

## **C. HYDROLOGY**

### **1. Off-Site Watersheds**

Alliance Engineering has completed a preliminary drainage assessment for Parcel 225-02-029C, the 19.99-acre parcel that is the subject of this rezoning application. The findings presented here are based on the above assessment, the results of previous study information, such as FEMA/Firm flood insurance mapping, as well as more recent hydrologic computations using the PC Hydro method.

The offsite watersheds contributing stormwater to the subject Hardy Road property are depicted on Exhibit-I-C.1. The Hardy Wash watershed is the primary one impacting the subject property, and the 100-year flows associated with it have been previously accepted by Pima County via the adjacent subdivision platting.

The total offsite area in the contributing upstream watershed is approximately 143 acres. Several prior subdivision plats analyzed and determined the Q100 for this wash. Of these, the Hardydale II (Lots 1-32) plat was most conservative and designated the Q100 as 1,225 cfs. With the current drainage assessment, Hec-RAS was utilized to delineate the 100-year water surface elevation across the site and the associated 50' erosion hazard setback (EHS).

The Hardy Wash flow enters the site near its northeast corner and exits along its western boundary, approximately 400 feet south of the north property line. Hardy Wash is undisturbed across the property. The developments to the west and east have encroached into the original natural wash channel.

The existing residential subdivisions to the north, west, and east of the subject property do not contribute to the offsite flows. Hardy Road lies to the south of the property, but drains away from the site.

### **2. Off-Site Natural or Man-Made Features**

The upstream watershed (Hardy Wash) features some constructed channels and several developed subdivisions with detention basins. No offsite features will be affected by the surface drainage traversing the subject property, as Hardy Wash will remain in its natural state (including the erosion hazard setback areas).

### **3. Acreages & Discharges of Watersheds**

The upstream area of the offsite watershed contributing to this parcel was also described above in Item 1. The total offsite drainage area is 143.8 acres, with an associated Q100 of 1,225 cfs as previously accepted by Pima County.

#### **4. On-Site Hydrology**

The rezoning site is vacant and undeveloped in the existing condition. The project parcel consists of 100% hydrologic soil type B. See Exhibit I.C.4a-g in support of the following:

- a. The approximate 100-year regulatory floodplains have been delineated on the Exhibit for Hardy wash.
- b. No FEMA mapped floodplains exist on the property. The site and surrounding properties do fall within an area designated by FEMA as having sheet flow (0.5' depth).
- c. The site includes one (1) concentration point with peak discharges in excess of 100 cfs entering the site. Peak discharge was accepted from the most conservative adjacent subdivision, Hardydale II (Lots 1-32).
- d. The existing washes traversing the site exit the property along the west boundary into a previously developed subdivision. Hardy Wash at the west boundary has a natural bottom, but the adjacent development encroaches into the floodplain and directs it to a developed channel.
- e. The site contains riparian habitat area regulated per the Pima County RFCD Flood Hazard Map; same is delineated in Exhibit I-C.2.
- f. The site contains no existing hydraulic structures or manmade hydraulic features.
- g. There are no sources of perennial surface water located on the site.
- h. According to Pima County Ordinance No. 2010 FC-5, 16.28.030, erosion hazard and building setback distances are required for Hardy Wash.

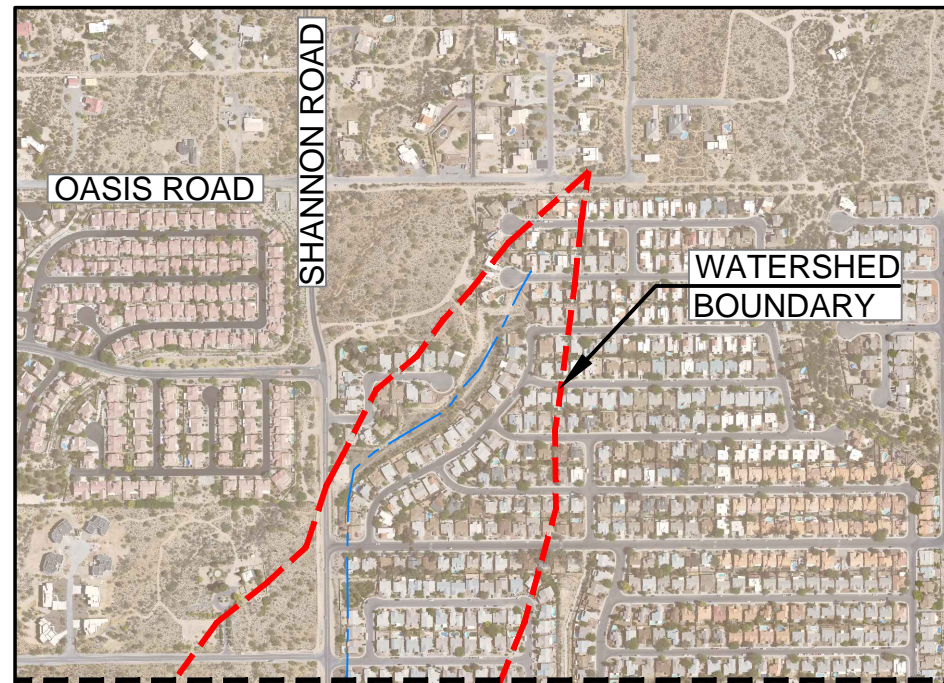
#### **5. Qualitative Description of Downstream Drainage Conditions**

The on-site Hardy Wash exits the subject site into the Hardydale II development to the immediate/adjacent west. Hardy Wash then traverses west, from Hardydale II, joining several unnamed washes and eventually discharging in to the Santa Cruz River.

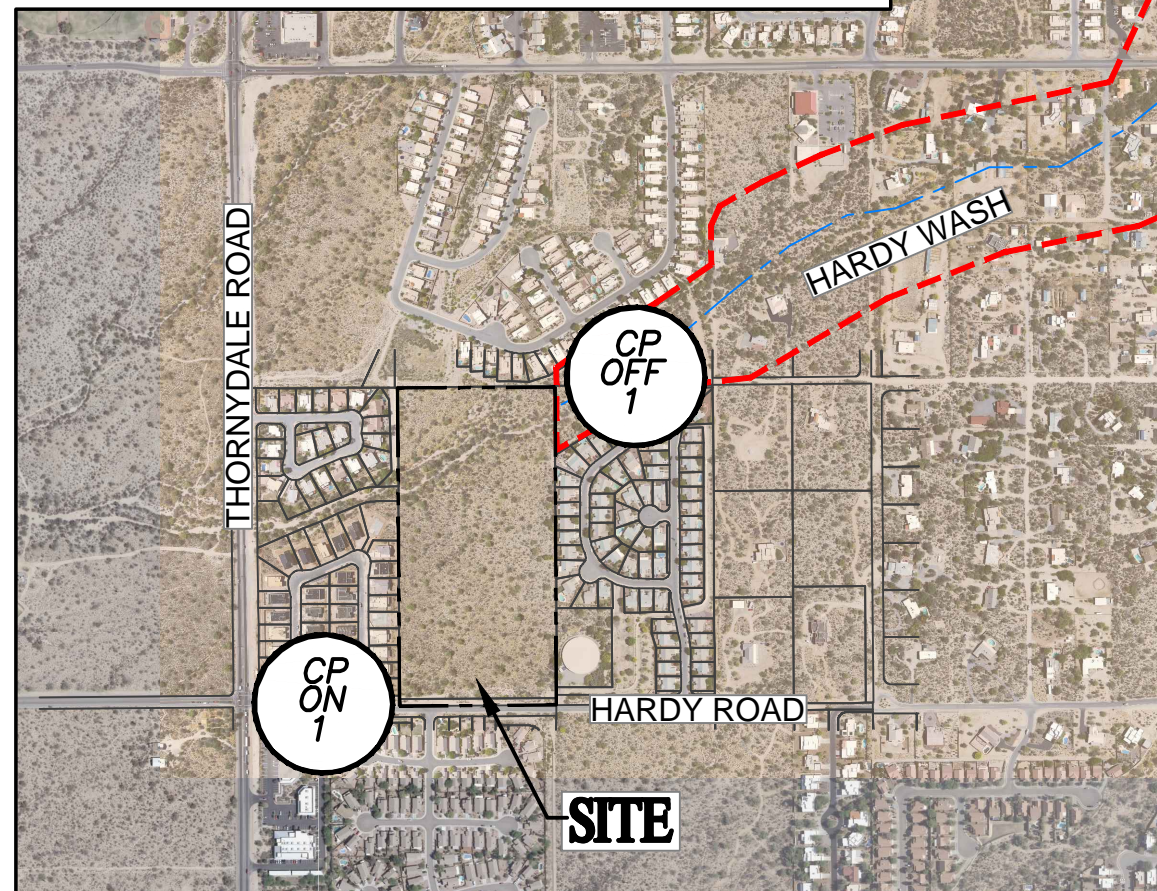
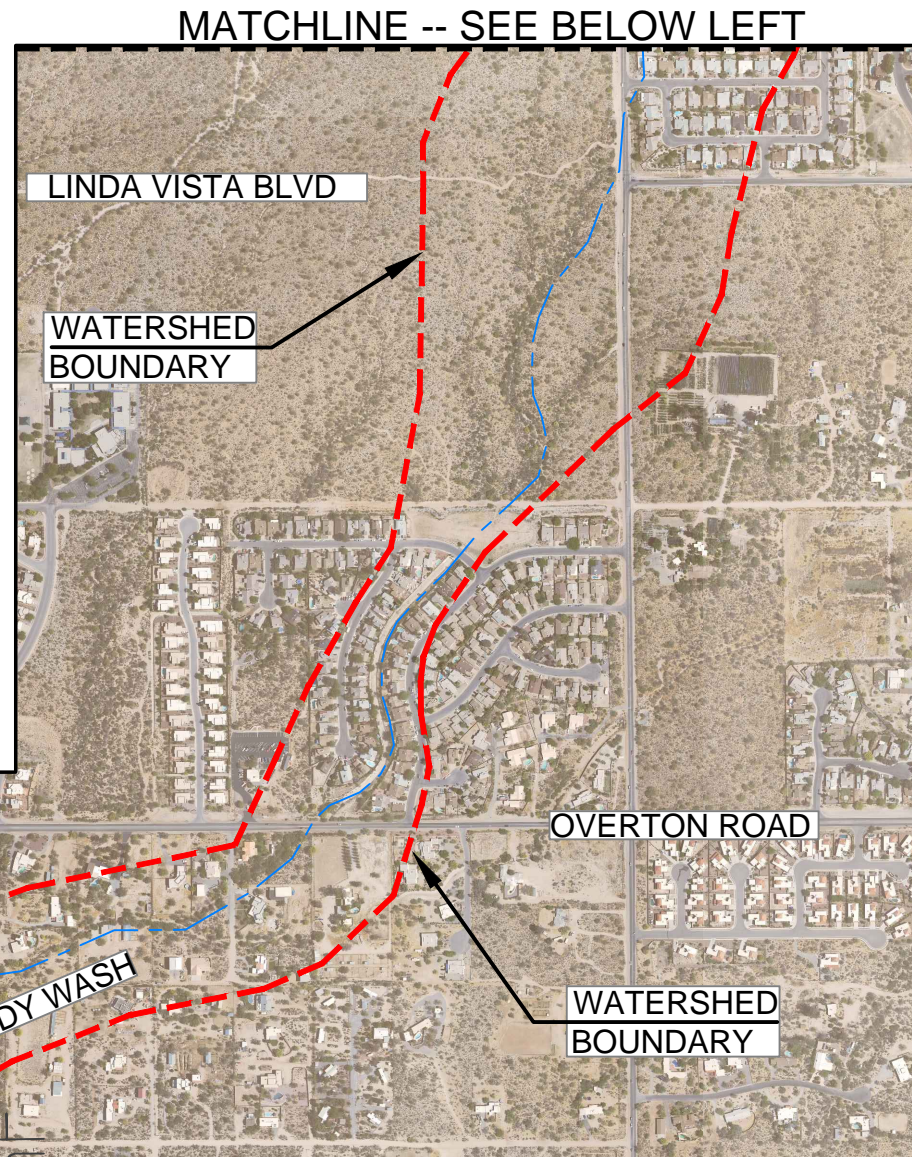
The onsite localized sheet flows exit the site at the southwest corner and enter the Hardy Road right-of-way.

#### **Exhibits to Follow**





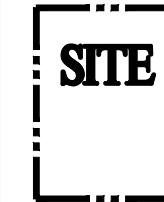
MATCHLINE -- SEE ABOVE RIGHT



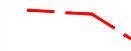
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SCALE IN FEET 1"=700'



## LEGEND



Rezoning Site



Watershed Boundary



Flow Centerline



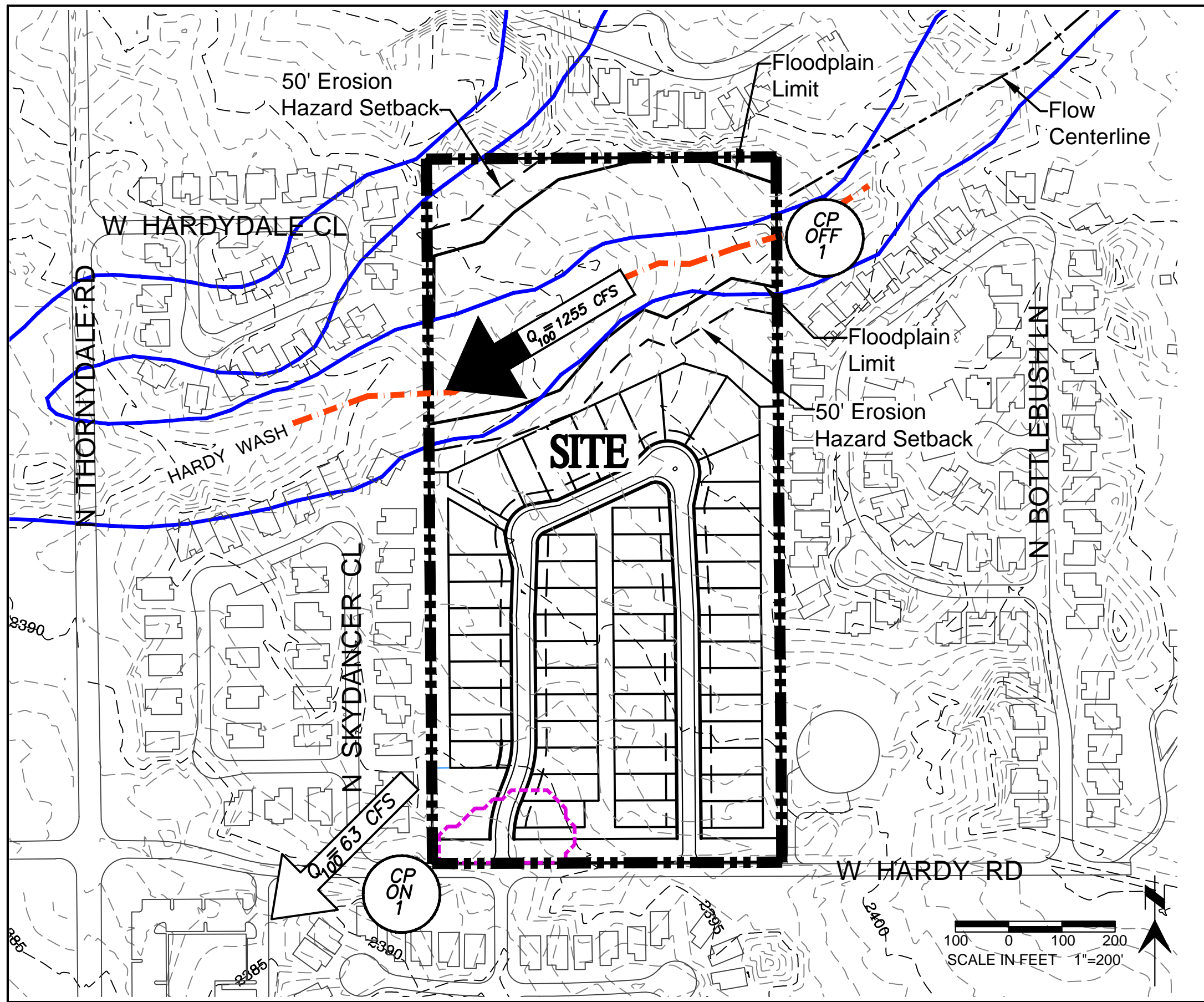
Concentration Point

### WATERSHED SUMMARY TABLE

| CONCENTRATION<br>POINT ID | Q100<br>(CFS) | DA<br>(AC) |
|---------------------------|---------------|------------|
| OFF 1                     | 1225          | 143.8      |
| ON 1                      | 63            | 14.3       |

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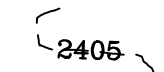




## LEGEND



Rezoning Site



Existing Condition Topographic Contour  
(1' Interval)



Erosion Hazard Setback Limit (EHSL)



Approximate 100-Year Floodplain  
Limit



Mapped Riparian Habitat --  
Important Riparian Areas (CLS-IRA)  
with Underlying Xeroriparian "C"



Area removed from riparian designation,  
per discussion with Flood Control



Hardy Wash



Concentration Point

NOTE:  
Subject Property and several surrounding  
properties are located within a FEMA  
designated sheet flow area (0.5' depth).

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## **D. BIOLOGICAL RESOURCES**

### **1. Conservation Lands System**

The entire site falls within the Maeveen Marie Behan Conservation Lands System (MMBCLS) and is primarily classified as CLS *Multiple Use Management Area (MUMA)*, with the entire property also being overlaid by the *Special Species Management Area (SSMA)*. Approximately 2.7 acres is also classified as CLS *Important Riparian Area (IRA)* with underlying Xeroriparian "C" regulated habitat. Exhibit I-D.1.2 shows the limits of these areas within the property.

### **2. Critical Landscape Linkages**

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

### **3. Pima Pineapple Cactus**

No portion of the site is designated as Priority Conservation Area (PCA) for the Pima Pineapple cactus.

### **4. Needle-Spined Pineapple Cactus**

No portion of the site is designated as Priority Conservation Area (PCA) for the needle-spined pineapple cactus.

### **5. Cactus Ferruginous Pygmy Owl/Western Burrowing Owl**

#### **a. Cactus Ferruginous Pygmy Owl**

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

#### **b. Western Burrowing Owl**

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

### **6. Arizona Game & Fish Special-Status Species**

An HDMS report from the Arizona Department of Game & Fish has been obtained for the subject property and is included in Appendix A of this Site Analysis. Four (4) *Special Status Species* are listed in this report.

**7. Saguaro and Ironwoods Inventory**

Saguaro Cactus (*Carnegie gigantea*) have been field surveyed and mapped on the subject rezoning site (See Exhibit I-D.3). A total of two hundred ten (210) saguaros were found on the property. Ninety-six (96) of these saguaros are six feet (6') tall or less, ninety-six (96) are greater than six feet up to eighteen feet (>6' to 18') tall, and eighteen (18) are greater than eighteen feet (>18') tall. Refer to Exhibit I-D.3.

The site was also surveyed for Ironwood trees. One hundred ninety-four (194) Ironwoods were found. Refer to Exhibit I-D.3.

**8. Open Space Acquisition Status**

The property was not designated on either the 2004 or on the 2015 Proposed Conservation Bond Program.

**9. Vegetation of Note for Scenic Value, Buffering, etc.**

There are some areas on the site with significant vegetation with respect to quality and aesthetic value. This is due to a combination of the size of individual plants and the density of plantings. These areas generally occur in the northern portion of the property and are associated with the Hardy Wash corridor; these have been delineated on Exhibit I-D.3. We have targeted these areas for use as CLS set-asides and for screening/buffering of the neighboring properties.

**10. On-Site Vegetative Communities**

Vegetation on the property is in generally good condition, with some minor destructive impacts along the eastern edge of the property. These are due to the incoming drainage from the upstream Hardy Wash. The following two (2) vegetative zones have been mapped on the subject site (see Exhibit I-D.3,7-10).

Zone I: Ironwood – Saguaro – Palo Verde Association – 18.0 Acres (90% of the Site)

The vegetation within this zone is in generally good condition. The predominant species within the Zone are:

Ironwood – *Olneya tesota*  
Foothills Palo Verde – *Cercidium microphyllum*  
Blue Palo Verde – *Cercidium floridum*  
Saguaro – *Carnegiea gigantea*  
Barrel Cactus – *Ferrocactus spp.*  
Prickly Pear – *Opuntia spp.*  
Cholla – *Opuntia spp.*  
Creosote – *Larrea tridentata*



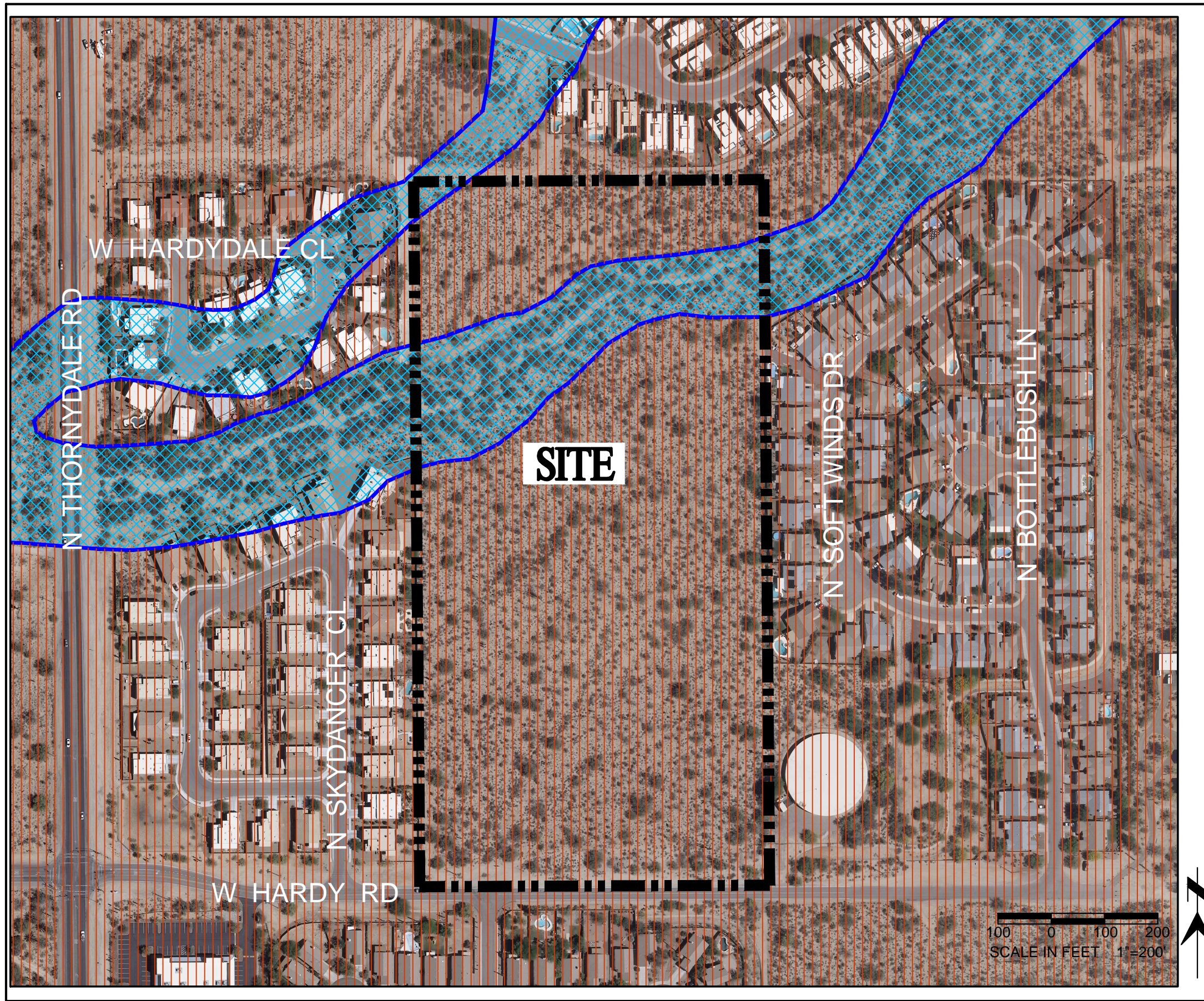
Zone II: Riparian Vegetation – 2.0 Acres (10% of the Site)

The vegetation within this zone is also in generally good condition and is characterized by many large specimens. The predominant species found within this Zone are:

Ironwood – *Olneya tesota* (limited population)  
Foothills Palo Verde – *Cercidium microphyllum*  
Whitethorn Acacia – *Acacia constricta*  
Catclaw Acacia – *Acacia greggii*  
Blue Palo Verde – *Cercidium floridum*  
Saguaro – *Carnegiea gigantean* (limited population)  
Barrel Cactus – *Ferrocactus spp.*  
Prickly Pear – *Opuntia spp.*  
Cholla – *Opuntia spp.*  
Creosote – *Larrea tridentata*

**Exhibits to Follow**





## LEGEND



Rezoning Site  
Entire site and surrounding area falls within  
Multiple Use Management Area (MUMA) and  
Special Species Management Area (SSMA)  
CLS Designation.  
(Approximately 20.0 AC)



Multiple Use Management Area (MUMA) and Special  
Species Management Area (SSMA) with underlying  
Important Riparian Areas with Xeroriparian "C"  
(Approx 2.7 AC)

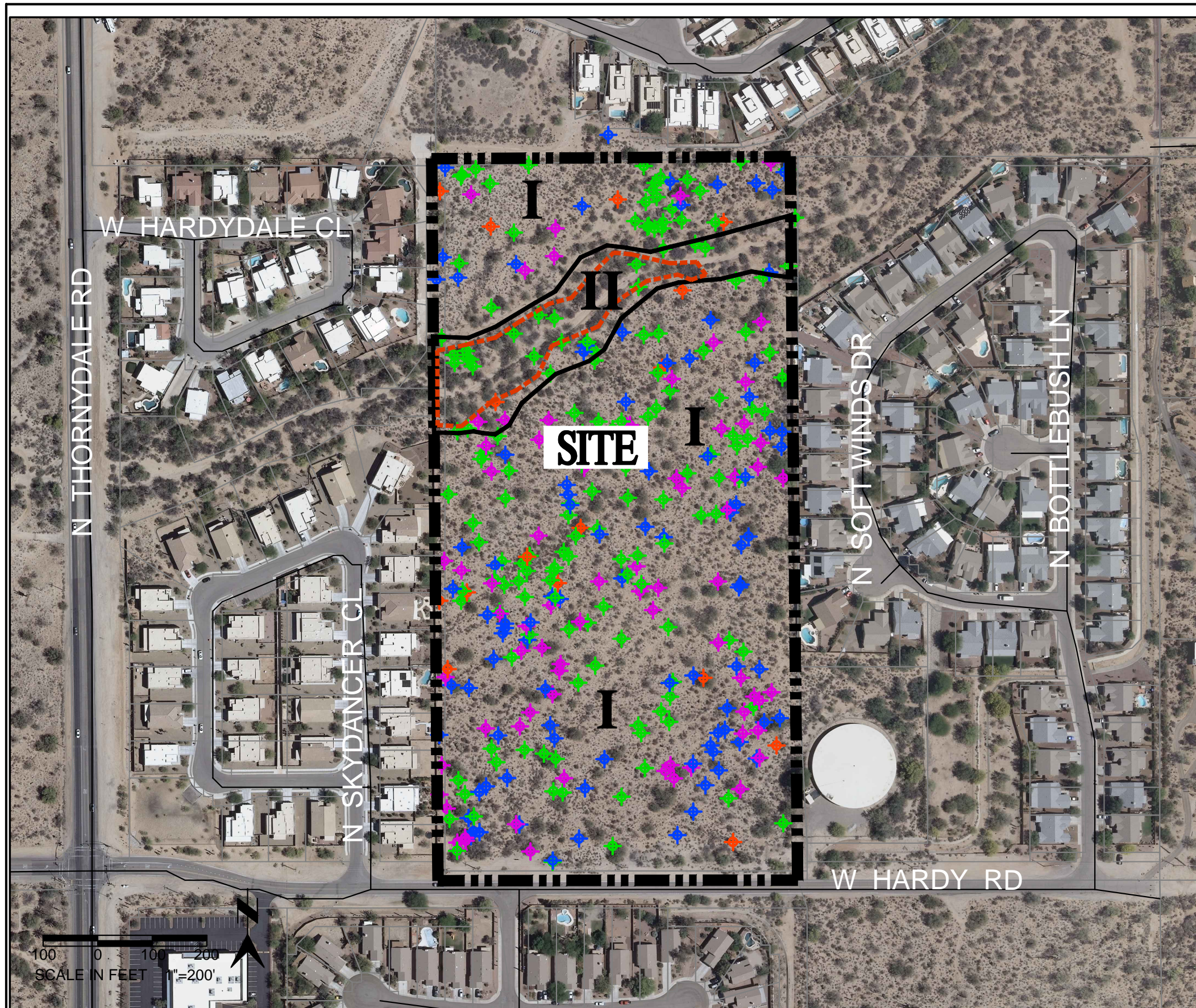


Multiple Use Management Area (MUMA)  
and Special Species Management Area (SSMA)  
(Approx 17.3 AC)

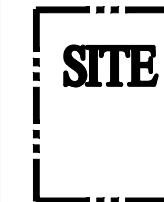
Entire Rezoning Site falls within  
MUMA and SSMA CLS Designation

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## LEGEND



Rezoning Site



I Upland Vegetation with Saguaro -  
Ironwood - Palo Verde Association



II Riparian Vegetation



Saguaro  
≤ 6' in height



Saguaro  
>6' - 18' in height



Saguaro  
>18' in height



Ironwood Tree



Vegetation of Special Note for  
Scenic Value or Buffering

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