

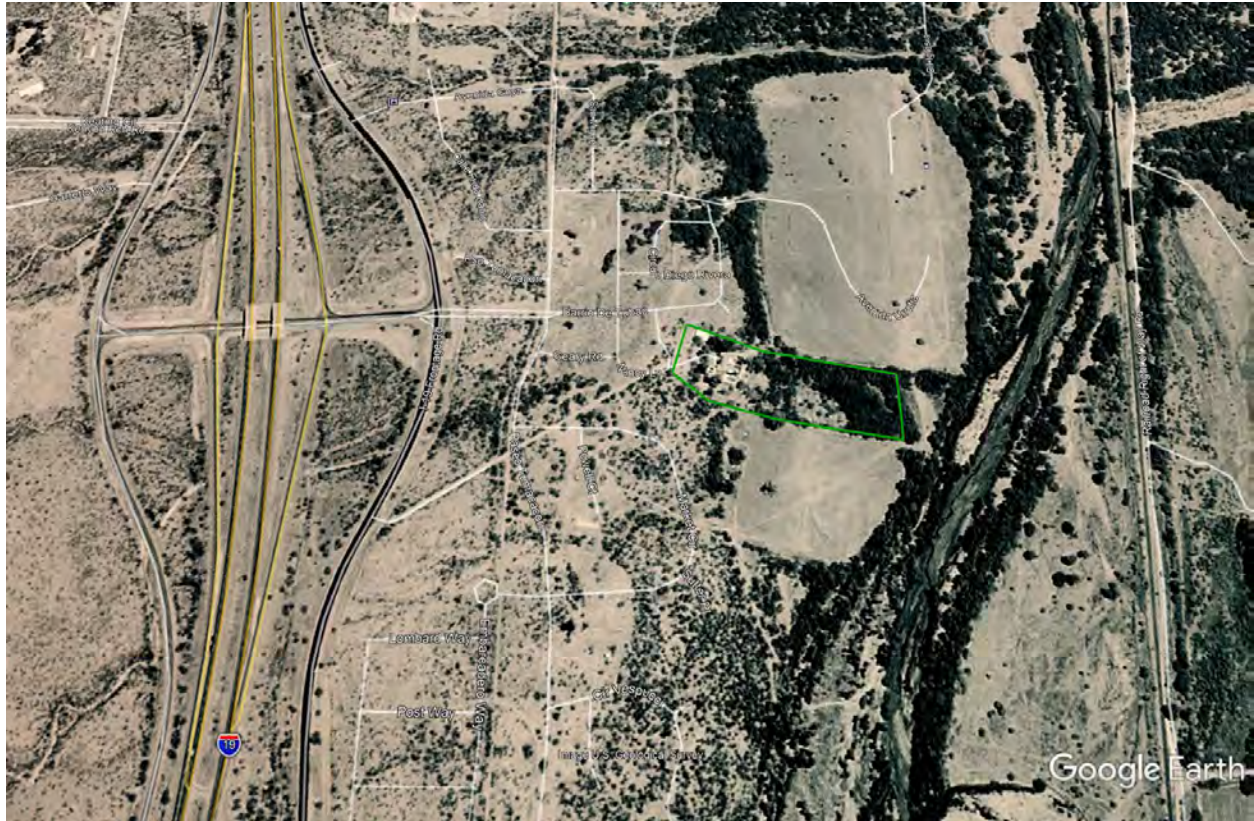
Valle Verde Ranch

Reconnaissance Level – Preliminary Drainage Analysis

By Ben Lomeli, Hydrologist CFM



9/4/1992: Note “Natural” NE flow direction of wash as shown by vegetated drainage towards old racetrack. (Valle Verde Ranch property shown within green polygon).



6/18/1996: Borrow Pit area appears scarified, probably in preparation for excavation.



8/26/2006: Borrow Pit ponding water.



6/7/2007: Borrow Pit dry in Summer.



3/16/2010: Only a small pond in Borrow Pit in early Spring.



6/4/2010: Borrow Pit dry again in Summer.



9/26/18: More trees and less ponding evident in Borrow Pit in Fall images since the Spring of 2010.



Box culvert under I-19 much larger than the 3 CMPs at Anza Trail (*outlet to river*).
(Photo by Rich Kiker)



Box culvert at East Frontage Road also much larger than the 3 CMPs at Anza Trail (*outlet to river*).
(Photo by Rich Kiker)



Arch culverts under Paseo de Tumacacori. Possible sediment build-up likely reducing hydraulic capacity.

The wash receives additional lateral inflows from both banks from adjacent residential subdivision streets, roofs, sidewalks, and other impervious surfaces.

(Photo by Rich Kiker)



Looking downstream towards river at beginning of sediment high spot.





3 CMPs at Anza Trail appear to be undersized.

(Much less conveyance capacity than all upstream box and arch culverts).



Preliminary Hydrologic Perspectives:

Based on observations during initial site visit and discussions of September 30th, 2020, and on subsequent Google Earth Pro imagery review, the preliminary salient points described below are not conclusions, but are shared now simply as starting points for further discussion; and/or as a possible basis for further observation, survey, investigation, etc.

Further discussion may reveal other pertinent pieces of information, alternative perspectives, and a need for some revisions or more detailed analysis.

Preliminary Hydrologic Findings:

The 3 CMPs at Anza Trail appear to be undersized and causing “backwatering” at the lower end of the subject wash. This outlet structure is considerably smaller with considerably less hydraulic conveyance capacity than the upstream box culverts under I-19 and East Frontage Road and the arch culverts under Paseo de Tumacacori.

The wash also receives additional lateral inflows from both banks from adjacent residential subdivision streets, roofs, sidewalks, and other impervious surfaces.

The wash is contained in the straight and well-defined grass-banked trapezoidal channel through the residential subdivision, but the channel is undefined downstream. The unconfined wash “opens-up” and spreads out from there, where its gradient and velocity decrease, (*it flattens out and slows down*).

The wash naturally flattens out as it reaches the river’s floodplain alluvium. Excess sediment deposits fan out from there in a “delta-like” pattern.

Sediment deposits are currently semi-stabilized with dense tall grass (*Johnson grass?*). Excess sediment deposits have accumulated to create a “high-spot” that effectively forms a low crossflow berm that partially obstructs downstream low flows. The obstructive crossflow sediment berm causes upstream backwater ponding and consequent overflow flooding and sedimentation, primarily NE towards Valle Verde Ranch. Water and sediment flows both follow the laws of physics and seek the “Natural” NE flow direction.

The borrow pit immediately south of the wash is a desirable site for a bird-watching wetland but has been “filling-in” with sediment deposits.

Possible “Win-Win” Solution:

1. Reestablish (*clear with sufficient conveyance*) channel at lower end of wash to **return flows** towards Santa Cruz River and direct overflows towards borrow pit (*desired wetland*), instead of towards Valle Verde Ranch.
2. Create earthen berm and/or bank with protective native vegetation (*at a minimum*) to keep flows heading down towards river instead of entering Valle Verde Ranch.
3. Provide adequate wash conveyance and outlet capacity to Santa Cruz River by replacing/upgrading the 3 CMPs at Anza Trail with either an open-span foot bridge, a properly sized box culvert, con-arch culvert(s), additional CMP barrels, or any other hydraulically equivalent structure.
4. Provide erosion protection for the potable water supply well at Anza Trail (*outlet to river*) with appropriately designed toe-down scour cut-off wall and riprap-lined “*banks/side-slopes*”.

I am always happy to discuss these preliminary findings, and/or any other reasonable perspectives with anyone.

I am also always willing to listen to any concerns, constructive criticism, or other suggestions; and I always welcome any questions.