APPENDIX A

Biological Survey Report

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2781 Canyon Oak Place, Escondido, CA 92029| 858-776-7444 | rod@bio-studies.com

Karen Stackpole
Environmental Quality Control Manager
CBP Environmental Services Contractor
DAWSON

October 29, 2020

RE: Environmental Support Services for Primary Fence Replacement in the Tucson Sector, Cochise, Pima, and Santa Cruz Counties, Arizona.

Dear Karen:

Bio-Studies has prepared a summary of information collected from a variety of literature sources and field surveys to describe the biological resources present and potentially present along the Tucson Sector Fence Replacement Project (Project) in Cochise, Pima, and Santa Cruz Counties, Arizona. This letter characterizes the surrounding vegetation communities and determines the potential for presence of special-status plant and wildlife species based on habitat.

Project Location

The Project is situated in the Custom and Border Protection's Tucson Sector region of the international boundary between Mexico and the United States (U.S.). The designated Survey Area for the effort focused on 100 feet north of the international border. The southern boundary of the Survey Area was delineated by Normandy fencing, barbed wire, and border monuments. For segments with no physical indication to delineate the international border biologists used aerial maps and global positioning units to navigate the Survey Area. Approximately 45 miles were surveyed for the new primary fence construction (new primary) and primary fence replacement (replacement) areas (**Figure 1.1**). The Survey Area is based on coordinate data received by Bio-Studies March 2020. Refined Segment data reflected below was received in October 2020. The following segments have been identified within the Survey Area (**Table 1).** For the purposes of this letter, only areas within the Survey Area will be discussed further.

Table 1: Primary Fence Segments in Tucson Sector within Survey Area

Segment	Fence Type	Total Length	Within Survey Area
Segment 28-3	New Primary	2.5 miles	Yes
Segment 28-1	Replacement	7 miles	Section over 3 miles
Segment 28-4	New Primary	5.7 miles	Section over 3 miles
Segment 10-3	New Primary	21 miles	Section over 6.5 miles

Segment	Fence Type	Total Length	Within Survey Area
Segment 10-1	Replacement	2.1 miles	No
Segment 10-4	Replacement	0.2 miles	No
Segment 10-5	New Primary	4.2 miles	Minor section
Segment 10-6	New Primary	2.1 miles	No
Segment 9-1	Replacement	9 miles	No
Segment 9-4	Replacement	1 mile	No
Segment 9-2	Replacement	14 miles	No
Segment 9-3	Replacement	1 mile	No
Segment 9-5	New Primary	4.7 miles	Yes

The Survey Area falls within two Level III Ecoregions, the Sonoran Basin and Range and the Madrean Archipelago. The level IV Ecoregion associated with the Sonoran Basin and Range is the Arizona Upland/Eastern Sonoran Basins, while the following three Level IV Ecoregions are associated with the Madrean Archipelago: Apachian Valley and Low Hills, Lower Madrean Woodlands, and Madrean Basin Grasslands (Griffith et al. 2016). The regional climate for the Sonoran Basin and Range include hot, arid summers, and variable summer precipitation ranging between 8 inches and 23 inches annually. Monsoonal activity is extremely variable spatially and year to year. Annual low temperatures range between 45 degrees Fahrenheit (°F) and 75°F with high temperatures range between 65°F and 105°F. The regional climate for the Madrean Archipelago includes hot, arid summers leading into late summer monsoonal (precipitation average of 14 inches annually) activity. This is followed by a moderate winter season with most of the annual precipitation falling as snow at higher elevations. Southeastern Arizona receives the highest precipitation rates across the state due to its proximity to the core of monsoonal region in Mexico. Annual low temperatures range between 32°F and 68°F with high temperatures range between 65°F and 100°F (ADWR 2020; U.S. Climate Data 2020). Overall, elevations across project segments range between 3,500 to 6,100 feet above mean sea level (Google Earth 2020).

Survey Methodology

The literature search identified 148 special-status species with potential to occur within the Survey Area. Site visits for segments 28-3, 28-1, 28-4, 10-3, a portion of 10-5, 10-6, and 9-5 were conducted between April and July 2020 to identify suitable habitat for special-status species (**Table 2)**. Biologists conducted general biological survey for all project segments noted below during the spring and summer of 2020.

Table 2: Project Segment and Survey Dates

Project Segment	Survey Date	Surveyors
28-3, 28-1, 28-4 and 10-3	March 17-18, 2020	Dustin Janeke, Karen Stackpole
Portions of 10-5 and 9-5	April 1-4, 2020	Lindsay Willrick, Scott Trageser
28-4 and 10-6	July 1-2, 2020	Dustin Janeke, Tamara Kramer

Habitat conditions observed in the Survey Area were used to evaluate the potential for occurrence of special-status species based on these surveys and the professional expertise of the investigating biologists. The following sources were reviewed to determine which special-status plant and wildlife species have been previously documented to occur near the Survey Area:

- AZGFD HabiMap Arizona environmental review online tool (AZGFD 2020; HabiMap Arizona),
- USFWS Endangered Species by County Database (USFWS 2020),
- Arizona Rare Plant Advisory Group Sensitive Plant List (ANPS 2014),
- NatureServe (NatureServe 2020),
- Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Cochise, Pima, and Santa Cruz Counties, Arizona (Soil Survey Staff 2020),
- United States Geological Survey 7.5-minute quadrangles Presumido Peak, Old Glory, Nogales, Hereford, and Perilla (USGS 1972),
- U.S. Forest Service Region 3 Regional Forester's Sensitive Species: Animals – 2013 (USFS 2020), and;
- Bureau of Land Management California Special-Status Animal Species and Sensitive Species List (BLM 2017).

Vegetation types across the Survey Area were mapped using the United States National Vegetation Classifications Database (USNVC 2020) and habitats were mapped to the association level when possible (**Figures 2.1-2.10**). Vegetation mapping was conducted with the use of a global positioning system and aerial photographs. During all surveys and site visits, biologists documented all plant and wildlife species observed incidentally.

Survey Results

Vegetation communities across all or portions of project segments are as follows:

- Segment 28-3: *Fouquieria splendens* - *Calliandra eriophylla- Parthenium incanum* Desert Scrub Alliance (**Figure 2.1**).
- Segment 28-4A: *Calliandra eriophylla/*Mixed Desert Grasses Shrubland, *Dodonaea angustifolia – Dasylirion wheeleri* Desert Scrub, *Fouquieria splendens – Prosopis velutina* Shrubland, *Mimosa aculeaticarpa - Dasylirion wheeleri* /Mixed Desert Grasses Shrubland, *Prosopis velutina - Dodonaea viscosa* Desert Scrub, *Prosopis velutina* Ruderal Foothill Shrubland, *Prosopis glandulosa-Prosopis velutina-Prosopis pubescens* Wet Scrub Alliance, *Quercus oblongifolia* Scrub Woodland Alliance, *Quercus oblongifolia* Scrub Woodland Alliance, and *Quercus turbinella* Chaparral Alliance(**Figure 2.2)**.
- Portions of Segment 10-3 : *Arctostaphylos pungens-Arctostaphylos pringlei-Ceanothus greggii* Chaparral Alliance, *Dasylirion* ssp. / *Bouteloua curtipendula-Muhlenbergia setifolia* Foothill Desert Grassland Alliance, *Prosopis velutina* Ruderal Desert Scrub Alliance, and *Quercus oblongifolia* Scrub Woodland Alliance (**Figures 2.3-2.5**).
- Portions of Segment 10-1: *Pinus cembroides - Pinus discolor - Pinus edulis* / Shrub Understory Woodland Alliance and *Prosopis velutina* Ruderal Desert Scrub Alliance (**Figure 2.5)**.

- Portions of Segment 10-5***:*** *Pinus cembroides - Pinus discolor - Pinus edulis* / Shrub Understory Woodland Alliance and *Prosopis velutina* Ruderal Desert Scrub Alliance **(Figures 2.6-2.7)**
- Portions of Segment 10-6: *Acacia constricta – Acacia neovemicosa*/ Thornscrub Alliance, *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance, and *Pleuraphis mutica – Sporobolus airoides – Panicum obtusum/* Semi-Desert Lowland Grassland Group (**Figure 2.8)**.
- Segment 9-5: *Fouquieria splendens - Calliandra eriophylla - Parthenium incanum* Desert Scrub Alliance and *Platanus wrightii* Riparian Forest Alliance (**Figures 2.9-2.10)**.
- **Appendix A: Figures A-1 to A13** illustrate vegetation communities mapped in the Survey Area under previous alignment coordinates.

A total of 128 special-status wildlife and 20 special-status plant species have been documented to occur within three miles of the Survey Area. **Table 3** lists critical habitat designations occur within surveyed project segments. All special-status plant and wildlife species listed in **Tables 4 and 5** have potential to occur in the Survey Area due to suitable soil, topographical, and/or vegetation communities observed during surveys.

Table 3: Critical Habitat Designations within Surveyed Project Segments

Critical Habitat	Plant or Wildlife Species Listed	Project Segment
Designated	Jaguar (*Panthera onca*)	28-3, 28-1, 10-3, 10-5, and 10-6
Designated	Mexican spotted owl (*Strix occidentalis lucida*)	10-3, 10-5, and 10-6
Proposed	Yellow-billed cuckoo (*Coccyzus americanus*)	10-5
Proposed	Northern Mexican gartersnake (*Thamnophis eques megalops*)	10-5
Proposed	Beardless cinchweed (*Pectis imberbis*)	10-6

If you have any questions or concerns regarding the results of this survey, do not hesitate to contact us at 760-916-1995 x 703, rod@bio-studies.com

Sincerely,

Principal;Bio-Studies

Letter Report References:

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Table 4: Special-Status Wildlife Species with Potential to Occur

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
INVERTEBRATES			
Pyrgulopsis thompsoni Huachuca Springsnail	USFWS Candidate Conservation Agreement, USFS Sensitive, SGCN 1A	Found in marshy springs and cienegas with emergent aquatic vegetation located in oak and pine-oak woodlands, and coniferous forests. Huachuca springsnail occupy the shallower areas of cienegas and are more likely to be found in wet rocky seep areas near the origin of the spring. Found on or near Fort Huachuca.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
VERTEBRATES			
Fish			
Agosia chrysogaster chrysogaster Gila Longfin Dace	USFWS Species of Concern, BLM Sensitive, SGCN 1B	Found in small to medium size streams from hot low desert to higher elevations. They occupy streams with sandy or gravelly bottoms and occupy shallow (less than 0.6 feet [ft.] deep) eddies and pools with cover. They are tolerant of high temperatures and low dissolved oxygen but prefer water less than 75 degrees Fahrenheit. Omnivorous and opportunistic feeders and will consume detritus, aquatic insects, algae, and zooplankton. In Gila and Bill Williams drainages (introduced to Virgin River basin)	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Catostomus clarkii Desert Sucker	USFWS Species of Concern; USFS Sensitive; BLM Sensitive; SGCN 1B	Found in riffles and shallow pools in the Virgin River, Bill Williams River and Gila River in Arizona, and in northern Sonora, Mexico.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Catostomus insignis Sonora Sucker	USFWS Species of Concern; USFS Sensitive; BLM Sensitive; SGCN 1B	Found in rocky pools and tributaries in riffles in the Bill Williams River and Gila River in Arizona, and in northern Sonora, Mexico.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Cyprinodon macularius Desert Pupfish	Federally Endangered; SGCN 1A	Cienegas, springs, small streams, and the edges of larger bodies of water. Requires clear water but tolerates saline and warm water conditions.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Gila intermedia Gila Chub	Federally Endangered; SGCN 1A	This species prefers smaller streams, cienegas, as well as artificial impoundments in the Gila River Basin.	This species has potential to occur across the Survey Area in appropriate habitats in project

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NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		Prefers quiet deep waters near vegetative or fallen log cover.	segments 10-5 and 10-6.
Gila purpurea Yaqui Chub	Federally endangered, SGCN 1A	Deep pools of smaller streams with dense vegetation in the water associated with watercress, willow, seep-willow, cottonwood, velvet ash, and tobosa grass (*Hilaria mutica*) vegetation (AZGFD 2001b).	This species has potential to occur across the Survey Area in appropriate habitats in project segment 9-5.
Poeciliopsis occidentalis occidentalis Gila Topminnow	Federally Endangered; SGCN 1A	Prefers slow moving waters and cienegas within the Gila River Basin.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Amphibian			
Ambystoma mavortium stebbinsi Sonora Tiger Salamander	Federally endangered, SGCN 1A	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Craugastor augusti Barking Frog	SGCN 1B	Strongly associated with limestone and rhyolitic outcrops in the Patagonia, Huachuca, Pajarito, Quinlan, and Santa Rita Mountains of Arizona. Found in scrubby oak and pine-oak woodland habitats between 4,200 and 6,200 ft. Lays clutches in moist rock crevices and fissures.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Craugastor augusti cactorum Western Barking Frog	USFS Sensitive; SGCN 1B	Shows strong association with Naco Group limestone of the Huachuca Mountains. Uses rock outcrops, caves and rocky slopes of limestone, rhyolite, granite, and possibly other fissure-forming rocks. Vegetation types include scrubby oak or pine-oak woodlands. Forages on a variety of invertebrates, including field crickets, scorpions, silverfish, centipedes, grasshoppers, and others.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Gastrophryne olivacea Western Narrow-mouthed Toad	BLM Sensitive; SGCN 1C	More terrestrial than aquatic, the western narrow-mouthed toad occurs in the vicinity of streams, springs and seasonal rain pools in vegetation ranging from mesquite semi-desert grassland to oak woodland. They share burrows with other animal species or can be found under flat rocks, dead wood, or other debris. Diet is composed almost entirely of ants.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Incilius alvarius Sonoran Desert Toad	SGCN 1B	Found in valley bottoms and hills of Sonoran Desert scrub, semi-desert grasslands, oak woodland, and occasionally pine-oak woodland habitats. Occurs below 5,800 ft. In the western parts of its distribution, the species is strongly associated with permanent water sources. Active above-ground only during Summer monsoon season; primarily resides in burrows and other underground shelters.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Lithobates chiricahuensis Chiricahua Leopard Frog	Federally threatened, SGCN 1A	Found in or near aquatic habitats including, cienegas, pools livestock tanks, lakes, streams, and rivers in oak, mixed oak, and pine woodlands. Also found in chaparral, grassland, and desert habitats. Feeds on arthropods and insects.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Lithobates tarahumarae Tarahumara Frog	USFWS Species of Concern; USFS Sensitive; SGCN 1A	Found in rocky streams and plunge pools in canyons and arroyos. In Arizona, the species inhabits semi-desert grassland, oak woodland and savanna, and pine-oak woodland habitats, where they are most active from April to October. Congregates around perennial water sources during the dry season. Pools with mean flows of less than 6 liters per second are preferred breeding sites.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Lithobates yavapaiensis Lowland Leopard Frog	USFWS Species of Concern, USFS Sensitive; BLM Sensitive, SGCN 1A	Unregulated streams, rivers, and cienages, cattle tanks, agricultural canals from sea level to 6,000 ft. in low desert scrub to pinyon-juniper woodlands. Feeds on arthropods and insects.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Smilisca fodiens Lowland Burrowing Treefrog	BLM Sensitive; SGCN 1B	Occurs near pools in mesquite-lined washes in Lower Colorado Desert scrub and semi-desert grassland habitats. Primarily terrestrial but occasionally found climbing mesquite trees. Burrows in clay soils during the dry season and emerges at the onset of summer rains. Congregates around ephemeral water sources during breeding season.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Reptile			
Aspidoscelis stictogramma Giant Spotted Whiptail	USFWS Species of Concern, USFS Sensitive; SGCN 1B	Occurs in dense shrubby vegetation or bunch grass habitats near perennial or seasonal water sources in mountain canyons, arroyos, semi-arid mesas, and lowland deserts. Forages on insects and spiders.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
			3, and 28-4 including Cerro del Fresnal.
Aspidoscelis xanthonota Red-backed Whiptail	USFWS Species of Concern, USFS Sensitive; SGCN 1B	Occurs in dense shrubby vegetation on hills and in canyons in juniper-oak woodlands to Sonoran upland deserts. Can also be found on volcanic slopes and near springs or other water sources. Forages on insects and spiders.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Chilomeniscus stramineus Variable Sandsnake	SGCN 1B	Found in Sonoran Desert scrub habitats in or near drainages with loose sand or gravel substrate. The variable sandsnake burrows and spends much of its time underground. Active at night, it feeds on insects and centipedes. Hibernates during the cold months (Brennan 2012).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Coluber bilineatus Sonoran Whipsnake	SGCN 1B	Found on mountain slopes, canyons, foothills, and rocky bajadas in Sonoran Desert scrub, semidesert grassland, interior chaparral, Madrean evergreen woodland and lower Great Basin conifer woodland. Feeds on small vertebrates (Brennan 2012).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Crotalus lepidus Rock Rattlesnake	SGCN 1A	Inhabits rocky stream beds, rock outcrops, and talus slopes in evergreen woodland, montane conifer forest, and occasionally grassland habitats. Occurs between 4,000 and 8,500 ft., in the “sky island” ranges of South Eastern Arizona. Primarily terrestrial but capable of climbing trees and cliff faces.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Crotalus lepidus klauberi Banded Rock Rattlesnake	SGCN 1A	Found in rocky areas of upper desert grassland to lower Ponderosa pine, typically on south-facing slopes and rockslides. Often found in near perennial or seasonal water sources. Main food source is lizards but will also prey on other snakes and rodents.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Crotalus pricei Twin-spotted Rattlesnake	USFS Sensitive; SGCN 1A	Found on south-facing rock outcrops and boulder rockslides, in flat open forest. Associated with Mexican pine-oak woodland, Ponderosa pine, spruce, and white and Douglas fir forests. Ranges from 6,000 to 11,000 ft. Feeds on lizards, small rodents, and birds.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.

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NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Crotalus tigris Tiger Rattlesnake	SGCN 1B	Occurs in Sonoran Desert scrub, Chihuahuan Desert scrub, interior chaparral, and Madrean evergreen woodland on rocky slopes and washes of rocky mountains and foothills. Feeds on small mammals and lizards (Brennan 2012).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Crotalus willardi willardi Arizona Ridge-nosed Rattlesnake	Federal Partial Status; SGCN 1A	Found around rock crevices and forest floor in oak woodland and pine-fir forest, mesic canyon bottoms with broadleaf deciduous trees, and occasionally in tall grasslands bordering forest habitats. Occurs in "sky island" ranges in the Huachuca, Santa Rita, Canelo, Patagonia, and Whetstone mountains between 4,800 and 9,000 ft. Feeds on rodents, snakes, lizards, and arthropods.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Gopherus morafkai Sonoran Desert Tortoise	USFWS Candidate Conservation Agreement, USFS Sensitive, BLM Sensitive; SGCN 1A	Found on rocky slopes and bajadas in Mojave and Sonoran Desert scrub. Often excavates a shallow burrow to escape the desert heat and to hibernate in the winter. Forages on annual and perennial grasses, forbs, and succulents.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.
Gyalopion quadrangulare Thornscrub Hook-nosed Snake	USFS Sensitive; SGCN 1B	Found in rolling, mesquite-invaded semi-desert grassland and adjacent oak savanna habitats. Very limited distribution in Arizona's Santa Cruz County.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Heloderma suspectum Gila Monster	SGCN 1A	Found in central and southeastern Arizona, in desert scrub, semi-desert grassland, interior chaparral, and occasionally woodland habitats. Primarily active underground, occupying burrows, packrat nests, and rock crevices during all times of the year. Diurnal in Spring and Fall; nocturnal in Summer. Overwinters in shelters on south-facing, rocky hillsides.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Hypsiglena sp. nov. Hooded Nightsnake	SGCN 1B	Found in Sonoran Desert scrub, grasslands, woodlands and Petran montane conifer forest on flat, open desert and steep, rocky wooded slopes. Feeds on lizards, small snakes, reptile eggs, frogs, and insects (Brennan 2012).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

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Kinosternon arizonense, Arizona Mud Turtle	SGCN 1B	Found primarily in the Rio Sonoyta drainage of the Tohono O'odham Nation; less common in the Vekol and Altar Valleys. Inhabits Sonoran Desert scrub, semi-desert grassland habitats between 650 and 2,600 ft. Typically found in ephemeral water sources such as cattle tanks, arroyos, and stream segments that fill during the Summer monsoon season. Active between July and October, with most observed between July and early September. Remains dormant underground during the dry season.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.
Kinosternon sonoriense sonoriense Desert Mud Turtle	BLM Sensitive; SGCN 1B	Occurs in springs, creeks, ponds, and water holes of intermittent streams up to 6,700 ft. Feeds on crustaceans, snails, fish, frogs, and plant material.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Lampropeltis nigrita Mexican Black Kingsnake	SGCN 1B	Occurs in low elevation semi desert grassland areas in rock outcrops, rodent burrows and under vegetative or surface cover. Feeds on various vertebrates including birds and reptiles, their eggs, and small mammals.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.
Micruroides euryxanthus Sonoran Coralsnake	SGCN 1B	Associated with rocky or gravelly drainages, mesquite washes, and canyons in Sonoran, Mojave, and Chihuahuan Desert scrub and semidesert grassland. Most common in upland desert and bajadas. Feeds on small snakes and lizards.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Oxybelis aeneus Brown Vinesnake	USFS Sensitive; SGCN 1B	Primarily tropical; restricted to Atascosa, Pajarito, and Patagonia mountains and mesquite basins. Found on steep, grassy slopes in Madrean evergreen woodland and densely vegetated canyons. Arboreal and feeds on lizards, frogs, fish, and insects.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Phrynosoma cornutum Texas Horned Lizard	USFWS Species of Concern	Occurs on sandy to gravelly flat ground with scattered shrubs or mesquite in Chihuahuan Desert and desert-grassland habitats. Feeds primarily on ants, grasshoppers, isopods, beetles, and beetle larvae.	This species has potential to occur across the Survey Area in appropriate habitats in project segment 9-5.

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NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Phrynosoma solare Regal Horned Lizard	SGCN 1B	Occurs in valleys, rocky bajadas, and low foothills in Sonoran and Chihuahuan Desert scrub, and semidesert grassland. Feeds primarily on ants but will also consume beetles and other insects (Brennan 2012).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Plestiodon callicephalus Mountain Skink	USFS Sensitive	Found in Madrean evergreen woodland and adjoining higher elevation areas of semidesert grassland under rocks, logs, and other surface cover. Typically found in mesic areas including riparian corridors, rocky canyon bottoms and grassy hills. Feeds on beetles, flies, and other insects as well as spiders (Brennan 2012).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Sceloporus slevini Slevin's Bunchgrass Lizard	USFS Sensitive; BLM Sensitive; SGCN 1B	Occurs on the ground around bunchgrass in coniferous forests up to 10,000 ft. Rare in desert grasslands. Feeds on insects and spiders.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Senticolis triaspis Green Ratsnake	USFS Sensitive; SGCN 1B	Found in rocky canyons and riparian corridors in oak woodland, savanna, adjacent mesquite-invaded semi-desert grassland, and Sonoran Desert scrub habitats. Prefers east-facing slopes. Typically recorded from March to November.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Tantilla wilcoxi Chihuahuan Black-headed Snake	BLM Sensitive; SGCN 1B	Found on rocky hillsides of cactus, grasslands, pine-oak forest, and shaded rocky canyons in Madrean evergreen woodland and Petran montane conifer forest. Typically found under surface debris. Feeds on a variety of invertebrates.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Tantilla yaquia Yaqui Black-headed Snake	USFS Sensitive; SGCN 1B	Inhabits rocky, wooded canyons and hillsides in Madrean evergreen woodland and semi-desert grassland habitats from 3,300 to 6,000 ft. Typically found in moist areas under rocks, logs, and leaf litter. Nocturnal but may emerge on moist spring days. Inactive during the late Fall and Winter months.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Terrapene ornata Ornate Box Turtle	SGCN 1A	Prefers plains, valleys, desert washers in grassland and Chihuahuan desert scrub vegetation communities in the southeastern corner of Arizona between 2,000 to 7,000 ft. in elevation.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Terrapene ornata luteola Desert Box Turtle	USFS Sensitive; BLM Sensitive; SGCN 1A	Occurs in semidesert grasslands and Chihuahuan desert scrub in southeastern Arizona. Forages for carrion, bird eggs, other reptiles, tadpoles, grass, cactus fruits, melons insects and beetles.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-5, and 10-6.
Thamnophis eques megalops Northern Mexican Gartersnake	Federally threatened; USFS Sensitive; SGCN 1A	Occurs in ponds, cienegas, riparian forest and woodland, and stream gallery forest. Avoids steep mountain stream habitats and prefers densely vegetated habitats. Forages for fish, adult and larval Ranid frogs, earthworms, small rodents, lizards, salamanders and treefrogs.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.
Birds			
Aix sponsa Wood Duck	SGCN 1B	Typically, a winter visitor to Arizona with occasional breeding in central Arizona. Prefers freshwater habitats in a woodland setting with plenty of cover, including marshes, wooded swamps, perennial pools, lakes, and slow stream reaches. Prefers to forage where the surface zone is 7 to 16 inches deep.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Amazilia violiceps Violet-crowned Hummingbird	USFS Sensitive; SGCN 1B	Occurs in riparian woodlands at lower elevations. Nests in sycamore or cottonwood-willow riparian habitats, but may also use scrub, woodland, forest edge, and plantations in arid or semi-arid regions.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.
Ammodramus savannarum ammolegus Arizona Grasshopper Sparrow	USFS Sensitive; BLM Sensitive; SGCN 1B	Breeds in southeastern Arizona and winters across southern Arizona. Occurs in semi-arid grassland habitats with low shrub component and medium-height grasses. Areas with trees are avoided. Feeds on insects in the summer and seeds in the winter.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Ammodramus savannarum perpallidus Western Grasshopper Sparrow	SGCN 1B	Winters in western and southeastern Arizona. Occurs in semi-arid grassland habitats with low shrub component and medium-height grasses. Areas with trees are avoided. Feeds on seeds in the winter.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Anthus spragueii Sprague's Pipit	USFWS Species of Concern; SGCN 1A	Sprague's pipit is a rare and sparse winter resident in Arizona and there are no records of it nesting in Arizona. Found in pastures and weedy fields, thickly vegetated grasslands or agricultural fields planted to	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6,

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		grass species.	28-3, and 28-4 including Cerro del Fresnal.
Antrostomus ridgwayi Buff-collared Nightjar	USFS Sensitive; SGCN 1B	A scarce summer visitor to Arizona. Found in arid canyons at low to mid elevations in foothill washes. Also known from open riparian canyons with mesquite or hackberry thickets. Breeding in Arizona has been reported in thick thornscrub of mesquite, acacia, and hackberry (Fray 2015).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Aquila chrysaetos Golden eagle	Bald and Golden Eagle Protection Act; BLM Sensitive; SGCN 1B	In Arizona, golden eagles are found in mountainous areas. Eagles nesting in desert habitats appear to leave the area after nesting. Nesting occurs on rock ledges, cliffs or in large trees. Forages on small mammals, reptiles, juvenile hoofed species, and carrion.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Athene cunicularia hypugaea Western Burrowing Owl	USFWS Species of Concern, USFS Sensitive, BLM Sensitive; SGCN 1B	Open, dry grassland, desert floor, and agricultural fields, usually in association with burrowing animal populations. Sometimes found near human developments, including airports and golf courses.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and10-6.
Botaurus lentiginosus American Bittern	SGCN 1B	Rare transient during spring and fall migrations in Arizona. Occurs in marshes and wet meadows with dense reed, rush, cordgrass, cattail, or other emergent aquatic vegetation.	This species has potential to occur in the Survey Area in appropriate habitats in segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Buteo regalis Ferruginous Hawk	USFWS Species of Concern; BLM Sensitive; SGCN 1B	Found throughout Arizona in the fall and winter, breeds in northern Arizona. Occurs in open forms of woodlands, scrublands, grasslands, and semi-desert grasslands. Also found in agricultural settings. Feeds primarily on rabbits, ground squirrels and pocket gophers, and potentially prairie dogs	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Calothorax lucifer Lucifer Hummingbird	USFS Sensitive	Occurs in Chihuahuan Desert foothills during the summer months. Found in canyons, dry washes in desert scrub vegetation (The Cornell Lab 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-5, and 10-6.
Camptostoma imberbe Northern Beardless-Tyrannulet	USFS Sensitive	Year-round resident in southeast Arizona. Found in wooded areas including mesquite stands, stream thickets, canyons. Prefers mesquite or cottonwood-willow stands in Arizona. Feeds on insects (Audubon 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 28-3 and 28-4.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Centronyx bairdii Baird's Sparrow	USFWS Species of Concern, USFS Sensitive; SGCN 1C	Winter visitor to southeast Arizona. Found in grasslands with scattered shrubs. Feeds on insects and seeds (The Cornell Lab 2019b).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Chordeiles minor Common Nighthawk	SGCN 1B	Summer resident in southern and southwestern Arizona. Occurs in open arid habitats of dry grasslands and scrub, and in desert washes. Nests on the ground with no nest, sometimes in the shade of a shrub (Audubon 2019b).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Coccothraustes vespertinus Evening Grosbeak	SGCN 1B	In Arizona, occurs in pine forests. May be found in deciduous forests, woodlands, and semi-open areas in the winter. Feeds on seeds berries and insects (Audubon 2019c).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Coccyzus americanus Yellow-billed Cuckoo (Western DPS)	Federally threatened, USFS Sensitive; SGCN 1A	Occurs in riparian cottonwood-willow gallery forest and tamarisk groves with dense understory. May also be found in large mesquite bosques. Forages for caterpillars, bird eggs, small reptiles and amphibians, insects, berries, and fruit.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Colaptes chrysoides Gilded Flicker	BLM Sensitive; SGCN 1B	Occurs in desert woodlands, bosques of saguaro, Joshua tree, mesquite, willow or cottonwood, and suburban areas. Feeds primarily on carpenter ants.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Colinus virginianus ridgwayi Masked Bobwhite	Federally Endangered; SGCN 1A	Inhabits mesic, subtropical grasslands with 20-100% woody shrub and herbaceous cover. Utilizes large variety of native grasses, forbs, and shrub species. Breeding season typically commences in June and corresponds with monsoonal rains. Extremely rare outside of Buenos Aires National Wildlife Refuge (USFWS 2014).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Cynanthus latirostris Broad-billed Hummingbird	USFS Sensitive; SGCN 1B	Summer resident in southeastern Arizona. Found in arid scrub and mesquite-sycamore riparian vegetation.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Eugenes fulgens Rivoli's Hummingbird	SGCN 1B	Summer resident in eastern Arizona. Occurs in montane coniferous forest, pine-oak and oak woodland and in canyons lined with sycamore and oak.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Falco peregrinus anatum American Peregrine Falcon	USFWS Species of Concern, USFS Sensitive, BLM Sensitive; SGCN 1A	Open habitats, particularly along water sources (e.g. coast lines and rivers) where cliffs are present for nesting. Requires an ample supply of birds as a prey base.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Glaucidium brasilianum cactorum Cactus Ferruginous Pygmy-owl	USFWS Species of Concern, USFS Sensitive, BLM Sensitive; SGCN 1B	Found in Sonoran riparian deciduous woodland and Sonoran Desert scrub. Frequent in riparian cottonwoods and willows and adjacent mesquite bosques with saguaros nearby. Less frequent in dry washes among large mesquite, paloverde, ironwood, and saguaro. Feeds on insects, small birds, lizards, and small mammals that is catches around dawn and dusk.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.
Glaucidium gnoma gnoma Mountain Pygmy-owl	SGCN 1B	Occurs in dense mountainous pine-oak, pine, and pine-evergreen forests (Lewis 2015).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Haliaeetus leucocephalus Bald Eagle	USFWS Species of Concern; Bald and Golden Eagle Protection Act; USFS Sensitive; BLM Sensitive; SGCN 1A	In Arizona, bald eagles typically nest on cliff faces, ledges, and pinnacles in central and northern Arizona. Nest sites are in saguaro-paloverde, desert grassland, and chaparral. Occupy areas near water sources, including rivers, reservoirs, and lakes.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Junco phaeonotus Yellow-eyed Junco	USFS Sensitive; SGCN 1B	Found in montane fir, pine, and pine-oak forests in southeastern Arizona. In the winter they move to lower elevations in oak woodland, scrub, pasture, and field habitats.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Lampornis clemenciae Blue-throated mountaingem	SGCN 1B	Nests in mountainous areas of southeastern Arizona in pine-oak, deciduous woodland, and wet mountain canyon habitats from 5,000 to 10,000 ft.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4
Megascops trichopsis Whiskered Screech-owl	USFS Sensitive; SGCN 1B	Occurs in dense montane oak-conifer and oak woodlands in canyons, generally above 5,000 ft. In Arizona, they can also be found in sycamore groves next to oak woodlands. Feeds mainly on insects (Audubon 2019d).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.
Melanerpes uropygialis Gila Woodpecker	SGCN 1B	Occurs in desert scrub and woodlands, saguaro stands, mesquite woodlands, riparian corridors with cottonwoods and low canyon woodlands. Can be common in urban settings and around date palm agriculture.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Meleagris gallopavo mexicana Gould's Turkey	USFS Sensitive; SGCN 1B	Occurs in coniferous, pine-oak, oak, deciduous and riparian woodlands, and thorn scrub in southeastern Arizona.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-5, and 10-6.
Melospiza lincolnii Lincoln's Sparrow	SGCN 1B	Winters in southern Arizona. Found in thickets, fallow fields, dense brush.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Melozone aberti Abert's Towhee	USFS Sensitive; SGCN 1B	Resident bird in southern and western Arizona. Found in desert woodlands, mesquite scrub, riparian habitats, orchard fields, and urban settings.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Myiarchus tuberculifer Dusky-capped Flycatcher	SGCN 1B	Summer resident, breeding in southeastern Arizona. Found in low to middle elevation montane riparian, oak, and pine-oak woodlands and juniper habitats.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Myiodynastes luteiventris Sulphur-bellied Flycatcher	USFS Sensitive; SGCN 1B	Summer resident in southern Arizona where it breeds in sycamore-walnut riparian habitat in lower elevation mountain canyons and cottonwood-sycamore riparian habitat along low elevation streams.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Pachyramphus aglaiae Rose-throated Becard	USFS Sensitive; SGCN 1B	Summer resident to arid woodlands and forest edges in southeastern Arizona.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Passerculus sandwichensis Savannah Sparrow	SGCN 1B	Winter resident in southern Arizona; breeds in eastern-central Arizona. Inhabits open fields, salt marshes, prairies, dunes, and shores. In winter, occupies shores and weedy vacant lots.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Peucaea botterii arizonae Arizona Botteri's Sparrow	BLM Sensitive; SGCN 1B	Summer resident in southeastern Arizona where it is closely associated with tall, dense desert grasslands for breeding. Avoids heavily grazed habitats.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Peucaea carpalis Rufous-winged Sparrow	SGCN 1B	Year-round resident in southern central Arizona where it occupies flat desert grassland with thorn scrub and cactus. Frequently observed along washes. Avoids heavily grazed habitats but may be found in well-vegetated suburban areas where development is scattered.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Picoides arizonae Arizona Woodpecker	USFS Sensitive; SGCN 1B	Occurs year-round in dry pine-oak woodlands and riparian oak woodlands in canyons between 4,000 and 7,000 ft.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Polioptila nigriceps Black-capped Gnatcatcher	SGCN 1B	Rare inhabitant of southeast Arizona. Found in canyons within forest and shrubland habitats.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Progne subis hesperia Desert Purple Martin	BLM Sensitive; SGCN 1B	Breeds in Sonoran Desert habitats in Arizona in the summer. Use natural cavities or woodpecker holes in saguaros or other trees for nesting. Loosely colonial to solitary in nesting.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Setophaga petechia Yellow Warbler	SGCN 1B	Found in riparian habitats within thickets and early stages of successional habitats dominated by willows.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Sialia sialis fulva Azure Bluebird	SGCN 1B	Year-round resident in southeastern Arizona. Nests in cavities in open habitats, including woodlands, secondary growth habitats, pastures, and field edges where cavities are available. Prefers cavities in open oak forests for nesting.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Strix occidentalis lucida Mexican Spotted Owl	Federally threatened; SGCN 1A	Closed-canopy forests of mixed conifer, pine-oak, and pinyon juniper woodland, and steep, narrow, entrenched, rocky canyons and cliffs. Riparian habitat is important as a movement corridor or stop-over habitat for dispersing owls.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Troglodytes pacificus Pacific Wren	SGCN 1B	Occurs in woodlands and brush in the winter in Arizona.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Trogon elegans Elegant Trogon	USFS Sensitive; SGCN 1B	Breeds in canyons of the “sky islands” in southeastern Arizona. Preferred canyons have sycamores along the riparian areas and pine and oaks in the remaining watershed.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Tyrannus crassirostris Thick-billed Kingbird	USFS Sensitive; SGCN 1B	Breeds in riparian habitats of Sonoita Creek, Sycamore Canyon, Guadalupe Canyon, and the lower San Pedro River. Prefers deciduous riparian habitats and semi-arid canyons, typically sycamores and cottonwoods.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5 and 28-4 including Cerro del Fresnal.
Vireo bellii arizonae Arizona Bell's Vireo	SGCN 1B	Breeds during the summer in lowland riparian areas composed of willows, mesquite and mulefat. Prefers low, dense, shrubby structure.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Vireo vicinior Gray Vireo	USFS Sensitive; SGCN 1C	Associated with oak scrub, chaparral, and juniper-pinon habitats in arid mountain ranges and high plains in the southeastern United States. This species overwinters in the central borderlands of Arizona.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Mammals			
Ammospermophilus harrisii Harris' Antelope Squirrel	SGCN 1B	Found in canyons, dry plains, and river valleys in low desert habitats. Digs burrows under shrubs and may be active throughout the day. Feeds on fruit and seeds of cactus and mesquite, and some insects (Reid 2006).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Antilocapra americana americana American Pronghorn	SGCN 1B	Occurs in broad intermountain alluvial valleys with creosote bush, bursage, and paloverde-mixed cacti associations. Pronghorn are grazers in the summer, feeding on grass, forbs and cacti, and browsers in the winter (AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Baiomys taylori Northern Pygmy Mouse	USFS Sensitive	The northern pygmy mouse is found in fields, prairies, desert grassland and open woodlands with a grassy vegetation community and thick thatch or another groundcover. This pygmy mouse creates tiny runways through the groundcover from nests to foraging areas.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		Feeds on seeds, fruit, and green vegetation (Reid 2006, AZGFD 2019a).	
Choeronycteris mexicana Mexican Long-tongued Bat	USFWS Species of Concern, USFS Sensitive, BLM Sensitive; SGCN 1C	Habitat generalist associated with a variety of vegetation types, including arid thorn scrub, riparian vegetation, montane oak-conifer woodlands and forests, and tropical deciduous forests. Day roosts are found in caves, old mines, culverts, rock fissures and rarely buildings. Mexican long-tongued bats hang from the ceiling of day-roosts in dimly lit portions of cave systems. They feed on fruit, pollen and nectar, and likely insects as well. Primary food sources are cactus and agave (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-5, and10-6.
Corynorhinus townsendii pallescens Pale Townsend's Big-eared Bat	USFWS Species of Concern, USFS Sensitive, BLM Sensitive; SGCN 1B	Occurs in desert scrub, pinyon-juniper woodlands, oak woodlands, and coniferous forest habitats. Obligate cave-roosting species, forming colonies in natural caves or abandoned mines. It has also been known to roost occasionally in buildings, bridges, and tree hollows. Males roost singly during the maternity season. Townsend's big-eared bat is considered a moth specialist but will take other insect species. They typically forage in edge habitats and may range as much as 93 miles in a night while foraging (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Cynomys ludovicianus Black-tailed Prairie Dog	USFWS Candidate Conservation Agreement, BLM Sensitive, SGCN 1A	Black-tailed prairie dogs are found on dry, flat, open plains and desert grasslands with medium to fine textured soils. Prairie dog towns are frequently found in silty clay loam, sandy clay loam, and loams with littler gravel and good drainage. They feed on a variety of grasses, forbs, and shrubs, including leaves, stems, and seeds. Will also consume some insects. The black-tailed prairie dog does not need a source of surface water for drinking (AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-5, and 10-6.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Dipodomys spectabilis Banner-tailed Kangaroo Rat	BLM Sensitive; SGCN 1B	Banner-tailed kangaroo rats are associated with desert scrub and desert grassland habitats with scattered shrubs on slopes with hard or gravelly soil. Common vegetation includes mesquite, juniper, creosote bush, or acacia. Typically, nocturnal, they feed on grass seeds and some green and succulent vegetation. Will store seeds for later consumption (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Euderma maculatum Spotted Bat	USFWS Species of Concern, USFS Sensitive, BLM Sensitive; SGCN 1B	Occurs in desert scrub, pinyon-juniper woodland, Ponderosa pine, mixed conifer forest, riparian habitats, pastures, and canyons. Day-roosts are found in rock cracks and crevices or caves high up on cliff faces. Spotted bats may travel as far as 24 miles from their day-roost and up to 50 miles a night. They feed primarily on moths (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Eumops perotis californicus Greater Western Bonneted Bat	USFWS Species of Concern; BLM Sensitive; SGCN 1B	Associated with lower and upper Sonoran Desert scrub near rugged rocky cliffs and canyons. Roosts in rock crevices in rugged rocky areas or steep-walled canyons. Forages well above ground level and may range far from the roost site in search of prey (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Eumops underwoodi Underwood's Bonneted Bat	USFWS Species of Concern; SGCN 1B	Similar to the greater western bonneted bat. Habitat associations of this species are not well-understood, but they have been encountered in mesquite-grassland and Sonoran Desert habitats in the U.S. and pine-oak forest in Mexico. Presumed to roost in rock crevices on cliff faces, but the only known roost (in Mexico) was in a large tree hollow. Feeds on night-flying insects, including grasshoppers, leafhoppers, moths, and beetles (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.
Lasiurus blossevillii Western Red Bat	USFS Sensitive; SGCN 1B	Highly migratory and typically solitary, roosting primarily in the foliage of trees or shrubs. Roosts are usually in broad-leaved trees, including cottonwoods, sycamores, alders, and maples. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. Rarely found in desert habitats. Western red bats feed on moths and other insects (Adams 2003, WBWG	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		2019).	
Lasiurus xanthinus Western Yellow Bat	USFS Sensitive; SGCN 1B	Western yellow bats prefer environments with dry, thorny vegetation. They roost individually in the leaves of *Washingtonia* sp. palms, sycamores, hackberries, and cottonwood trees. Feeds on medium to small night-flying insects, particularly beetles (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Leopardus pardalis Ocelot	Federally endangered; SGCN 1A	Ocelots occupy habitats containing dense cover with an ample prey base. Habitat use in Arizona is not well understood, but ocelots are known to use dense thornscrub and chaparral in Texas with 95 percent cover preferred, and areas under 75 percent cover avoided. Preys on a variety of small vertebrates and invertebrates including small mammals, reptiles, amphibians, birds, fish, insects, and land crabs (AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Leptonycteris yerbabuenae Lesser Long-nosed Bat	USFWS Species of Concern; SGCN 1A	Found in desert grassland and shrubland, up to the point of transition to oak woodlands. They day-roost in caves and mine tunnels, and occasionally old buildings and culverts. May roost in large colonies in excess of 10,000 individuals. Feeds on nectar, pollen, fruit, and insects, particularly agaves, yuccas, saguaro, and organ pipe cactus. May travel up to 19 miles to feeding grounds (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.
Lepus alleni Antelope Jackrabbit	SGCN 1B	Occurs on grassy slopes in arid habitats, often with mesquite, catclaw and cacti. Typically, crepuscular to nocturnal, but may be active during the day in mild weather. Feeds on grass and browses on leaves of mesquite, cacti, and other shrubs (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Macrotus californicus California Leaf-nosed Bat	USFWS Species of Concern; BLM Sensitive; SGCN 1B	California leaf-nosed bats can be found in desert riparian, desert wash, desert scrub, desert succulent scrub, alkali scrub and palm oasis habitats. They inhabit rocky, rugged terrain with mines or caves for roosting. Feeds on large flying insects, including grasshoppers,	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		moths, and beetles, gleaned from vegetation, or taken in flight (Adams 2003, WBWG 2019).	
Microtus mexicanus Mexican Vole	SGCN 1B	Found in moist grass and sedge habitats with perennial and seasonal waters likes seeps and springs. May occupy drier grass and forb areas. Often in association with spruce-fir, Ponderosa pine, or Gambel's oaks above 6,000 ft. and pinyon-juniper or sage brush under 6,000 ft. Active day and night, they create runways between burrows and feeding sites. Mexican voles feed on grasses, forbs, and other plants (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5.
Myotis occultus Arizona Myotis	USFWS Species of Concern; BLM Sensitive; SGCN 1B	Found in Ponderosa pine and oak pine woodlands near water, or in desert riparian habitats around sources of permanent water. In Arizona, this myotis is more common at higher elevations. Day roosts are formed in tree cavities and crevices, and nursery colonies are found in snags exposed to a greater degree of solar heating. Arizona myotis have been observed roosting with other species of *Myotis* and *Tadarida brasiliensis* (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4.
Myotis thysanodes Fringed Myotis	USFWS Species of Concern	Found in dry oak-pine montane forest, down to desert transition vegetation. In the desert transition fringed myotis can be found around palm groves in the eastern foothills of the Peninsular Range. Roost sites vary from dead snags, to rock crevices, and man-made structures including buildings, mines and bridges.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Myotis velifer Cave Myotis	USFWS Species of Concern; BLM Sensitive; SGCN 1B	Cave myotis are found in desert scrub vegetation consisting of creosote bush brittlebush, paloverde and cacti. Forms large colonies of 2,000 to 5,000 individuals in mines, caves, bridges and sometimes buildings. Feeds opportunistically on small moths, weevils, antlions, and small beetles that it catches in flight over the desert scrub vegetation (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Myotis yumanensis Yuma Myotis	USFWS Species of Concern; SGCN 1B	Occupies a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands, and forests, usually near open water. Foraging occurs over water or in open spaces over land. Warm-season roosts are in caves, cliff crevices, bridges, buildings, tunnels, abandoned cliff swallow nests, and cavities of large live trees (redwood, Douglas-fir, oak, maple) near water. Large nursery colonies may form in buildings, caves, mine tunnels, and under bridges (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Notiosorex cockrumi Cockrum's Desert Shrew	SGCN 1B	Occurs in desert and desert scrub habitat, dry woodlands, pinion-juniper, and Ponderosa pine forests. Prefers areas with fallen branches or other cover that allows for more humid habitat pockets in the desert. Small nests are made of plant fiber, often in wood rat nests. Diet is similar to other shrews and includes small invertebrates like insects and earthworms, small vertebrates including amphibians and neonate rodents, and some seeds and fungi (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Nyctinomops femorosaccus Pocketed Free-tailed Bat	SGCN 1B	Occurs rarely in low-lying arid areas, including desert scrub, woodlands, and evergreen forests. Requires high cliffs or rocky outcrops for roosting sites. Feeds on small moths, beetles, flying ants, flies, leafhoppers, crickets, and other insects (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Odocoileus virginianus White-tailed Deer	SGCN 1B	Habitats are variable throughout the range of the white-tailed deer, but basic requirements are wooded areas for cover and open areas for foraging. May be common in mesquite brushland and thornscrub habitats. Feeds on leaves, twigs, nuts, berries, fungi, grasses, and some agricultural crops (AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Panthera onca Jaguar	Federally endangered; SGCN 1A	Prefer wetter lowland habitats like swampy grasslands and tropical rain forests, but at the northern end of their range in Arizona, they occur in more arid habitats from desert scrub to pine-oak woodland. Recent sightings have been above 5,000 ft. The jaguar is an apex predator, taking larger prey such as deer and javelinas	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		as well as smaller species when available and depending on the location within the large range of the species (AZGFD 2019a).	
Perognathus amplus Arizona Pocket Mouse	SGCN 1B	Associated with areas of flat desert scrub with firm, fine sandy soils, and sparse creosote bush vegetation. Stays torpid in a burrow over winter. Feeds on the seeds of creosote bush and other plants (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.
Perognathus amplus cineris Wupatki Arizona Pocket Mouse	USFWS Species of Concern; SGCN 1B	Found in desert scrubland and desert grassland habitats in a highly restricted range in northern Arizona. Inhabits flat areas with fine, firm soils and scattered shrubs or bunchgrasses. Occurs most frequently between 4,750 and 5,300 ft.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnal.
Sciurus arizonensis Arizona Gray Squirrel	SGCN 1B	Found in river valleys and canyons in mixed oak-pine forest and woodland habitats. Occurs in areas with abundant black walnuts and acorns, and in cottonwood and sycamore groves. Places nests made from leaves in trees.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5,10-6, 28-3, and 28-4.
Sigmodon ochrognathus Yellow-nosed Cotton Rat	USFWS Species of Concern; SGCN 1C	Occurs on dry rocky slopes in sparse grassy habitats, oak woodlands, and montane meadows in Ponderosa pine and Douglas fir forests. Associated with bunch grasses, beargrass, agave and yucca. Nests are above ground in bunch grasses, or underground. Yellow-nosed cotton rats feed on grasses and prickly pear fruit where it occurs. Do not require a free water source (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Sorex arizonae Arizona Shrew	USFWS Species of Concern, USFS Sensitive; SGCN 1B	Associated with riparian vegetation in mountain canyons. Typical vegetation includes oak, walnut, maple, sycamore, Douglas fir, quaking aspen, and conifers. Suitable habitats have heavy ground cover consisting of logs, rocks and dense vegetation and a surface water source. The Arizona shrew forages on arthropods, earthworms, slugs, and other insects (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.

Table 4

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Tadarida brasiliensis Brazilian Free-tailed Bat	SGCN 1B	Inhabits the Lower Sonoran and Upper Sonoran life zones. Primarily a lowland species, it occasionally ranges into the highlands. They can form extremely large colonies, in excess of 100,000 individuals, in caves, mines, bridges, parking garages, buildings and attics. They feed primarily on moths. Capable of fast, long distance flight, and may travel as much as 30 miles from its roots to forage (Adams 2003, WBWG 2019).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Thomomys umbrinus intermedius Southern Pocket Gopher	SGCN 1B	Found in gravely soils on rocky slopes in open oak woodland. Found towards the base of mountain ranges. Other vegetation associated with this gopher include juniper, agave, mountain mahogany, sumac, and grasses. Feeds on roots, tubers, grasses, and forbs like most pocket gophers (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.
Vulpes macrotis Kit Fox	SGCN 1B	Found in open arid areas, shrub grasslands and desert habitats. They use an underground den to rest during the day. Dens may have multiple entrances and there may be several dens in a territory. Primarily nocturnal, they feed on kangaroo rats, rabbits, reptiles, insects, and some berries (Reid 2006, AZGFD 2019a).	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5, 10-3, 10-5, 10-6, 28-3, and 28-4 including Cerro del Fresnal.

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Table 5: Special-Status Plant Species with Potential to Occur

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
MONOCOT			
Asparagaceae – Asparagus family			
Agave parviflora ssp. *parviflora* Santa Cruz Striped Agave	USFWS Species of Concern; USFS Sensitive	Perennial succulent found on open rocky slopes in desert grasslands and oak woodlands between 3,000 to 5,000 feet (ft.). Blooming period June to July.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4 including Cerro del Fresnel.
Orchidaceae – Orchid family			
Spiranthes delitescens Canelo Hills Ladies'-tresses	Federally Endangered	Perennial occurring in cienegas, wet riparian meadows, stream banks between 4,500 to 5,000 ft in the San Pedro River watershed. Blooming period July to August.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
EUDICOTS			
Apiaceae – Carrot family			
Lilaeopsis schaffneriana ssp. *recurva* Huachuca Water-umbel	Federally Endangered	Semi-aquatic perennial herb/forb found in cienegas, streams, rivers, and springs in Sonoran Desert scrub, grassland, oak woodland, and conifer forest habitats between 4,000 and 6,500 ft. Requires perennial water, small to medium drainage areas, and gentle stream gradients, as well as intermediate flooding frequency. Typically found between 2 and 6 inches deep; occasionally 10, in water sources with silty or muddy substrates.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Apocynaceae – Dogbane family			
Amsonia grandiflora Large-flowered Blue Star	USFWS Species of Concern; USFS Sensitive	Perennial herb found in canyons in oak woodland between 3,900 and 4,500 ft. Blooming period March to May.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.

Table 5

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Asclepiadaceae – Milkweed family			
Cynanchum wigginsii Wiggins Milkweed Vine	USFWS Species of Concern; USFS Sensitive	Perennial herbaceous vine that inhabits rocky slopes, canyons, and oak woodland habitats. Occurs in desert mountain ranges between 3,500 and 5,500 ft. Blooming period August to October.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Asteraceae - Sunflower family			
Erigeron arisolius Arid Throne Fleabane	USFS Sensitive	Annual herb/forb found in grasslands, openings, and roadsides in moist areas, sometimes with mesquite and oak species. Occurs between 4,000 and 5,000 ft. Blooming period May to June.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Heterotheca rutteri Huachuca Golden Aster	USFWS Species of Concern; USFS Sensitive; BLM Sensitive	Perennial herb found in mesquite grasslands, grassy understory in oak woodlands, and grassy flood plains between 3,200 and 5,000 ft, in the vicinity of the Huachuca and Santa Rita mountains. Grows in sandy or loamy soils. Blooming period August to October.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Pectis imberbis Beardless Cinchweed	Proposed Federally Endangered; USFS Sensitive	Perennial occurring in pine oak and juniper woodlands, grasslands and arid shrublands between 3,300 and 5,500 ft. Blooming period August and October.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Senecio multidentatus var. huachucanus Huachuca Groundsel	USFS Sensitive	Perennial occurring in mountainous habitats between 5,900 and 7,200 ft. Blooming period is Spring to Summer months.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.

Table 5

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
Cactaceae - Cactus family			
Coryphantha recurvata Santa Cruz Beehive Cactus	USFS Sensitive	Perennial succulent. Occurs in valleys, mesas, foothills, grasslands, oak belts, and grassy or rocky areas between 4,000 and 5,900 ft. Blooming period approximately begins in July.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Coryphantha robbinsorum Cochise Pincushion Cactus	USFWS Listed Threatened	Perennial succulent occurs in semidesert grasslands with limestone substrates between 4,250 and 5,000 ft. Blooming period March to April, fruiting June to August.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5.
Coryphantha robustispina ssp. scheeri Pima Pineapple Cactus	USFWS Listed Endangered	Perennial succulent found in lower Sonoran Desert scrubland and desert grassland habitats of southeastern Arizona and northern Sonora, Mexico. Occurs in Brawley wash and Upper Santa Cruz subbasins of the Santa Cruz Watershed. Blooming period begins in July.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 10-5, 10-6, 28-3, and 28-4.
Euphorbiaceae - Spurge family			
Tragia laciniata Sonoita Noseburn	USFS Sensitive	Perennial vine found in oak woodlands, canyons, and stream banks between 3,900 and 5,500 ft. Blooming period Summer to Fall.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Fabaceae – Pea family			
Astragalus hypoxylus Huachuca Milkvetch	USFWS Species of Concern; USFS Sensitive; BLM Sensitive	Perennial herb/forb found in open, rocky clearings and hillsides in oak-juniper-pinyon woodland, and in drainages and clearings. Occurs from	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.

Table 5

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		5,000 to 6,000 ft. Blooming period April to March.	
Coursetia glabella Smooth Baby-bonnets	USFWS Species of Concern; USFS Sensitive	Perennial herb found on shady rocky slopes and disturbed areas in oak and oak-pine forest habitats.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Desmodium metcalfei Metcalfe's Tick-trefoil	USFS Sensitive	Perennial herb found in canyons, rocky slopes, and ditches in interior chaparral, semi-desert grasslands, pinyon-juniper woodland, montane conifer forest, and riparian plant communities. Occurs from 4,000 to 6,500 ft. Blooming period begins in July, August to October.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Macroptilium (=Phaseolus) supinum Supine Bean	USFWS Species of Concern; USFS Sensitive	Perennial herb or vine known from 12 localities in southern Arizona. Habitat incudes grassy and rocky slopes of oak savannah woodlands on southern or eastern aspects and ridgetops. Blooming period July with summer monsoonal activity.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-5 and 10-6.
Passifloraceae – Passionflower family			
Passiflora arizonica Arizona Passionflower	USFS Sensitive	Perennial, tendril-climbing vine found on rocky, igneous slopes in semi-desert and oak savanna habitats. Occurs between 3,200 and 5,900 ft. Blooming period June to September.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 10-3, 28-3, and 28-4.
Primulaceae – Primrose family			
Samolus vagans Chiricahua Mountain Brookweed	USFS Sensitive	Perennial occurring in mesic sandy substrates between 3,200 and 6,500	This species has potential to occur across the Survey Area in appropriate habitats in project

Table 5

NAME	STATUS	HABITAT	POTENTIAL TO OCCUR IN SURVEY AREA
		ft. Blooming period between Spring and Fall.	segments 10-5 and 10-6.
Rosaceae – Rose family			
Vauquelinia californica subsp. pauciflora Limestone Arizona Rosewood	USFWS Species of Concern	Perennial shrub or tree from occurring in chaparral and desert scrub habitats with limestone substrates between 4,500 and 7,500 ft. Blooming period in Spring months.	This species has potential to occur across the Survey Area in appropriate habitats in project segments 9-5.

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Figure 1.1: Project Overview Map

Project Overview Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
1.1

KEY

US-Mexico Border

Counties

New Primary

- Section 28-4A (1.2 mi.)
- Section 28-4B (1.8 mi.)
- Section 28-4C (2.7 mi.)
- Segment 10-3 (21 mi.)
- Segment 10-5 (4.2 mi.)
- Segment 10-6 (2.1 mi.)
- Segment 28-3 (2.5 mi.)
- Segment 9-5 (4.7 mi.)

Primary Replacement

- Segment 10-1 (2.1 mi.)
- Segment 10-4 (0.2 mi.)
- Segment 28-1 (7.0 mi.)
- Segment 9-1 (9.0 mi.)
- Segment 9-2 (14.0 mi.)
- Segment 9-3 (1.0 mi.)
- Segment 9-4 (1.0 mi.)

Casas Adobes
Tucson
Saguaro National Park
Pima County
Green Valley
7743 ft
Las Cienegas NCA
Buenos Aires Nat'l Wildlife Refuge
Santa Cruz County
Sierra Vista
Cochise County
Chiricahua Mountains
9752 ft
Sulphur Springs Valley
San Simon River
Bisbee
9473 ft
Nogales
Agua Prieta
Cananea
2486 m
2618 m
1661 m
Magdalena de Kino
Santa Ana

Segment 28-3
Segment 28-1
Section 28-4A
Section 28-4B
Section 28-4C
Segment 10-3
Segment 10-1
Segment 10-4
Segment 10-5
Segment 10-6
Segment 9-1
Segment 9-4
Segment 9-2
Segment 9-3
Segment 9-5

Engineering Scale
1" = 66,000'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 30,000 60,000 Feet

DAWSON

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Figure 1.2: Project Location Map

Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

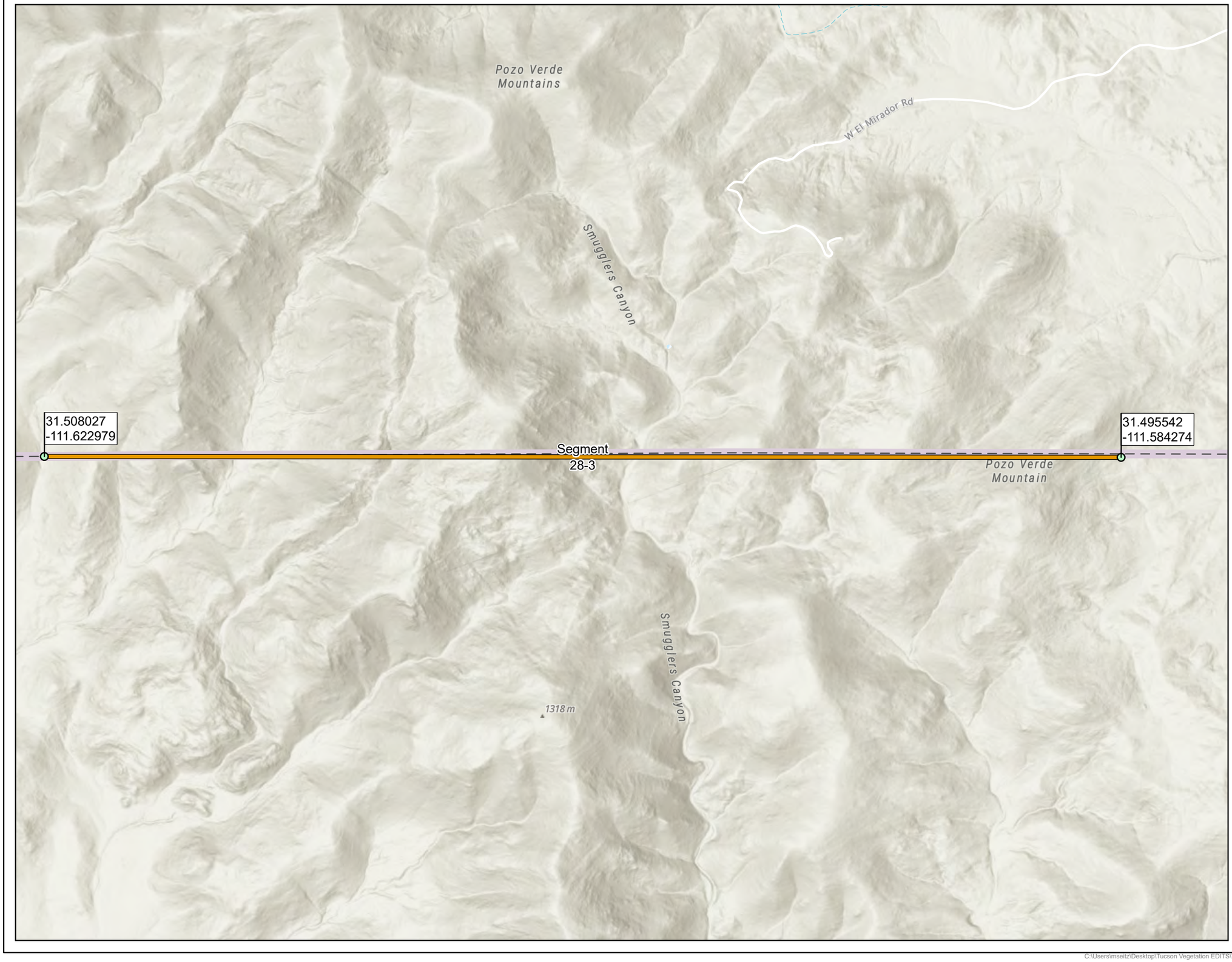
Figure
1

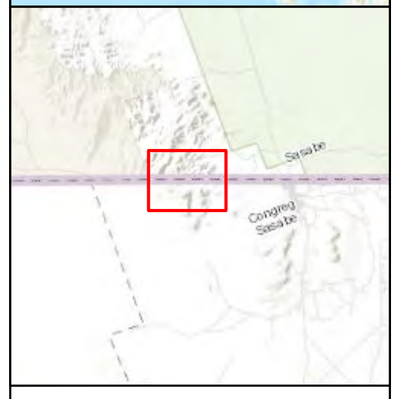
KEY

US-Mexico Border

Sector Segment

New Primary (2.5 mi.)





Engineering Scale
1" = 1,100'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N
W
E
S

0 550 1,100 Feet

DAWSON

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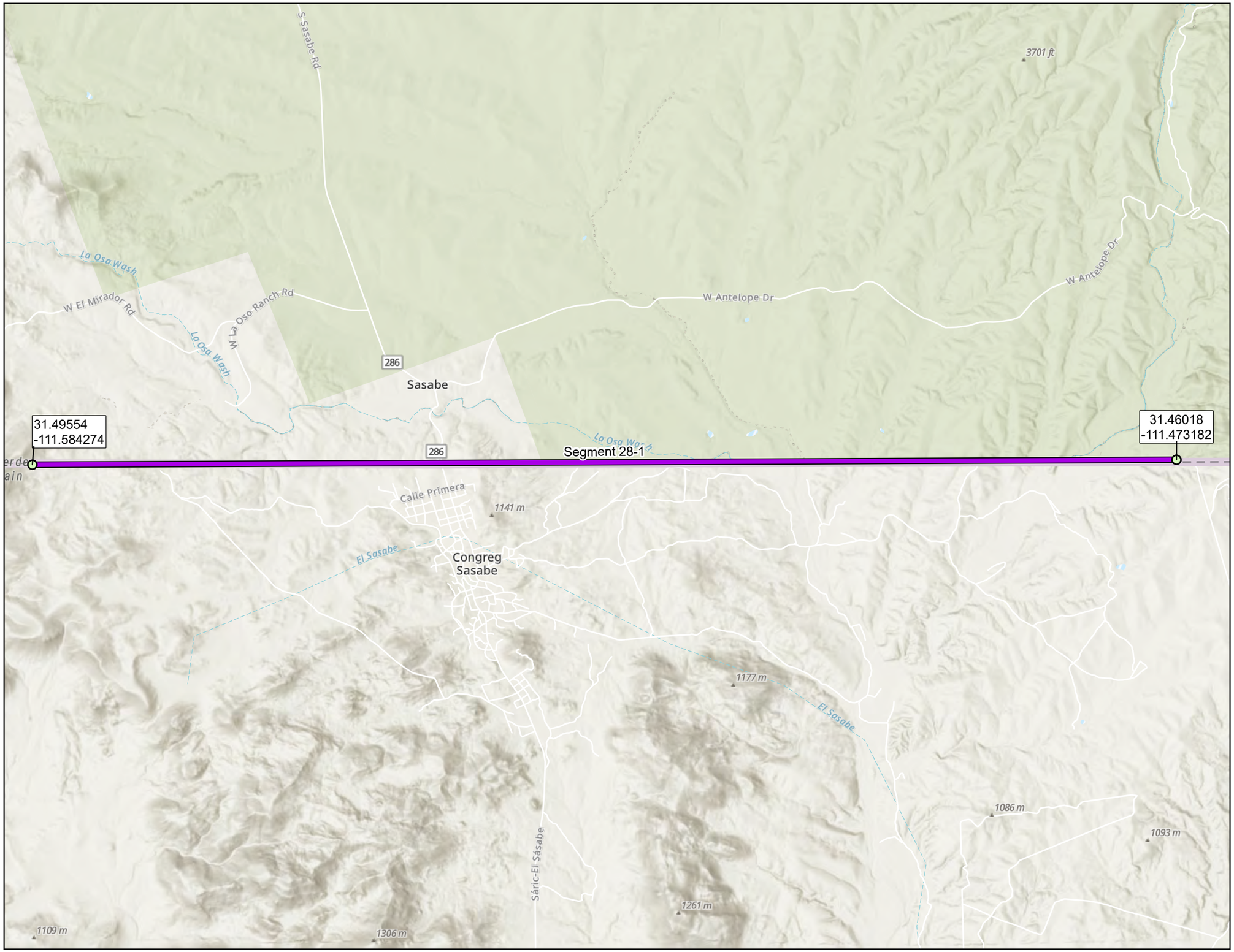


Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

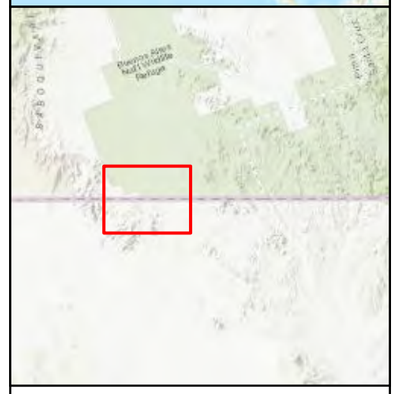
Date	Figure
OCTOBER 2020	1.2 B

KEY

US-Mexico Border

Sector Segment

Replacement Primary (7 mi.)



Engineering Scale
1" = 3,000'

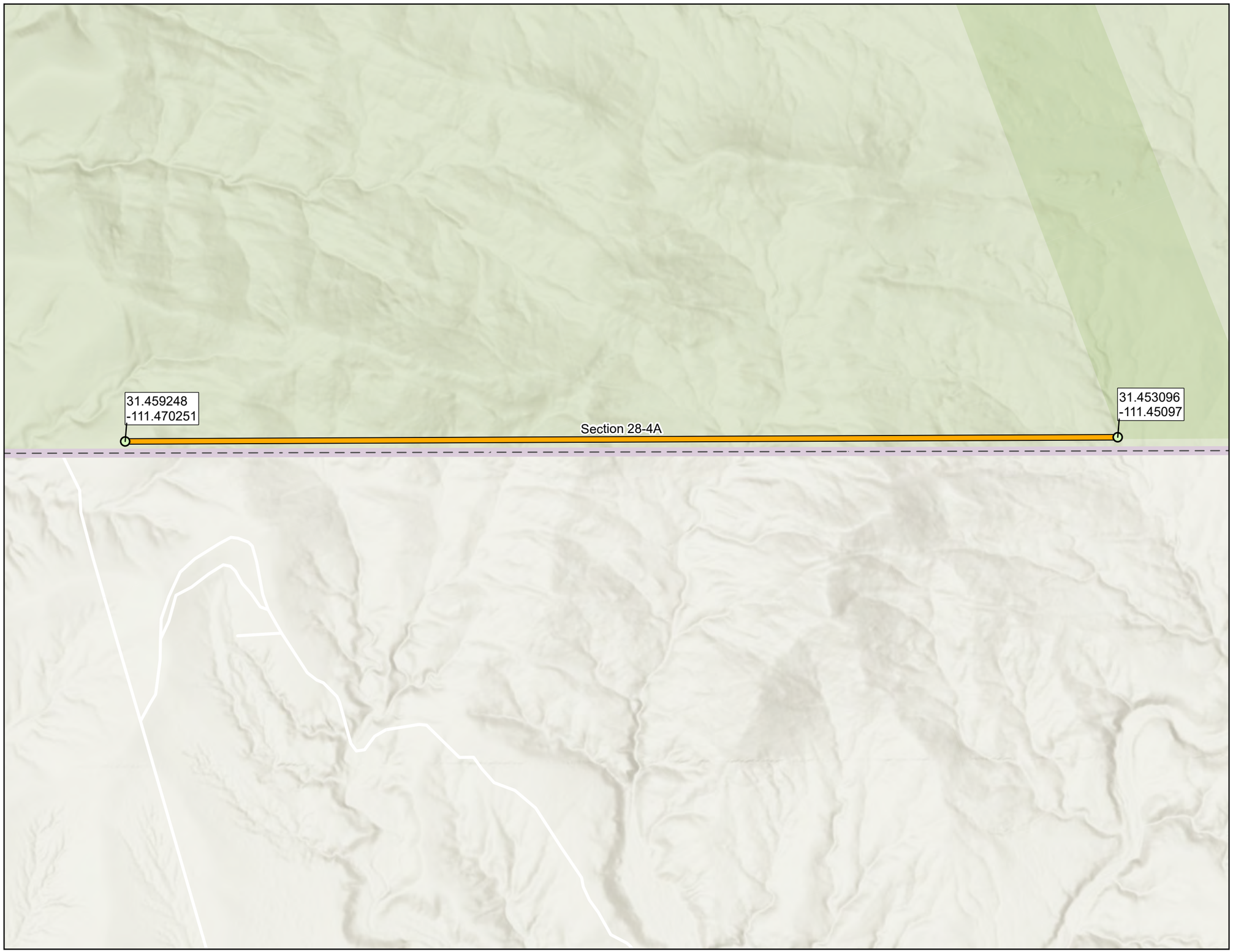
Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 1,500 3,000 Feet

DAWSON



Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

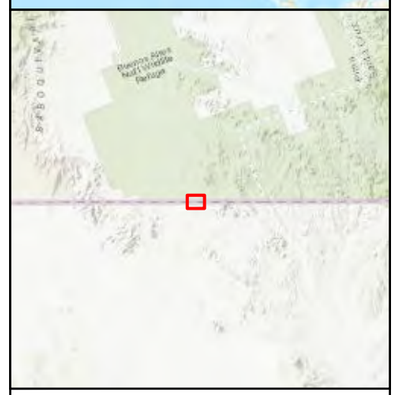
Date	Figure
OCTOBER 2020	1.2 C

KEY

US-Mexico Border

Sector Segment

New Primary (1.2 mi.)



Engineering Scale
1" = 600'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 300 600 Feet

DAWSON

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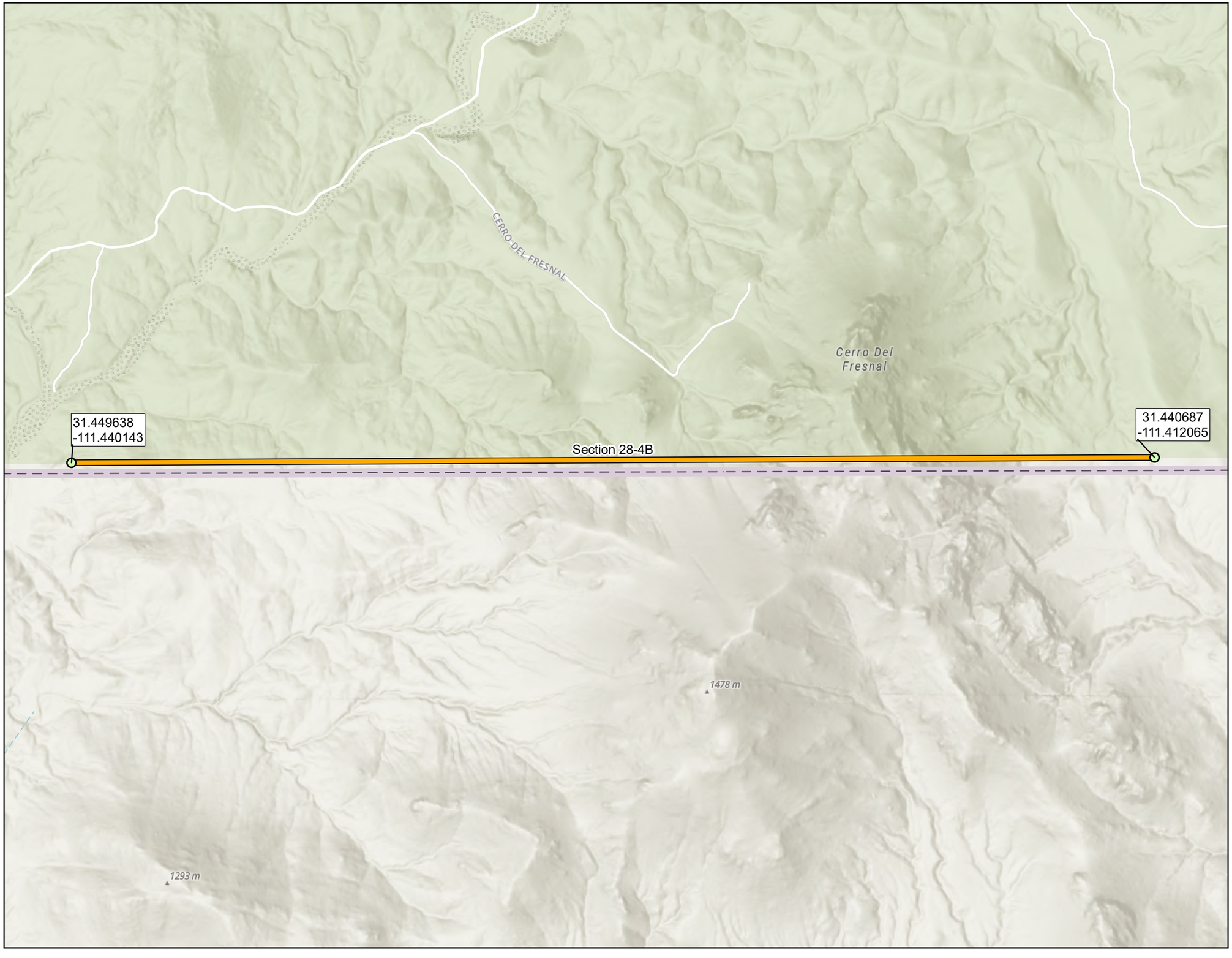

Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	1.2 D

KEY

US-Mexico Border

Sector Segment

New Primary (1.8 mi.)

Engineering Scale
1" = 800'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 400 800 Feet

DAWSON

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Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

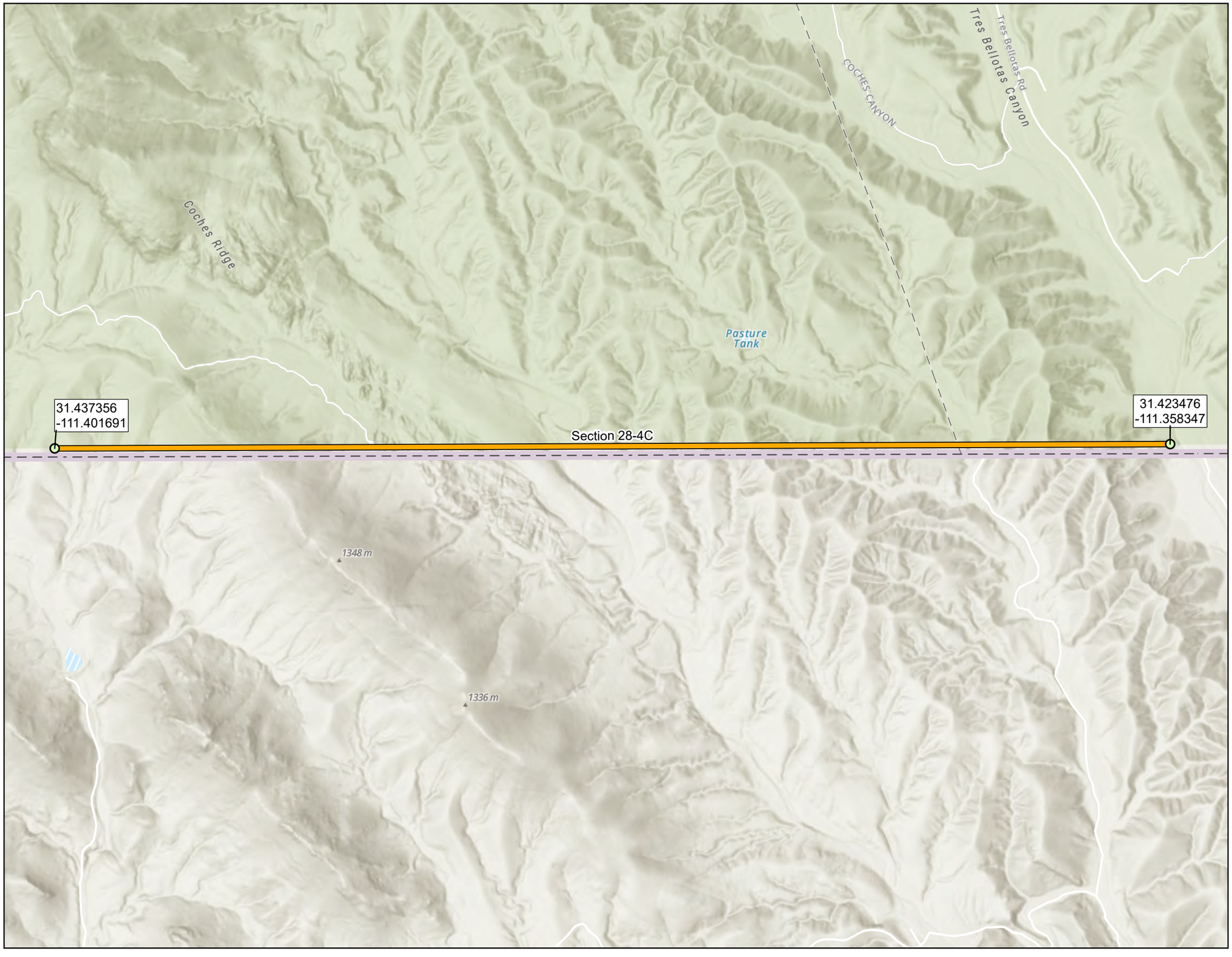
Date	Figure
OCTOBER 2020	1.2E

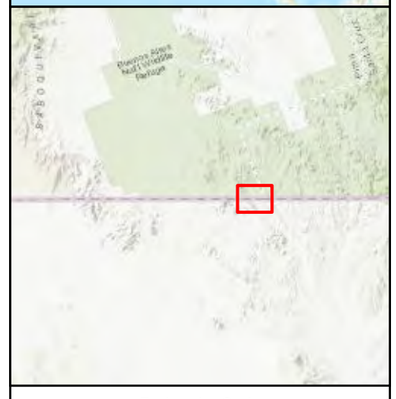
KEY

US-Mexico Border

Sector Segment

New Primary (2.7 mi.)





Engineering Scale
1" = 1,200'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 600 1,200 Feet

DAWSON

Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

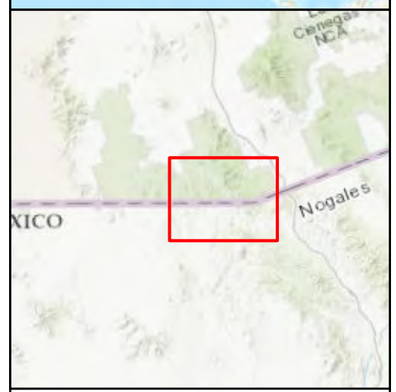
Date	Figure
OCTOBER 2020	1.2F

KEY

US-Mexico Border

Sector Segment

New Primary (21 mi.)



Engineering Scale
1" = 9,100'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 4,550 9,100 Feet

DAWSON

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Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

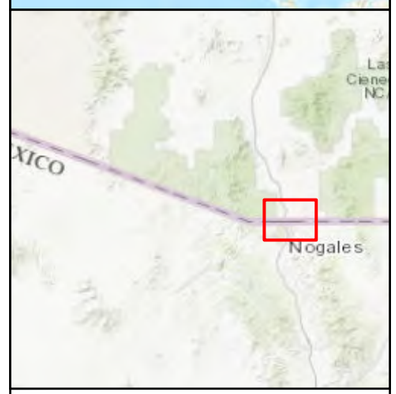
Date	Figure
OCTOBER 2020	1.2G

KEY

US-Mexico Border

Sector Segment

Replacement Primary (2.3 mi. total)



Engineering Scale
1" = 4,400'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 2,200 4,400 Feet

DAWSON

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Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

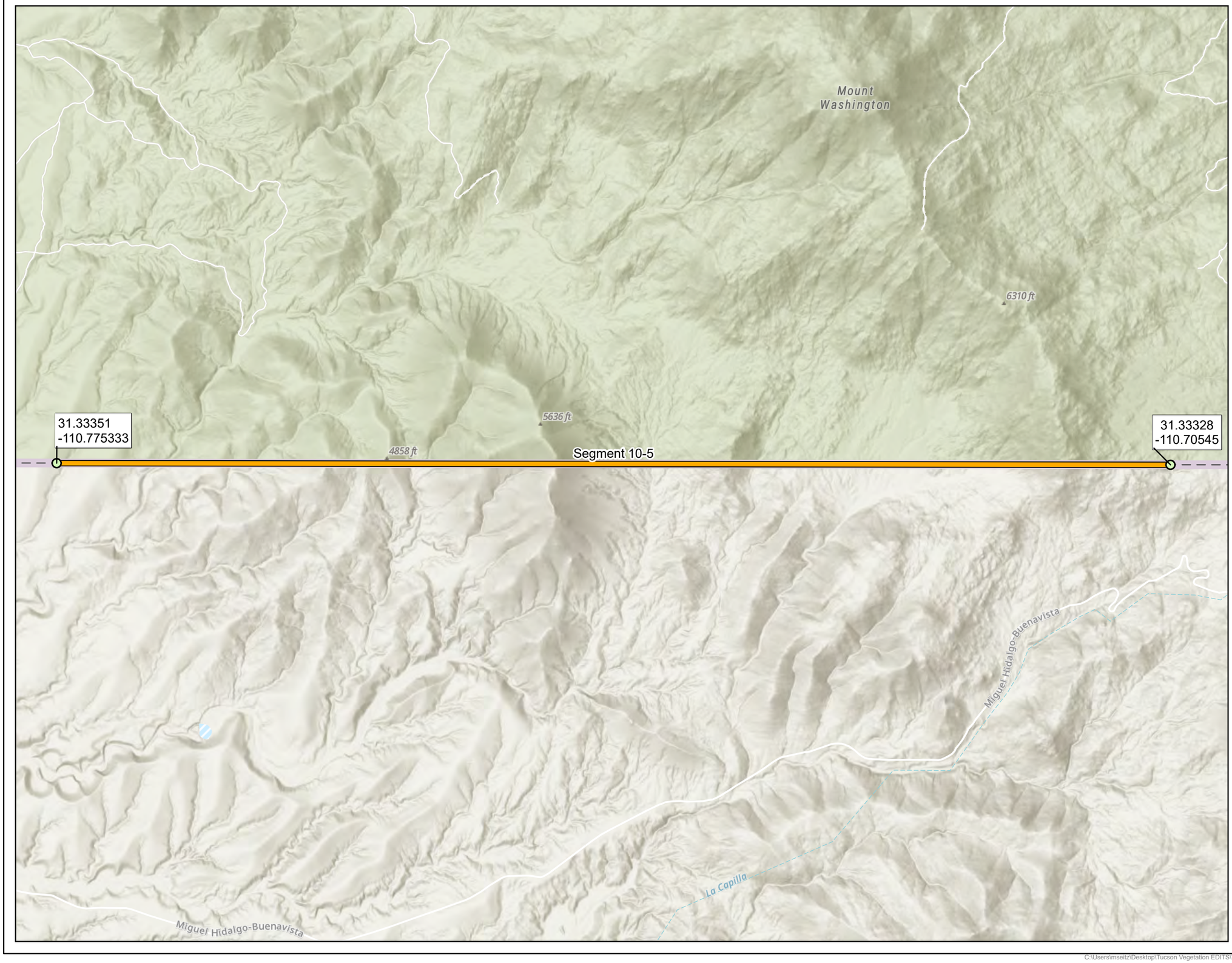
Date	Figure
OCTOBER 2020	1.2H

KEY

US-Mexico Border

Sector Segment

New Primary (4.2 mi.)



Engineering Scale
1" = 1,800'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 900 1,800 Feet

DAWSON

Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

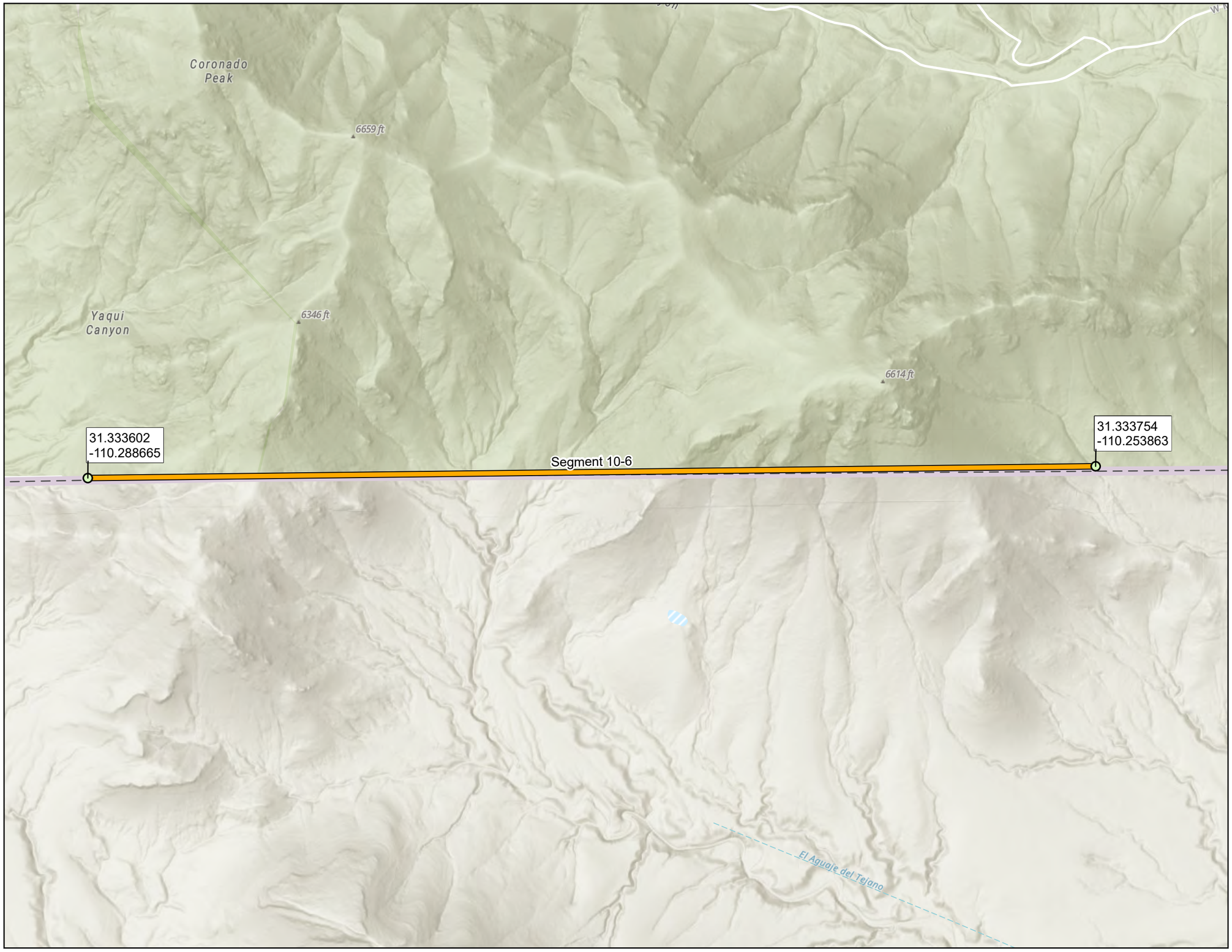
Figure
1.2I

KEY

US-Mexico Border

Sector Segment

New Primary (2.1 mi.)



Engineering Scale
1" = 1,000'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N
W
E
S

0 500 1,000 Feet

DAWSON

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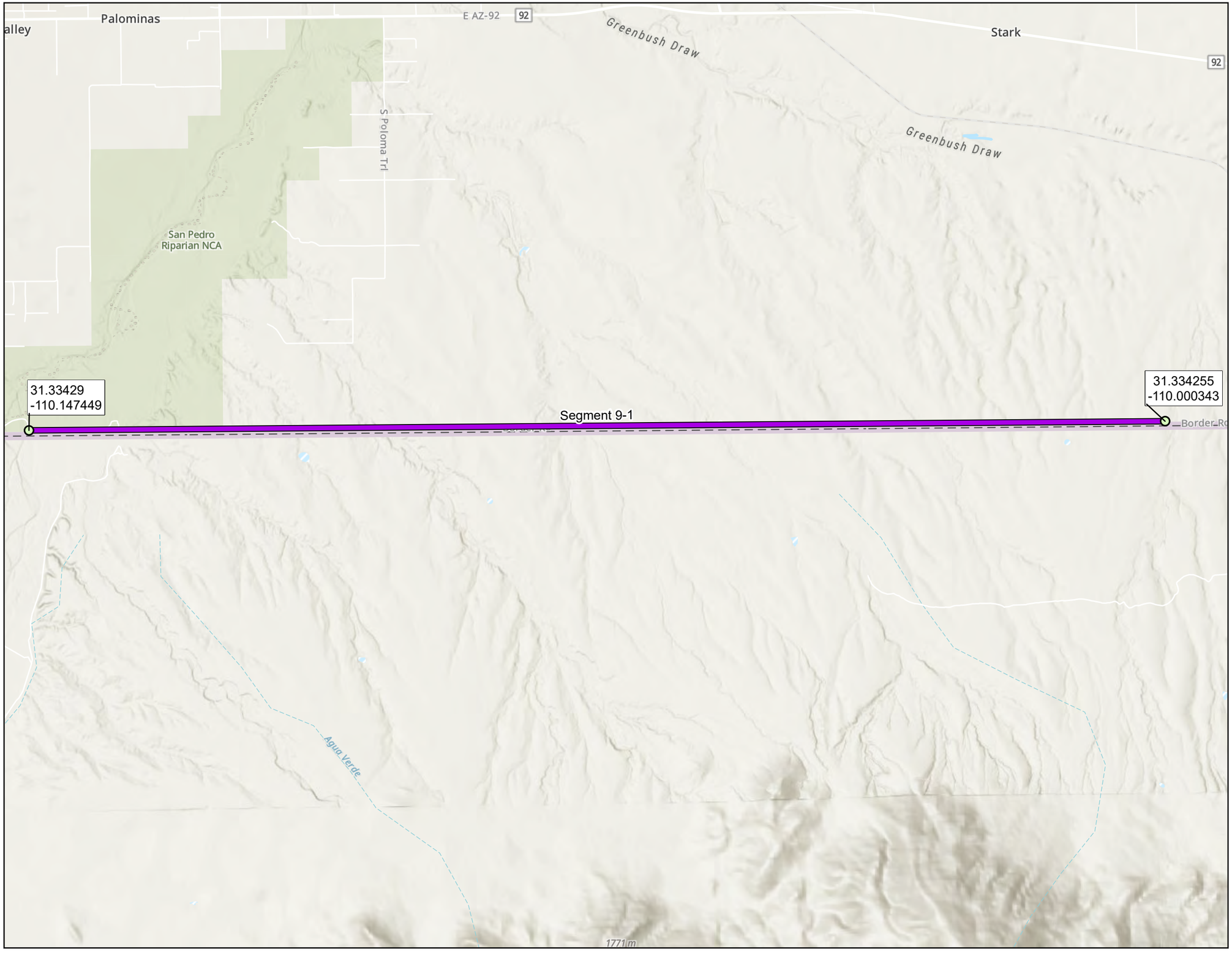

Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	11.2J

KEY

US-Mexico Border

Sector Segment

Replacement Primary (9 mi.)

Engineering Scale
1" = 3,750'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 1,875 3,750 Feet

DAWSON

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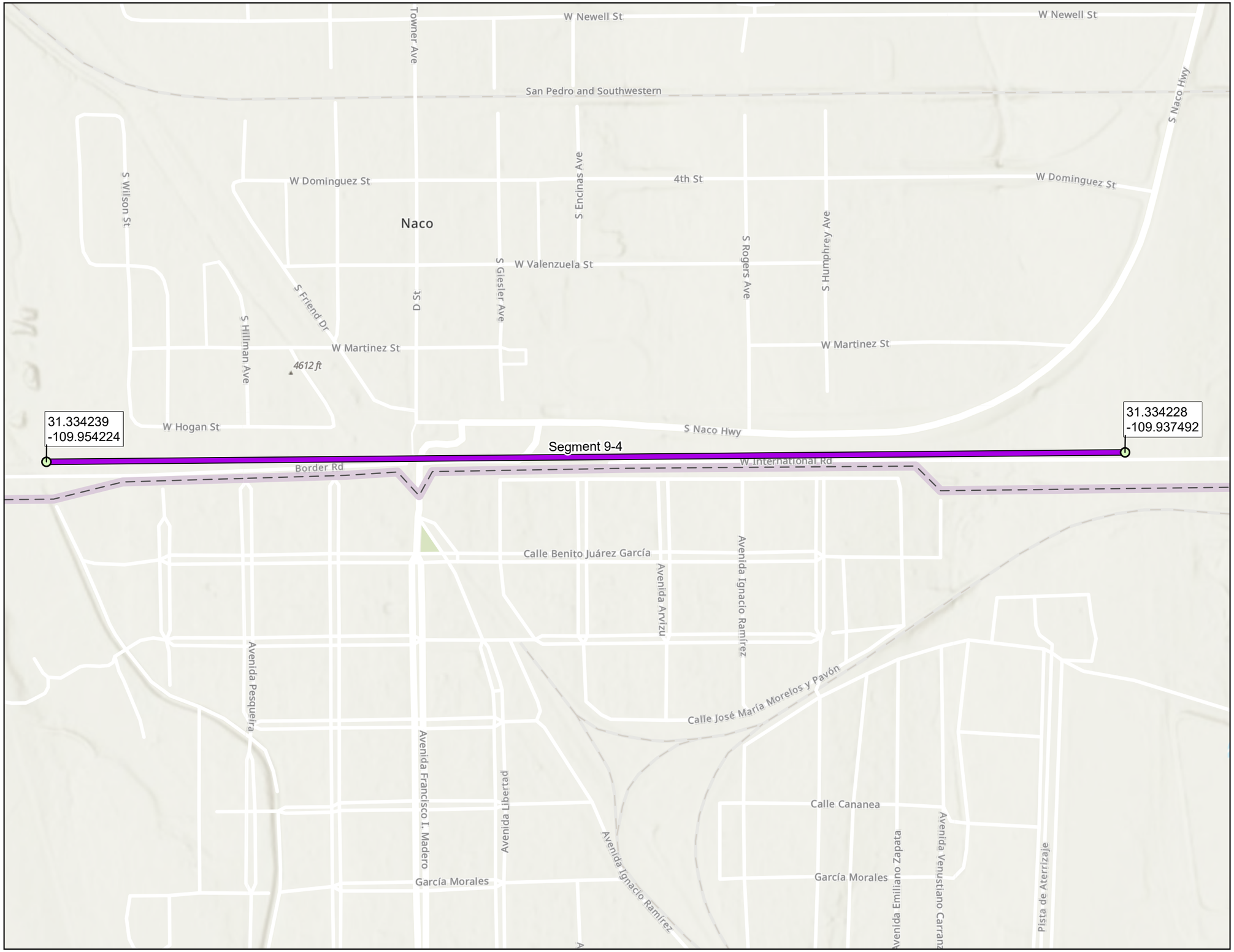


Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	1.2K

KEY

US-Mexico Border

Sector Segment

Replacement Primary (1 mi.)

Engineering Scale
1" = 450'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 225 450 Feet

DAWSON

Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

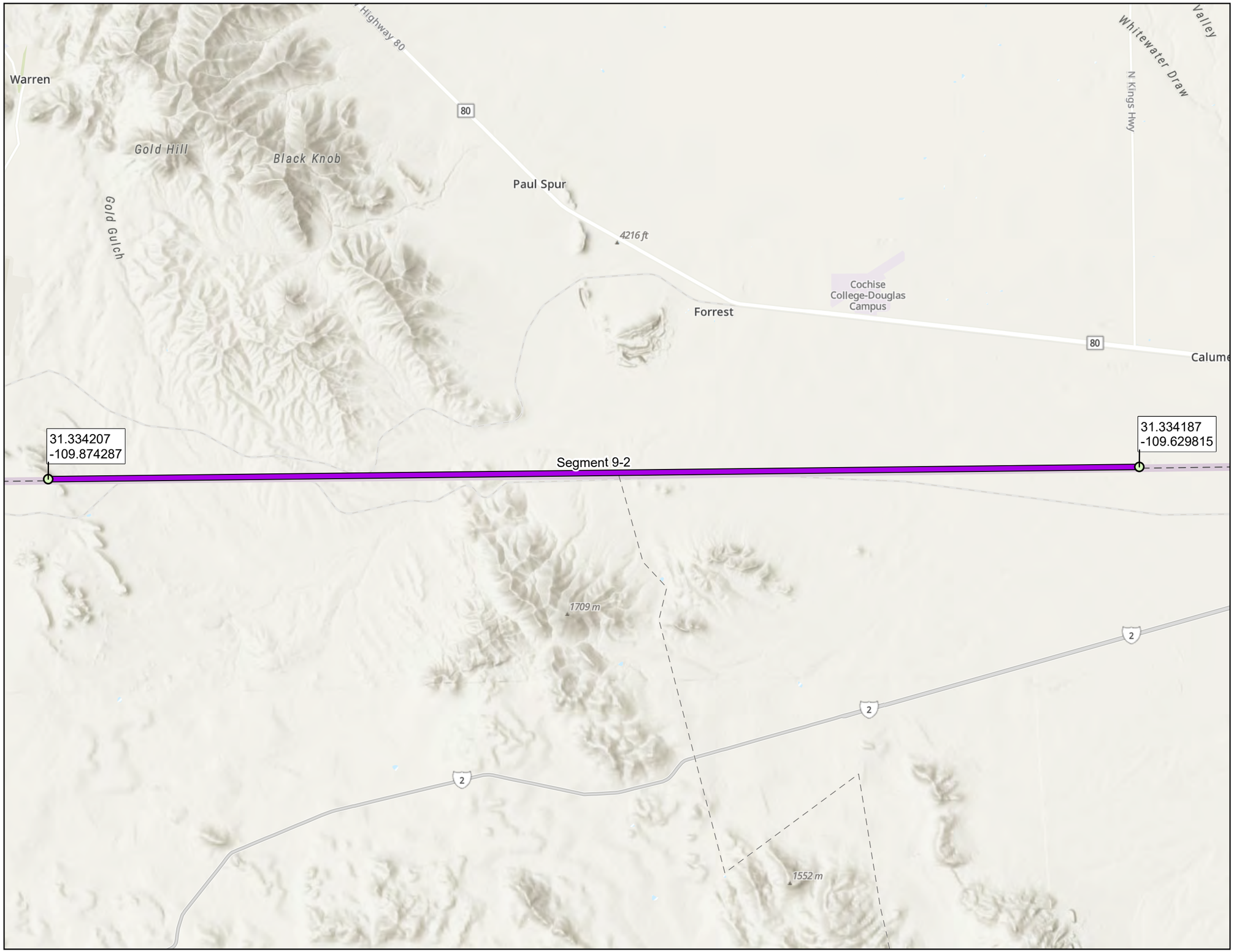
Date	Figure
OCTOBER 2020	1.2L

KEY

US-Mexico Border

Sector Segment

Replacement Primary (14 mi.)



Engineering Scale
1" = 6,500'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 3,250 6,500 Feet

DAWSON

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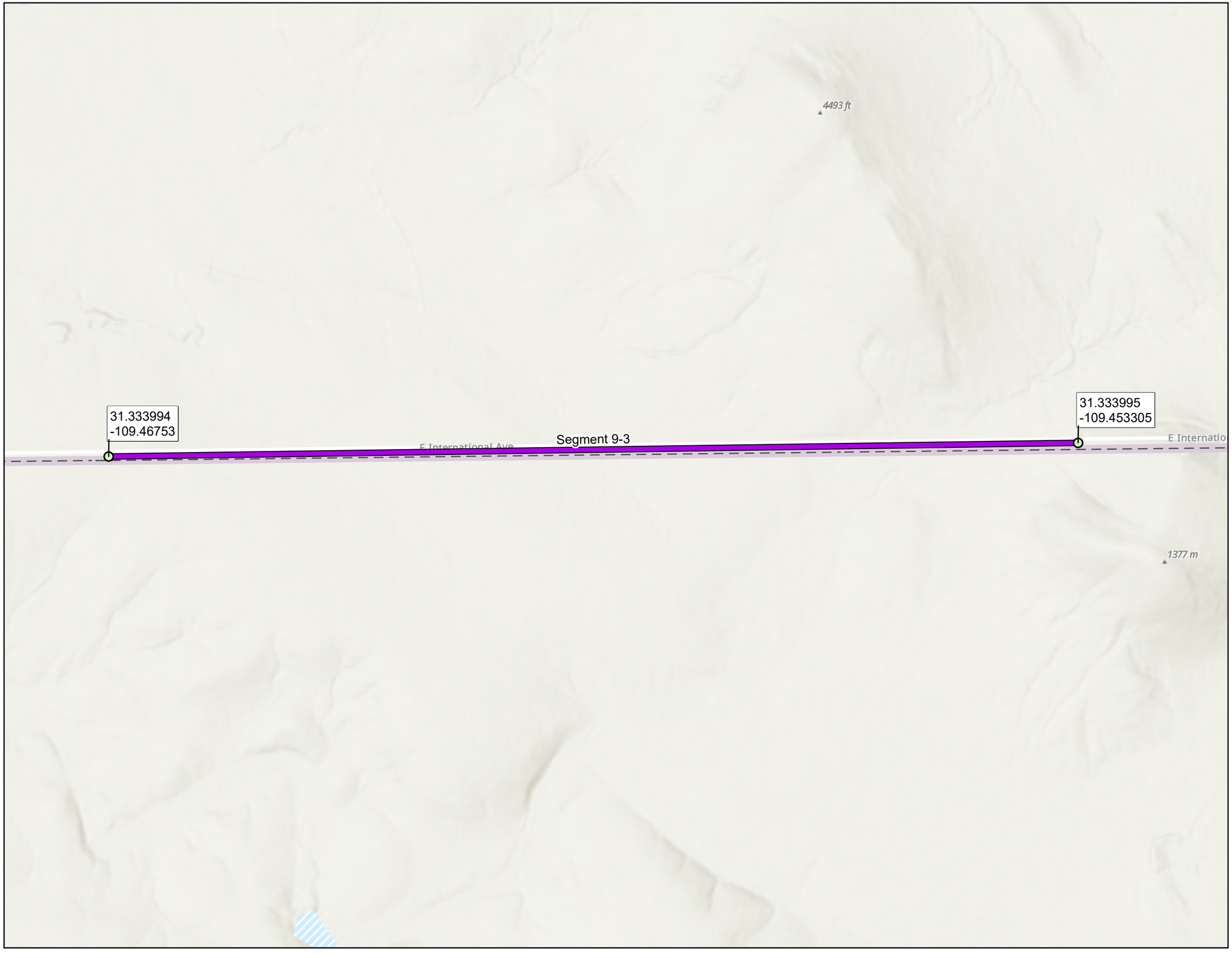


Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

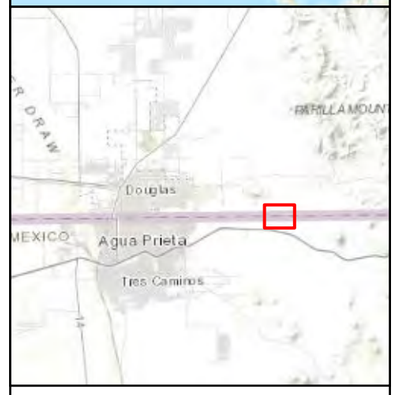
Date	Figure
OCTOBER 2020	1.2M

KEY

US-Mexico Border

Sector Segment

Replacement Primary (1 mi.)



Engineering Scale
1" = 425'

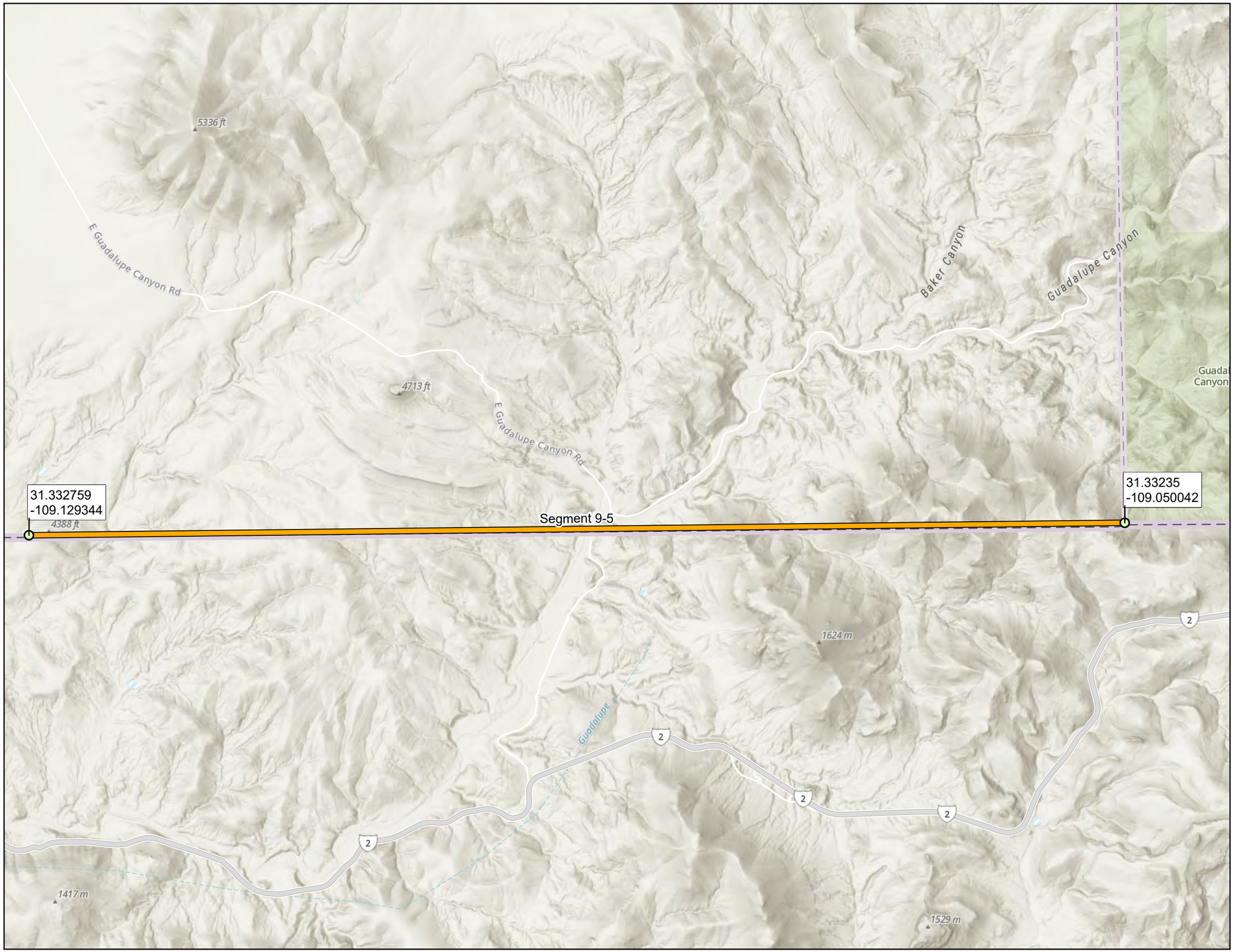
Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N
W E
S

0 212.5 425 Feet

DAWSON



Project Location Map
Primary Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	1.2 N

KEY

US-Mexico Border

Sector Segment

New Primary (4.7 mi.)

Engineering Scale
1" = 2,100'

Source(s)
DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 1,050 2,100 Feet

DAWSON

Figure 2: Vegetation Community Map

Map Frame 1

Map Frame 2

140

Map Frame 3

Map Frame 4

Segment 28-3

Segment 28-1

Section 28-4A

139

138

137

Sasabe

Mountain

Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
2.1

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Fouquieria splendens - Calliandra eriophylla-Partheniumincanum* Desert Scrub Alliance
- *Prosopis glandulosa-Prosopis velutina-Prosopis pubescens* Wet Scrub Alliance
- *Prosopis velutina Ruderal* Desert Scrub Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N
W
E
S

0 80 160 Feet

DAWSON

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Map Frame 1

Map Frame 2

137

Map Frame 3

Map Frame 4

128

Section 28-4A

137

Section 28-4B

136

1478 m

135

Section 28-4C

132

Segment 10-3

Tonto Canyon

130

129

Pajarito Mountains

128

126

127

Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
2.2

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Dasylirion ssp. / Bouteloua curtipendula-Muhlenbergia setifolia* Foothill Desert Grassland Alliance
- *Fouquieria splendens - Calliandra eriophylla-Partheniumincanum* Desert Scrub Alliance
- *Prosopis glandulosa-Prosopis velutina-Prosopis pubescens* Wet Scrub Alliance
- *Prosopis velutina Ruderal* Desert Scrub Alliance
- *Quercus oblongifolia* Scrub Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

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Map Frame 1

127

126

Map Frame 2

Map Frame 3

Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

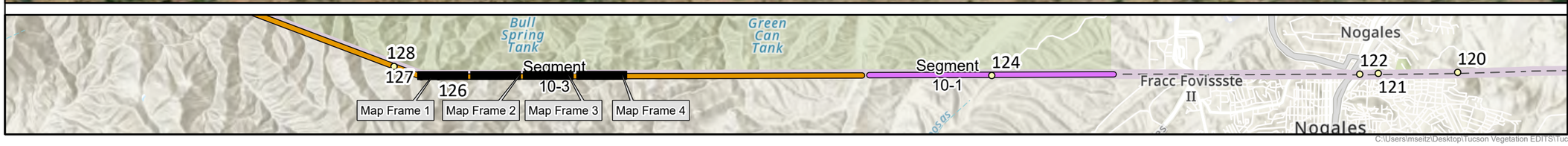
Date	Figure
OCTOBER 2020	2.3

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Arctostaphylos pungens-Arctostaphylos pringlei -Ceanothus greggii* Chaparral Alliance
- *Dasylirion ssp. / Bouteloua curtipendula-Muhlenbergia setifolia* Foothill Desert Grassland Alliance
- *Quercus oblongifolia* Scrub Woodland Alliance



Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

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Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
2.4

KEY

US-Mexico Border

Extent of Individual Map Frame

Northern Survey Area Boundary

Vegetation Association

Dasylirion ssp. / Bouteloua curtipendula-Muhlenbergia setifolia Foothill Desert Grassland Alliance

Quercus oblongifolia Scrub Woodland Alliance

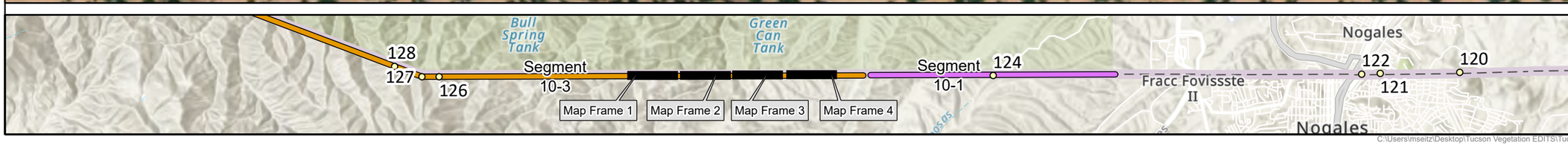
Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N
W
E
S

0 80 160 Feet



DAWSON

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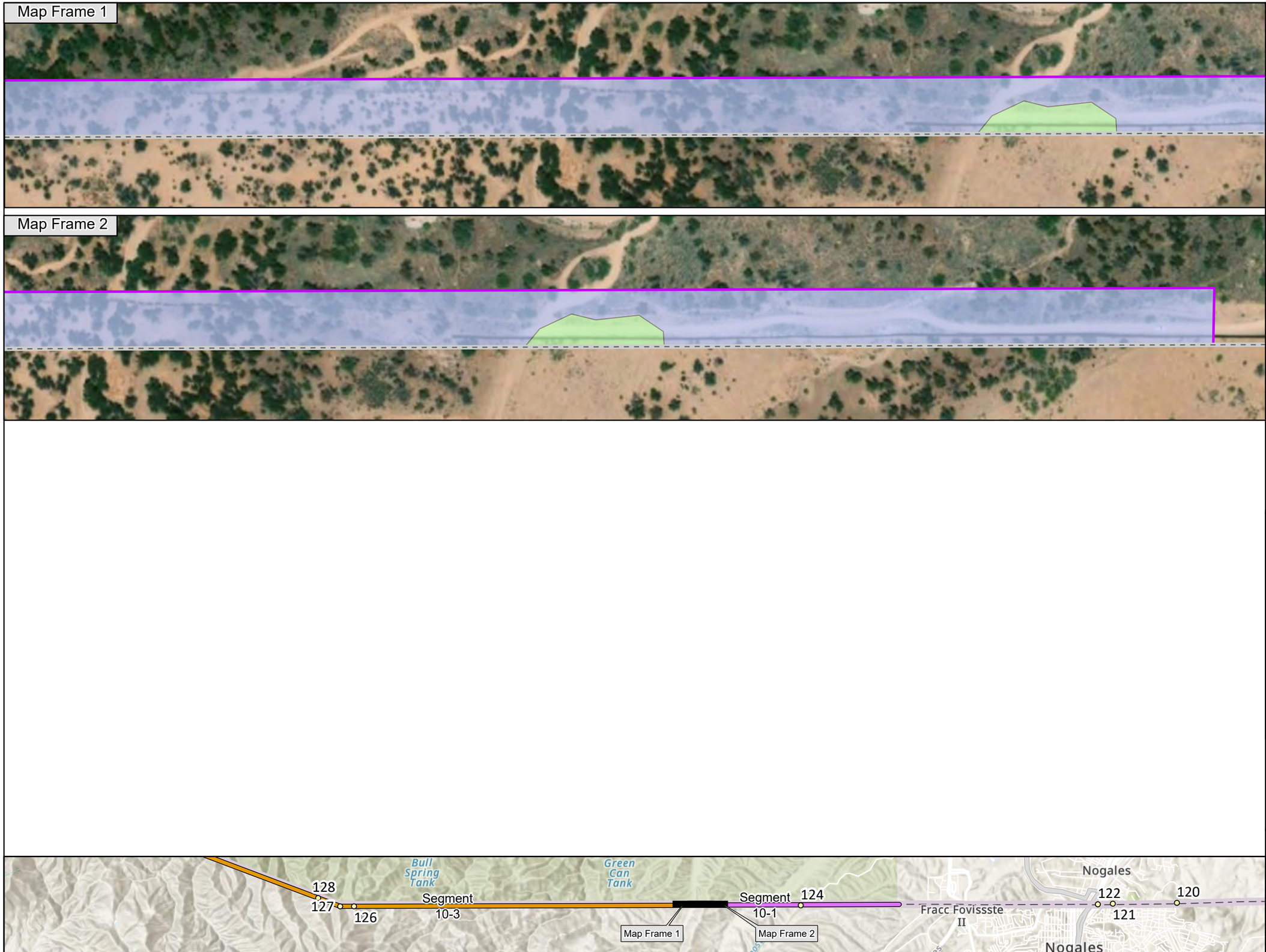

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
2.5

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Dasylirion ssp. / Bouteloua curtipendula-Muhlenbergia setifolia* Foothill Desert Grassland Alliance
- *Quercus oblongifolia* Scrub Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

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Map Frame 1

Map Frame 2

116

Map Frame 3

Map Frame 4

118 117 Camino Buena Vis 116 115 Segment 10-5 114 113

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Tank

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
2.6

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Prosopis velutina* Ruderal Desert Scrub Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

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Map Frame 1

Map Frame 2

113

Map Frame 3

Map Frame 4

118 117 Camino Buena Vis 116 115 Segment 10-5 114 113

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Tank

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
2.7

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Pinus cembroides - Pinus discolor - Pinus edulis* / Shrub Understory Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

Map Frame 1

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	2.8

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Acacia constricta - Acacia neovernicosa* Thornscrub Alliance
- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group

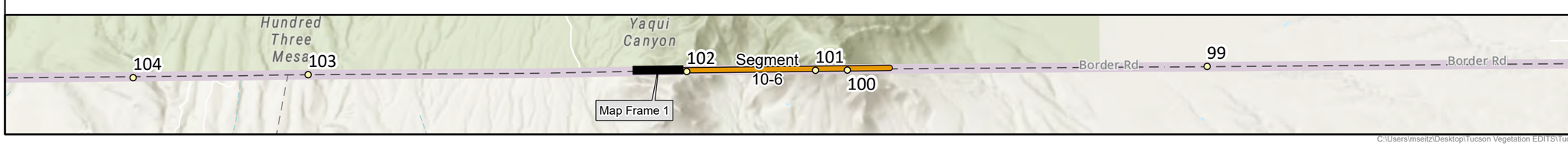
Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet



DAWSON

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Map Frame 1

74

Map Frame 2

Map Frame 3

Map Frame 4

75 — E International Ave — 74 — Segment 9-5 — 73 — 71 — 70

Map Frame 1 | Map Frame 2 | Map Frame 3 | Map Frame 4

1624 m

2

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	2.9

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Fouquieria splendens - Calliandra eriophylla* - Parthenium incanum Desert Scrub Alliance

Engineering Scale
1" = 160'

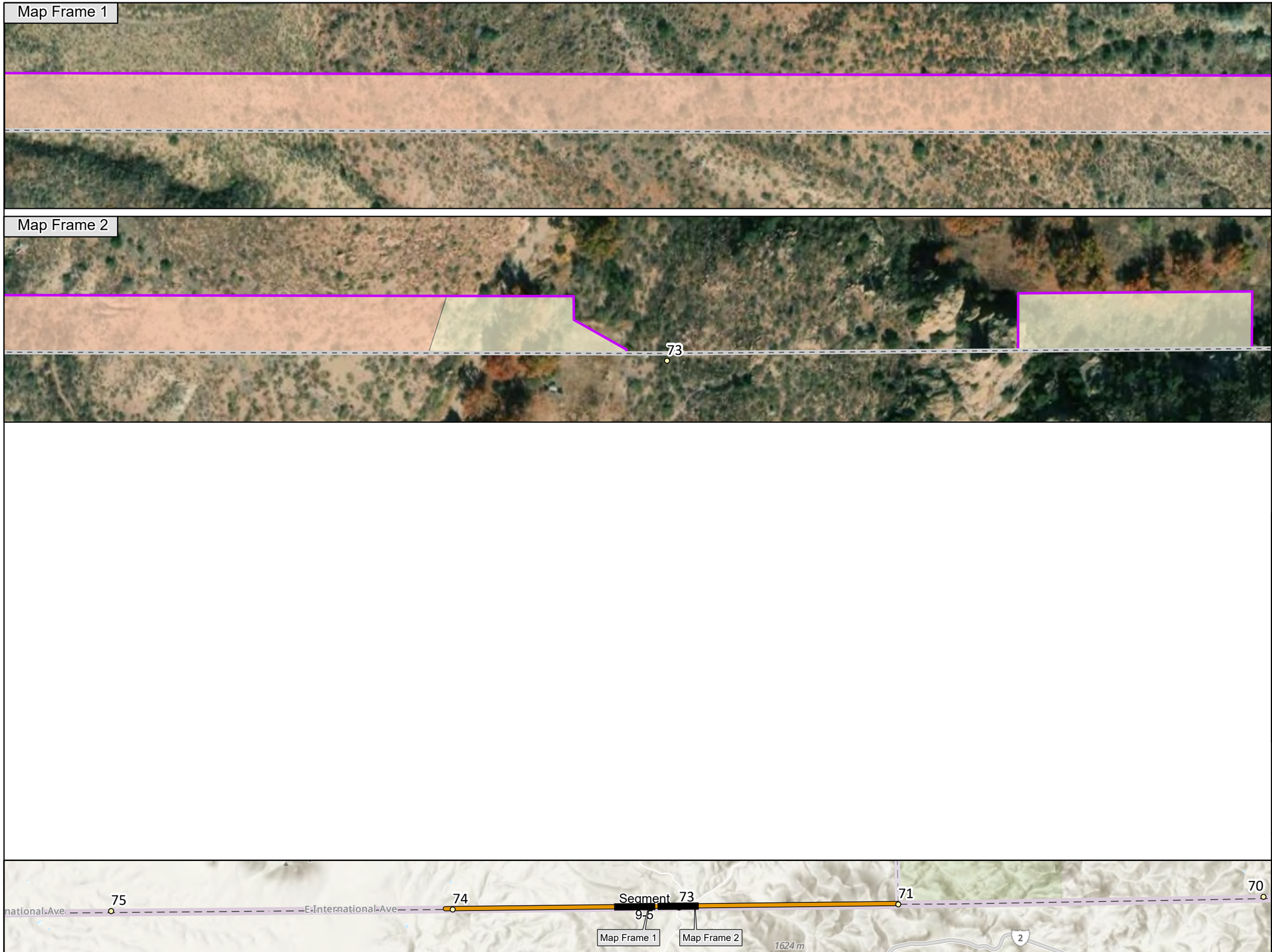
Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON



Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	2.10

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Fouquieria splendens - Calliandra eriophylla* - Parthenium incanum Desert Scrub Alliance
- *Platanus wrightii* Riparian Forest Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

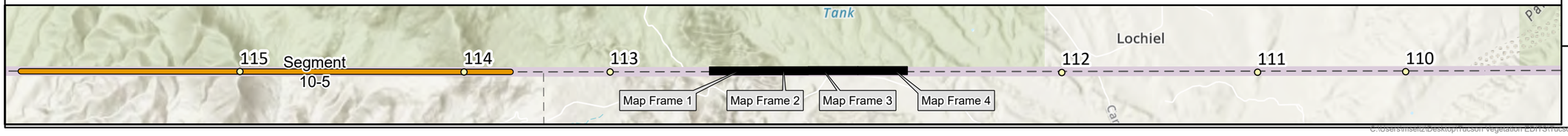
Appendix A: Additional Survey Area Maps

Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4



Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-1

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Pinus cembroides - Pinus discolor - Pinus edulis* / Shrub Understory Woodland Alliance
- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

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0 80 160 Feet

DAWSON

Map Frame 1

Map Frame 2

Map Frame 3

112

Map Frame 4

Tank

Lochiel

115 Segment 10-5 114 113 112 111 110

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-2

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Prosopis velutina* Ruderal Desert Scrub Alliance
- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Populus fremontii* Great Basin Riparian Forest Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

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Map Frame 1

Map Frame 2

Map Frame 3

111

Map Frame 4

Tank

115 Segment 10-5 114 113 112 111 110

Lochiel

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-3

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Prosopis velutina* Ruderal Desert Scrub Alliance
- *Populus fremontii* Great Basin Riparian Forest Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group
- *Eleocharis palustris - Eleocharis macrostachya* Marsh Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

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0 80 160 Feet

DAWSON

Map Frame 1

Map Frame 2

110

Map Frame 3

Map Frame 4

Lochiel

112 111 110 109 108 107 106

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-4

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group
- *Chilopsis linearis - Psorothamnus spinosus* Desert Wash Scrub Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
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Map Frame 1

Map Frame 2

Map Frame 3

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Map Frame 4

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112 111 110 109 108 107 106

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-5

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

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Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

108

Lochiel

112 111 110 109 108 107 106

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-6

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group
- *Platanus wrightii* Riparian Forest Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

Map Frame 1

Map Frame 2

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Map Frame 3

Map Frame 4

112 Lochiel 111 110 109 108 107 106

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-7

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

Map Frame 1

Map Frame 2

106

Map Frame 3

Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	A - 8

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

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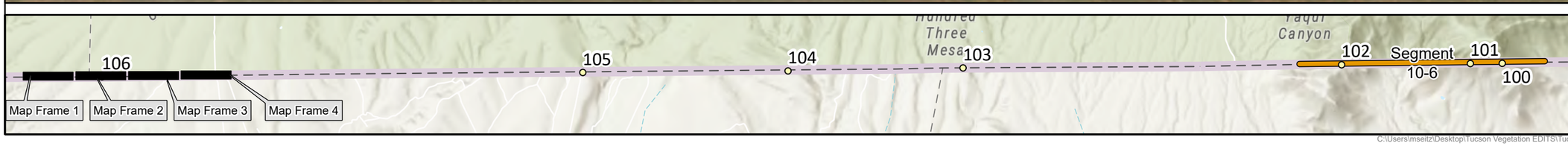


DAWSON

Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	A - 9

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group

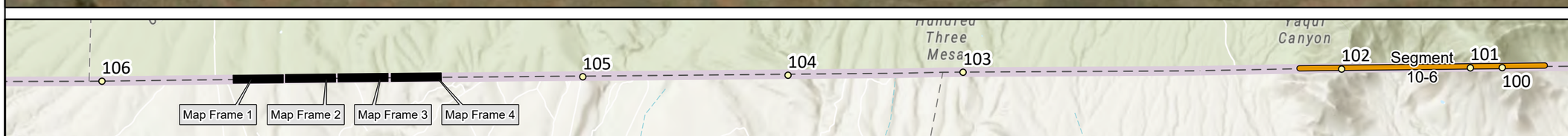
Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet



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Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

105

106 105 104 103 102 Segment 10-6 101 100

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	A-10

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group
- *Platanus wrightii* Riparian Forest Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

Map Frame 1

Map Frame 2

Map Frame 3

104

Map Frame 4

106 105 104 103 102 101 100

Segment 10-6

Hundred Three Mesa

Yaqui Canyon

Map Frame 1 | Map Frame 2 | Map Frame 3 | Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date	Figure
OCTOBER 2020	A-11

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance
- *Pleuraphis mutica - Sporobolus airoides - Panicum obtusum* Semi-Desert Lowland Grassland Group
- *Quercus oblongifolia Scrub Woodland Alliance* Scrub Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

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DAWSON

Map Frame 1

Map Frame 2

103

Map Frame 3

Map Frame 4

106 105 104 103 102 101 100

Segment 10-6

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-12

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

Map Frame 1

Map Frame 2

Map Frame 3

Map Frame 4

106 105 104 103 102 101 100

Segment 10-6

Map Frame 1 Map Frame 2 Map Frame 3 Map Frame 4

Vegetation Community Map
Fence Replacement Project
Tucson Sector, Arizona

Date
OCTOBER 2020

Figure
A-13

KEY

- Border Monument
- US-Mexico Border
- Extent of Individual Map Frame
- Northern Survey Area Boundary

Vegetation Association

- *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance

Engineering Scale
1" = 160'

Source(s)
Bio Studies, DAWSON, Esri

Projection
WGS 1984 UTM Zone 12N

N W E S

0 80 160 Feet

DAWSON

APPENDIX B

Air Emissions Calculations

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APPENDIX B
AIR EMISSIONS CALCULATIONS

Assumptions

Assumptions	Impacted Area	Notes
Border wall length (miles):	74	Equivalent to 390,720 feet
Total number of panels:	48,780	Assume 659.20 panels per mile. (659.20 panels/mile x 74 miles)
Total construction area (square feet):	1,172,160	(390,720 feet of fence x 3 feet of fence width)
Estimated distance from wall to neraby town (miles):	10	Estimated distance (one way) from Douglas or Sasabe to mid-point of Project segment
Construction duration (days):	312	Construction is assummed to last 1 year. (52 weeks x 6 days per week)

APPENDIX B
AIR EMISSIONS CALCULATIONS

Estimated Equipment Usage*

Type of Equipment	Quantity	Total Days	Number of Trips	Total Usage	Total Usage Units	Comments
Loader	1	312	-	3744	hours	Assumed to be used 12 hours per day, 6 days per week, 52 weeks per year for 1 year.
Dozer	1	346	-	4149	hours	Assume dirt to be removed = 74 mi x (5280 ft/mi) x (3 ft wide) = 1,172,160 ft2 = 26.91 acres 1,172,160 ft2 x 6 ft deep = 7,032,960 ft3. Assume spread and leveling dirt** at 48 m3/hour and 12-hour days = 576 m3/day (or 20,341.2 ft3/day). Total impacted volume (7,032,960 ft3) / rate of spread and leveling (20,341 ft3/day) = 346 12-hour days = 4,149 hours.
Excavator	1	415	-	4979	hours	Assume dirt to be removed = 74 mi x (5280 ft/mi) x (3 ft wide) = 1,172,160 ft2 = 26.91 acres 1,172,160 ft2 x 6 ft deep = 7,032,960 ft3. Assume digging*** 40 m3/hour and 12-hour days = 480 m3/day (or 16,951 ft3/day). Total impacted volume (7,032,960 ft3) / rate of spread and leveling (16,951 ft3/day) = 415 12-hour days = 4,979 hours.
Crane	1	312	312	3744	hours	Assumed to be used 12 hours per day, 6 days per week, 52 weeks per year for 1 year.
Water Truck	1	-	312	23088	miles	Assume water truck stays at project site and drives 19.08 miles in the project corrdior every day. 312 trips x 74 miles = 23,088 total miles
Delivery Truck	1	-	9756	195120	miles	Based on round trip from Douglas or Sasabe to midpoint of Project segment (10 miles one way). Assume necessary for construction. Assume 5 panels per trip. 48,780 total panels/5 panels per trip = 9,756 trips. 9,756 trips x 20 round trip miles = 195,120 miles.

APPENDIX B
AIR EMISSIONS CALCULATIONS

Estimated Equipment Usage*

Type of Equipment	Quantity	Total Days	Number of Trips	Total Usage	Total Usage Units	Comments
Hauling Truck	1	-	542	10840	miles	Based on round trip from Douglas or Sasabe to midpoint of Project segment (10 miles one way). Assume 12,578 panels at 550 lbs per panel are needed for construction. Assume flat bed truck with 50,000-lb capacity. 50,000lbs/550lbs = 90 panels per truck 12,578 panels/90 panels per trucks = 542 truck loads. 542 truck loads x 20 round trip miles = 10,840 miles.
Cement Truck	1	-	103554	2071078	miles	Based on estimated distance between batch plant and midpoint of Project segment (10 miles one way). Assume 8-yd3 concrete capacity per delivery. Assume wall footing = 27.5ft x 1ft x 2ft = 55ft3 x 5280ft/mi = 290,400 ft3 of cement per mile of footing. 290,400 ft3/mile x 74 mi = 21,489,600 ft3 of cement for all footing. Assume 8 poles per 10-ft panel of fence and poles are 0.5-ft (6 in) x 0.5-ft (6 in) x 18-ft = 4.5 ft3*8 poles = 36 ft3. Assume poles filled half-capacity with cement to account for rebar = 36 ft3/2= 18 ft3 of cement per panel. 18ft3 x 48,780 panels = 878,040 ft3 of cement for panels. 21,489,600 ft3 + 878,040 ft3 = 22,367,640 ft3 = 828,431 yd3 of cement. 828,431 yd3 total of cement / 8-yd3 capacity per trip = 103,554 trips. 103,554 trips x 20 round trip miles = 2,071,078 miles.
Passenger Car (Worker Commute)	7	-	312	43680	miles	Based on round trip from Douglas or Sasabe to midpoint of Project segment (10 miles one way). Assume one operator, two riggers, and one safety representative for crane; one operator and one assistant for all other equipment; 3 other construction site workers (e.g., foreman). Assume 7 passenger cars (7 vehicles x 20 miles x 312 days = 43,680) and 8 passenger trucks (8 vehicles x 20 miles x 312 days = 49,920 miles).
Passenger Truck (Worker Commute)	8	-	312	49920	miles	

* Equipment usage is based off estimates from the Environmental Stewardship Plan For the Proposed Yuma Wall Replacement Project (https://www.cbp.gov/sites/default/files/assets/documents/2019-Jun/Yuma%20Primary%20Fence%20Replacement_Environmental%20Stewardship%20Plan.pdf)

APPENDIX B
AIR EMISSIONS CALCULATIONS

Estimated Equipment Usage*

Type of Equipment	Quantity	Total Days	Number of Trips	Total Usage	Total Usage Units	Comments

** Excavation production and removal rates extracted from https://www.methvin.org/construction-production-rates/excavation/bulk-excavation to estimate PM10 for excavation using equation 4-4 from Air Emissions Guide for Air Force Transitory Sources, Methods for Estimating Emissions of Air Pollutants for Transitory Sources at U.S. Air Force Installations, August 2018 (http://solutioenv.com/Documents/2018%20TransitorySourceGuide.pdf)

***Spread and level (Average) rate for grading extracted from: https://www.methvin.org/construction-production-rates/excavation/spread-and-level - Dozer, 1.2m3 bucket, 50-200m2, Sand/Soil Slow: 43.5 Average: 48.0 Fast: 52.6 Unit: m3/hr to estimate PM 10 using equation 4-4 from Air Emissions Guide (see previous bullet point).

APPENDIX B

AIR EMISSIONS CALCULATIONS

Equipment Emission Rates

Equipment	Horsepower (hp)	Emission Rate*							Unit
		VOC	CO	CO2e	NOx	SO2	PM2.5	PM10	
Crane	300	0.14773	0.21564	-	1.01555	2.74E-03	3.90E-02	4.02E-02	g/hp-hr per day
Excavator	175	0.13668	0.2279	-	0.55829	2.65E-03	3.45E-02	3.56E-02	g/hp-hr per day
Dozer	175	0.14123	0.28219	-	0.7193	2.69E-03	4.89E-02	5.04E-02	g/hp-hr per day
Loader	100	0.58932	3.9348	-	3.03713	4.03E-03	0.51927	0.53533	g/hp-hr per day
Water Truck	-	6.45E-04	3.97E-03	6.79E-02	1.12E-03	5.69E-07	3.36E-06	3.66E-06	lbs/mi
Cement Truck	-	5.73E-04	1.05E-03	8.48E-03	0	6.98E-08	3.05E-07	3.32E-07	lbs/mi
Hauling Truck	-	5.73E-04	1.05E-03	8.48E-03	0	6.98E-08	3.05E-07	3.32E-07	lbs/mi
Delivery Truck	-	5.73E-04	1.06E-03	8.48E-03	0	6.98E-08	3.05E-07	3.32E-07	lbs/mi

Equipment	Type of PM Emission	Emission Rate*							Unit
		VOC	CO	CO2e	NOx	SO2	PM2.5	PM10	
Passenger Truck	-	1.72E-04	7.28E-03	-	0.000132	6.60E-06	-	-	lbs/mi
	Primary Exhaust						9.10E-06	1.03E-05	lbs/mi
	Tirewear Particulate						3.38E-05	2.25E-05	lbs/mi
	Brakewear Particulate						1.67E-05	0.00013381	lbs/mi
Passenger Car	-	1.06E-04	5.79E-03	-	7.80E-05	5.41E-06	-	-	lbs/mi
	Primary Exhaust						6.26E-06	7.07E-06	lbs/mi
	Tirewear Particulate						3.38E-06	2.25E-05	lbs/mi
	Brakewear Particulate						8.05E-05	1.01E-05	lbs/mi

* Emission rates extracted from the Environmental Stewardship Plan For the Proposed Yuma Wall Replacement Project (https://www.cbp.gov/sites/default/files/assets/documents/2019-Jun/Yuma%20Primary%20Fence%20Replacement_Environmental%20Stewardship%20Plan.pdf) which were originally acquired from USEPA's Motor Vehicle Emission Simulator (MOVES).

Fugitive Dust Emissions

Equipment	Type of PM Emission	Acreage	Emission Rate*		Unit
			PM2.5**	PM10	
Excavator	Fugitive Dust	26.91	2	20	lb/ac-day
Dozer	Fugitive Dust	26.91	2	20	lb/ac-day

** Emission rates extracted from Air Emissions Guide for Air Force Transitory Sources, Methods for Estimating Emissions of Air Pollutants for Transitory Sources at U.S. Air Force Installations, August 2018 (http://solutioenv.com/Documents/2018%20TransitorySourceGuide.pdf)

*** PM2.5 was calculated using PM10 conversion factor of 0.1 acquired from Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors (https://www3.epa.gov/ttn/chief/ap42/ch13/bgdocs/b13s02.pdf)

APPENDIX B

AIR EMISSIONS CALCULATIONS

Equipment Emissions

Equipment	Total Emissions (lbs/year)*						
	VOC	CO	CO2e	NOx	SO2	PM2.5**	PM10**
Crane	365.81568	533.97749	-	2514.75068	6.78491	96.57356	99.54505
Excavator	262.54492	437.76695	-	1072.40417	5.09031	22396.15668	223367.24875
Dozer	226.07296	451.71373	-	1151.41460	4.30600	18686.69811	186164.91115
Loader	486.43358	3247.84303	-	2506.89273	3.32642	428.61326	441.86942
Water Truck	14.8836792	91.7447856	1568.183136	25.86780	0.01314	0.07767	0.08442
Cement Truck	1185.77487	2184.57284	17572.47362	0	0.14450	0.63206	0.68703
Hauling Truck	6.20644	11.43422	91.97566	0	0.00076	0.00331	0.00360
Delivery Truck	111.71400	207.76378	1655.53466	0	0.01361	0.05955	0.06473
Passenger Truck	8.59922	363.40262	-	6.58195	0.32931	2.97546	8.31741
Passenger Car	4.61130	252.79800	-	3.40649	0.23630	3.93638	1.73214
TOTAL	**2672.65666**	**7783.01744**	**20888.16708**	**7281.31841**	**20.24527**	**41615.72603**	**410084.46370**

* Total emissions for Crane, Excavator, Dozer, and Loader were calculated using the following formula: *Total emission (lbs) = Emission rate (g/hp-hr per day) * Hours equipment is used (hrs) * Horsepower of equipment (hp) * g to lb conversion factor*

Total emissions for Water Truck, Cement Truck, Hauling Truck, Delivery Truck were calculated using the following formula: Total Emission (lbs) = Emission rate (lbs/mi) * Total miles driven (mi)

** PM emission values for Excavator and Dozer include primary exhaust and fugitive dust emission rates.

PM emission values for Passenger Truck and Car include primary exhaust, tirewear particulate, and brakewear particulate emission rates.

APPENDIX B

AIR EMISSIONS CALCULATIONS

Summary

Type of Emission	VOC	CO	NOx	SO2	PM2.5	PM10
Project Emissions (tons/year)	1.33633	3.89151	3.64066	0.01012	20.80786	205.04223
Significance Threshold (tons/year)*	50	100	100	100	Moderate: 100 Serious: 70	Moderate: 100 Serious: 70

*Threshold data acquired from 40 CFR 93.153(b)(1) and Gulf South Research Corporation (GSRC) model projections (https://ecfr.io/Title-40/pt40.22.93#se40.22.93_1153)

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APPENDIX C

Waters of the U.S. Delineation Report

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SUPPLEMENTAL WETLANDS AND WATERS OF THE US ASSESSMENT FOR SELECT PRIMARY, SECONDARY, AND REPLACEMENT BORDER WALL CONSTRUCTION PROJECTS IN COCHISE, SANTA CRUZ, AND PIMA COUNTIES

Prepared for:

Paul Enriquez, Acquisition, Real Estate, and Environmental Director
Program Management Office Directorate
U.S. Customs and Border Protection

Prepared by:

DAWSON

October 2020

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TABLE OF CONTENTS

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LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

CBP	U.S. Customs and Border Protection
CWA	Clean Water Act
CFR	Code of Federal Regulations
GPS	Global Positioning System
IBL	International Boundary Line
NRCS	Natural Resources Conservation Science
OHWM	Ordinary High Water Mark
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

United States (U.S.) Customs and Border Protection (CBP) proposes to replace and maintain approximately 34 miles of primary and secondary pedestrian fence and to construct and maintain approximately 40 miles of new primary pedestrian fence along the U.S./Mexico international border within the U.S. Border Patrol Tucson Sector in Arizona. The Project will include the installation and maintenance of a linear ground detection system, road construction or refurbishment, and the installation of a fiber optic cable and lighting.

1.2 PROJECT LOCATION

The Project Area is split into 13 segments across Cochise, Santa Cruz, and Pima counties, Arizona (see **Figure 1-1**). Project coordinates are found in **Appendix A.**

The Survey Area for the subject delineation stretches 100 feet north of the International Boundary Line (IBL) across each of the 13 Project segments. The Survey Area includes the Roosevelt Reservation, which is the 60-foot-wide strip of land owned by the Federal Government along the U.S. side of the U.S./Mexico international border in Arizona, California, and New Mexico. The main patrol road is parallel to the IBL and generally runs through the Roosevelt Reservation.

1.3 PURPOSE OF THE ASSESSMENT

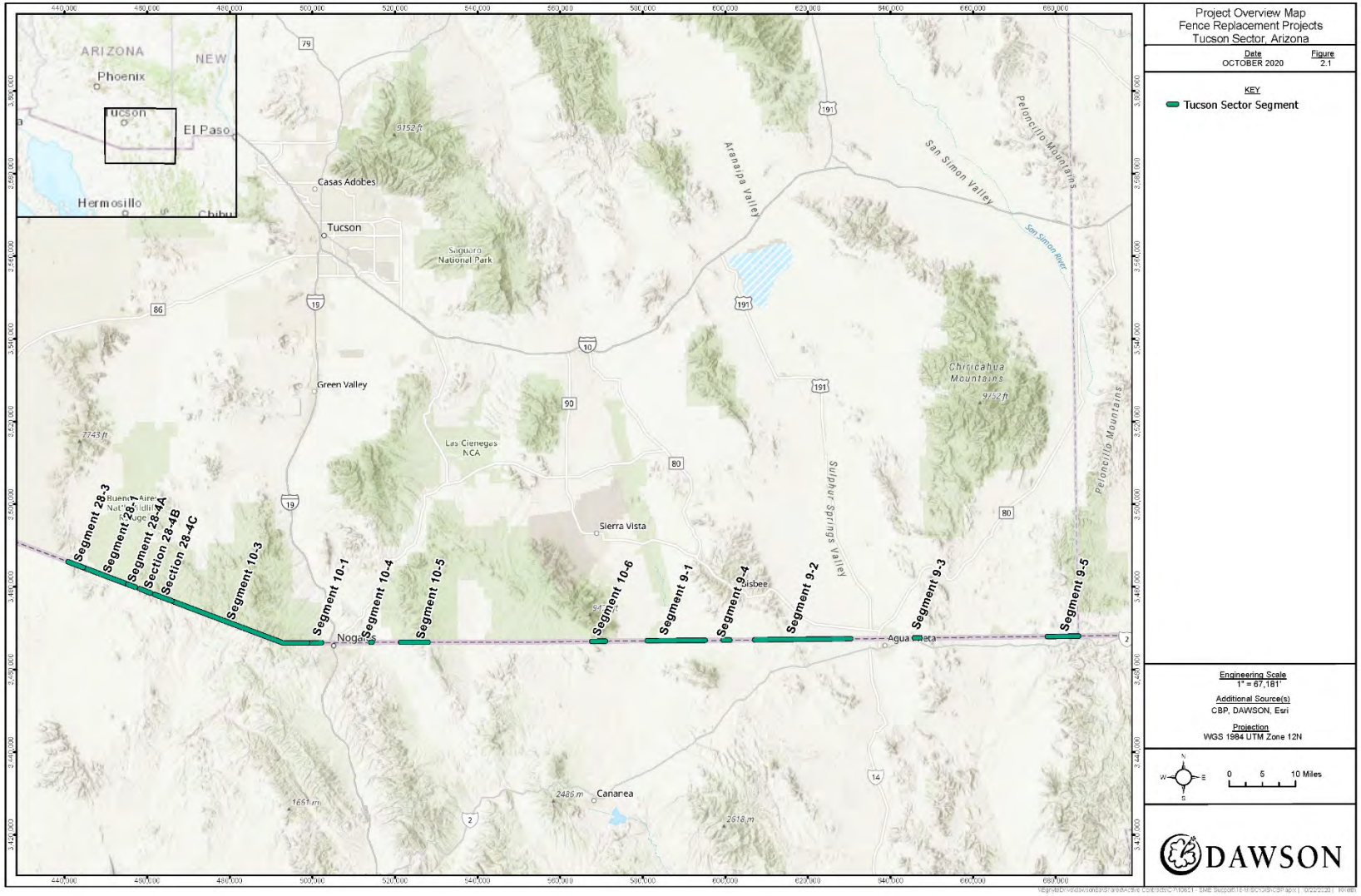
Portions of the Survey Area cross or are adjacent to potentially regulated water and wetland features under the jurisdiction of the U.S. Army Corps of Engineers (USACE). The purpose of this delineation report is to identify and evaluate these potentially regulated features to ensure the proposed Project activities comply with state and federal law, namely Section 404 of the Clean Water Act (CWA).

1.4 REGULATORY FRAMEWORK

Section 404 of the Clean Water Act gives the U.S. Environmental Protection Agency (USEPA) and USACE regulatory and permitting authority regarding discharge of dredged or fills material into “navigable waters of the United States.” Section 502(7) of the CWA defines navigable waters as “waters of the United States, including territorial seas.” Section 328 of Chapter 33 in the Code of Federal Regulations (CFR) applies to the jurisdictional limits of USACE authority under CWA to “waters of the United States” which are defined as:

- Waters used for commerce;
- Interstate waters and wetlands;
- “Other waters” such as intrastate lakes, rivers, streams, and wetlands;

Figure 1-1 Map of Project Area



- Impoundments of waters;
- Tributaries to the above waters;
- Territorial seas; and
- Wetlands adjacent to waters.

The limits of USACE jurisdiction under Section 404 of the CWA as given in 33 CFR Section 328.4 are as follows:

- Territorial seas: three nautical miles in a seaward direction from the baseline;
- Tidal waters of the U.S.: high tide line or to the limit of adjacent non-tidal waters;
- Non-tidal waters of the U.S.:
    - Ordinary High-Water Mark (OHWM) or to the limit of adjacent wetlands;
    - Wetlands, to the limit of the wetland.

USACE requires the use of the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (USACE Manual) to be used for delineating wetlands and waters of the U.S. (Environmental Labs 1987). Waters of the U.S. are delineated based upon the limited of the OHWM as determined by erosion, deposition of vegetation or debris, and changes in vegetation structure within rivers and streams.

Should the results of this assessment be used for a jurisdictional determination, these results may change under legislation effective June 22, 2020 as defined in the Final Rule defining “Navigable Waters of the United States”, Section 120.2 (DOD and EPA 2020)

2.0 SITE DESCRIPTION

2.1 ENVIRONMENTAL SETTING

The Survey Area is located along the U.S./Mexico international border. The Project traverses the Sasabe and Naco Ports of Entries, as well as various rural areas (including ranch land and wilderness) of Pima, Santa Cruz, and Cochise counties, including ranch land and wilderness. The landscape within the Survey Area is generally undisturbed, consisting of open desert and mountains.

The Survey Area falls within two Level III Ecoregions, the Sonoran Basin and Range and the Madrean Archipelago. The level IV Ecoregion associated with the Sonoran Basin and Range is the Arizona Upland/Eastern Sonoran Basins, while the following three Level IV Ecoregions are associated with the Madrean Archipelago: Apachian Valley and Low Hills, Lower Madrean Woodlands, and Madrean Basin Grasslands (Griffith et al. 2016).

The regional climate for the Sonoran Basin and Range include hot, arid summers, and variable summer precipitation ranging between 8 inches and 23 inches annually. Annual low temperatures range between 45 degrees Fahrenheit (°F) and 75°F with high temperatures ranging between 65°F and 105°F. The regional climate for the Madrean Archipelago includes hot, arid summers leading into late summer monsoonal activity (precipitation average of 14 inches annually). This is followed by a moderate winter season with most of the annual precipitation falling as snow at higher elevations. Southeastern Arizona receives the highest precipitation rates across the state due to its proximity to the core of the monsoonal region in Mexico. Annual low temperatures range between 32°F and 68°F with high temperatures ranging between 65°F and 100°F (ADWR 2020; U.S. Climate Data 2020).

2.2 VEGETATION

Plant species were identified in the Survey Area using survey and study results provided by Bio-Studies (Bio-Studies 2020). The following vegetation communities were identified across various segments of the Survey Area:

Segment 28-3	*Fouquieria splendens - Calliandra eriophylla - Parthenium incanum* Desert Scrub Alliance.
Segment 28-4A	*Calliandra eriophylla/*Mixed Desert Grasses Shrubland, *Dodonaea angustifolia – Dasylirion wheeleri* Desert Scrub, *Fouquieria splendens – Prosopis velutina* Shrubland, *Mimosa aculeaticarpa - Dasylirion wheeleri*/Mixed Desert Grasses Shrubland, *Prosopis velutina – Dodonaea viscosa* Desert Scrub, *Prosopis velutina* Ruderal Foothill Shrubland, *Prosopis glandulosa-Prosopis velutina-Prosopis pubescens* Wet Scrub Alliance, *Quercus oblongifolia* Scrub Woodland Alliance,

	Quercus oblongifolia Scrub Woodland Alliance, *Quercus turbinella* Chaparral Alliance.
Segment 10-3	*Arctostaphylos pungens-Arctostaphylos pringlei-Ceanothus greggii* Chaparral Alliance, *Dasylirion* ssp. / *Bouteloua curtipendula-Muhlenbergia setifolia* Foothill Desert Grassland Alliance, *Prosopis velutina* Ruderal Desert Scrub Alliance, *Quercus oblongifolia* Scrub Woodland Alliance.
Segment 10-1	*Pinus cembroides - Pinus discolor - Pinus edulis* / *Shrub* Understory Woodland Alliance*,* *Prosopis velutina* Ruderal Desert Scrub Alliance.
Segment 10-5	*Pinus cembroides - Pinus discolor - Pinus edulis* / Shrub Understory Woodland Alliance, *Prosopis velutina* Ruderal Desert Scrub Alliance.
Segment 10-6	*Acacia constricta – Acacia neovemicosa*/ Thornscrub Alliance, *Quercus arizonica - Quercus emoryi - Quercus grisea* Scrub Woodland Alliance, *Pleuraphis mutica – Sporobolus airoides – Panicum obtusum/* Semi-Desert Lowland Grassland Group.
Segment 9-5	*Fouquieria splendens - Calliandra eriophylla - Parthenium incanum* Desert Scrub Alliance, *Platanus wrightii* Riparian Forest Alliance.

2.3 SOILS

The NRCS Web Soil Survey was used to research soil types within the Survey Area. The Survey Area consists primarily of well-drained soils that range from very fine sandy loam to gravelly loam to clay loam. There are five soils classifications that are classified as “prime farmland if irrigated:” Tenneco fine sandy loam (Segment 9-1, 9-4), Riveroad and Comoro soils (Segment 28-1), Comoro soils (Segments 28-4, 10-3, 10-4), Grabe-Comoro complex (Segment 10-1), and Pima soils (Segment 28-4). All other soils in the Survey Area are classified as “not prime farmland” (NRCS 2020a). The following soils associations and complexes can be found within the Survey Area:

- Altar-Mallet complex
- Bakerville-Gaddes complex
- Bakerville-Gaddes association
- Blackeney-Luckyhills complex

- Brunkcow-Chiricahua-Andrada complex
- Caralampi gravelly sandy loam
- Cellar-Lampshire-Rock outcrop complex
- Cherrycow-Magoffin-Rock outcrop complex
- Chiricahua-Lampshire complex
- Chiricahua-Lampshire association
- Comoro sandy loam
- Comoro soils
- Courtland-Sasave-Diaspar complex
- Eloma sandy loam
- Eloma-Caralampi-White House
- Grabe-Comoro complex
- Graham soils
- Guest-Riveroad association
- Hayhollow-Rafter-Riverwash complex
- Lampshire-Romero-Rock outcrop complex
- Lampshire very gravelly sandy loam
- Lampshire-Graham-Rock outcrop association
- Libby-Gulch complex
- Luckyhills-McNeal complex
- Mabray-Rock outcrop complex
- Nolam-Libby-Buntline complex
- Nolam-Tombstone complex
- Pima soils

- Riveroad and Ubik soils
- Riveroad and Comoro soils
- Rock outcrop-Lithic Haplustolls association
- Bodecker-Riverwash complex
- Sutherland-Mule complex
- Tenneco fine sandy loam
- White House complex
- White House-Caralampi comlex
- White House-Hathaway association
- Rough broken land and Rock land

3.0 METHODS

In preparation for the on-site assessment, applicable reference materials were reviewed during desktop analysis. Following the desktop review, biologists conducted an evaluation of wetland and waters indicators in the Survey Area between March and April 2020. The evaluation included driving and walking along sections of proposed border wall system and identifying any drainage along the route that displayed a clear active channel. Photographs were taken to document any potentially jurisdictional waters encountered in the Survey Area.

The following sources were consulted prior to the site visit:

- Google Earth aerial photography (Google Earth 2020)
- National Wetland Inventory Interactive website (USFWS 2015)
- Natural Resources Conservation Science (NRCS) Web Soil Survey (NRCS 2020a)
- NRCS National List of Hydric Soils (NRCS 2020b)

Delineation of jurisdictional wetlands and non-wetland waters is based on the USACE Manual, the *Regional Supplement to the U.S. Army Corps of Engineers Wetland Delineation Manual: Arid West Region* (Arid West Supplement) (USACE 2008), and the *U.S. Army Corps of Engineers Regulatory Guidance Letter No. 05-05* (USACE 2005).

3.1 WETLANDS

Section 328.3 of the CFR defines wetlands as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."

The three parameters used to delineate wetlands are the presence of: (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. According to the USACE Manual, at least one positive wetland indicator from each parameter must be present in order to make a positive wetland determination.

If an area is determined to be a wetland based on the three-parameter approach, its boundary would be mapped using sub-meter accuracy global positioning system (GPS) equipment.

3.2 NON-WETLAND WATERS

Non-wetland waters subject to USACE jurisdiction include lakes, rivers, and streams (including intermittent streams) in addition to all areas below the high tide line in areas subject to tidal influence. Jurisdiction in non-tidal areas extends to the OHWM, which is defined as, “that line on the shore established by the fluctuations of water and indicated

by physical characteristics such as clear, natural line impresses on the bank, shelving, changes in the characteristics of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas" (Federal Register Vol. 51, No. 219, Part 328.3 (e). November 13, 1986).

USACE has issued specific guidance for delineation of streams in the arid west region (Lichvar and McColley 2008, Curtis and Lichvar 2010). This guidance applies to "low-gradient, alluvial, ephemeral/intermittent channel forms" that may have a broad lateral extent and are often referred to as "washes" or "dry washes." The OHWM boundaries of dry washes would be delineated using sub-meter accuracy GPS equipment or digitally mapped using aerial photography. The areas of potential jurisdictional non-wetland waters would be measured digitally using ArcGIS software.

4.0 RESULTS

Dawson biologists conducted an assessment of potentially regulated waters and wetlands between March and April 2020. The results of the delineation are provided below.

4.1 WETLANDS

Dawson biologists did not observe an indicator from all three parameters – hydrophytic vegetation, hydric soils, and wetland hydrology. Indicators from all three parameters are necessary to qualify a given area as a wetland within the Survey Area.

4.2 NON-WETLAND WATERS

The Survey Area contains one designated category of non-wetlands waters – ephemeral streams. Ephemeral streams are episodic stream channels that appear to convey flows only during and immediately after precipitation events. Across the Survey Area, the majority of these features are shallow bottomed narrow channels, however some braided systems that stretch across alluvial fan and flood plain systems were also observed. The general directionality of all features across the Survey Area run in a north and south direction and bisect the Survey Area. With the sharp topographic changes in certain parts of the Survey Area, most features flow in a southerly direction.

Not all ephemeral streams across the Survey Area are considered potentially jurisdictional based on direction of flow, feature isolation, or connectivity to navigable waters of the U.S. Figures in **Appendix B** show all potential waters of the U.S. occurring within the Survey Area.

Biologists identified 36 features within the Survey Area as potential jurisdictional waters. The total area of these waters is approximately 2.78 acres.

One of the identified non-wetland features is a section of the Santa Cruz River that crosses the border. While the section of the River is considered only potentially jurisdictional within the Survey Area, two reaches of the Santa Cruz River located far north of the Survey Area are considered to be traditionally navigable waters (SPL MFR 2008).

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Appendix A

Project Area Coordinates

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Segment	Section	Latitude	Longitude	Length	Barrier Type
Segment 28-3	Section 28-3 Start	31.508027	-111.622979	2.5 miles	New Primary
	Section 28-3 End	31.495542	-111.584274		
Segment 28-1	Section 28-1 Start	31.49554	-111.584274	7 miles	Replacement Primary
	Section 28-1 End	31.46018	-111.473182		
Segment 28-4	Section 28-4A Start	31.459248	-111.470251	1.2 miles	New Primary
	Section 28-4A End	31.453096	-111.45097		
	Section 28-4B Start	31.449638	-111.440143	1.8 miles	New Primary
	Section 28-4B End	31.440687	-111.412065		
	Section 28-4C Start	31.437356	-111.401691	2.7 miles	New Primary
	Section 28-4C End	31.423476	-111.358347		
Segment 10-3	Section 10-3 Start	31.421325	-111.351619	21 miles	New Primary
	Section 10-3 End	31.332535	-111.012341		
Segment 10-1	Section 10-1 Start	31.33256	-111.01133	2.1 miles	Replacement Primary
	Section 10-1 End	31.332654	-110.976597		
Segment 10-4	Section 10-4 Start	31.333702	-110.851153	0.2 miles	Replacement Primary
	Section 10-4 End	31.333758	-110.847792		
Segment 10-5	Section 10-5 Start	31.33351	-110.775333	4.2 miles	New Primary
	Section 10-5 End	31.33328	-110.70545		
Segment 10-6	Section 10-6 Start	31.333602	-110.288665	2.1 miles	New Primary
	Section 10-6 End	31.333754	-110.253863		
Segment 9-1	Section 9-1 Start	31.3342902	-110.1474490	9 miles	Replacement Primary
	Section 9-1 End	31.3342554	-110.0003427		
Segment 9-4	Section 9-4 Start	31.334239	-109.954224	1 mile	Replacement Secondary
	Section 9-4 End	31.334228	-109.937492		
Segment 9-2	Section 9-2 Start	31.3342073	-109.8742874	14 miles	Replacement Primary
	Section 9-2 End	31.3341871	-109.6298149		
Segment 9-3	Section 9-1 Start	31.333994	-109.46753	1 mile	Replacement Primary
	Section 9-1 End	31.333995	-109.453305		
Segment 9-5	Section 9-5 Start	31.332759	-109.129344	4.7 miles	New Primary
	Section 9-5 End	31.33235	-109.050042		

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Appendix B

Survey Area Maps

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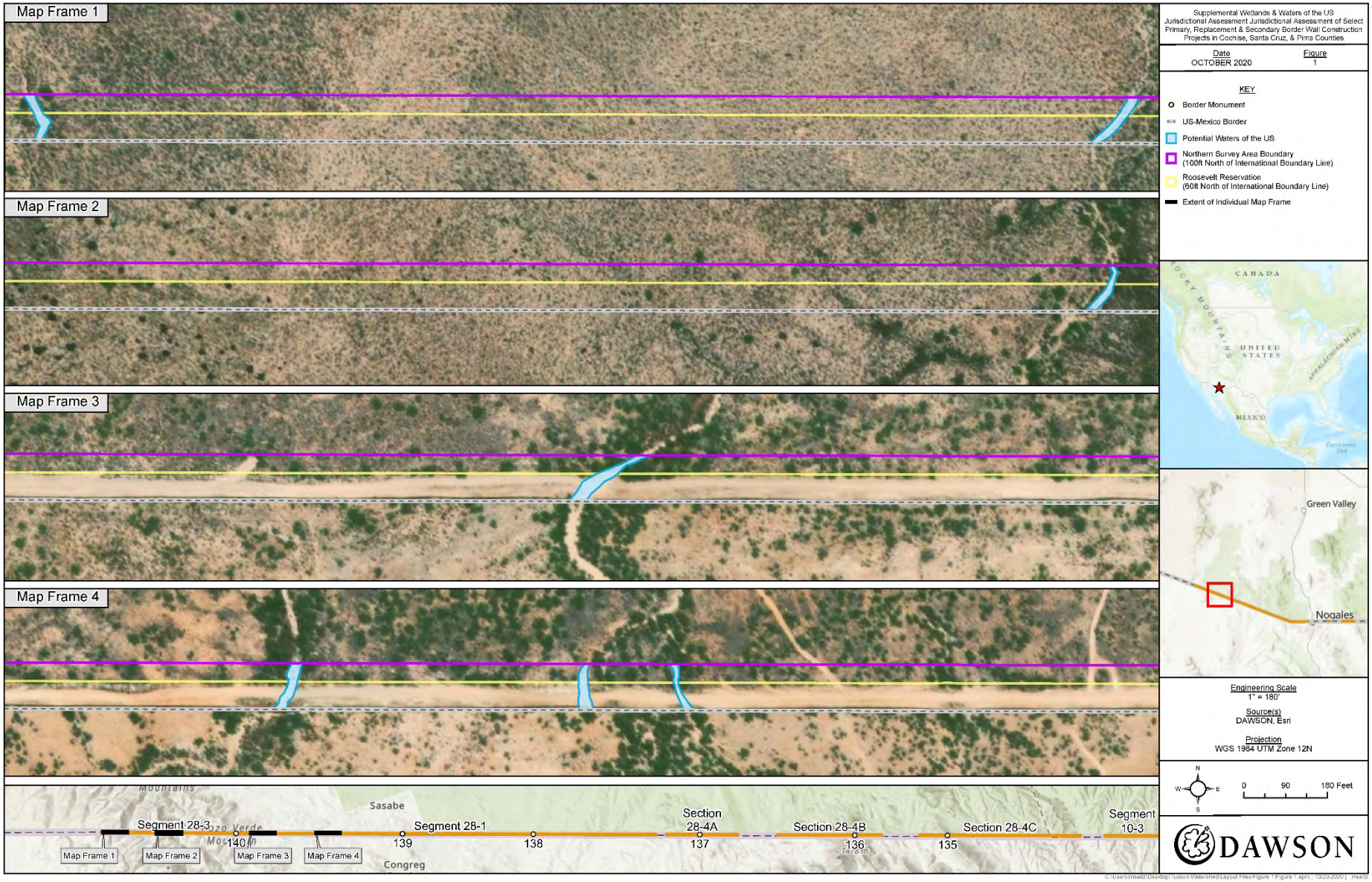
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Map Frame 3
Map Frame 4
Supplemental Wetlands & Waters of the US Jurisdictional Assessment Jurisdictional Assessment of Select Primary, Replacement & Secondary Border Wall Construction Projects in Cochise, Santa Cruz, & Pima Counties
Date
OCTOBER 2020
Figure
1
KEY
Border Monument
US-Mexico Border
Potential Waters of the US
Northern Survey Area Boundary (100ft North of International Boundary Line)
Roosevelt Reservation (60ft North of International Boundary Line)
Extent of Individual Map Frame
CANADA
UNITED STATES
MEXICO
Green Valley
Nogales
Engineering Scale
1" = 180'
Source(s)
DAWSON, Esri
Projection
WGS 1984 UTM Zone 12N
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Segment 28-3
Segment 28-1
Section 28-4A
Section 28-4B
Section 28-4C
Segment 10-3
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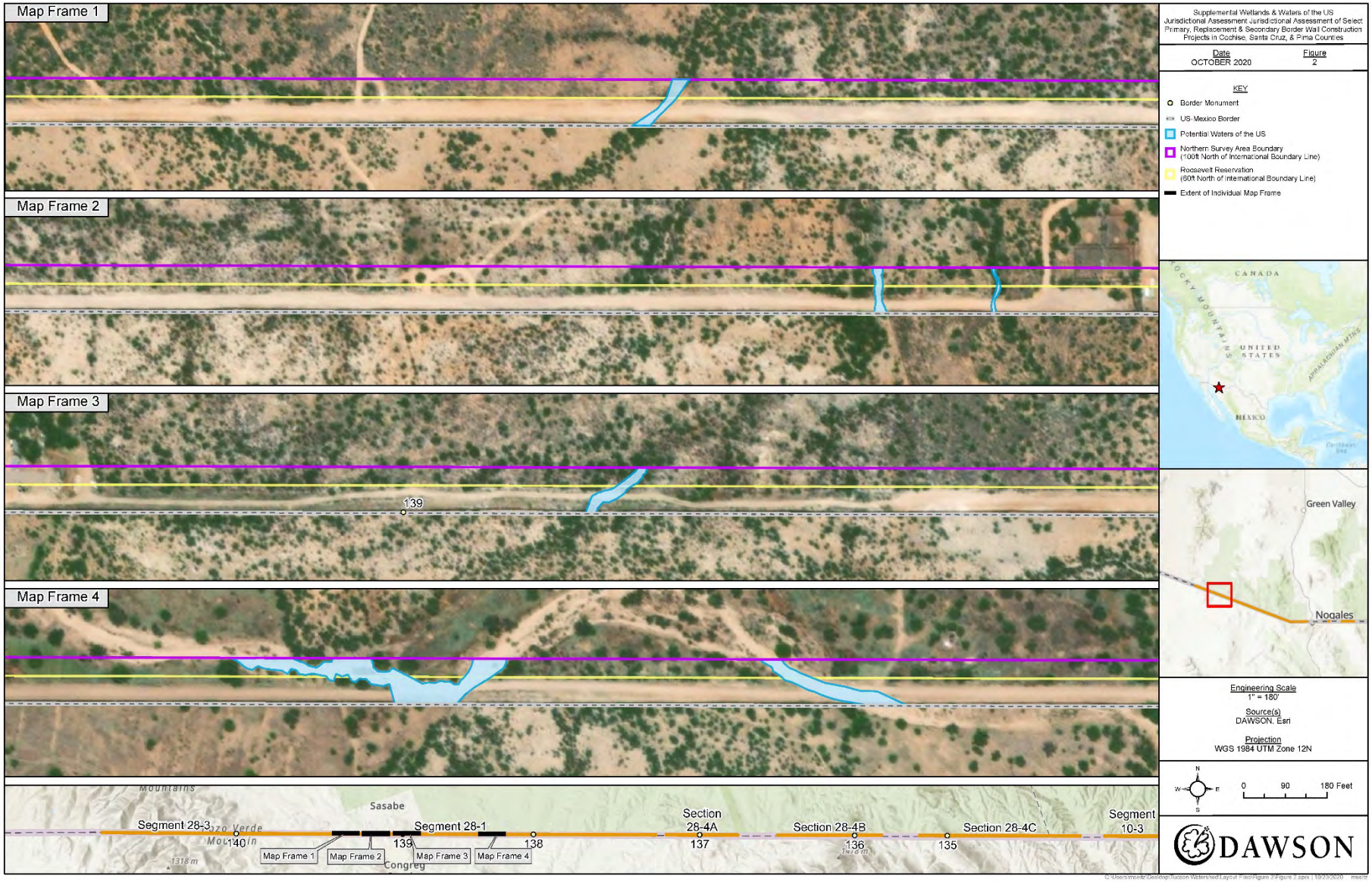
DAWSON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Date
OCTOBER 2020
Figure
2
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Border Monument
US-Mexico Border
Potential Waters of the US
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Roosevelt Reservation (60ft North of International Boundary Line)
Extent of Individual Map Frame
CANADA
UNITED STATES
MEXICO
Green Valley
Nogales
Engineering Scale
1" = 180'
Source(s)
DAWSON, Esri
Projection
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Segment 28-3
Segment 28-1
Section 28-4A
Section 28-4B
Section 28-4C
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Map Frame 4
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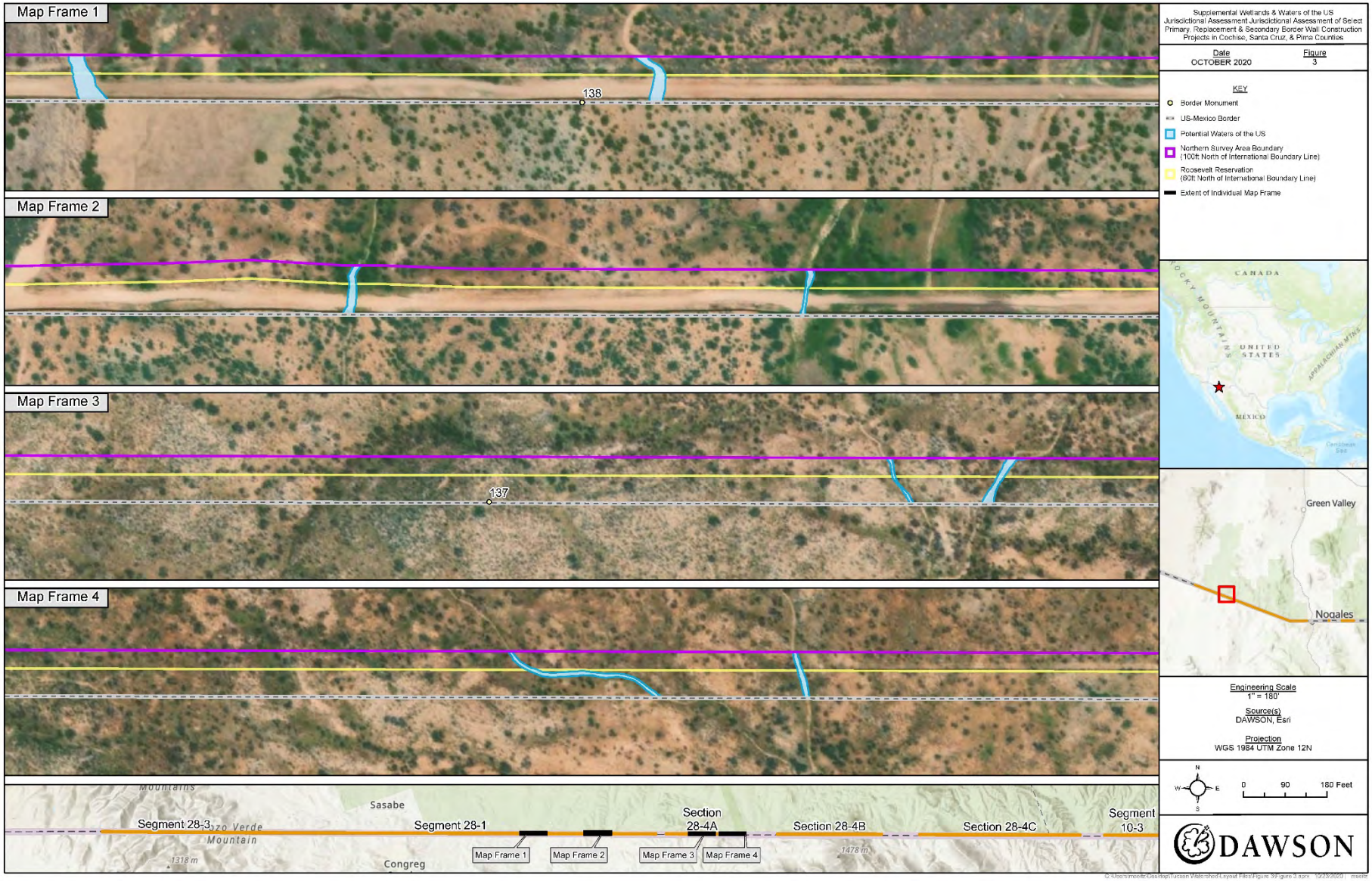
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Map Frame 4
Supplemental Wetlands & Waters of the US Jurisdictional Assessment Jurisdictional Assessment of Select Primary, Replacement & Secondary Border Wall Construction Projects in Cochise, Santa Cruz, & Pima Counties
Date
OCTOBER 2020
Figure
3
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Border Monument
US-Mexico Border
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Northern Survey Area Boundary (100ft North of International Boundary Line)
Roosevelt Reservation (60ft North of International Boundary Line)
Extent of Individual Map Frame
CANADA
UNITED STATES
MEXICO
Green Valley
Nogales
Engineering Scale
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Projection
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Mountains
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Segment 28-3
Segment 28-1
Section 28-4A
Section 28-4B
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Segment 10-3
Mountain
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Map Frame 4
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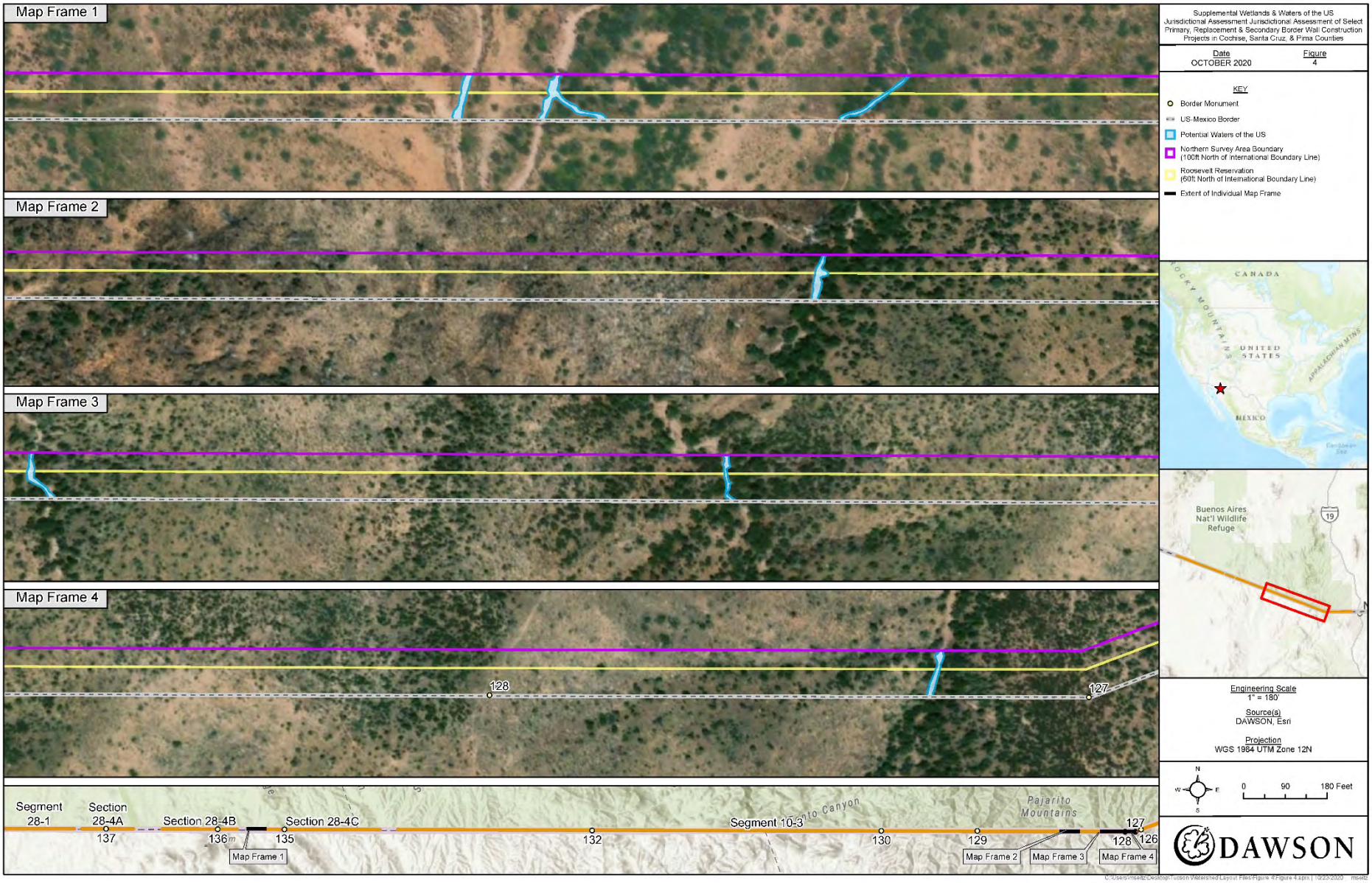
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Supplemental Wetlands & Waters of the US
Jurisdictional Assessment Jurisdictional Assessment of Select Primary, Replacement & Secondary Border Wall Construction Projects in Cochise, Santa Cruz, & Pima Counties
Date
OCTOBER 2020
Figure
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US-Mexico Border
Potential Waters of the US
Northern Survey Area Boundary (100ft North of International Boundary Line)
Roosevelt Reservation (60ft North of International Boundary Line)
Extent of Individual Map Frame
CANADA
UNITED STATES
MEXICO
Buenos Aires Nat'l Wildlife Refuge
Engineering Scale
1" = 180'
Source(s)
DAWSON, Esri
Projection
WGS 1984 UTM Zone 12N
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Segment 28-1
Section 28-4A
Section 28-4B
Section 28-4C
Segment 10-3
Pajarito Mountains
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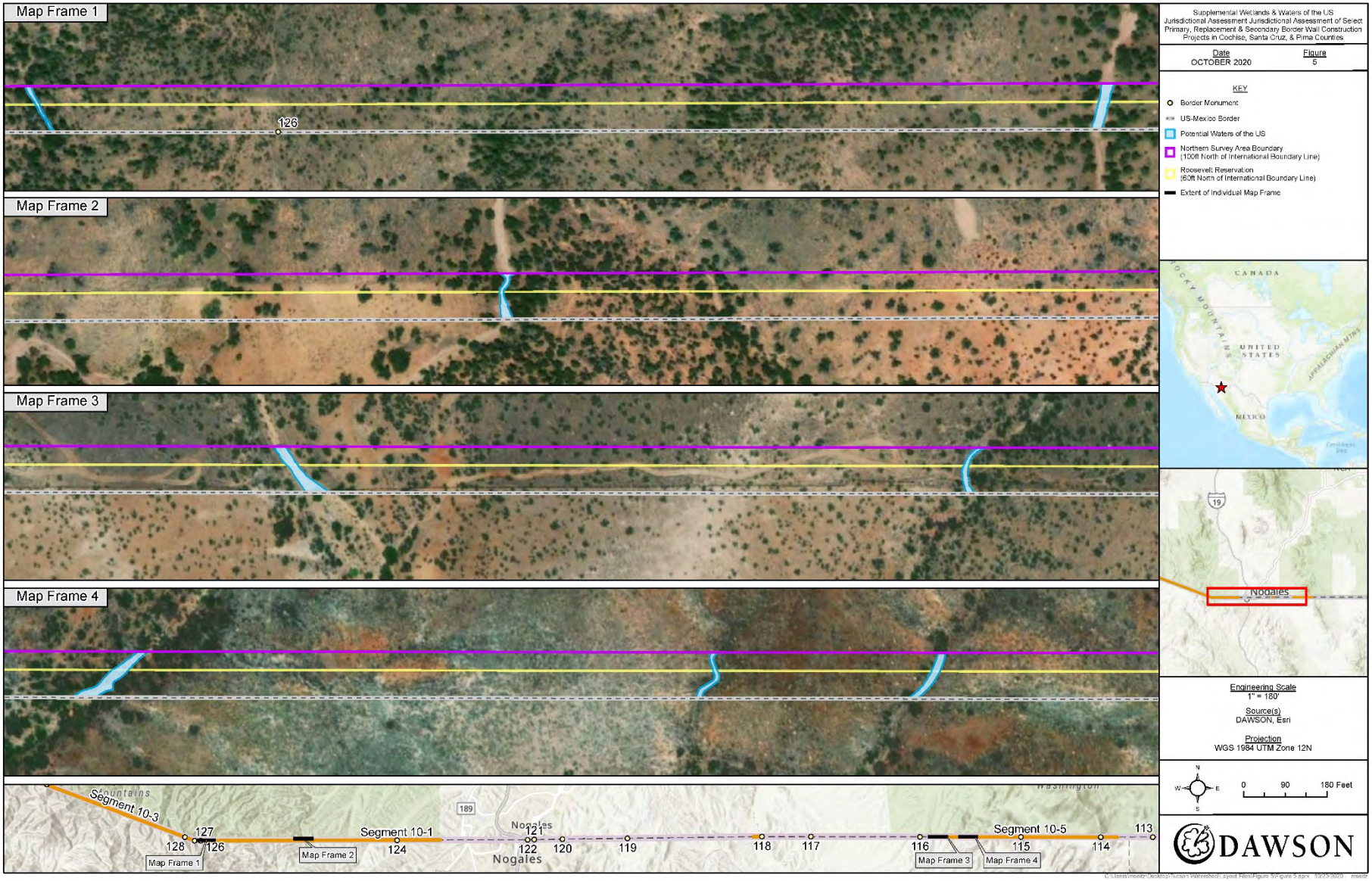
Map Frame 2
Map Frame 3
Map Frame 4
DAWSON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Map Frame 4
Supplemental Wetlands & Waters of the US Jurisdictional Assessment Jurisdictional Assessment of Select Primary, Replacement & Secondary Border Wall Construction Projects in Cochise, Santa Cruz, & Pima Counties
Date
OCTOBER 2020
Figure
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Border Monument
US-Mexico Border
Potential Waters of the US
Northern Survey Area Boundary (100ft North of International Boundary Line)
Roosevelt Reservation (60ft North of International Boundary Line)
Extent of Individual Map Frame
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MEXICO
Nogales
Engineering Scale
1" = 180'
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Projection
WGS 1984 UTM Zone 12N
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Segment 10-3
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Segment 10-5
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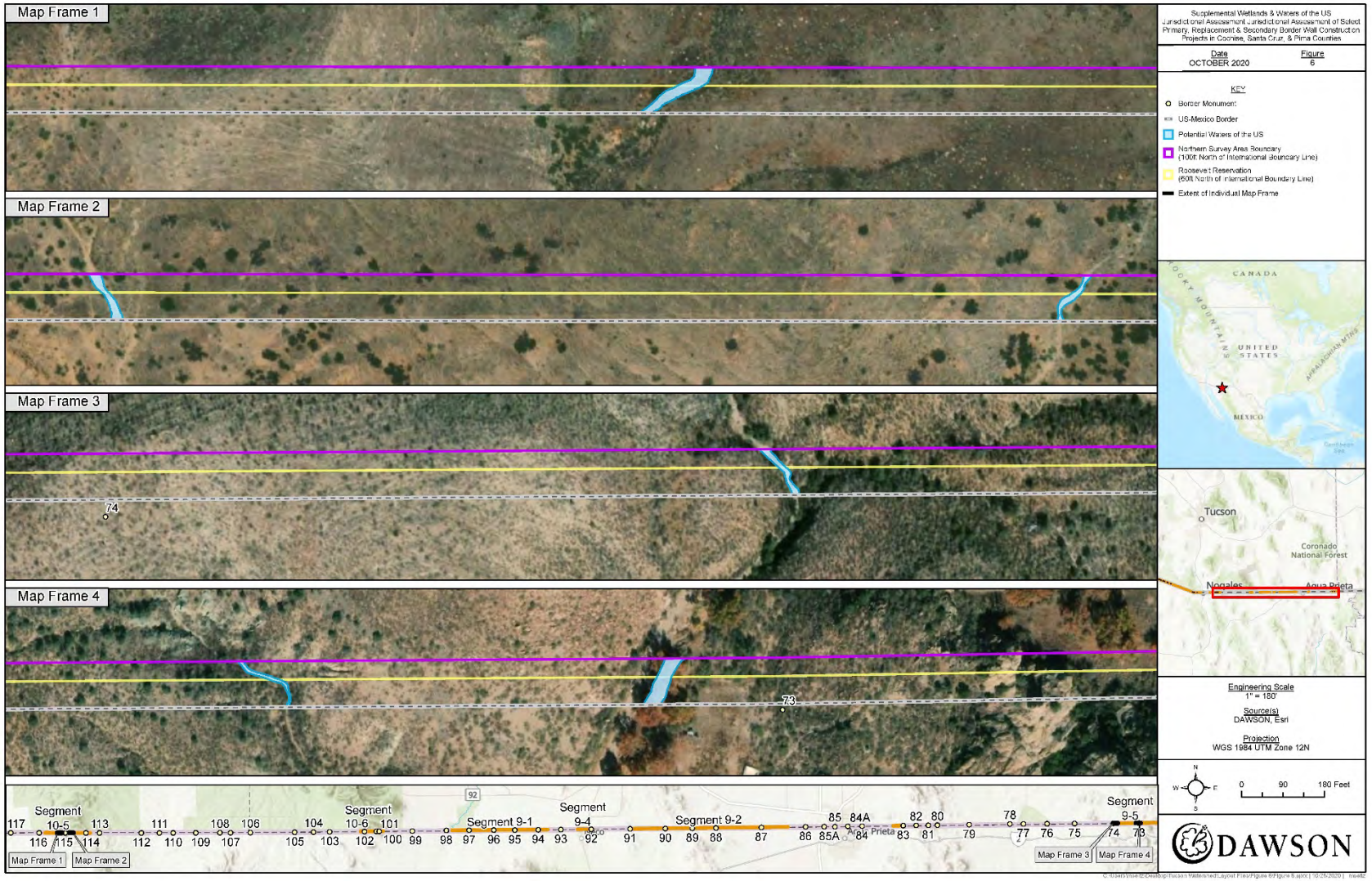
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Jurisdictional Assessment Jurisdictional Assessment of Select Primary, Replacement & Secondary Border Wall Construction Projects in Cochise, Santa Cruz, & Pima Counties
Date
OCTOBER 2020
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US-Mexico Border
Potential Waters of the US
Northern Survey Area Boundary (100ft North of International Boundary Line)
Roosevelt Reservation (60ft North of International Boundary Line)
Extent of Individual Map Frame
CANADA
UNITED STATES
MEXICO
Tucson
Coronado National Forest
Nogales
Agua Prieta
Engineering Scale
1" = 180'
Source(s)
DAWSON, Esri
Projection
WGS 1984 UTM Zone 12N
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Segment 10-5
Segment 10-6
Segment 9-1
Segment 9-4
Segment 9-2
Segment 9-5
Map Frame 1
Map Frame 2
Map Frame 3
Map Frame 4
DAWSON