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October 30, 2014

Mr. Robert G. Longaker III, P.L.A., ASLA
Senior Project Manager
The WLB Group, Inc.
4444 East Broadway Boulevard
Tucson, AZ 85711

Reference: La Posada – ESL Map Amendment (RECON Number 7520)

Dear Rob:

Per your request, RECON Environmental, Inc. (RECON) evaluated the portion of the proposed La Posada parcel (Figures 1 and 2) near First Avenue and Lambert Lane currently mapped as Critical Resource Area (CRA) per the Town of Oro Valley's Environmentally Sensitive Lands (ESL) code.

General Site Conditions

The La Posada parcel is identified on the Town's General Plan as a master planned community with much of the parcel (i.e., outside the CRA) classified as Resource Management Area Tier 2. The 14.78-acre area currently mapped as CRA lies in the eastern portion of the parcel (Figure 3) and is referenced as the study area for this report (see Figure 2). The study area is between two ridges but is generally flat with a gentle drop in elevation of approximately 30 feet (2,608 to 2,578 feet) over a distance of approximately 1,400 feet from north to south. Vegetation in the study area is representative of typical Sonoran desertscrub-palo verde mixed cacti, with the dominant species being blue and foothills palo verde (*Parkinsonia* spp.), mesquite (*Prosopis velutina*), whitethorn acacia (*Acacia constricta*), barrel cactus (*Ferocactus wislizeni*), and cholla cactus (*Opuntia* spp.).

Drainage across the study area is dispersed through a system of often braided ephemeral channels, which drain into the Cañada del Oro (CDO) wash (see Figure 2), an ESL Major Wildlife Linkage and Important Riparian Area, which is immediately south of the parcel.

Methods

RECON biologists¹ Colby Henley and Kate Connor conducted an initial site visit on June 27, 2014, prior to the monsoon season, and Mr. Henley and Helen Cordier subsequently returned on October 15, 2014, five weeks after a significant precipitation event was recorded at the nearest weather station, approximately 1 mile north-northwest of the parcel. This weather station recorded 2.97 inches of precipitation over a period of about two hours on September 8, 2014².

We evaluated all drainage features in the study area and the extent to which they meet the ESL riparian area criteria as identified in *Town of Oro Valley Zoning Code Addendum G: ESL Resource*

¹ Qualified Habitat Restoration Specialists per Town of Oro Valley Code Chapter 31.

² <http://www.wunderground.com/personal-weather-station/dashboard?ID=KAZTUCSO21#history/s20140908/e20140908/mdaily>

Science Specifications and Definitions. Specifically, Appendix G, paragraph A defines xeroriparian areas by the presence of both intermittent/ephemeral drainage features and representative vegetation volume of $0.500 \text{ m}^3/\text{m}^2$ or greater. Paragraphs D and E also indicate that upland "islands" between braided channels are included as part of the riparian area only if they are less than 200 feet wide, and that mapped riparian areas that contribute drainage connectivity, sediment and nutrient transport, etc. may include areas without representative vegetation volume. In summary, the identification of xeroriparian areas as defined in Appendix G is based on the full site context and riparian function rather than the presence of any single feature or indicator.

During the October site visit, we conducted eight transects to measure Total Vegetation Volume (TVV) adjacent drainage channels in the study area (see Figure 3). This methodology is specified in Appendix G, Paragraph H. The TVV data sheets are presented in Attachment 1. We also took representative photographs looking upstream and downstream along each transect and at other key viewpoints. Site photographs are included in Attachment 2.

Results

During our June site visit, we identified two primary drainage channels, one along the western edge and one along the eastern edge of the study area, both of which connect to the CDO wash south of the parcel. During our October site visit, we were able to identify additional tributary drainage channels in the north-central portion of the study area that were incised by the large precipitation event in September. These tributary drainage channels connect to the primary channels upstream of their (the primary channels') connection to the CDO wash (see Figure 3).

The vegetation adjacent all these drainage channels includes riparian facultative species (i.e., more abundant in but not restricted to riparian areas) such as desert hackberry (*Celits pallida*), mesquite, and blue paloverde (*Parkinsonia florida*). The results of the TVV transects, presented in Table 1, show that the total vegetation volume within all eight transects are well above the minimum $0.500 \text{ m}^3/\text{m}^2$ threshold for xeroriparian. Additionally, the presence of distinct channels, sediment deposits, and vegetation debris were noted to indicate hydrologic flow and connectivity, and nutrient/sediment transport.

Table 1. Total Vegetation Volume, La Posada Study Area, Oro Valley, Arizona, October 2014

Transect Number	Primary Species	Total Vegetation Volume (m^3/m^2)
1	Desert hackberry, whitethorn and catclaw acacia, wolfberry (<i>Lycium</i> spp.)	1.112
2	whitethorn acacia, wolfberry	0.720
3	Mesquite, desert hackberry	0.888
4	Whitethorn acacia	1.196
5	Blue paloverde, mesquite	1.188
6	Blue paloverde, desert hackberry, wolfberry, whitethorn acacia	0.928
7	Desert hackberry, mesquite, whitethorn and catclaw acacia, foothills paloverde	1.024
8	Desert hackberry, mesquite	0.936

The area in the southern portion of the study area between the two primary drainage channels was thoroughly examined for the presence of drainage features during the October site visit, when any indicators would have been readily apparent because of the recent significant precipitation in September. No indicators of hydrologic flow were found (see Photographs 17-23 in Attachment 2). Additionally, this area between the two primary drainage channels is greater than 200 feet wide. Because of the lack of drainage features in this area and its size, it is by definition an upland area.

No major rock outcrops/boulders or distinctive habitat resources, as defined by the ESL code, were identified within the study area.

Recommendations

As you are aware, the Town devoted a substantial effort to field verify the map components developed as part of the ESL code. However, due to the lack of visibility from public roads and private property access issues, the La Posada parcel is one location that was not field-verified and is in an area where ESL mapping was based exclusively on aerial imagery. The field investigations described above add field-verified data to the ESL mapping record. The recommendations below are based on this more complete data.

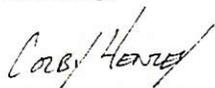
Recommendation 1. Based on our evaluation, RECON recommends a modification to the CRA as depicted in Figure 3. The northern portion of the study area does meet the criteria of xeroriparian habitat based on total vegetation volume as listed in Table 1 as well as other riparian function indicators.

Recommendation 2. RECON also recommends that the area in the southern portion of the study area between the two primary drainage channels (see Figure 3) be removed from the CRA designation because of the lack of drainage features in this area and its size. This area should revert to designation as Resource Management Area (RMA) Tier 2, like the remainder of the parcel. The RMAs in the ESL code are based on specific criteria (Appendix G, Sections 2 and 3) and merge resource science with adopted future land use designations and intensities as specified in the General Plan. Table 27.10-3 in the Zoning Code identifies the La Posada parcel (Master Planned Community Rooney) as RMA Tier 2.

Recommendation 3. RECON recommends that any impacts to CRAs be mitigated through ecological restoration efforts focused on the degraded or disturbed riparian segments within or adjacent to the CRA. Specifically, the access road along the eastern edge of the CRA could be revegetated to provide additional habitat buffer to the adjacent riparian area. Additionally, there are areas near the confluence of the two primary drainage channels that have suffered damage from off-road vehicle use and wildcat dumping. These areas could also be revegetated to provide riparian buffer and wildlife connectivity.

Thank you again for the opportunity to conduct this evaluation. Please contact us if you have any questions or need any additional information.

Sincerely,



Colby Henley
Senior Biologist/Project Manager



Kate Connor
Restoration Ecologist

DCH:KC:sh

Attachments



 Project Location

FIGURE 1

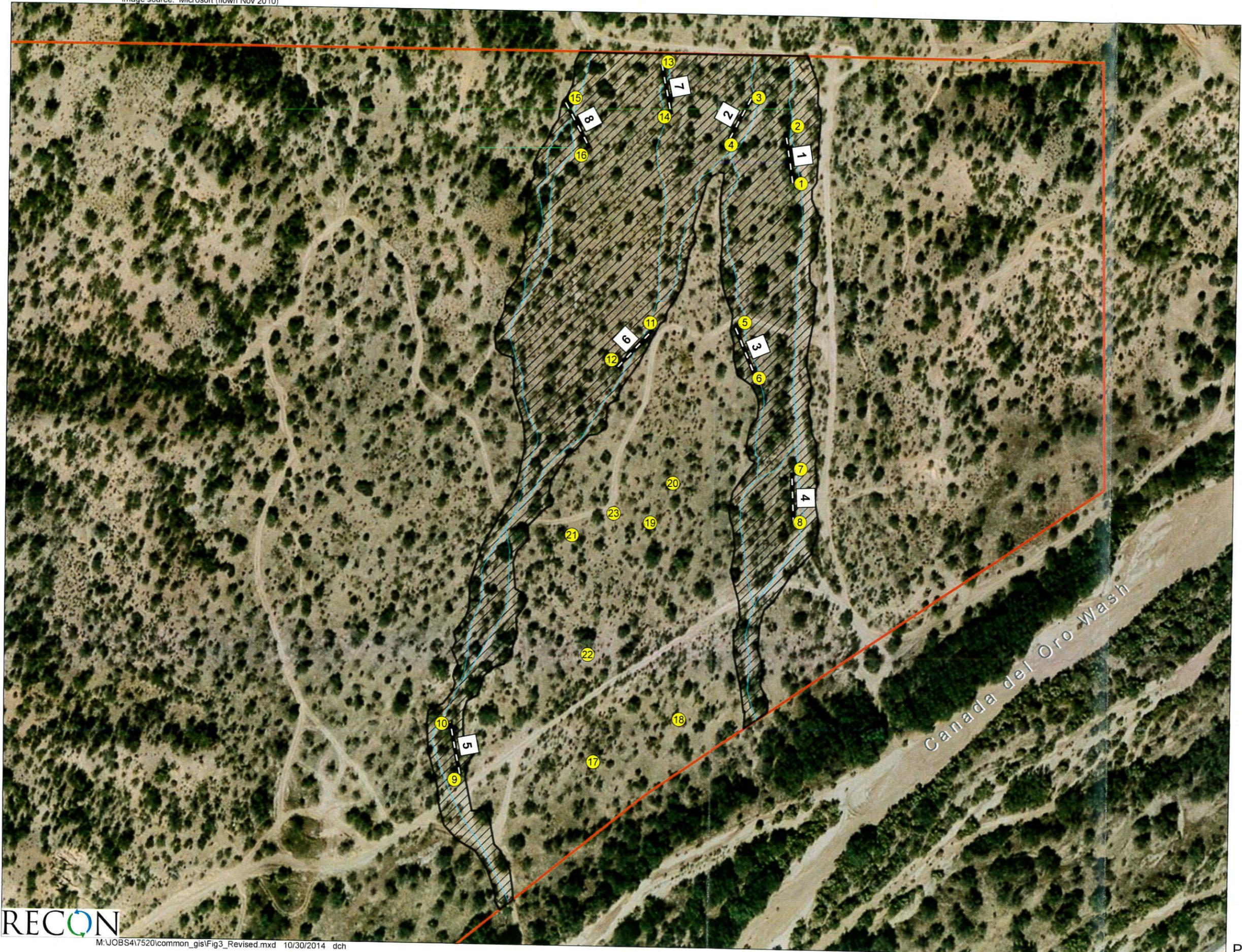
Regional Location



-  Parcel Boundary
-  Study Area



FIGURE 2
La Posada Parcel



-  Parcel Boundary
-  Proposed CRA Boundary
-  Drainage Channels
-  TVV Transects
-  Photo Points



FIGURE 3

Proposed Critical Resource Area

ATTACHMENT 1
TVV Data Sheets

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Personnel:
Colby Henley,
Helen Cordier

Date:
10/15/2014

Transect # 1

		Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																								
Vertical cubic meters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	4	1	2	0	3	8	10	10	0	1	5	10	4	0	0	0	7	10	10	6	10	3	2	6	10	
2	1	0	2	1	10	8	10	10	2	3	7	10	10	2	4	0	9	6	3	6	5	2	2	6	5	
3	1	4	0	0	3	2	6	0	0	0	1	0	4	8	0	2	0	0	0	1	0	0	0	0	0	
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
TOTAL	6	5	4	4	1	16	18	26	20	2	4	13	20	18	10	4	2	16	16	13	13	15	5	4	12	15

Other Species Present within Belt Transect

Desert hackberry, whitethorn & catclaw acacia,
wolfberry, globe mallow

TVV = 1.112
Photos 1 & 2

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Transect #
2

Date:
10/15/2014

Personnel:
Colby Henley,
Helen Cordier

		Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																							
Vertical cubic meters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	2	4	10	5	0	0	0	0	0	0	3	4	5	7	9	10	6	3	0	0	0	7	8	10	8
2	9	0	6	5	0	0	0	0	0	0	3	6	8	7	3	4	3	0	0	0	0	0	0	2	0
3	9	0	6	1	0	0	0	0	0	0	0	1	2	2	0	2	0	0	0	0	0	0	0	0	0
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
TOTAL	20	4	22	11	0	0	0	0	0	0	6	11	15	16	12	16	9	3	0	0	0	7	8	12	8

Other Species Present within Belt Transect

Whitethorn acacia, wolfberry, datura, morning glory

TVV = 0.720
Photos 3 & 4

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Transect #
3

Date:
10/15/2014

Personnel:
Colby Henley,
Helen Cordier

Vertical cubic meters	Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	4	2	2	3	5	0	4	3	0	0	0	0	0	0	0	1	2	5	7	8	5	3	3	9	8
2	4	8	4	3	2	3	1	0	0	0	0	0	0	0	4	3	0	2	10	7	8	3	0	0	8
3	0	2	8	3	8	5	3	2	0	0	0	0	0	0	0	0	9	3	5	3	2	0	0	0	0
4	0	2	7	4	4	2	4	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
TOTAL	8	14	21	13	20	10	12	5	0	0	0	0	0	0	4	4	11	10	23	18	15	6	3	9	16

Other Species Present within Belt Transect

TVV = 0.888
Photos 5 & 6

Mesquite, hackberry, amaranth, bush muhy

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Transect #
4

Personnel:
Colby Henley,
Helen Cordier

Date:
10/15/2014

Vertical cubic meters	Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	2	0	5	2	0	1	4	3	5	4	6	10	10	9	6	1	4	10	10	8	10	10	7	10	7	10
2	0	0	0	0	0	0	0	0	0	1	8	10	7	2	1	5	10	7	2	3	0	2	6	9	8	
3	0	0	0	0	0	0	0	0	0	3	4	3	3	0	0	2	3	0	3	4	6	0	5	5	9	
4	0	0	0	0	0	0	0	0	0	4	3	4	7	0	0	0	0	0	2	4	0	0	0	0	0	
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
TOTAL	2	0	5	2	0	1	4	3	5	12	21	27	27	11	7	8	17	17	17	19	16	12	18	21	27	

Other Species Present within Belt Transect

Whitethorn acacia, datura

TVV = 1.196
Photos 7 & 8

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Transect #
5

Date:
10/15/2014

Personnel:
Colby Henley,
Helen Cordier

		Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																								
Vertical cubic meters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	0	3	5	7	3	0	0	0	0	0	3	9	5	4	5	0	3	3	0	2	5	2	9	3	1	
2	7	4	1	1	0	0	0	0	0	0	0	7	7	8	4	1	3	0	0	0	1	1	6	0	0	
3	8	8	10	6	2	1	0	0	0	2	2	5	5	3	9	10	7	0	0	0	0	3	4	0	6	
4	0	4	10	8	10	10	8	0	0	0	0	0	1	2	5	1	1	0	0	0	0	1	3	4	7	
5	0	0	3	4	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
TOTAL	15	19	29	26	20	12	8	0	0	0	5	18	18	17	23	12	14	3	0	2	6	7	22	7	14	

Other Species Present within Belt Transect

TVV = 1.188
Photos 9 & 10

Blue paloverde, mesquite, datura, cholla, globe mallow

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Personnel:
Colby Henley,
Helen Cordier

Date:
10/15/2014

Transect # 6

		Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																								
Vertical cubic meters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	5	3	7	8	2	2	6	3	5	4	0	0	2	5	5	9	1	2	0	0	0	0	5	7	8	
2	3	0	8	6	0	0	3	9	7	1	1	0	2	6	3	5	0	0	0	0	0	0	0	10	5	
3	0	0	9	0	2	5	7	9	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
4	0	0	0	0	0	5	6	4	8	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	
5	0	0	0	0	0	0	0	1	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
TOTAL	8	3	24	14	4	12	22	26	24	11	1	0	4	11	8	14	1	2	0	0	0	0	5	21	17	

Other Species Present within Belt Transect

TVV = 0.928
Photos 11 & 12

Whitethorn acacia, wolfberry, blue paloverde datura hackberry

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Personnel:
Colby Henley,
Helen Cordier

Date:
10/15/2014

Transect # 7

		Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																								
Vertical cubic meters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1	4	10	9	8	0	1	0	2	5	5	2	1	0	5	1	6	10	10	1	4	7	1	1	0	3	
2	4	6	8	4	5	0	0	5	8	4	0	0	0	10	8	1	10	10	10	4	6	7	0	0	0	
3	0	0	0	0	0	0	0	1	9	8	5	0	0	0	0	0	3	0	0	0	5	6	4	0	0	
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										
13																										
14																										
15																										
TOTAL	5	16	17	12	5	1	0	8	22	17	7	1	0	15	8	7	23	20	11	10	23	16	9	0	3	

Other Species Present within Belt Transect

Hackberry, mesquite, whitethorn & catclaw acacia, datura, foothills
paloverde, burrowweed

TVV = 1.024
Photos 13 & 14

VEGETATION VOLUME DATA SHEET

Location:
La Posada, Town of Oro
Valley, AZ

Transect #
8

Date:
10/15/2014

Personnel:
Colby Henley,
Helen Cordier

Horizontal Transect Samples (# of cubic decimeters containing vegetation within each vertical meter)																									
Vertical cubic meters	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	4	9	10	10	10	3	0	0	2	5	1	3	10	9	2	0	0	0	0	0	3	5	1	0	2
2	2	7	10	9	5	1	0	1	0	4	2	10	10	10	8	0	0	0	0	0	0	5	5	4	9
3	0	0	1	0	0	0	0	0	0	0	0	7	5	6	0	0	0	0	0	0	0	1	9	2	9
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									
15																									
TOTAL	6	16	21	19	15	4	0	1	2	9	3	20	25	25	10	0	0	0	0	0	3	11	17	7	20

Other Species Present within Belt Transect

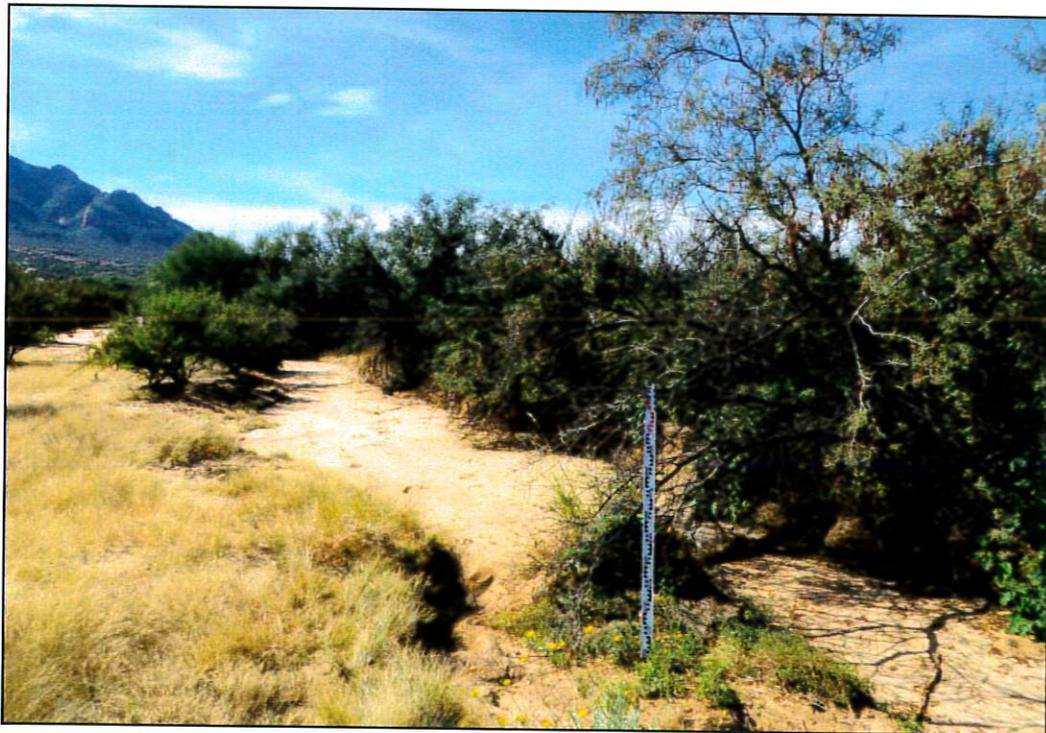
TVW = 0.936
Photos 15 & 16

Hackberry, datura, mesquite, amaranth, globe mallow

ATTACHMENT 2
Site Photographs



PHOTOGRAPH 1
Transect 1 Looking North



PHOTOGRAPH 2
Transect 1 Looking South



PHOTOGRAPH 3
Transect 2 Looking South



PHOTOGRAPH 4
Transect 2 Looking North



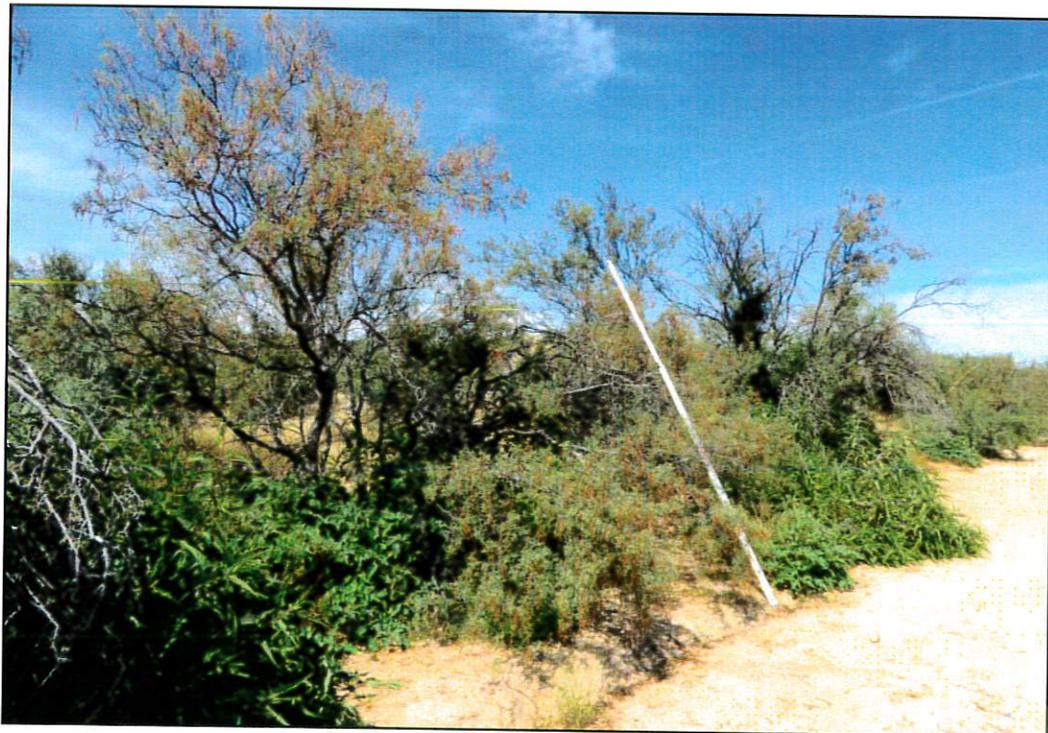
PHOTOGRAPH 5
Transect 3 Looking South



PHOTOGRAPH 6
Transect 3 Looking North



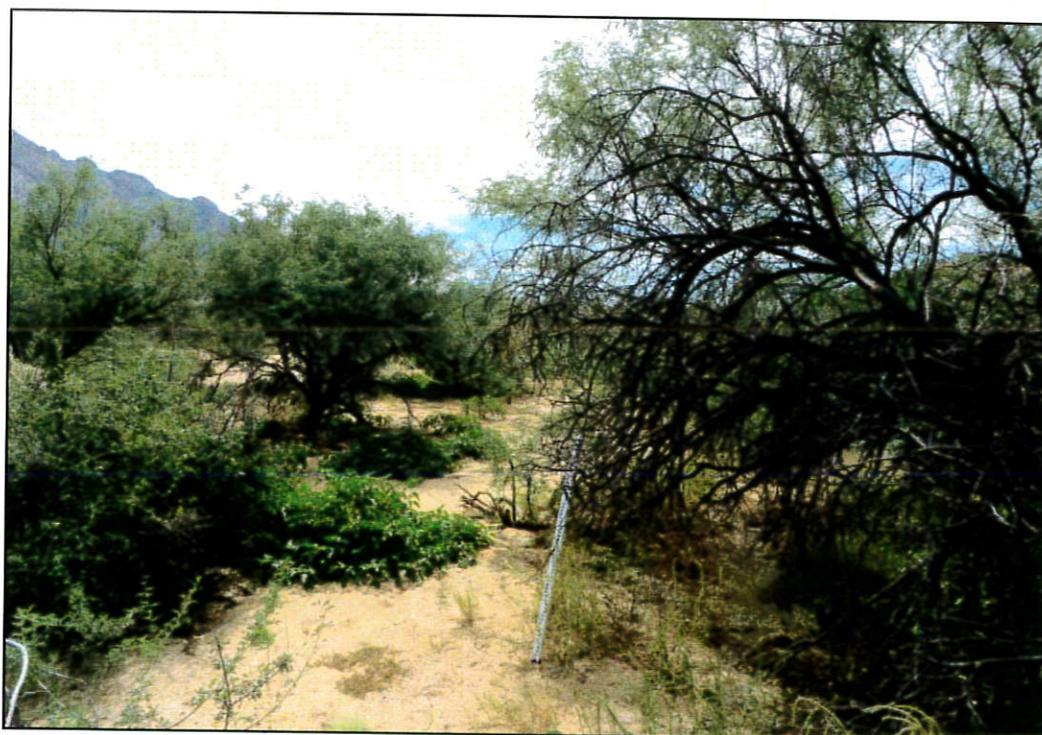
PHOTOGRAPH 7
Transect 4 Looking South



PHOTOGRAPH 8
Transect 4 Looking North



PHOTOGRAPH 9
Transect 5 Looking North



PHOTOGRAPH 10
Transect 5 Looking South



PHOTOGRAPH 11
Transect 6 Looking South



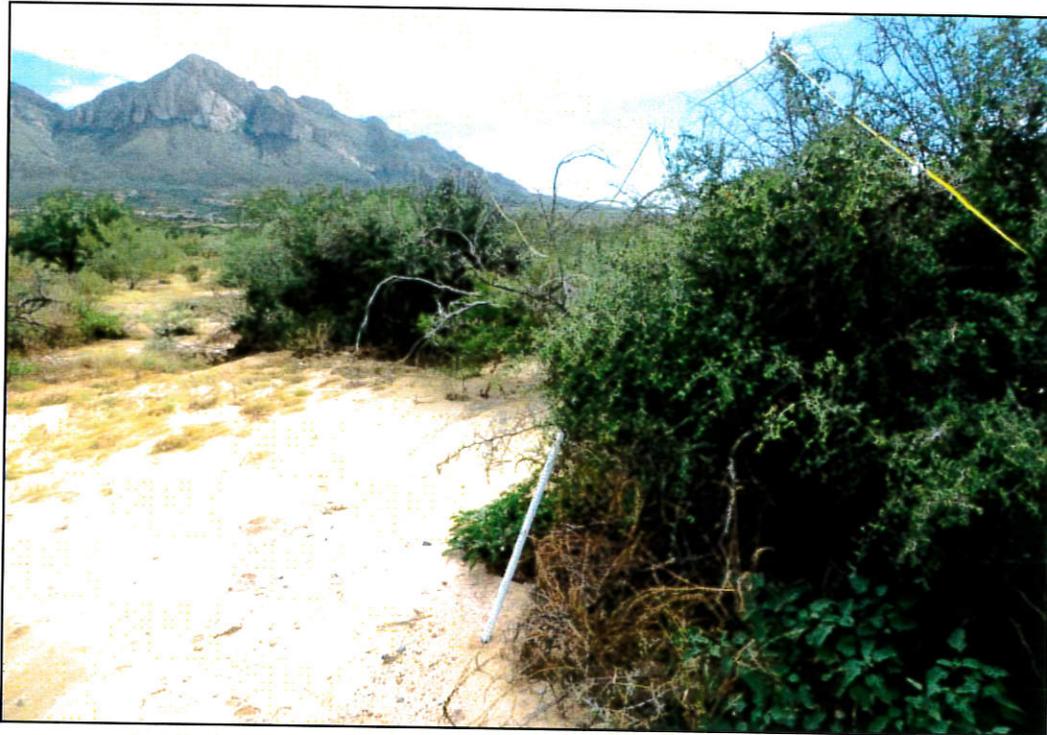
PHOTOGRAPH 12
Transect 6 Looking North



PHOTOGRAPH 13
Transect 7 Looking South



PHOTOGRAPH 14
Transect 7 Looking North



PHOTOGRAPH 15
Transect 8 Looking South



PHOTOGRAPH 16
Transect 8 Looking North



PHOTOGRAPH 17
Upland Area Looking Southwest



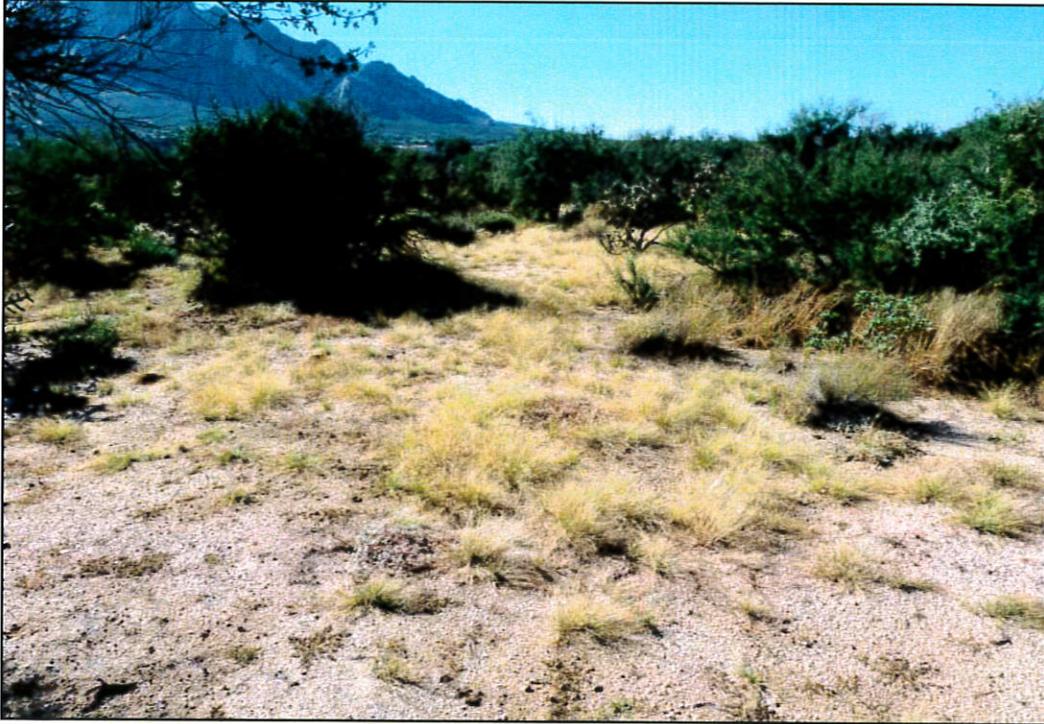
PHOTOGRAPH 18
Upland Area Looking Northeast



PHOTOGRAPH 19
Upland Area Looking Northeast



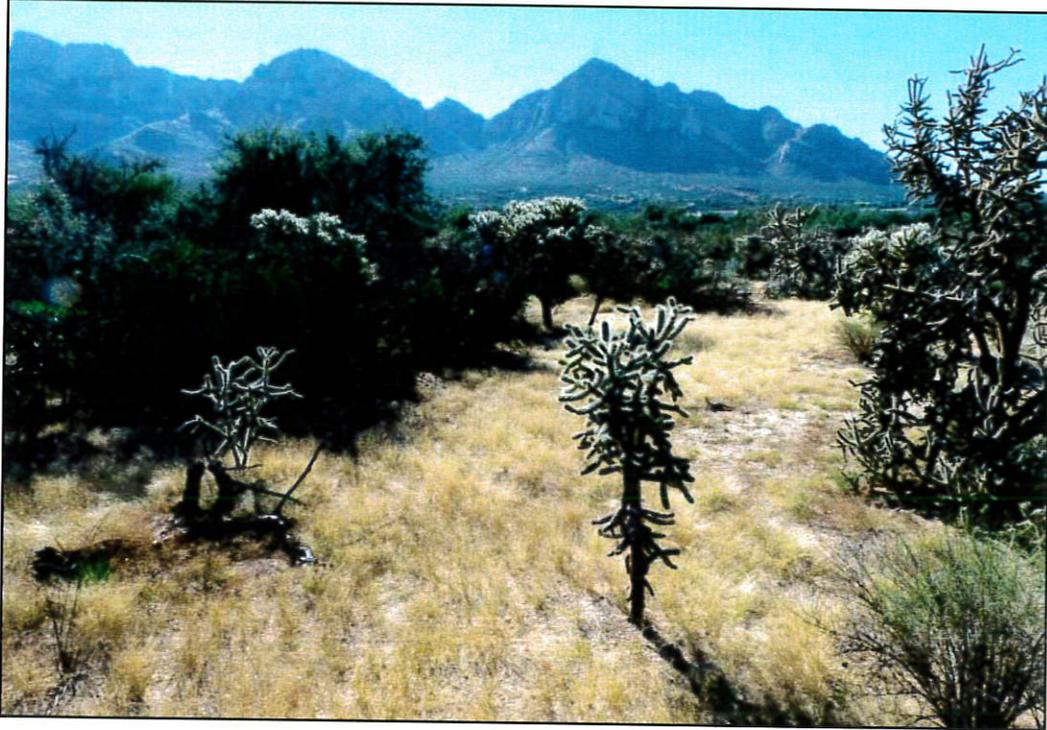
PHOTOGRAPH 20
Upland Area Looking North



PHOTOGRAPH 21
Upland Area Looking Southwest



PHOTOGRAPH 22
Upland Area Looking Southwest



PHOTOGRAPH 23
Upland Area Looking South