Table 3: Development Data					
Parcel #	Acres	Land Use Designation	Minimum Units	Maximum Units	Maximum Density (RAC)
1	1.3	Commercial	-	-	-
2	11.2	Commercial	-	-	-
3	6.7	Commercial	-	-	-
4	10.5	Business Park	-	-	-
5	7.2	HDR	-	144	20
6	5.0	MDR	-	50	10
7	32.1	LDR	-	202	6
8	21.4	LDR	-	128	6
9	48.6	LDR	-	301	6
10	25.6	LDR	-	156	6
11	68.9	LDR	-	399	6
12	2.0	Park	-	-	-
13	34.8	LDR	-	209	6
14	20.6	MDR	-	206	10
15	7.1	Business Park	-	-	-
16	14.3	Business Park	-	-	-
17	11.5	HDR	-	229	20
18	54.4	LDR	-	347	6
19	15.0	K-8 School	-	-	-
20	17.0	LDR	-	102	6
21	18.4	MDR	-	184	10
22	7.4	Park	-	-	-
23	22.7	Enhanced OS			
Roads	41.9	Roads	-	-	-
NOS	141.8	Natural OS	-	-	-
Total	**647.7**	-	**1,329**	**2,658**	-

LDR:	Low Density Residential (6 RAC Maximum)
MDR:	Medium Density Residential (10 RAC Maximum)
HDR:	High Density Residential (20 RAC Maximum)
Comm:	Commercial
Bus. Pk.	Business Park
School:	K-8 School Site
Park:	Neighborhod Park
Roads:	Arterial and Collector Street Right-of-Way
EOS	Enhanced Open Space
NOS:	Natural Open Space

Footnote #1: *See PART IV-8 for a description of the platting and tracking process regarding minimum and maximum density provisions. .*

Effect of Proposed Development on Existing Land Use

The proposed development will have no adverse effects on the existing land uses on the site, as the property is vacant. There is one existing adjacent land use, Sonoran Ranch Estates I and the Villages to the east. Within this development, there is a natural buffer between the two projects that ranges from 130' to 635' wide just east of the eastern boundary of Pomegranate Farms. All other adjoining land is vacant property. Ryan Field will not be negatively impacted by this development, and proposed commercial services could help support the airport. The adobe mining company to the north across Valencia Road will also not be effected by this development, as the Specific Plan designates compatible commercial uses along Valencia Road.

Compare Development Characteristics of Adjacent Land Uses

The surrounding land was included in the same Comprehensive Plan Amendment group as this plan amendment, and all the land is targeted as a higher density, mixed use growth area. The development entity of the Sendero Pass property to the west has coordinated with Pomegranate Farms to jointly plan both projects in terms of circulation, infrastructure and compatible land uses.

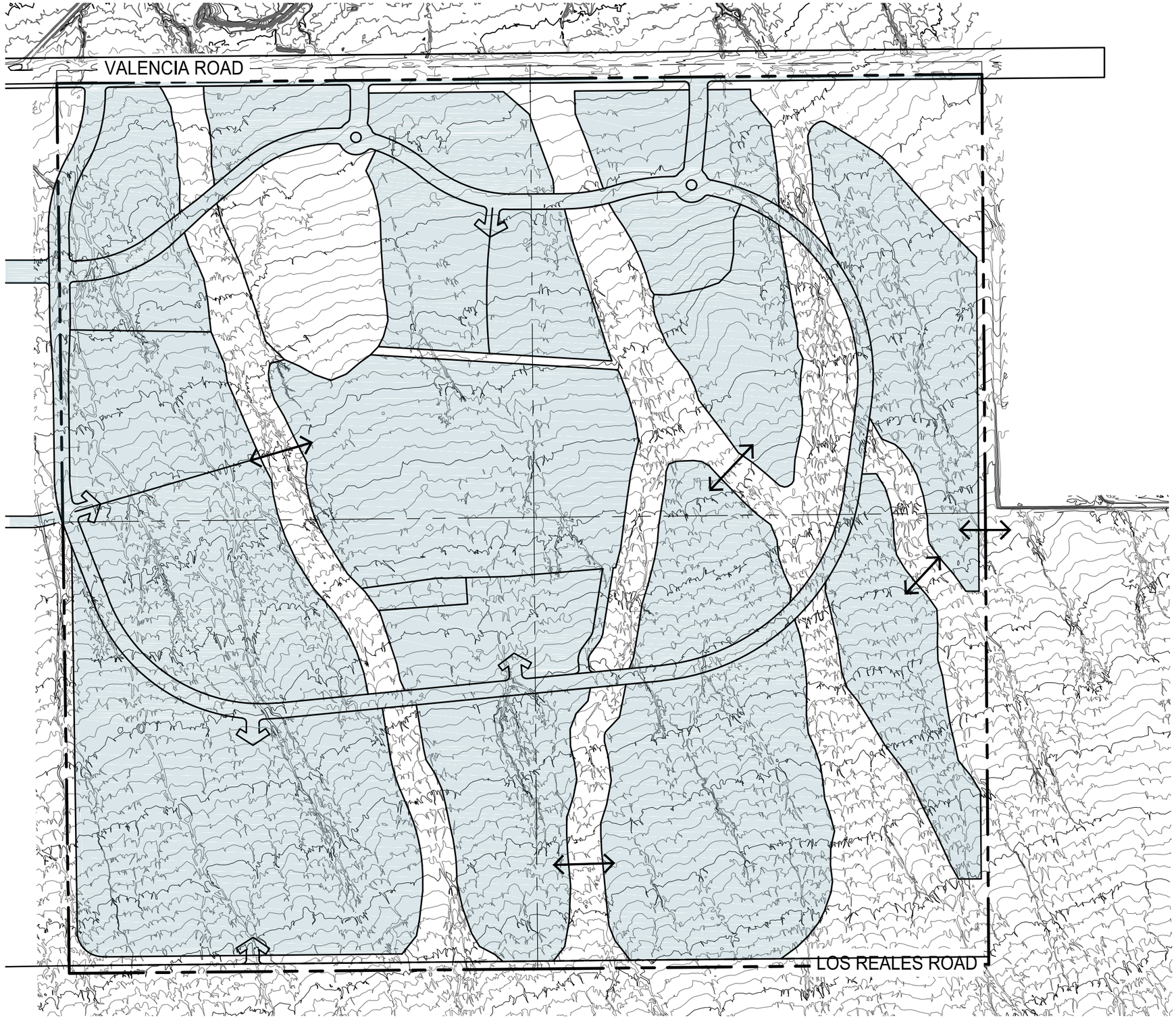
II-C TOPOGRAPHY

There are no significant topographic features or slopes exceeding 15% on the site. In fact, the lack of topographic change across the site presents more of a challenge in terms of drainage and visual interest.

Most of the project can be graded with cuts and fills of less than five feet. However, there is a borrow pit on the site that is 8-10 feet deep, and filling this area for development would result in fills greater than five feet.

Elevation differences between adjacent properties are not severe, and therefore little impact is expected to the surrounding properties. Slopes of 3:1 will be stabilized by native seeding, while steeper slopes (1.5:1 – 2:1) will be stabilized by native rip-rap or other appropriate design techniques that blend with the natural environment.

Approximately 487 +/- acres will be graded. See **Exhibit II-C** for approximate limits of grading.



POMEGRANATE FARMS

GRADING
EXHIBIT II-C

LEGEND

NATURAL OPEN SPACE

GRADED AREAS

Subject to engineering and County review and approval.

SCALE: 1"=600'

NORTH

0 300' 600' 1200'

Date. 09/2016

Project No. 1614

LVA urban design studio
land planning • development entitlements • landscape architecture
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II-D HYDROLOGY

1. To preserve natural drainage patterns in the area, the project is being designed to allow primary washes to flow through open space corridors across the project. These corridors will allow offsite flows to pass through the project in a natural state and maintain or improve the riparian qualities of the washes.

   The width of these open space areas vary from an average of 200-feet to 300-feet, with a minimum width of 200-feet. The width of these open space areas have been planned to conform as best as possible to the width of the natural washes; the purpose being to minimize the hydraulic impacts of the transition of the offsite washes at the upstream and downstream boundaries of the project into and out of the open spaces/drainageways within the project.

   In addition to the natural open space flow corridors, the sheet flow conditions that encumber the property will necessitate that the development blocks along the south (upstream) property boundary be elevated on fill to direct storm water to one of the open space corridors that function to convey offsite storm water through the project. The soil fill will require erosion protection in the form of concrete, riprap or soil cement and will be designed to meet Pima County RFCD standards. Freeboard for the blocks will be provided in accordance with standard Pima County design procedures.

   As the site topography allows, elevation of the blocks on fill will be combined with construction of temporary interceptor channels along the south property boundary within the proposed future Los Reales Road right-of-way. These interceptor channels will help collect storm water and convey it to one of the open space corridors. The interceptor channels will require erosion protection and will be designed to meet Pima County RFCD standards. The design of these channels may include installation of grade control structures in combination with lined banks and earthen bottom channels or lining of the channel bottom and banks with concrete, grouted rock or soil cement. These stabilization measures may also be needed to maintain adequate velocity for the sediment conveyance. The interceptor channels are expected to be wide and shallow and generally aligned parallel to the topographic contours, so longitudinal channel slopes will be minimal. When the future Los Reales Road is constructed, it will need to be elevated to provide all-weather access to the area developments. The construction of this roadway embankment will remove the need for the temporary collector channels, because the roadway will then direct storm water runoff to new culverts aligned with the downstream flow corridors within the Pomegranate Farms project.

   The cross-section for the open space corridors that will function to convey offsite storm water runoff through the project may include installation of grade control structures in combination with lined banks and earthen bottom channels. These stabilization measures may need to be provided to maintain adequate velocity for the sediment conveyance. The interceptor channels are generally aligned parallel to contour so that channel slope will be minimal. The width of the interceptor channels will vary and depths will comply with RFCD design criteria. Freeboard for the interceptor channels will also be provided in accordance with standard Pima County design procedures.

The building pads along the borders of the natural drainage ways will be raised to levels necessary to create the channel banks and contain 100-year flows at a minimum. The side slopes of the banks will generally be stabilized with concrete, riprap or soil cement to protect the adjoining homes from the threat of erosion. In some locations where flow velocities are low and non-erosive, the banks may be set back outside the regulatory erosion hazard limits and stabilized with vegetation. Usually, there will be an 8-foot wide maintenance road / pedestrian path between the bank and lot line. Vegetation within the 200-foot to 300-foot wide open space areas / drainageways will remain natural and undisturbed except at roadway and underground utility crossings.

Road crossings of the natural wash areas will be designed to convey the 100-year discharge beneath the pavement surface so that all-weather access is provided. Minor drainageways within the subdivision blocks may be constructed as lined channels. This will occur where engineering constraints prohibit the use of natural drainageways or where the watercourses contain limited vegetation. Constructed drainageways may also be used within the subdivisions to collect street drainage and convey it to one of the natural drainageways or to the downstream project boundary. Where constructed drainage facilities are utilized, maintenance plans for the facilities will be developed and incorporated into the covenant, condition and restriction documents for the subdivision blocks affected.

The project site is located within a critical basin so detention systems must provide a 10 percent reduction in onsite peak flow rates. The design for onsite storm water storage systems will follow the requirements outlined in the RFCD's "Design Standards for Stormwater Detention and Retention Systems" (June 2014) including Low Impact Development Practices. The total detention volume for this project has been estimated to be approximately 62 acre-feet. Detention/ retention facilities will be located within each of the primary sub-watersheds to reduce peak discharges at each location where major flows leave the project limits. First-flush retention volume requirements will be met within the detention/retention basins where ever possible as allowed by the 2014 Detention & Retention Manual. Where additional threshold retention is required, roadside swales, medians and other development features within the blocks may be utilized to meet first-flush requirements.

A storm water detention/retention facility with multi-use recreational functions is planned within the park area in the northwest portion of the project. The basin will receive flows from several of the proposed blocks upstream. Storm water detention/retention within the park will be confined to areas where storm water is accepted from subdivisions having a negligible sediment component.

Detention basins will also be provided within some of the subdivision blocks, since it will not be possible to convey storm water runoff from the entire project to regional-type basins without adversely disrupting the natural drainage patterns. Where possible, these basins will be linear in design and be placed at the perimeter within or adjacent to the natural open space corridors, so storm water can be readily discharged to one of the primary flow corridors. These linear basins will be constructed to only receive flow

from the onsite blocks and by-pass all offsite flows being conveyed within the primary flow corridors. The basin designs may incorporate multi-use facilities such as a linear trail system or other recreational facilities that are compatible with the drainage design.

Landscaping within the basins will enhance the natural characteristics of the flow corridors and serve to enhance the open spaces. Adequate transition distances and erosion control features such as riprap aprons, stilling basins, etc. will be constructed at the basin outlets to maintain existing flow conditions where storm water passes onto an adjoining property. A conceptual cross-section drawing of the linear detention basin landscape basin, prepared by Olsson Associates, is included as Figure 1, found under separate cover in the Pomegranate Farms Graphics & Appendices.

Outlets from the basins and channels will be aligned with the proposed drainage culvert crossings of the ongoing Valencia Road widening project. Currently, flows cross the road through at-grade road crossings. When Valencia Road is upgraded within this area, construction of new drainage crossing culverts with adequate capacity to convey the 100-year discharge will be constructed and coordinated with Pima County and PAG related to the RTA roadway upgrades.

Exhibits II-D.3 and **II-D.4** depicts the conceptual post-development drainage design scheme for Pomegranate Farms. This exhibit identifies the location and preliminary alignment for the primary drainage features that will need to be constructed as a part of this project. A typical cross-section of the open space flow corridors and adjacent development blocks is provided on Exhibit II-D.4.

2. Avoidance of encroachments into the 100-year floodplain area is not possible because of the sheet flow conditions that exist over the entire property. The proposed drainage plan as discussed above will result in an approximate 10% decrease in peak discharge rates onto downstream properties because onsite detention will be provided to comply with critical basin requirements. Any increases in flow velocities caused by the project will be mitigated at the downstream property boundary by widening flow limits and by constructing energy dissipation structures, such as riprap aprons, if needed. Erosion protection will be provided along the banks of the washes and downstream areas wherever velocities exceed allowable limits as determined by Pima County design procedures.

   Building pads adjacent to flow corridors will be elevated to 100-year or 500-year flood levels based on block width and grading balance requirements. Blocks with perimeter lots elevated to 100-year flood levels will also have all internal lots elevated to 100-year flood levels. For blocks with perimeter lots elevated to 500-year flood levels, internal lots will not have minimum elevation requirements tied to adjacent flow corridors, but all building pads will be elevated to provide positive drainage within the blocks. Flood peaks for the 500-year event will be estimated by use of a multiplier for 100-year flows based on USGS Regional Regression Equations, the ADOT Bridge Design Manual, or other appropriate source acceptable to the RFCD.

3. The post-development peak discharge rates along the downstream property boundary will be approximately 90% of existing conditions peak discharge rates, based on conveyance of the offsite flows through the project. Peak flows emanating from the land surfaces within the project will be conveyed through detention basins and will be reduced as necessary to comply with critical basin requirements. The post-development peak discharge rates for the primary washes entering and leaving the property are listed in Table 4. Exhibit II-D.3 shows the locations of the post-development discharges flowing onto and leaving the site. The discharge rates given in Part II of this site analysis are based on requirements set forth by the RFCD and are documented in a letter to Eric Shepp P.E. dated May 26, 2016. The drainage design criteria outlined therein states: 100-year discharges to be based on FLO-2D model results from the Pomegranate Farms 2015 LOMR, modified to include onsite post-project discharges as described below:

   - Obtain 10-year & 100-year onsite peak discharges for each onsite blocks (approximately 25 onsite blocks) by utilizing Pima County hydrology methods (PC-Hydro program).
   - Determine design discharges (combination of offsite & onsite runoff) for open space flow corridors per RFCD requirements that were applied to the Sendero Pass project.
     i) Evaluate 10-year offsite discharges combined with 100-year onsite for all applicable locations along the flow corridors
     ii) Evaluate 100-year offsite discharges combined with 10-year onsite for the same locations
     iii) Utilize the higher of the two combinations evaluated above for flow corridor & roadway crossing peak design discharges

TABLE 4 Post-Development Regulatory 100-Year Discharges (Q's)

Concentration Point Number		Q100 (CFS)
Entering Site	Leaving Site	
7	---	172
	7L	280
	1	168
8&9	---	296
	2	522
10&11	---	268
	3	657
12&13	---	183
	4&5	746
14	---	375
	6	422

4. The project will not result in any drainage impacts to offsite land uses both upstream and downstream of the proposed development. The block fill and

/or collector channels to be constructed along the south property boundary will be stabilized and will be designed such that backwater onto the adjoining upstream properties will be maintained within allowable limits. Along the west downstream property boundary, the Pomegranate Farms drainage design has been coordinated with the developing Sendero Pass project to the west. This coordination effort has been undertaken to assure that matching drainage facilities are incorporated into each project's design that will adequately convey regulatory flows and meet RFCD floodplain management requirements. The open space flow corridors will be transitioned to existing drainageways at the north downstream boundary (Valencia Road) as discussed in paragraphs 1 and 2 above.

5. A description of the proposed engineering and design features that will be used to mitigate drainage and erosion problems has been discussed in paragraphs 1 through 3 above. These features include stabilized embankment fill, natural wash corridors, riprap aprons, bank protection and detention/retention basins. The 100-year floodplains within the project will be contained within the open space flow corridors. It is planned that the FEMA Shaded Zone X flood hazard zones be removed from the developed block areas of the project through the Letter of Map Revision (LOMR) processes through FEMA. As the phased construction of the blocks proceeds, one or more LOMRs will be submitted to officially revise the FEMA Flood Insurance Rate Maps. The LOMR(s) will be based on a combination of fill and infrastructure improvements.

6. The Master Plan conforms to the Pima County Floodplain Management Ordinance and all drainage development standards and policies. The final Pima County Southwest Infrastructure Plan (SWIP), November, 2007 was also reviewed. The results of this site analysis conforms to the existing conditions hydrologic and hydraulic results of that plan. The SWIP identifies a potential regional detention basin to be located upstream of the Pomegranate Farms project site. If constructed, the facility would serve to attenuate flows and reduce flood peaks that would impact this project. The SWIP also cites preservation of natural drainage corridors as a proposed flood control element to be utilized in the study area. The Pomegranate Farms proposed drainage concept is consistent with this element through the preservation of natural flow corridors along primary wash alignments.

7. The US Army Corps of Engineers Regulatory Branch has determined that waters of the US do not occur on the project site. This finding was outlined in the summary review letter dated September 14, 2015 to Rion Bowers (File No. SPL-2015-00032-MWL).

8. Post-development drainage plans have been submitted in both the Specific Plan (**Exhibit II.D.3** & **Exhibit II.D.4**) that provides the RFCD with information needed to make their determinations for Specific Plan level of detail. The drainage design for the future block plat improvements and individual lot plats or development plans will be designed to comply with the Floodplain Management and Erosion Control Ordinance and all other RFCD regulations and normal process RFCD review and approval will be needed prior to overall development approval.