacted]
32	One obsidian non-cortical flake	Native American, unknown age	[redacted]	[redacted]
33	One metasediment core	Native American, unknown age	[redacted]	[redacted]

* UTM coordinates (NAD 83), Zone 12



Figure D-5. IO 8; irrigation canal, view facing south.