





# ACM VENTURES, LLC

9.77 ACRE PARCEL @ SOUTHWEST CORNER CAMINO DE OESTE & PIMA FARMS RD. (OWNERSHIP: ROBERT LEE BOYKIN ESTATE) REZONING: SR TO CR-4

# **EXHIBIT I-B**

TOPOGRAPHIC CHARACTERISTICS PAGE 5

### C. HYDROLOGY

EPS Group, Inc. has completed a preliminary drainage assessment for the subject property (Assessors Parcel No. 221-35-0010) in accordance with the County's adopted Site Analysis guidelines. The findings of same are presented below.

# 1. Off-Site Watersheds & Hydrology

Exhibit I-C.1 illustrates the off-site watersheds draining into the subject property, along with their respective points of concentration, and provides a Summary Table indicating their individual drainage areas and 100-year discharges. The upstream watersheds are very limited in size and largely sit within the public rights-of-way of Pima Farms Road, Camino de Oeste and Magee Road. Three (3) of them enter the subject site via surface low; one (1) enters via a 2-cell culvert beneath Camino de Oeste.

# 2. On-Site Hydrology

The rezoning site contains an existing vacant residence, together with several accessory buildings and associated cleared/disturbed areas for driveways, outdoor storage, etc. The balance of the site (approximately two-thirds of its area) is natural desert. Refer to Exhibit I-C.2 in support of the following:

#### a. Flood Control Resources.

Flood control resources include topography from PAG, the Pima County Regional Flood Control District website, Pima County MapGuide (GIS), City of Tucson Drainage Manual, and the FEMA Maps website.

Hydrologic Computation Procedures. The Pima County hydrologic computation procedure, as presented within the "PC-HYDRO User Guide" (Arroyo Engineering, March 2007), was used to compute the peak discharges. PC-Hydro, Version 6.1, was used to estimate the flows affecting this site. PC-Hydro is a web-based computer program developed per the Pima County Hydrology Procedures, which uses a Rational Method based algorithm and utilizes rainfall depth information from the intensity-duration-frequency data from NOAA Precipitation Atlas 14 of the Western United States (Volume I, Version 4, NOAA National Weather Service, Silver Spring, Maryland; G. M. Bonnin, et al., 2006). Specific watershed parameters were estimated per the Pima County Hydrology Procedures and based on local topography, recent aerial photography, and field verification.

Hydrologic soil groups (HSG) for the existing and proposed condition drainage areas were determined from the Pima County Mapguide Map, which is a GIS system that includes various digital mapping layers for Pima County, Arizona. Soils information for this report is based off of the NRCS (Natural Resources Conservation Services) line work within Pima County Mapguide Map, effective October 1, 2016.

PC-Hydro computations, similar to the Rational Method, assume that rainfall is uniformly distributed over the entire watershed, uniform rainfall intensity occurs with a duration of at least the time of concentration, the peak rate of runoff is proportional to rainfall intensity and rainfall depth averaged over the time period is equal to the time of concentration, the return period of the runoff event is the same as the return period of the precipitation event, and that channel storage is negligible. It is noted that the Pima County Hydrology Procedure as presented in PC-Hydro can be used for watersheds up to 10 square miles, with further notation that it tends to be valid for watersheds with homogenous areas up to 1 square mile (Arroyo Engineering, March 2007).

#### b. Concentration Points & 100-year Discharges

The existing on-site site watersheds were divided into three (3) areas, annotated as EON-1, EON-2, and EON-3 on Exhibit I-C.2, with their respective areas and discharge rates shown in Table 1 below.

Table 1: Existing Conditions Onsite 100-year Hydrology Results							
Drainage Area ID	Watershed Area (acres)	Conc. Point	Cw	Tc (min)	i (in/hr)	q (in/hr)	Q (CFS)
EON-1	2.30	CPX-1	0.58	5.0	9.96	5.75	13.3
EON-2	0.77	CPX-2	0.60	5.0	9.96	5.98	4.6
EON-3	5.53	CPX-3	0.54	5.0	9.96	5.33	29.7
EON-1, OFF-1, OFF-2 & OFF-3	4.13	CPX-1	0.68	5.0	9.96	6.73	28.0

<sup>\*</sup> Figures shown above in green shading reflect onsite drainage contribution only

Concentration points CPX-2 and CPX-3 represent the discharge where onsite watersheds EON-2 and EON-3 exit the site to the west and at the southwest corner of the site. CPX-1 represents the point discharge where onsite watershed EON-1 exits the site to the west. The above table includes both the on-site portion of this discharge, as well as the combined on-site and upstream/offsite (OFF-1 + OFF-2 + OFF-3) drainage area and contributing discharge.

### c. FEMA-Designated Floodplains.

The project area is covered in FEMA FIRM Panel 1655, Map Number 04019C1655L, with a revision date of June 16, 2011. As shown on the map, the project site is within Zone "X", which classifies an area of 0.2% annual chance of flood, areas of 1% annual chance flood with average depths of less than 1 foot, or with drainage areas less than 1 square mile; together with areas protected by levees from 1% annual chance of flood.

d. Regulatory Floodplain Delineations.

No regulatory floodplains affect this site; all flows are less than 100 cfs.

e. Determination of Regulatory Sheet Flood Areas.

No regulatory sheet flood areas affect this site.

f. Lakes, Ponds, Wetlands, etc.

There are no lakes, ponds, wetlands, springs, or other sources of perennial surface water on this site.

g. Erosion Hazard Setbacks (EHS)

No Erosion hazard setbacks (EHS's) impact this site.

h. Pima County Regulated Habitat

There are no Pima County Regulated Riparian Habitat areas within the project site.

i. Flow Arrows for Non-regulatory Flows

Directional surface-flow arrows are provided on Exhibit I-C.2.

j. Existing Drainage Easements.

There are no established or recorded drainage easements on this site.

k. Existing Drainage Infrastructure.

The only existing drainage infrastructure in place lies off-site of the subject property, per the following:

- a two-cell, CMP elliptical culvert beneath Camino de Oeste located near the northeast corner of the rezoning site. This culvert discharges runoff from an area south of Magee Road.
- a downstream detention basin and, further to the south, a lined drainage channel within the existing residential subdivision to the immediate west.

### 3. Hydrology

The subject property contains an existing vacant residence and accessory buildings. The remainder of the site is natural desert, The existing site drainage is nominal, with all flows impacting the property being less than 100 cfs in the 100-year event. Thus, there are no regulatory floodplains or erosion-hazard setbacks on the rezoning site. Refer to Exhibit I-C.2 for the following:

a. Features of the Watersheds That May be Affected.

The subject property is currently composed of mostly undeveloped land, with the exception of one (1) single-family residence and attendant accessory structures. Vegetation across the site is composed of desert brush and local cacti, with an approximate cover density of 30%. Soils across the site are comprised of two soil types: 1) Anthony gravelly sandy loam complex soils with 1 – 3 percent slopes, which is classified as hydrologic soil group (HSG) A; and 2) rough broken land-Palos Verdes complex soils with 0-60 percent slopes, which are classified as hydrologic soil group (HSG) C.

Rainfall runoff enters the subject property from the north (Pima Farms Road) and the east (Camino De Oeste) and exits the site to the west and southwest. Offsite drainage runoff is generated within the existing Camino De Oeste, Pima Farms, and Magee Road rights-of-way. The undeveloped property at the immediate southeast corner of Camino de Oeste and Magee Road conveys runoff into the subject site at its northeast corner via an existing 2-cell, CMP elliptical culvert.

The existing on-site drainage of the subject property is divided into three (3) watersheds. The northern area drains to the southwest and discharges at the west boundary of the site into the adjacent Pima Farms subdivision. A small area south of this first watershed drains to the southwest and also discharges at the west boundary into the same Pima Farms subdivision. The balance of the site drains to the southwest and discharges at the southwest corner of the property onto an adjacent unsubdivided residential homestead.

Per the Pima County Regional Flood Control District (PCRFCD) *Critical Basins within Unincorporated Pima County Map* with an effective date of 3/15/2007, the subject property lies within the Tortolita Critical Basin. As such, and as a requirement of the current PCRFCD Design Standards for Stormwater Detention and Retention, new developments must demonstrate appropriate measures to reduce post-development runoff rates to 90% of pre-developed peak discharge rates at the project boundaries for the 2-, 10-, and 100-year storm runoff events.

Per the *Preliminary Development Plan (PDP)* presented for this rezoning in Section II-B of this Site Analysis, retention/detention basins are proposed for this subdivision as a method to reduce post-development peak discharge rates per the above Pima County design standards. The retention/detention basins will be equipped with storage volume and outlet structures consisting of appropriate weir/pipe outlet configurations so as to achieve the appropriate site outfall discharge rates.

b. Acreages and 100-year Peak Discharges of Upstream Watersheds.

The boundary of the offsite watersheds contributing rainfall runoff to the subject site are shown on Exhibit I-C.1. Offsite watersheds affecting this site parcel extend to the northeast, are relatively small in area, and are composed almost entirely public road rights-of-way.

**Upstream Drainage Areas OFF-1, OFF-2, & OFF-4**. These watersheds drain to the site's north and east property boundary as sheet flow from within Magee Road, Camino De Oeste, and Pima Farm Road. The watershed areas are approximately 0.73 AC, 0.69 AC, and 0.27 AC, respectively, with soils composed of rough broken land Palos Verdes complex soils with 0-60 percent slopes. All soils within the watersheds are classified as HSG "C" soils.

**Upstream Drainage Area OFF-3.** Offsite drainage from this watershed is conveyed through an existing 2-cell, CMP elliptical culvert that runs beneath Camino de Oeste and outlets onto the subject property near its northeast corner. This watershed drains the undeveloped area at the southeast corner of Camino de Oeste and Magee Road. The watershed area is approximately 0.41 AC in size, with soils composed of rough broken land-Palos Verdes complex soils with 0-60 percent slopes. All soils within this watershed are classified as HSG "C" soils.

Refer to Table 2 below for the upstream/offsite drainage hydrology:

Table 2: Offsite 100-year Hydrology Results							
Drainage Area ID	Watershed Area (acres)	Conc. Point	Cw	Tc (min)	i (in/hr)	q (in/hr)	Q (CFS)
OFF-1	0.73	CP01	0.80	5.0	9.96	7.92	5.8
OFF-2	0.69	CP02	0.89	5.0	9.96	8.87	6.2
OFF-3	0.41	CP03	0.70	5.0	9.96	6.94	2.9
OFF-4	0.27	CP04	0.86	5.0	9.96	8.51	2.3

c. Methodology Used to Determine EHS's.

No Erosion hazard setbacks impact this site.

d. Methodology Used to Determine 100-year Floodplains.

No regulatory flood areas impact this site; all flows are less than 100 cfs in the 100-year condition.

#### **Exhibits to Follow**



W. PIMA FARMS RD. (PUBLIC)

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Off-Site Conc	entration	Points Table	32-1-1	4		LIC	TO THE YEAR
Concentration Point	Area (Ac)	Q100 Existing Site (Cfs)				TE (PUBI	
CP01 (OFF-1)	0.73	5.8	1	1		ES.	
CP02 (OFF-2)	0.69	6.2		-		ō	
CP03 (OFF-3)	0.41	2.9	DETAILS.	2	建學學品體	吕	
CP04 (OFF-4)	0.27	2.3			S March	0	
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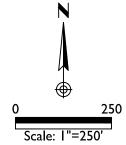
Rezoning Site

Offsite Watershed Boundary

Direction of Primary Flow

Existing Off-Site Drainage Area (Refer to site analysis text)

Existing Off-Site Concentration point (Refer to site analysis text)



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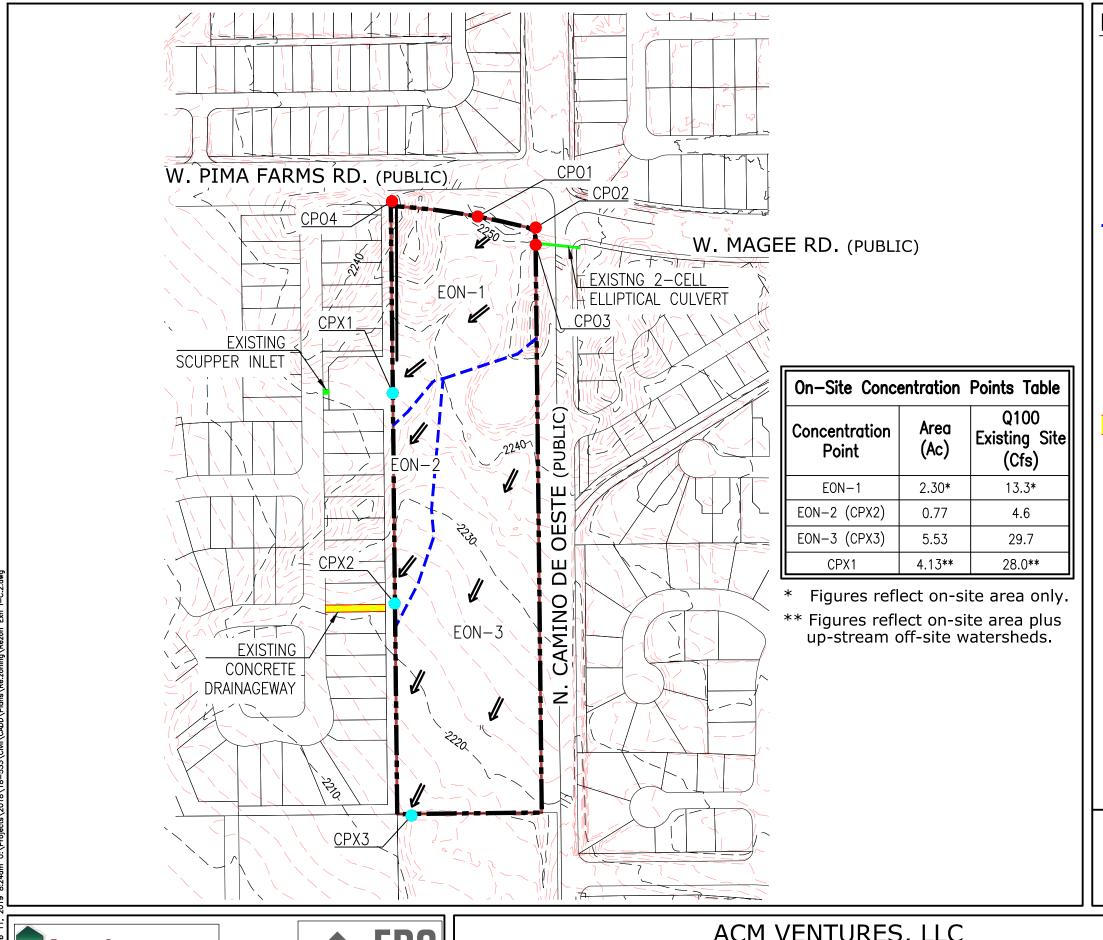
# ACM VENTURES, LLC

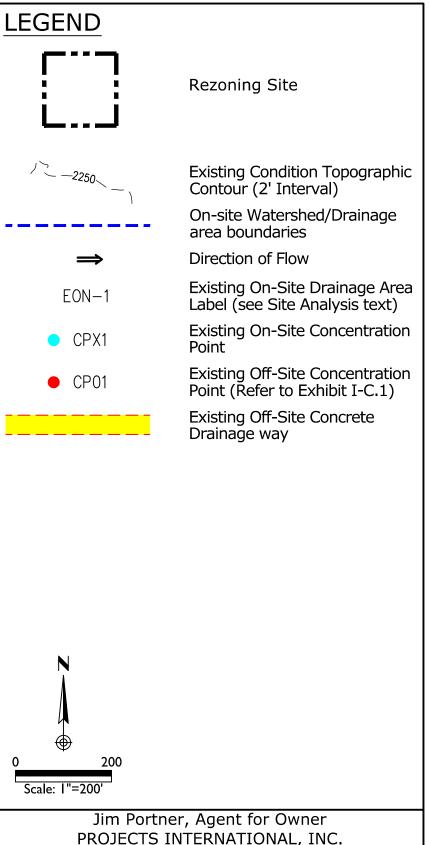
9.77 ACRE PARCEL @ SOUTHWEST CORNER CAMINO DE OESTE & PIMA FARMS RD.

(OWNERSHIP: ROBERT LEE BOYKIN ESTATE)

REZONING: SR TO CR-4

EXHIBIT I-C.1
OFFSITE HYDROLOGY
PAGE 11











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EXHIBIT I-C.2 **ONSITE HYDROLOGY** PAGE 12

### D. BIOLOGICAL RESOURCES

### 1. Conservation Lands System

The entire site falls **outside of** the Maeveen Marie Behan Conservation Lands System (MMBCLS).

### 2. Priority Conservation Areas

There are no Critical Landscape Linkages on or near this property.

#### a. Pima Pineapple Cactus

No portion of the site is designated as Priority Conservation Area (PCA) for the Pima Pineapple Cactus. The site was field surveyed for this species and none were found.

#### b. Needle-Spined Pineapple Cactus

No portion of the site is designated as Priority Conservation Area (PCA) for the Needle-spined Pineapple Cactus. The site was field surveyed for this species and none were found.

### c. Cactus Ferruginous Pygmy Owl and Burrowing Owl

The entire site is designated as part of Priority Conservation Area (PCA-1) for the Cactus Ferruginous Pygmy Owl.

No portion of the site is designated as Priority Conservation Area (PCA) for the Western Burrowing Owl.

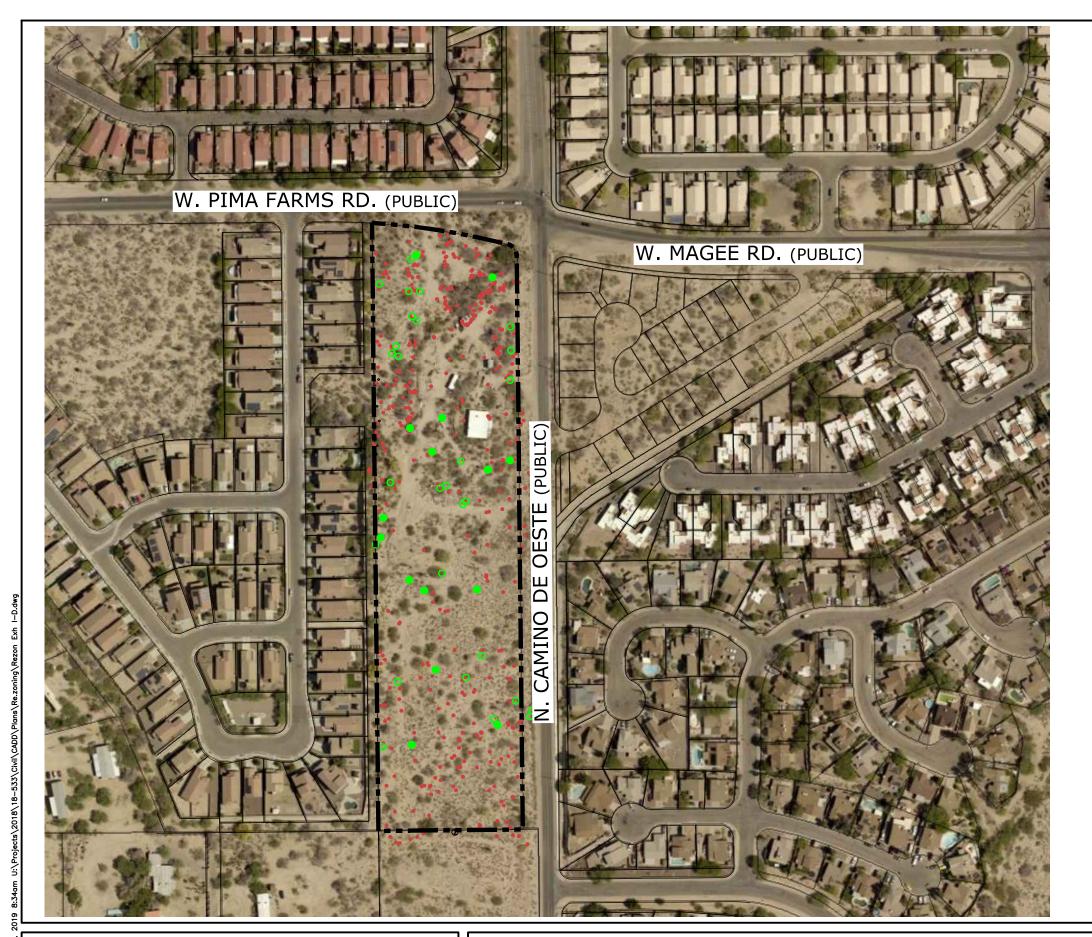
# 3. Saguaro and Ironwoods Inventory

Saguaro Cactus (Carnegia gigantea) have been field surveyed and mapped on the subject rezoning site. A total of forty-four (44) saguaros were found, some of which occurred in clustered arrangements. The on-site specimens have been mapped in categories of six feet (6') tall or less (29 specimens), and greater than six feet (> 6') in height (14 specimens). See Exhibit I-D.

The site was also field surveyed for Ironwood trees. Three hundred three (303) total specimens were found. The field inventory included an assessment of viability and transplantability in accordance with Sec. 18.72.S04 of the *Pima County Native Plant Preservation Manual* (Resolution No. 1998-112); more than 70% of the specimens had a Low ranking on both factors. Regardless, all of the specimens found on-site were nonetheless mapped and shown on Exhibit I-D. The raw field data of the aforementioned inventory is provided in Appendix A.

#### 4. Habitat Protection/Community Open Space

The property lies outside of the Conservation Lands System (CLS) and is not designated for habitat protection or open space acquisition by Pima County.



# **LEGEND**



Rezoning Site

# Saguaro Inventory

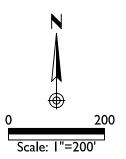
- 29 Saguaros ( $\leq$  6') exist on this property
- 15 Saguaros ( > 6' ) exist on this property

# **Ironwood Tree Inventory**

303 Ironwood trees exist on this property

Note: All Ironwood specimens were evaluated during inventory for transplantability and viability.

More than 70% have a rating of Low on both scales.



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REZONING: SR TO CR-4

EXHIBIT I-D
PLANT INVENTORY
PAGE 14

### E. TRANSPORTATION

The subject property is located at the southwest corner of Pima Farms Road @ Camino de Oeste. Pima Farms is not designated as a *Pima County Major Streets & Routes Plan (MSRP)* street. Camino de Oeste is a designated "major street" (low volume arterial) on the *MSRP* per its August 17, 2015 update. Please refer to Exhibit I-F.1.

### 1. Existing & Proposed Off-Site Streets

a. Existing Rights-of-Way

The existing right-of-way width for Pima Farms Road is nominally ninety feet (90'), although it widens from that dimension near the Camino de Oeste intersection so as to accommodate the physical off-set that exists between Pima Farms Road and Magee Road.

The existing right-of-way in place for Camino de Oeste along the project frontage is seventy-five feet (75'). This dimension is five feet (5') deficient from the *MSRP* mandated width of eighty feet (80'). The eighty-foot width was established by the *MSRP* some years ago for the segment of Camino de Oeste lying south of Magee Road.

This designated width reflected the past at-grade intersection that was then in place with Ina Road (which lies one [1] mile to the south) and the fact that flow-through traffic had then continued on Camino de Oeste south of Ina. With construction of the Ina Road overpass (above Interstate 10), this field condition has materially changed. Camino de Oeste will now end in a t-intersection with Ina Road and no southward flow-through traffic will occur. This raises the question as to whether the full MSRP eighty-foot right-of-way width is any longer necessary in light of the lesser role that Camino de Oeste will play as a continuous north-south arterial. Further amplifying this question is the fact the Camino de Oeste currently dead-ends ¼ mile north of Magee/Pima Farms Road, with no connection northward to Cortaro Farms.

b. Number of Travel Lanes, Capacity & Posted Speed Limits

Pima Farms Road, Magee Road, and Camino de Oeste and are all two-lane, paved public roadways. Their pavements are generally in satisfactory condition. Pima Farms Road is not striped and has a posted speed limit 25 MPH. Magee Road and Camino de Oeste are striped and have a posted speed limit of 35 MPH. Two-lane roadways typically possess a capacity of 13,122 daily trips (ADT), with Pima Farms being potentially less than this figure due to its 25 MPH posted speed limit.

c. Present Average Daily Trips (ADT)

Per the Preliminary Development Plan (PDP) presented in Section II of this Site Analysis, the proposed residential subdivision will contain forty-five (45) single-family residential lots. This will yield a total trip generation of

approximately five hundred thirty (450) additional vehicle trips onto the surrounding street network. As such, Table 3 below provides the existing ADT volumes for those major streets within one (1) mile of the property (per PCDOT Historical Traffic Volume Data).

# TABLE 3: ADT VOLUMES FOR NEARBY MAJOR STREETS WITHIN ONE (1) MILE

Data Shown is Per PCDOT Historical Traffic Volume Data Table (unless otherwise noted)

Street Name	Average Daily Trip (ADT) Volume				
Pima Farms Road	No data available from PCDOT Historical Traffic Volume Data or from PCDOT GIS Traffic Volume Map				
Camino de Oeste	3,264 (Ina Road to Magee/Pima Farms Road) No data available from Pima Farms Road to Cortaro Farms Road (i.e. neither from PCDOT Historical Volume				
	Data or from the GIS Traffic Volume Map)				
Magee Road	5,488 (Camino de Oeste to Thornydale Rd)				
Thornydale Road	28,311 (Massingale Road to Magee Road) 20,944 (Magee Road to Cortaro Farms Road)				
Oldfather Drive	6,117 (Ina Road to Magee Road) 5,783 (Magee Road to Cortaro Farms Road)				
Massingale Road	1,273 (west of Camino de Oeste) 813 (east of Camino de Oeste) Above data per PCDOT GIS Traffic Counts Map				
Ina Road	No data available for the segment immediately east and west of Camino de Oeste				

### d. Existing Bicycle & Pedestrian Ways

There are no existing pedestrian or bicycle ways in place on Pima Farms Road, Magee Road or Camino de Oeste.

### e. Public Roadway Improvements Underway or Planned

PCDOT current road improvement projects under construction in the area include the widening of Cortaro Farms Road (west of Thornydale Road to Camino de Oeste) to a four-lane divided arterial, together with the repaving of Thornydale Road, north of Cortaro Farms Road to Camino del Norte, and the addition of bike/multi-use lanes to this existing roadway prism. The Cortaro Farms Road improvements will likely be completed by the year 2020, while the Thornydale Road repaving is already well along and will be completed in early 2019.

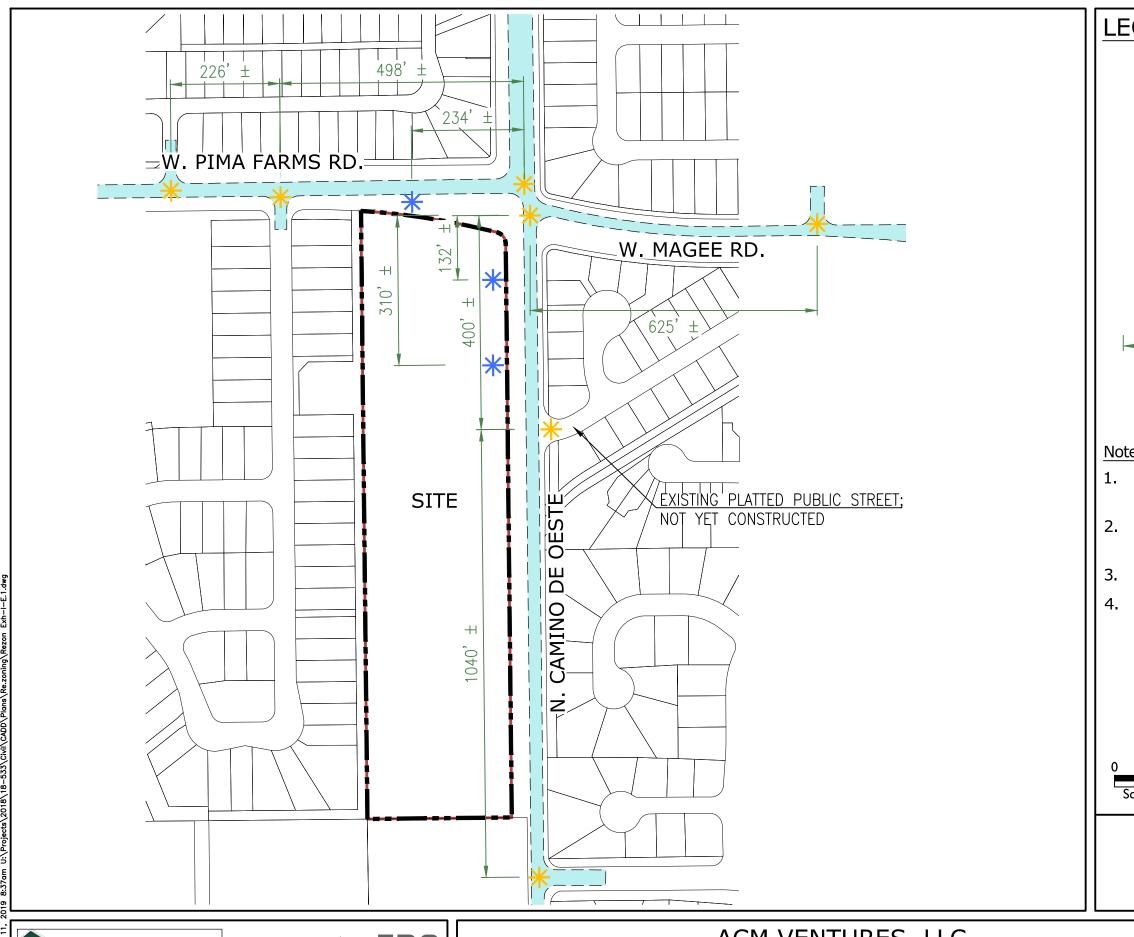
# 2. Distances from Site to Existing Nearby Driveways & Intersections

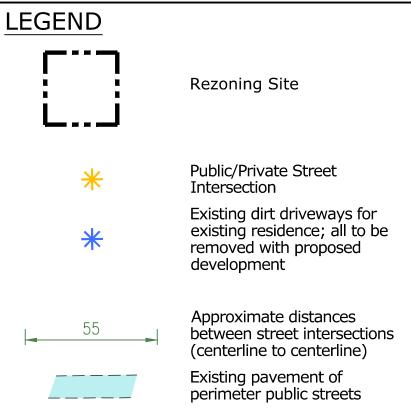
Nearby private driveways and public street intersections in the vicinity of the subject property have been illustrated on Exhibit I-E.1 (Adjacent Driveways & Street Intersections).

### 3. Existing & Planned Transit Routes

Sun Tran has no regular bus routes serving the project site and surrounding vicinity. There are three *Sun Shuttle* routes serving the general area, these being No. 411 (Cortaro/Silverbell), No. 412 (Thornydale/River) and No. 16 (Oracle/Ina). Please refer to Exhibit I-E.2: Public Transit.

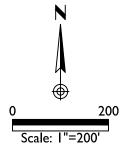
### **Exhibits to Follow**





### Note:

- W. MAGEE ROAD IS DESIGNATED AS A "LOW VOLUME ARTERIAL" BY THE MSRP.
- CAMINO DE OESTE IS DESIGNATED AS A "COLLECTOR" BY THE MSRP.
- PIMA FARMS ROAD IS NOT A MSRP STREET.
- NONE OF THE ABOVE ARE DESIGNATED SCENIC ROUTES.



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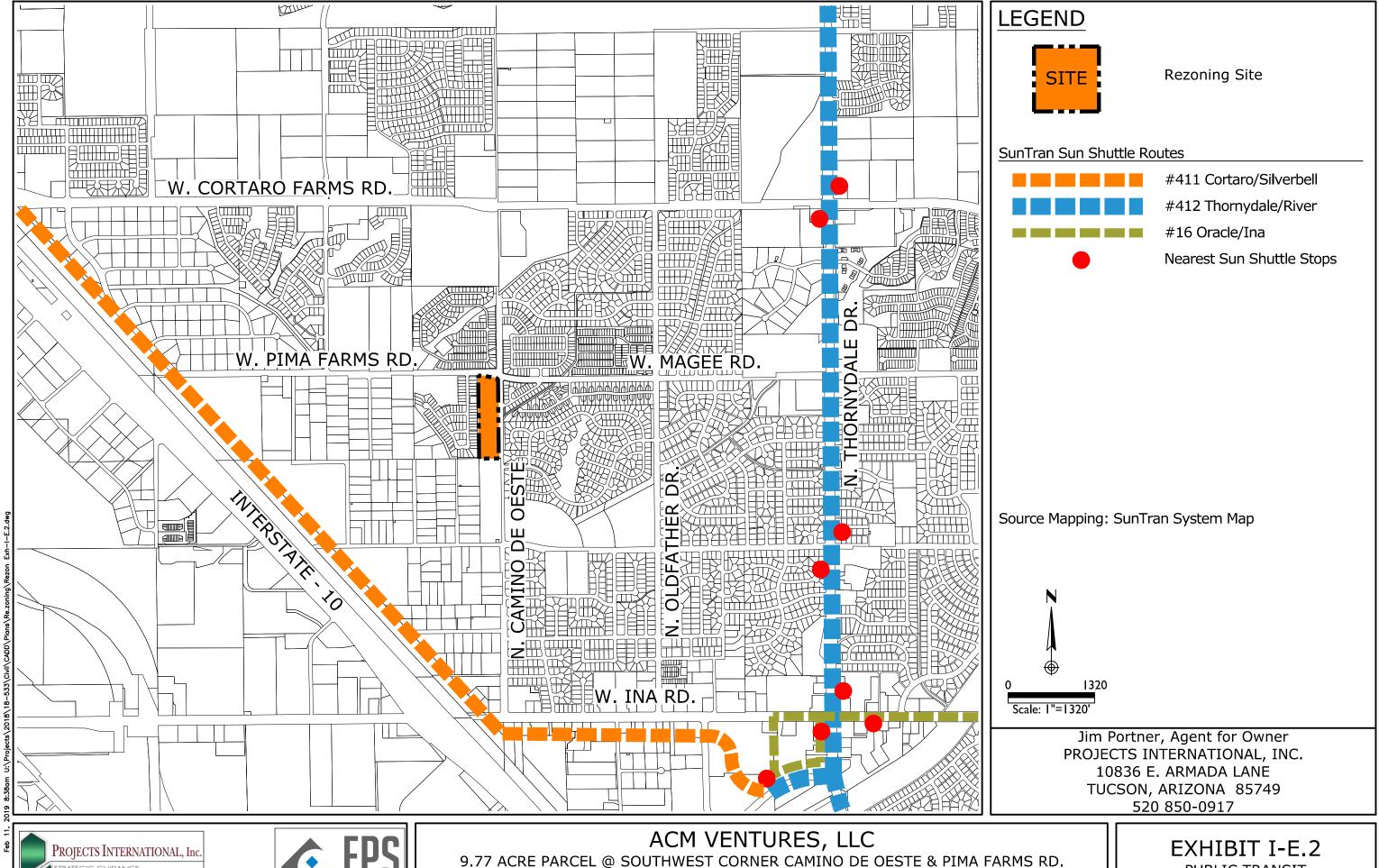


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# **EXHIBIT I-E.1**

ADJACENT DRIVEWAYS & STREET INTERSECTIONS PAGE 18







(OWNERSHIP: ROBERT LEE BOYKIN ESTATE) REZONING: SR TO CR-4

**PUBLIC TRANSIT** PAGE 19

#### F. SEWERS

# 1. Size & Location of Existing Sewers

An extensive network of existing public sewers is already in place in the immediate vicinity (see Exhibit I-F). Specifically, the rezoning site is served by an existing 15" public sewer (G-79-121) located within the Camino de Oeste right-of-way. Capacity is currently available in this existing line downstream from attendant Manhole No. 1728-08, near the southeast corner of the subject property.

A formal Type I Capacity Response letter (No. 2018-266) has been obtained from the Pima County Regional Water Reclamation District (PCRWRD) and is presented in Section II.I (pp. 54) of this Site Analysis.

### 2. Any Constraints to Gravity Service

There are no constraints to providing gravity sewer service for the project nor in connecting its new sewers to the aforementioned public line and manhole. Given the prevailing natural topography, the entire proposed project will drain southerly and facilitate a direct connection to the existing public sewer located within the Camino de Oeste right-of-way.

**Exhibit to Follow**