JURISDICTIONAL WATERS DETERMINATION FOR THE ROSEMONT COPPER PROJECT UTILITY CORRIDOR AND WEST SIDE OPERATIONS, PIMA COUNTY, ARIZONA

Prepared for: U.S. Army Corps of Engineers

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EXECUTIVE SUMMARY

WestLand Resources, Inc. was retained by Rosemont Copper Company to analyze the Rosemont Copper Project West Side, totaling approximately 757 acres in southeastern Pima County, Arizona (Analysis Area), for the potential occurrence of waters of the United States (WOTUS). The Rosemont Copper Project Utility Corridor and West Side Operations is located west side of the Santa Rita Mountain divide, approximately 30 miles south of Tucson, Arizona.

All surface water features within the Analysis Area are ephemeral drainages, flowing only briefly in direct response to storm events. No wetland features were identified within the Analysis Area.

The drainage features within the Analysis Area do not qualify as either navigable-in-fact waters (they have not been used, and are not susceptible for use, for water-borne trade or commerce) or relatively permanent waters (RPWs; they do not flow continuously on a year-round or seasonal basis). Per current U.S. Army Corps of Engineers guidance, therefore, the onsite ephemeral drainages were evaluated to determine whether they constitute non-navigable, non-RPW tributaries possessing a significant nexus with a navigable-in-fact waterway.

The significant nexus evaluation found that none of the ephemeral drainage features within the Analysis Area meet the regulatory standard to be considered WOTUS. In regulatory terms, none were found to have more than an insubstantial or speculative effect on the physical, chemical, or biological integrity of the nearest downgradient navigable-in-fact waterway. Accordingly, none of these ephemeral drainage features were determined to possess a significant nexus with a downgradient navigable-in-fact waterway or potential navigable-in-fact waterway. Therefore, all of the ephemeral drainage features considered in this analysis are non-jurisdictional.

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1 INTRODUCTION

WestLand Resources, Inc. (WestLand) was retained by Rosemont Copper Company (Rosemont) to analyze the Rosemont Copper Project Utility Corridor and West Side Operations for the potential occurrence of waters of the United States (WOTUS). This analysis includes approximately 757 acres on the west side of the Santa Rita Mountains divide (Analysis Area) and is predominately linear in nature. The Rosemont Copper Project Site (east of the Santa Rita Mountains divide) is the subject of a separate evaluation. This formal request for an Approved Jurisdictional Determination (JD) is being submitted by WestLand on behalf of Rosemont.

This evaluation was conducted in general accordance with the June 5, 2007 *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (the Guidebook), its attachments (revised December 2008), and the December 2008 Corps/EPA guidance entitled *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States and Carabell v. United States* (the Guidance).

The Guidance discusses analysis of whether a property's drainage features possess a significant nexus with the nearest navigable-in-fact waterway, i.e., a traditional navigable water (TNW). Drainage features that do not possess a significant nexus with the TNW and are not relative permanent waters (RPWs; they do not flow continuously on a year-round or seasonal basis) are not subject to U.S. Army Corps of Engineers (Corps) jurisdiction as WOTUS. Principal drainage feature elements identified in the Guidance, in conjunction with other case-specific relevant elements, are used in the significant nexus analysis (SNA) to determine whether the property's non-navigable, non-RPWs (i.e., ephemeral drainages) that are tributary to a TNW possess a significant nexus with the TNW. The principal elements include "*the volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to a traditional navigable water.*" The Guidance also includes consideration for "*contextual factors that directly influence the hydrology of tributaries including the size of the tributary's watershed, average annual rainfall, average annual winter snow pack, slope, and channel dimensions.*" WestLand has considered these attributes in the following analysis.

The standard in the Guidance for determining whether a tributary has a significant nexus to the nearest downstream TNW, and is therefore WOTUS, is whether evaluation of the above attributes and any other relevant attributes leads to the determination that "*the tributary and its adjacent wetlands are likely to have an effect that is* ***more than speculative or insubstantial*** *on the chemical, physical, and biological integrity of a traditional navigable water*" (emphasis ours). The Guidance notes that as the distance from the tributary to the TNW increases, it becomes increasingly important to document whether the tributary and its adjacent wetlands have a significant nexus rather than a speculative or insubstantial nexus with the TNW.

A concept of vital importance to the SNA is that the analysis is conducted separately for each relevant reach (i.e., reach of the channel from the point of confluence of two lower order streams, downstream

to the point where the tributary enters a higher order stream) within the analysis area, and not for the analysis area as a whole. A relevant reach is evaluated at the farthest downstream limit of such tributary, the point the tributary enters a higher order stream, even if that point is downstream from the analysis area. Typically, this means that the evaluation can start with the relevant reach with the largest watershed within an analysis area, and if determined to be WOTUS, proceeds to the relevant reach with the next largest watershed, and so on until it is determined that the relevant reach under consideration is not WOTUS. Any tributaries to the relevant reach that is WOTUS would also not be WOTUS. This process may vary if there are considerably different flow routes of relevant reaches from the analysis area to the nearest TNW, if there is more than one nearest downstream TNW from the analysis area, or if there are significant differences in relevant reach attributes such that a smaller relevant reach may have a more significant effect than a larger tributary on the nearest downstream TNW.

2 PROJECT LOCATION AND BACKGROUND INFORMATION

The Analysis Area is located on the west side of the Santa Rita Mountains, approximately 30 miles south of Tucson, Arizona (**Figure 1**), and includes approximately 150 acres of private land owned by Rosemont, 169 acres of State Trust lands managed by the Arizona State Land Department, and 438 acres of the Nogales Ranger District of the Coronado National Forest (CNF) on National Forest System (NFS) land. The Analysis Area is located within Sections 17-21 and 27-35, Township 17 South, Range 14 East; Sections 1, 2, and 12, Township 18 South, Range 14 East; Sections 7, 17, 18, 20-24 and 36, Township 18 South, Range 15 East; and Sections 1, 6, 7, and 12, Township 19 South, Range 15 East, Gila & Salt River Baseline & Meridian (see **Figure 1**). The Analysis Area is found on the Sahuarita, Corona de Tucson, and Helvetia USGS 7.5' Quadrangles.

Hydrologically, the Analysis Area is within the Santa Cruz basin (Hydrologic Unit Code [HUC] 150503) of the Middle Gila subregion (HUC 1505) (**Figure 2**). More specifically, the Analysis Area is on the west side of the Santa Rita Mountains divide, within the Box Canyon Wash-Santa Cruz River watershed (HUC 1505030107) of the Upper Santa Cruz subbasin (HUC 15050301).

2.1 NEAREST NAVIGABLE-IN-FACT WATERWAY

For the purpose of determining whether any of the surface water features within the Analysis Area are WOTUS, we initially determined the location of the nearest navigable-in-fact waterway to which these surface water features may be tributary. We consider a "navigable-in-fact" waterway to be a waterway (river, stream, lake or reservoir) that is "used, or [is] susceptible of being used, in [its] ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water." *The Daniel Ball*, 77 U.S. 557, 563 (1870). This test for determining navigability for Commerce Clause and related regulatory purposes has been used on many occasions by the United States Supreme Court, most recently in *PPL Montana v. Montana*, 132 S. Ct. 1215 (2012).

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When not considering intervening impediments to flow, all delineated surface water features within the Analysis Area may be considered ultimately tributary to the Colorado River, which is the nearest downgradient navigable-in-fact waterway to the Analysis Area, approximately 309 to 327 river miles from the Analysis Area, depending on the relevant reach traced from the Analysis Area. **Figure 3** provides an overview of the intervening landscape between the Analysis Area and the Colorado River.

Although the Colorado River is the nearest navigable-in-fact waterway to the Analysis Area, the Corps has previously identified two intervening reaches as TNW: "Study Reach B" of the Santa Cruz River near Tucson, and the Gila River from Powers Butte to Gillespie Dam, west of Phoenix.

Study Reach B begins as effluent discharge from Pima County's Agua Nueva (formerly Roger Road) wastewater treatment plant in Tucson, Arizona, and ends at the Pima County-Pinal County border in Arizona, a distance of approximately 32 miles. The base effluent surface flows were determined to be completely lost through infiltration, evaporation, and evapotranspiration before the Pinal County line. The flow path from the Analysis Area joins Study Reach B approximately 26.2 to 46.0 river miles from the Analysis Area.

From the 1800s to present day, the Santa Cruz River has been a discontinuous stream, normally flowing only in response to significant precipitation and discharges of sewage effluent. Additionally, there are no reports of any successful commercial navigation over any significant portion of the river, and there is no evidence that the river has ever been used for water-borne trade or commerce. Study Reach B specifically was historically ephemeral or, at best, intermittent. At present, this reach has no natural flow for most of the year. Base flows in Study Reach B consist of sewage effluent discharged by two Tucson metropolitan area wastewater treatment facilities, which are located near the Santa Cruz River at Roger Road and Ina Road. The ordinary flow of water in Study Reach B is insufficient for the Santa Cruz River to be used as a highway for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water, and there is no evidence that this reach of the river has ever been used, or is susceptible to being used, for water-borne trade or commerce. Consequently, there is not sufficient support for treating Study Reach B as navigable-in-fact under the traditional test for navigability.

The second previously Corps-determined TNW is the 6.9-mile reach of the Gila River between Powers Butte and Gillespie Dam, located west of Phoenix near Arlington, Arizona. Base flows in this reach are the result of irrigation return flows and runoff from agricultural activities. The intervening distance between the Analysis Area and the Gila River at Powers Butte is approximately 184 to 202 river miles. There are no reports of any successful commercial navigation within this reach of the Gila River, and there is no evidence that this reach of the river has ever been used, or is susceptible to being used, for water-borne trade or commerce. Consequently, there is not sufficient support for treating this reach of the Gila river as navigable-in-fact under the traditional test for navigability.

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In a recent lawsuit challenging the designation of Study Reaches A[1] and B of the Santa Cruz River as TNWs, the Corps and the Environmental Protection Agency (EPA) indicated to the federal court that the TNW designations do not determine any legal rights or obligations and that no legal consequences flow from the designation. The court accepted the agencies' characterization of the effect of the TNW designations, and explained that the designation was merely advisory and was not legally binding (*National Association of Home Builders v. United States Environmental Protection Agency*, 956 F. Supp. 2d 198 [D.D.C. 2013], *aff'd on other grounds*, 786 F.3d 34 [D.C. Cir. 2015]).

Consequently, for the purpose of determining whether any surface water features within the Analysis Area are WOTUS, we regard the Colorado River as the nearest navigable-in-fact waterway. For the sake of completeness, additional analyses considering Study Reach B of the Santa Cruz River and the Gila River at Powers Butte as TNW are provided as well, recognizing, again, that these designations are advisory in nature and are not binding on Rosemont.

A more thorough discussion of the TNW designations will be provided under separate cover.

2.2 OTHER APPROVED SIGNIFICANT NEXUS JURISDICTIONAL DETERMINATIONS

The Corps has signed numerous other Approved JDs in Arizona under the current guidance, utilizing SNA. In many of these cases, the Corps has determined that the evaluated non-RPW tributaries lacked a significant nexus with a downgradient TNW and were not WOTUS. Although the details of each SNA varied among projects, a persistent theme in the analyses is that the further removed a given non-RPW relevant reach is from the TNW, and the smaller its watershed in comparison to that of the TNW, the less likely the Corps was to assert jurisdiction.

A review of selected significant nexus JDs informs the current analysis. The Corps completed two previous significant nexus JDs identifying Study Reach B of the Santa Cruz River as the nearest TNW: the ASARCO Mission Mine[2] (Mission), and portions of the Sierrita Open Pit Copper Mine[3] (Sierrita). The approved JDs for Mission and Sierrita both had findings of "no significant nexus" between the evaluated ephemeral drainage features and Study Reach B of the Santa Cruz River.[4] The Corps' determinations that the drainages analyzed within the Mission and Sierrita JDs had no significant nexus with Study Reach B of the Santa Cruz River was based at least partially upon the distance to Study Reach B (25 to greater than 30 river miles) and the intervening deep, sandy, alluvial bed with limited stands of xeroriparian vegetation along the Santa Cruz River.

[1] Study Reach A is a second effluent-reliant reach of the Santa Cruz River that the Corps was determined a TNW at the same time as Study Reach B. Study Reach A is upstream from Study Reach B and does not affect the Rosemont analysis.

[2] Corps File No. SPL-2015-00520-MWL

[3] Corps File No. SPL-2011-00160-MWL

[4] As explained above, there is no evidence that Study Reach B qualifies as a navigable-in-fact waterway under the traditional test for navigability, and, in any case, the Corps and EPA have stated that this TNW designation is merely advisory and has no legal effect. However, in these prior JDs, it was considered a TNW for the significant nexus test.

Relative to the Mission and Sierrita JDs, the surface water features within the Analysis Area are of similar to greater distance from Study Reach B of the Santa Cruz River and share the same flow path almost entirely, including the same intervening deep, sandy, alluvial bed in the Santa Cruz River.

Downstream from the confluence of the Analysis Area flow path with the Santa Cruz River, the potential flow path to the Gila and Colorado Rivers shares many segments and characteristics with three previously completed JDs in which the Corps determined no WOTUS were present: 1) Sendero Pass (Corps File No. SPL-2006-01833-MB; hereafter Sendero), 2) the Silver Bell Mine No. 1 Leach Dump and West Oxide Pit Expansion Areas (Corps File No. SPL-2010-00102-MB), and 3) another Silver Bell Mine Expansion (Corps File No. SPL-2010-00102-MB; the two Silver Bell Mine AJDs hereafter referred together as Silver Bell). The approved Sendero and Silver Bell JDs were evaluated with the Gila River between Powers Butte and Gillespie Dam as the nearest TNW, and both indicated findings of "no significant nexus" between the evaluated ephemeral drainage features and the Gila River TNW.[5] The Colorado River is approximately 118 river miles farther downstream from this reach of the Gila River.

The Sendero and Silver Bell JDs included an evaluation of a portion of the downgradient flow path shared by the Analysis Area, namely Greene Canal to Greene Wash, Santa Rosa Wash, Santa Cruz Wash, and finally the Gila River (see **Figure 3**). The Corps determinations that the drainages analyzed within the Sendero and Silver Bell JDs had no significant nexus with the TNW reach of the Gila River were based at least partially upon the great distance (118 to 152 river miles) to the TNW reach of the Gila River and the presence of multiple constructed impediments (berms, structures, and agricultural fields) along this potential downgradient flow route, especially between Greene Wash and Santa Cruz Wash (see **Figure 3**).

Relative to the Sendero and Silver Bell JDs, the surface water features within the current Analysis Area lie approximately 32 and 66 river miles or more farther upstream from the TNW reach of the Gila River (and from the Colorado River), and share essentially the same downgradient flow path (Santa Cruz River to Study Reach B, Greene Canal, Greene Wash, Santa Rosa Wash, Santa Cruz Wash, and the Gila River).

In addition to the specific Approved JDs described above, WestLand reviewed publicly available information on more than 20 additional Approved JDs (with SNA) in Arizona. **Exhibit 1** provides a graph of these previous Approved JDs, plotted based on the distance and relative watershed size between the largest non-RPW in each JD and the nearest designated TNW. Included in the exhibit is a plot of the three largest watersheds associated with relevant reaches in the Analysis Area (Box Canyon [20.2 square miles (sq mi)], Helvetia Wash [8.52 sq mi], and Delgado Wash [3.88 sq mi])

[5] Again, there does not appear to be any evidence that this reach of the Gila River is navigable-in-fact under the traditional test for navigability. We also assume that like the TNW designations for the Santa Cruz River, the Corps regards this TNW designation as advisory in nature and not legally binding.

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compared to the Colorado River. All three relevant reaches clearly plot well outside that portion of the graph in which the Corps has typically asserted jurisdiction.

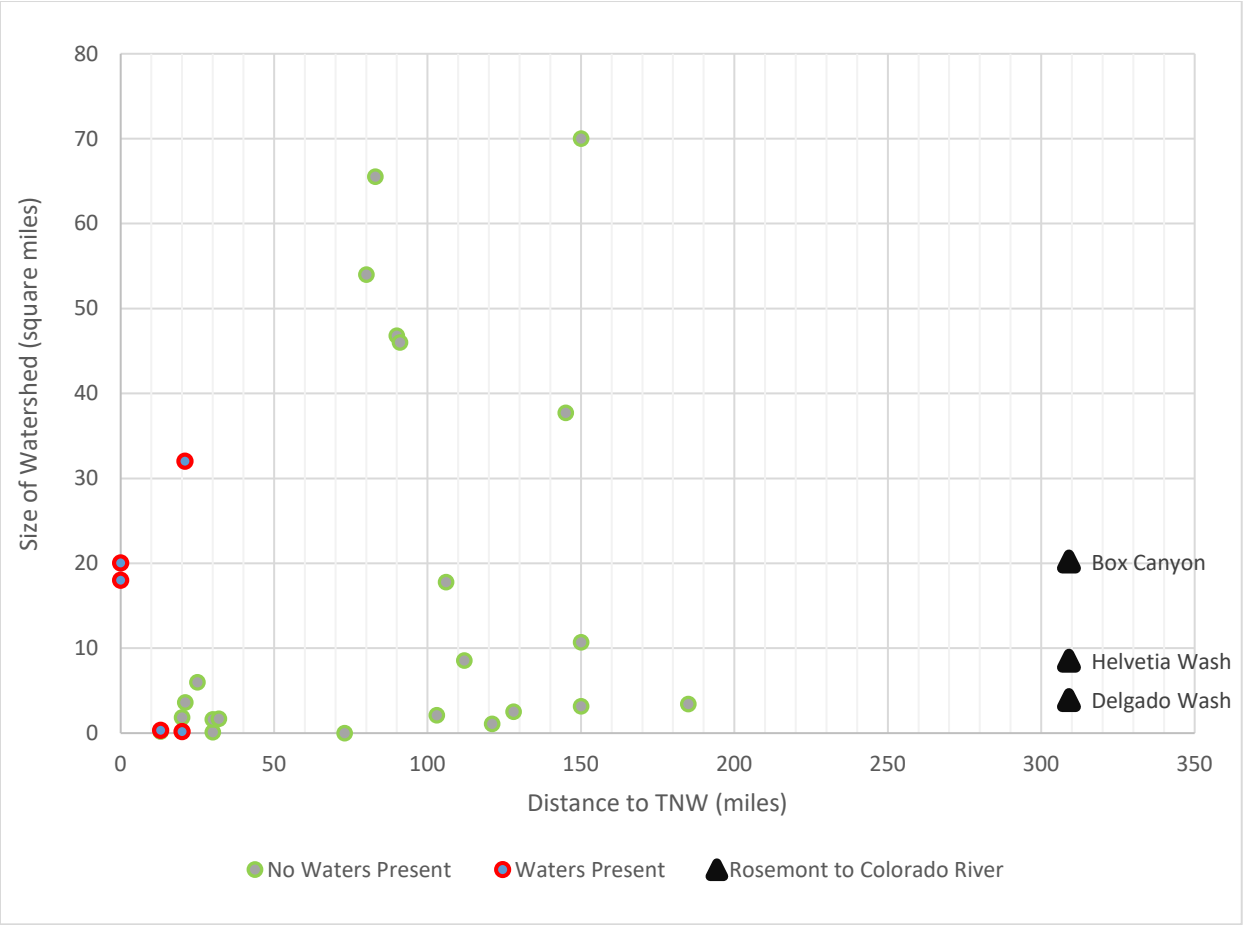

Exhibit 1. Watershed size and distance of largest Non-RPW in previously approved SNA JDs with the three largest Analysis Area relevant reach watersheds plotted against the Colorado River.

It is important to note that in the two JDs in which WOTUS were determined present, and the largest surface water features are plotted less than 20 miles to a TNW and have a very small watersheds, the intervening surface water features (Pinto Creek and Pinal Creek) are intermittent to perennial in nature.

Even when comparing the three Analysis Area relevant reaches to Study Reach B of the Santa Cruz River or the Gila River at Powers Butte, these features still plot within the non-jurisdictional area of the graph (**Exhibit 2**).

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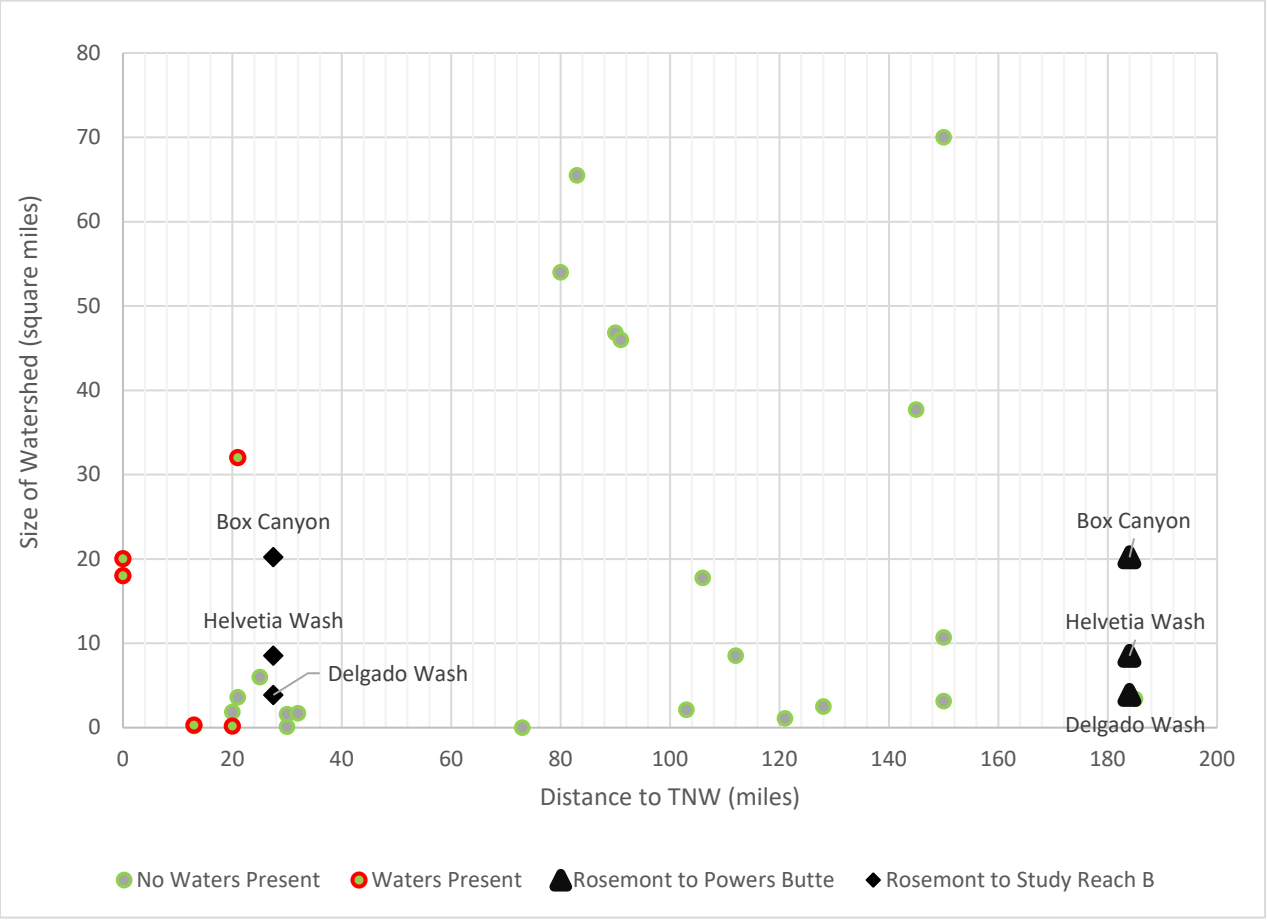

Exhibit 2. Watershed size and distance of largest Non-RPW in previously approved SNA JDs with the three largest Analysis Area relevant reach watersheds plotted against Study Reach B of Santa Cruz River and the Gila River at Powers Butte. The two WOTUS determinations plotted near the watershed size (Y-axis) 0 line had intermittent to perennial reaches covering a substantial distance between the Analysis Areas and the nearest TNW.

3 ANALYSIS AREA SURFACE WATER FEATURES

Rosemont previously requested and received a preliminary JD, pursuant to Corps Regulatory Guidance Letter (RGL) 08-02, of areas that may be considered by the Corps as potential WOTUS within the Analysis Area (Corps File No. 2008-00816-MB, signed by Corps November 1, 2010). The Analysis Area as considered under this Approved JD request aligns with the preliminary JD analysis area that is on the west side of the Santa Rita Mountains divide.

WestLand personnel visited the Analysis Area numerous times between September 2009 and September 2011 to assess site conditions and document the physical characteristics of potentially jurisdictional features. Drainage characteristics were measured at selected points where appropriate, and photographs were taken at each data point, generally alternating between upstream and downstream views. Data points and photo locations were digitally transferred onto a recent aerial photograph using ArcGIS. Lengths of each analyzed feature were then calculated using ArcGIS and

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included drainage meanders. The calculation of drainage area (in acres) used a combination of measured ordinary high water mark (OHWM) widths at known locations and aerial photograph interpretation. Average widths were calculated by dividing these feature areas by total feature lengths. Most of the evaluation was completed for the March 1, 2010 preliminary JD submittal, with additional area submitted on October 29, 2010. Mapped OHWM have been modified slightly as part of a desktop evaluation to account for changes in projection associated with current aerial photography.

Analysis of the physical characteristics of the evaluated drainages was informed by the August 2008 delineation manual *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*, the July 2010 update to the same, and the 2007 *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* and its attachments. Where appropriate, wetland evaluations would follow the procedures described in the 1987 *Corps of Engineers Wetlands Delineation Manual* and the 2008 arid west regional supplement to that document. No locations were evaluated as a potentially jurisdictional wetland.

3.1 TRADITIONAL NAVIGABLE WATERS

There are no TNWs or wetlands adjacent to TNWs in the Analysis Area. The nearest navigable-in-fact waterway, the Colorado River, is located approximately 309 to 327 river miles downgradient of the Analysis Area. As explained above, the Corps has indicated that Study Reach B of the Santa Cruz River and the reach of the Gila River between Powers Butte and Gillespie Dam are TNWs, but these were advisory and not binding agency determinations. We discuss them as well for the sake of completeness. These reaches are still 28 to 46 miles and 184 to 202 miles downgradient, respectively, of the Analysis Area.

3.2 RELATIVELY PERMANENT WATERS

There are no RPWs in the Analysis Area.

3.3 NON-RPW TRIBUTARIES

All surface water features within the Analysis Area are ephemeral drainages, flowing only briefly in direct response to storm events. No wetland features were identified within the Analysis Area.

A total of 99 relevant reaches were identified within the Analysis Area. Drainage is primarily northwest from the west slopes of the Santa Rita Mountains. The delineated drainage features cross and discharge from the mainly linear Analysis Area at dozens of locations, including features that weave in and out of the approximately 20 miles of linear utility line. The relevant reach with the largest watershed is the Box Canyon Wash watershed, which is 20.2 sq mi measured at the downstream end of the relevant reach, approximately 1.5 miles from where it discharges from near the west end of the Analysis Area. The downstream end of the Box Canyon Wash relevant reach is also the closest relevant reach to the Colorado River TNW, at approximately 309 miles.

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Seven other relevant reach watersheds exceed 1 sq mi in area; one is approximately 8.5 sq mi, which is less than half the size of Box Canyon Wash, and the other six range from 1.1 to 3.9 sq mi each. Numerous watersheds are less than 0.1 sq mi.

In WestLand's judgment, using the practices typically utilized by the Corps in assessing surface water features in the arid southwest, an OHWM is present in approximately 50,099 linear feet of drainage channel within the Analysis Area. OHWM characteristics consist mainly of geomorphological slope breaks, destruction of terrestrial vegetation, and a change in substrate in the drainage as compared to the surrounding upland area. Based on the observed width of the drainages, the estimated total area of non-wetland potential WOTUS subject to evaluation under this significant nexus analysis is approximately 8.9 acres. Mapped drainages within the Analysis Area are depicted on **Attachment 1**. It should be noted that many of the delineated channels on the east end are depicted outside of the Analysis Area. Those channels were within the preliminary JD area, which was wider than the current Analysis Area, and were not changed for this analysis.

For the purposes of the significant nexus determination, a JD Form for each individual relevant drainage reach will be provided in an electronic database upon Corps approval of the JD. **Attachment 2** provides representative ground photographs of the characteristics of the evaluated drainages. Locations of these representative ground photographs are shown in the maps provided in **Attachment 1**. Note that the information to be contained in these attachments is provided in a Geoportal web-based geographic information system[6] to facilitate Corps review. Following Corps review, this information will be revised as appropriate and captured in appropriate digital format for Corps archiving.

3.4 WETLANDS

No wetlands adjacent to non-TNW tributaries were identified within the Analysis Area, but one site was inspected to determine whether it required wetland analysis. A wetland analysis table is found in **Attachment 3**.

4 SIGNIFICANT NEXUS ANALYSIS

4.1 HYDROLOGICAL FACTORS

4.1.1 Site Hydrology

As described above, all drainage features within the Analysis Area are ephemeral, draining stormwater generally northwest from the west slopes of the Santa Rita Mountains and crossing the Analysis Area at dozens of locations along the approximately 20 miles of linear utility line. The Analysis Area is

[6] Geoportal link: https://maps.westlandresources.com/maps/RosemontAJD/. Please contact Chuck Powell at WestLand (520.206.9585 or cpowell@westlandresources.com) for unique login and password.

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within the Box Canyon Wash-Santa Cruz River watershed (HUC 1505030107) of the Upper Santa Cruz subbasin (HUC 15050301).

The path from the slopes of the Santa Rita Mountains to the Santa Cruz River includes crossing more than 10 miles of deep alluvial deposits with lessening slope grade as distance from the mountain slopes increases. Typical of hydrology on these landscapes, multiple channels descend from the mountain slopes and run generally parallel to each other towards the Santa Cruz River, forming a depositional landform composed of a series of coalescing alluvial fans (bajada). Runoff and sediment in large channels near the base of the mountains spreads out into numerous shallow channels on the lower-gradient alluvium, tending to divide even more the further downstream and the lower the slope gradient over which the flow travels. Flows transfer between these adjacent features via a network of break-out channels.

Mean Annual Precipitation

Rainfall in the region occurs in a bimodal pattern; mainly relatively short duration, intense storms during summer months, and steadier, long-duration storms in the winter months, with dry periods in the spring and fall. Snow accumulation is essentially absent at the lower elevations and not uncommon but generally short-lived at all but the highest elevations.

Mean precipitation within the Analysis Area varies depending on location. The Santa Rita Experimental Range weather station (027593) at 4,300 feet elevation in Florida Canyon on the west slopes of the Santa Rita Mountains, approximately 4 miles south of the Analysis Area east end, reported annual mean precipitation of 22.20 inches, including 3.9 inches of snow, for the period of 1950 through 2010 (Western Regional Climate Center 2019). By contrast, the Green Valley weather station (023668) at 2,900 feet elevation in Green Valley approximately 4 miles southwest of the Analysis Area, reported annual mean precipitation of 13.42 inches, with 0.1 inch of snow, for the period of 1988 through 2016 (Western Regional Climate Center 2019).

Precipitation data was generated by Paretti et al. (2014) for their regression equations used to predict surface flow for watersheds in Arizona, in cubic feet per second (cfs). Their precipitation data is similar to the observed data at the weather stations. One Analysis Area watershed that is entirely on the Santa Rita Mountain slopes, with a mean elevation of 5,406 feet, has a reported mean annual precipitation of 25.5 inches, while another Analysis Area watershed that is entirely on the west end of the Analysis Area, approximately 10 miles from the mountains at a mean elevation of 2,922 feet, has a reported annual precipitation of 13.5 inches (U.S. Geological Survey 2019).

Flow Event Data and Estimated Onsite Peak Flow

No flow monitoring data is available for the Analysis Area. The nearest downstream gage to an Analysis Area watershed is the Santa Cruz River at Tucson (Congress Street; USGS gage 09482500),

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approximately 22 miles away. We used a regionalized regression analysis obtained from the Streamstats database (USGS 2017a), developed for ungauged streams in Arizona by the USGS (Paretti et al. 2014) to estimate the magnitude and frequency of peak flows from Analysis Area watersheds. The Analysis Area occurs within flood region 5 (Southeastern Basin and Range), and region 5 regression equations were therefore applied to calculate the P-percent annual exceedance probabilities for channels within the Analysis Area.

For the Analysis Area, 37 watersheds were defined, many of them including multiple channels that are defined in **Attachment 1**. Estimated Analysis Area peak flow for the one percent annual exceedance probability (AEP) ranged from 60 to 6,520 cfs. Grouped by one percent annual exceedance probability (AEP; one percent chance of occurrence in any year) flow, 17 have an AEP of less than 300 cfs; 4 have an AEP of 300 to 499 cfs; 7 have an AEP of 500-999 cfs, 6 have an AEP of 1,000 to 2,999 cfs, and three have an AEP of 3,000 to 6,520 cfs (**Table 1**).

Table 1. Estimated Annual Exceedance Probability for Analysis Area Relevant Reach Watersheds.

One Percent Annual Exceedance Probability[a]	Number of Analysis Area Watersheds
<300 cfs	17
300-499 cfs	4
400-999 cfs	7
1,000-2,999 cfs	6
3,000-6,520 cfs	3

a: Methodology described in Paretti et al. (2014)

4.1.1.1 Study Reach B of the Santa Cruz River

After discharging from the Analysis Area, Analysis Area washes continue across between approximately 1.5 and 8 miles of alluvial surface, where infiltration of surface flows is high, before reaching the Santa Cruz River. The alluvial soils on the bajada are typically classified as well drained with medium to low runoff potential (Soil Survey Staff 2019). Stormwater flows in Box Canyon Wash and other nearby wash systems (west of Santa Rita Road) travel a relatively direct route to the Santa Cruz River south of Sahuarita Road, but flows in the systems farther to the east that cross the Analysis Area closer to the Santa Rita Mountains take a more circuitous route to the Santa Cruz River.

North of Sahuarita Road, that longer route includes a 1-2 mile stretch of relatively dense vegetation approximately 800 feet wide that is likely supported in part by the flows that first cross the Analysis Area. Any continuing flows then encounter livestock tanks, one of which appears to largely divert flows to an agricultural area, where those flows are contained (**Figure 4**).

Any flows from the Analysis Area that reach the Santa Cruz River are approximately 17 to 27 miles upstream from Study Reach B of the Santa Cruz River, a 32-mile-long effluent-dependent reach that

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ends at the Pinal County line. The Santa Cruz River upstream and downstream from Study Reach B is ephemeral and possesses an extremely permeable stream bed that is known to result in significant losses of surface flow (de la Torre 1970). Downstream of the potential receiving areas, the Santa Cruz River widens and gains access to much of its historic floodplain, further increasing percolation rates.

4.1.1.2 Gila River at Powers Butte

From Study Reach B, ephemeral flows continue north in Pinal County and cross the Santa Cruz Flats, a broad plain of indistinct, non-continuous channels. In this area, some or all of the flows enter Greene Canal and then follow the path of Greene Wash, Santa Rosa Wash, Santa Cruz Wash, where it crosses into Maricopa County, and ultimately the Gila River, unless otherwise truncated by man-made features. There are multiple constructed impediments (berms, structures, and agricultural fields) through this area, especially between Greene Wash and Santa Cruz Wash.

The Gila River continues west past Powers Butte and turns sharply south to the Gillespie Dam, which was partially collapsed during severe flooding in 1993 and remains unrepaired, but still impounds water.

4.1.1.3 Colorado River

From the Gillespie Dam, the Gila River continues south, then turns sharply west again into Painted Rock Reservoir, located northwest of Gila Bend, Arizona. The reservoir was constructed and is operated by the Corps to capture and store water for flood-control purposes. The reservoir is frequently dry due to the lack of flows in the Gila River.

Water that is released from Painted Rock Reservoir continues to flow southwest in the Gila River channel through western Maricopa County and Yuma County. This reach of the river is largely ephemeral, with intermittent flows in certain locations due to agricultural activities near the river. Along this reach of river, daily data for USGS Gage 09520280 (Gila River near Dateland) shows no flows recorded for years at a time, including from August 1999 through July 2003, December 2008 through December 2009, June 2010 through June 2011, August 2014 through December 2015, and February 2017 through June 2018. In the past 9 years (September 2010 through August 2019), only 23 days of flow have been recorded at the Dateland gage, typically on 2 or 3 consecutive days (18 of the 23 flow days), so only 13 different flow events were recorded. The two largest events had peak flows of 1,580 and 1,500 cfs, four events peaked between 158 and 720 cfs, and five peaked at less than 24 cfs. Only the mean cfs for the day is available for two events. Based on their mean cfs for the day and the mean daily cfs for the flows with known peaks, those two events likely peaked in the hundreds of cfs. The Gila River eventually reaches the Colorado River near Yuma, Arizona, approximately 309 to 327 river miles from the Analysis Area (see **Figure 3**).

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4.1.2 Distance to TNW

Assuming the flow route described above, the drainages within the Analysis Area lie between approximately 28 and 46 river miles from Study Reach B of the Santa Cruz River, 184 to 202 river miles from the Gila River at Powers Butte, and 309 to 327 river miles from the Colorado River at the Gila River confluence, depending on the relevant reach traced from the Analysis Area (see **Figure 3**).

In Arizona's surface water quality standards (A.A.C. Title 18, Chapter 11, Article 1), all intervening channels in the possible flow path from the Analysis Area to the Gila River are classified as ephemeral except:

- an effluent-dependent (defined in the regulations as a water that would be ephemeral absent the discharge of wastewater) reach of the Santa Cruz River from the Agua Nueva Water Reclamation Facility outfall to Baumgartner Road in southern Pinal County, approximately 34 miles;

- an approximately 1-mile effluent-dependent stretch of Santa Rosa Wash downstream of the Palo Verde Utilities wastewater treatment plant; and

- an effluent-dependent reach of the Gila River upstream of and including the Powers Butte to Gillespie Dam reach, beginning at the confluence of the Gila and Salt Rivers.

Arizona's surface water quality standards do not consider the Gila River between Gillespie Dam and the Colorado River to be ephemeral, but as detailed above (**Section 4.1.2.3**), USGS Gage 09520280 (Gila River near Dateland, below the Painted Rock Dam) demonstrates that flows within that reach of the Gila River can be absent for more than a year at a time at that location.

4.1.3 Watershed Comparison to TNW

4.1.3.1 Study Reach B of Santa Cruz River

The watershed of Study Reach B of the Santa Cruz River, as measured at the Cortaro USGS stream gage (09486520), is 3,503 sq mi. The four largest watersheds of Analysis Area relevant reaches illustrate the drop in magnitude of Analysis Area watersheds from the largest down. Box Canyon (includes Features D[I], D3[I], D3b, D3c, D4, D4a, and D5 on **Attachment 1**), the largest of washes in the Analysis Area, has a watershed of 20.2 sq mi, representing approximately 0.6 percent of the Study Reach B watershed. The second largest wash, Delgado Wash (Feature G[I] on **Attachment 1**), has a watershed of 13.4 sq mi, representing approximately 0.4 percent of the Study Reach B watershed. The third largest wash, Helvetia Wash, has a watershed of 8.52 sq mi (includes Features D3[II], D3d, and D3e on **Attachment 1**), representing approximately 0.2 percent of the Study Reach B watershed. The fourth largest wash, a Delgado Wash tributary (Feature G3 on **Attachment 1**), has a watershed of 3.88 square miles, representing approximately 0.1 percent of the Study Reach B watershed.

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As discussed above, two other Approved JDs in the immediate vicinity of the Analysis Area, with Study Reach B of the Santa Cruz River considered the nearest TNW, resulted in the Corps not asserting jurisdiction over any of the subject washes. The largest watershed considered in those two Approved JDs was 6.0 sq mi, or 0.2 percent of the Study Reach B watershed, and was 25 miles from Study Reach B.

4.1.3.2 Gila River at Powers Butte

The Analysis Area surface water features represent a very small fraction of the overall watershed of the Gila River at Powers Butte. The Box Canyon watershed within the Analysis Area represents approximately 0.04 percent of the 49,650-sq mi Gila River watershed, as measured at the Gillespie Dam.

4.1.3.3 Colorado River

The watershed of the Colorado River, as measured at Yuma stream gage (09521000) near the confluence of the Gila River, is 242,900 sq mi. Box Canyon, both the largest watershed discharging from the Analysis Area and the feature closest to the nearest downstream TNW, has a watershed of 20.2 sq mi. The Box Canyon watershed represents approximately 0.008 percent of the Colorado River at the Gila River confluence.

4.1.4 Potential Hydrologic Connectivity to TNW

Research on ephemeral stream systems in the arid Southwest have been conducted in climatic conditions similar to those of the Analysis Area (Cataldo et al. 2010), specifically at the Walnut Gulch Experimental Watershed (WGEW) approximately 40 miles east of the Analysis Area. This research investigated the roles that soil porosity, evapotranspiration, and other factors play in surface water transmission losses. After comparing multiple studies, Cataldo et al. (2010) found that transmission loss over distance traveled is most strongly correlated with the inflow volume (determined by the size of the drainage's watershed) and the peak rate inflow. Of particular relevance to the Analysis Area, Cataldo et al. (2005) found that stormwater flows in a 57.1-sq mi watershed experienced a 95-98% transmission loss over a 7.8-mile length of the stream reach. The Analysis Area watershed is much smaller (20.2 sq mi) and the distance to the nearest TNW much farther (approximately 28 to 309 miles) than Cataldo's study watershed, but the climate and setting are very similar to the WGEW. It seems very likely that Analysis Area surface water flows, as in the Cataldo study, would be entirely lost before reaching Study Reach B of the Santa Cruz River, let alone the Gila or Colorado Rivers.

Flow monitoring data are not available for the Analysis Area, but the magnitude and frequency of peak flows were estimated using a regionalized regression analysis developed for ungauged streams in Arizona by the USGS (Paretti et al. 2014). The Analysis Area occurs within flood region 5 (Southeastern Basin and Range), and region 5 regression equations were therefore applied to calculate

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the *P*-percent annual exceedance probabilities[7] for the four largest channels within the Analysis Area. The results of these calculations are provided in **Table 2**. For the 20.2-sq mi watershed, the 2-year, 24-hour event is estimated to be 502 cfs, and the 100-year, 24-hour event is estimated to be 6,520 cfs. For the 13.4 sq mi watershed, the 2-year, 24-hour event is estimated to be 407 cfs, and the 100-year, 24-hour event is estimated to be 5,270 cfs. For the 8.52 sq mi watershed, the 2-year, 24-hour event is estimated to be 407 cfs, and the 100-year, 24-hour event is estimated to be 5,270 cfs.

Table 2. Estimated Peak Flows for the Four Largest Analysis Area Washes.

Wash	Watershed Size (sq mi)	2-year, 24-hour Flow Event Estimate (cfs) [a]	100-year, 24-hour Flow Event Estimate (cfs) [a]
Box Canyon Wash	20.2	502	6,520
Delgado Wash	13.4	407	5,270
Helvetia Wash	8.52	321	4,110
Delgado Wash Tributary	3.88	209	2,590

a: Methodology described in Paretti et al. (2014)

In addition to expected loss of surface flows discussed above, other impediments to downstream flow to the nearest TNW have already been discussed. These impediments include retention basins along some channels between the Analysis Area and the Santa Cruz River, the Santa Cruz Flats broad plain of indistinct, non-continuous channels; multiple constructed berms, structures, and agricultural fields between the Santa Cruz Flats and the Gila River; and the Painted Rock Reservoir dam.

The sheer distance from the Analysis Area to the Gila and Colorado Rivers, combined with the ephemeral nature of most of the route, indicates that the hydrologic connectivity between the onsite drainages in the Analysis Area and the Gila and Colorado Rivers is, at best, negligible.

4.2 ECOLOGICAL FACTORS

Within the Analysis Area, potential pollutant sources primarily include unpaved roads, other minor surface disturbances, and limited, scattered historic mine workings. While the historic mine workings may contribute some concentration of metals in runoff, the most significant potential pollutant from this area is expected to be unconsolidated sediment from existing disturbance. Any natural desert area also contributes significant sediment loads to ephemeral drainages.

A portion of Study Reach B, downgradient of the confluence with Rillito Creek, has been designated as "impaired" by the Arizona Department of Environmental Quality (ADEQ). However, the impairment of this reach is a result of exceedances for ammonia and *E. coli*, not for sediment or any other analytes that may be anticipated to occur in stormwater flows within the Analysis Area. So, while the chemical integrity of Study Reach B is compromised, that condition has not resulted from flows within the Analysis Area drainages.

[7] Formerly known as the T-year recurrence interval.

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The Analysis Area drainages are all ephemeral and do not support aquatic species. As such, these features do not "provide aquatic habitat that supports biota of" Study Reach B of the Santa Cruz River. Although the xeroriparian habitat of the Analysis Area drainages supports terrestrial species known to favor xeroriparian habitats, the only species with Endangered Species Act protections that is known to occur within the Analysis Area, the Pima pineapple cactus, is considered an upland species and no proposed or designated critical habitat occurs in the Analysis Area or along Study Reach B. As such, there is no demonstrable biological nexus between the Analysis Area drainages and the Santa Cruz River that is more than speculative or insubstantial.

Considering that the distance from the Analysis Area to the Gila River at Powers Butte is approximately four to five times the distance as to Study Reach B of the Santa Cruz River, and that multiple additional constructed impediments to flow exist between Study Reach B and the Gila River, the potential for the drainages within the Analysis Area to have a more than an insubstantial or speculative effect on the ecology of the effluent-dominated flows of this reach of the Gila River is even more remote than the potential to affect Study Reach B. The effect on the Colorado River would likely be non-existent.

4.3 SIGNIFICANT NEXUS DETERMINATION

Within the Analysis Area, the dominant surface water feature is Box Canyon, an ephemeral wash with a watershed of approximately 20.2 square miles. The nearest downstream Corps-designated TNW to the Analysis Area is Study Reach B of the Santa Cruz River, an effluent-dependent reach that in the absence of effluent would likewise be ephemeral. Study Reach B is between 28 and 46 miles downstream of the Analysis Area's ephemeral washes. Based on hydrologic studies completed at the WGEW, one may readily infer that flows within the Analysis Area's ephemeral washes would be lost to infiltration well before reaching Study Reach B of the Santa Cruz River. In addition, there is no indication that sediment or other analytes that occur in the Analysis Area's drainages have any effect on the chemical integrity of Study Reach B, nor do these drainages have any meaningful biological or ecological relationship to the TNW given their small size, ephemeral condition, distance upstream, and other factors.

Based on the information provided above, none of the drainages within the Analysis Area possess a significant nexus with Study Reach B of the Santa Cruz River. As such, the Analysis Area drainages do not possess a significant nexus with the Gila River at Powers Butte and the Colorado River, which are 205 and 330 river miles, respectively, further downstream.

The drainage features within the Analysis Area constitute non-navigable, non-RPW tributaries, which do not possess a significant nexus with a downgradient navigable-in-fact water.

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5 CONCLUSION

All features within the Analysis Area are non-RPW tributaries. The nearest potential downstream TNW to the Analysis Area is Study Reach B of the Santa Cruz River, which is 28 to 46 miles downstream from Analysis Area washes and dominated by effluent discharged from wastewater treatment plants.

Based on the analysis conducted, we have determined that the tributaries within the Analysis Area, which lack any adjacent wetlands, do not have an effect that is more than speculative or insubstantial on the chemical, physical, and biological integrity of the nearest downstream TNW.

All of the surface water features considered in this analysis are non-jurisdictional. **Attachment 4** includes a table summarizing the physical characteristics of drainage features within the Analysis Area. All drainage features possessing OHWM characteristics are delineated on recent aerial photography in **Attachment 1** of this document.

RCC-CW009917

6 REFERENCES

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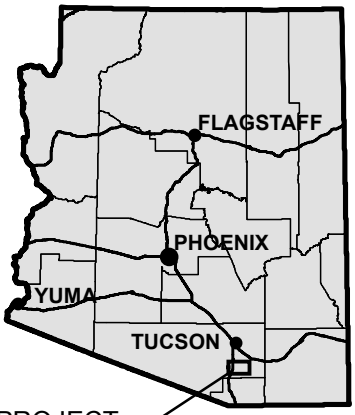
RCC-CW009918

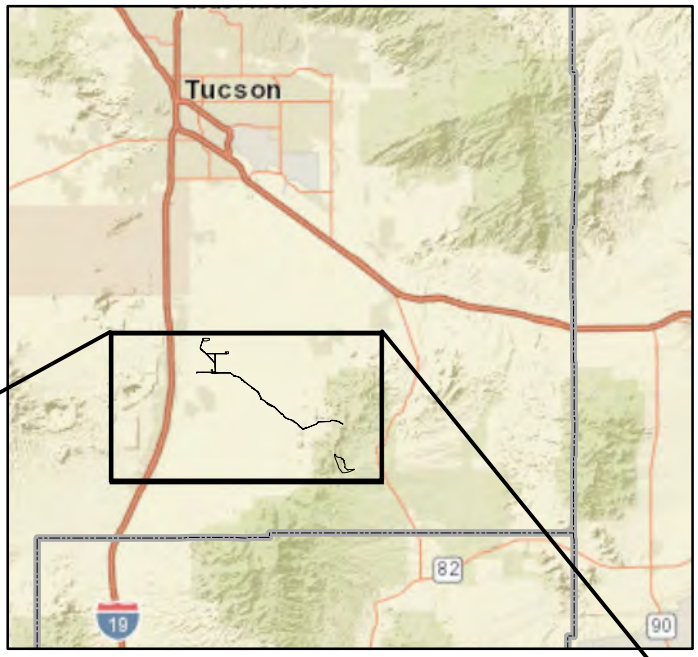
FIGURES

ARIZONA

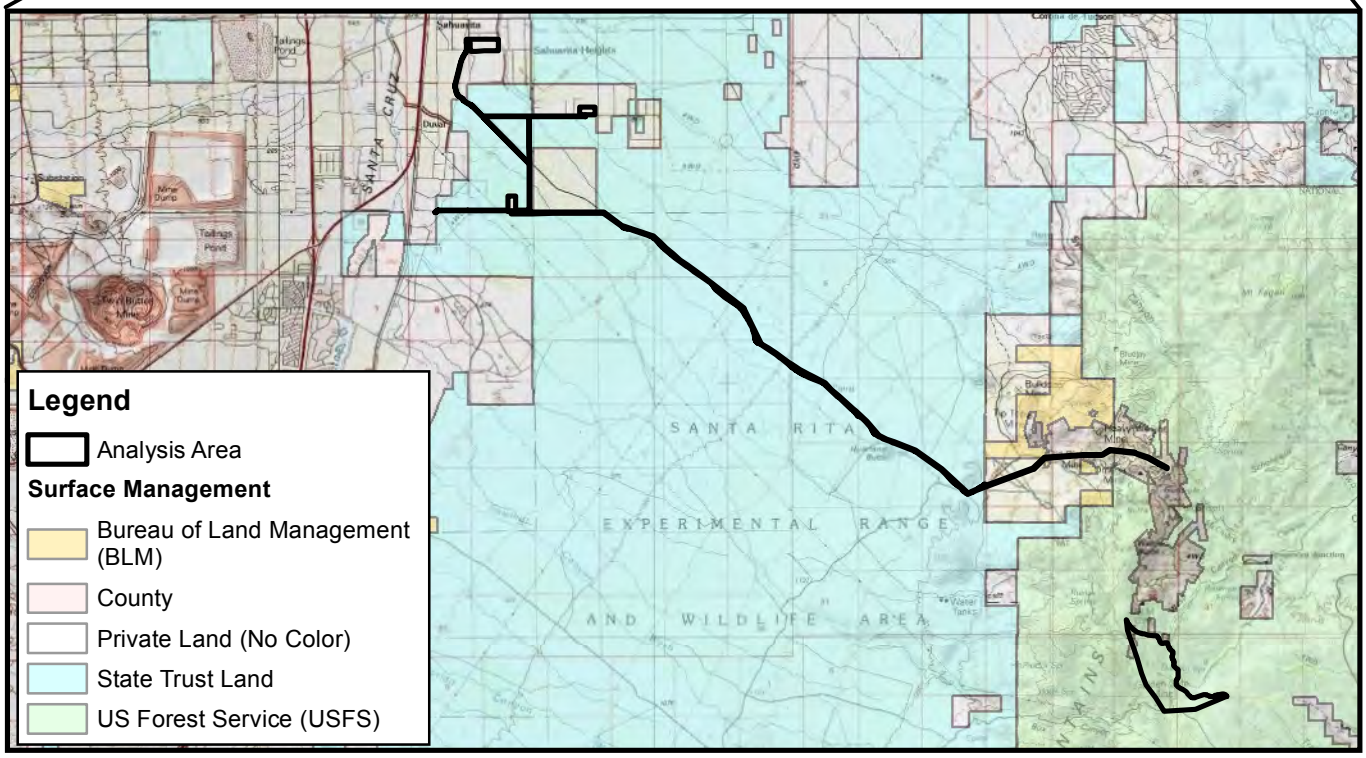


PROJECT LOCATION

PROJECT VICINITY



Approximate Scale 1 Inch = 15 Miles



T17S, R14E, Portions of Sections 17-21 and 27-35,
T18S, R14E, Portions of Sections 1, 2 and 12,
T18S, R15E, Portions of Sections 7, 17, 18, 20-24 and 36,
T19S, R15E, Portions of Sections 1 and 12,
T19S, R16E, Portions of Sections 6 and 7,
Pima County, Arizona,
Fort Huachuca USGS 1:100,000 Quadrangle
Data Source: Stantec
Surface Managment: BLM 2019, WRI modified 2019
Image Source: ArcGIS Online, World Street Map

WestLand Resources

N

0 1.5 3 Miles

0 2.5 5 Kilometers

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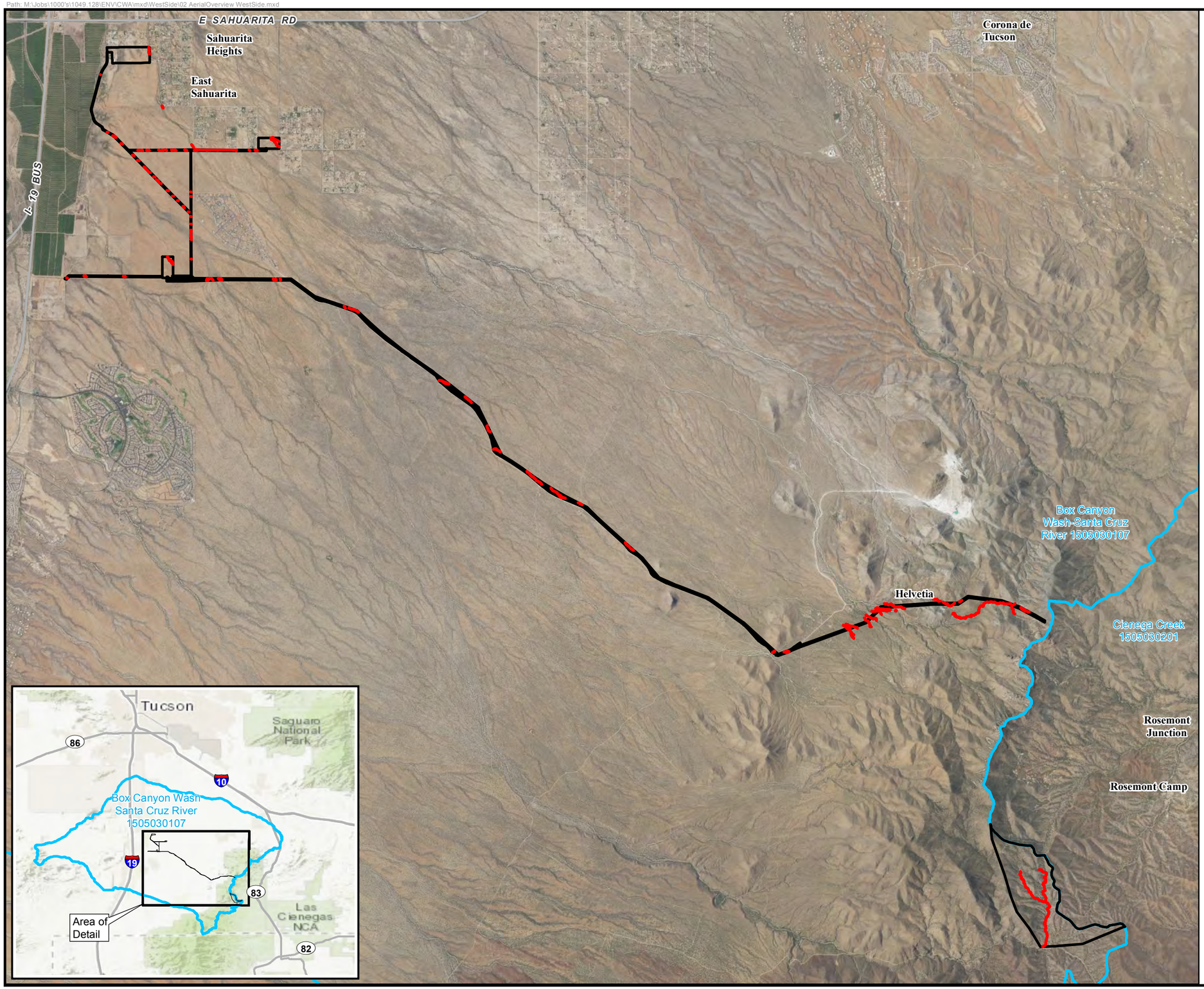
Utility Corridor and West Side Operations
Jurisdictional Determination

VICINITY MAP

Figure 1

RCC-CW009920



T17S, R14E, Portions of Sections 17-21 and 27-35,
T18S, R14E, Portions of Sections 1, 2 and 12,
T18S, R15E, Portions of Sections 7, 17, 18, 20-24 and 36,
T19S, R15E, Portions of Sections 1 and 12,
T19S, R16E, Portions of Sections 6 and 7,
Pima County, Arizona,
Data Source: Stantec
Hydrologic Unit: USGS National Hydrography Dataset 2015
Image Source: ArcGIS Online, USA NAIP 2017, Natural Color and World Topographic Map

Area of Detail 1"=15 Miles

Legend

- Potential Waters of the U.S.
- Analysis Area
- HUC 10 Watershed Boundary

N

0 3,000 6,000 Feet

0 1,000 2,000 Meters

WestLand Resources

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Rosemont Copper Project
Utility Corridor and West Side Operations
Jurisdictional Determination

AERIAL OVERVIEW OF ANALYSIS AREA
Figure 2

T17S, R14E, Portions of Sections 17-21 and 27-35,
T18S, R14E, Portions of Sections 1, 2 and 12,
T18S, R15E, Portions of Sections 7, 17, 18, 20-24 and 36,
T19S, R15E, Portions of Sections 1 and 12,
T19S, R16E, Portions of Sections 6 and 7,
Pima County, Arizona,
Data Source: Stantec
Image Source: ArcGIS Online, World Topographic Map

Legend

- Downgradient Receiving Waters
- Navigable-In-Fact Waterway
- Potential Downgradient Flow Path
- Figure 4 Detail Area
- Corps No Waters Determinations
- Analysis Area

N

0 10 20 Miles

0 20 40 Kilometers

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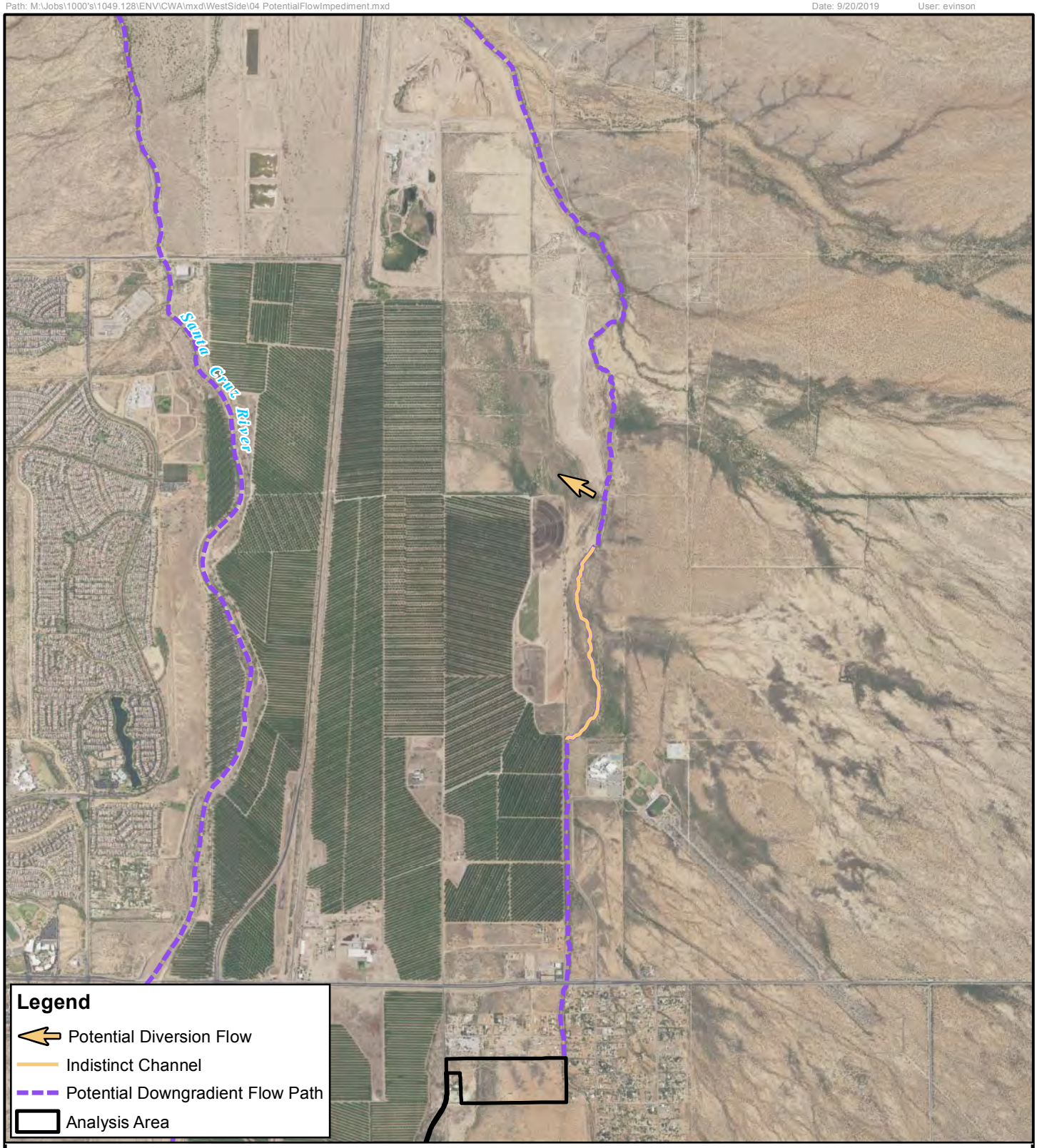
REGIONAL OVERVIEW

Figure 3

Path: M:\Jobs\1000's\1049.128\ENV\CWA\mxd\WestSide\04 PotentialFlowImpediment.mxd Date: 9/20/2019 User: evinson



T17S, R14E, Portions of Sections 17-21 and 27-35,
T18S, R14E, Portions of Sections 1, 2 and 12,
T18S, R15E, Portions of Sections 7, 17, 18, 20-24 and 36,
T19S, R15E, Portions of Sections 1 and 12,
T19S, R16E, Portions of Sections 6 and 7,
Pima County, Arizona,
Data Source: Stantec
Image Source: ArcGIS Online, NAIP 2017 Natural Color

WestLand Resources

N

0 1,500 3,000 Feet

0 500 1,000 Meters

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POTENTIAL FLOW IMPEDIMENT

Figure 4

RCC-CW009923

ATTACHMENT 1

CWA Section 404 Jurisdictional Determination

(AVAILABLE ON GEOPORTAL DURING REVIEW-WILL BE INCLUDED IN FINAL DOCUMENT)

ATTACHMENT 2

Representative Ground Photographs

(AVAILABLE ON GEOPORTAL DURING REVIEW-WILL BE INCLUDED IN FINAL DOCUMENT)

ATTACHMENT 3

Wetlands
Analysis Table

Table 1. Site within the Utility Corridor and West Side Operations Analysis Area Inspected for Potential Wetlands

Site Name, Latitude and Longitude	Wetland Determination	Errol Montgomery and Associates Water Flow Data	Site Description and Photo Number
Deering Spring 31.8088, -110.7614	Not a wetland, no form completed	04/28/08 Flowing ~0.1gpm 05/20/08 Flowing ~0.1gpm 06/17/08 Flowing ~0.1gpm 07/29/08 Flowing ~0.1gpm	Spring in unnamed canyon tributary to Box Canyon east of south Sycamore Canyon. During 8/8 and 8/28/08 site visits, spring dry, but concrete trough may hold perennial water. No floating, submerged, or emergent vegetation. No perimeter vegetation, canopy vegetation (90%) includes oak, velvet mesquite, and juniper. Concrete substrate, water extremely clear. See Photo A1.

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ATTACHMENT 4

Summary of Drainage Feature Physical Characteristics

Attachment 4. Summary of Utility Corridor and West Side Operations Drainage Feature Physical Characteristics

Feature ID	Feature Area (ac)	Length (ft)	Average Width (ft)	Center Latitude	Center Longitude
B	0.012	71	7.4	31.913899	-110.952488
C	0.006	82	3.3	31.914221	-110.948733
C1	0.004	69	2.8	31.914268	-110.949105
D(I)	0.013	65	8.9	31.920456	-110.927851
D(II)	0.045	324	6.1	31.913663	-110.922290
D1	0.018	124	6.3	31.934706	-110.939337
D1a	0.003	88	1.6	31.938619	-110.944493
D1a1	0.017	212	3.6	31.937986	-110.943090
D1b	0.008	111	3.1	31.937723	-110.942721
D1c	0.008	120	3.1	31.936621	-110.941453
D1d	0.003	55	2.7	31.924320	-110.927872
D1d1	0.017	129	5.8	31.933822	-110.938323
D1d2-a	0.011	97	4.8	31.931796	-110.936020
D1d2-b	0.010	107	3.9	31.931044	-110.935148
D1d2-c	0.011	93	5.2	31.929940	-110.933888
D1d2(I)	0.067	450	6.5	31.932070	-110.936392
D1d2(II)	0.030	247	5.4	31.930541	-110.934636
D1d3	0.008	118	3.1	31.928717	-110.932370
D1d4	0.005	87	2.6	31.927806	-110.931292
D1d5	0.003	86	1.6	31.927007	-110.930413
D1d6	0.007	82	3.7	31.926063	-110.929399
D1d6-a	0.006	130	1.9	31.925810	-110.929195
D1d7	0.005	81	2.5	31.925114	-110.928274
D2	0.019	88	9.5	31.914176	-110.941107
D2a	0.016	75	9.4	31.914167	-110.940922
D2b	0.008	72	4.8	31.914178	-110.941269
D2c	0.045	560	3.5	31.917295	-110.932429
D2c1	0.034	478	3.1	31.916536	-110.931777
D2c2	0.002	45	2.1	31.917114	-110.927847
D3(I)	0.006	90	2.9	31.921568	-110.927859
D3(II)	0.024	125	8.4	31.913658	-110.911501
D3a	0.006	50	5.1	31.923069	-110.927860
D3b	0.005	50	4.4	31.922017	-110.927847
D3c	0.005	58	3.7	31.921847	-110.927849
D3d	0.017	122	6.1	31.913739	-110.910138
D3e	0.020	120	7.2	31.913567	-110.910986
D3f	0.126	218	25.3	31.850425	-110.812219
D3f1	0.069	480	6.2	31.850376	-110.809835
D3f2	0.010	140	3.0	31.850539	-110.809401
D4	0.003	47	2.7	31.921380	-110.927901
D4a	0.005	63	3.5	31.920985	-110.927876

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Feature ID	Feature Area (ac)	Length (ft)	Average Width (ft)	Center Latitude	Center Longitude
D5	0.006	60	4.1	31.920827	-110.927858
D6	0.023	284	3.6	31.913637	-110.923624
D6a	0.012	174	3.0	31.913694	-110.924323
D6b	0.021	160	5.6	31.913662	-110.924741
D7	0.015	178	3.7	31.913612	-110.921747
D10	1.548	6,534	10.3	31.802965	-110.758347
D10a	0.200	2,865	3.0	31.808970	-110.760953
E(I)	0.024	160	6.7	31.935552	-110.937606
E(II)	0.004	40	3.8	31.927732	-110.927872
E1	0.014	116	5.3	31.935545	-110.938145
E1a	0.004	74	2.2	31.935576	-110.938417
F(I)	0.010	129	3.5	31.935517	-110.936654
F(II)	0.006	45	5.9	31.928499	-110.927872
F1	0.005	63	3.3	31.935551	-110.933586
F1a	0.013	186	3.1	31.935616	-110.929076
F1b	0.011	138	3.5	31.935562	-110.930957
F1c	0.010	164	2.8	31.935553	-110.931683
F1d	0.009	130	3.1	31.935521	-110.932661
F2	0.008	71	4.9	31.935568	-110.933427
F3	0.003	64	2.0	31.935578	-110.936172
F3a	0.006	122	2.2	31.935580	-110.934188
F4	0.003	34	3.3	31.948370	-110.945817
G(I)	0.245	460	23.2	31.952418	-110.936188
G(II)	0.125	201	27.0	31.942917	-110.933512
G(III)	0.058	262	9.7	31.942917	-110.933512
G(IV)	0.016	149	4.5	31.935524	-110.926670
G(V)	0.067	179	16.4	31.908952	-110.897324
G(VI)	0.178	620	12.5	31.884467	-110.866567
G(VII)	0.118	1,217	4.2	31.877589	-110.855463
G1	0.071	856	3.6	31.936395	-110.910812
G1a	0.029	553	2.3	31.937157	-110.910537
G2(I)	0.441	2,480	7.8	31.935607	-110.923155
G2(II)	0.006	83	2.9	31.935578	-110.916234
G2a	0.010	97	4.7	31.935532	-110.927192
G2b	0.012	72	7.4	31.935547	-110.922563
G2c	0.029	93	13.6	31.935524	-110.918910
G2d	0.008	94	3.8	31.935543	-110.915057
G2e	0.016	166	4.2	31.935572	-110.914869
G2f(I)	1.015	3,536	12.5	31.857759	-110.791337
G2f(II)	1.211	6,406	8.2	31.858305	-110.770541
G2f1	0.347	899	16.8	31.856433	-110.793530
G2f2	0.309	1,696	7.9	31.859089	-110.779583
G2f2-a	0.195	1,551	5.5	31.858222	-110.788484

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Feature ID	Feature Area (ac)	Length (ft)	Average Width (ft)	Center Latitude	Center Longitude
G2f3	0.035	371	4.1	31.857079	-110.791102
G2f4(I)	0.018	282	2.7	31.858281	-110.764632
G2f4(II)	0.060	987	2.7	31.857549	-110.762922
G3	0.102	752	5.9	31.908225	-110.894861
G4(I)	0.320	960	14.5	31.896411	-110.877999
G4(II)	0.534	1,733	13.4	31.853548	-110.796891
G4a	0.028	584	2.1	31.893567	-110.873253
G4b	0.071	520	5.9	31.887986	-110.868813
G4c	0.043	759	2.5	31.868726	-110.841469
G4d	0.169	824	8.9	31.855542	-110.793435
G4e	0.145	910	7.0	31.854753	-110.796745
G4f	0.059	291	8.8	31.853599	-110.796719
G5	0.116	1,293	3.9	31.880184	-110.859979
G6	0.018	266	3.0	31.876663	-110.854433
G7	0.010	200	2.1	31.875615	-110.850729

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