

July 19, 2022

Thienan Pfeiffer
Glenn Lukos Associates, Inc.
1940 E Deere Avenue, Suite 250
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Via email: tly@wetlandpermitting.com

Subject: Results of a Mohave Ground Squirrel Protocol Survey for the Palmdale Logistics Park Project, City of Palmdale, Los Angeles County, California

Dear Ms. Pfeiffer:

The purpose of this report is to document the results of a California Department of Fish and Wildlife (CDFW) protocol survey for Mohave ground squirrel (*Xerospermophilus mohavensis*; MGS) conducted by Dipodomys Ecological Consulting LLC (DEC) for the Palmdale Logistics Park Project (project). Presented in this report are a description of the project, project location, the biological setting of the site, MGS natural history, survey methodology, results of trapping efforts for MGS, and conclusions.

Project Description and Location

Covington Group, Inc., proposes to develop a speculative industrial distribution warehouse on a 78.68-acre parcel. The 78.68-acre project parcel is located within the City of Palmdale in Los Angeles County, California. The parcel is bordered by West Avenue M on the north, West Avenue N on the south, 10th Street West on the west, and Sierra Highway on the east (**Figures 1 and 2**). The parcel is surrounded by undeveloped land to the south and east, and commercial development to the north and west. The primary sources of disturbance at the site are transient encampments and off-highway vehicle (OHV) use. The project site can be found on the U.S. Geological Survey (USGS) 7.5-minute Lancaster West topographic quadrangle map within Section 03, Township 6 North and Range 12 West, as shown in **Figure 1**, Project Location.

Biological Setting

Vegetation communities within the project site include *Ephedra nevadensis* scrub-*Lycium andersonii*-*Grayia spinosa* scrub (CDFW CA Code 33.185.00) on the east and central portion of the parcel and *Atriplex canescens* scrub (36.310.00) on the west end of the parcel. Dominant shrubs present include creosote bush (*Larrea tridentata*), Cooper's boxthorn (*Lycium cooperi*), Nevada joint-fir (*Ephedra nevadensis*), spiny hopsage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*), cheesebush (*Ambrosia salsola*), big sagebrush (*Artemisia tridentata*), four-wing saltbush (*Atriplex canescens*), and Joshua tree (*Yucca brevifolia*). Herbaceous plants present onsite include red-stemmed filaree (*Erodium*

cicutarium), rattlesnake weed (*Euphorbia albomarginata*), fiddleneck (*Amsinckia tessellata*), and Mohave sand verbena (*Abronia pogonantha*).

Soils consist of Rosamond Loam/Cajon Loamy Sand (WebSoil 2022). The project site is located at an elevation of approximately 2,445 feet above mean sea level.

Mohave Ground Squirrel Natural History

Mohave ground squirrels (*Xerospermophilus mohavensis*) are medium-sized (210-230mm, 85-130g), diurnal squirrels. Their dorsal pelage is light gray to cinnamon-brown, while their ventral side is creamy. Unlike round-tailed ground squirrels, which occur sympatrically in the southeast portion of their range, MGS have a short, flat tail that is light-colored on its underside, and have brown cheeks instead of white.

MGS inhabit a small geographic area in the western Mojave Desert. This species ranges from Palmdale in the southwest, the Lucerne Valley in the southeast, Olancha in the northwest, and the Avawatz Mountains in the northeast (Gustafson 1993). Although occurrences in the southern portion of their range are rare, occurrences have been documented on the California Natural Diversity Database (CNDDB) as recently as 2011 (Figure 3). Vegetation communities (as classified by the California Native Plant Society) typically associated with MGS include Mojave Creosote Scrub, Shadscale Scrub, Desert Saltbush Scrub, Desert Sink Scrub, and Joshua Tree Woodland. MGS feed primarily on the leaves and seeds of forbs and shrubs. In the northern portion of their range, MGS have been found to feed on spiny hopsage (*Grayia spinosa*), winterfat (*Krascheninnikovia lanata*) and saltbush (*Atriplex* sp.), especially in early spring when forbs are unavailable, during summer when forbs have dried out, and during drought conditions (Leitner and Leitner 1998). Recent studies have also indicated that MGS feed on the following forbs and shrubs: freckled milkvetch (*Astragalus lentiginosus*), Mojave lupine (*Lupinus odoratus*), buckwheat (*Eriogonum* sp.), white mallow (*Eremalche exilis*), fiddleneck (*Amsinckia tessellata*), Russian thistle (*Salsola tragus*), desert pincushion (*Chaenactis* sp.), Cryptantha (*Cryptantha pterocarya*), Coreopsis (*Leptosyne bigelovii*), Valley lessingia (*Lessingia glandulifera*), desert dandelion (*Malacothrix glabrata*), Phacelia (*Phacelia* sp.), wire lettuce (*Stephanomeria* sp.) Anderson's desert thorn (*Lycium andersonii*), spiny horsebrush (*Tetradimya spinosa*), and Joshua tree (*Yucca brevifolia*) (Leitner and Leitner 2017).

MGS have adapted to live in hot desert environments by limiting their activity aboveground through estivation and hibernation. The timing of emergence from hibernation varies by location: in the northern portion of their range male MGS emerge mid-March (Leitner and Leitner 1998); however, in the southern portion of their range, MGS may emerge as early as mid-January (Recht 1977). Throughout their active period, MGS store fat in preparation for estivation, which typically occurs between July and September, but may occur as early as April or May during drought conditions (Leitner et al. 1995). MGS reproduction is dependent on fall and winter rains and individuals may forgo breeding entirely if low rainfall (<80mm) results in reduced herbaceous plants (Leitner and Leitner 2017).

Throughout the range of MGS, they may co-occur with antelope ground squirrels, round-tailed ground squirrels, and California ground squirrels. MGS may be misidentified with round-tailed ground squirrels, but this is unlikely to occur with antelope ground squirrels, because the latter species has white dorsal stripes that makes them resemble a chipmunk more than an MGS. California ground squirrels are also notably larger and are not typically confused with MGS.

MGS are classified as threatened and are protected under the California Endangered Species Act. Primary threats to MGS include limited distribution, low abundance and habitat loss from by converting suitable habitat to urban, suburban, agricultural and military land uses (Gustafson 1993, Leitner and Leitner 2017).

Methods

MGS protocol surveys were conducted in accordance with the 2010 CDFW MGS Survey Guidelines and consisted of an initial visual survey, followed by live trapping and camera trapping efforts. Details for each survey type are described below.

Visual Survey

An initial review of the California Natural Diversity Database (CNDDDB) was conducted prior to the visual assessment to determine the historical recorded occurrences of MGS near the project site (**Figure 3**). The visual survey was conducted by Principal Investigator Karla Flores (MOU and Scientific Collection Permit SC-10572) and Independent Researcher Karl Fairchild (SCP S-182820007-18333-001) on April 15, 2022. The visual survey consisted of driving and walking throughout the project site to identify suitable habitat for MGS. This included identifying plants known to provide forage material for MGS such as spiny hopsage, winterfat, Cooper's boxthorn, Anderson's desert thorn, and Joshua tree (Leitner 2022). Areas supporting suitable habitat for MGS where these plants are concentrated were recorded on an aerial map. Suitable soil types for burrowing and burrow densities were also noted.

Live Trapping

Live trapping surveys were conducted by Karl Fairchild. Surveys consisted of setting up one 100-trap 10x10 survey grid (315x315 meters) within the project parcel. The grid primarily consisted of upland habitat, with an apparent dry lake in the northwest portion of the grid. Coordinate locations for the grid corners are listed in **Table 1**. Traps in each grid were spaced 35 meters apart and utilized XLK Sherman live-traps (3x3.75x12"), with accompanying A-frame cardboard shade covers staked to the ground with metal tent stakes. All traps were baited with 4-way livestock feed and peanut butter powder and were opened within one hour of sunrise and were checked no more than every four hours. All traps were closed within hour of sunset. Trapping was only conducted when temperatures were between 50 and 90 degrees Fahrenheit, and inclement conditions (rain, thunderstorms) were not present. All animals captured were released at their capture location, and the following information recorded for each capture: species, weight, age, sex, and reproductive condition. Live-trapping surveys were conducted for a period of five days in each of the three survey windows established by the MGS survey guidelines (1st: March 15-April 30; 2nd May 1-31; 3rd June 15-July 15). Details for each survey period are presented in **Table 2**. MGS Survey and Trapping Forms, including weather details, are presented in **Attachment A** and **Attachment B**.

TABLE 1
UTM COORDINATES FOR CORNERS OF LIVE TRAPPING GRID

Corner	Zone	Easting	Northing
SW	11	396010	3833975
NW	11	396010	3834290
SE	11	396325	3833975
NE	11	396325	3834290

*Datum: WGS 1984

TABLE 2
MOHAVE GROUND SQUIRREL SURVEY DATE AND TYPE

Session	Date	Survey Type	Surveyor
1	April 18-22, 2022	LT/CT	Karl Fairchild
2	May 27-31, 2022	LT/CT	Karl Fairchild
3	June 15-19, 2022	LT/CT	Karl Fairchild

LT: Live Trapping CT: Camera Trapping

Camera Trapping

Camera trapping surveys were used to supplement live-trapping efforts and consisted of setting up five camera trapping stations throughout the project site (**Figure 2**). Each camera trap station consisted of a Bushnell Core Low Glow Trail Camera (Model 1199932CB) secured to a 36-inch U-post facing a bait station. The bait station consisted of a feeding tube filled with 4-way livestock feed and staked to the ground with a 12-inch nail. Cameras operated 24 hours a day, concurrent with live-trapping surveys, and followed the set-up specifications described in Delaney et al. 2017. Coordinate locations for each camera trap station are listed below in **Table 3**.

Photos from the camera trap stations were downloaded and reviewed by the Principal Investigator after every five-day trapping session. A list of species detected at the camera trap stations is included in **Table 5**.

TABLE 3
COORDINATE LOCATIONS FOR CAMERA TRAP STATIONS

Camera	Zone	Easting	Northing
1	11	395665	3834233
2	11	395674	3833959
3	11	395954	3834114
4	11	396162	3834014
5	11	396214	3834124

*Datum: WGS 1984

Results

Visual Survey

Based on the habitat data collected during the visual survey, some MGS habitat is present onsite. Primary MGS food plants such as spiny hopsage and winterfat are present. Additionally, other plants recently identified as being associated with MGS habitat in microhistology and metabarcoding studies (Leitner 2022) are present onsite and include: creosote bush, Cooper's boxthorn, Joshua tree, and fiddleneck. Visual observations of burrows and burrow complexes showed that soil onsite is suitable for burrowing.

Live Trapping

No Mohave ground squirrels were captured during the three live-trapping survey periods. Live-trapping captures consisted entirely of non-target species and included white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), California ground squirrel (*Otospermophilus beecheyi*), Cactus wren (*Campylorhynchus brunneicapillus*), Great Basin whiptail (*Aspidoscelis tigris*) and yellow-backed spiny lizard (*Sceloporus uniformis*) (Table 4; Figure 4).

TABLE 4
RESULTS OF MOHAVE GROUND SQUIRREL PROTOCOL SURVEYS

Common name	Scientific name	Session			Total
		1	2	3	
White-tailed antelope ground squirrel	<i>Ammospermophilus leucurus</i>	37	22	50	109
California ground squirrel	<i>Otospermophilus beecheyi</i>	90	130	52	272
Cactus wren	<i>Campylorhynchus brunneicapillus</i>	0	0	1	1
Great Basin whiptail	<i>Aspidoscelis tigris</i>	4	3	1	8
Yellow-backed spiny lizard	<i>Sceloporus uniformis</i>	2	0	2	4
Total		133	155	106	394

Camera Trapping

No Mohave ground squirrels were detected in the images collected during the camera trapping surveys. Species recorded at camera stations included: black-tailed jackrabbit (*Lepus californicus*), California ground squirrel (*Otospermophilus beecheyi*), common raven (*Corvus corax*), deer mouse (*Peromyscus maniculatus*), desert cottontail (*Sylvilagus audubonii*), desert pocket mouse (*Chaetodipus penicillatus*), kangaroo rat (*Dipodomys* sp.), red racer (*Coluber flagellum*), southern grasshopper mouse (*Onychomys torridus*), western zebra-tailed lizard (*Callisaurus draconoides*) and white-tailed antelope ground squirrel (*Ammospermophilus leucurus*).

TABLE 5
RESULTS OF MOHAVE GROUND SQUIRREL CAMERA TRAPPING

Common Name	Scientific Name	Common Name	Scientific Name
Black-tailed jackrabbit	<i>Lepus californicus</i>	Common raven	<i>Corvus corax</i>
California ground squirrel	<i>Otospermophilus beecheyi</i>	Red racer	<i>Coluber flagellum</i>
Deer mouse	<i>Peromyscus maniculatus</i>	Western zebra-tailed lizard	<i>Callisaurus draconoides</i>
Desert cottontail	<i>Sylvilagus audubonii</i>		
Desert pocket mouse	<i>Chaetodipus penicillatus</i>		
Kangaroo rat	<i>Dipodomys</i> sp.		
Southern grasshopper mouse	<i>Onychomys torridus</i>		
White-tailed antelope ground squirrel	<i>Ammospermophilus leucurus</i>		

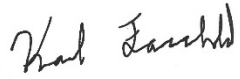
Conclusions

The Palmdale Logistics Park Project is located in the southwestern portion of the MGS range where MGS occurrences are uncommon, and population densities have historically been low. A California Natural Diversity Database (CNDDDB) query for the Lancaster West quadrangle and the surrounding eight quadrangles showed that no MGS have been recorded in the vicinity since 1984. The closest and most recent MGS occurrence on CNDDDB was recorded in 1984 at 2.0 miles northeast of the project site, in an area which appears to have been recently graded (based on recent aerial photos). The second-closest MGS occurrence was recorded in 1977 approximately 5.45 miles southeast from the project site (**Figure 3**). In addition, the project site is not located within an MGS core population area, peripheral population area or linkage area, the closest of which is the Edwards Air Force base core population area approximately 16 miles northeast of the project site.

Although some suitable habitat was detected during the visual survey, including the presence of preferred MGS food plants (spiny hopsage, winterfat) and soils suitable for burrowing, no MGS were captured during the live-trapping or camera trapping surveys. Furthermore, the distance from core population areas and significant barriers to dispersal between the project site and documented recent occurrences make it unlikely that colonization from core MGS populations will occur within the near future. Based on the results of this survey, CDFW survey guidelines indicate that the department will stipulate that no MGS occur on the project site. This stipulation will expire one year from the last day of trapping, June 19, 2022.

I hereby certify that the information in this report is true, and that it conforms to accepted biological standards. Please feel free to contact Karl Fairchild by phone at (541) 609-1038 or by email at kfairchild@dipodomys ecological.com, or Karla Flores by phone at (619) 972-4319 or by email at kflores@dipodomys ecological.com, with any questions regarding this report.

Sincerely,



Karl Fairchild
Independent Researcher



Karla L. Flores
Principal Investigator

Figures and Attachments

Figure 1-Project Location

Figure 2-Survey Area

Figure 3- Historical MGS Occurrences

Figure 4- Results

Attachment A-CDFW Mohave Ground Squirrel Survey and Trapping Form(s)

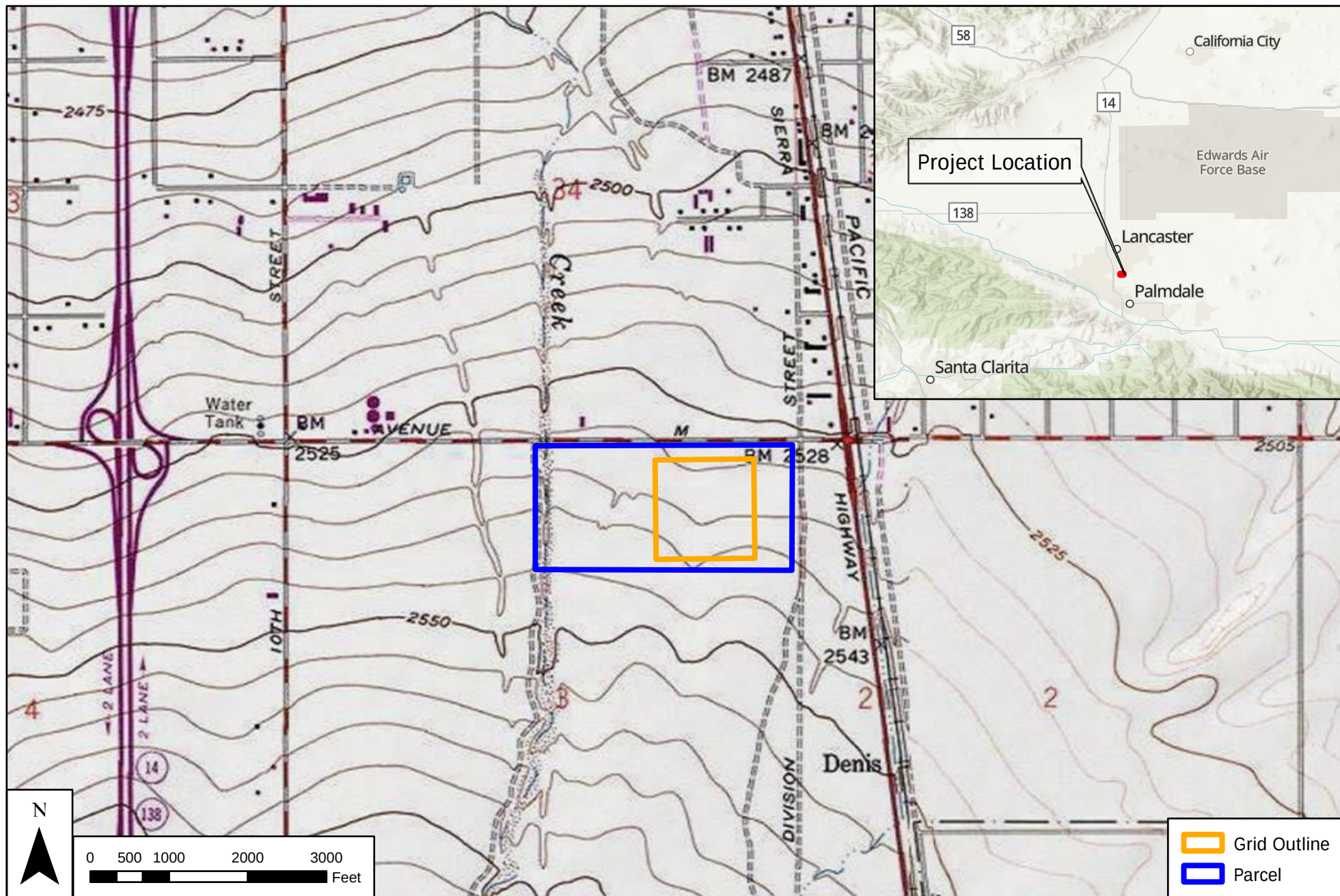
Attachment B-Weather Details

Attachment C-Species Compendium

Attachment D-Representative Photographs

References

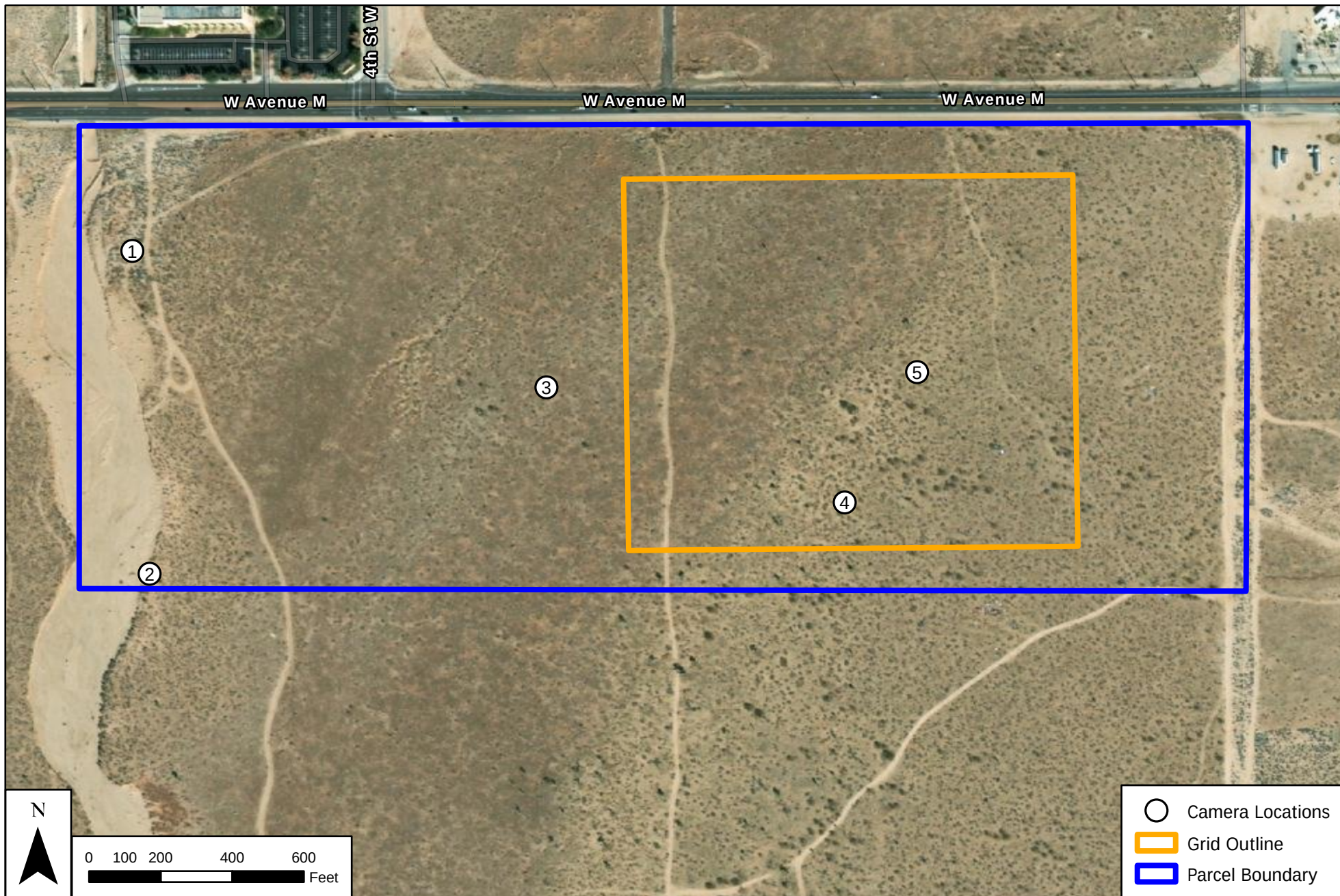
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- Leitner, B. 2022. Primary Food Items Consumed by Mohave Ground Squirrels based on visual observations of MGS and microhistology and metabarcoding of fecal pellets from 1988-2021.
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- Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: <http://websoilsurvey.sc.egov.usda.gov/>. Accessed [07/11/2022].



SOURCE: ESRI

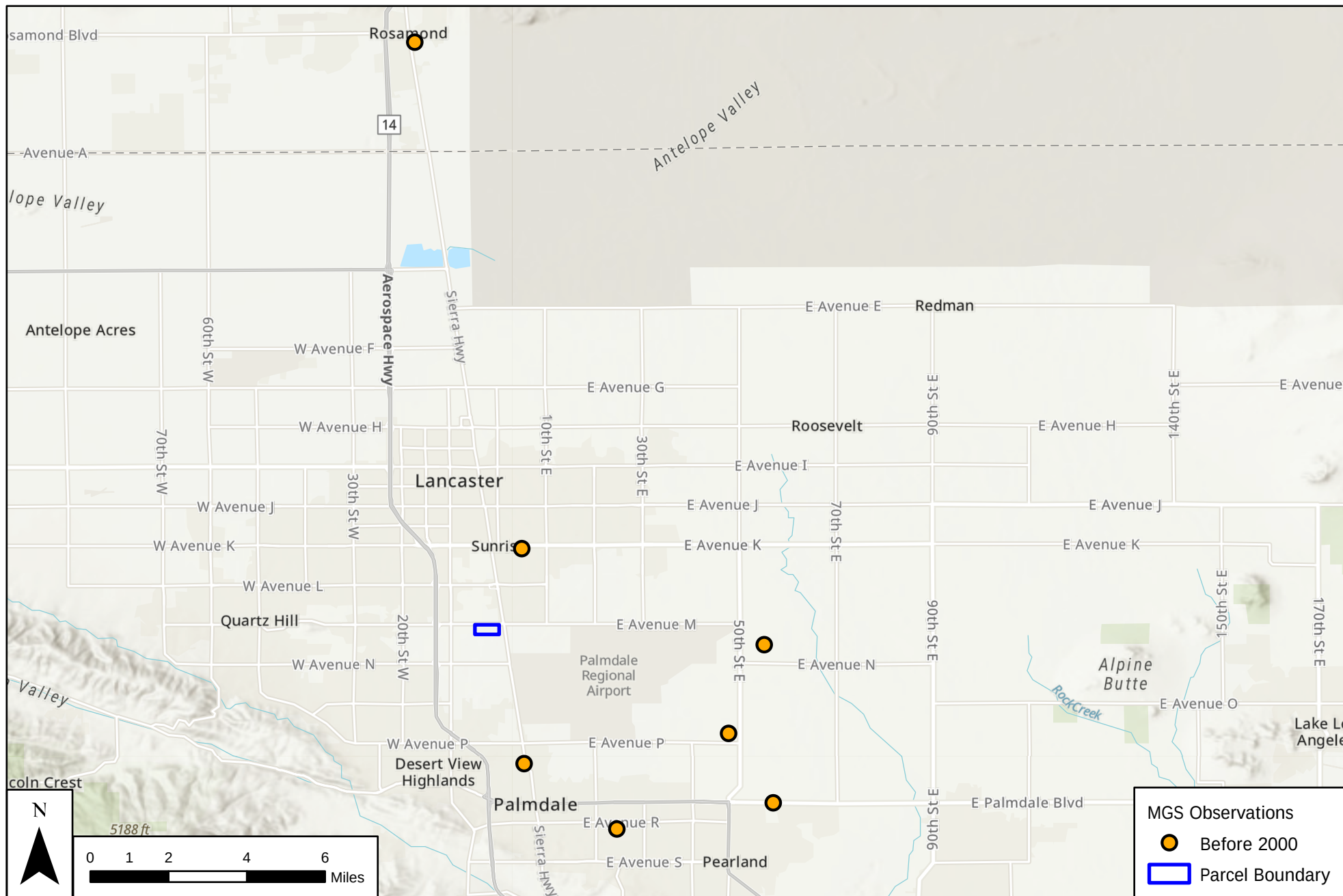
Palmdale Logistics Park Project

Figure 1
Project Location



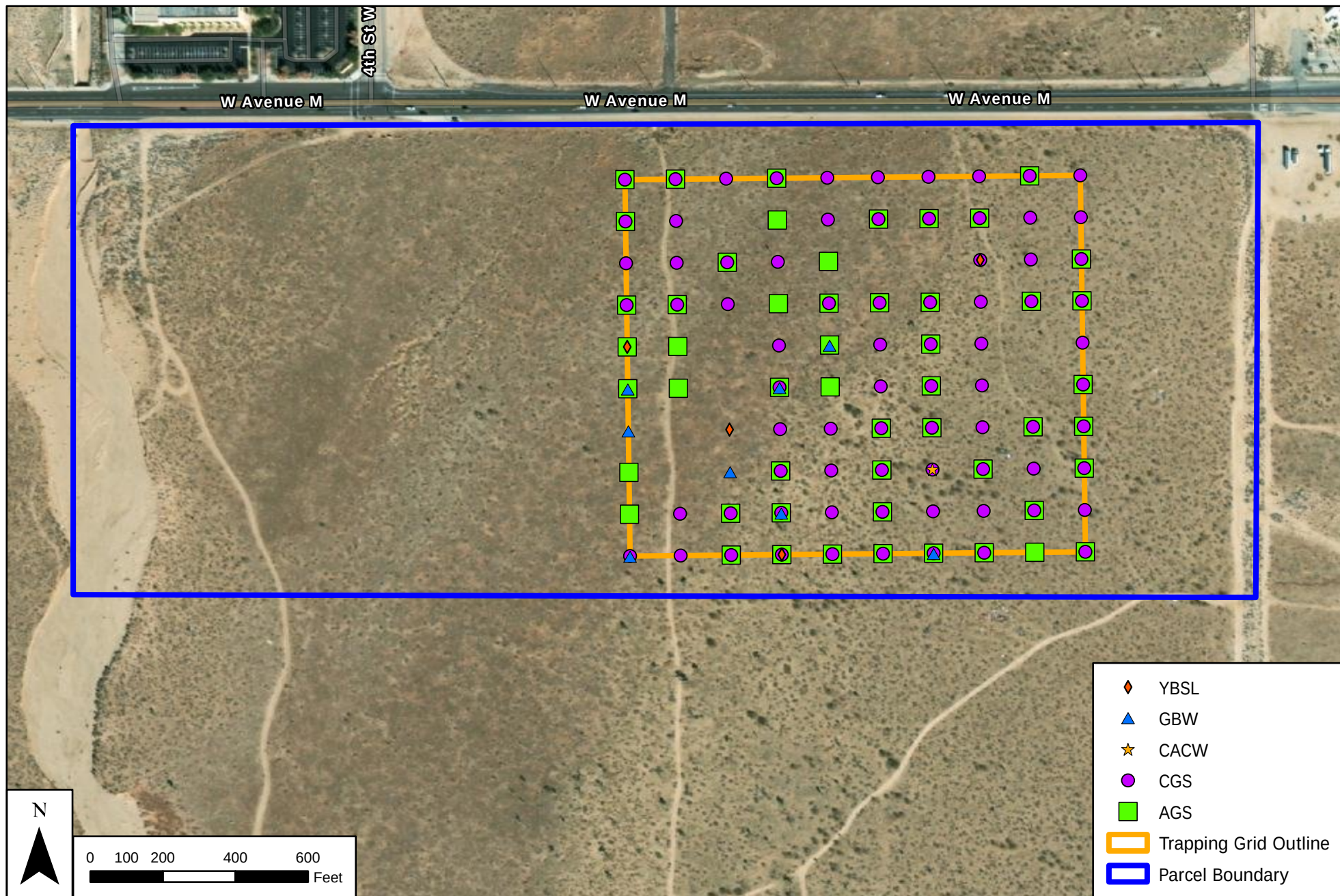
SOURCE: ESRI

Palmdale Logistics Park Project



SOURCE: ESRI

Palmdale Logistics Park Project



SOURCE: ESRI

Palmdale Logistics Park Project

Figure 4

Trapping Results

Attachment A

Mohave Ground Squirrel (MGS) Survey and Trapping Form (photocopy as needed)

PART I - PROJECT INFORMATION (use a separate form for each sampling grid)

Project name: Palmdale Logistics Park Property owner: Covington Group

Location: Township 6 North; Range 12 West; Section 3; $\frac{1}{4}$ Section _____

SW:396010 3833975 NW:396010 3834290

Quad map/series: Lancaster West UTM coordinates: SE: 396325 3833975 NW: 396010 3834290
GPS coordinates of trapping-grid corners

Acreage of Project Site: 80 Acreage of potential MGS habitat on site: 80

Total acreage visually surveyed on project site: 80 Date(s): 4/15/2022
visual surveys

Visual surveys conducted by: Karl Fairchild and Karla Flores
names of all persons by date (use back of form, if needed)

Total acres trapped: 80 Number of sampling grids: 1

Trapping conducted by: Karl Fairchild and Karla Flores
names of all persons by sampling term and sampling grid (use back of form, if needed)

Dates of sampling term(s): FIRST April 18-22, 2022 SECOND May 27-31, 2022 THIRD June 15-19, 2022
if required if required

PART II - GENERAL HABITAT DESCRIPTION (use back of form, if needed)

Vegetation: dominant perennials: *Yucca brevifolia*, *Ericameria nauseosa*, *Ambrosia salsola*, *Ephedra nevadensis*, *Lycium cooperi*
other perennials: *Krascheninnikovia lanata*, *Grayia spinosa*, *Lycium andersonii*, *Atriplex canescens*, *Larrea tridentata*, *Scutellaria mexicana*
dominant annuals: *Amsinckia tessellata*, *Erodium cicutarium*

other annuals: _____

Land forms (mesa, bajada, wash): desert plain

Soils description: Rosamond Loam/Cajon Loamy Sand

Elevation: 745 meters Slope: 0-2%

PART III - WEATHER (report measurements in the following categories for each day of visual survey and each day of trapping; using 24-hour clock, indicate time of day that each measurement was made; use a separate blank sheet for each day)

Temperature: AIR minimum and maximum; SOIL minimum and maximum; Cloud Cover: % in AM and % in PM; Wind Speed: in AM and in PM

Attachment B

Attachment B: Weather details for California Department of Fish and Wildlife (CDFW) Mohave ground squirrel (*Xerospermophilus mohavensis*) protocol surveys. Details include date, survey (1-3), air temperature (min-max ° Fahrenheit), soil temperature (min-max ° Fahrenheit), wind speed (mph) and percent cloud cover (%).

Date		Air Temperature (°F)		Soil temperature (°F)		Wind (mph)		Cloud Cover (%)	
		Min	Max	Min	Max	Start	End	Start	End
4/18/2022	1	59.7	87.8	55	85.7	5.7	13.7	10	40
4/19/2022	1	61.7	81.1	61.2	76.8	11.8	18.7	15	15
4/20/2022	1	54.6	81.5	60.6	75.9	8.8	7.6	5	2
4/21/2022	1	56.2	74.7	56.4	72.6	18.7	19	1	20
4/22/2022	1	51.2	65	55.2	66.5	16.7	18	20	5
5/27/2022	2	71.7	90	72.5	80	1.9	12.5	5	25
5/28/2022	2	67.3	84.2	70	96.5	8.7	19.8	30	10
5/29/2022	2	61.2	73.6	67.9	92.5	17.8	21.7	10	10
5/30/2022	2	65.1	80.4	66.1	92.5	15.9	20.5	2	0
5/31/2022	2	67	89.6	68.2	77.5	7.4	2.5	0	0
6/15/2022	3	62.4	87.2	73.3	80.2	1.8	2.5	0	0
6/16/2022	3	70	90	80.4	80.2	1.3	1.2	0	0
6/17/2022	3	63.9	80.8	77.8	103	3.2	15.1	5	25
6/18/2022	3	56.5	83	71.6	85.8	8.2	14.8	0	2
6/19/2022	3	58.7	83.3	69.2	74.6	7.1	4.9	0	0

Attachment C

Common name	Scientific name	SSC*
Plants		
big sagebrush	<i>Artemisia tridentata</i>	
Cooper's boxthorn	<i>Lycium cooperi</i>	
Creosote bush	<i>Larrea tridentata</i>	
fiddleneck	<i>Amsinckia tessellata</i>	
four-wing salt bush	<i>Atriplex canescens</i>	
Joshua tree	<i>Yucca brevifolia</i>	
Mexican bladdergrass	<i>Scutellaria mexicana</i>	
Nevada joint-fir	<i>Ephedra nevadensis</i>	
rubber rabbitbrush	<i>Ericameria nauseosa</i>	
Spiny hopsage	<i>Grayia spinosa</i>	
winterfat	<i>Kraschenninikovia lanata</i>	
Birds		
ash-throated flycatcher	<i>Myiarchus cinerascens</i>	
Bell's sparrow	<i>Artemisiospiza belli</i>	
cactus wren	<i>Campylorhynchus brunneicapillus</i>	
cliff swallow	<i>Petrochelidon pyrrhonot</i>	
common raven	<i>Corvus corax</i>	
horned lark	<i>Eremophila alpestris</i>	
house finch	<i>Haemorhous mexicanus</i>	
killdeer	<i>Charadrius vociferus</i>	
loggerhead shrike	<i>Lanius ludovicianus</i>	Y
mourning dove	<i>Zenaida macroura</i>	
northern mockingbird	<i>Mimus polyglottos</i>	
red-tailed hawk	<i>Buteo jamaicensis</i>	
rock pigeon	<i>Columba livia</i>	
Vaux's swift	<i>Chaetura vauxi</i>	
verdin	<i>Auriparus flaviceps</i>	
white-crowned sparrow	<i>Zonotrichia leucophrys</i>	
Mammals		
black-tailed jackrabbit	<i>Lepus californicus</i>	
California ground squirrel	<i>Otospermophilus beecheyi</i>	
desert cottontail	<i>Sylvilagus audubonii</i>	
white-tailed antelope ground squirrel	<i>Ammospermophilus leucurus</i>	
Reptiles		
Great Basin whiptail	<i>Aspidoscelis tigris</i>	
red racer	<i>Coluber flagellum</i>	
yellow-backed spiny lizard	<i>Sceloporus uniformis</i>	

*SSC-Species of Special Concern

Attachment D



Photograph 1: Representative vegetation community at west end of project site, facing southwest.



Photograph 2: Representative vegetation community in central portion of parcel, facing northeast.



Photograph 3: Representative vegetation community in western portion of parcel, facing south.



Photograph 4: Representative trap station. Each station consists of one XLK Sherman trap with a cardboard A-frame to provide artificial shade.



Photograph 5: Representative camera trap station at west end of parcel. Camera stations consist of Bushnell camera secured to 36-inch u-post facing bait tube.



Photograph 6(a-b): Representative species captured (a) white tailed antelope ground squirrel (*Ammospermophilus leucurus*) and (b) juvenile California ground squirrel (*Otospermophilus beecheyi*).



Photograph 7(a-b): Representative species captured (a) cactus wren (*Campylorhynchus brunneicapillus*) and (b) yellow-backed spiny lizard (*Sceloporus uniformis*).