

Appendix E
Botanical Resources Survey Report

Final

**Botanical Resources Survey Report
Red Rock Canyon Trail and Intersections Improvements Project
NV FLAP 500(1)
Clark County, Nevada**

**Federal Highway Administration
Central Federal Lands Highway Division
12300 West Dakota Avenue
Lakewood, Colorado 80228**



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Summary

The Central Federal Lands Highway Division of the Federal Highway Administration, in cooperation with the U.S. Bureau of Land Management (BLM), is proposing to implement the Red Rock Canyon Trail and Intersections Improvements Project (Project) (DOI-BLM-NV-S020-2020-00-EA) in Clark County, Nevada. The proposed Project consists of a new shared-use trail that would connect the Red Rock Canyon National Conservation Area (RRCNCA) entrance station with the Summerlin residential development via a route approximately 5.5 miles long. An alternative alignment approximately 0.4 mile long is also being investigated. Several safety and access improvements are also proposed along State Route 159 (SR 159), including relocating the Red Rock Canyon sign, adding a small parking lot with a deceleration lane, and improving two parking lots along Calico Basin Road.

This report summarizes the results of botanical resource surveys conducted May 5 through 9, 2020. A total of 111 species were observed within the 417.14-acre botanical resources survey area, including the BLM-sensitive yellow twotone beardtongue (*Penstemon bicolor* ssp. *bicolor*). A total of 123 individuals of this species was observed at 21 locations. No other BLM-sensitive species were observed. The state-listed noxious weed Sahara mustard (*Brassica tournefortii*) was also observed within the survey area. Approximately 6,978 cactus and yucca plants were inventoried within the proposed disturbance area.

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Acronyms and Abbreviations

Acronym	Definition
BLM	U.S. Bureau of Land Management
NRS	Nevada Revised Statutes
Project	Red Rock Canyon Trail and Intersections Improvements Project
RRCNCA	Red Rock Canyon National Conservation Area
SR	State Route

1. Introduction

The Central Federal Lands Highway Division of the Federal Highway Administration, in cooperation with the U.S. Bureau of Land Management (BLM), the Nevada Department of Transportation, and Clark County, Nevada, is proposing to implement the Red Rock Canyon Trail and Intersections Improvements Project (Project) (DOI-BLM-NV-SO20-2020-00-EA) in Clark County, Nevada. Located near Las Vegas, the Project will include improvements to Red Rock Canyon National Conservation Area (RRCNCA) and State Route 159 (SR 159) (Appendix A, Figure 1). The proposed Project consists of a new shared-use trail that would connect the RRCNCA entrance station with the Summerlin residential development via a route approximately 5.5 miles long. An alternative alignment approximately 0.4 mile long is also being investigated. Several safety and access improvements are also proposed along SR 159, including relocating the Red Rock Canyon sign and adding a small parking area with a deceleration lane. The sign relocation would reduce the frequency of motorists pulling off the road shoulder to take photographs at the current sign location, and the parking area would provide short-term parking for these motorists. Two other parking area improvements included in the Project along Calico Basin Road would provide access to the new trail. These improvements would improve the safety of SR 159 for motorized and non-motorized users, provide improved access to the RRCNCA, create a new high-quality recreation experience, and help conserve RRCNCA's rare and diverse natural resources.

This report summarizes the results of surveys for BLM-sensitive plant species, state-listed noxious weeds, and a cactus/yucca inventory within the proposed project area conducted May 5 through 9, 2020.

2. Survey Methodology

The survey area for botanical resources had two tiers (Appendix A, Figure 1). The survey area for state-listed noxious weeds and the cactus/yucca inventory focused on all areas of potential permanent and temporary disturbance associated with trail and parking area construction. Because Project design is still under development, this area included a 200-foot-wide buffer centered on both trail alternative alignment centerlines and around proposed parking areas, encompassing approximately 189.74 acres. The survey area for BLM-sensitive plant species consisted of a 200-meter buffer extending from each side of both trail alternative alignment centerlines and around each proposed parking lot, encompassing approximately 417.14 acres. This larger survey area was required to determine any indirect effects to BLM-sensitive species resulting from the proposed Project. Surveys for BLM-sensitive species were conducted using the intuitive-controlled method, which entails a complete survey of habitats with the highest potential for supporting rare plant populations and a less intense survey of all other habitats (Whiteaker et al. 1998).

Locations of any BLM-sensitive plants, state-listed noxious weeds, and cactus and yucca species encountered were recorded using a sub-meter accurate global positioning service (GPS) device. All species observed were identified using *The Jepson Desert Manual* (Baldwin et al. 2002).

2.1 BLM-Sensitive Plant Species

Three BLM-sensitive plant species have the potential to occur in the vicinity of the proposed Project: Blue Diamond cholla (*Cylindropuntia multigeniculata*), yellow twotone beardtongue (*Penstemon bicolor* ssp. *bicolor*), and rosy twotone beardtongue (*Penstemon bicolor* ssp. *roseus*) (Kobelt, pers. comm. 2019).

The Blue Diamond cholla is endemic to southwestern Nevada and northwestern Arizona and is known from approximately 10 populations (NatureServe 2020). It inhabits dry, open carbonate ledges, crevices, and rocky colluvium on gentle to steep slopes of all aspects, but predominantly on northerly exposures, canyon walls, or other cooler or more protected exposures (BLM 2017). These areas are in close proximity to overlying gypsum beds upslope and are associated with numerous other succulent and shrub species of the creosote bush and blackbrush vegetation zones.

The yellow twotone beardtongue is endemic to Clark County, Nevada, and is known from approximately 31 occurrences scattered on mostly BLM and private lands immediately adjacent to the Las Vegas urban area (NNHP 2001). It inhabits calcareous or carbonate soils in washes, roadsides, rock crevices, outcrops, or similar places receiving enhanced runoff at elevations between 2,500 and 5,480 feet. Associated vegetation communities include creosote-bursage, blackbrush, mixed-shrub, and lower juniper zones. The flowering period is March through May.

The rosy twotone beardtongue is found in similar habitats as the yellow twotone beardtongue but differs by having a pink to magenta corolla. The flowering period is March through May.

2.2 Noxious Weeds

The Nevada Revised Statutes (NRS) defines a noxious weed as "any species of plant which is, or likely to be, detrimental or destructive and difficult to control or eradicate" (NRS 555.130). Forty-seven species are currently listed as noxious weeds within Nevada (Nevada Administrative Code 555.010).

2.3 Cactus and Yucca

Cactus and yucca plants are regulated by the Nevada Department of Forestry. "Cactus" includes any member of the Cactaceae family, and "yucca" includes any member of the genus *Yucca* (NRS 527.060).

3. Results

Surveys were conducted by Jacobs Engineering Group Inc. biologists Rachel Newton, Morgan King, and Natalie Dowdy from May 5 through 9, 2020. A total of 111 species were observed within the larger 417.14-acre botanical resource survey area (Table C-1, Appendix C). A total of 123 individuals of yellow twotone beardtongue were observed in 21 locations (Appendix A, Figure 2). Most of these were within Red Rock Wash and not within the proposed disturbance area. Representative photographs of this species are presented in Appendix B. No individuals of the other BLM sensitive plant species with the potential to occur in the survey area—Blue Diamond cholla and rosy twotone beardtongue—were observed. The state-listed noxious weed Sahara mustard (*Brassica tournefortii*) was also observed, primarily along SR 159 and in high-use areas of existing social trails (Appendix A, Figure 3). Approximately 6,978 cactus and yucca plants were inventoried within the proposed disturbance area (Appendix A, Figure 4). Complete results by species are presented in Table C-2, Appendix C.

4. References

Baldwin, B.G., S. Boyd, B.J. Ertter, R.W. Patterson, T.J. Rosatti, and D.H. Wilken. 2002. *The Jepson Desert Manual: Vascular Plants of Southeastern California*. University of California Press, Berkeley, California.

Bureau of Land Management (BLM). 2017. "Updated Bureau of Land Management Sensitive Species List for Nevada." <https://www.blm.gov/policy/nv-im-2018-003>

Kobelt, Lara, District Botanist, Bureau of Land Management (BLM) Southern Nevada District Office. 2019. Personal communication (email) with Rachel Newton, Jacobs. September 16.

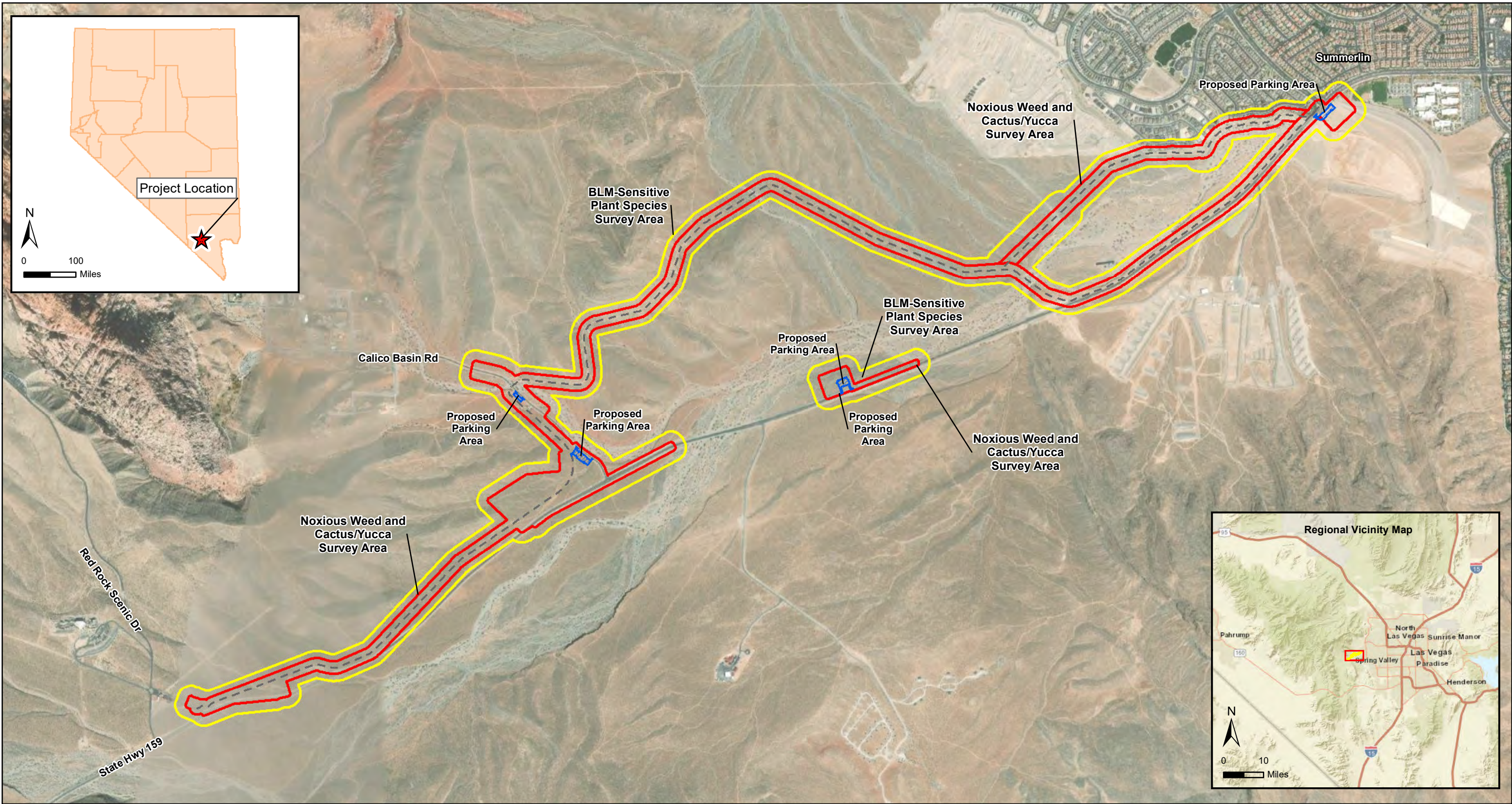
NatureServe. 2020. *NatureServe Explorer* [web application]. NatureServe, Arlington, Virginia. August 16. <https://explorer.natureserve.org/>

Nevada Natural Heritage Program (NNHP). 2001. Rare Plant Fact Sheet for *Penstemon bicolor* (Brandege) Clokey & Keck ssp. *bicolor*, yellow twotone beardtongue. <http://heritage.nv.gov/sites/default/files/atlas/penstbicolbicol.pdf>

Whiteaker, L., J. Henderson, R. Holmes, L. Hoover, R. Leshner, J. Lippert, E. Olson, L. Potash, J. Seevers, M. Stein, and N. Wogen. 1998. *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants*, v. 2.0. December. <https://www.blm.gov/or/plans/surveyandmanage/files/sp-sp-va-vascularplants-v2-1998-12.pdf>

Appendix A

Figures



Basemap Source: NAIP Imagery

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- Legend**
- BLM-Sensitive Plant Species Survey Area (417.14 acres)
 - Noxious Weed and Cactus/Yucca Survey Area (189.74 acres)
 - Proposed Parking Area
 - Proposed Trail Centerline

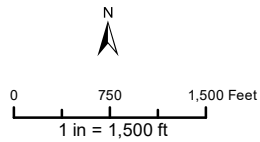
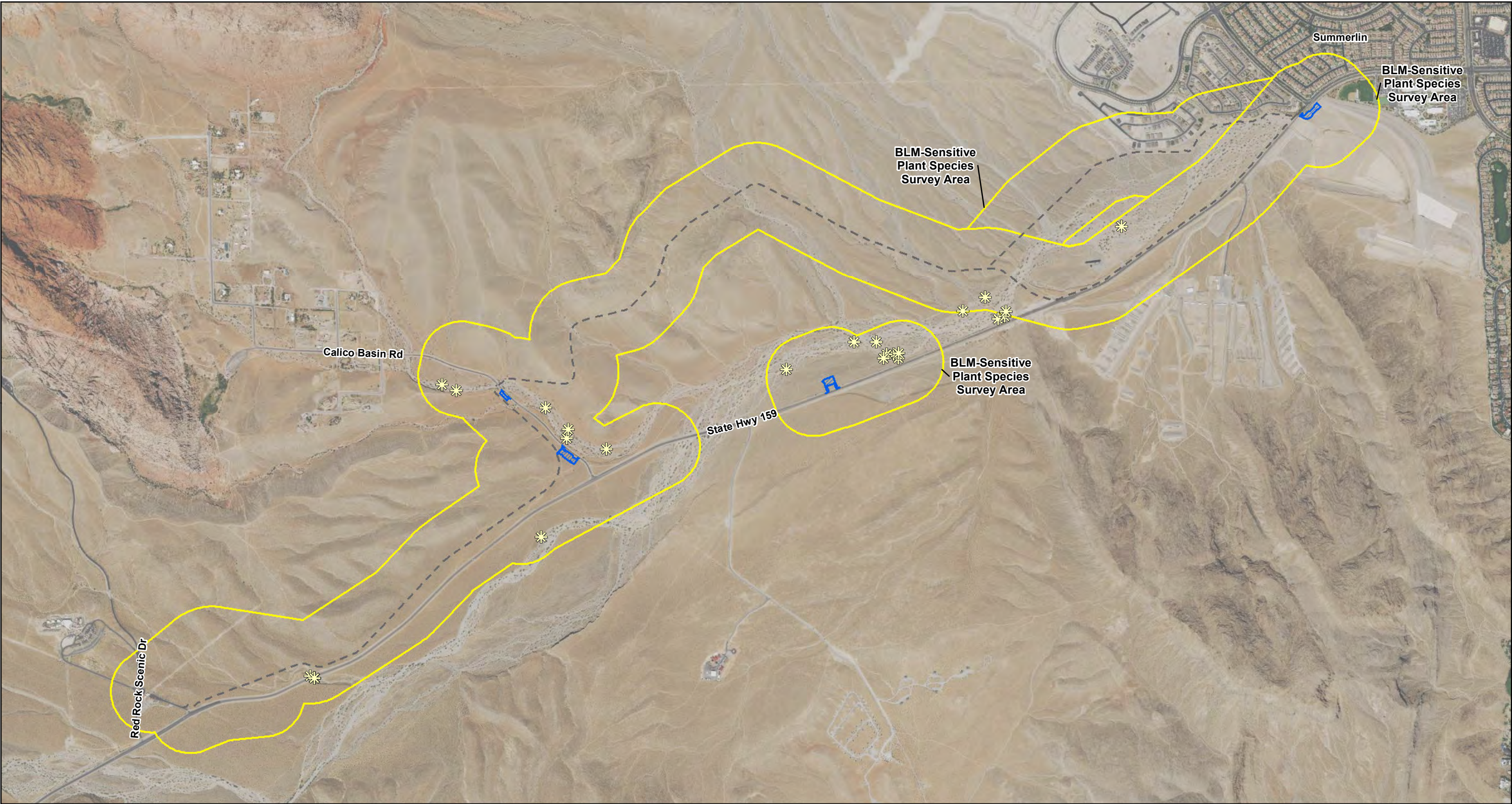






Figure 1
Project Location Map
 Botanical Resources Survey
 Red Rock Canyon Trail and Intersections Improvements Project
 Central Federal Lands Highway Division
 NV FLAP 500(1)
 Clark County, NV



Basemap Source: NAIP Imagery

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Legend

-  BLM-Sensitive Plant Species Survey Area (417.14 acres)
-  Proposed Parking Area
-  Proposed Trail Centerline
-  Yellow twotone beardtongue

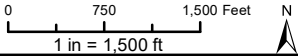
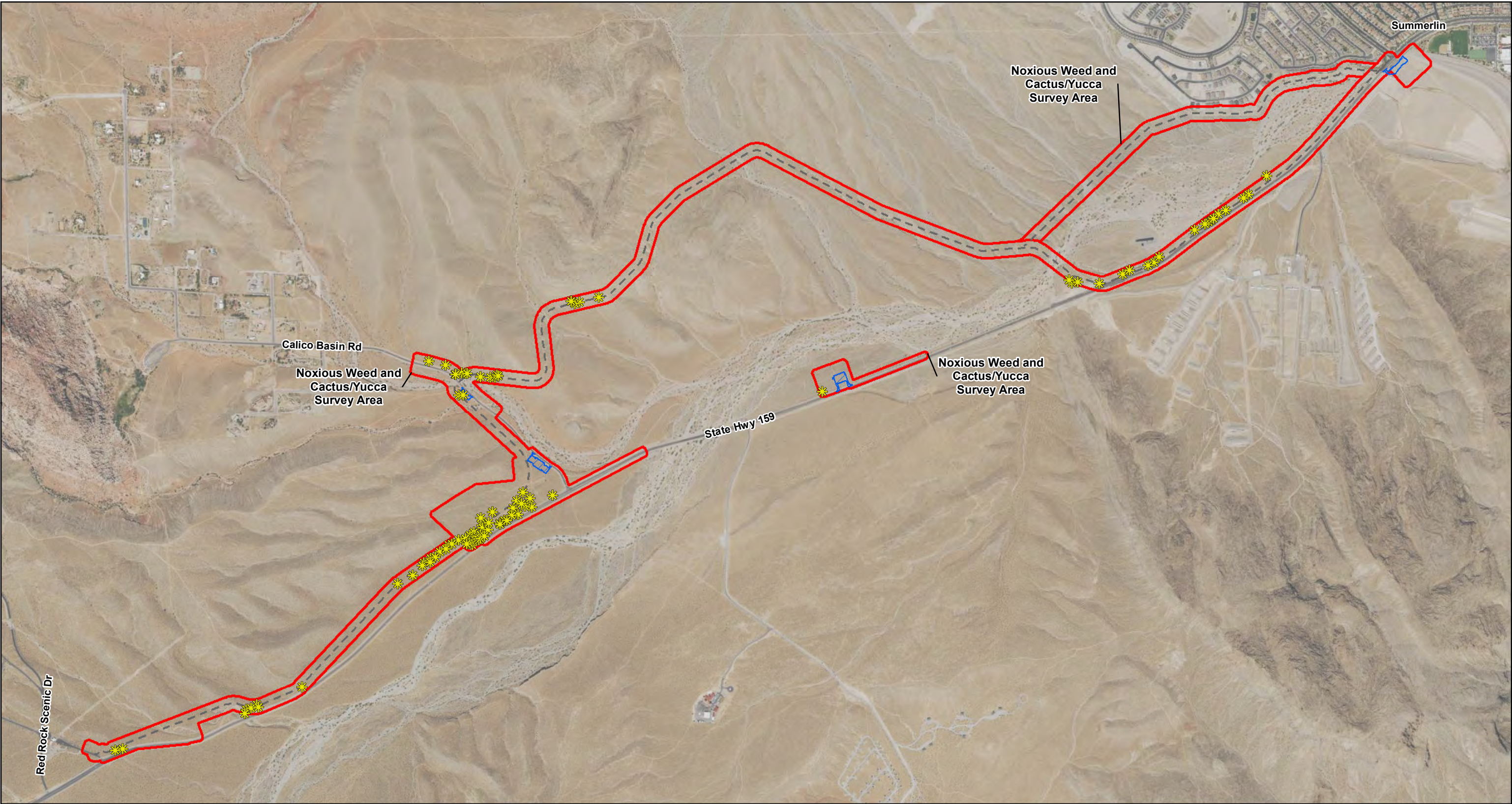


Figure 2
BLM-Sensitive Plant Species Survey Results
Red Rock Canyon Trail and Intersections Improvements Project
Central Federal Lands Highway Division
NV FLAP 500(1)
Clark County, NV



Basemap Source: NAIP Imagery

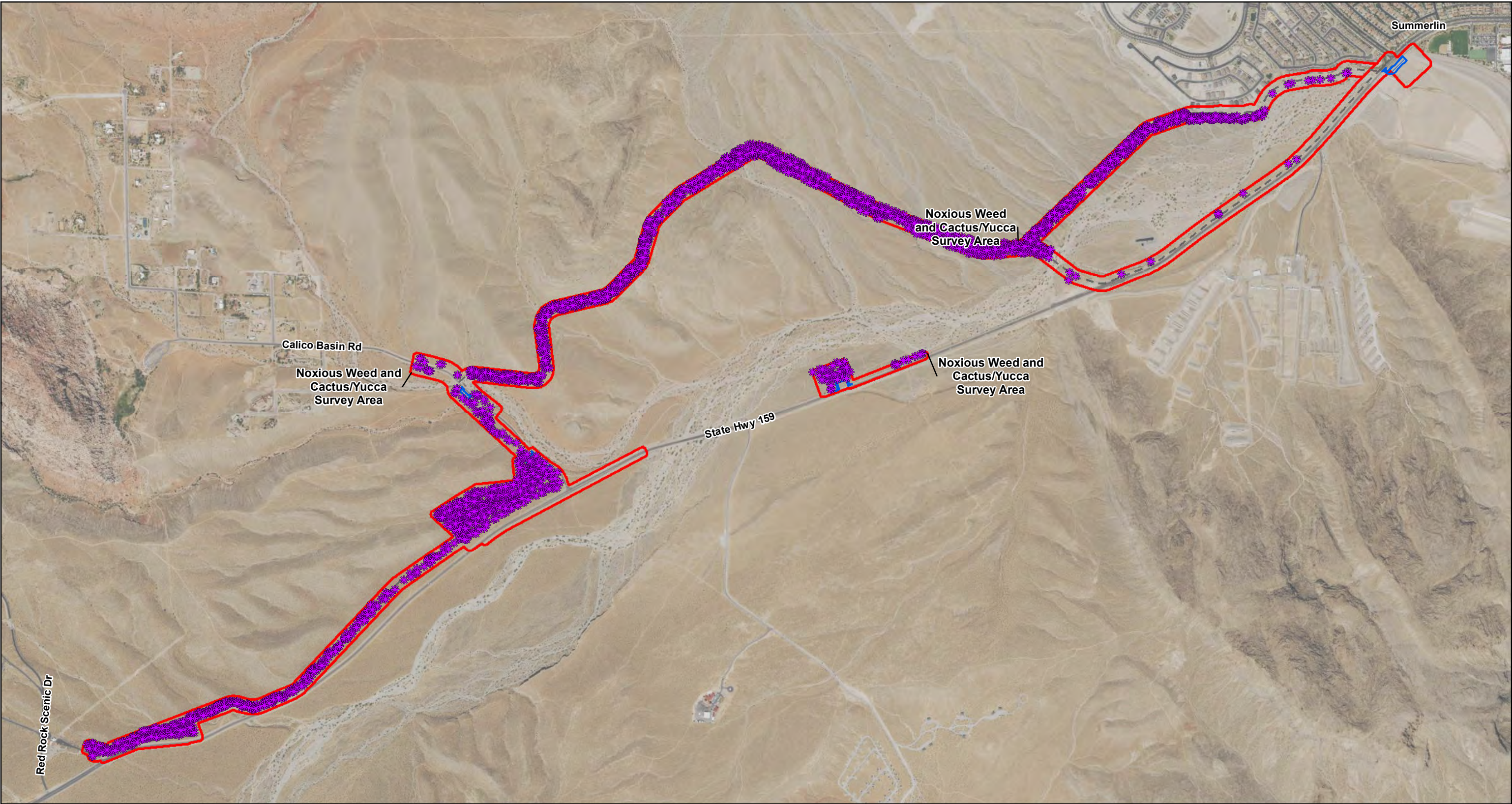
\\dc1vs01\GISProj\C\CentralFederalLands\RedRockCanyonPath\Maps\Report\2022\RRRC_NoxiousWeeds.mxd

- Legend**
- Noxious Weed and Cactus/Yucca Survey Area (189.74 acres)
 - Proposed Parking Area
 - Proposed Trail Centerline
 - ✱ Sahara mustard

0 650 1,300 Feet
1 in = 1,300 ft



Figure 3
Noxious Weed Survey Results
Red Rock Canyon Trail and Intersections Improvements Project
Central Federal Lands Highway Division
NV FLAP 500(1)
Clark County, NV



Basemap Source: NAIP Imagery

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Legend

- Noxious Weed and Cactus/Yucca Survey Area (189.74 acres)
- Proposed Parking Area
- Proposed Trail Centerline
- ✱ Cactus/Yucca Plant

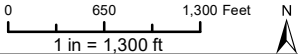


Figure 4
Cactus and Yucca Inventory Results
Red Rock Canyon Trail and Intersections Improvements Project
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Appendix B

Photographs



Photo 1. Flowering yellow twotone beardtongue in Red Rock Wash.



Photo 2. Flowering and basal rosettes of yellow twotone beardtongue adjacent to Red Rock Wash.

Appendix C

Botanical Resources Survey Results

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Table C-1. Plant Species Observed During Red Rock Canyon Botanical Resources Survey, May 2020

Family	Scientific Name	Common Name
Agavaceae	<i>Yucca brevifolia</i>	Joshua tree
Agavaceae	<i>Yucca schidigera</i>	Mojave yucca
Asteraceae	<i>Acamptopappus schockleyi</i>	Schockley's goldenhead
Asteraceae	<i>Adenophyllum cooperi</i>	Cooper's glandweed
Asteraceae	<i>Ambrosia acanthicarpa</i>	annual bursage
Asteraceae	<i>Ambrosia dumosa</i>	white bursage
Asteraceae	<i>Ambrosia eriocentra</i>	woolly bursage
Asteraceae	<i>Ambrosia salsola</i>	desert cheesebush
Asteraceae	<i>Baileya multiradiata</i>	desert marigold
Asteraceae	<i>Brickellia oblongifolia</i> var. <i>linifolia</i>	pinion brickellia
Asteraceae	<i>Chaenactis macrantha</i>	Mojave pincushion
Asteraceae	<i>Chaenactis stevioides</i>	desert pincushion
Asteraceae	<i>Cirsium neomexicanum</i>	desert thistle
Asteraceae	<i>Encelia virginensis</i>	Virgin River brittlebush
Asteraceae	<i>Baccharis sarothroides</i>	broom baccharis
Asteraceae	<i>Eriophyllum wallacei</i>	Wallace's woolly daisy
Asteraceae	<i>Gutierrezia microcephala</i>	sticky snakeweed
Asteraceae	<i>Malacothrix glabrata</i>	desert dandelion
Asteraceae	<i>Porophyllum gracile</i>	slender poreleaf
Asteraceae	<i>Psilostrophe cooperi</i>	paper daisy
Asteraceae	<i>Senecio flaccidus</i> var. <i>monoensis</i>	California butterweed
Asteraceae	<i>Stephanomeria pauciflora</i>	wire lettuce
Asteraceae	<i>Thymophylla pentachaeta</i>	thymophylla
Asteraceae	<i>Xylorhiza tortifolia</i>	Mojave aster
Bignoniaceae	<i>Chilopsis linearis</i>	desert willow
Boraginaceae	<i>Pectocarya</i> sp.	pectocarya
Boraginaceae	<i>Phacelia fremontii</i>	Fremont's phacelia
Brassicaceae	<i>Brassica tournefortii</i>	Sahara mustard
Brassicaceae	<i>Lepidium fremontii</i>	bush peppergrass
Brassicaceae	<i>Lepidium strictum</i>	prostrate peppergrass
Brassicaceae	<i>Sisymbrium altissimum</i>	tumble mustard
Brassicaceae	<i>Sisymbrium irio</i>	London rocket
Brassicaceae	<i>Strigosella africana</i>	Turkish mustard
Cactaceae	<i>Cylindropuntia echinocarpa</i>	silver cholla
Cactaceae	<i>Cylindropuntia ramosissima</i>	pencil cholla
Cactaceae	<i>Echinocactus polycephalus</i>	cottontop cactus
Cactaceae	<i>Echinocereus engelmannii</i>	strawberry hedgehog cactus
Cactaceae	<i>Escobaria chlorantha</i>	desert pincushion

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Family	Scientific Name	Common Name
Cactaceae	<i>Ferocactus cylindraceus</i>	barrel cactus
Cactaceae	<i>Grusonia parishi</i>	dead cholla
Cactaceae	<i>Opuntia basillaris</i>	beavertail cactus
Cactaceae	<i>Opuntia polyacantha</i>	pricklypear cactus
Chenopodiaceae	<i>Atriplex canescens</i>	four-wing saltbush
Chenopodiaceae	<i>Grayia spinosa</i>	spiny hopsage
Chenopodiaceae	<i>Krascheninnikovia lanata</i>	winterfat
Chenopodiaceae	<i>Salsola tragus</i>	Russian thistle
Ephedraceae	<i>Ephedra nevadensis</i>	Nevada ephedra
Ephedraceae	<i>Ephedra viridis</i>	green ephedra
Fabaceae	<i>Lupinus shockleyi</i>	desert lupine
Fabaceae	<i>Prosopis glandulosa</i>	honey mesquite
Fabaceae	<i>Psoralea argophylla</i>	indigo bush
Fabaceae	<i>Psoralea polydenia</i>	Nevada indigo bush
Fabaceae	<i>Senegalia greggii</i>	catclaw acacia
Geraniaceae	<i>Erodium cicutarium</i>	redstem filaree
Krameriaceae	<i>Krameria erecta</i>	little-leaved rhatany
Lamiaceae	<i>Salvia dorrii</i> var. <i>pilosa</i>	desert sage
Lamiaceae	<i>Scutellaria mexicana</i>	bladder sage
Loasaceae	<i>Mentzelia albicaulis</i>	white-stemmed stick-leaf
Loasaceae	<i>Petalonyx nitidus</i>	smooth sandpaper plant
Malvaceae	<i>Sphaeralcea ambigua</i>	desert mallow
Nyctaginaceae	<i>Allionia incarnata</i>	windmills
Nyctaginaceae	<i>Mirabilis laevis</i> var. <i>villosa</i>	wishbone bush
Nyctaginaceae	<i>Mirabilis multiflora</i>	giant four o'clock
Oleaceae	<i>Menodora spinescens</i>	spiny menodora
Onagraceae	<i>Camissonia campestris</i>	Mojave suncup
Onagraceae	<i>Chylismia claviformis</i>	brown eyes
Onagraceae	<i>Oenothera deltoides</i>	basket evening-primrose
Onagraceae	<i>Oenothera suffrutescens</i>	linda tarde
Orobanchaceae	<i>Castilleja chromosa</i>	desert paintbrush
Papaveraceae	<i>Argemone corymbosa</i>	Mojave prickly poppy
Phrymaceae	<i>Diplacus bigelovii</i>	Bigelow's monkeyflower
Plantaginaceae	<i>Penstemon ambiguus</i>	gilia beardtongue
Plantaginaceae	<i>Penstemon bicolor</i> ssp. <i>bicolor</i>	yellow twotone penstemon
Plantaginaceae	<i>Penstemon eatonii</i> var. <i>eatonii</i>	firecracker penstemon
Plantaginaceae	<i>Penstemon palmeri</i>	Palmer's penstemon
Plantaginaceae	<i>Plantago ovata</i>	desert Indianwheat

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Family	Scientific Name	Common Name
Poaceae	<i>Achnatherum hymenoides</i>	sand rice grass
Poaceae	<i>Aristida purpurea</i>	purple three-awn
Poaceae	<i>Bromus rubens</i>	red brome
Poaceae	<i>Bromus tectorum</i>	cheatgrass
Poaceae	<i>Dasyochloa pulchella</i>	desert fluff grass
Poaceae	<i>Hilaria rigida</i>	big galleta
Poaceae	<i>Hordeum murinum</i>	wall barley
Poaceae	<i>Muhlenbergia porteri</i>	Porter's muhly
Poaceae	<i>Polypogon monspeliensis</i>	rabbitfoot grass
Poaceae	<i>Schismus barbatus</i>	bearded Mediterranean grass
Poaceae	<i>Sporobolus airoides</i>	alkali sacaton
Poaceae	<i>Stipa speciosa</i>	desert needle grass
Polemoniaceae	<i>Eriastrum eremicum</i>	desert eriastrum
Poaceae	<i>Langloisia setosissima</i>	bristly langloisia
Poaceae	<i>Linanthus parryae</i>	Parry's linanthus
Poaceae	<i>Loeseliastrum matthewsii</i>	desert calico
Polygonaceae	<i>Chorizanthe brevicornu</i>	brittle spineflower
Polygonaceae	<i>Chorizanthe rigida</i>	devil's spineflower
Polygonaceae	<i>Eriogonum deflexum</i>	skeleton weed
Polygonaceae	<i>Eriogonum fasciculatum</i>	California buckwheat
Polygonaceae	<i>Eriogonum heermannii</i>	Heermann's wild buckwheat
Polygonaceae	<i>Eriogonum inflatum</i>	desert trumpet
Polygonaceae	<i>Rumex crispus</i>	curly dock
Ranunculaceae	<i>Delphinium parishii</i>	Mojave larkspur
Rosaceae	<i>Fallugia paradoxa</i>	Apache plume
Rosaceae	<i>Prunus fasciculata</i>	desert almond
Rosaceae	<i>Purshia stansburyana</i>	cliffrose
Rutaceae	<i>Thamnosma montana</i>	turpentine-broom
Solanaceae	<i>Datura wrightii</i>	Wright's jimsonweed
Solanaceae	<i>Lycium andersonii</i>	Anderson's desert-thorn
Solanaceae	<i>Nicotiana obtusifolia</i>	desert coyote-tobacco
Solanaceae	<i>Physalis crassifolia</i>	thick-leaved ground cherry
Typhaceae	<i>Typha angustifolia</i>	narrow-leaved cattail
Viscaceae	<i>Phoradendron californicum</i>	desert mistletoe
Zygophyllaceae	<i>Larrea tridentata</i>	creosote bush

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Table C-2. Cactus and Yucca Inventory Results, May 2020

Plant Type	Common Name (<i>Scientific Name</i>)	Number within Survey Area
Cactus	Silver cholla (<i>Cylindropuntia echinocarpa</i>)	191
Cactus	Pencil cholla (<i>Cylindropuntia ramosissima</i>)	228
Cactus	Cottontop cactus (<i>Echinocactus polycephala</i>)	123
Cactus	Strawberry hedgehog cactus (<i>Echinocereus engelmannii</i>)	54
Cactus	Desert pincushion (<i>Escobaria chlorantha</i>)	7
Cactus	Barrel cactus (<i>Ferocactus cylindraceus</i>)	45
Cactus	Dead cholla (<i>Grusonia parishii</i>)	8
Cactus	Beavertail cactus (<i>Opuntia basilaris</i>)	71
Cactus	Pricklypear cactus (<i>Opuntia polyacantha</i>)	1
Yucca	Joshua tree (<i>Yucca brevifolia</i>)	292
Yucca	Mojave yucca (<i>Yucca schidigera</i>)	5958
TOTAL		6978