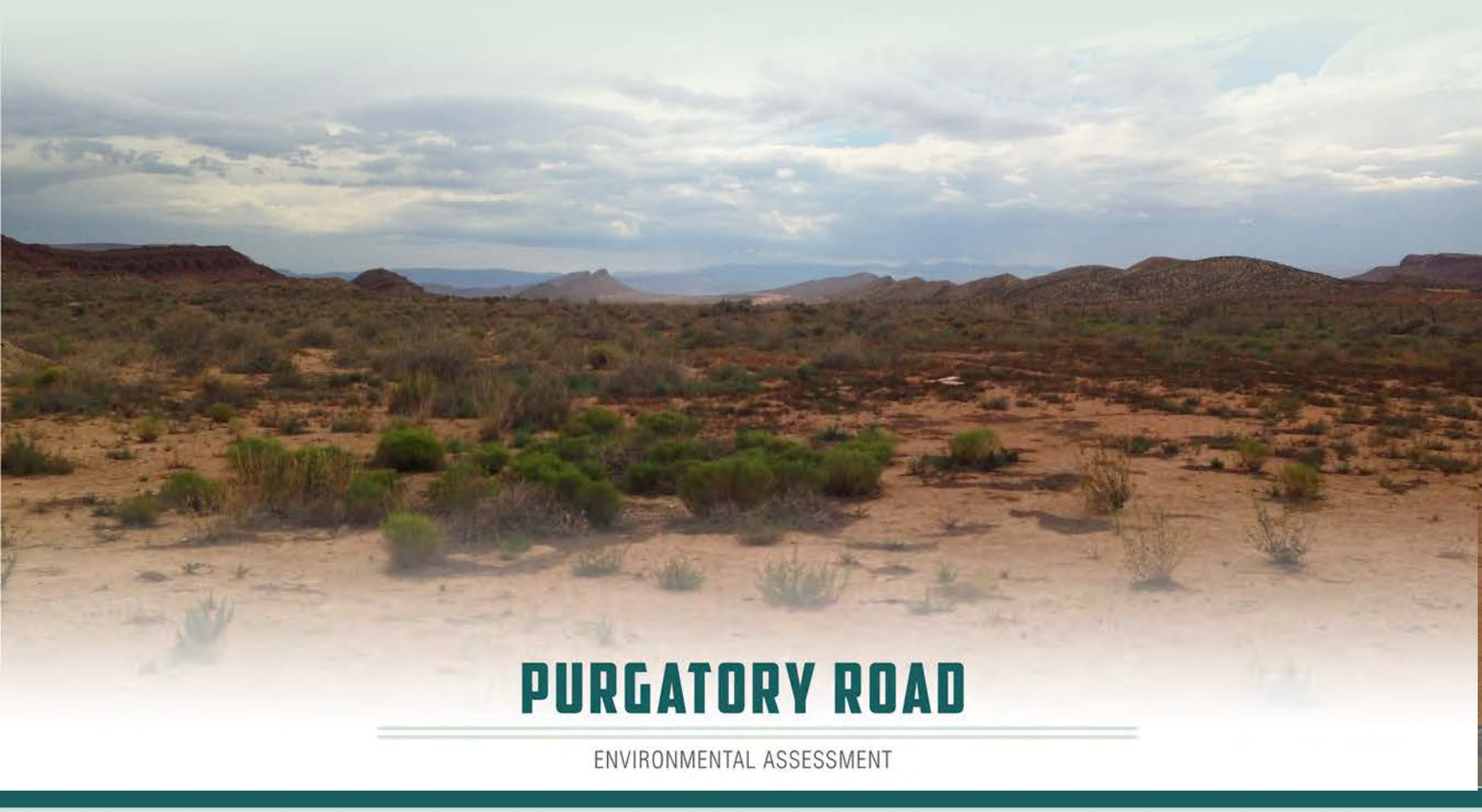

PURGATORY ROAD

ENVIRONMENTAL ASSESSMENT

STATE ROUTE 9 TO SOUTHERN PARKWAY
WASHINGTON COUNTY, UTAH

SUBMITTED PURSUANT TO 42 USC 4332(2)(C)

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
AND
UTAH DEPARTMENT OF TRANSPORTATION

SEPTEMBER 2016

Purgatory Road

Washington County, Utah

Environmental Assessment

Submitted pursuant to 42 U.S.C. 4332(2)(c) and 49 U.S.C. 303
by
The U.S. Department of Transportation, Federal Highway Administration (FHWA)
and the Utah Department of Transportation (UDOT)

Date of Approval	Rick Torgerson Region Four Director Utah Department of Transportation
Date of Approval	Ivan Marrero Division Administrator Federal Highway Administration

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Abstract:

FHWA and UDOT propose construction of a new road in Washington County, Utah. Proposed improvements include a new, three-lane road and a new bridge across the Virgin River. Two alternatives were considered in detail: the No-action Alternative and the Preferred Alternative. Environmental impacts and mitigation measures to reduce the levels of the impacts are discussed.

Comments on this Environmental Assessment are due by _____ and should be sent to Horrocks Engineers, c/o Purgatory Road EA, 555 South Bluff Street, Suite 101, St. George, Utah 84770-7321.

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1: Purpose and Need

Chapter 2: Alternatives

Chapter 3: Affected Environment and Environmental Consequences

LIST OF TABLES

Chapter 1: Purpose and Need

Chapter 2: Alternatives

Chapter 3: Affected Environment and Environmental Consequences

Chapter 4: Comments and Coordination

LIST OF ACRONYMS

AADT	Average Annual Daily Traffic
ACHP	Advisory Council on Historic Preservation
AOI	Area of Interest
APA	Agricultural Protection Areas
APE	Area of Potential Effects
BA	Biological Assessment
BFE	Base Flood Elevation
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	Best Management Practices
BO	Biological Opinion
CAAA	Clean Air Act Amendments
CAFE	Corporate Automobile Fuel Efficiency
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation Liability Act
CFR	Code of Federal Regulations
CLOMR	Conditional Letter of Map Revision
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CS	Species receiving special management under a Conservation Agreement
dBA	A-weighted decibels
Dixie MPO	Dixie Metropolitan Planning Organization
DOEFOE	Determination of Eligibility and Finding of Effect
DOT	Department of Transportation
EA	Environmental Assessment
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FDP	Floodplain Development Permit
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
GHG	Green House Gases
HEI	Health Effects Institute
HHS	Health and Human Services
IPaC	Information Planning and Conservation System
IRIS	Integrated Risk Information System
Lbs	Pounds
LDS	Church of Jesus Christ of Latter-Day Saints
L_{eq}	Equivalent Noise Levels
LOMR	Letter of Map Revision
LOS	Level-of-Service
LRTP	Long Range Transportation Plan
LUST	Leaking Underground Storage Tank
MBTA	Migratory Bird Treaty Act
mg/m^3	milligrams per cubic meter
MOU	Memorandum of Understanding
mpg	Miles per Gallon
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization

MSAT	Mobile Source Air Toxic
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OHWM	Ordinary High Water Mark
Pb	Lead
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with a diameter of 2.5 micrometers or less
PM_{10}	Particulate Matter with a diameter of 10 micrometers or less
POD	Points of Diversion
POM	Polycyclic Organic Matter
ppb	Parts per billion
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
RTP	Regional Transportation Plan
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
Section 4(f)	Section 4(f) of the Department of Transportation Act of 1966
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SPC	Wildlife Species of Concern
SPCC	Spill Prevention, Control, and Countermeasures
SR-9	State Route 9
STIP	Statewide Transportation Improvement Program
SWPPP	Storm Water Pollution Prevention Plan
TDS	Total Dissolved Solids
THPO	Tribal Historic Preservation Office
TIP	Transportation Improvement Program
TNM	Traffic Noise Model
TRI	Toxic Release Inventory
TSS	Total Suspended Solids
UAC	Utah Administrative Code
UCA	Utah Code, Annotated
UDAQ	Utah Division of Air Quality
UDEQ	Utah Division of Environmental Quality
UDOT	Utah Department of Transportation
UDWQ	Utah Division of Water Quality
UDWR	Utah Division of Wildlife Resources
UGS	Utah Geological Survey
UNHP	Utah Natural Heritage Program
UPDES	Utah Pollutant Discharge Elimination System
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank

UTP	Unified Transportation Plan
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VPD	Vehicles per Day
WOUS	Waters of the United States
µg/m^3	micrograms per cubic meter
˚C	Degrees Celsius
˚F	Degrees Fahrenheit

CHAPTER 1: PURPOSE AND NEED

1.1 INTRODUCTION

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, Hurricane City, and the Dixie Metropolitan Planning Organization (Dixie MPO), have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Southern Parkway and State Route 9 (SR-9) in Washington County, Utah (see Figure 1-1). Purgatory Road is a planned facility that would connect two existing roadway facilities.

What is an Environmental Assessment?

A public document that should briefly provide sufficient evidence and analysis for a federal agency (FHWA) to determine whether or not a more detailed Environmental Impact Statement (EIS) should be prepared.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) and associated FHWA regulations and guidance. The purpose of this chapter is to document the specific purposes and needs of the proposed project.

1.2 STUDY AREA

The study area is located in Washington County, within Hurricane City, Washington City, and unincorporated Washington County. The study area is generally bounded by SR-9 to the north, Southern Parkway to the south, and lies within the eroded valley of the Virgin anticline, a long upward fold in layers of rock that trends northeast through south-central Washington County, otherwise known as the Purgatory Flat (see Figures 1-1 and 1-2).

The logical termini for this EA are SR-9 in Hurricane City to the north and Southern Parkway in Washington City to the south. These termini are an adequate distance apart to assess the environmental impacts on a broad scope and are located at rational end points for proposed transportation improvements. The proposed project has independent utility since proposed improvements would be usable and be a reasonable expenditure, even if no additional transportation improvements in the area were made. The identified study area is sufficiently broad and does not restrict the consideration of a reasonable range of alternatives that could meet the identified needs of the project.

What are logical termini?

Logical termini are the beginning and end points of a project. For roadway projects logical termini are usually interchanges or intersections where travel demand changes.

1.3 COOPERATING AGENCIES

A cooperating agency is defined as any Federal agency, other than the lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative (40 CFR 1508.5). The following were invited to be cooperating agencies: Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers (USACE), Bureau of Land Management (BLM), Advisory Council on Historic Preservation (ACHP), and the Bureau of Indian Affairs (BIA) Western Region. Of these, the USFWS and the BLM accepted the invitation to be cooperating agencies on the Purgatory Road EA.

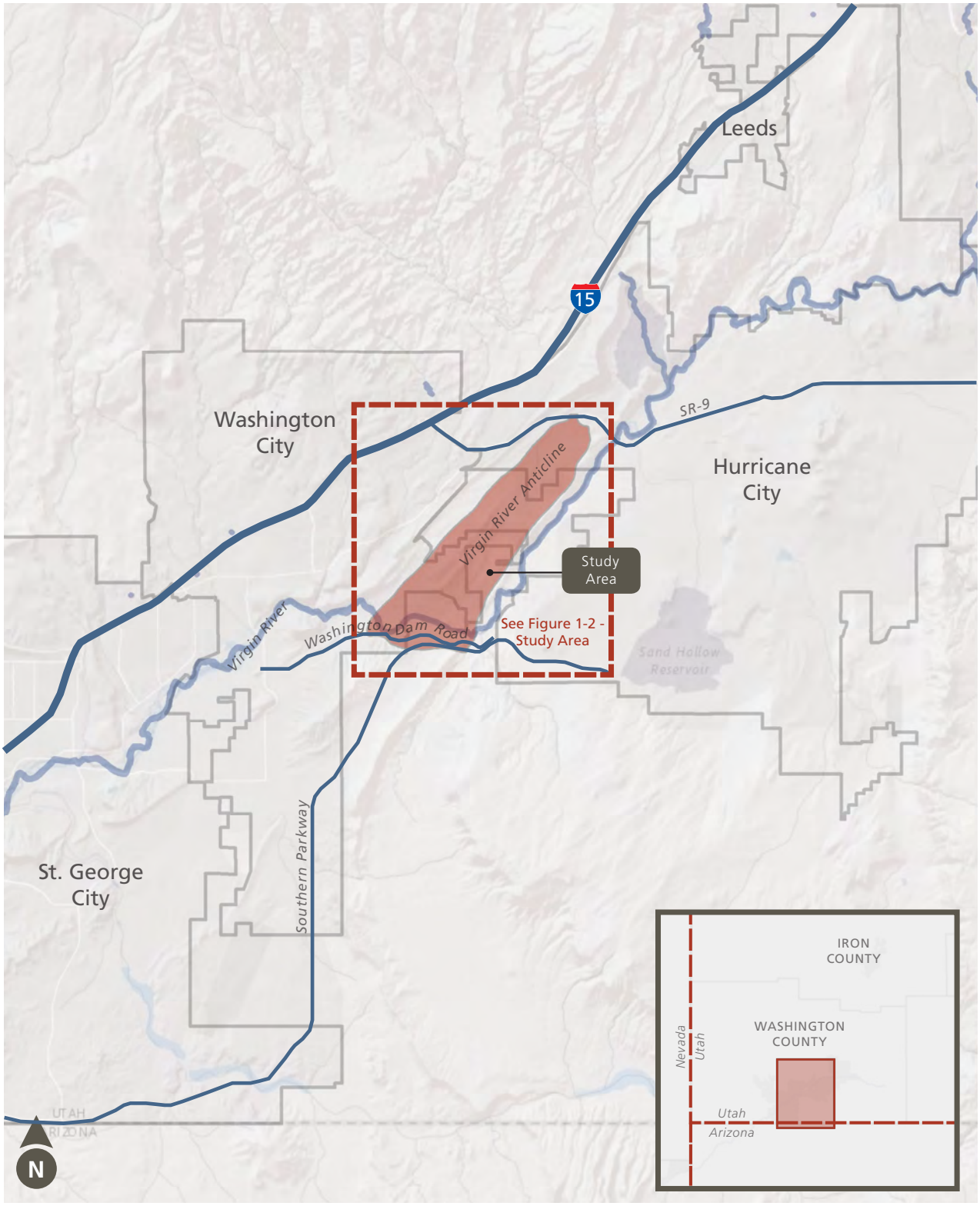


Figure 1-1. Project Vicinity Map

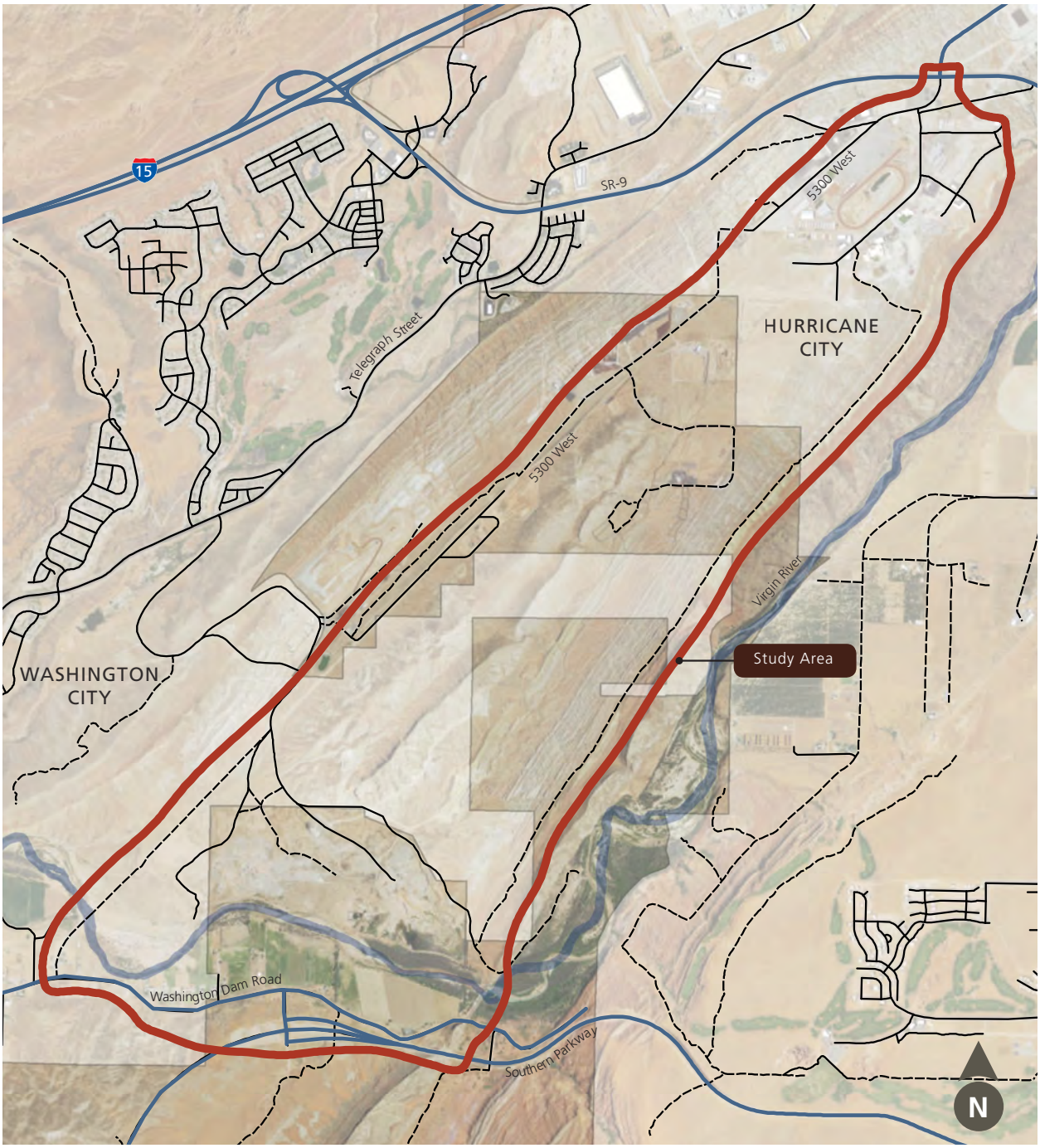


Figure 1-2. Study Area

1.4 SUMMARY OF THE PURPOSE OF AND NEED FOR THE PROJECT

1.4.1 PURPOSE OF THE PROJECT

The primary purpose of this project is to:

1. Improve regional system linkage and mobility.

Other purposes of the project include:

2. Improve the health, welfare, and safety of the public.
3. Support local economic development through mobility improvements.

1.4.2 NEED FOR THE PROJECT

The project is needed for the following reasons:

1. Lack of north-south roadways linking SR-9 and Southern Parkway.
2. Lack of public secondary access to rapidly growing Purgatory Flat. Existing development in the northern area of the Purgatory Flat has only one access point, the 5300 West and SR-9 intersection.
3. Lack of access to the developable areas of the Purgatory Flat, which are planned for industrial, residential, and commercial uses.

What is a Purpose and Need Statement?

A Purpose and Need Statement identifies and describes the transportation problem(s) or other needs which the Proposed Action is intended to address (40 CFR 1502.13).

The Purpose and Need chapter should clearly demonstrate that a "need" exists and should define the "need" in terms understandable to the general public. This discussion should clearly describe the problems which the proposed action is to correct. It will form the basis for the "no action" discussion in Chapter 2: Alternatives, and assist with the identification of reasonable alternatives and the selection of the Preferred Alternative.

1.5 TRANSPORTATION PLANNING EFFORTS

Transportation planning is an important, on-going process to identify needs and projects to maintain an adequate transportation system. The Dixie Metropolitan Planning Organization (MPO), Hurricane City, and Washington City are responsible for transportation planning in the study area.

1.5.1 METROPOLITAN PLANNING

Dixie Metropolitan Planning Organization

Consistent with federal law, the Dixie MPO is responsible for developing a 30-year financially-constrained regional transportation plan based on a comprehensive, region-wide transportation systems analysis. This analysis addresses all modes of transportation, including highways, transit, trucking, rail, air, pedestrian, and bicycle. Purgatory Road is included in Phase 1 (2015 to 2024) of the 2015-2040 Dixie MPO Regional Transportation Plan (RTP), and is listed on the Council of Governments (COG) project priority list. See Figure 1-3 for all projects on the 2040 RTP within and near the study area.

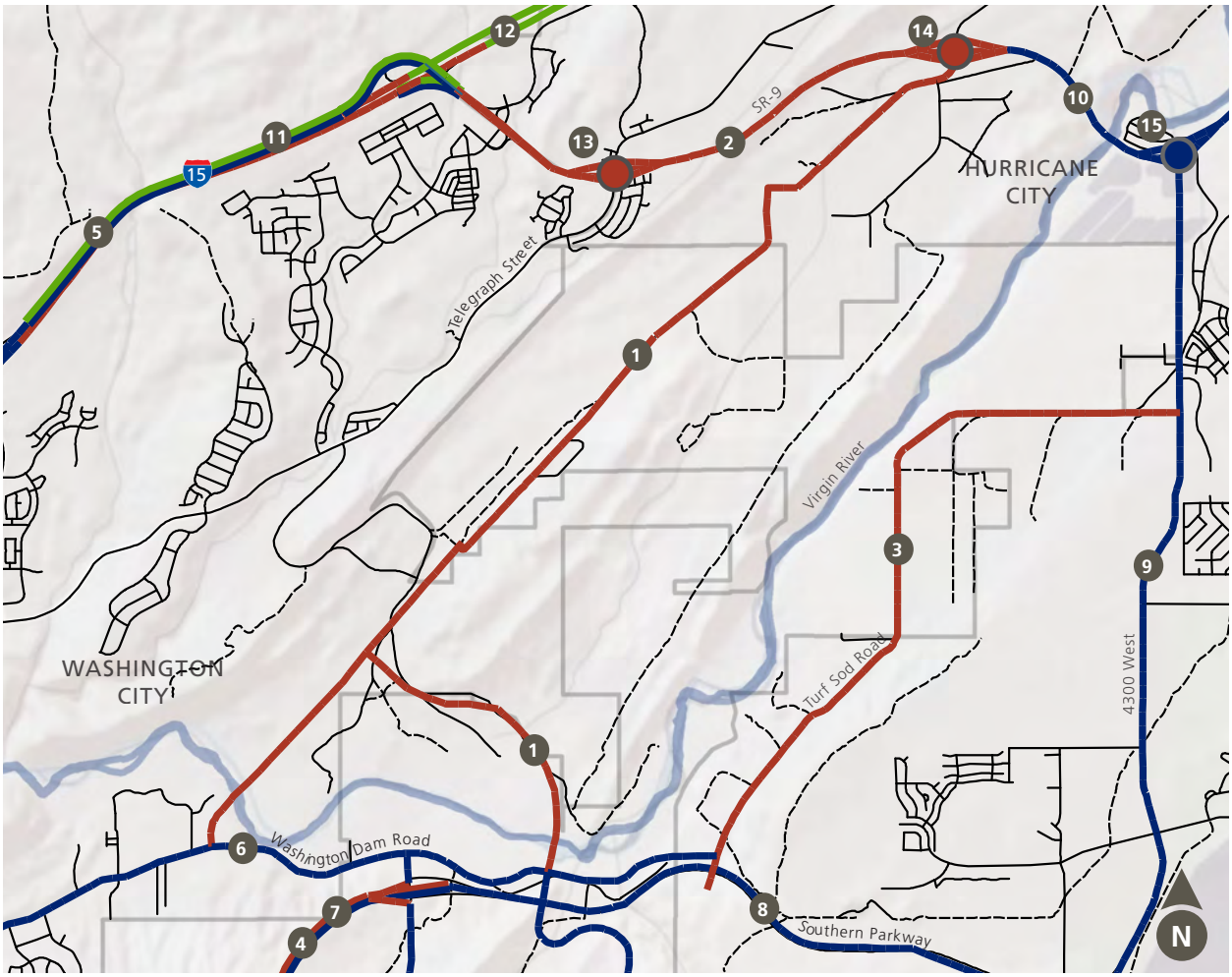
Unified Transportation Plan

UDOT, the Dixie MPO, and other metropolitan planning organizations in Utah have created Utah's Unified Transportation Plan (UTP) 2011-2040. The Unified Plan is an executive summary of five individual agency plans, including Dixie MPO's RTP, and contains a comprehensive project list including all major capacity

What is the Dixie MPO?

The Dixie MPO is designated by the state of Utah to oversee transportation planning in the urbanized and urbanizing areas in Utah's Washington County – historically known as "Utah's Dixie."

The Dixie MPO boundaries encompass St. George, Washington City, Santa Clara, Ivins, Hurricane, LaVerkin, Toquerville, Leeds, and portions of unincorporated Washington County. Member jurisdictions which comprise the Dixie MPO include Washington County, St. George, Washington City, Santa Clara, Ivins, Hurricane, LaVerkin, Toquerville, Leeds, and UDOT.



		Project Facility	Location and/or Extents	Type
Roadways	Phase I: 2015-2024	1 Purgatory Road	SR-9 to Washington Dam Road	New Construction
		2 SR-9	So. Parkway Seg VI, I-15 to 5300 West	Widen/Improve to Freeway Standards
		3 Turf Sod Road	4300 West to Southern Parkway	New Construction
		4 Southern Parkway	Seg IIIb, Warner Valley Rd to Washington Dam Rd	New Construction
	Phase II: 2025-2034	5 I-15	MP 4 to MP 16	Lane Widening
		6 Washington Dam Road	1900 East to East City Limits	Widen/Reconstruct
		7 Southern Parkway	Seg IIIb, Warner Valley Rd to Washington Dam Rd	New Construction
		8 Southern Parkway	Seg IVa, Washington Dam Rd to Sand Hollow	New Construction
		9 4300 West	SR-9 to Southern Parkway	New Construction
		10 SR-9	So. Parkway Seg VI, 5300 West to So. Parkway	Widen/Improve to Freeway Standards
	Phase III: 2031-2040	11 I-15	MP 16 to MP 13	Widen in Southbound Direction
		12 I-15	MP 16 to MP 27	Widening
Interchanges	Phase I: 2015-2024	13 Southern Parkway Interchange	at Telegraph Street and SR-9	New Construction
		14 Southern Parkway Interchange	at 5300 West and SR-9	New Construction
	Phase II: 2025-2034	15 Southern Parkway Interchange	at 4300 West and SR-9	New Construction

Figure 1-3. Dixie MPO Regional Transportation Plan (2015-2040)

projects anticipated through 2040. Therefore, any project that is listed on the Dixie MPO RTP is also listed on the Unified Plan, and is officially recognized as a planned project by UDOT.

Washington City's Transportation Master Plan

Washington City has identified Purgatory Road as a minor arterial on their Transportation Master Plan (September 2014). As described in the Transportation Master Plan, the roadway is intended to provide further additional access points across the Virgin River, provide additional access to and from the eastern and southeastern parts of Washington City, and draw traffic away from Washington Fields Road and 300 East.

Hurricane City's Transportation Master Plan

Hurricane City has identified Purgatory Road as a major collector on their master planned roads map (June 2014). The road provides access to the various facilities already present in the study area and provides connections to other roadways planned under other jurisdictions.

1.6 DESCRIPTION OF TRANSPORTATION NEEDS

1.6.1 LACK OF NORTH-SOUTH ROADWAYS

Other than Purgatory Road, the only roadways that provide a north-south system link to SR-9 and Southern Parkway are the 4300 West corridor and Telegraph Street (by way of Washington Fields Road). See Figure 1-4. Telegraph Street does not connect directly to Southern Parkway. To reach Southern Parkway from SR-9, travelers must cross the Virgin River twice by travelling south on Telegraph Street and then make a left-turn on Washington Fields Road, which connects to Washington Dam Road, and then to Southern Parkway. Telegraph Street and the 4300 West corridor are approximately five miles apart.

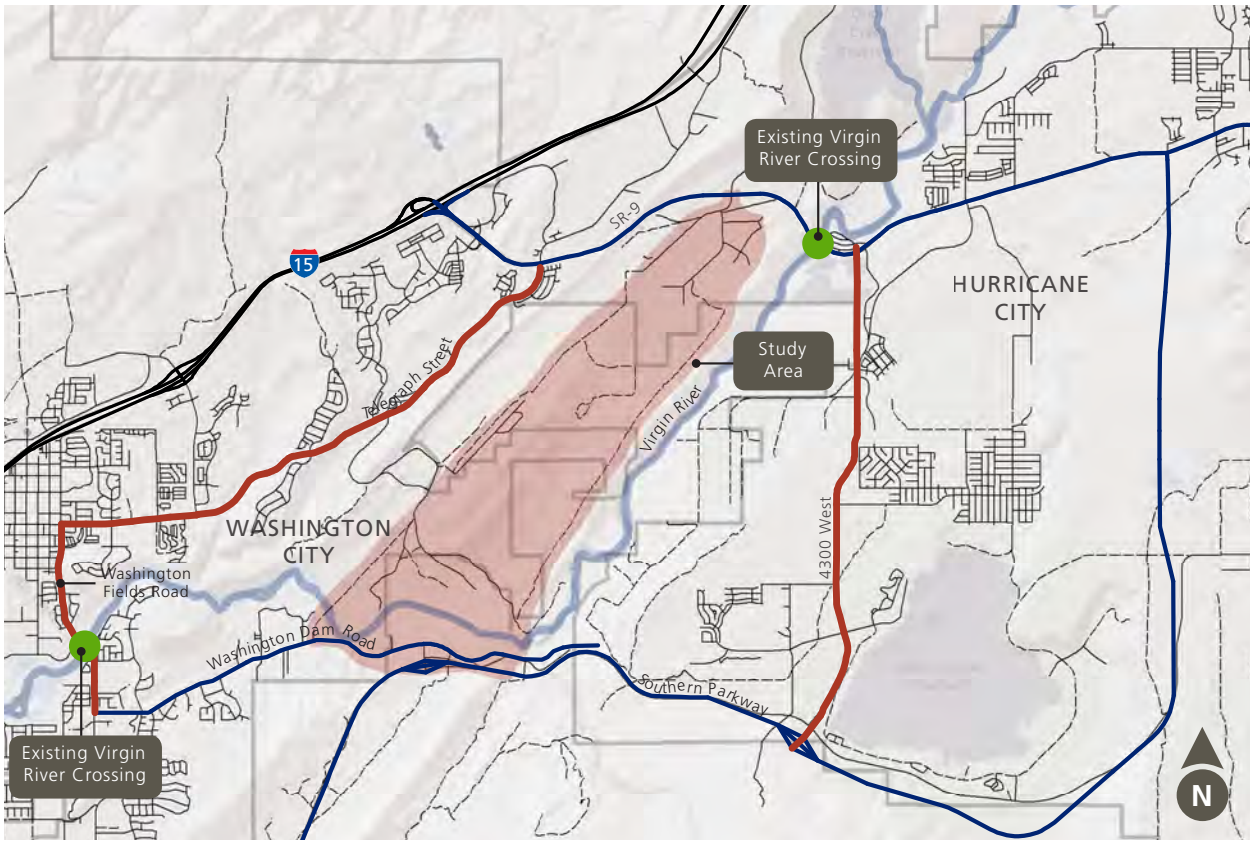


Figure 1-4. North-South Roadways Near Study Area

Additionally, there are only two general use crossings of the Virgin River in Hurricane City and Washington City. These two crossings are located approximately 7.5 miles apart at SR-9 in Hurricane City and Washington Fields Road in Washington City (see Figure 1-4). (It should be noted that there is a private/closed crossing of the Virgin River at County Way in Washington City.) The lack of north-south roadways, in combination with the limited crossings of the Virgin River, results in a substantial amount of out-of-direction travel for residents in Washington City trying to get to the service and employment areas in Hurricane City, and vice versa.

Based on the Dixie MPO Travel Demand Model, it currently takes 15 minutes 55 seconds to travel between the Washington Public Works Building (Point A) to the Southern Utah Shooting Sports Park (Point B) via Washington Fields Road and Telegraph Street, and 17 minutes 50 seconds to travel from Point B to Point A (see Table 1-1 and Figure 1-5). In 2040, this same route would take 18 minutes 2 seconds from Point A to Point B, and 18 minutes 24 seconds from Point B to Point A. A system link between SR-9 and Southern Parkway would reduce the amount of time it would take a driver to negotiate between Point A and Point B by about 40 percent (approximately 11 minutes).

Table 1-1. Travel Times

PM Travel Times	A to B	B to A
Existing (2015)	15:55	17:50
No-action Condition (2040)	18:02	18:24
System Link between SR-9 and Southern Parkway/ Washington Dam Road (2040)	10:59	10:44

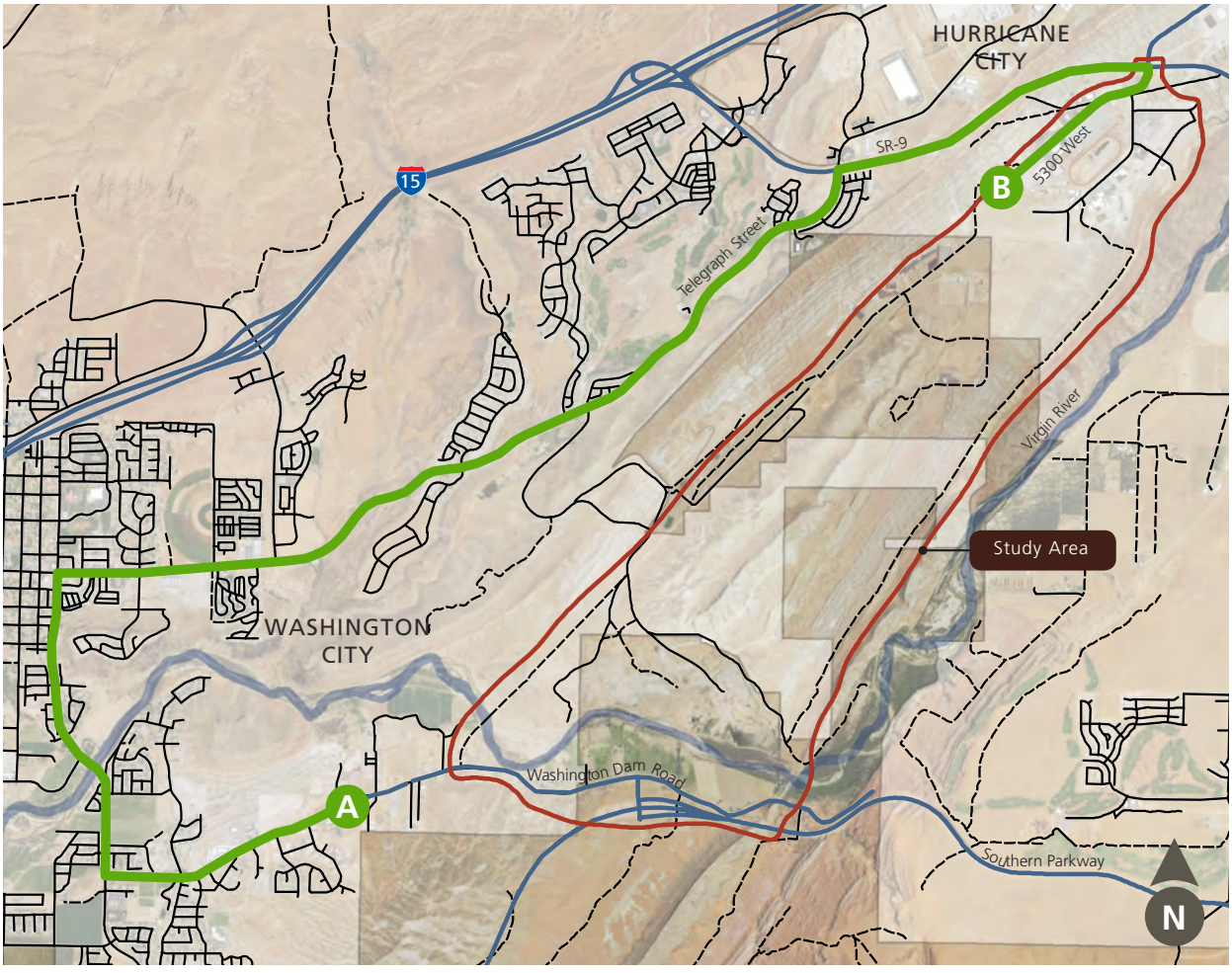


Figure 1-5. Travel Times

1.6.2 LACK OF SECONDARY ACCESS TO PURGATORY FLAT

Existing development in the northern area of the Purgatory Flat, including the Washington County Fairgrounds, Southern Utah Shooting Sports Park, Purgatory Correctional Facility, Fairground Industrial Development, Quail Creek Industrial Development, UDOT Maintenance Facilities, and the Utah Division of Motor Vehicles (DMV), has only one access point, the 5300 West and SR-9 intersection (see Figure 1-6). If this access is blocked, it prevents how well first-response personnel (such as fire, medical, and police) can respond to emergency calls. In these situations, time is critical, and delays can affect the ability of emergency personnel to protect the health, welfare, and safety of the public.

The Washington County Fairgrounds generates large volumes of traffic during events that overwhelm the intersection of 5300 West and SR-9 (the single point of access to existing development in the northern area of the Purgatory Flat). For example, Washington County has indicated that between 40,000 to 45,000 individuals attend the Washington County Fair each year. On the Saturday of the fair, nearly 4,000 vehicles are in attendance, with approximately 75 percent of those vehicles leaving at the same time over a 45 minute period following the closing fireworks. These vehicles must all use the 5300 West and SR-9 intersection, blocking the intersection and affecting emergency response times.

1.6.3 LACK OF ACCESS TO UNDEVELOPED AREAS OF THE PURGATORY FLAT

According to the future land use maps of Hurricane City and Washington City, much of the undeveloped land within the study area is planned for residential, commercial, and industrial development (see Figure 1-7). As discussed above, there is only one access into the northern area of the Purgatory Flat (the 5300 West and SR-9 intersection). This single access cannot support Hurricane City, Washington City, and Washington County's plans for development. For the study area to be economically viable, adequate transportation access will be required.

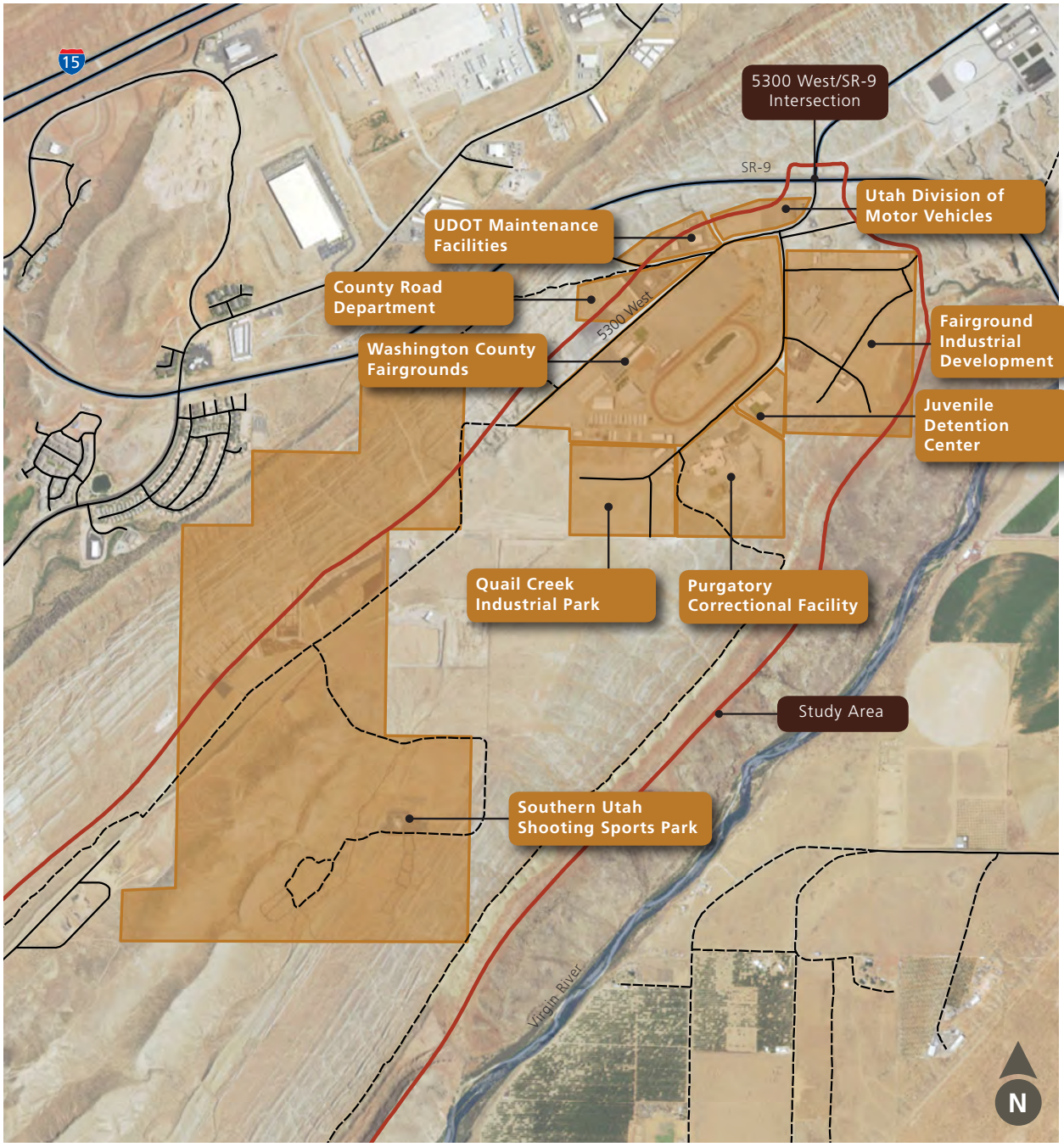


Figure 1-6. Existing Development

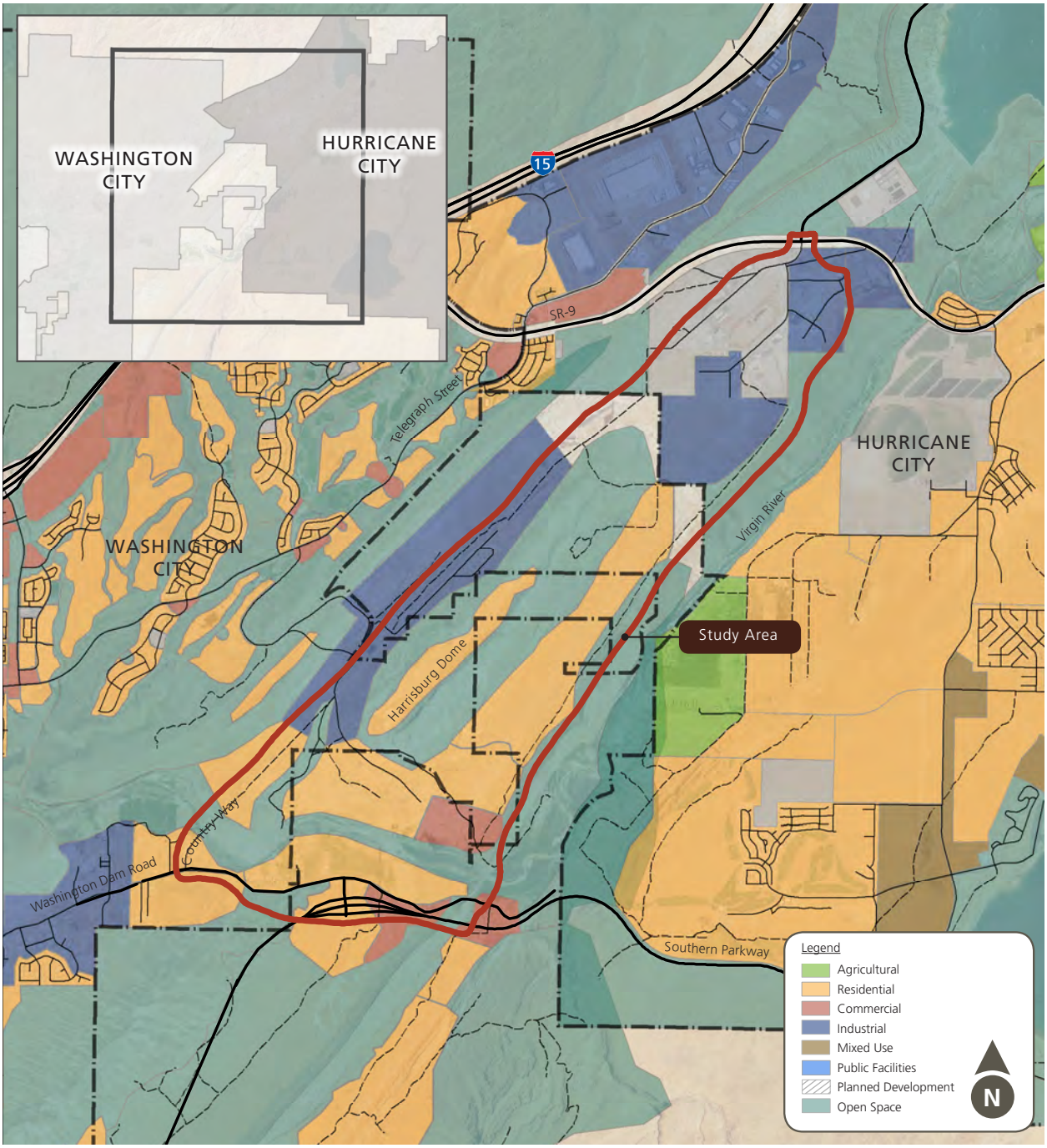


Figure 1-7. Planned Land Uses within and near the Study Area

1.7 CONCLUSION

1.7.1 SUMMARY OF PURPOSE AND NEED

The primary purpose of this project is to:

1. Improve regional system linkage and mobility.

Other purposes of the project include:

2. Improve the health, welfare, and safety of the public.
3. Support local economic development through mobility improvements.

The project is needed for the following reasons:

1. Lack of north-south roadways linking SR-9 and Southern Parkway.
2. Lack of public secondary access to rapidly growing Purgatory Flat. Existing development in the northern area of the Purgatory Flat has only one access point, the 5300 West and SR-9 intersection.
3. Lack of access to the undeveloped areas of the Purgatory Flat, which are planned for industrial, residential, and commercial uses.

1.7.2 PURPOSE AND NEED OBJECTIVES

The project team developed specific objectives to measure an alternative's ability to meet the purpose and need (see Table 1-2).

Table 1-2. Purpose and Need Objectives

Purpose	Objective
Improve regional system linkage and mobility.	Provide an additional north-south system link that operates at an acceptable level-of-service* between SR-9 and Southern Parkway.
Improve the health, welfare, and safety of the public.	Provide a secondary public access for present and future developments in the study area.
Support local economic development through mobility improvements.	Be consistent with the economic development and master transportation plans of Hurricane City, Washington City, and Washington County.

*See Chapter 2 for a description of level-of-service.

CHAPTER 2: ALTERNATIVES

2.1 INTRODUCTION

For an Environmental Assessment (EA), the Federal Highway Administration (FHWA) Technical Advisory T6640.8A requires a discussion of the No-action Alternative and one or more build alternatives. This chapter presents the alternatives development process, the alternatives considered, the screening process by which alternatives were eliminated from further consideration, a description of the alternatives selected for detailed study, and a selection of the Preferred Alternative.

2.2 ALTERNATIVES DEVELOPMENT

The alternatives development process included identifying potential solutions that meet the project purpose. The purpose of the project consists of three elements: (1) improve regional system linkage and mobility, (2) improve the health, welfare, and safety of the public, and (3) support local economic development through mobility improvements.

2.2.1 ALTERNATIVES

Each alternative assumes that all other planned improvements included in approved regional and local plans would be completed by 2040. These include all improvements, regardless of transportation mode, in the 2015-2040 Dixie Metropolitan Planning Organization (MPO) Regional Transportation Plan (RTP), Utah's Unified Transportation Plan (UTP) (2011-2040), Washington City's Transportation Master Plan, and Hurricane City's Transportation Master Plan.

No-action Alternative

The No-action Alternative would maintain roadways within the study area in their current roadway configurations. This alternative assumes that short-term minor restoration (safety and maintenance) activities that maintain continued operation of the existing roadway facilities would be ongoing. The No-action Alternative assumes all other improvements included in the 2040 RTP and other approved regional and local plans would be implemented.

Purgatory Road Build Alternatives

The project team developed several Purgatory Road Build Alternatives to connect SR-9 to Southern Parkway. All Purgatory Road Build Alternatives would construct a three-lane roadway (one travel lane in each direction with a two-way left-turn lane) on new alignment between SR-9 and Southern Parkway (see Figure 2-1 for typical section).

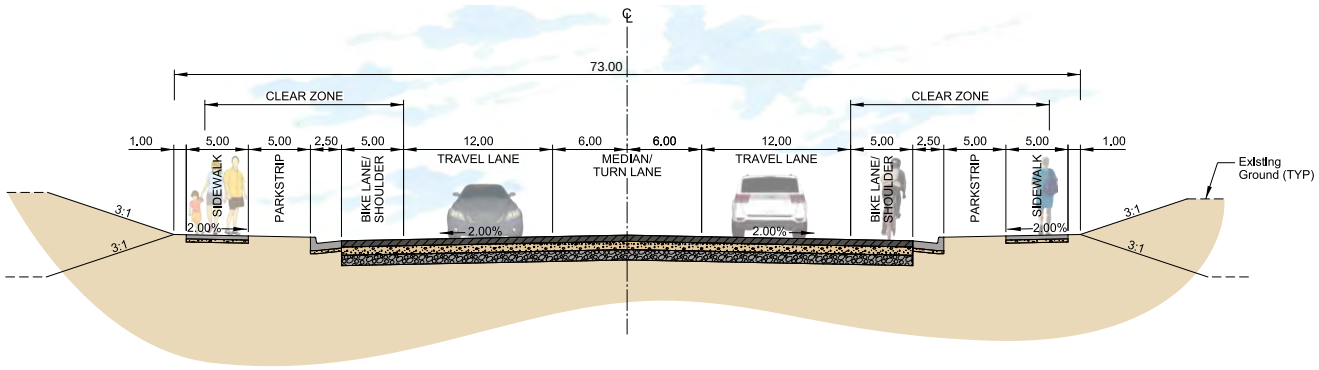


Figure 2-1. Typical Section

The Purgatory Road Build Alternatives were divided into three sections:

North Section

The north section of the study area would extend from SR-9 to approximately Quail Creek Industrial Park. The Project Team evaluated three alternatives in this northern section:

- **Alternative N1** would follow the existing 5500 West roadway and wrap around the west side of the Washington County Fairgrounds
- **Alternative N2** would follow the existing 5300 West roadway and wrap around the east side of the Washington County Fairgrounds
- **Alternative N3** would follow the existing 5300 West roadway and then leave the roadway to wrap around the east side of the Purgatory Correctional Facility

Middle Section

The middle section of the study area would extend from approximately Quail Creek Industrial Park to Landfill Road. The Project Team evaluated three alternatives in this middle section:

- **Alternative M1** would follow the existing utility corridor on the west side of the Purgatory Flat
- **Alternative M2** would extend through the middle of the Purgatory Flat
- **Alternative M3** would follow the existing dirt road on the east side of the Purgatory Flat

River Crossing

The Project Team evaluated two Virgin River crossing locations:

- **Alternative R1** would cross the river on an existing bridge at Country Way and would connect to Washington Dam Road
- **Alternative R2** would cross the river at a new location to connect directly to Southern Parkway

Each alternative can be combined with any other alternative, as depicted in Figure 2-2 by the gray "connecting" lines.

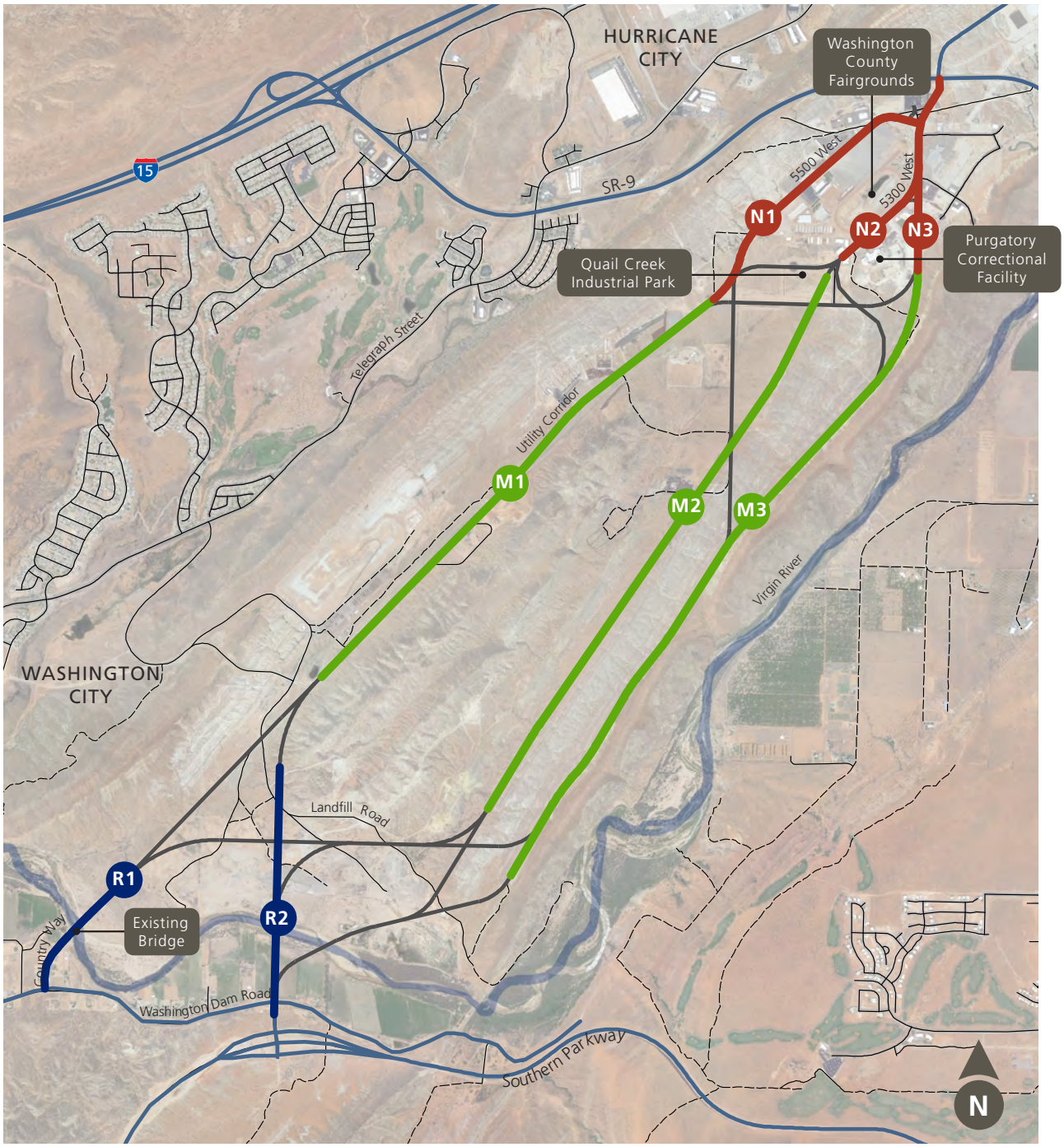


Figure 2-2. Build Alternatives Overview

2.3 ALTERNATIVES SCREENING

The alternatives screening process evaluated the alternatives described in the previous section. The screening process for this EA included:

- **Level 1 – Purpose and Need Screening:** Evaluate the compatibility of the alternatives with the purpose and need.
- **Level 2 – Environmental Screening:** Screen alternatives that are found acceptable in Level 1 Screening. The Project Team screened alternatives based on critical environmental resources, including threatened & endangered species, Section 4(f), and land use impacts (Washington County Landfill, Washington County Fairgrounds, and the Purgatory Correctional Facility).

2.3.1 LEVEL 1 – PURPOSE AND NEED SCREENING

The alternatives were evaluated based on their ability to meet the purpose of the project. If an alternative met the purpose of the project, it was studied in greater detail. If an alternative did not meet the purpose of the project, it was eliminated from further study. The purpose of the project consists of three elements: (1) improve regional system linkage and mobility, (2) improve the health, welfare, and safety of the public, and (3) support local economic development through mobility improvements.

Level-of-Service

Transportation agencies use a qualitative measurement known as "level-of-service" (LOS) to measure the quality of the traffic flow rate. LOS characterizes the traffic operations of a facility in factors such as speed, average travel delay, travel times, and freedom to maneuver. LOS ranges from A to F, with LOS A representing the best operating conditions (little or no congestion or delay) and LOS F representing the worst operating conditions (extreme congestion and delay with long traffic queues and stop-and-go traffic). If a roadway exhibits LOS E or LOS F conditions, it is considered failing.

When planning for future improvements, a roadway should have adequate capacity to handle the anticipated traffic flow rate, and should provide for a minimum acceptable LOS. UDOT's Roadway Design Manual of Instruction states that roadway designers should provide LOS C or higher in a rural area and LOS D or higher in an urban area. The proposed project is within an urbanized area and, therefore, streets should operate at LOS D or better during peak hours, if possible.

Level of Service (LOS)	
A	FREE FLOW. Low volumes and no delays 
B	STABLE FLOW. Speeds restricted by travel conditions, minor delays 
C	STABLE FLOW. Speeds and maneuverability closely controlled because of higher volumes 
D	STABLE FLOW. Speeds considerably affected by change in operation conditions. High density traffic restricts maneuverability, volume near capacity 
E	UNSTABLE FLOW. Low speeds, considerable delay, volume at or slightly over capacity 
F	FORCED FLOW. Very low speeds, volumes exceed capacity, long delays with stop-and-go traffic 

Measures of Effectiveness

The corridor alternatives were evaluated against the following measures of effectiveness. Measures of effectiveness are tools used to measure the achievement of desired results, or in this case, whether or not an alternative meets the purpose of the project.

No-action Alternative

The No-action Alternative fails to meet the purpose and need for the project; however, it will move forward to detailed study because it satisfies the NEPA "no-action" requirements and provides a baseline to compare impacts of build alternatives.

Purgatory Road Build Alternatives

Improve Regional System Linkage and Mobility

All Purgatory Road Build Alternatives, with the exception of River Crossing Alternative R1, would improve system linkage and regional mobility by providing a direct connection between SR-9 and Southern Parkway that would operate at LOS D or better in 2040 (see Traffic Memo in Appendix B). River Crossing Alternative R1 would connect to Washington Dam Road, and would not provide a direct connection to Southern Parkway.

Improve Health, Welfare, and Safety of the Public

All Purgatory Road Build Alternatives would improve the health, welfare, and safety of the public by providing a secondary public access at Southern Parkway. First-response personnel (such as fire, medical, and police) would be able to more effectively respond to emergency calls, even if the existing access point to the northern area of the study area at 5300 West and SR-9 is blocked.

Support Local Economic Development through Mobility Improvements

All Purgatory Road Build Alternatives would be consistent with the economic development and master transportation plans of Hurricane City, Washington City, and Washington County by providing improved access to existing and future development.

Screening Results

Based on Level 1 – Purpose and Need Screening, all Purgatory Road Build Alternatives, with the exception of River Crossing Alternative R1 met all three elements of the project purpose and moved forward to Level 2 – Environmental Resources Screening (see Table 2-1). As discussed above, the No-action Alternative fails to meet the purpose and need for the project; however, it will move forward to detailed study.

Table 2-1. Purpose and Need Screening

Alternative	Improve Regional System Linkage and Mobility	Improve the Health, Welfare, and Safety of the Public	Support local Economic Development through Mobility improvements	Move Forward to Environmental Resources Screening
No-action Alternative	No	No	No	**Yes**
Alternative N1	Yes	Yes	Yes	**Yes**
Alternative N2	Yes	Yes	Yes	**Yes**
Alternative N3	Yes	Yes	Yes	**Yes**
Alternative M1	Yes	Yes	Yes	**Yes**
Alternative M2	Yes	Yes	Yes	**Yes**
Alternative M3	Yes	Yes	Yes	**Yes**
Alternative R1	No	Yes	Yes	**No**
Alternative R2	Yes	Yes	Yes	**Yes**

2.3.2 ENVIRONMENTAL RESOURCES SCREENING

The alternatives that passed the Level 1 – Purpose and Need Screening went through Level 2 – Environmental Resources Screening. The environmental screening analysis included an inventory of existing critical environmental resources located near the study area.

Screening Factors

Designated Critical Habitat for Threatened & Endangered Species

Section 7 of the Endangered Species Act states that "each Federal agency shall...insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat." See Figure 2-3 for Designated Critical Habitat within the study area.

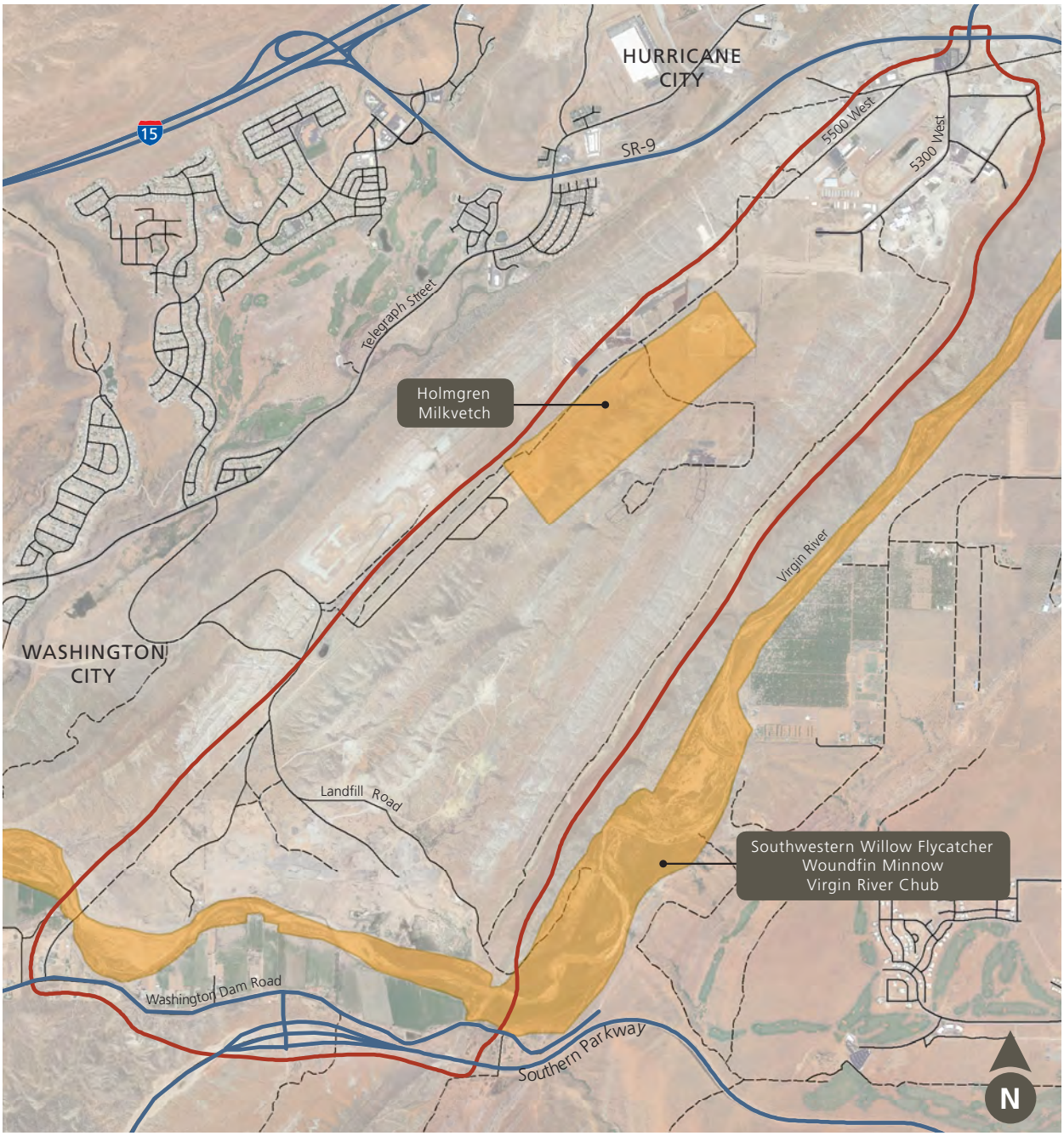


Figure 2-3. Designated Critical Habitat within Study Area

Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 (49 USC §303 and 23 USC §138) requires avoidance of impacts to public parks and recreation areas, wildlife and waterfowl refuges, and historic sites unless: (1) there is no prudent and feasible avoidance alternative and all possible planning has been done to minimize harm to the Section 4(f) properties as a result of the project, or (2) if the project would have a *de minimis* impact on the property. For parks, recreation area, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f). The Southern Utah Shooting Sports Park is a Section 4(f) property within the study area. Although the Washington County Regional Park is a recreation area, it is not a Section 4(f) property. FHWA guidance states "Publicly owned fairgrounds that function primarily for commercial purposes by hosting

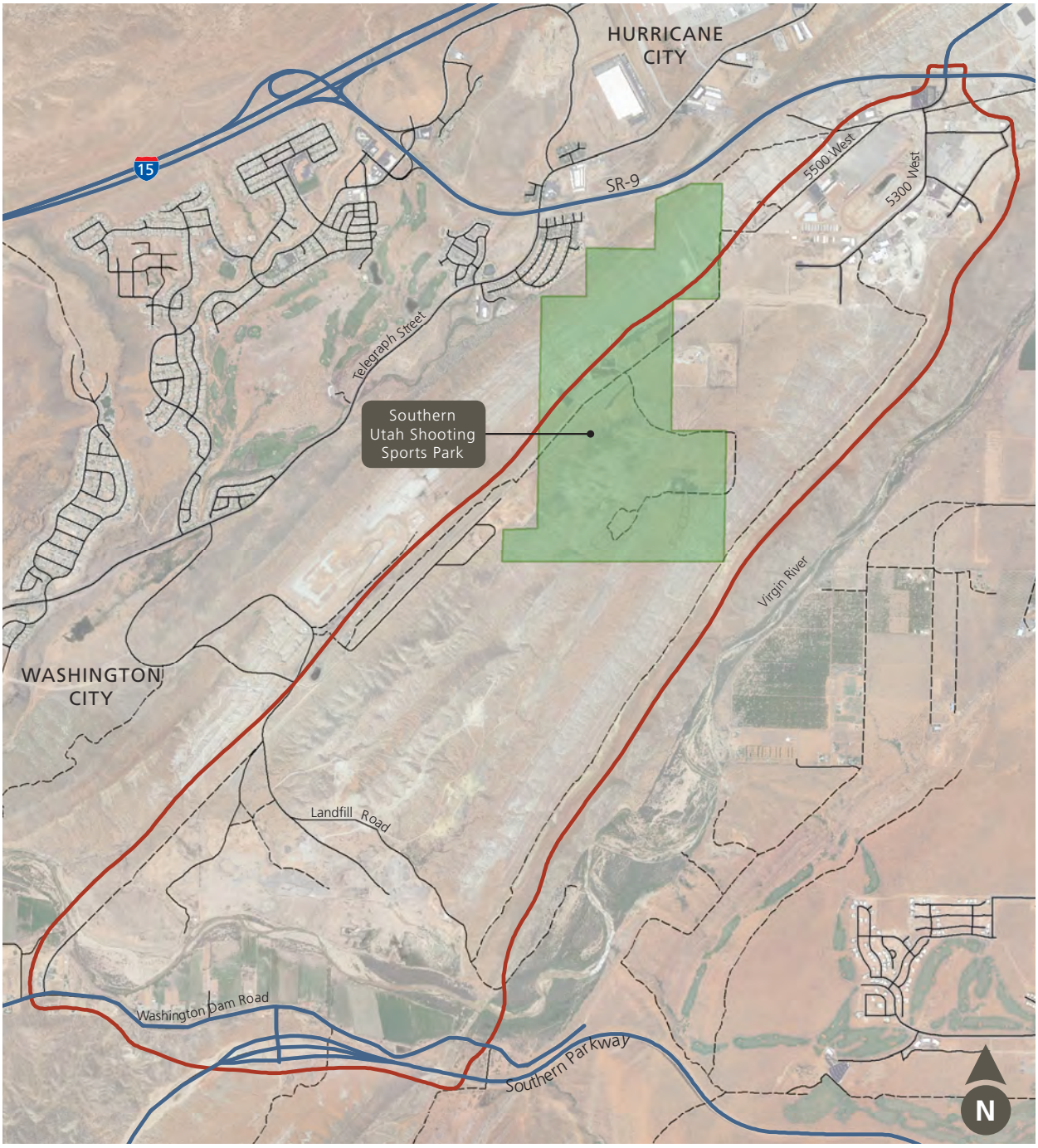


Figure 2-4. Section 4(f) Properties within Study Area

state or county fairs, horse races, or other commercial ventures are not considered Section 4(f) properties." As the Regional Park is primarily used to host the Washington County Fair, horse races, and horse training, the property does not qualify for protection under Section 4(f).

Land Use

In addition to the Southern Utah Shooting Sports Park, other important land uses within the study area include:

- Washington County Landfill
- Washington County Fairgrounds
- Purgatory Correctional Facility

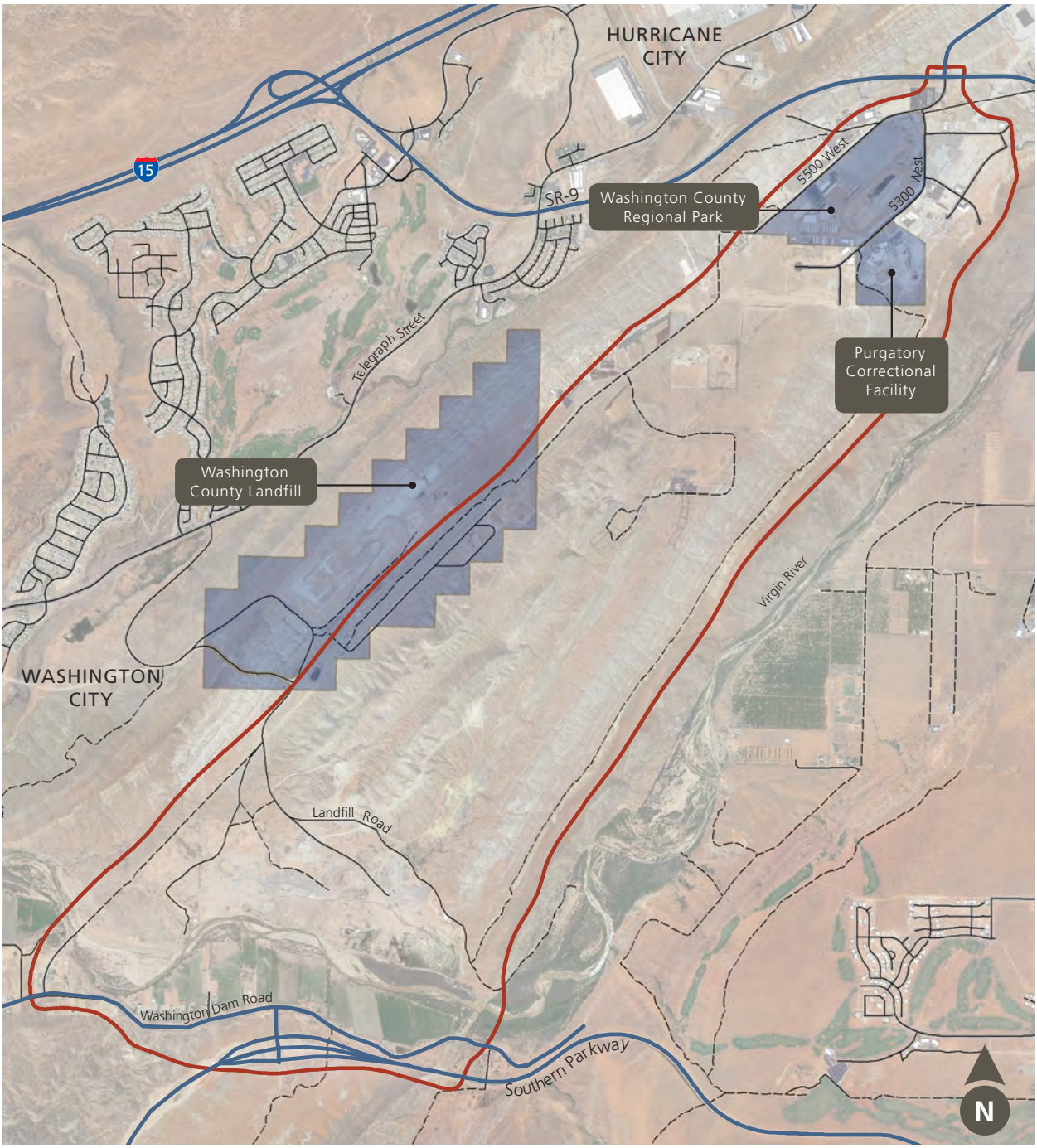


Figure 2-5. Important Land Uses within Study Area

North Section

A summary of the Level 2 - Environmental Resources Screening for the North Section is shown in Table 2-2 and Figure 2-6. Highlighted rows indicate North Section Alternatives that moved forward for detailed study.

Table 2-2. North Section Environmental Screening

Alternative	Designated Critical Habitat	Section 4(f)	Land Use
Alternative N1	No impact	No impact	Indirectly impacts the Washington County Fairgrounds: • During events at the Fairground, individuals park on the west side of 5500 West. Increased traffic on 5500 West could cause safety concerns for individuals, children, and animals, as they cross the busier roadway.
Alternative N2	No impact	No impact	No impact
Alternative N3	No impact	No impact	Indirectly impacts the Purgatory Correctional Facility: • Current correctional facility operations (police training and shooting range) are not compatible with a new roadway to the east.

Alternative N2 was carried forward for detailed study because it had no impacts to Designated Critical Habitat, Section 4(f) properties, and important land uses.

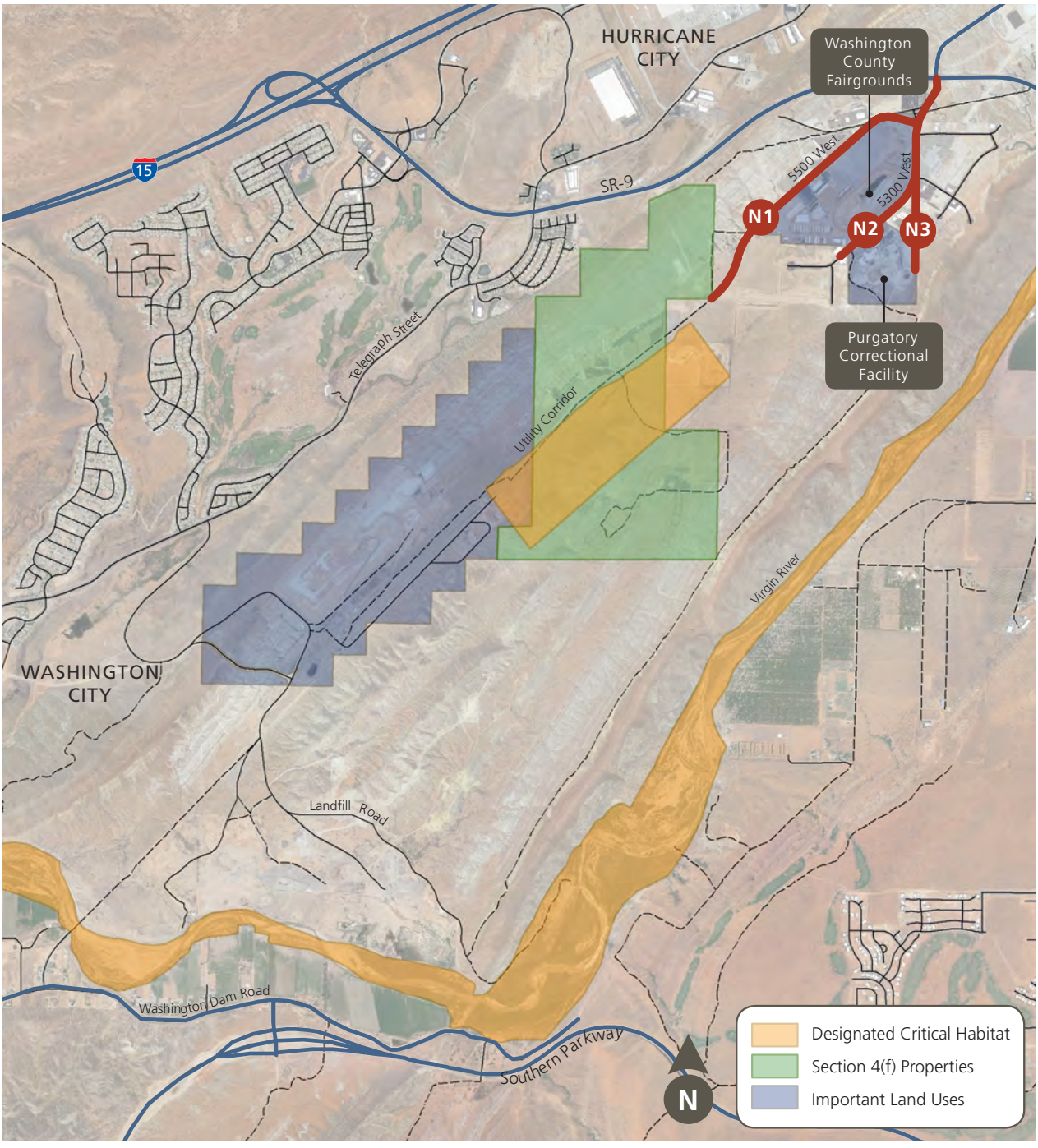


Figure 2-6. North Section

Middle Section

A summary of the Level 2 - Environmental Resources Screening for the Middle Section is shown in Table 2-3 and Figure 2-7. Highlighted rows indicate Middle Section Alternatives that moved forward for detailed study.

Table 2-3. Middle Section Environmental Screening

Alternative	Designated Critical Habitat	Section 4(f)	Land Use
Alternative M1	Impacts approximately 40 acres of Holmgren Milkvetch Designated Critical Habitat and known plant locations (potential adverse modification/ jeopardy determination).	• Has a Section 4(f) use to the Southern Utah Shooting Sports Park.	• Directly impacts approximately 10 acres of the Washington County Landfill • Negatively affects the operations and lifespan of the Washington County Landfill
Alternative M2	No impact	• Directly impacts approximately 6 acres of the Southern Utah Shooting Sports Park. • Has a Section 4(f) use to the Southern Utah Shooting Sports Park.	No impact
Alternative M3	No impact	• Minimally impacts the Southern Utah Shooting Sports Park (less than 0.5 acres from the southeast corner). This area contains no facilities and is not integral to the operation of the shooting park.	No impact

Alternative M3 was carried forward for detailed study because it had no impacts to Designated Critical Habitat, Section 4(f) properties, and important land uses.

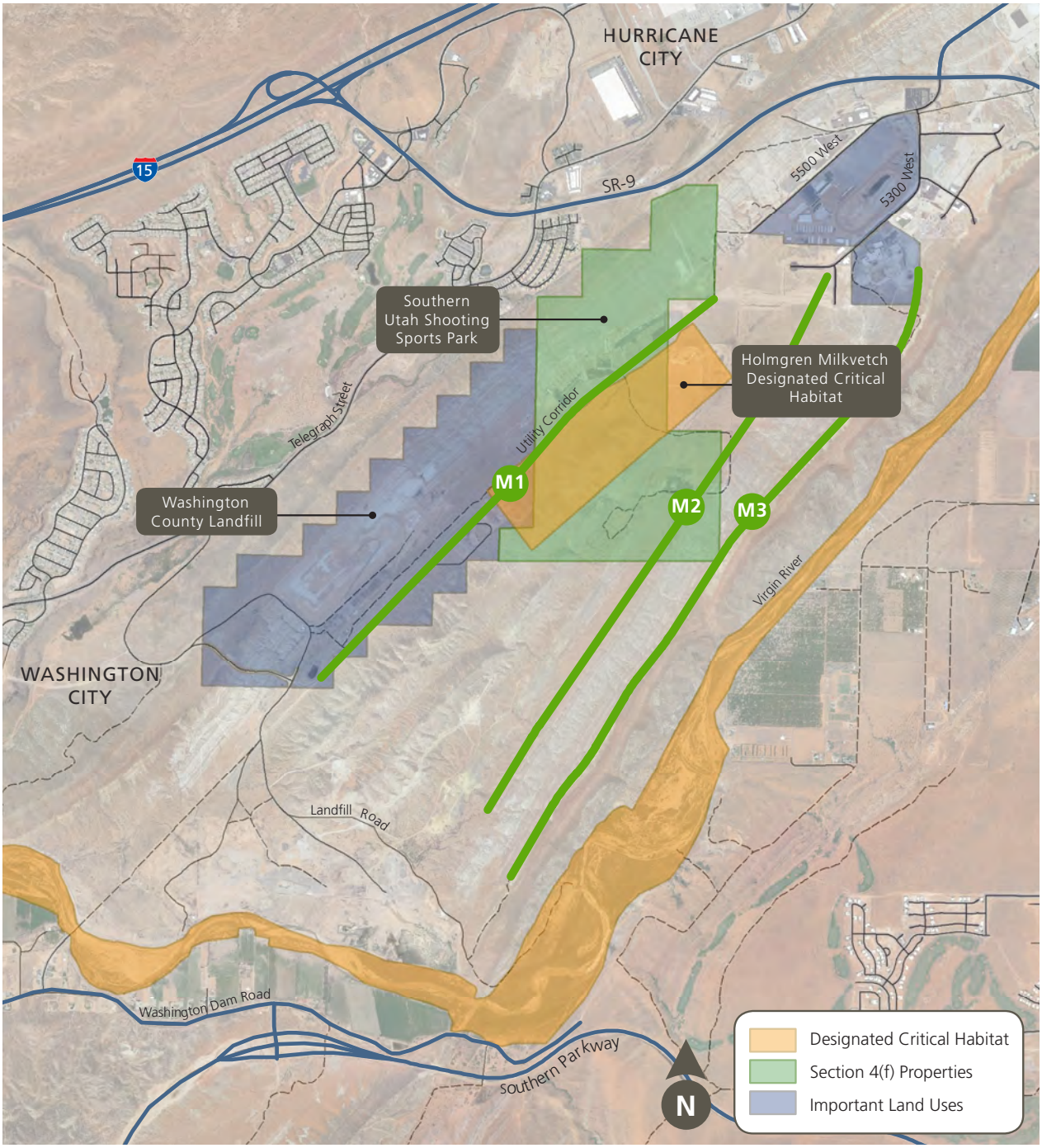


Figure 2-7. Middle Section

2.4 ALTERATIVES SELECTED FOR DETAILED STUDY

The screening process identified the following alternatives that will move forward for detailed study.

What is detailed study?

The probable beneficial and adverse social, economic, and environmental effects of alternatives selected for "detailed study" will be analyzed in Chapter 3.

2.4.1 NO-ACTION ALTERNATIVE

The No-action Alternative would maintain roadways within the study area in their current roadway configurations. This alternative assumes that short-term minor restoration (safety and maintenance) activities that maintain continued operation of the existing roadway facilities would be ongoing. The No-action Alternative assumes all other improvements included in the 2040 RTP and other approved regional and local plans would be implemented.

Why was the No-action Alternative selected for detailed study?

The No Action Alternative satisfies the NEPA "no action" requirement and will be used as a baseline to compare impacts of build alternatives.

2.4.2 PURGATORY ROAD BUILD ALTERNATIVE

The screening process identified Alternative N2 in the north section, Alternative M3 in the middle section, and Alternative R2 at the river crossing as meriting detailed study. These three alternatives were combined into one alternative, the Purgatory Road Build Alternative (see Figure 2-8).

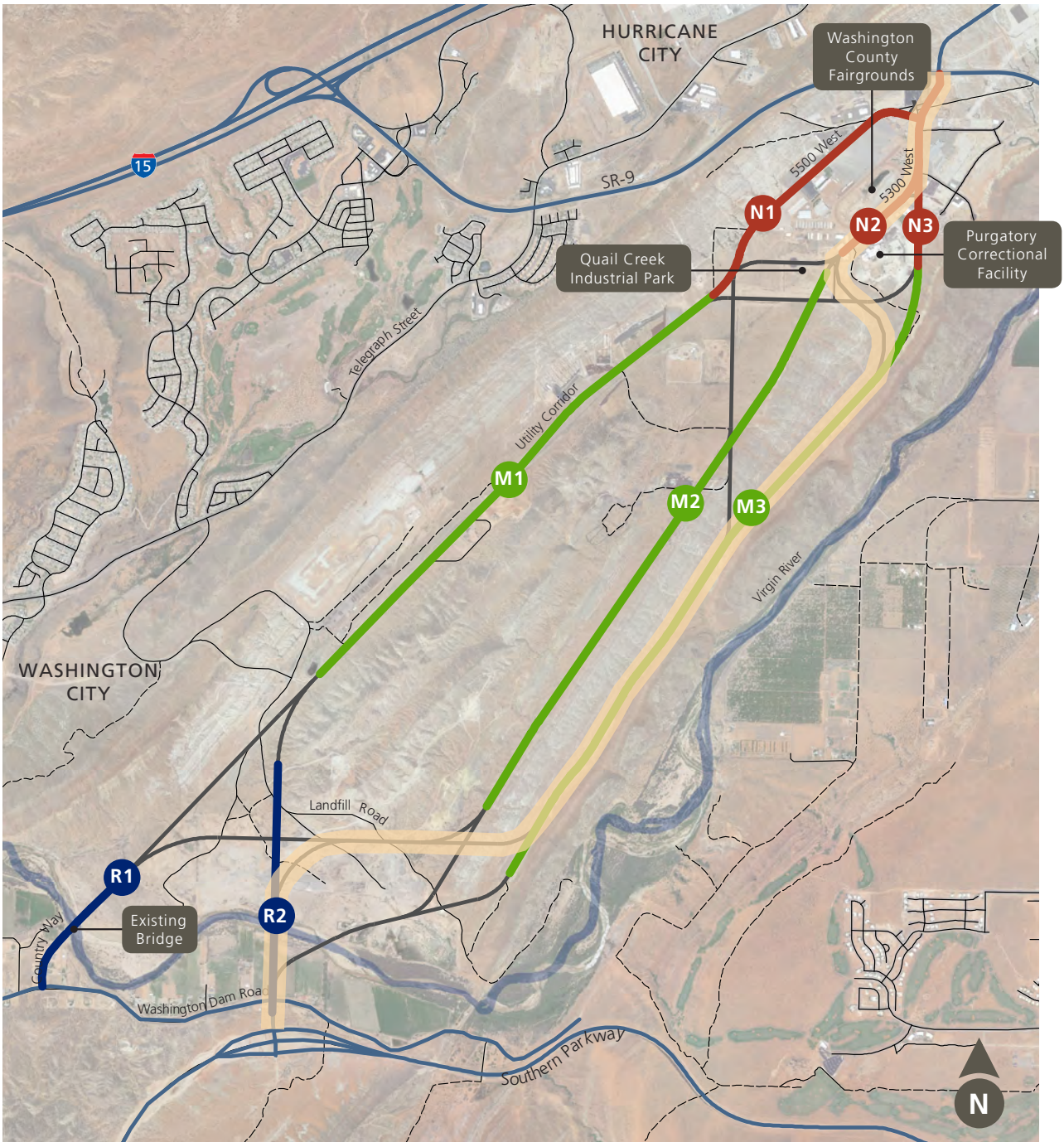


Figure 2-8. Alternatives Meriting Detailed Study (Alternative N2, M3, and R2)

As a result of further, detailed environmental analysis, the Purgatory Road Build Alternative alignment was shifted to avoid impacting the endangered Dwarf Bear-poppy (see Section 3.15 Threatened and Endangered Species in Chapter 3 for more information). The Purgatory Road Build Alternative includes the following elements (see Figures 2-9, 2-10, and 2-11):

- Constructing a new three-lane roadway on new alignment between SR-9 and Southern Parkway (see Figure 2-9 for roadway typical section). The proposed alignment would begin at SR-9 and follow the existing 5300 West alignment until the Quail Creek Industrial Park. The alignment would then run generally southward along the existing dirt road on the east side of the Purgatory Flat until approximately Landfill Road where it would swing to the west. The alignment would then cross the river at a new location to connect directly to Southern Parkway.
- Constructing a new bridge over the Virgin River. The new bridge is anticipated to be 400 feet long, three-span structure.

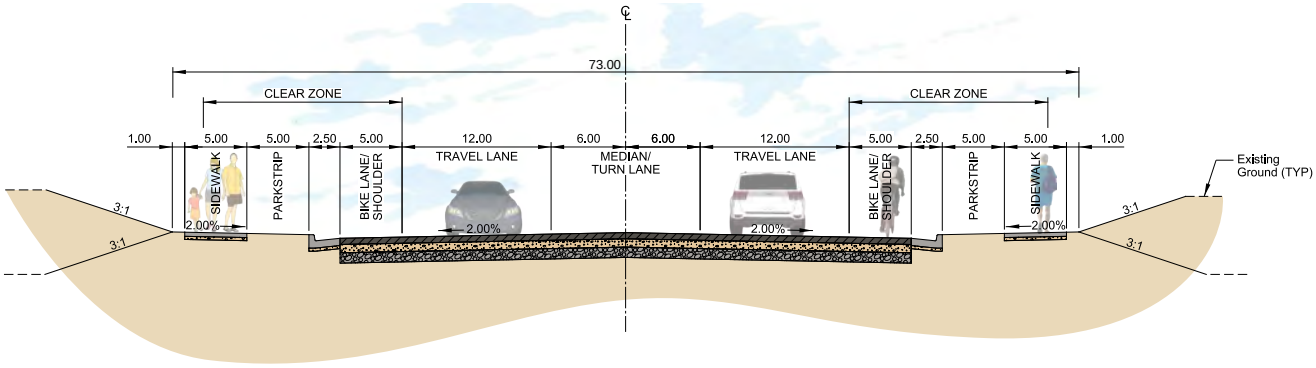


Figure 2-9. Roadway Typical Section

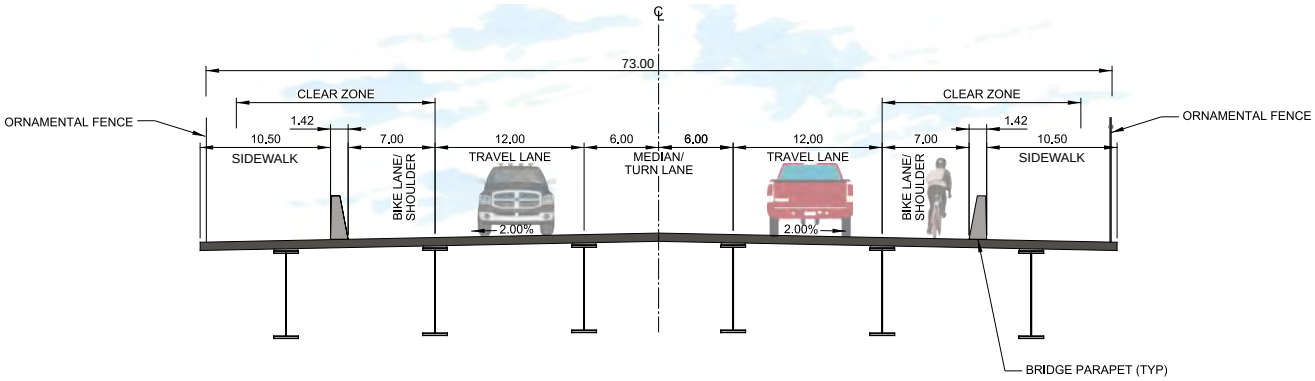


Figure 2-10. New Bridge Typical Section

2.5 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

UDOT has identified the Purgatory Road Build Alternative as the alternative which best meets the purpose and need and includes measures to minimize impacts to environmental resources (see Figure 2-11).

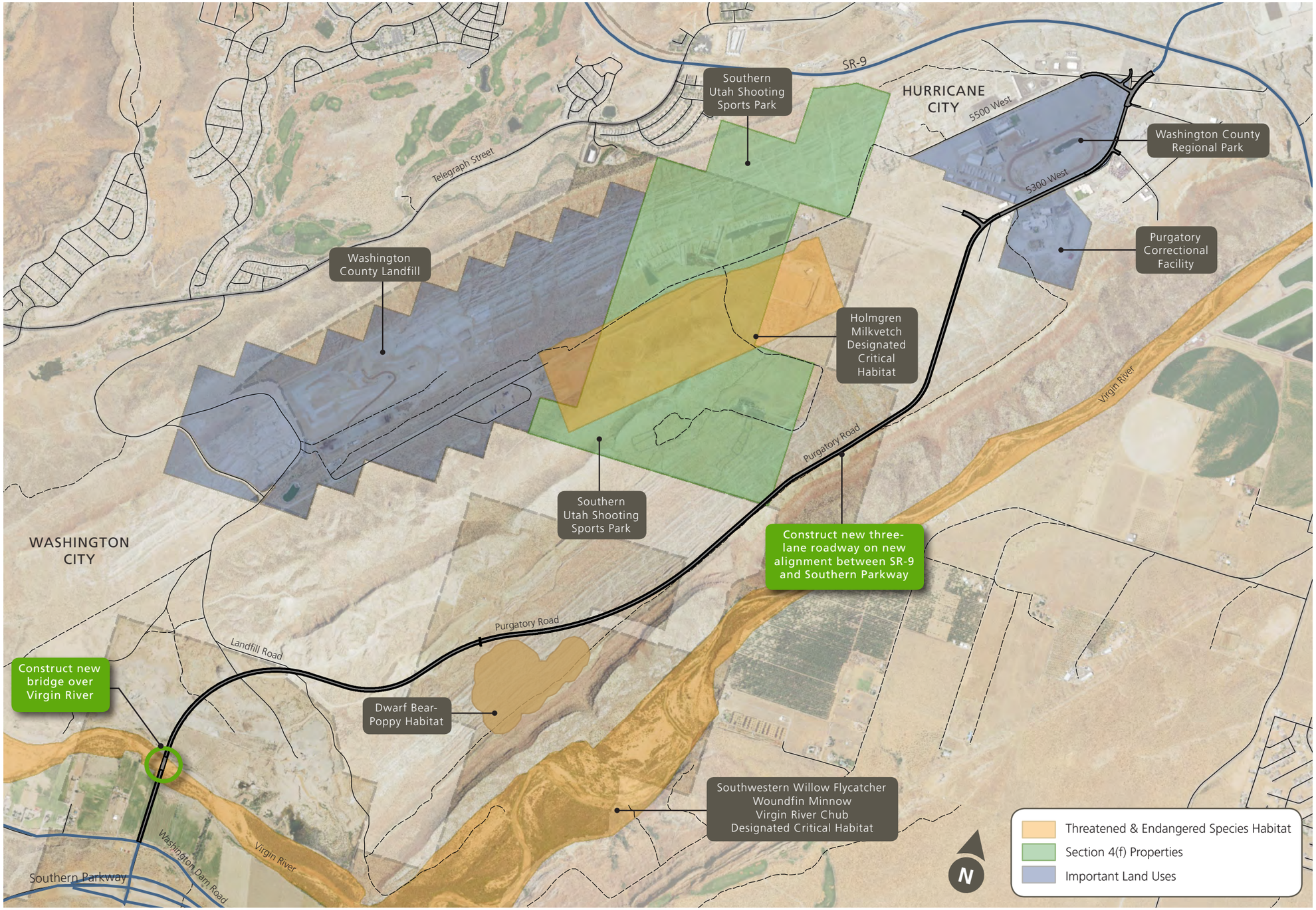


Figure 2-11. Purgatory Road Build Alternative

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

3.1.1 AFFECTED ENVIRONMENT

Existing conditions were identified based on literature and data file searches; coordination with local, state, and federal agency personnel; and field investigations. Additional details relating to the technical research performed in the preparation of this Environmental Assessment (EA), which are not fully discussed in this document, are included in Technical Reports (see Appendix B) and other project records.

3.1.2 ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act (NEPA) of 1969 requires consideration of direct, indirect, and cumulative impacts plus measures to mitigate the impacts. These impacts are described and generally illustrated as follows:

- **Direct impacts** are caused by the action and occur at the same time and place (40 CFR § 1508.8). These are discussed in each resource area subsection.
- **Indirect impacts** are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR § 1508.8). Indirect effects are generally not quantifiable, but can be reasonably predicted to occur. These impacts are described in each resource area subsection.
- **Cumulative impacts** are the impacts to the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR § 1508.7). These are addressed in Section 3.27 of this chapter.

3.1.3 STUDY AREA

The study area, for the purposes of this chapter, is defined as the limits shown in Figure 1-2 Study Area in Chapter 1 of this EA. The study area can vary by individual resource, depending upon individual resource characteristics. Unless otherwise noted, the study area for each resource is the study area defined in Figure 1-2 Study Area.

3.2 LAND USE

The Federal Highway Administration's (FHWA) Technical Advisory T 6640.8A, Guidance for Preparing and Processing Environmental and Section 4(f) Documents, recommends that the land use analysis identify current development trends and state and/or local government plans and policies on land use and growth in the area which would be impacted by the proposed project. These plans and policies are often reflected in the area's comprehensive development plan and include land use, transportation, public facilities, housing, community services, and other areas.

Utah Code authorizes municipalities to plan for future growth and development as outlined in the Municipal Land Use, Development, and Management Act (UCA 10-9a-102).

Zoning maps, general plans, and master plans are used to show current and planned land uses within the study area. Zoning maps are used to show how the land within each municipality is currently zoned, while general plans and master plans are used to show proposed future land uses. Local governments develop these maps and plans and use them to identify community goals and priorities, and to assist in decision-making processes.

3.2.1 AFFECTED ENVIRONMENT

The study area is split between three planning and zoning jurisdictions: Washington County, Washington City, and Hurricane City. Planning documents regarding land use, zoning regulations, and transportation planning were obtained from these entities. In addition, Washington County led the 2007 completion of the "Vision Dixie 2035" report which serves as the foundation for a variety of plans and implementation activities. One of these, prepared by the Dixie Metropolitan Planning Organization (Dixie MPO) is the Regional Transportation Plan (RTP). The Bureau of Land Management (BLM) also has jurisdiction over certain lands within the study area, which are governed in accordance with the St. George Field Office Resource Management Plan (RMP).

Dixie MPO Regional Transportation Plan

The Dixie MPO RTP is the St. George area's fiscally constrained plan for highway and other transportation facility improvements. The most recent adopted plan is the 2015-2040 RTP. The 2015-2040 RTP identifies the Purgatory Road project as a Phase I (2015-2024) project.

Washington County Existing and Future Land Use Plans

Land uses within the study area under Washington County's jurisdiction include agricultural, industrial, and open space/undeveloped uses (see Figures 3-1 and 3-2).

Existing Zoning

Washington County's Zoning Map identifies current zoning for property in the study area under County jurisdiction. The area between the Virgin River and Washington Dam Road, as well as the area north of the river, are zoned for agricultural uses. The gravel quarry operated by Western Rock Products located north of the Virgin River is zoned for manufacturing. The remaining areas within the study area are zoned as open space.

Future Land Use

The 2010 Washington County General Plan shows much of the study area as Bureau of Land Management (BLM) Open Space Multiple Use, meaning it will be managed by the BLM as public land with multiple uses. The agricultural areas along the Virgin River are not given a specific land use designation.

Washington City Existing and Future Land Use Plans

Land uses within the study area under Washington City's jurisdiction include agricultural, residential, and open space/undeveloped uses (see Figures 3-1 and 3-2).

Existing Zoning

A small area adjacent to Country Way is zoned residential. The area to the west of Country Way, and north of the Virgin River, is designated for planned community development. An area on the western edge of the Purgatory Flat south of the county landfill, is designated heavy industrial and the remainder of the property in the area is zoned for open space.

Future Land Use

Future land use plans envision residential uses (medium density and medium-high density) for much of the study area. The plan also envisions a pocket of neighborhood commercial at the southeastern corner of the study area and industrial development adjacent to the landfill. Open space would be maintained along Harrisburg Dome and other areas too steep for development.

Hurricane City Existing and Future Land Use Plans

Land uses within the study area under Hurricane City's jurisdiction include manufacturing/industrial, governmental, and open space/undeveloped uses (see Figures 3-1 and 3-2).

Existing Zoning

Much of the study area within Hurricane City is zoned for open space. The existing industrial parks are zoned light industrial, general commercial, and planned commercial. A small area near Telegraph Street is zoned residential agricultural.

Future Land Use

In the 2011 Hurricane City General Plan, the Purgatory Correctional Facility, Washington County Regional Park, and nearby areas are designated for public uses. The existing industrial parks are designated for business/light industrial, and the area north of the shooting park and west of the regional park is designated as open space with recreational uses. The bluffs above the Virgin River are designated as natural open space.

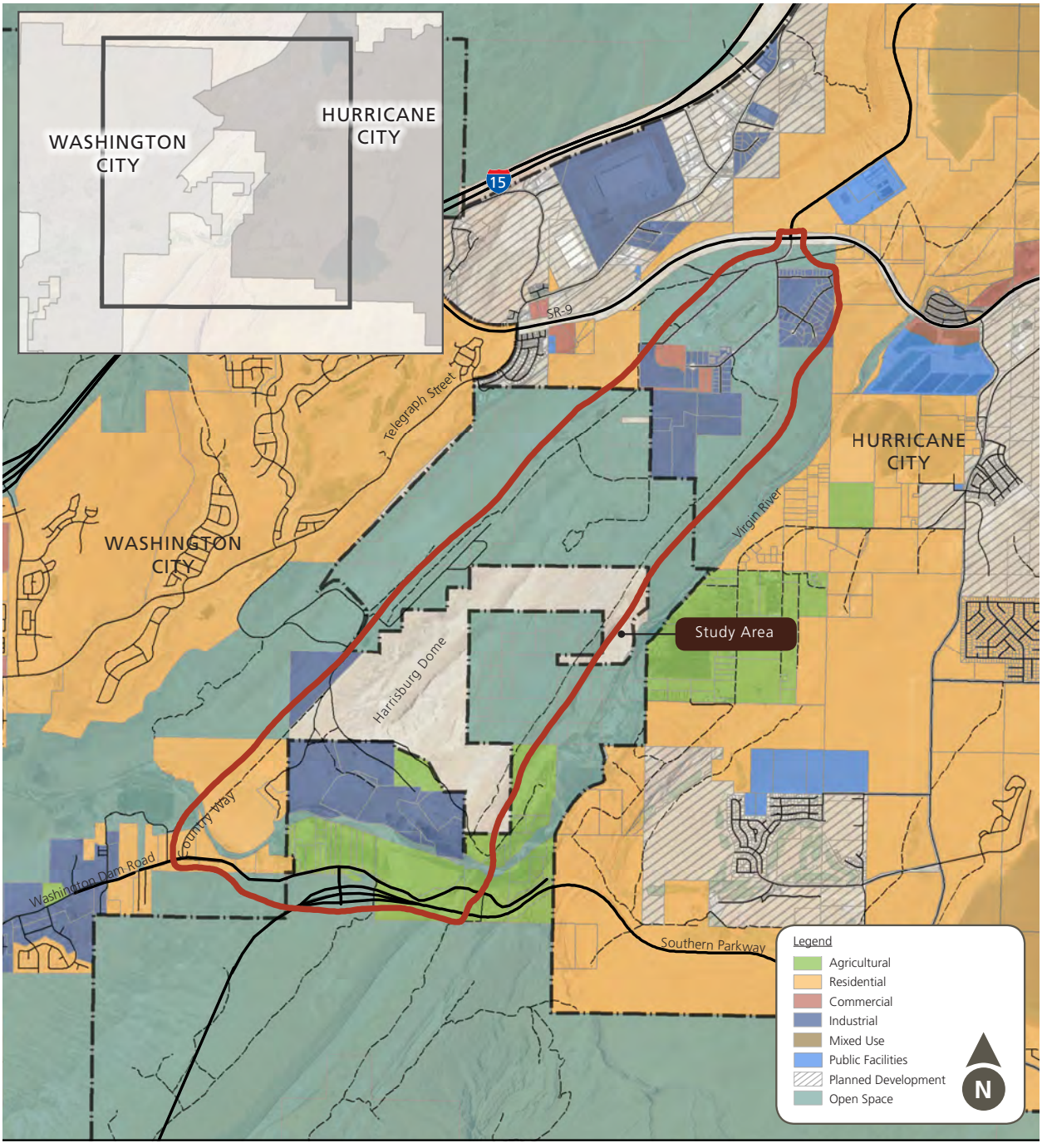


Figure 3-1. Existing Zoning

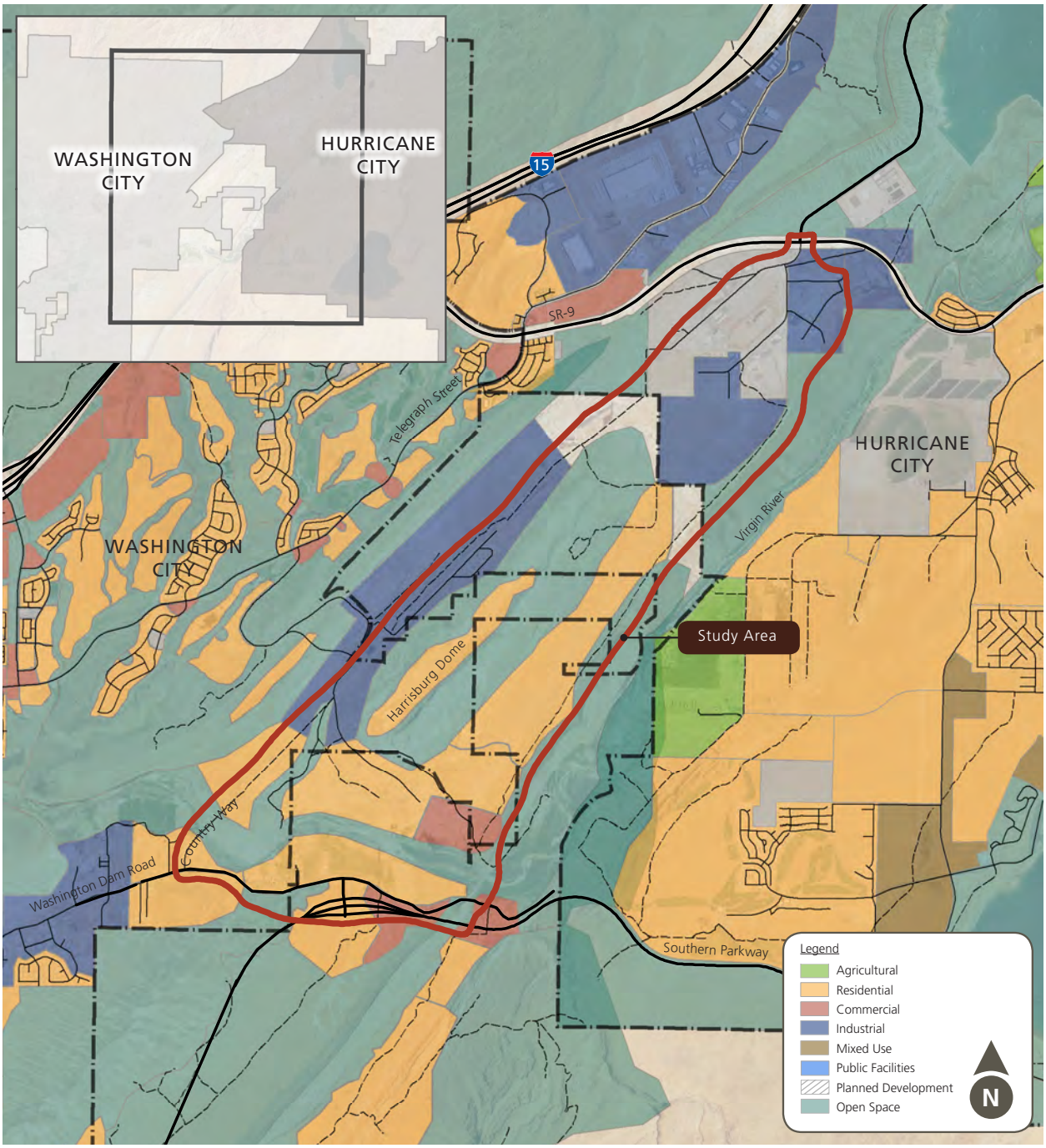


Figure 3-2. Future Land Use

BLM St. George Field Office Resource Management Plan

The St. George Field Office RMP, which is currently in the process of being updated, sets forth the management objectives for BLM-administered land, including those lands that are located within the study area The area in question is not identified as either an existing or proposed area of critical environmental concern (ACEC), a Special Recreation Management Area (SRMA), or a wilderness or wilderness study area and it is not currently designated for future transfer out of federal jurisdiction.

3.2.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

Under the No-action Alternative, there would be no direct impacts to land use.

Indirect Impacts

Without the construction of Purgatory Road, future development planned for the northern portion of the study area would be delayed until another access route is constructed. Currently there is only one access point in the northern portion of the study area (the 5300 West and SR-9 intersection). If this access is blocked, it prevents how well first-response personnel (such as fire, medical, and police) can respond to emergency calls. In these situations, time is critical, and delays can affect the ability of emergency personnel to protect the health, welfare, and safety of the public.

Preferred Alternative

Direct Impacts

Under the Preferred Alternative, some property that is currently zoned as open space, agricultural, and industrial would be converted to roadway use. It would also provide improved access for existing land uses and would provide the secondary access that would satisfy the requirement for an emergency access needed to support the current development plans for the northern area. The BLM would continue to manage the lands within the project area that are under its jurisdiction in accordance with the St. George Field Office RMP. The proposed project is not inconsistent with the RMP for the area. Although the Preferred Alternative would entail a new roadway through a corner of BLM-administered lands, the area is not in a rights-of-way avoidance or exclusion area.

Indirect Impacts

This Preferred Alternative would introduce a new roadway to an area that is undeveloped and currently has limited access. The construction of Purgatory Road would provide better access to these properties, which would facilitate the planned future development of the area, in accordance with Hurricane City and Washington City General Plans.

Mitigation

No mitigation required.

3.3 FARMLANDS

The Farmland Protection Policy Act (FPPA) (7 CFR §658.2a) requires federal agencies to identify and account for adverse effects of their programs and policies on the preservation of farmlands, including identifying potential alternatives to lessen potential adverse impacts. Under the FPPA, the definition of prime, unique, or statewide important farmland excludes land already in or committed to urban development or water storage. Farmland already in urban development also includes lands identified as an "urbanized area" on the Census Bureau Map, an urban area on the US Geological Survey (USGS) topographical maps, or as "urban-built-up" on US Department of Agriculture (USDA) Important Farmland Maps. Farmland "committed to urban development or water storage" also includes all such land that received a combined score of 160 points or less from the land evaluation and site assessment criteria.

Federal programs are also required to comply with state, local, and private programs aimed at preserving farmland. In Utah Code Annotated, Title 17, Chapter 41, the State of Utah allows for the formation of Agricultural Protection Areas (APAs). Areas so designated are protected for the production of commercial crops, livestock, and livestock products.

3.3.1 AFFECTED ENVIRONMENT

According to the 2010 Census, the study area is not within the limits of the St. George Urbanized Area and is therefore not already committed to urban development. Portions of the study area are within the municipal boundaries of Washington and Hurricane Cities. A review of Natural Resource Conservation Service (NRCS) Soil Maps reveals 61 acres of farmland of Statewide Importance in the southwestern portion of the study area (see Preferred Alternative Maps in Appendix A). This land is not currently cultivated. An additional 880 acres is designated prime farmland if irrigated. These soil types are located around the Virgin River, as well as a strip west of Harrisburg Dome and much of Purgatory Flat. The area between the Virgin River and Washington Dam Road is currently irrigated and is considered prime farmland.

3.3.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would have no direct impacts to farmlands.

Indirect Impacts

The No-action Alternative would have no indirect impacts to farmlands.

Preferred Alternative

Direct Impacts

The Preferred Alternative would directly impact 9.86 acres of prime, unique, or statewide important farmland (see Preferred Alternative Maps in Appendix A). A Farmland Conversion Impact Rating Form (Form AD-1006) was completed and submitted to the NRCS in regards to potential impacts to prime farmland. The impacts analysis resulted in a score of 151 (see Chapter 4 - Comments and Coordination). Because implementation of the Preferred Alternative scored less than 160 points, additional alternatives and measures to minimize the impacts do not need to be evaluated.

Indirect Impacts

Construction of the Preferred Alternative may speed up the time-frame of the conversion of farmland to non-agricultural uses (commercial, residential, and other mixed use developments) due to improved access; however, the development is expected to be consistent with the future land use plans for the area.

Mitigation

No mitigation is required.

3.4 SOCIAL CONDITIONS

The community social characteristics were analyzed for Washington County and the study area.

3.4.1 AFFECTED ENVIRONMENT

Most of the study area is undeveloped land, with the only residential development occurring south of the Virgin River along Country Way. Recreational facilities in the area include the Southern Utah Shooting Sports Park and the Washington County Regional Park. The Purgatory Correctional Facility is also located within the study area; however, the inmates are not factored into the social analysis, since their occupancy is temporary.

The study area also includes lands under municipal, state, and federal jurisdiction that are not populated. Due to the geographic nature of the study area, there are also areas that are too steep for development, according to local ordinances.

The US Census Bureau establishes geographies for conducting census studies. At the local level, these geographies are defined by state, county, city, census tract, block group, and block. For this analysis, the demographic study area includes: Census Tract 2708.01 (the southern portion of the study area and much of Washington City) and Census Tract 2709.02 (the northern portion of the study area and much of Hurricane City). See Figure 3-3.

Census data provides detailed information regarding household characteristics such as age, income, race, household size, etc. As shown in Table 3-1, the Census Tracts that make up the study area are similar in terms of demographic characteristics to both Washington City and Hurricane City.

Table 3-1. Demographic Characteristics

Characteristic	Study Area				Washington City		Hurricane City		Washington County	
	2708.01		2709.02							
	Number	%	Number	%	Number	%	Number	%	Number	%
Total Population	13,516	100%	10,113	100%	18,761	100%	13,748	100%	138,115	100%
Median Age	29.6	--	33.3	--	31.0	--	33.5	--	32.5	--
Average Household Size	3.24	--	2.84	--	3.06	--	2.87	--	2.94	--
Over 65 Years	1,792	13.2%	1,712	16.9%	2,863	15.2%	2,389	17.4%	23,826	17.4%
Race										
White	12,426	91.9%	9,164	90.6%	17,010	90.7%	12,555	91.3%	123,914	89.7%
Black or African American	42	0.3%	52	0.5%	61	0.3%	72	0.5%	790	0.6%
American Indian and Alaska Native	115	0.9%	148	1.5%	185	1.0%	177	1.3%	1,869	1.4%
Asian	92	0.7%	65	0.6%	168	0.9%	70	0.5%	982	0.7%
Native Hawaiian and Other Pacific Islander	102	0.8%	70	0.7%	127	0.7%	113	0.8%	1,078	0.8%
Some Other Race	456	3.4%	356	3.5%	830	4.4%	440	3.2%	6,313	4.6%
Two or More Races	283	2.1%	258	2.6%	380	2.0%	321	2.3%	3,169	2.3%
Hispanic or Latino	982	7.3%	819	8.1%	1,574	8.4%	986	7.2%	13,486	9.8%
Families/Income under Poverty Line	--	9.5%	--	8.1%	--	11.5%	--	11.0%	--	10.9%
Median Household Income (dollars)	$53,710	--	$45,541	--	$49,995	--	$45,213	--	$49,498	--

Source: US Census 2010, 2010-2014 American Community Survey 5-Year Estimates

3.4.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

Under the No-action Alternative there would be no direct impacts to social conditions.

Indirect Impacts

Under the No-action Alternative there would be no indirect impacts to social conditions.

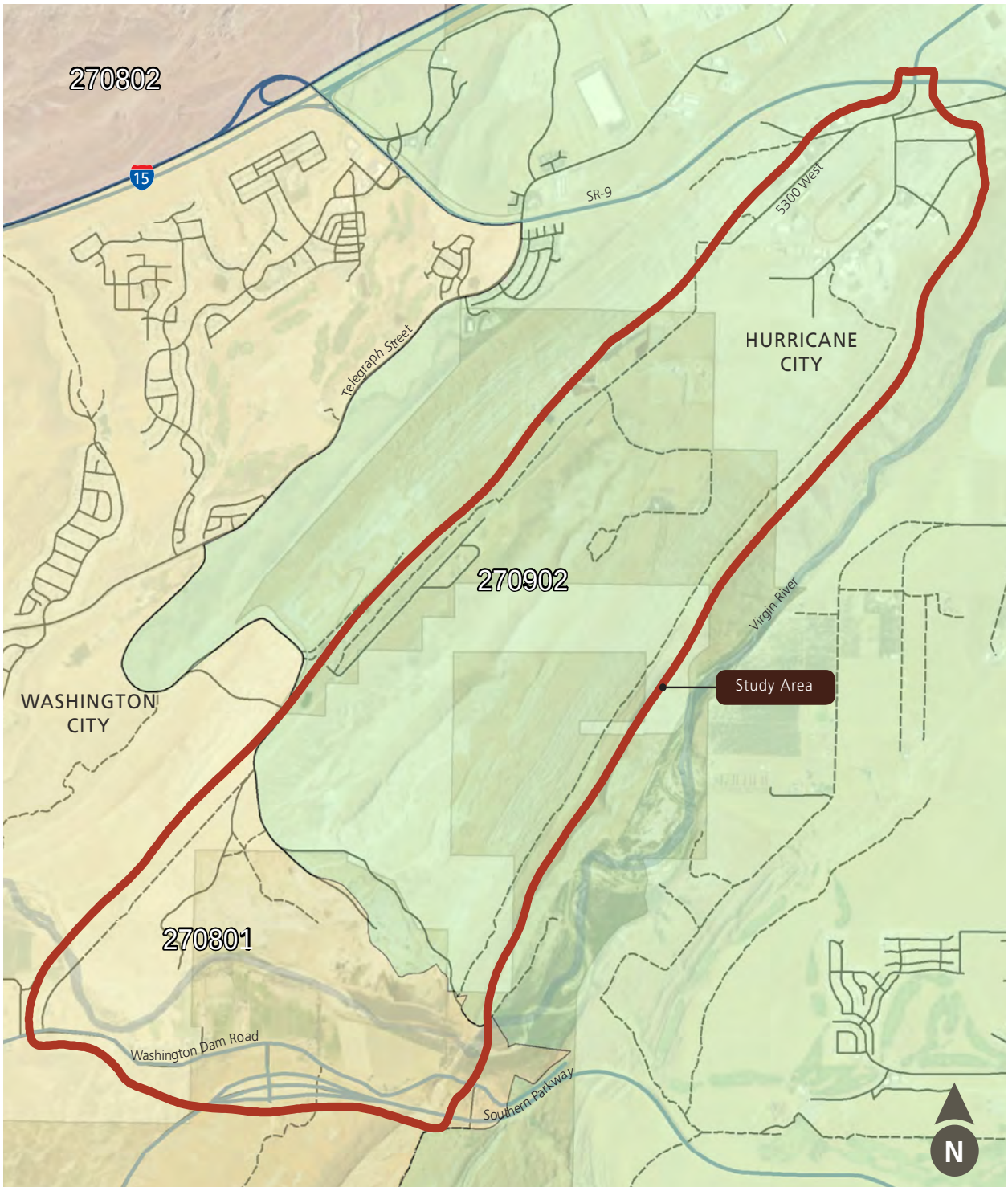


Figure 3-3. Census Tracts in the Study Area

Preferred Alternative

Direct Impacts

Most of the study area is undeveloped vacant land, which means that the Preferred Alternative would have no direct impacts to existing social conditions or community cohesion. Additionally, the Preferred Alternative would have no impact to the Washington County Regional Park and only minor impacts to the Southern Utah

Shooting Sports Park (less than 0.5 acres from the southeast corner or the park – an area which contains no facilities and is not integral to the park's operation).

Indirect Impacts
The Preferred Alternative would have no indirect impacts to social conditions.

Mitigation
No mitigation required.

3.5 ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by the President on February 11, 1994, directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent possible and permitted by law.

Fundamental Environmental Justice principles include[1]:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations
- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process
- To prevent the denial of, reduction in, or substantial delay in the receipt of benefits by minority and low-income populations

On June 14, 2012, the Federal Highway Administration issued Order 664023A, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which reaffirm the principles of Title VI and related statutes, NEPA, 23 U.S.C. 109(h), and other Federal environmental laws, emphasizing the incorporation of those provisions with the environmental and transportation decision-making processes. This Order includes the following definitions:

Minority means a person who is:

- **Black:** a person having origins in any of the black racial groups of Africa
- **Asian American:** a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
- **American Indian and Alaskan Native:** a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; or
- **Native Hawaiian or Other Pacific Islander:** people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands
- **Hispanic/Latino:** a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race

Low-Income means a person whose median household income is at or below the Health and Human Services (HHS) poverty guidelines. The 2015 Poverty Guidelines for the 48 contiguous states and the District of Columbia are shown in Table 3-2.

1www.fhwa.dot.gov/environment/ej2000.htm

Low income and minority populations are also defined in FHWA Order 6640.23A as follows:

- **Low-Income Population** means readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed DOT program, policy, or activity.
- **Minority Population** means any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity.

Table 3-2. Illustration of Poverty Guidelines

Persons in Family	Poverty Guideline
1	$11,770
2	15,930
3	20,090
4	24,250
5	28,410
6	32,570
7	36,730
8	40,890

Source: Department of Health and Human Services.

For families with more than 8 persons, add $4,160 for each additional person.

This section of the report discloses any detrimental, as well as beneficial, impacts to low-income and minority populations based on the No-Build Alternative and the Build Alternative. This analysis has been completed in compliance with Title VI of the 1964 Civil Rights Act and Executive Order 12898.

Other regulations related to environmental justice include:

- **DOT Order 5610.2(a):** reaffirms the principles of Title VI and related statutes, NEPA, 23 U.S.C. 109(h), and other Federal environmental laws, emphasizing the incorporation of those provisions with the environmental and transportation decision-making processes.
- **23 CFR 771, FHWA Environmental Impact And Related Procedures:** provides the policies and procedures for implementing the National Environmental Policy Act of 1969, as amended, and the regulation of the Council on Environmental Quality (CEQ), 40 CFR 1500 – 1508.
- **49 CFR 24 Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,** as amended, has the following objectives:
  (a) To ensure that owners of real property to be acquired for Federal and federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owners, to minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally-assisted land acquisition programs;
  (b) To ensure that persons displaced as a direct result of Federal or federally-assisted projects are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole; and
  (c) To ensure that Agencies implement these regulations in a manner that is efficient and cost effective
- **Title VI of the Civil Rights Act,** enacted as part of the Civil Rights Act of 1964, prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance.

3.5.1 AFFECTED ENVIRONMENT

No environmental justice populations were identified within the study area during the environmental analysis process.

Low-Income Populations
Income demographics show the study area is on par with, or slightly lower than the Cities, and similar to the County in all income categories (see Table 3-1).

According to the FHWA, "low-income" is defined as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines." Average household sizes in the area range from 2.84 to 3.24 persons. Low income would be defined in the study area as households with an income below approximately $20,090 (poverty level for household with three persons), based on average household sizes and the 2015 Poverty Guidelines for the 48 contiguous states and the District of Columbia. The Census Tracts within the study area have median family incomes that are higher than the poverty threshold, ranging from $45,541 to $53,710. Also, the study area has lower percentages of families with income under the poverty threshold than the cities or the county as a whole.

Minority Populations
The study area is predominantly White Alone, with over 90 percent of the population, similar to the Cities and Washington County (see Table 3-1). A comparison of race as a percent of the total shows the study area has a slightly lower percentage of Hispanic or Latino within the population when compared to the County.

3.5.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative
Direct Impacts
The No-action Alternative would not have any disproportionately high and adverse effects on minority or low-income populations.

Indirect Impacts
The No-action Alternative would not indirectly result in any disproportionately high and adverse effects on minority or low-income populations.

Preferred Alternative
Direct Impacts
No specific environmental justice populations were identified as part of the review process. Further, the Preferred Alternative would not impact businesses that primarily serve minority or low-income populations nor would it adversely impact recreational facilities. Therefore, the Preferred Alternative would not have any disproportionately high and adverse effects on minority or low-income populations.

Indirect Impacts
The Preferred Alternative would not indirectly result in any disproportionately high and adverse effects on minority or low-income populations.

Mitigation
No mitigation required.

3.6 RIGHT OF WAY AND RELOCATIONS

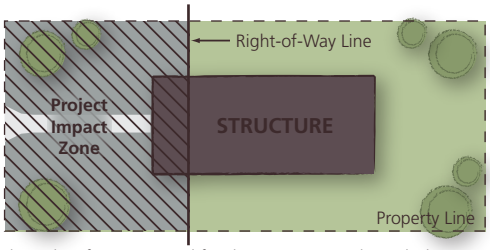
Where property acquisition is necessary, land owners are compensated under the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. If any persons are displaced as a result of a federal or federally assisted program, assistance will be provided.

UDOT will compensate persons from whom right-of-way (ROW) acquisition is required. Any ROW acquisitions will occur in accordance with federal, state, and local policies. The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended

This relocations section will use the following definitions to analyze the impacts of relocations:

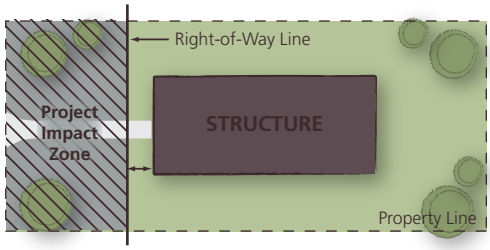
- **Relocation:** Occurs when an existing structure would be within the ROW of an alternative and the residents or business would need to relocate.
- **Potential Relocation:** A situation in which a property would be directly affected by the project and an existing structure (excluding porches and garages) would be close to the proposed ROW, but it is not clear whether the entire property needs to be acquired. By the end of the ROW acquisition phase, UDOT will determine whether each potential relocation is a full relocation or a strip take. This determination depends on an independent valuation of the property that includes any project-related damage to buildings.
- **Partial Acquisition:** Generally occurs when a property is located within the proposed ROW, but the ROW does not encroach upon the existing structure. For this type of impact, only a strip of land would need to be acquired. As with potential relocations, UDOT could refine partial acquisitions during the ROW acquisition phase.

RELOCATION: DIRECT IMPACT



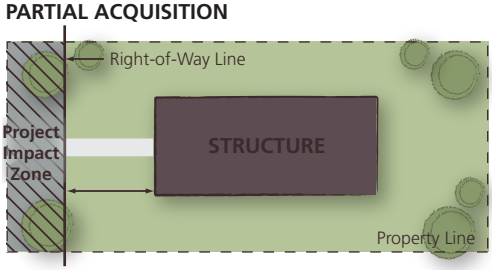
The right-of-way required for the project goes through the structure.

POTENTIAL RELOCATION: PROXIMITY IMPACT



The right-of-way required for the project impacts the property and is close to the structure.

PARTIAL ACQUISITION



The right-of-way required for the project impacts the property but is farther away from the structure.

Figure 3-4. Relocation Definitions

3.6.1 AFFECTED ENVIRONMENT

The study area is located within the Purgatory Flat in Washington County. Ownership of the study area is split between federal, state, local, and private landowners.

3.6.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would not require any relocations or ROW acquisition.

Indirect Impacts

The No-action Alternative would have no indirect effects regarding relocations or ROW acquisition.

Preferred Alternative

Direct Impacts

Under the Preferred Alternative, no relocations would be required. The construction of a new roadway would require approximately 31 acres of ROW from 40 parcels. Table 3-3 and the Preferred Alternative Maps in Appendix A shows the anticipated ROW needs, subject to change during final design. During final design, UDOT would determine if an individual parcel would need to be acquired in full. This decision would be made based on whether the ROW acquisition would impact the parcel to an extent that the parcel would be unusable.

Table 3-3. Right of Way Acquisition

Map Label	Parcel ID No	Owner	ROW Acquisition (acres)
1	4191-A-7-HV	L J RANCHES LTD	2.07
2	---	---	0.31
3	4195-HV	STAKER & PARSON COMPANIES	0.16
4	4198-B-2-HV-SA	STAKER & PARSON COMPANIES	0.06
5	4193-A-HV-SA	STAKER & PARSON COMPANIES	0.08
6	W-4193-B-2	FNBN-CMLCON I LLC	1.26
7	W-4187-A-4	FNBN-CMLCON I LLC	2.41
8	4144-A-HV	BRINGHURST J WILLIAM TR	0.35
9	4145-D-HV	ARROW TO THE SUN LLC	0.27
10	4145-B-HV	ARROW TO THE SUN LLC	0.22
11	4145-E-HV	PICKETT FAWN S & SPENCER TRS C/O: SHAUNA PICKETT	0.34
12	4145-A-HV	HAMILTON SHERRI L TR	0.43
13	4144-A-HV	BRINGHURST J WILLIAM TR	0.21
14	4155-HV	NORTON JEFFREY LYNN & DEBRA LEE TRS	0.44
15	4173-HV	PROVISOR BESSIE TR	0.65
16	4163-HV	YOSHICO SYSTEMS LLC	2.41
17	4142-HV	EARL RANDY & APRIL	0.003
18	W-4143	FNBN-CMLCON I LLC	3.70
19	4150-HV	PAYTON ROYDEN L PR	0.03
20	4152-HV	NAY JIMMY A	0.66
21	4176-A-1-HV	WEBB WESLEY D TR	0.76
22	4146-HV	TOPHAM DOUGLAS	0.11
23	4189-HV	SIMPSON TRYGE	0.65
24	4177-HV	RIZZO VERLE C/O: CHRISTINE BOSWORTH	0.11
25	---	FEDERAL	7.50
26	H-4-2-10-4112	MCAR LLC	0.95
27	H-4-2-10-4111	DMW TX LLC	1.10
28	H-QCIP-2-12	HURRICANE LAND HOLDINGS LLC	0.12
29	H-QCIP-3-20	HURRICANE LAND HOLDINGS LLC	0.38
30	H-QCIP-2-11	HURRICANE LAND HOLDINGS LLC	0.11
31	H-QCIP-2-10	HURRICANE LAND HOLDINGS LLC	0.14
32	H-QCIP-2-9	HURRICANE LAND HOLDINGS LLC	0.19

Map Label	Parcel ID No	Owner	ROW Acquisition (acres)
33	H-QCIP-2-8	HURRICANE LAND HOLDINGS LLC	0.19
34	H-QCIP-2-7	HURRICANE LAND HOLDINGS LLC	17,492.52
35	H-QCIP-3-19	HURRICANE LAND HOLDINGS LLC	105.85
36	H-QCIP-2-3	HURRICANE LAND HOLDINGS LLC	44.41
37	H-QCIP-1-A-2	TWR INV LLC C/O: GREGORY A WAGNER	297.25
38	H-4-2-3-1202	WASHINGTON CO/ST GEORGE INTERLOCAL	70,607.38
39	H-FAIR-1	AUFFHAMMER THOMAS F TR	5,091.84
40	H-4-2-3-1202	WASHINGTON CO/ST GEORGE INTERLOCAL	24,253.45

Indirect Impacts
The Preferred Alternative would have no indirect effects regarding relocations or ROW acquisition.

Mitigation
No mitigation required.

3.7 ECONOMIC CONDITIONS

3.7.1 AFFECTED ENVIRONMENT

Washington County has a strong and growing economy. According to the Utah Department of Workforce Services, as of April 2016, it had a seasonally adjusted unemployment rate of 4.1 percent, compared to 3.7 percent for the State of Utah and 5.0 percent for the United States. For the fourth quarter of 2015, Washington County experienced a 10.3 percent change in gross taxable sales, compared to the State of Utah at 3.4 percent, with motor vehicle dealers, durable wholesale trade, and general merchandise store sales with the strongest showings.

Residential construction permitting in 2016 was up almost 40 percent compared to 2015. Washington County added almost 3,000 new jobs in 2015, an increase of 5.3 percent, compared to the State of Utah at 3.8 percent and the United States at 2.0 percent. The majority of these jobs were in the health care/social services sector, although all major industrial sectors experienced job growth.

The study area is mostly undeveloped land with some commercial properties in the northern section and residential and agricultural activities in the southern section near the Virgin River. Western Gravel Products operates a gravel pit in the southeastern section of the study area, the Purgatory Correctional Facility is located in the northern section, and the Washington County Landfill is located in the western section. Recreational facilities include the Southern Utah Shooting Sports Park and the Washington County Regional Park.

3.7.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative
Direct Impacts
Under the No-action Alternative, there would be no direct impacts to economic conditions.

Indirect Impacts
The No-action Alternative would result in the delay of residential and commercial development in the study area due to concerns over a lack of sufficient access for emergency personnel. Economic development would likely be slower than currently planned, resulting in minor, temporary impacts to the local and regional economy.

Preferred Alternative

Direct Impacts

The Preferred Alternative would acquire property from the Western Rock Products gravel quarry (see Preferred Alternative Maps in Appendix A). However, the Preferred Alternative would provide better access to the quarry and make it easier to distribute product throughout Washington County. There may be temporary impacts to the existing access to the gravel pit during construction; however, appropriate access would be maintained.

The Preferred Alternative would not adversely impact any existing businesses in the study area and would help facilitate economic growth by providing a secondary access for emergency personnel. The lack of a secondary access has delayed the construction of development projects. The Executive Director of Site Select Plus (a private-public partnership for economic development corporation for Southwestern Utah) indicated in a meeting held on September 21, 2015 that several projects planned for the study area were unable to be completed due to access issues, including a 300-acre project.

Indirect Impacts

Under the Preferred Alternative, a new roadway would provide a secondary access to the Purgatory Flat, allowing planned development to proceed. Residential and economic development plans for the area are not specific at this point, but it is anticipated that economic conditions would continue to dictate the rate and location of development.

Mitigation

Existing accesses to all businesses would be maintained during construction.

3.8 PEDESTRIANS AND BICYCLISTS

3.8.1 AFFECTED ENVIRONMENT

Pedestrian and Bicyclist Facilities

Sidewalks

Sidewalks are currently located primarily on streets in the Quail Creek and Fairgrounds Industrial Park. Sidewalks also exist along both sides of Country Way between Washington Dam Road and the Virgin River. There are no sidewalks on SR-9, 5300 West, Landfill Road, or Washington Dam Road.

Paved, Shared Trails

A paved, shared path called the Virgin River Boardwalk Trail is located along the north side of the Virgin River between a point 1,230 feet northwest of Country Way in Washington, and Riverside Drive in St. George. According to the Regional Transportation Plan, this trail is planned to cross the Virgin River at Country Way and connect to a planned Canal Trail on the south side of the river. This planned canal trail will parallel Washington Dam Road through the study area (see Preferred Alternative Maps in Appendix A).

Unpaved Trails

The Dixie MPO RTP shows an unpaved, loop trail running along the cliffs at the eastern edge of the Purgatory Flat.

Bicycle Facilities

In addition to the planned Virgin River Boardwalk Trail and Canal Trail, SR-9, Southern Parkway east of the Washington Dam Road exit, and Washington Dam Road west of the interchange with Southern Parkway, are designated as bicycle facilities on the Dixie MPO RTP.

3.8.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

Under the No-action Alternative there would be no direct impacts to existing or planned trails and pedestrian access within the study area.

Indirect Impacts

No indirect impacts to pedestrian or bicycle facilities are anticipated as a result of the No-action Alternative.

Preferred Alternative

Direct Impacts

The Preferred Alternative would construct sidewalk along the entire length of the proposed Purgatory Road, increasing pedestrian access within the study area. There would be no impact to trails or bicycle facilities, as a crossing of the planned Canal Trail could be accommodated at the intersection of Purgatory Road and Washington Dam Road.

Indirect Impacts

No indirect impacts to pedestrian or bicycle facilities are anticipated as a result of the No-action Alternative.

Mitigation

No mitigation is required.

3.9 AIR QUALITY

Air quality is assessed on both the regional and project levels. The regional level analysis for this EA includes Washington County, Utah. The project level analysis encompasses the study area.

3.9.1 REGULATORY BACKGROUND

National Ambient Air Quality Standards

The Clean Air Act Amendments (CAAA) of 1990 established the National Ambient Air Quality Standards (NAAQS) for airborne pollutants. Current NAAQS are shown in Table 3-4. The six criteria pollutants addressed in the NAAQS are:

- carbon monoxide (CO),
- particulate matter (PM),
- ozone (O_3),
- nitrogen dioxide (NO_2),
- lead (Pb), and
- sulfur dioxide (SO_2).

Particulate matter is broken into two categories: particulate matter with a diameter of 10 micrometers or less (PM_{10}) and particulate matter with a diameter of 2.5 micrometers or less ($PM_{2.5}$).

Table 3-4. National Ambient Air Quality Standards

Pollutant	Primary/ Secondary	Level	Averaging Time	Violation Determination
Carbon Monoxide (CO)	Primary	9 ppm	8-hour	Not to be exceeded more than once per year
		35 ppm	1-hour	
Lead (Pb)	Primary/ Secondary	0.15 µg/m3	Rolling 3-Month Average	Not to be exceeded
Nitrogen Dioxide (NO_2)	Primary/ Secondary	53 ppb	Annual	Annual mean
	Primary	100 ppb	1-hour	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
Particulate Matter (PM_{10})	Primary/ Secondary	150 µg/m3	24-hour	Not to be exceeded more than once per year on average over 3 years
Particulate Matter ($PM_{2.5}$)	Primary	12.0 µg/m3	Annual	Annual mean, averaged over 3 years
	Secondary	15.0 µg/m3	Annual	Annual mean, averaged over 3 years
	Primary/ Secondary	35 µg/m3	24-hour	98th percentile, averaged over 3 years
Ozone (O_3)	Primary/ Secondary	0.070 ppm	8-hour	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Sulfur Dioxide (SO_2)	Primary	75 ppb	1-hour	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	0.5 ppm	3-hour	Not to be exceeded more than once per year

Source: EPA (as of May 2016) https://www.epa.gov/criteria-air-pollutants/naaqs-table

Note: Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m3), and micrograms per cubic meter of air (µg/m3). Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

If the levels of the criteria air pollutants exceed the NAAQS, then the area is designated a non-attainment area and the State is required to develop a State Implementation Plan (SIP). The SIP sets allowable emissions levels to be met and identifies control strategies to meet the NAAQS for those specific criteria pollutants that experienced exceedances. All proposed transportation projects must conform to the SIP. The Transportation Conformity Rule (40 C.F.R. parts 51 and 93) sets forth the standards and guidelines for determining conformity of a proposed transportation project with the SIP.

Attainment Area – An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Non-Attainment Area – Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard (NAAQS) for the pollutant.

Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the U.S. Environmental Protection Agency (EPA) also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary source (e.g., factories or refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

In 2001, EPA issued its first MSAT Rule, which identified 21 MSAT compounds as being hazardous. According to the EPA Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA (2012), the seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) are:

- Acrolein
- Benzene
- 1,3-butadiene
- Diesel exhaust particulate matter plus diesel exhaust organic gases (diesel PM)
- Formaldehyde
- Naphthalene
- Polycyclic organic matter (POM)

Greenhouse Gases

The issue of global climate change is an important national and global concern that is being addressed in several ways by the federal government. The transportation sector is the second-largest source of total greenhouse gases (GHGs) in the United States and the largest source of carbon dioxide (CO_2) emissions, the predominant greenhouse gas. In 2013, the transportation sector was responsible for 33.4% of all CO_2 emissions produced in the United States, according to the U.S. Greenhouse Gas Inventory Report: 1990-2013. The principal anthropogenic (human-made) source of carbon emissions is the combustion of fossil fuels, which accounts for about 82.5% of anthropogenic emissions of carbon worldwide and 93.7% in the US in 2013.

3.9.2 AFFECTED ENVIRONMENT

Climate

The study area is located in Washington City, Hurricane, and Washington County and is at an elevation of approximately 2,800 feet above mean sea level. The climate is characterized as arid desert, with long, hot summers and short, cool winters. On average, there are 60 days with high temperatures over 100° F (38° C) and 122 days with high temperatures over 90° F (32° C). The low temperature regularly reaches freezing (32° F, 0° C) during the winter. The area receives abundant sunshine with relatively little precipitation.

Attainment Status

According to information from the Utah Department of Environmental Quality, Washington County is an attainment area for all NAAQS criteria pollutants.

Existing Air Quality Data

The Utah Division of Air Quality (UDAQ) maintains a network of air quality monitoring stations throughout the state. A monitoring station is located at 147 North 870 West in Hurricane, Washington County. This station measures particulate matter, ozone, and nitrogen oxides. The site was established in 2014 and has not yet been in operation long enough to establish long-term trends. A previous station was located in Santa Clara.

Measurements for 2014 do not show any exceedences of the NAAQS. Additional information is available for St. George and Hurricane for ozone. These monitoring reports show that emissions for ozone have generally remained steady since 2005 (see Table 3-5).

Table 3-5. Summary of NAAQS Pollutant Concentrations at the Santa Clara and Hurricane Monitoring Stations

Pollutant		NAAQS Standard	2012		2013	2014
			Santa Clara	Hurricane	Hurricane	Hurricane
NO_2	1-hour (ppb)	100 ppb	18.0	22.0	28.0	24.0
	Annual (ppb)	53 ppb	3.68*	2.45*	3.07*	2.62*
O_3	8-hour (ppm)	0.075 ppm	0.75	.059	.069	.066
PM_{10}	24-hour (µg/m3)	150 µg/m3	--	--	--	47
$PM_{2.5}$	24-hour (µg/m3)	35 µg/m3	--	--	--	8.8

Source: Utah DEQ website at http://www.airmonitoring.utah.gov/dataarchive/index.htm. Accessed September 2015.
**mean does not satisfy summary criteria*
***Note:** ppm=parts per million; µg/m3=micrograms per cubic meters; ppb=parts per billion. Nitrogen dioxide concentrations represent 98th percentile values. Ozone concentrations represent the 4th highest daily maximum value. PM_{10} concentrations represent the 1st highest daily maximum value. The $PM_{2.5}$ 24-hour concentration represents the 98th percentile 24-hour value. The $PM_{2.5}$ annual concentration represents the arithmetic mean of 24-hour values.*

Although Washington County is currently not designated as a non-attainment or maintenance area, measures are already being taken to protect the air shed, especially for ozone. Previous monitoring has indicated that the ozone standards were being approached and that the proposed new standards could result in the area being designated as non-attainment. The UDAQ is currently conducting non regulatory air pollution monitoring in Washington County for several pollutants, including ozone, and voluntary control measures, as outlined in the EPA's Ozone Flex Program, are being implemented.

3.9.3 ENVIRONMENTAL CONSEQUENCES

Transportation Conformity

A regional level analysis looks at the Regional Transportation Plan (RTP) to see that all of the projects included in the RTP, including the proposed project, conform to the control strategies and emissions levels set in the SIP. An individual project is said to conform to the SIP if, both by itself and in combination with the other planned transportation projects in the plan, it would not result in any of the following conditions:

- New violations of the NAAQS
- Increases in the frequency or severity of existing violations of the NAAQS
- Delays in attaining the NAAQS

For $PM_{2.5}$, work has begun on a $PM_{2.5}$ section of the SIP which will establish a motor vehicle emission budget for $PM_{2.5}$ emissions. Until the $PM_{2.5}$ SIP is completed and approved by EPA, $PM_{2.5}$ interim conformity requirements apply, which require that future NOx emissions (a precursor to $PM_{2.5}$) and primary particulate emissions not exceed 2008 levels.

The project is included in Phase One of the Dixie MPO 2015-2040 RTP, as well as in the 2016 to 2021 Transportation Improvement Program (TIP) for Washington County and the 2016 to 2012 Statewide Transportation Improvement Program (STIP).

Project Level Analysis

Project level analysis is performed when a project is located in a non-attainment area for CO or PM_{10} /$PM_{2.5}$ or in an area that was previously designated as non-attainment but has been subsequently redesignated as attainment, otherwise known as a maintenance area. Project level analysis may consist of either a qualitative or quantitative analysis or both.

Carbon Monoxide

The study area is not located in a non-attainment area for CO; therefore, no project level ("hot spot") analysis is required under transportation conformity rules.

Particulate Matter

A quantitative analysis for PM_{10} and $PM_{2.5}$ is only required for a "project of air quality concern" (see 40 CFR Section 93.123(b)(i)). Projects of air quality concern are certain highway and transit projects that involve a significant level of diesel vehicle traffic or any other project that is identified in the $PM_{2.5}$ or PM_{10} SIP as a localized air quality concern, such as:

- i) new or expanded highway projects that have a significant number of or significant increase in diesel vehicles;
- ii) projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;
- iii) new bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;
- iv) expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location, and
- v) projects in or affecting locations, areas, or categories of sites which are identified in the $PM_{2.5}$ or PM_{10} applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The preamble to the March 10, 2006 rule (71 FR 12491) provided an example of a project of air quality concern as "a project on a new highway or expressway that serves a significant volume of diesel truck traffic, such as facilities with greater than 125,000 AADT and 8% or more of such AADT is diesel truck traffic."

Generally, a project is not a Project of Concern unless it changes capacity or alignment of a road with more than 125,000 AADT and 8% trucks, more than 10,000 truck AADT (8% of 125,000), or otherwise may substantially increase or concentrate diesel exhaust emissions (such as bus terminals and transfer points, designated truck routes, and freight intermodal terminals). Expected AADT and truck AADT on Purgatory Road do not qualify the project as a Project of Concern. The average annual daily traffic volume for the Purgatory Road is 485 vehicles per day (vpd) for the No-action Alternative (on the small section of the roadway that currently exists) and 3,412 vpd for the Preferred Alternative. See Traffic Memo in Appendix B.

Construction-Related Fugitive Dust

Construction-related dust is not identified in the Utah SIP as a Contributor to the PM_{10} non-attainment area. Therefore, there is no conformity requirement for construction dust. Section 93.122(d) (1) of 40 CFR reads as follows: "For areas in which the implementation plan does not identify construction-related fugitive PM_{10} as a contributor to the non-attainment problem, the fugitive PM_{10} emissions associated with highway and transit project construction are not required to be considered in the regional emissions analysis." In the Utah PM_{10} SIP, construction-related PM_{10} is not included in the inventory, nor is it included in the attainment demonstration or control strategies.

Control of construction-related PM_{10} emissions are mentioned in qualitative terms in Section IX.A.7 of the SIP as a maintenance measure to preserve attainment of the PM_{10} standard achieved by application of the control strategies identified in the SIP. Section IX.A.7.d of the SIP requires UDOT and local planning agencies to cooperate and review all proposed construction projects for impacts on the PM_{10} standard. This SIP requirement is satisfied through the Utah State Air Quality Rules. R307-309-4 requires that sponsors of any construction activity file a dust control plan with the State Division of Air Quality.

Mobile Source Air Toxics (MSAT)

MSATs were not quantitatively evaluated for this project because the relatively low traffic volumes in the vicinity of the proposed project would not meet FHWA's threshold of about 140,000 vehicles per day (vpd) for conducting a quantitative MSAT analysis. Average daily traffic volumes in the study area are expected to be less than 3,000 vehicles per day.

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled "A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives," found at: www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm.

For the proposed project, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT). The VMT estimated for Washington County with the proposed project is slightly higher than that for the No-action Alternative, because the new roadway would provide access to new properties and would provide connections between other destinations, thereby attracting rerouted trips from elsewhere in the transportation network (see Table 3-6). This increase in VMT would lead to higher MSAT emissions for the proposed project along the highway corridor, along with a corresponding decrease in MSAT emissions along other routes.

*Table 3-6. Comparison of Vehicle Miles Traveled (VMT) and Vehicle Hours Traveled (VHT) in Washington County**

Scenario	Daily VMT		Daily VHT	
	Total	Percent Change	Total	Percent Change
2014 Existing Conditions	3,211,456	NA	72,108	NA
2040 No Action Alternative	8,162,769	154.18%	197,240	173.53%
2040 Preferred Alternative	8,163,750	154.21%	196,963	173.16%

***Area modeled is Washington County*

EPA's national control programs are projected to reduce annual MSAT emissions by 72% between 1999 and 2050. Local conditions will likely differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. VMT growth in the area is projected to dramatically increase in comparison with existing levels, which in turn will result in an increase in MSAT emissions in the study area. In comparison with the No-action Alternative, however, the Preferred Alternative would have only slightly higher MSAT emissions since the difference in VMT in the design year is minor (less than 1000 VMT per day). Therefore, although there would be increased MSAT emissions in the design year, it would not be appreciably higher under the Preferred Alternative than it would be if the roadway were not constructed.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with the proposed project. Due to these limitations, the following discussion is included in accordance with the CEQ regulations (40 C.F.R. 1502.22(b)) regarding incomplete or unavailable information.

Health impacts related to exposure to project-specific MSAT emissions cannot be credibly assessed at this time due to inherent difficulties in modeling, uncertainty as to the toxicity of MSAT emissions, and the lack of a consensus on an acceptable level of risk to the general public.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's Draft MOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel PM emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with NAAQS for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). See Special Report #16: Mobile-Source Air Toxics: A Critical Review of the Literature on Exposure and Health Effects prepared by the HEI in November 2007 and Special Report 17, Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects released January 2010 (http://www.healtheffects.org/). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives, including the No Build Alternative, is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, that are better suited for quantitative analysis. Therefore, the unavailable or incomplete information is relevant in that it is not possible to make a determination of whether the proposed project would have "significant adverse impacts on the human environment."

Greenhouse Gases

Greenhouse gas emissions have accumulated rapidly as the world has industrialized, with concentration of atmospheric CO_2 increasing form roughly 300 parts per million in 1900 to over 400 parts per million today. Over this timeframe, global average temperatures have increased by roughly 1.5 degrees Fahrenheit (1 degree Celsius), and the most rapid increases have occurred over the past 50 years.

Scientists have warned that significant and potentially dangerous shifts in climate and weather are possible without substantial reductions in greenhouse gas emissions. They commonly have cited 2 degrees Celsius (1 degree Celsius beyond warming that has already occurred) as the total amount of warming the earth can tolerate without serious and potentially irreversible climate effects. For warming to be limited to this level, atmospheric concentrations of CO_2 would need to stabilize at a maximum of 450 ppm, requiring annual global emissions to be reduced 40-70% below 2010 levels by 2050 (see IPCC, 2014: Climate Change 2014: Synthesis Report Summary for Policymakers. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change).

State and national governments in many developed countries have set GHG emissions reduction targets of 80 percent below current levels by 2050, recognizing that post-industrial economies are primarily responsible for GHGs already in the atmosphere. As part of a 2014 bilateral agreement with China, the U.S. pledged to reduce GHG emissions 26-28 percent below 2005 levels by 2025; this emissions reduction pathway is intended to support economy-wide reductions of 80 percent or more by 2050 (see "U.S.-China Joint Announcement on Climate Change," White House, Office of the Press Secretary, November 11, 2014, on the White House website, https://www.whitehouse.gov/the-press-office/2014/11/11/us-china-joint-announcement-climate-change, accessed December 22, 2015). Further, as reported in the New York Times (http://mobile.nytimes.com/2015/12/13/world/europe/climate-change-accord-paris.html?_r), the representatives of 195 nations reached a landmark accord on December 12, 2015 that commits nearly every country to lowering GHG emissions in order to stave off an increase in atmospheric temperatures of 2 degrees Celsius or 3.6 degrees Fahrenheit.

GHG emissions from vehicles using roadways are a function of distance travelled (expressed as vehicle miles travelled, or VMT), vehicle speed, and road grade. GHG emissions are also generated during roadway construction and maintenance activities. An estimate of GHG emissions for Washington County is contained in Table 3-7 for comparison purposes.

Table 3-7. Comparison of 2014 and 2040 GHG Emission Estimates in Washington County

Scenario	Daily VMT*			GHG Emissions	
	Total	Difference	Percent Change	Total (lbs/day)	Percent Change
2014 Travel Demand	3,211,456	NA	NA	2,564,087.40	NA
2040 Travel Demand (No-action Alternative)	8,162,769	4,951,313	154.18%	4,432,471.33	72.87%
2040 Travel Demand (Preferred Alternative)	8,163,750	4,952,294	154.21%	4,433,004.03	72.89%

**Area modeled is Washington County*

In the 2040 design year, VMT in the region would increase, which in turn would increase GHG emissions above existing levels. However, the difference between the No-action Alternative and the Preferred Alternative is so minor that there would not be any appreciable difference in the alternatives. The difference in VMT is less than 1000 vehicle miles per day, which translates into less than 1,000 pounds per day in GHG emissions. EPA's GHG emissions standards, implemented in concert with national fuel economy standards, would help minimize GHG emissions. The Energy Information Administration (EIA) projects that vehicle energy efficiency (and thus, GHG emissions) on a per-mile basis will improve by 28% between 2012 and 2040 and fuel economy standards are continuing to be increased. In fact, the Obama Administration has finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by Model Year 2025. Increased fuel economy would help to offset the difference in GHG emissions so that the emissions would be less than otherwise expected.

Construction and subsequent maintenance of the project will generate GHG emissions. Preparation of the roadway corridor (e.g., earth-moving activities) involves a considerable amount of energy consumption and resulting GHG emissions; manufacture of the materials used in construction and fuel used by construction equipment also contribute GHG emissions. Typically, construction emissions associated with a new roadway account for approximately 5% of the total 20-year lifetime emissions from the roadway, although this can vary widely with the extent of construction activity and the number of vehicles that use the roadway.

Conclusion

The proposed project would not result in new violations of the NAAQS, increases in the frequency or severity of existing violations of the NAAQS, or delays in attaining the NAAQS. Although there would be increased MSAT and GHG emissions in the design year for the study area, it would not be appreciably higher under the Preferred Alternative than it would be for the No-action Alternative.

Mitigation

No mitigation required.

3.10 NOISE

A preliminary noise analysis was completed in accordance with 23 CFR §772 and the UDOT Noise Abatement Policy, last revised January 10, 2012 (see Appendix A). The preliminary noise analysis is summarized below.

3.10.1 AFFECTED ENVIRONMENT

Traffic noise is measured in A-weighted sound levels in decibels (dBA) which most closely approximates the way the human ear hears sounds at different frequencies. Since traffic noise varies over time, the sound levels for this noise analysis are expressed as "equivalent levels" or Leq, representing the average sound level over a one hour period of time. Unless noted otherwise, all sound levels in this noise analysis are expressed in the hourly equivalent noise level.

FHWA has established Noise Abatement Criteria for several categories of land use activities (see Table 3-8). FHWA's noise criteria is based on sound levels that are considered an impact to nearby property owners, also known as receptors. Primary consideration is to be given for exterior areas where frequent human use occurs.

UDOT has developed a Noise Abatement Policy for transportation projects, which conforms to FHWA noise abatement requirements outlined in 23 CFR §772. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either 1) the future worst case noise level is equal to or greater than the UDOT Noise Abatement Criteria for specified land use categories or, 2) the future worst case noise level is greater than or equal to an increase of 10 dBA over the existing noise level.

Table 3-8. Noise Abatement Criteria

Activity Category	FHWA Criteria Leq(h)	UDOT Criteria Leq (h)	Evaluation Location	Activity Description
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	66	Exterior	Residential.
C	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	---	---		Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	---		Undeveloped lands that are not permitted.

Source: UDOT Noise Abatement Policy

Noise impact and abatement analyses are required within Land Use Activity Categories A, B, C, D, and E (see Table 3-8) only when development exists or has been permitted (formal building permit issued prior to the date the final environmental decision document is approved). Activity Categories F and G include lands that are not sensitive to traffic noise. There are no impact criteria for these land use types and an analysis of noise impacts is not required.

There are no Activity Category A or D land uses within the study area. Activity Category B land uses include all residences and the correctional facilities. Activity Category C land uses include the Washington County Fairground. Activity Category E land uses include office buildings in the industrial park. The UDOT Noise Policy states that a noise impact analysis will not be required for Activity Categories F and G.

Existing Noise Levels

The primary source of noise in the study area is automobile and truck traffic on SR-9, Southern Parkway, and other roadways in the area. Existing traffic sounds for each receptor in the study area were calculated using the Traffic Noise Model (TNM) 2.5 software using existing conditions (travel lane configurations and the posted speed limit). Existing noise levels were determined using the greatest hourly traffic noise conditions likely to occur on a regular basis, or Level-of-Service (LOS) C traffic volumes.

On site measurements were made to verify the accuracy of the model and are shown in Table 3-9. For existing noise levels and figures see the Noise Report in Appendix B.

Table 3-9. Field Noise Measurements

Site #	Location	Field Noise Level (dBA)	TNM Output (dBA)	Difference
1	3110 East Washington Dam Road	58.1	55.2	2.9
2	Adjacent to Washington County Fairground track	46.1	44.3	1.8

3.10.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

Noise levels for the No-action Alternative would generally be the same as existing conditions.

Indirect Impacts

There would be no indirect impacts to noise levels in the study area as a result of the No-action Alternative.

Preferred Alternative

Direct Impacts

The Preferred Alternative would generally result in a small noise level increase throughout the study area, with the greatest increase being 1.8 dBA at Receptor 10C (see the Noise Report in Appendix B). Overall, the average increase in noise levels for the study area would be about 0.4 dBA, which is imperceptible to the human ear. No receptors would be impacted by traffic noise.

Indirect Impacts

There would be no indirect impacts to noise levels in the study area as a result of the Preferred Alternative.

Noise Abatement

Noise abatement measures were not considered because no receptors in the study area would be impacted.

Mitigation

No mitigation required.

3.11 WATER RESOURCES

Water quality in Utah is regulated by the EPA through the federal Clean Water Act and by the regulations of the Utah Department of Environmental Quality (UDEQ) Division of Water Quality (UDWQ) and the Division of Drinking Water as described in the Utah Administrative Code, Rules 317 and 309 (UAC R317 and R309). This sections describes water resources and current water quality conditions within the study area.

3.11.1 AFFECTED ENVIRONMENT

Storm Water

In general, areas with storm drain systems capture storm water runoff from roads and convey it to a discharge point through catch basins and/or detention ponds. These systems can be effective at reducing total suspended solids (TSS) is storm water is conveyed to a detention pond with discharge control devices prior to storm water entering surface waters. Paved areas without storm drain systems allow storm water to sheet flow into nearby surface waters or to nearby pervious surfaces. Pervious areas allow for storm water to infiltrate into the ground.

If not managed properly, roadway runoff can negatively impact water quality by increasing total dissolved solids (TDS) and TSS entering nearby streams and lakes. Highway surfaces collect automobile-related pollutants (mainly lead, copper, zinc, oil, grease, and rust) and de-icing chemicals (salt and salt solutions), which are then washed off highway surfaces by rain or snow melt. Unmanaged runoff can become concentrated, gather sediment through erosion, and enter streams and lakes unless measures are taken to reduce pollutants.

Impervious surfaces in the study area are limited. The industrial parks to the north and Country Way to the south have storm drainage features. Other roadways and areas use sheet flow to drain water to surrounding pervious surfaces, which then eventually drain to the Virgin River.

Groundwater/Aquifers

The study area is located within a discharge zone of the Navajo and Kayenta Sandstone aquifers. The outflow of groundwater discharge may occur naturally or as the result of human activity, notably well pumping. The Navajo and Kayenta Sandstone aquifers are primary aquifers used by municipalities in the St. George Basin for drinking and other water needs. A primary aquifer provides a high level of water storage and may support water supplies and/or river base flows.

The Utah Division of Water Rights lists a recharge recovery project under the guidance of the Washington County Water Conservancy District at Sand Hollow Reservoir. Water is diverted from the Virgin River at Quail Creek diversion dam and conveyed to Sand Hollow Reservoir (located on the Navajo Sandstone formation) to facilitate recharge of the underlying groundwater.

Surface Water

The study area is located south of Quail Creek Reservoir and west of Sand Hollow Reservoir. The Virgin River runs south just outside of the eastern edge of the study area, turning westward to cross the study area along the southern edge before turning south again.

According to the Utah 303(d) list of Impaired Waters, the Virgin River has segments that have been determined to be impaired for TDS and/or temperature. Virgin River 1 includes the stretch from the State Line to the Santa Clara Confluence and Virgin River 2 includes the Virgin River and its tributaries from the Santa Clara River Confluence to Quail Creek Diversion (Excludes Quail, Ash, and La Verkin Creeks). The Virgin River 2 section is located within the study area.

Wells/Points of Diversion

According to the Utah Division of Water Rights, several underground points of diversion (POD) are located within the study area, mostly in connection with the Virgin River. See Preferred Alternative Maps in Appendix A. In addition, the St. George and Washington Canal Company diverts water from the Virgin River at the southeastern corner of the study area, via the Washington Fields Diversion.

3.11.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

Storm Water

Under the No-action Alternative, there would be no increase in impervious surfaces and no need for measures to address additional stormwater runoff.

Groundwater/Aquifers

The No-action Alternative would have no impacts on groundwater quality.

Surface Water

The No-action Alternative would have no impacts on surface water quality in the area.

Wells/Points of Diversion

The No-action Alternative would have no impacts to wells or PODs.

Indirect Impacts

There would be no anticipated indirect impacts to water quality as a result of the No-action Alternative.

Preferred Alternative

Direct Impacts

Storm Water

Under the Preferred Alternative, there would be an increase in impervious surfaces of approximately 26.15 acres within the study area, resulting in an increase in storm water runoff volumes of 76 cubic feet per second (cfs) during a 100-year flood event.

The Preferred Alternative includes curb and gutter along both sides of the new roadway and across the bridge structure, which would direct stormwater to a new storm drain system. This system would include detention basins to allow sediment and other contaminants to settle out before the water is released into the environment. The detention basins would act as a filter for oil and other contaminants to prevent deterioration of water quality in the study area. The study team has reviewed potential locations for detention basins throughout the study area, and has identified favorable locations to be further analyzed during design (see Preferred Alternative Maps in Appendix A).

Groundwater/Aquifers

It is possible that runoff from the roadway that would be built under the Preferred Alternative could infiltrate the soil and enter into the Navajo Sandstone Aquifer. However, it is unlikely that the Preferred Alternative would impact groundwater quality. According to the Navajo Sandstone Recharge Study undertaken by the USGS Utah Water Science Center (http://ut.water.usgs.gov/projects/navajosandstone/index/html), natural net-infiltration rates for the Navajo Sandstone outcrop of western Washington County are estimated to range from 0.1 to 66 mm/year, which indicates that about 5 percent of the precipitation falling in the outcrop area recharges the aquifer. Further, the study found that about 10 percent of the porosity of the Navajo Sandstone was closed with trapped air, reducing the permeability by more than an order of magnitude.

Surface Water

The Preferred Alternative includes constructing a bridge over the Virgin River. Construction activities and disturbance related to bridge and roadway construction could temporarily increase TDS and TSS (i.e., sediment and organic matter) within the Virgin River. Best Management Practices (BMPs) would be in place during construction to minimize such impacts.

Wells/Points of Diversion

The Preferred Alternative would have no impact to PODs.

Indirect Impacts

There would be no indirect impacts to water quality as a result of the Preferred Alternative.

Mitigation

No mitigation is required.

3.12 WETLANDS AND WATERS OF THE US

The U.S. Army Corps of Engineers (USACE) administers and enforces Section 404 of the Clean Water Act (33 U.S.C. 1251). Under the Clean Water Act, waters of the U.S. (WOUS) are defined as waters currently or previously used for interstate or foreign commerce; all interstate waters; any waters, the destruction of which could affect interstate or foreign commerce; all impoundments and tributaries of the previously mentioned waters; the territorial seas; and wetlands adjacent to waters. Wetlands are considered a subset of WOUS. and, for the purposes of regulatory guidance, are considered special aquatic sites.

Under Section 404 of the Clean Water Act, no discharge of dredged or fill material is permitted in WOUS, if there is a less environmentally damaging practicable alternative. Executive Order 11990 (May 24, 1977) requires federal agencies to not undertake or provide assistance to activities that impact wetlands. If a project does impact wetlands, it must be determined by the head of the agency (1) that there is no practicable alternative to such construction, and (2) that the proposed action includes all practicable measures to minimize harm to wetlands, which may result from such use.

3.12.1 AFFECTED ENVIRONMENT

In compliance with Section 404 of the Clean Water Act and USACE policy, and under the direction of UDOT, a wetland and WOUS inventory of the study area was conducted by Horrocks Engineers on March 29 and 30, 2016. The purpose of the inventory was to identify and map potential wetlands and non-wetland WOUS within the study area. A wetland delineation was not conducted and a jurisdiction determination from the USACE was not obtained.

Wetlands

Four potential wetlands totaling 0.32 acres were identified within the study area. All of the potential wetland areas are located at the northern end of the project near the Washington County Regional Park (see Preferred Alternative Maps in Appendix A).

Non-wetland Waters of the U.S.

One perennial non-wetland WOUS, the Virgin River, was identified in the study area (see Preferred Alternative Maps in Appendix A). The Virgin River is a known jurisdictional water.

Approximately 42 ephemeral washes were identified in the study area. All of the identified ephemeral washes lose evidence of an ordinary high water mark (OHWM) before they converge with a WOUS (i.e., the Virgin River). Because the washes lack connectivity with and do not serve as tributaries to another WOUS, it is unlikely that any of the washes would be considered jurisdictional (see Preferred Alternative Maps in Appendix A).

3.12.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would not result in any direct impacts to wetlands or other WOUS.

Indirect Impacts

The No-action Alternative would not result in any indirect impacts to wetlands or other WOUS.

Preferred Alternative

Direct Impacts

Wetlands

The Preferred Alternative would permanently impact approximately 0.13 acres of potential wetlands.

Non-wetland Waters of the U.S.

The Preferred Alternative would impact approximately 42 ephemeral washes. However, it is unlikely that any of the washes would be considered jurisdictional by the USACE.

The Preferred Alternative would permanently impact approximately 0.18 acres and 70 linear feet of the Virgin River due to the construction of a new bridge structure. The construction of the new bridge structure would also require additional temporary impacts to the Virgin River.

Indirect Impacts

The Preferred Alternative would not result in any indirect impacts to wetlands or other WOUS.

Mitigation

The project will conduct a wetland delineation prior to construction. A Section 404 Permit and Stream Alteration Permit will be obtained from the USACE for all work to be conducted within the Virgin River and any other wetland or WOUS that is determined to be jurisdictional.

3.13 FLOODPLAINS

A floodplain is defined as a normally dry area surrounding a natural lake or river that is occasionally inundated by water and subject to periodic flooding. Floodplain impacts occur when a project encroaches on a 100-year floodplain (or those floodplains that may have a 1 in 100 chance of being flooded in any given year), which in the case of roadways and other linear features, can be parallel or perpendicular crossings. Development in floodplains can reduce flood-carrying capacity and extend the flooding hazard beyond the developed area.

Federal Emergency Management

In response to escalating taxpayer costs for flood disaster relief, Congress established the National Flood Insurance Program (NFIP) as a voluntary mitigation program administered by the Federal Emergency Management Agency (FEMA). FEMA designates flood zones according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map or Flood Hazard Boundary. Each zone reflects the severity or type of flooding in the area. Under this program, the federal government makes flood insurance available in those communities that practice sound floodplain management. This incentive encourages state and local governments to develop and implement floodplain management programs.

Participating communities are required to review proposed development projects to determine if they are in identified FEMA floodplains. If a project is located in a mapped Special Flood Hazard Area, the project must obtain a Floodplain Development Permit (FDP) from the community before any proposed construction or development begins to ensure that the project meets the requirements of the NFIP.

If a project will cause changes to the FEMA floodplain, one or more FEMA documents must be updated. A Letter of Map Revision (LOMR) officially revises these documents. A LOMR is generally done after the completion of the project causing the changes. In certain situations, a Conditional Letter of Map Revision (CLOMR) must be obtained from FEMA. A CLOMR is FEMA's comment on a proposed project and how it would affect the existing floodplain. A CLOMR does not have to be done as part of a FDP, but a community may require it before the permit is issued to show anticipated impacts. Further, a CLOMR is required if a proposed project changes the base flood elevations (BFEs) more than a predetermined amount (based on FEMA's minimum standards or more stringent community-adopted standards). FEMA has set a 1 foot increase in the 100-year flood elevation as the upper limit of the allowable encroachment caused by a project.

Executive Order 11988, Floodplain Management

Executive Order 11988 and 23 CFR §650, Subpart A, provide guidance to federal agencies on projects with floodplains. Executive Order 11988 requires the avoidance, to the extent possible, of long and short term adverse impacts associated with the occupancy and modification of floodplains. 23 CFR §650, Subpart A, outlines FHWA policies and procedures for floodplain encroachment. FHWA must avoid longitudinal and significant encroachments, where practicable, and avoid support of incompatible floodplain development.
Under FHWA's regulations, a significant encroachment can arise from any of the following situations:

- Significant potential for interfering with a transportation facility that is needed for emergency vehicles or that provides a community's only evacuation route
- Significant risk of upstream flooding
- Significant adverse impact on natural and beneficial floodplain values

3.13.1 AFFECTED ENVIRONMENT

Hurricane City, Washington City, and Washington County are FEMA Flood Insurance Program participating communities (community identification numbers 490172#, 490182#, and 490224#, respectively). According to FEMA Flood Rate Insurance Maps, the study area contains one regulatory 100-year floodplain that is associated with the Virgin River (see Preferred Alternative Maps in Appendix A). A regulatory floodplain is a floodplain that

is recognized by FEMA and adopted by the local community (that is, the community agrees to abide by FEMA regulations associated with the floodplain). No other floodplains were identified within the study area.

3.13.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would not result in any direct impacts to floodplains.

Indirect Impacts

The No-action Alternative would not result in any indirect impacts to floodplains.

Preferred Alternative

Direct Impacts

The Preferred Alternative would construct a bridge over the Virgin River and would involve construction activities within the 100-year floodplain within unincorporated Washington County. It is likely that support columns, footings, and bridge abutments associated with the bridge structure would need to be located within the 100-year floodplain. Permanent impacts would be avoided and minimized to the maximum extent practicable. Exact quantities of permanent impacts will be determined during final design. It is anticipated that as much as 2.5 acres and 270 linear feet of the 100-year floodplain could be temporarily impacted.

Indirect Impacts

The Preferred Alternative would not result in any indirect impacts to floodplains.

Mitigation

Hydraulic analyses will be performed to determine if there would be a rise in the BFE. If the rise in the BFE is greater than one foot, proper steps will be taken with Washington County and FEMA to obtain a LOMR. These steps include:

- Coordination with Washington County Floodplain Manager during final design
- Washington County approval of CLOMR documentation
- A CLOMR from FEMA
- A FDP from Washington County
- Following project completion, a LOMR from FEMA

3.14 WILDLIFE

Pursuant to Utah Division of Wildlife Resources (UDWR) Administrative Rule R657-48, species for which a conservation agreement is in place automatically qualify for the Utah Sensitive Species List. The additional species on the Utah Sensitive Species List, "wildlife species of concern", are those species for which there is credible scientific evidence to substantiate a threat to continued population viability. It is anticipated that wildlife species of concern designations will identify species for which conservation actions are needed, and that timely and appropriate conservation actions implemented on their behalf will preclude the need to list these species under the Endangered Species Act (ESA).

3.14.1 AFFECTED ENVIRONMENT

Table 3-10 provides the common and scientific names, statuses, habitat and/or range, and probability of occurrence for each Utah Sensitive Species that is known to occur in Washington County, Utah. The probability of occurrence in the study area is based on known and recorded accounts of occurrence within the study area as well as the presence of suitable habitat in the study area. Species that have a "high" or "low" probability of occurrence in the study area are discussed in greater detail in the paragraphs below the table.

Table 3-10. Utah Sensitive Species in Washington County

Common Name	Scientific Name	State Status	Habitat Requirements or Known Range**	Probability of Occurrence in Study Area
Allen's Big-eared Bat	*Idionycteris phyllotis*	SPC	Rocky and riparian areas in woodland and scrubland regions.	None
American Three-toed Woodpecker	*Picoides dorsalis*	SPC	Engelmann spruce, sub-alpine fir, Douglas-fir, grand fir, ponderosa pine, tamarack, aspen, and lodgepole pine forests with both living and dead trees for nesting and foraging.	None
American White Pelican	*Pelecanus erythrorhynchos*	SPC	Located in the northern portions of the state, specifically within the Utah Lake/ Great Salt Lake ecological complex.	None
Arizona Toad	*Bufo microscaphus*	SPC	Streams, washes, irrigated crop lands, reservoirs, and uplands adjacent to water	High
Bald Eagle	*Haliaeetus leuocephalus*	SPC	Tall trees near bodies of water where fish and waterfowl prey are available.	None
Big Free-tailed Bat	*Nyctinomops macrotis*	SPC	Rocky and woodland habitats, caves, mines, old buildings, and rock crevices.	Low
Black Swift	*Cypseloides niger*	SPC	Require waterfalls for nesting; nesting sites are typically surrounded by coniferous forests, often mixed conifer or spruce-fir forests, and nest sites may include mountain shrub, aspen, or alpine components.	None
Bluehead Sucker	*Catostomus discobolus*	CS	Fast flowing water in high gradient reaches of mountain rivers.	None

Common Name	Scientific Name	State Status	Habitat Requirements or Known Range**	Probability of Occurrence in Study Area
Bonneville Cutthroat Trout	*Oncorhynchus clarkii utah*	CS	High-elevation mountain streams and lakes to low-elevation grassland streams. In all of these habitat types, however, the Bonneville cutthroat trout requires a functional stream riparian zone, which provides structure, cover, shade, and bank stability.	None
Burrowing Owl	*Athene cunicularia*	SPC	Open grassland and prairies but the species is also found in other open habitats such as golf courses, cemeteries, and airports.	None
Common Chuckwalla	*Sauromalus ater*	SPC	Predominantly found near cliffs, boulders, or rocky slopes, where they use rocks as basking sites and rock crevices for shelter.	Low
Desert Iguana	*Dipsosaurus dorsalis*	SPC	Creosote bush desert.	Low
Desert Night Lizard	*Xantusia vigilis*	SPC	Desert habitats containing Joshua trees.	None
Desert Springsnail	*Pyrgulopsis deserta*	SPC	Springs, however characteristics of these springs have not been reported.	None
Desert Sucker	*Catostomus clarkii*	SPC	This species occurs only in the Virgin River system.	High
Ferruginous Hawk	*Buteo regalis*	SPC	Flat and rolling terrain in grassland or shrub steppe.	Low
Flannelmouth Sucker	*Catostomus latipinnis*	CS	The main-stem of the Colorado River, as well as in many of the Colorado River's large tributaries.	High
Fringed Myotis	*Myotis thysanodes*	SPC	Inhabits caves, mines, and buildings, most often in desert and woodland areas.	Low
Gila Monster	*Heloderma suspectum*	SPC	Large rocky shelves, sandy areas, and creosote-sage areas.	Low
Greater Sage-grouse	*Centrocercus urophasianus*	SPC	Sagebrush dominated landscapes.	None
Kit Fox	*Vulpes microtis*	SPC	Open prairie, plains, and desert habitats.	Low
Lewis's Woodpecker	*Melanerpes lewis*	SPC	Burned-over Douglas-fir, mixed conifer, pinyon-juniper, riparian, and oak woodlands, but is also found in the fringes of pine and juniper stands, and deciduous forests, especially riparian cottonwoods.	None
Long-Billed Curlew	*Numenius americanus*	SPC	Shorebird requiring short grass (less than 30 cm tall), bare ground components, shade, and abundant vertebrate prey. Less common in the Colorado River drainage.	None
Mojave Rattlesnake	*Crotalus scutulatus*	SPC	Barren desert and desert scrub habitats.	Low

Common Name	Scientific Name	State Status	Habitat Requirements or Known Range**	Probability of Occurrence in Study Area
Mountain Plover	*Charadrius montanus*	SPC	Shorebird requiring shortgrass prairie habitat composed primarily of blue grama and buffalo grass.	None
Northern Goshawk	*Accipiter gentilis*	CS	Mature mountain forest and riparian zone habitats.	None
Pygmy Rabbit	*Brachylagus idahoensis*	SPC	Tall dense sagebrush and loose soils.	None
Short-Eared Owl	*Asio flammeus*	SPC	Grasslands, shrublands, and other open habitats.	None
Sidewinder	*Crotalus cerastes*	SPC	Sandy open terrain.	None
Speckled Rattlesnake	*Crotalus mitchellii*	SPC	Rocky desert areas.	Low
Spotted Bat	*Euderma maculatum*	SPC	Variety of habitats, ranging from deserts to forested mountains.	Low
Townsend's Big-Eared Bat	*Corynorhinus townsendii*	SPC	Can occur in many types of habitat but is most often found near forested areas.	None
Virgin Spinedace	*Lepidomeda mollispinis*	CS	Found throughout the Virgin River System.	High
Western Banded Gecko	*Coleonyx variegatus*	SPC	Diverse habitat types of the Mojave Desert.	Low
Western Red Bat	*Lasiurus blossevillii*	SPC	Normally found near water, often in wooded areas.	None
Western Threadsnake	*Leptotyphlops humilis*	SPC	Burrowing species found in moist loose soils.	None
Western Toad	*Bufo boreas*	SPC	Slow moving streams, wetlands, desert springs, ponds, lakes, meadows, and woodlands.	None
Wet-rock Physa	*Physella zionis*	SPC	Seeps and "hanging gardens", mainly on the vertical sandstone walls of the narrow canyons through which the North Fork of the Virgin River flows.	None
Zebra-tailed Lizard	*Callisaurus draconoides*	SPC	Sparsely vegetated desert areas with hard packed soils.	Low

**SPC - Species of Concern, CS - Conservation Agreement*

*** Source: UDWR, Conservation Data Center, July 2016*

Arizona Toad

Historically, the Arizona toad was known to be present in the southwestern U.S. along the lower Virgin River through southwestern Utah and into Nevada and Arizona, but it is believed to have disappeared from much of its former range. The species prefers the quieter parts of rocky streams and rivers, ponds or lakes, irrigated farmlands, riparian area, and occasionally upland areas adjacent to water (UDWR). Utah Natural Heritage Program (UNHP) historic occupancy data shows that Arizona toads have been observed within the study area along the Virgin River. No toads were observed during field visits of the study area but it is possible that the species may be present.

Big Free-tailed Bat

Big free-tailed bats are rare in Utah and are known to occur primarily in the southern portion of the state. The species prefers rocky and woodland habitats containing roosting sites in caves, mines, old buildings, or rock crevices (UDWR). Potentially suitable habitat for the species exists within the study area along the cliffs on the east side of Purgatory Flat. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Common Chuckwalla

The common chuckwalla is found only in the southern portion of the state where it is predominately found near cliffs, boulders, or rocky slopes (UDWR). Potentially suitable habitat for the species exists along the cliffs on the east side of Purgatory Flat. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Desert Iguana

The desert iguana occurs only in the extreme southwestern corner of the state. Desert iguanas are tolerant of extremely high temperatures and remain active in hot weather. The preferred habitat of the species is creosote bush desert (UDWR). Potentially suitable habitat exists within the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Desert Sucker

Desert suckers are native to the Colorado River system including the Virgin River (UDWR). UNHP data shows records of the species within the Virgin River in the study area and it is likely that the species is present within the study area.

Ferruginous Hawk

Ferruginous hawks are found throughout Utah in grassland and shrub steppe habitats. Suitable habitat typically consists of flat or rolling terrain with various grass or shrub species and can even be found in agricultural areas. The species prefers to nest in elevated areas including buttes and cliffs (UDWR). Potentially suitable habitat exists within the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Flannelmouth Sucker

Flannelmouth suckers are native to the Colorado River system including the Virgin River (UDWR). UNHP data shows records of the species just outside of the study area within the Virgin River and it is likely that the species is present within the study area.

Fringed Myotis

The fringed myotis has a wide distribution throughout Utah but is not very common in the state. The species prefers to roost in caves, mines, and buildings within desert and woodland habitats (UDWR). Potentially suitable habitat for the species exists in the study area along the cliffs on the east side of Purgatory Flat. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Gila Monster

In Utah, gila monsters are found only in the extreme southwestern portion of the state. The preferred habitat of the gila monster includes sandy areas, creosote-sagebrush habitats, and rocky shelves (UDWR). Potentially suitable habitat for the species is found in the study area. UNHP data has one record from 1985 of the species in the study area. Gila monsters were not observed in the study area during field visits, but it is possible that the species may be present.

Kit Fox

Kit foxes are known to occur in desert, prairies, and plain habitats in the western, east-central, and southeastern portions of Utah (UDWR). Potentially suitable habitat for the kit fox may be present in the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Mojave Rattlesnake

The Mojave rattlesnake is found only within the extreme southwestern corner of the state, where it can be found in barren desert and desert scrub habitats (UDWR). Potentially suitable habitat for the species may be present in the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Speckled Rattlesnake

Speckled rattlesnakes are found only in the southern portion of the state where the species prefers rocky desert habitats (UDWR). Potentially suitable habitat may be present within the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Spotted Bat

The spotted bat is similar in range and roosting preferences to the fringed myotis (UDWR). Potentially suitable habitat exists within the study area along the cliffs on the east side of Purgatory Flat. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Virgin Spinedace

Virgin spinedace are native to the Colorado River system including the Virgin River (UDWR). UNHP data shows records of the species just outside of the study area within the Virgin River and it is likely that the species is present within the study area.

Western Banded Gecko

Western banded geckos can be found in the extreme southwestern portion of the state in various habitats of the Mojave Desert (UDWR). Potentially suitable habitat exists within the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Zebra-tailed Lizard

Zebra-tailed lizards are found in the extreme southwestern portion of the state in sparsely vegetated desert habitats with hard packed soils (UDWR). Potentially suitable habitat exists within the study area. However, there are no UNHP records of the species within the study area and the species was not observed during field visits of the study area.

Migratory Birds

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in the take of migratory birds, including eagles, is prohibited unless otherwise permitted by USFWS. Field visits to the study area identified a pair of nesting red tail hawks within the proposed roadway alignment. Red tail hawks are migratory birds and are protected under the MBTA.

3.14.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would have no direct impacts to wildlife.

Indirect Impacts

The No-action Alternative would have no indirect impacts to wildlife.

Preferred Alternative

Direct Impacts

Utah State Sensitive Species

Of the state sensitive species listed in Table 3-10, sixteen species have been recorded, or have the potential to be present, in the study area: Arizona toad, big free-tailed bat, common chuckwalla, desert iguana, desert sucker, ferruginous hawk, flannelmouth sucker, fringed myotis, gila monster, kit fox, Mojave rattlesnake, speckled rattlesnake, spotted bat, Virgin spinedace, western banded gecko, and zebra-tailed lizard. Table 3-11 describes potential project related impacts to these species.

Table 3-11. Impacts to Utah Sensitive Species as a Result of the Preferred Alternative

Common Name	Scientific Name	Impacts from Preferred Alternative
Arizona Toad	*Bufo microscaphus*	The Preferred Alternative has the potential to impact the Arizona toad through habitat destruction and modification near the Virgin River related to bridge construction. Additionally, if there are toads in the study area during construction activities it is possible that the Preferred Alternative could result in mortality to some individuals or young. It is likely that the Preferred Alternative would negatively impact the Arizona toad.
Big Free-tailed Bat	*Nyctinomops macrotis*	The Preferred Alternative would not directly impact the big free-tailed bat.
Common Chuckwalla	*Sauromalus ater*	The Preferred Alternative has the potential to impact the common chuckwalla through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Desert Iguana	*Diposaurus dorsalis*	The Preferred Alternative has the potential to impact the desert iguana through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Desert Sucker	*Catostomus clarkii*	The Preferred Alternative would impact the desert sucker through habitat destruction and modification in the Virgin River related to bridge construction. It is possible that the Preferred Alternative could also result in mortality to some individuals or young. It is likely that the Preferred Alternative would negatively impact the desert sucker.

Common Name	Scientific Name	Impacts from Preferred Alternative
Ferruginous Hawk	*Buteo regalis*	The Preferred Alternative would not directly impact the ferruginous hawk.
Flannelmouth Sucker	*Catostomus latipinnis*	The Preferred Alternative would impact the flannelmouth sucker through habitat destruction and modification in the Virgin River related to bridge construction. It is possible that the Preferred Alternative could also result in mortality to some individuals or young. It is likely that the Preferred Alternative would negatively impact the flannelmouth sucker.
Fringed Myotis	*Myotis thysanodes*	The Preferred Alternative would not directly impact the fringed myotis.
Gila Monster		The Preferred Alternative has the potential to impact the gila monster through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Kit Fox	*Vulpes microtis*	The Preferred Alternative has the potential to impact the kit fox through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Mojave Rattlesnake	*Crotalus scutalatus*	The Preferred Alternative has the potential to impact the Mojave rattlesnake through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Speckled Rattlesnake	*Crotalus mitchellii*	The Preferred Alternative has the potential to impact the speckled rattlesnake through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Spotted Bat	*Euderma maculatum*	The Preferred Alternative would not directly impact the spotted bat.
Virgin Spinedace	*Lepidomeda mollispinis*	The Preferred Alternative would impact the Virgin spinedace through habitat destruction and modification in the Virgin River related to bridge construction. It is possible that the Preferred Alternative could also result in mortality to some individuals or young. It is likely that the Preferred Alternative would negatively impact the Virgin spinedace.
Western Banded Gecko	*Coleonyx variegatus*	The Preferred Alternative has the potential to impact the western banded gecko through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.
Zebra-tailed Lizard	*Callisaurus draconoides*	The Preferred Alternative has the potential to impact the zebra-tailed lizard through habitat destruction and modification related to roadway construction. It is unlikely that the Preferred Alternative would cause substantial negative impacts.

Migratory Birds

The Proposed Action would require the removal of the tree containing the nest currently in use by a pair of nesting red tail hawks.

Indirect Impacts

The Preferred Alternative may contribute to induced economic growth and development in the study area which may indirectly affect listed species. It is anticipated that this development would occur eventually, with or without construction of the Preferred Alternative, but the Preferred Alternative may slightly accelerate this growth. For more information see the full induced growth study in the Biological Assessment (BA).

Mitigation

Utah State Sensitive Species

See Section 3.15 Threatened and Endangered Species, for mitigation and project commitments to reduce the effects of the Preferred Alternative to impacted species including the Arizona toad, desert sucker, flannelmouth sucker, and Virgin spinedace.

Migratory Birds

The project will complete a pre-construction presence/absence survey of the roadway alignment for breeding migratory birds and raptors. If breeding pairs or active nests are located within proximity to the roadway alignment, the project will follow U.S. Fish and Wildlife Service (USFWS) guidance on temporal and spatial buffers for construction activities near the nest (including nest tree removal). If construction activities near the nest within the temporal or spatial buffers are unavoidable, the project will coordinate with USFWS to determine the appropriate mitigation.

3.15 THREATENED AND ENDANGERED SPECIES

Impacts of the proposed project on threatened and endangered species were assessed in accordance with the Endangered Species Act (ESA). The ESA provides protection to federally-listed threatened and endangered species and their designated critical habitats. It requires that all federal agencies considering a project or action to consult with USFWS or National Marine Fisheries Service (NMFS) to ensure that the proposed activity is "not likely to jeopardize the continued existence" of any listed species or will not "result in adverse modification" of its critical habitat.

3.15.1 AFFECTED ENVIRONMENT

USFWS's Information Planning and Conservation System (IPaC) website provides information regarding the occurrence of ESA species in an area based on a specific area of interest (AOI). Table 3-12 identifies the federally-listed species from an IPaC Official Species List which are known to occur in Washington County and could occur in the study area.

Table 3-12. Federally-listed Threatened and Endangered Species in Washington County

Species	Status	Habitat Requirements and Occurrence in the Study Area
California Condor *Gymnogyps californianus*	Experimental	Nest in caves and sheltered rock outcrops. Roosts in old growth trees or snags, and on isolated rock outcrops and cliffs. Foraging occurs in grasslands. No nesting or roosting areas occur in the study area. No documented occurrences. No observations or evidence of occurrence discovered in the study area. No Critical Habitat in study area.
Desert Tortoise *Gopherus agassizii*	Threatened	Inhabits warm upland plateaus and mountain slopes in western desert habitats. Suitable habitat is found within the study area and surveys of the study area identified five old tortoise burrows on the west side of Purgatory Flat. No evidence of recent activity or occupancy by desert tortoise in the study area was observed. No Critical Habitat in study area.
Dwarf Bear-poppy *Actomecon humilis*	Endangered	Occurs on rolling low hills and ridges in barren, open desert habitats with gypisferous clay soils. Endemic to Washington County, Utah. Suitable habitat and the required geological formations occur in study area. Field surveys conducted during the 2016 flowering period located approximately 80 individuals in the south east side of Purgatory Flat within the Shnabkaib Member of the Moenkopi Geologic Formation.
Gierisch Mallow *Sphaeralcea gierischii*	Endangered	Only found on gypsum outcrops associated with the Harrisburg Member of the Kaibab Formation in northern Mohave County, Arizona and closely adjacent Washington County, Utah. No suitable habitat and no documented occurrences in study area. No observations or evidence of occurrence discovered in study area. No Critical Habitat in study area.
Homgren Milkvetch *Astragalus holmgreniorum*	Endangered	Occurs on shallow, sparsely vegetated soils derived from the Virgin limestone member of the Moenkopi Formation. Suitable habitat and Critical Habitat in the study area. Field surveys conducted during the 2015 and 2016 flowering period did not locate any plants in the study area. Species known to have occurred in study area in the past, but has likely been extirpated from the area.

Species	Status	Habitat Requirements and Occurrence in the Study Area
Mexican Spotted Owl *Strix occidentalis lucida*	Threatened	Inhabits benches above canyons associated with undisturbed mixed conifer forests. No suitable habitat and no documented occurrences in study area. No observations or evidence of occurrence in study area. No Critical Habitat in study area.
Shivwits Milkvetch *Astragalus ampullarioides*	Endangered	Occurs in open desert habitats with purple-hued patches of soft clay of which 99% are associated with isolated outcrops of the Petrified Forest member of the Chinle geological formation; less than 1% of known occurrences are associated with the Dinosaur Canyon member of the Moenave Formation. No suitable habitat and no documented occurrences in study area. No observations or evidence of occurrence in study area. No Critical Habitat in study area.
Siler Pincushion Cactus *Pediocactus sileri*	Threatened	Occurs on rolling hills in warm desert shrub, sagebrush-grass, and pinyon-juniper communities with gypsiferous and calcareous sand or clay soils derived from various members of the Moenkopi Formation; also occurs on the Kaibab Formation. Suitable habitat is found within the study area. Field surveys of suitable habitat conducted during the 2016 flowering season did not locate any plants.
Southwestern Willow Flycatcher *Empidonax traillii extimus*	Endangered	Inhabits dense patches of willow or shrubs with similar structure (i.e. alder, tamarisk) along rivers, streams, and wetlands. Stantec conducted southwestern willow flycatcher surveys in the study area using USFWS standard protocol. No southwestern willow flycatchers were located within the study area. Critical Habitat present within the study area.
Virgin River Chub *Gila seminuda*	Endangered	Inhabits the Virgin River. Suitable habitat and Critical Habitat in study area. Known to occur in study area.
Woundfin *Plagopterus argentissimus*	Endangered	Inhabits the Virgin River. Suitable habitat and Critical Habitat in study area. Known to occur in study area.
Utah Prairie Dog *Cynomys parvidens*	Threatened	Inhabits rangelands, grasslands, meadows, and agricultural areas in southwest Utah. No suitable habitat and no documented occurrences in study area. No observations or evidence of occurrence discovered in study area. No Critical Habitat in study area.
Yellow-billed Cuckoo *Coccyzus americanus*	Threatened	Inhabits dense, deciduous riparian forests, at least 25 acres in size with a canopy cover of at least 50% in both the understory and over story; prefers tall cottonwoods and willows in western habitats. No observations or evidence of occurrence in study area. No Critical Habitat in study area.

Source: USFWS IPaC Official Species List

Habitat Requirements Source: USFWS Species Profiles

The California condor, Mexican spotted owl, Gierisch mallow, Shivwits milkvetch, yellow-billed cuckoo, and Utah prairie dog do not have suitable habitat in the study area, do not have Critical Habitat in the study area, and are not likely to occur in the study area. Therefore, additional analysis for these species is not included in this EA.

The following species have suitable habitat in the study area, have Critical Habitat in the study area, have been discovered during surveys of the study area, and/or are expected to be present in the study area: desert tortoise, dwarf bear-poppy, Holmgren milkvetch, Siler pincushion cactus, southwestern willow flycatcher, Virgin River chub, and woundfin. Additional information and analysis for each species is provided in the paragraphs below.

Desert Tortoise

Surveys conducted in 2016 by Red Cliffs Desert Reserve personnel located five old desert tortoise burrows on the west side of Purgatory Flat between the Southern Utah Shooting Sports Park fence and the eastern most extent of the landfill. None of the burrows were occupied and did not appear to have been occupied for over a year. No tortoises or tortoise sign was observed near the alignment of the Preferred Alternative. No desert tortoise Critical Habitat is located within the study area. For additional information regarding the life history, status, and distribution of the desert tortoise see the Biological Assessment (BA).

Dwarf Bear-poppy

Approximately 80 dwarf bear-poppy individuals were discovered in the study area during botanical surveys conducted in the 2016 flowering season for the species. All recorded individuals are located on private land and are outside of the proposed alignment of the Preferred Alternative. For additional information regarding the life history, status, and distribution of the dwarf bear-poppy see the BA.

Holmgren Milkvetch

Critical Habitat for the Holmgren milkvetch is located in the study area on the west side of Purgatory Flat outside of the proposed alignment for the Preferred Alternative. The Critical Habitat historically contained a single Holmgren milkvetch population of approximately 30 individuals. However, no individuals have been observed in Purgatory Flat for many years and it is likely that the species has been extirpated from the area. Botanical surveys of the study area conducted during the 2015 and 2016 flowering season for Holmgren milkvetch did not locate any plants. For additional information regarding the life history, status, and distribution of Holmgren milkvetch see the BA.

Siler Pincushion Cactus

Botanical surveys of the study area conducted during the 2016 flowering season did not located any Siler pincushion cactus. There are no documented occurrences of the species in the study area. For additional information regarding the life history, status, and distribution of the Siler pincushion cactus see the BA.

Southwestern Willow Flycatcher

Critical Habitat for the southwestern willow flycatcher is located in the study area and includes the Virgin River and its associated 100-year floodplain. Presence/absence surveys of the Critical Habitat were conducted during the 2016 breeding season and did not locate any individuals in the study area. For additional information regarding the life history, status, and distribution of the southwestern willow flycatcher see the BA.

Virgin River Chub

Critical Habitat for the Virgin River chub is located in the study area and includes the Virgin River and its associated 100-year floodplain. Historic occupancy data from the Utah Natural Heritage Program has record of Virgin River chub in the study area and verbal communication with UDWR confirmed the presence of the species in the study area under current conditions. For additional information regarding the life history, status, and distribution of the Virgin River chub see the BA.

Woundfin

Critical Habitat for the woundfin is located in the study area and includes the Virgin River and its associated 100-year floodplain. Historic occupancy data from the Utah Natural Heritage Program has record of woundfin in the study area and verbal communication with UDWR confirmed the presence of the species in the study area under current conditions. For additional information regarding the life history, status, and distribution of the woundfin see the BA.

3.15.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would not directly impact threatened and endangered species.

Indirect Impacts

The No-action Alternative would not indirectly impact threatened and endangered species.

Preferred Alternative

Direct Impacts

The Preferred Alternative would have **no effect** on: California condor, Mexican spotted owl, Gierisch mallow, Shivwits milkvetch, yellow-billed cuckoo, and Utah prairie dog. A no effect determination was made because there is no suitable habitat in the study area, there is no Critical Habitat in the study area, the species is not known to occur in the study area, and the species is not expected to be present in the study area.

It has been determined that the Preferred alternative is **likely to adversely affect**: Virgin River chub, Virgin River chub Critical Habitat, woundfin, woundfin Critical Habitat, and southwestern willow flycatcher Critical Habitat. It has also been determined that the Preferred Alternative **may affect, but is not likely to adversely affect**: dwarf bear-poppy, desert tortoise, Holmgren milkvetch, Siler pincushion cactus, and southwestern willow flycatcher. Furthermore, it has been determined that the Preferred Alternative would have **no effect** on: desert tortoise Critical Habitat and Holmgren milkvetch Critical Habitat (see Biological Opinion [BO]). Additional detail is provided in the paragraphs below.

Desert Tortoise

The Preferred Alternative **may affect, but is not likely to adversely affect** desert tortoise due to habitat loss. The Preferred Alternative would have 55.2 acres of permanent impacts and 17.8 acres of temporary impacts to suitable desert tortoise habitat. Impacts to suitable habitat would occur as a result of the conversion of habitat to roadway uses.

The Preferred Alternative would have **no effect** to desert tortoise Critical Habitat.

Dwarf Bear-Poppy

The Preferred Alternative **may affect, but it not likely to adversely affect** dwarf bear-poppy due to habitat loss, increase in habitat fragmentation, and pollinator mortality/disturbance. The Preferred Alternative would have 28.2 acres of permanent impacts and 9.2 acres of temporary impacts to suitable dwarf bear-poppy habitat. Impacts to suitable habitat would occur as a result of the conversion of habitat to roadway uses. The Preferred Alternative would avoid the population of dwarf bear-poppies located in Purgatory Flat.

No Critical Habitat has been designated or proposed for the dwarf bear-poppy. Therefore, the Preferred Alternative would have **no effect** to Critical Habitat.

Holmgren Milkvetch
The Preferred Alternative **may affect, but is not likely to adversely affect** Holmgren milkvetch due to habitat loss. The Preferred Alternative would have 12 acres of permanent impacts and 4 acres of temporary impacts to suitable Holmgren milkvetch habitat. Impacts to suitable habitat would occur as a result of the conversion of habitat to roadway uses.

The proposed alignment for the Preferred Alternative avoids Holmgren milkvetch Critical Habitat. Therefore, the Preferred Alternative would have **no effect** to Holmgren milkvetch Critical Habitat.

Siler Pincushion Cactus
The Preferred Alternative **may affect but is not likely to adversely affect** Siler pincushion cactus due to habitat loss. The Preferred Alternative would have 23.9 acres of permanent impacts and 7.2 acres of temporary impacts to suitable Siler pincushion cactus habitat. Impacts to suitable habitat would occur as a result of the conversion of habitat to roadway uses.

No Critical Habitat has been designated or proposed for the Siler pincushion cactus. Therefore, the Preferred Alternative would have **no effect** to Critical Habitat.

Southwestern Willow Flycatcher
The Preferred Alternative **may affect, but is not likely to adversely affect** southwestern willow flycatcher due to habitat loss. The Preferred Alternative would have an unknown quantity of permanent impacts and approximately 2.5 acres of temporary impacts to suitable habitat associated with the Virgin River. These impacts would result from the construction of a bridge over the Virgin River. Exact acreages of permanent impacts would be quantified during final design.

The Preferred Alternative is **likely to adversely affect** southwestern willow flycatcher Critical Habitat. The Preferred Alternative would have an unknown quantity of permanent impacts and approximately 2.5 acres of temporary impacts to Critical Habitat resulting from the construction of a bridge over the Virgin River. Exact acreages of permanent impacts would be quantified during final design.

Virgin River Chub
The Preferred Alternative is **likely to adversely affect** Virgin River chub due to habitat loss, harassment or harm from construction activities, and decreased water quality. The Preferred Alternative would have an unknown quantity of permanent impacts and approximately 2.5 acres of temporary impacts to suitable habitat associated with the Virgin River. These impacts would result from the construction of a bridge over the Virgin River. Exact acreages of permanent impacts would be quantified during final design. Construction activities may also cause fish mortality if individuals are struck by equipment or debris or if fish get trapped in areas which will be dewatered. The Preferred Alternative also has the potential to temporarily decrease water quality through turbidity and sedimentation from construction activities.

The Preferred Alternative is **likely to adversely affect** Virgin River chub Critical Habitat. The Preferred Alternative would have an unknown quantity of permanent impacts and approximately 2.5 acres of temporary impacts to Critical Habitat resulting from the construction of a bridge over the Virgin River. Exact acreages of permanent impacts would be quantified during final design.

Woundfin
The Preferred Alternative is **likely to adversely affect** woundfin due to habitat loss, harassment or harm from construction activities, and decreased water quality. The Preferred Alternative would have an unknown quantity of permanent impacts and approximately 2.5 acres of temporary impacts to suitable habitat associated with the Virgin River. These impacts would result from the construction of a bridge over the Virgin River. Exact acreages

of permanent impacts would be quantified during final design. Construction activities may also cause fish mortality if individuals are struck by equipment or debris or if fish get trapped in areas which will be dewatered. The Preferred Alternative also has the potential to temporarily decrease water quality through turbidity and sedimentation from construction activities.

The Preferred Alternative is **likely to adversely affect** woundfin Critical Habitat. The Preferred Alternative would have an unknown quantity of permanent impacts and approximately 2.5 acres of temporary impacts to Critical Habitat resulting from the construction of a bridge over the Virgin River. Exact acreages of permanent impacts would be quantified during final design.

USFWS Biological Opinion
A BA has been prepared and submitted to USFWS to initiate formal consultation. For more information on ESA species, associated Critical Habitats, or effects determinations refer to the BA.

Indirect Impacts
The Preferred Alternative may contribute to induced economic growth and development in the study area which may indirectly affect listed species. It is anticipated that this development would occur eventually, with or without construction of the Preferred Alternative, but the Preferred Alternative may slightly accelerate this growth. For more information see the full induced growth study in the BA.

Mitigation and Project Commitments
General Project Commitments
Employee Training

- All construction employees shall be trained to visually recognize threatened and endangered species they have the potential to encounter during construction.

Trash

- "Good housekeeping" procedures shall be developed to ensure that the project site, including the Virgin River, will be kept clean of debris, garbage and fugitive trash or waste. Garbage containers must preclude the entrance of both birds and mammals which might be attracted to the garbage. Trash, especially food-related trash, must be regularly removed from the project site. The project will also prohibit scrap heaps and dumps and will minimize storage areas.

Roads

- Excessive grades on roads, road embankments, and ditches and drainages shall be avoided especially in areas with soils prone to erosion. All construction techniques will implement BMPs.

Hazardous Materials

- To minimize the potential for accidental spills of hazardous materials, BMPs and measures specified in the storm water pollution prevention plan (SWPPP) will be implemented. A spill prevention, control, and countermeasures (SPCC) plan will be developed and followed during construction.
- All chemicals and other hazardous materials (concrete, grout, fuel, etc.) will be stored at least 150-feet from any water.
- Refueling will occur at least 150-feet from any water.
- All restroom facilities will be placed at least 150-feet from any water.
- Spill kits will be stored onsite.
- A list of contacts and telephone numbers will be kept onsite and available to key personnel to reduce response times (e.g., fire department, hazardous materials, spill response, UDOT).
- Construction equipment will be regularly inspected for leaks and repaired and cleaned as needed.
- Secondary containment shall be provided for all onsite hazardous materials and waste storage, including fuel.

- If a fuel/oil or other hazardous material spill occurs, UDOT will be contacted immediately and actions will be taken to minimize the amount and spread of the spill material. Such measures may include using straw bale plugs, earthen berms, or other absorbent materials. If necessary, soil remediation will be conducted and will include the removal of contaminated soils to an approved bioremediation facility and a soil sample(s) will be taken to verify the success of the site remediation.
- The construction contractor will be required to follow any other local, state, or federal regulations related to the use, handling, storing, transporting, and disposing of hazardous materials.

Noxious Weeds

- All construction-related equipment will be cleaned of soils, seeds, vegetative matter, or other debris or matter that may contain or hold noxious seeds. The cleaning of equipment will also be done any time thereafter if the equipment leaves the construction site, is used on another project, and then re-enters the site.
- Contractor will be responsible to control noxious weeds throughout the entire construction site through the duration of construction activities.

Soils and Erosion

- Fill stored onsite will be kept at least 150-feet away from water.
- Silt fences will be installed to keep sediment out of the Virgin River.
- Native species will be used to revegetate temporarily disturbed areas. Excavated soils will be sorted into mineral soils and top soils so top soils may be replaced on the project site post-construction to provide a seed bank for native plants.
- Construction activities and ground disturbance will be limited to only those areas within the proposed right-of-way where it is absolutely necessary. Excessive clearing and grubbing will not be permitted.
- Installation of temporary and permanent fences (i.e., silt fence and right-of-way fence) will not disturb areas more than 15-feet beyond the proposed right-of-way.

Species Specific Mitigation and Project Commitments

Desert Tortoise

Construction

- It is unlikely that desert tortoise are found in the study area. However, if desert tortoise are spotted during construction, construction activities in the area will stop, the siting will be reported immediately, and UDOT will coordinate with USFWS.

Mitigation

- No mitigation proposed.

Dwarf Bear-poppy

Construction

- A pre-construction botanical survey will be conducted in order to identify dwarf bear-poppy occupied habitat within the proposed ROW.
- Ground disturbance and removal of natural vegetation within the ROW will be limited in order to maintain native plant species composition and minimize impacts to pollinators.
- Temporarily disturbed areas will be revegetated with native shrubs and grasses.
- If necessary, environmental fencing will be installed around dwarf bear-poppy occupied habitat in order to create exclusionary zones where construction activities will be prohibited. The exclusionary zones will also include any new areas of dwarf bear-poppy occupied habitat that are discovered during pre-construction botanical surveys.

Project Features and Maintenance

- The alignment of Purgatory Road has been intentionally designed to avoid impacts to dwarf bear-poppy occupied habitat.

- Broadcast applications of herbicides will be prohibited in dwarf bear-poppy suitable habitat (Shnabkaib, Middle Red, and Upper Red members of the Moenkopi Formation) that occurs in the proposed ROW. Spot treatments of herbicides will be used to undesirable plants in these areas.

Mitigation
- No mitigation is proposed.

Holmgren Milkvetch

Construction
- A pre-construction botanical survey will be conducted in order to identify Holmgren milkvetch occupied habitat within the proposed ROW.
- Ground disturbance and removal of natural vegetation within the ROW will be limited in order to maintain native plant species composition and minimize impacts to pollinators.
- Temporarily disturbed areas will be revegetated with native shrubs and grasses.

Project Features and Maintenance
- The alignment of Purgatory Road has been intentionally designed to avoid impacts to Holmgren milkvetch designated Critical Habitat.
- Broadcast applications of herbicides will be prohibited in Holmgren milkvetch suitable habitat (Middle Red, Upper Red, and Virgin Limestone members of the Moenkopi Formation) that occurs in the proposed ROW. Spot treatments of herbicides will be used to undesirable plants in these areas.

Mitigation
- No mitigation is proposed.

Siler Pincushion Cactus

Construction
- A pre-construction botanical survey will be conducted in order to identify Siler pincushion cactus occupied habitat within the proposed ROW.
- Ground disturbance and removal of natural vegetation within the ROW will be limited in order to maintain native plant species composition and minimize impacts to pollinators.
- Temporarily disturbed areas will be revegetated with native shrubs and grasses.

Project Features and Maintenance
- Broadcast applications of herbicides will be prohibited in Siler pincushion cactus suitable habitat (Shnabkaib and Middle Red members of the Moenkopi Formation) that occurs in the proposed ROW. Spot treatments of herbicides will be used to undesirable plants in these areas.

Mitigation
- No mitigation is proposed.

Southwestern Willow Flycatcher

Construction
- To minimize the potential for impacts to spawning fish (April 1 – July 31) and the breeding season for southwestern willow flycatcher (breeding period is April 15 – August 15), project actions within the active channel of the Virgin River will not occur between April 1 and August 15. During this timeframe, project actions are permitted to occur above the active channel of the Virgin River within the 100-year floodplain, including for bridge construction activities such as the above ground structural work.
- Riparian vegetation will be disturbed as little as possible during construction.

Project Features and Maintenance

- The project will revegetate disturbed riparian areas in cooperation with the Virgin River Program at the conclusion of construction activities.

Mitigation

- Mitigation for effects to southwestern willow flycatcher Critical Habitat will be achieved through completion of a restoration project implemented at a 3:1 ratio for permanent impacts and a 2:1 ratio for temporary impacts in the Virgin River's 100-year floodplain. All mitigation will be developed, implemented, and monitored in coordination with the Virgin River Program, UDWR, and the USFWS and will follow USFWS Best Management Practices (BMPs). Currently, the acreage of permanent and temporary impacts to southwestern willow flycatcher Critical Habitat is unknown. Permanent and temporary impacts will be quantified during final design and will then be used to determine the amount of mitigation. Habitat restoration for both temporary and permanent impacts will be implemented prior to or concurrent with the start of project impacts in southwestern willow flycatcher Critical Habitat. A USFWS approved mitigation plan will need to be in place prior to the start of the aforementioned impacts.

Virgin River Chub and Woundfin

Construction

- To minimize the potential for impacts to spawning fish (April 1 – July 31) and the breeding season for southwestern willow flycatcher (breeding period is April 15 – August 15), project actions within the active channel of the Virgin River will not occur between April 1 and August 15. During this timeframe, project actions are permitted to occur above the active channel of the Virgin River within the 100-year floodplain, including for bridge construction activities such as the above ground structural work.
- Prior to in-stream construction, a USFWS approved biologist will clear the stream reach within the direct area of construction of any Virgin River chub and woundfin individuals using USFWS approved methodology. Biologists will prepare a report for USFWS that summarizes the number of fish handled of each species.
- Construction activities in designated Critical Habitat will not occur during active flooding events.
- All in-channel work associated with the construction of the bridge will take place "in the dry" and using a vibratory driver or drilled shafts to avoid adverse acoustic effects.
- Cast-in-place concrete for new bridge infrastructure not contained within a dewatered cofferdam will be secured using a watertight "diaphragm" or plate below the structure. Concrete will be poured atop it, with tarping or other appropriate measures to prevent the spill of wet concrete into waters below. Once poured, the concrete will be covered with protective Visqueen for several days to allow sufficient curing and protection from the elements. Concrete for overwater infrastructure use will be provided by one of two methods: (1) through a pipe attached to a pumper truck positioned near the shoreline or (2) from buckets lifted by crane from the bank. Either method requires the use of spill prevention and control measures, including tarps under buckets, positioning the pumper truck a sufficient distance from the shoreline, and ensuring a tight connection of the delivery pipe to the pumper truck.
- The project will immediately notify USFWS of any unforeseen impacts detected during project construction. Any implemented action that may be contributing to the introduction of toxic materials or other causes of fish mortality will be immediately stopped until the situation has been remedied. If investigative monitoring efforts demonstrate the source of fish mortality is not related to the authorized activity, the action may proceed only after notification of USFWS authorities.
- A ditch lining will be used on all channels dug for discharging water from the excavated area if flow velocities might possibly cause erosion within the channel.
- Dewatering in periods of intense heavy rain, when the infiltrative capacity of the soil is exceeded, will be avoided.
- Flow to a sediment settling basin may not exceed the basin's capacity to settle and filter flow or the structure's volume capacity.
- Sediment basin's will discharge wherever possible to a well-vegetated buffer through sheet flow and maximize the distance to the nearest water resources as well as minimize the slope of the buffer area.

- For trench excavation, trench length will be limited to 500 feet and the excavated material will be placed on the up-gradient side of the trench.
- Diversion ditches or berms will be installed to minimize the amount of clean stormwater runoff allowed into the excavation area.
- Stormwater from the bridge structure will be captured and treated as part of the stormwater system for the rest of the project.
- The project will revegetate disturbed riparian areas in accordance with the Virgin River Program at the conclusion of construction activities.

Project Features and Maintenance

- Design of riprap and abutments will avoid creating non-native fish species refuges (i.e. interstitial spaces). Voids in newly constructed riprap will be filled. The riprap will be backfilled and buried up to the corresponding water level for a 5-year flood event. In addition, riprap sections will be built or reconstructed such that cutoff walls are installed to limit fresh-water flow. These measures (filling voids, burying riprap walls, and limiting fresh-water flow) will be specified in any construction plans.
- A UPDES permit will be required for all stormwater runoff generated by the project. The project will abide by all applicable permit requirements and state laws for stormwater discharge. Water quality requirements could include the use of detention ponds or basins. Detention basins will be designed according the Utah Division of Water Quality by incorporating oil-skimming devices and grease traps and by providing 30 minutes of detention time to adequately capture sediment and pollutants before discharging stormwater. Detention basins or ponds will be designed to store runoff and discharge it within about 6 hours to minimize solar heating of the ponded water.

Mitigation

- Mitigation for effects to Virgin River chub and woundfin Critical Habitat will be achieved through completion of a restoration project implemented at a 3:1 ratio for permanent impacts and a 2:1 ratio for temporary impacts in the Virgin River's 100-year floodplain. All mitigation will be developed, implemented, and monitored in coordination with the Virgin River Program, UDWR, and the USFWS and will follow USFWS Best Management Practices (BMPs). Currently, the acreage of permanent and temporary impacts to Virgin River chub and woundfin Critical Habitat is unknown. Permanent and temporary impacts will be quantified during final design and will then be used to determine the amount of mitigation. Habitat restoration for both temporary and permanent impacts will be implemented prior to or concurrent with the start of project impacts in Virgin River chub and woundfin Critical Habitat. A USFWS approved mitigation plan will need to be in place prior to the start of the aforementioned impacts.

It should be noted that impacts to habitat and species within the Virgin River floodplain (southwestern willow flycatcher, Virgin River chub, and woundfin) will be mitigated for collectively, not individually.

3.16 ARCHAEOLOGICAL AND ARCHITECTURAL RESOURCES

Historic properties include archaeological resources (both prehistoric and historic), historic architectural resources (buildings and structures), and traditional cultural properties. As per 36 CFR 800.16(l)2, the Advisory Council on Historic Preservation (ACHP) defines a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (i.e., generally historic properties that meet the National Register criteria, which are described below). A property is considered historic if it is 50 years and older; however, UDOT evaluates properties that are 45 years or older to allow for the time needed to complete construction of complex roadway projects.

The National Historic Preservation Act (NHPA) of 1966, as amended, and it's implementing regulations (36 CFR §800) establish the national policy and procedures regarding historic properties. Section 106 of the NHPA requires consideration of the effects of federal projects and policies on historic properties. Also, the Utah Historic Preservation Act (UCA §9-8-401 et seq.) was passed to provide protection of "all antiquities, historic and prehistoric ruins, and historic sites, buildings, and objects which, when neglected, desecrated, destroyed or diminished in aesthetic value, result in an irreplaceable loss to the people of this state."

For federal-aid projects, UDOT is authorized to conduct the cultural resource investigations in compliance with Section 106 on behalf of FHWA. FHWA, the State Historic Preservation Officer (SHPO), ACHP, USACE, and UDOT executed a Programmatic Agreement (PA) that streamlined the Section 106 process in April 2007 (amended June 2013). In the Section 106 PA, FHWA authorizes UDOT to initiate and, in most cases, conclude consultation with the SHPO and other consulting parties. FHWA retains the responsibility to consult with Native American tribes and is still responsible for Section 106 compliance.

The Section 106 review process requires historic properties to be evaluated for eligibility and listing on the National Register of Historic Places (NRHP), based upon whether "the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association" and meet one or more of the NRHP criteria. See Table 3-13 - NRHP Criteria for Evaluation.

Table 3-13. NRHP Criteria for Evaluation

NRHP Criterion	Characteristics
A	Associated with events that have made a significant contribution to the broad patterns of our history.
B	Associated with the lives of persons significant in our past.
C	Embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic value, or that represent a significant and distinguishable entity whose components may lack individual distinction.
D	Yielded, or may likely to yield, information important in prehistory or history.

3.16.1 AFFECTED ENVIRONMENT

Area of Potential Effects (APE)

The Area of Potential Effects (APE) was determined in consultation with the SHPO, the BLM, and the USACE through letters sent in March 2016. Concurrence was received from all three agencies (see Chapter 4). The APE is the same as the study area evaluated by the EA and encompasses the entire Purgatory Flat. The area surveyed for cultural resources was smaller and encompassed a 150-foot wide corridor following the Preferred Alternative alignment.

Archaeological Resources

A Class III Inventory of the archaeological survey area was completed in 2016 by Horrocks Engineers. Three archaeological sites were identified within the survey area. Of those sites, only site 42WS5164 has been determined to be eligible for inclusion on the NRHP (see Table 3-14).

Table 3-14. Archaeological Sites in the Study Area

Site Number	Site Description	NRHP Eligibility
42WS2228	Prehistoric Artifact Scatter	Not Eligible
42WS4336	Washington & St. George Canal	Not Eligible
42WS5164	Prehistoric Habitation	Eligible

Architectural Resources

No historic architectural resources are present within the survey area.

3.16.2 ENVIRONMENTAL CONSEQUENCES

Effects are defined as "alteration[s] to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register" (36 CFR §800.16(i)). Impacts to historic properties are categorized as No Historic Properties Affected, No Adverse Effect, and Adverse Effect.

A finding of No Historic Properties Affected is made when "[e]ither there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them as defined in §800.16(i)" (See 36 CFR §800.1(d)(1)).

A finding of No Adverse Effect is made "[w]hen the undertaking's effects do not meet the criteria of paragraph (a)(1) of this section [see Adverse Effect definition] or the undertaking is modified or conditions are imposed... to ensure consistency with the Secretary's standards for the treatment of historic properties (36 CFR §68) to avoid adverse effects" (See 36 CFR §800.5(b)).

A finding of Adverse Effect is made "[w]hen an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, and association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative" (See 36 CFR §800.5(a)(1)).

Finding of Effect

UDOT has determined that construction of the Preferred Alternative will result in No Historic Properties Affected. The Finding of Effect was made pursuant to the Second Amended Programmatic Agreement among FHWA, the Utah SHPO, the ACHP, the USACE Sacramento District and the UDOT Regarding Section 106 Implementation for Federal Aid Transportation Projects in the State of Utah. Pursuant to the agreement, undertakings that result in no historic properties affected are classified as Tier 1 undertakings. A copy of the Tier 1 form is found in Chapter 4 – Comments and Coordination.

No-action Alternative

Direct Impacts

The No-action Alternative would have no direct impacts on archaeological sites.

Indirect Impacts

There would be no indirect impacts from the No-action Alternative.

Preferred Alternative

Direct Impacts

The Preferred Alternative would have no effect to eligible archaeological sites.

Indirect Impacts

The Preferred Alternative would have no indirect impacts on eligible archaeological sites.

Mitigation

As there are no effects to eligible cultural resources, no mitigation is required.

3.17 SECTION 4(F) PROPERTIES

Section 4(f) of the Department of Transportation Act protects certain types of properties from the effects of transportation projects. These protected properties are historic properties, public parks and recreational facilities, and wildlife and waterfowl refuges. Use of these properties in a transportation facility is not permitted unless the effect has been determined to be *de minimis* or there is no feasible and prudent avoidance alternative to the use and the action includes all possible planning to minimize harm. Guidelines for evaluation of Section 4(f) properties and potential uses is found in the FHWA implementing regulations (23 CFR 774) and the FHWA Technical Advisory T6640.8A.

3.17.1 AFFECTED ENVIRONMENT

Recreational Resources

To qualify for protection under Section 4(f), a park or recreation area must be publicly owned and open to the public, its major purpose must be for recreational activity, and it must be significant as a park or recreation area. Recreation resources that qualify for Section 4(f) protection are listed in Table 3-15 and are shown on the Preferred Alternative Maps in Appendix A.

Table 3-15. Section 4(f) Recreational Resources

Resource	Location	Size	Ownership	Function	Existing/ Planned Facilities
Southern Utah Shooting Sports Park	1134 South Regional Park Road (5500 West)	Approximately 500 acres	Bureau of Land Management	Shooting Sports	Pistol, Rifle, Shotgun, and Archery Ranges

The Washington County Regional Park was also examined to determine whether it qualified as a Section 4(f) property. FHWA guidance states "Publicly owned fairgrounds that function primarily for commercial purposes by hosting state or county fairs, horse races, or other commercial ventures are not considered Section 4(f) properties." As the Regional Park is primarily used to host the Washington County Fair, horse races, and horse training, the property does not qualify for protection under Section 4(f).

3.17.2 ENVIRONMENTAL CONSEQUENCES

A Section 4(f) use is defined in 23 CFR 774.17 as an impact that occurs:

- When land is permanently incorporated into a transportation facility;
- When there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in § 774.13(d); or
- When there is a constructive use of a Section 4(f) property as determined by the criteria in § 774.15.

According to 23 CFR 774.5(a), a constructive use occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished.

In August of 2005, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was enacted as Public Law 109-59. Section 6009(a) of SAFETEA-LU amended the existing Section 4(f) legislation to simplify the processing and approval of projects that have only minor (*de minimis*) impacts on resources protected by Section 4(f). According to Section 6009 of SAFETEA-LU, the requirements of Section 4(f) will be considered satisfied with respect to a Section 4(f) resource if it is determined that a transportation project will have only a *de minimis* impact on the Section 4(f) resource.

According to 23 CFR 774.17:

- For historic sites, *de minimis* impact means that FHWA has determined, in accordance with 36 CFR part 800 that no historic property is affected by the project or that the project will have "no adverse effect" on the historic property in question.
- For parks, recreation area, and wildlife and waterfowl refuges, a *de minimis* impact is one that will not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f).

According to 23 CFR 774.5, prior to making *de minimis* impact determinations under § 774.3(b), the following coordination shall be undertaken:

For historic properties:

- The consulting parties identified in accordance with 36 CFR part 800 must be consulted; and
- FHWA must receive written concurrence from the pertinent State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO), and from the Advisory Council on Historic Preservation (ACHP) if participating in the consultation process, in a finding of "no adverse effect" or "no historic properties affected" in accordance with 36 CFR part 800. The Administration shall inform these officials of its intent to make a *de minimis* impact determination based on their concurrence in the finding of "no adverse effect" or "no historic properties affected (see June 12, 2007 letter in Chapter 4)."
- Public notice and comment beyond that required by 36 CFR part 800 is not required.

For parks, recreation areas, and wildlife and waterfowl refuges:

- Public notice and an opportunity for public review and comment concerning the effects on the protected activities, features, or attributes of the property must be provided. This requirement can be satisfied

in conjunction with other public involvement procedures, such as a comment period provided on a NEPA document.

- The Administration shall inform the official(s) with jurisdiction of its intent to make a *de minimis* impact finding. Following an opportunity for public review and comment as described in paragraph (b)(2)(i) of this section, the official(s) with jurisdiction over the Section 4(f) resource must concur in writing that the project will not adversely affect the activities, features, or attributes that make the property eligible for Section 4(f) protection. This concurrence may be combined with other comments on the project provided by the official(s).

No-action Alternative

Direct Impacts

The No-action Alternative will have no effect on Section 4(f) properties.

Indirect Impacts

The No-action Alternative will have no indirect effects on Section 4(f) properties.

Preferred Alternative

Direct Impacts

The Preferred Alternative may acquire up to 0.5 acres from the southeast corner of the Southern Utah Shooting Sports Park. This area contains no facilities and is not integral to the operation of the shooting park. Therefore, this impact constitutes a *de minimis* impact under Section 4(f). Washington County, which has jurisdiction over the Southern Utah Shooting Sports Park, and FHWA are planning on concurring with UDOT's assessment that implementation of the Preferred Alternative would not have an adverse effect on the activities, features, or attributes of the Shooting Sports Park, after an opportunity for public review and comment is provided.

An opportunity for public review and comment on the proposed impacts and measures to minimize harm to the Southern Utah Shooting Sports Park will be provided at the Public Hearing for the project.

Indirect Impacts

There would be no indirect impact to Section 4(f) properties.

Mitigation

No mitigation required.

3.18 PALEONTOLOGY

Paleontology is the scientific study of life in the geologic past, especially through the study of animal and plant fossils. Before expending state funds or approving an undertaking, a state agency is required to take into account the effect of the undertaking on a specimen that is included in or eligible for inclusion in the State Paleontological Register (U.C.A. 63-73-19). The Memorandum of Understanding (MOU) between the Utah Geological Survey (UGS) and UDOT outlines the process for implementing U.C.A. §63-73-19.

3.18.1 AFFECTED ENVIRONMENT

The UGS conducted a paleontological file search of the study area and has indicated that there are no known paleontological localities and that deposits in the area "have a low to moderate potential for yielding significant fossil localities" In particular, the UGS identified the Triassic Moenkopi Formation as having unknown potential to yield deposits and has recommended that the project be evaluated by a permitted paleontologist in order to determine and mitigate any potential impacts to paleontological resources (see June 23, 2016 letter in Chapter 4 – Comments and Coordination).

3.18.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would have no direct impacts to paleontological resources.

Indirect Impacts

The No-action Alternative would have no indirect impacts to paleontological resources.

Preferred Alternative

Direct Impacts

The Preferred Alternative has the potential to affect portions of the Triassic Moenkopi Formation. A permitted paleontologist is currently evaluating the project to determine any potential impacts.

Indirect Impacts

Construction of the Preferred Alternative would allow additional development in the study area. This development could affect the Moenkopi Formation.

Mitigation

A permitted paleontologist is currently evaluating the project to determine potential impacts and mitigation measures.

3.19 HAZARDOUS WASTE

Hazardous materials or waste are substances that are dangerous or potentially harmful to health or the environment. Hazardous materials may be liquids, solids, gases, or sludges and can include discarded commercial products, such as cleaning fluids, pesticides, or the byproducts of manufacturing processes.

The Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as Superfund) and United States Code (USC) Title 19—Environmental Quality regulate hazardous material and waste sites. These regulations include cleanup requirements and make liable those involved in hazardous materials releases. These regulations also authorize the Environmental Protection Agency (EPA) to act to ensure public health and safety. Presently the UDEQ regulates underground storage tanks (USTs) and leaking underground storage tanks (LUSTs).

3.19.1 AFFECTED ENVIRONMENT

A review of UDEQ and EPA databases was undertaken to identify known hazardous material and waste sites within the study area. This review yielded five sites, including two solid waste regulated facilities (Washington County Landfill and Washington County Compost), two Toxic Release Inventory (TRI) facilities (Hanson Pipe and Precast and Sorenson Ready-Mix Concrete), and one environmental incident record (a diesel fuel spill on SR-9).

3.19.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

The No-action Alternative would have no effect on hazardous waste sites.

Indirect Impacts

The No-action Alternative would have no indirect impacts on hazardous waste sites.

Preferred Alternative

Direct Impacts

The Preferred Alternative would pass through the western section of an active gravel pit. Although this facility does not have any hazardous waste records associated with it, construction in the area may encounter general construction materials and waste. No other hazardous materials sites will be affected by the Preferred Alternative.

Indirect Impacts

No indirect impacts to hazardous waste will occur as a result of the Preferred Alternative.

Mitigation

No mitigation is required.

3.20 VISUAL CONDITIONS

The visual resources of a community or area include the physical features that make up the landscape and include both natural (landforms, waterways, etc.) and other elements (buildings, roads, structures, etc.). The following visual analysis discusses the visual qualities and resources within and nearby the study area and how the No-Action and Preferred Alternative impact those visual resources.

3.20.1 AFFECTED ENVIRONMENT

Existing Visual Environment

Existing development in Purgatory Flat includes the Washington County Regional Park, Southern Utah Shooting Sports Park, Purgatory Correctional Facility, Fairground Industrial Development, Quail Creek Industrial Development, UDOT Maintenance Facilities, and the Utah Division of Motor Vehicles (DMV). Much of the rest of the land within the study area is undeveloped. Western Rock Products gravel pit is located in the southern portion of the study area, as well as agricultural land that is bordered by the Virgin River to the north and Washington Dam Road to the south. The visual quality of the area is analogous to southern Utah's arid desert landscape that is void of trees and sparsely covered with shrubs and herbaceous vegetation. Some trees and thicker vegetation are present along the Virgin River. See Figure 3-5 for the locations at which the photographs of the study area were taken.

Industrial Park and Developed Area

A mix of industrial and commercial structures and buildings are present in this area located in the northern section of the study area. Minimal vegetation is present and is located near a few of the existing facilities. The center of this developed area is a large gravel parking lot adjacent to the Washington County Regional Park Racetrack.

Southern Utah Shooting Sports Park

Several different ranges are spread across the Shooting Sports Park for pistols, rifles, and clay targets. The areas are not greatly developed and still have large open areas of sand and rock.

Image 1. View of valley near 5520 West

Image 2. Looking North from Southern Parkway to Washington Dam Road

Image 3. Looking Southeast from Skeet Range

Image 4. Looking North from Landfill Road

Image 5. View of Virgin River from S. Country Way.

Image 6. Looking East from Clay Target Range

Image 7. View of Correctional Facilities and Industrial Park

Image 8. Looking South from Industrial Park (5520 West), near the northern terminal for the Preferred Alternative

Undeveloped area

The undeveloped area along the valley offers long views to the north and south, views to the east and west are backed by hills and rocky outcrops.

Virgin River Area

The study area gradually slopes to the southwest until it reaches the flat floodplain of the Virgin River. This region has several irrigated agricultural fields, a few homes and structures, and allows for unobstructed views of the surrounding hills and geographical features.

Viewers

For this project, the viewers of the road include the few residence near the Virgin River, those using the Shooting Sports Park, or visitors of the developed area in the northwest. Since the proposed roadway is a new road on a new alignment, there are no other viewers.

3.20.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

Direct Impacts

Under the No-action Alternative, visual resources in the study are would remain unchanged.

Indirect Impacts

The No-action Alternative would have no indirect impacts to visual resources.

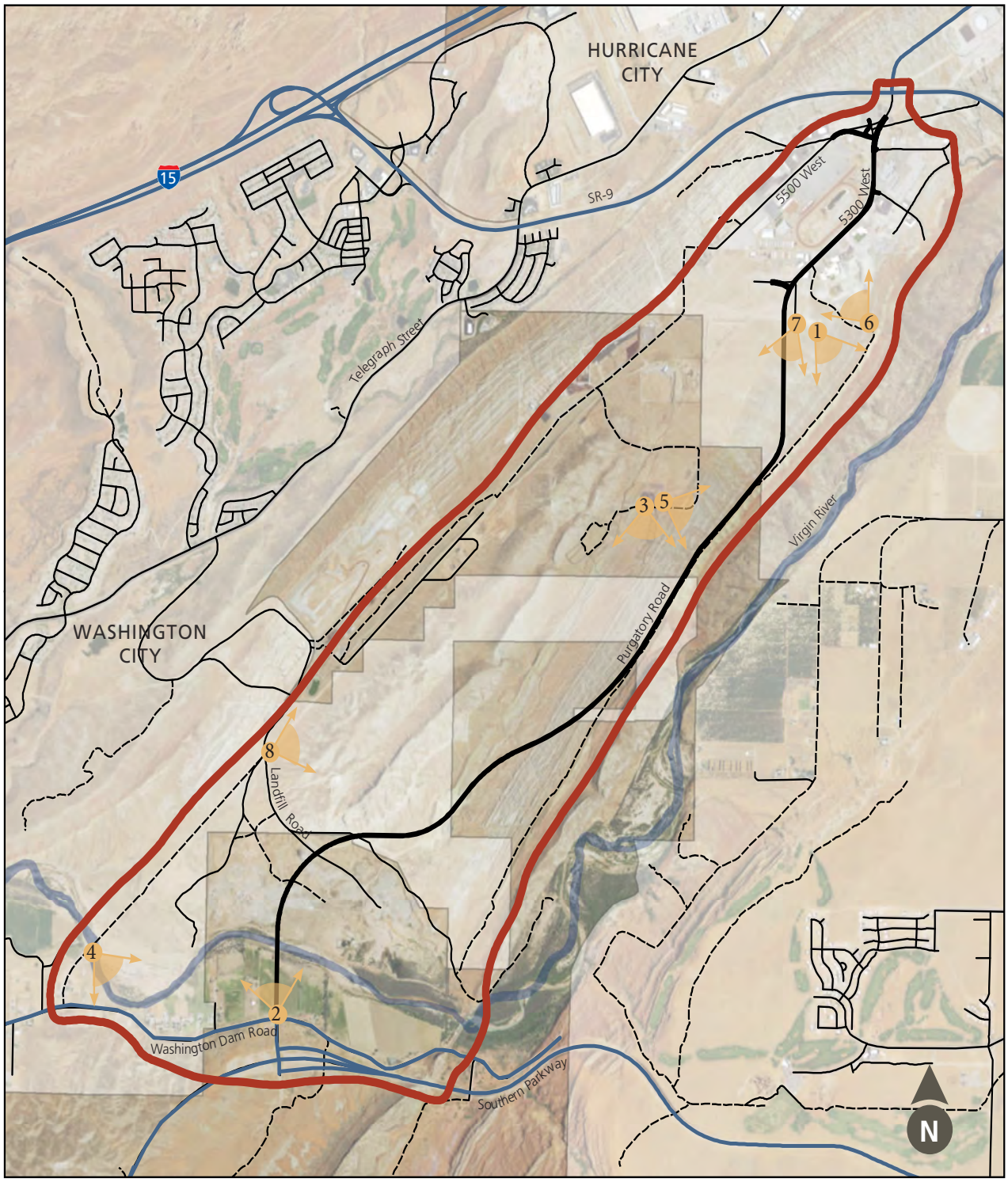


Figure 3-5. Locations of Photographic Images Taken in the Study Area

Preferred Alternative

Direct Impacts

Viewers of the roadway

Current Residences – The limited number of residences within the study area are located along Washington Dam Road south of the Virgin River. The greatest visual change in the study area would be to those residents near the Virgin River and the proposed new bridge crossing. As a result of project implementations, the viewshed would change from agricultural fields and Western Rock Products gravel quarry to a new roadway and elevated bridge structure connecting to Southern Parkway.

Southern Utah Shooting Sports Park Users – At the center of the study area, the new roadway would come close to the clay target range of the Sports Park. Users of this facility would see minor changes due to increased traffic, and would see the cut-and-fill slopes in the distance.

Industrial Park and Correctional Facilities Users – At the north end of the study area, the new road would connect to 5300 West, southwest of the correctional facilities, and would most likely have little noticeable visual change to users other than slightly increased traffic on the roadway.

Indirect Impacts

Changes to the visual conditions in the study area as a result of the Preferred Alternative also include those changes associated with the implementation of current and future zoning and land use plans. As the roadway continues to be constructed and development continues to occur, the open views of the study area will be replaced with a more residential and commercial visual landscape.

Mitigation

No mitigation required.

3.21 INVASIVE SPECIES

Executive Order 13112 directs federal agencies to expand and coordinate their efforts to combat the introduction and spread of plants and animals not native to the United States. Non-native flora and fauna can cause substantial changes to ecosystems, upset the ecological balance, and cause economic harm to the Nation's agricultural and recreational sectors. Since roadway corridors provide opportunities for the movement of invasive species through the landscape, it is important that roadway projects include measures to combat the introduction and spread of invasive species. The State of Utah Department of Agriculture and Food maintains a Utah Noxious Weeds List with which designates three classes of noxious weeds: Class A, Class B, and Class C.

- **Class A** – Early Detection Rapid Response: Declared noxious weeds not native to the sate of Utah that pose a serious threat to the state and should be considered as a very high priority.

Black henbane	*Hyseyamus niger*
Diffuse knapweed	*Centaurea diffusa*
Leafy spurge	*Euphorbia esula*
Medusahead	*Taeniatherum caput-medusae*
Ox-Eye daisy	*Chrysanthemum leucanthemum*
Perennial Sorgum	including but not limited to Johnson Grass (*Sorghum zhalepense*) and Sorghum Almum (*Sorghum almum, parodi*)
Purple loosestrife	*Lythrum salicaria*
Spotted knapweed	*Centaurea maculosa*
Squarrose knapweed	*Centaurea Squarrosa*
St. Johnswort	*Hypericum perforatum*
Sulfur cinquefoil	*Potentilla recta*
Yellow starthistle	*Centaurea solstitialis*
Yellow toadflax	*Linaria vulgaris*

- **Class B –** Control: Declared noxious weeds not native to the state of Utah that pose a threat to the state and should be considered a high priority for control.

Bermudagrass	*Cynodon dactylon* (except in Washington County)
Broad-leaved peppergrass	*Lepidium latifolium*
Dalmatian toadflax	*Linaria dalmatica*
Dyers woad	*Isatis tinctoria*
Hoary cress	*Cardaria spp.*
Musk thistle	*Carduus nutans*
Poison hemlock	*Conium maculatum*
Russian knapweed	*Centaurea repens*
Scotch thistle	*Onopordium acanthium*
Squarrose knapweed	*Centaurea virgata ssp*

- **Class C –** Containment: Declared noxious weeds not native to the state of Utah that are widely spread but pose a threat to the agricultural industry and products with a focus on stopping expansion.

Field bindweed	Convolvulus spp.
Canada thistle	*Cirsium arvense*
Houndstongue	*Cynoglossum officianale*
Saltcedar	*Tamarix ramosissima*
Quackgrass	*Agropyron repens*

- **Washington County** – The following plants have been declared noxious weeds by Washington County.

Whorled milkweed	*Asclepias subverticillata*
Silverleaf nightshade	*Solanum elaeagnifolium Cav.*
Halogeton	*Halogeton glomeratus*

3.21.1 AFFECTED ENVIRONMENT

Portions of the study area have been developed, while other areas have been disturbed or remain undeveloped. Vacant land could contain invasive species, and earth-disturbing activities in the area could potentially introduce or spread invasive species.

3.21.2 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

The No-action Alternative would not involve construction activities and therefore, would not provide opportunities for the movement of invasive species.

Preferred Alternative

The Preferred Alternative would include construction which would provide opportunities for the movement of invasive species.

To minimize the movement of invasive species, the contractor will be required to comply with UDOT's Special Provision 02924S – Invasive Weed Control. UDOT will specify on all construction contract documents that seed mixes used for landscaping and/or erosion control must be free of noxious weeds and other invasive plant species. In areas of particular sensitivity, extra precautions will be taken if invasive species are found in or adjacent to the construction areas, including inspection and cleaning of construction equipment and eradication strategies to be implemented, should an invasion occur.

Mitigation

No mitigation required.

3.22 WILD AND SCENIC RIVERS

3.22.1 AFFECTED ENVIRONMENT

A wild and scenic river is defined by the Wild and Scenic River Act (16 USC §1271-1287) as one that qualifies for inclusion on the Nationwide Inventory maintained by the Heritage Conservation and Recreation Service, which requires that it must be free-flowing (i.e., "existing or flowing in a natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway") and possess "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or similar values."

There are no wild and scenic rivers within or near the study area. The Virgin River has sections that have been designated as wild and scenic, but those sections are outside of the study area.

3.22.2 ENVIRONMENTAL CONSEQUENCES

No Action Alternative

Direct Impacts

The No-action Alternative would have no direct impacts to wild and scenic rivers.

Indirect Impacts

The No-action Alternative would have no indirect impacts to wild and scenic rivers.

Preferred Alternative

Direct Impacts

The Preferred Alternative would have no direct impacts to wild and scenic rivers.

Indirect Impacts

The Preferred Alternative would have no indirect impacts to wild and scenic rivers.

Mitigation

No mitigation required.

3.23 ENERGY

3.23.1 AFFECTED ENVIRONMENT

In the context of transportation projects, energy is consumed during both the construction and the operational phases of the project. For construction, it is used to manufacture and transport materials and to operate construction machinery. During operation of the facility, energy is primarily related to vehicle fuel consumption, which is dependent upon vehicle miles traveled and travel conditions, i.e. vehicle type, speed, weather conditions, and roadway conditions such as vertical grade, roadway geometry, and the type and condition of the pavement.

Construction energy requirements were analyzed on a qualitative basis as to what types of construction activities (if any) would be required. Operational energy requirements were analyzed on a quantitative basis, as well as a qualitative basis.

3.23.2 ENVIRONMENTAL CONSEQUENCES

The analysis consisted of dividing the average daily vehicle miles traveled by an average vehicle fuel economy estimate obtained from the *U.S. Department of Energy, Energy Information Administration's Annual Energy Outlook 2014*, which includes on-the-road estimates for light duty vehicles. 2040 conditions for both the No-action and Preferred Alternative used an average fuel efficiency of 37.2 mpg (see Table 3-16). Fuel efficiency standards may exceed those utilized in this analysis, as the corporate average fuel economy (CAFE) standard for 2040 is 48.2 mpg under the reference case. The Obama Administration has finalized standards that will increase fuel economy to the equivalent of 54.5 mpg for cars and light-duty trucks by Model Year 2025.

Table 3-16. Construction and Operational Energy Requirements

Alternative	Construction?	Vehicle Miles Traveled (Daily)*	Consumption (gallons/day)
2040 No-action Alternative	No	8,162,769	219,429.27
2040 Preferred Alternative	Yes	8,163,750	219,455.65

**Area modeled is Washington County*

Mitigation

No mitigation required.

3.24 CONSTRUCTION

3.24.1 ENVIRONMENTAL CONSEQUENCES

No-action Alternative

There would be no construction impacts under the No-action Alternative.

Preferred Alternative

Social Conditions

Some residents who live or work in close proximity to the study corridor may experience disturbance effects from noise and dust generated by construction activities. Access to all properties will be maintained; however, there may be some temporary construction impacts.

Economic Conditions

Commuters who work in the study area would experience disturbance effects from noise and dust generated by construction activities. Access to all businesses will be maintained; however, there may be some temporary construction impacts.

Air Quality

Construction of the Preferred Alternative would result in temporary negative effects to air quality in the study area due to increased dust and particulates. PM_{10} emissions from construction activities are usually local and short-term and last only for the duration of the construction period. Construction activity may also generate a temporary increase in MSAT emissions, especially for long-term construction projects. A permit for air quality impacts during construction would be obtained from the Utah Department of Air Quality (UDAQ) by the contractor.

Fugitive dust during construction would be mitigated and controlled in accordance with a fugitive dust control plan to be developed in coordination with UDAQ. This plan would include measures to minimize the extent of disturbed surface areas and restrict construction activities during high-wind periods.

Noise

Area residents would experience temporary inconvenience due to construction noise. Extended disruption of normal activities is not anticipated, since no one receptor is expected to be exposed to construction noise of long duration. Construction noise impacts would be minimized through adherence to UDOT Standard Specification 01355, Section 3.6 – Noise Control. The contractor would also be required to abide by any and all local noise ordinances.

Wetlands and Waters of the U.S.

The Preferred Alternative would include the construction of a new bridge over the Virgin River and impacts to potential wetlands near the Washington County Regional Park. Coordination with the USACE and the State Engineer's Office to obtain the appropriate Section 404 Permit and stream alteration permit will take place prior to any activity which could impact a water of the U.S. Permanent impacts to waters of the U.S. will be avoided and minimized to the maximum extent possible.

Water Quality

The Preferred Alternative would involve construction activities adjacent to, and possibly within the Virgin River, which could increase the amount of TDS and TSS within these waters. During construction, there is also the potential for temporary soil erosion and sediment/siltation impacts. Construction-related erosion and sedimentation would be managed through obtaining a Utah Pollution Discharge Elimination System (UPDES) permit from the UDEQ. This permit requires a Storm Water Pollution Prevention Plan (SWPPP) and for Best Management Practices (BMPs) to be followed during construction. Short-term impacts to water quality would

be minimized through implementation of UDOT's BMPs from the Temporary Erosion and Sediment Control Manual.

Cultural and Paleontological Resources

It is not expected than any previously unidentified cultural or paleontological resources would be encountered during construction. However, in the event that any such resources are discovered, the contractor would be required to abide by UDOT Standard Specification 01355 – Environmental Protection, Part 1.13, in relation to the discovery of any historical, archaeological, or paleontological objects, features, sites, and human remains.

Hazardous Waste

It is not expected that any hazardous materials would be encountered during construction activities. However, if hazardous waste material is encountered during construction, mitigation would be coordinated in accordance with UDOT Standard Specification 03155, which directs the contractor to stop work and notify the project engineer of any discovery of hazardous material. Disposition of any hazardous material would take place under the guidelines set by the UDEQ.

Visual Conditions

There would be some temporary visual impacts to the study area with the addition of construction signs, barricades, exposed earth, and construction equipment during construction.

Invasive Species

The Interchange Alternatives involve construction activities, including soil disruption, and therefore would provide opportunities for the movement of invasive species. The contractor will abide by UDOT's Special Provision 02926S – Invasive Weed Control to minimize the spread and introduction of invasive species. Some of the measures in the Special Provision include:

- Cleaning all earth-moving equipment before entering the project
- Treating existing noxious weeds at least ten days before starting earthwork operations
- Controlling invasive weeds using pre-emergent, selective and non-selective herbicides, as appropriate

Energy

The Preferred Alternative would involve construction activities and would therefore directly consume energy in the form of energy used to operate machinery, provide construction lighting, and produce and transport materials used in the construction of the project, such as asphalt.

Mitigation

No mitigation is required for construction impacts since they are only temporary.

3.25 THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

All roadway projects require the investment or commitment of some resources found in the existing environment. Short-term refers to the immediate consequences of the project; long-term relates to its direct or secondary effects on future generations.

3.25.1 NO-ACTION ALTERNATIVE

In the short-term, no construction activities would occur and there would be no need for the conversion of raw materials, funding sources, and labor for any improvements in the study area. In the short-term, the No-action Alternative would result in existing conditions continuing unabated, with no additional connectivity between SR-9 and Washington Dam Road and no secondary public access to Purgatory Flat. In the long term, additional roadways would need to be provided in order to provide the needed connectivity and to support the ongoing population and economic development pressure in the area, with the locations and timing of these roadway to be dependent upon the timing of the development.

3.25.2 PREFERRED ALTERNATIVE

Under the Preferred Alternative, finite resources would be required, such as land and materials for the reconstruction of the roadway, as well as the expenditure of funds and labor. Short-term impacts would occur primarily during and immediately after the construction of the project.

With the Preferred Alternative comes greater traffic connectivity in the study area due to the new roadway, support for the population and economic development planned for the area, and improved safety by providing a secondary public access. Thus, the short-term impacts of and the use of resources under the Preferred Alternative (e.g., lane closures, traffic delays, consumption of raw materials and funding resources) are consistent with the maintenance of and enhancement of long-term productivity at both a local and state level.

3.26 ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ALTERNATIVE

3.26.1 NO-ACTION ALTERNATIVE

For the No-action Alternative, there would be no construction activities and no commitment of either natural, physical, human, or fiscal resources. There would be no irreversible or irretrievable commitments of resources.

3.26.2 PREFERRED ALTERNATIVE

Implementation of the Preferred Alternative would involve construction activities and would therefore require a commitment of natural, physical, human and fiscal resources. Land used in the construction of the facilities included in the Preferred Alternative is considered an irreversible commitment during the time period that the land is used for a roadway facility. However, if a greater need arises for the use of the land or if the roadway facility is no longer needed, the land could be converted to another use. At present, there is no reason to believe that such a conversion would be necessary or desirable.

Considerable amounts of fossil fuels, labor and roadway construction materials (such as cement, aggregate, and bituminous material) would be expended in the construction of the new and/or improved roadway facilities. Additionally, large amounts of labor and natural resources would be used in the fabrication of construction

materials. These materials are generally not retrievable. However, they are currently not in short supply and their use would not have an adverse effect on continued availability of these resources for other projects. Any construction would also require a substantial one-time expenditure of both state and federal funds for construction, which are not retrievable.

The commitment of these resources is based on the concept that residents in the area, and the state and the region would benefit by the improved quality of the transportation system by providing a secondary public access for present and future developments in the area, as well as supporting increased growth and economic These benefits include improved accessibility and safety, support for economic and residential growth, and greater connectivity, which are anticipated to outweigh the commitment of these resources.

3.27 CUMULATIVE IMPACTS

3.27.1 INTRODUCTION

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (see 40 CFR 1508.7). Cumulative impacts include the direct and indirect impacts of a project, together with the reasonably foreseeable future actions of other projects.

Cumulative impact analysis is focused on the sustainability of the environmental resource in light of all the forces acting upon it and can result from individually minor but collectively significant actions taking place over time. For a project to have a cumulative effect, however, it must first have a direct or indirect effect on the resource in question. In accordance with the CEQ cumulative effects guidelines, cumulative effects analysis should be limited to those issues of a regional, national, or global concern.

3.27.2 METHODOLOGY AND TIME FRAME FOR DETERMINING CUMULATIVE IMPACTS

The methodology for determining cumulative impacts is based on *Considering Cumulative Effects under NEPA (CEQ 1997)*. The geographic scope of the cumulative impacts analysis was determined to be Washington County The timeframe for the cumulative impacts analysis includes past actions dating from the 1850s and extends to the 2040 design year. The cumulative impact issues to be analyzed, based on the concerns expressed during scoping and the project impact analysis, are:

- Land Use
- Farmland
- Economic Conditions
- Air Quality
- Wetlands/Waters of the U.S.
- Wildlife
- Threatened and Endangered Species
- Floodplains
- Visual and Aesthetics

3.27.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

This section provides a brief overview of the past, present and reasonably foreseeable actions that either have contributed or will likely contribute to cumulative impacts on the previously mentioned resources.

Past Actions

Settlement of the Washington County area began in the 1850s and 1860s, when the Church of Jesus Christ of Latter-Day Saints (LDS) established communities at various locations in the area. Irrigation projects were initiated (including the construction of the Washington Fields Dam, the Enterprise Dam, and the Hurricane Canal) that provided much-needed water supplies for agricultural activities and also regulated the water flow, which was unpredictable due to the nature of the area being a desert crossed by multiple dry washes. The local economy included agricultural and ranching, mining (silver), lumber mills, and other commercial activities.

The establishment of Zion National Park in 1919 (originally the Mukuntuweap National Monument) introduced tourism to the area and the construction of I-15 through St. George in 1972 made travel through the area, both for tourism and as a trucking route, significantly easier.

Tourism began to change the area from an agricultural focus to an increasingly service-oriented tourist economy. The first golf course opened in 1965 and a major change to development patterns occurred in 1968 with the development of Bloomington and its golf course. The Bloomington development also led to the development of condominiums and retirement homes in the region. Rapid growth has accelerated through the end of the 20th Century and into the 21st, with St. George growing from a population of 5,130 in 1960 to over 80,000 in 2015.

Present and Reasonably Foreseeable Future Actions

The present and reasonably foreseeable future actions that were included in the cumulative impacts analysis include (see Table 3-17):

Table 3-17. Present and Reasonably Foreseeable Future Actions

	Phase	Project Facility	Location and/or Extent	Type
Roadways	Phase 1: 2015-2024	SR-9	Southern Parkway Segment VI, I-15 to 5300 West	Widen/Improve to Freeway Standards
		Turf Sod Road	4300 West to Southern Parkway	New construction
		Southern Parkway	Segment IIIb. Warner Valley Road to Washington Dam ROad	New construction
	Phase II: 2025-2034	I-15	MP 4 to MP 16	Lane widening
		Washington Dam Road	1900 East to East City Limits	New construction
		Southern Parkway	Segment IIIb, Warner Valley Road to Washington Dam Road	New construction
		Southern Parkway	Segment IVa, Washington Dam Road to Sand Hollow	New construction
		4300 West	SR-9 to Southern Parkway	New construction
		SR-9	Southern Parkway Segment VI, 5300 West to Southern Parkway	Widen/Improve to Freeway Standards
	Phase III: 2035 - 2040	I-15	MP 16 to MP 13	Widen Southbound
		I-15	MP 16 to MP 27	Widen
Interchanges	Phase I: 2015-2024	Southern Parkway Interchange	at Telegraph Street and SR-9	New construction
		Southern Parkway Interchange	at 5300 West and SR-9	New construction
	Phase II: 2025-2034	Southern Parkway Interchange	at 4300 West and SR-9	New construction

	Phase	Project Facility	Location and/or Extent	Type
Utilities	Construction anticipated to begin in 2020 through 2025	Lake Powell Pipeline	Water from the Colorado River at Lake Powell will be delivered to Sand Hollow Reservoir through a 139-mile, 69-inch buried pipeline. The project also includes pumping facilities and hydroelectric generation facilities that will generate power to offset pumping costs. The pipeline will deliver 86,249 acre feet of water at full capacity: 82,249 acre feet to Washington County and 4,000 acre feet to Kane County. Project to be located from Lake Powell to Sand Hollow Reservoir, located northeast of the study area.	Water Supply
	Construction to begin in 2017	Sand Hollow Regional Pipeline	11.5-mile culinary water transmission line to provide culinary water to the southern areas of Hurricane, Washington and St. George. Project to be located just south of the study area.	Water supply
	Construction to begin in 2017	Toquer Reservoir and Ash Creek pipeline	Project consists of a 17-mile pipeline and a 115-acre, 3,640-acre-foot reservoir. Located outside of the study area but within Washington County.	Water supply
	Construction to begin in 2020	Warner Valley Reservoir	Project consists of a 3,300-foot long and 235-foot high dam, spillway, approximately 7,000 feet of pipeline, a five-acre regulating pond, settling ponds, pumping station and access/haul roads. The settling ponds will divert and remove sediment directly adjacent to the Virgin River and the pump station will move water into the reservoir. Water will be transported to municipal irrigation systems via underground pipelines. Project to be located just south of the study area.	Water supply

No specific residential or economic development projects are included in this analysis; however, existing growth and development trends are expected to continue to occur due to population and economic pressures.

Land Use

The potential cumulative impacts on this resource depend on the future changes in land use that would result from urban development in the area. The study area is expected to be developed into residential and commercial use, which is consistent with the future land use plans for Hurricane City, Washington City, and Washington County.

The pressure for development of the study area is a result of population and economic factors, along with the construction of new roadways in the area to facilitate travel within the region (e.g., Southern Parkway). Its location near major freeways such as I-15, SR-9 and the new Southern Parkway make it a desirable location for development. These factors will continue to exist and to contribute to the development of the area, in accordance with the long range land use plans.

Expected population growth is also expected to affect the demographic make-up of the region. Much of the population growth is expected to come from migration into the region, rather than from natural increase.

Farmlands

Similar to the land use discussion, potential cumulative impacts on this resource depend on the future changes in land use that would result from urban development in the area. The study area is expected to be developed into residential and commercial use, which would impact potential farmland. Much of the study area is not classified as farmland due to the nature of the soils and is not currently being actively farmed; however, there are areas of farmland that are likely to be impacted by the future land use plans for Hurricane City, Washington City, and Washington County. The pressure for development of the study area is a result of population and economic factors, along with the construction of new roadways in the area to facilitate travel within the region (e.g., Southern Parkway). These factors will continue to contribute to the eventual development of potential farmland into other uses.

Economic Conditions

Socioeconomic development in the study area would be facilitated by the various infrastructure projects planned for the near future, all of which would make the area more attractive to population influx and commercial ventures, which would in turn influence the local economy of the region. One of the planned infrastructure projects, the Lake Powell Pipeline, would help to provide much needed water supplies to support the anticipated growth, along with the other water supply projects planned for Washington County.

According to the Washington County Water Conservancy District (WCWCD), the Lake Powell Pipeline would provide jobs and business opportunities for Utah companies while contributing millions of dollars to the local economy. One-time construction impacts are estimated to produce the following in southern Utah:

- over 10,000 jobs
- over $425,000,000 in wages
- over $1,500,000,000 in economic output

According to the WCWCD, the economic potential of 86,000 acre feet of water in southern Utah would support the following:

- a population of 292,547
- 99,506 households
- 8,944 businesses
- 97,240 employment
- $7,829,202,462 in total personal income
- $3,042,564,293 in wages and salaries
- $7,294,949,651 in gross metropolitan product

In addition, incremental sales tax revenue and personal income tax payments supported by the Lake Powell Pipeline are estimated to generate more than $19.2 billion between 2026 and 2060, much of which would inure to the state. This revenue could be used to fund other essential community services such as education, healthcare and transportation.

Air Quality

The UDAQ ensures compliance with the EPA's NAAQS by monitoring air emissions, enacting rules and plans pertaining to air quality standards, and issuing preconstruction and operating permits to stationary sources. UDAQ maintains a network of air-monitoring stations throughout the state; however, there is only one station

within a relative proximity of the study area, located in Hurricane (150 North 870 West), which monitors nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM_{10} and $PM_{2.5}$).

Ozone

The current NAAQS for ozone is 70 ppb, based on a three-year average of the annual 4th highest daily eight-hour average concentration, which standard was set in 2015. According to the Division of Air Quality's Annual Report for 2015, ozone monitors showed exceedances of the new standard in Weber, Davis, Salt Lake, Utah, Uintah and Duchesne Counties, but not in Washington County.

EPA expects the vast majority of U.S. counties outside of California will meet the revised standards by 2025 without taking additional action to reduce emissions, including all of the State of Utah. This is likely due to several factors, including the implementation of the Tier 3 Vehicle Emissions and Fuel Standards.

Particulate Matter

For $PM_{2.5}$, EPA lowered the annual standard in 2012 from 15 µg/m3 to 12 µg/m3. In the 2015 UDAQ report, Utah documented compliance with the annual standard for $PM_{2.5}$; however, the 24-hour standard was also lowered from 65 µg/m3 to 35 µm/m3, which resulted in the designation of three non-attainment areas (Logan, Salt Lake City and Provo). UDAQ has prepared SIPs for the designated non-attainment areas and submitted them to EPA for approval. There have been no recent changes in the PM_{10} standard.

The study area is located in Washington County, which is currently not in a non-attainment status for either PM_{10} or $PM_{2.5}$. According to the data presented, the $PM_{2.5}$ levels in Washington County have not exceeded either the annual standard or the 24-hour standard. High values of monitored PM_{10} sometimes result from exceptional events, such as high winds from dust storms and wildfires. Outside of the exceptional events, Utah has been in compliance with the PM_{10} NAAQS since 2008. Further, UDAQ and St. George city officials have taken steps to actively monitor air quality and implement measures to minimize the impact of exceptional events, such as requiring industrial, construction and any other sites with dust concerns to stop all operations except for dust control upon receiving notification of imminent high winds (classified as steady wind above 30 mph for at least five minutes) from the National Weather Service. Other area municipalities also employ strict dust control ordinances.

MSAT

Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (such as airplanes), area sources (such as dry cleaners), and stationary sources (such as factories or refineries). In 2007, the EPS issued the Control of Hazardous Air Pollutants from Mobile Sources Final Rule, which is expected to lower emissions of benzene and other air toxics in three ways: (1) by lowering the benzene content of gasoline; (2) by reducing exhaust emissions from passenger vehicles operating at cold temperatures (under 75 degrees); and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers. Taken together, the standards will reduce total emissions of mobile source air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. EPA estimates that existing programs will result in an over 65 percent reduction in emissions of gaseous air toxics from highway mobile sources between 1999 and 2030, despite large increases in vehicle miles traveled. By 2030, EPA expects to see on-highway diesel PM emission reductions of over 90 percent from 2011 levels.

Utah has several initiatives that are designed to help reduce emissions from both point and non-point sources. These initiatives, along with improvements to vehicle emissions (including Tier 3 Vehicle Emission and Fuel Standards Program) are expected to help continue to improve the air quality along the Wasatch Front through the 2040 planning period.

The EPA is finalizing a new motor vehicle emission standard aimed at reducing air pollution from passenger cars and trucks. Starting in 2017, Tier 3 sets new vehicle emissions standards and lowers the sulfur content of gasoline, considering the vehicle and its fuel as an integrated system. By 2030, the Tier 3 standards are expected to significantly reduce motor vehicle emissions, including nitrogen oxides, volatile organic compounds, direct particulate matter, carbon, and air toxics (see Table 3-18).

Table 3-18. Estimated Emission Reductions from the Final Tier 3 Standards (Annual U.S. Short Tons)

Pollutant	2018		2030	
	Tons	Percent of Onroad Inventory	Tons	Percent of Onroad Inventory
NO_2	264,369	10%	328,509	25%
VOC	47,504	3%	157,591	16%
CO	278,879	2%	3,458,041	24%
Direct $PM_{2.5}$	130	0.1%	2,892	10%
Benzene	1,916	6%	4,762	26%
SO_2	14,813	56%	12,399	56%
1, 3-Butadiene	257	5%	677	29%
Formaldehyde	513	2%	1,277	10%
Acetaldehyde	600	3%	2,067	21%
Acrolein	40	3%	127	15%
Ethanol	2,704	2%	19,950	16%

Source: EPA, Office of Transportation and Air Quality Regulatory Announcement. EPA-420-F-14-009. March 2014

Future residential growth could also affect future ozone levels. Based upon the population growth anticipated in the region, there would be an increase in non-road sources, such as lawn mowers, paints, and consumer products, which emit pollutants such as NO_2 and/or VOCs.

Wetlands/ Waters of the U.S.

The Preferred Alternative has impacts to the Virgin River, which is classified as a water of the U.S., due to the bridge supports that are needed to span the waterway. There is already another bridge over the Virgin River in the immediate vicinity of the study area, which may need upgrades or modifications in the future to support residential and/or commercial development. If the proposed project does not occur, it is likely that the existing bridge may be utilized sooner than would otherwise be anticipated as a means of facilitating growth in the study area. Other than the two bridge structures discussed, no other bridges are currently planned to span the Virgin River; therefore no other direct impacts are anticipated.

Wildlife

The study area is currently relatively undeveloped and in a natural state, but as discussed in other sections of this document, long term plans for this area would result in the conversion of much of this area into residential and commercial use. The land use changes would occur whether or not the proposed project is approved, as the existing and anticipated growth and economic development needs would continue to provide pressure on the study area. This planned land use conversion would impact wildlife resources in the region as it would alter available habitat for those species that are present in the area. Even with development, however, there would likely still be suitable habitat for wildlife in the area due to the presence of BLM-administered lands within and in the proximity of the study area, which are not anticipated to be developed. Further, Sand Hollow Reservoir and Quail Creek Reservoir, as well as the Virgin River, would continue to provide sources of water to support wildlife in the area.

Threatened and Endangered Species

The study area is currently relatively undeveloped and in a natural state, but as discussed in other sections of this document, long term plans for this area would result in the conversion of much of this area into residential and commercial use. The land use changes would occur whether or not the proposed project is approved, as the existing and anticipated growth and economic development needs would continue to provide pressure on the study area. This planned land use conversion would impact those threatened and endangered species that have been located in the study area as it would alter available habitat for those species. Also, the dwarf bear-claw poppy population that was identified as part of the environmental analysis for this project is located on land currently under private ownership and therefore, not protected against development.

The Preferred Alternative would impact suitable habitat for the dwarf bear-claw poppy. It would also impact critical habitat for several aquatic species and for the southwestern willow flycatcher due to construction activities in and adjacent to the Virgin River. The other projects identified in this impacts analysis, as well as those not currently known, would result in the conversion of suitable habitat for dwarf bear-claw poppy. There may also be additional work for other projects that may have impacts on the Virgin River or its floodplains, although it is likely that those projects would involve their own mitigation measures to deal with potential impacts.

Even with the future development of the area, however, there are other areas in the region that have been set aside specifically to protect threatened and endangered species (i.e., Red Cliffs Desert Reserve), along with several National Parks that also provide critical habitat. The BLM has jurisdiction over and actively manages areas of the region that also provide areas of protection from development and it is likely that with additional development of the transportation infrastructure that would be needed to support the anticipated growth would come additional areas of protected critical habitat as mitigation of impacts related to those future projects.

Floodplains

Development in the floodplains is expected to occur as part of the future build out, as indicated by the future land use plans of both Hurricane City and Washington City. Construction in the floodplain would be required to comply with all relevant floodplain regulations.

Visual and Aesthetics

The potential cumulative impacts on this resource depend on the future changes in land use that would result from urban development in the area. The study area is expected to be developed into residential and commercial use, which would impact the viewshed in this area. Future land use plans call for the majority of the study area to eventually be developed into residential and commercial uses, which would change the area from its current undeveloped state to include homes, outbuildings, and commercial structures, along with the accompanying infrastructure to support it. There would still be areas that would be undeveloped due to geological or other considerations that would restrict development, but the other areas would change drastically. The changes to the viewshed are expected to occur as a result of population and economic growth pressures, regardless of the implementation of the Preferred Alternative, albeit in a different time frame and fashion.

3.28 MITIGATION SUMMARY

Land Use
No mitigation required.

Farmlands
No mitigation required.

Social Conditions
No mitigation required.

Environmental Justice
No mitigation required.

Right of Way and Relocations
No mitigation required.

Economic Conditions
Existing accesses to all businesses would be maintained during construction.

Pedestrians and Bicyclists
No mitigation required.

Air Quality
No mitigation required.

Noise
No mitigation required.

Water Resources
No mitigation required.

Wetlands and Waters of the U.S.
The project will conduct a wetland delineation prior to construction. A Section 404 Permit and Stream Alteration Permit will be obtained from the USACE for all work to be conducted within the Virgin River and any other wetland or WOUS that is determined to be jurisdictional.

Floodplains
Hydraulic analyses will be performed to determine if there would be a rise in the BFE. If the rise in the BFE is greater than one foot, proper steps will be taken with Washington County and FEMA to obtain a LOMR. These steps include:

- Coordination with Washington County Floodplain Manager during final design
- Washington County approval of CLOMR documentation
- A CLOMR from FEMA
- A FDP from Washington County
- Following project completion, a LOMR from FEMA

Wildlife

Utah State Sensitive Species

See Threatened and Endangered Species section below, for mitigation and project commitments to reduce the effects of the Preferred Alternative to aquatic and riparian species including the Arizona toad, desert sucker, flannelmouth sucker, and Virgin spinedace.

Migratory Birds

The project will complete a pre-construction presence/absence survey of the roadway alignment for breeding migratory birds and raptors. If breeding pairs or active nests are located within proximity to the roadway alignment, the project will follow USFWS temporal and spatial buffers for construction activities near the nest (including nest tree removal). If construction activities near the nest within the temporal or spatial buffers are unavoidable, the project will coordinate with USFWS to determine the appropriate mitigation.

Threatened and Endangered Species

General Project Commitments

Employee Training

- All construction employees shall be trained to visually recognize threatened and endangered species they have the potential to encounter during construction.

Trash

- "Good housekeeping" procedures shall be developed to ensure that the project site, including the Virgin River, will be kept clean of debris, garbage and fugitive trash or waste. Garbage containers must preclude the entrance of both birds and mammals which might be attracted to the garbage. Trash, especially food-related trash, must be regularly removed from the project site. The project will also prohibit scrap heaps and dumps and will minimize storage areas.

Roads

- Excessive grades on roads, road embankments, and ditches and drainages shall be avoided especially in areas with soils prone to erosion. All construction techniques will implement BMPs.

Hazardous Materials

- To minimize the potential for accidental spills of hazardous materials, BMPs and measures specified in the storm water pollution prevention plan (SWPPP) will be implemented. A spill prevention, control, and countermeasures (SPCC) plan will be developed and followed during construction.
- All chemicals and other hazardous materials (concrete, grout, fuel, etc.) will be stored at least 150-feet from any water.
- Refueling will occur at least 150-feet from any water.
- All restroom facilities will be placed at least 150-feet from any water.
- Spill kits will be stored onsite.
- A list of contacts and telephone numbers will be kept onsite and available to key personnel to reduce response times (e.g., fire department, hazardous materials, spill response, UDOT).
- Construction equipment will be regularly inspected for leaks and repaired and cleaned as needed.
- Secondary containment shall be provided for all onsite hazardous materials and waste storage, including fuel.
- If a fuel/oil or other hazardous material spill occurs, UDOT will be contacted immediately and actions will be taken to minimize the amount and spread of the spill material. Such measures may include using straw bale plugs, earthen berms, or other absorbent materials. If necessary, soil remediation will be conducted and will include the removal of contaminated soils to an approved bioremediation facility and a soil sample(s) will be taken to verify the success of the site remediation.
- The construction contractor will be required to follow any other local, state, or federal regulations related to the use, handling, storing, transporting, and disposing of hazardous materials.

Noxious Weeds

- All construction-related equipment will be cleaned of soils, seeds, vegetative matter, or other debris or matter that may contain or hold noxious seeds. The cleaning of equipment will also be done any time thereafter if the equipment leaves the construction site, is used on another project, and then re-enters the site.
- Contractor will be responsible to control noxious weeds throughout the entire construction site through the duration of construction activities.

Soils and Erosion

- Fill stored onsite will be kept at least 150-feet away from water.
- Silt fences will be installed to keep sediment out of the Virgin River.
- Native species will be used to revegetate temporarily disturbed areas. Excavated soils will be sorted into mineral soils and top soils so top soils may be replaced on the project site post-construction to provide a seed bank for native plants.
- Construction activities and ground disturbance will be limited to only those areas within the proposed right-of-way where it is absolutely necessary. Excessive clearing and grubbing will not be permitted.
- Installation of temporary and permanent fences (i.e., silt fence and right-of-way fence) will not disturb areas more than 15-feet beyond the proposed right-of-way.

Species Specific Mitigation and Project Commitments

Desert Tortoise

Construction

- It is unlikely that desert tortoise are found in the study area. However, if desert tortoise are spotted during construction, construction activities in the area will stop, the siting will be reported immediately, and UDOT will coordinate with USFWS.

Mitigation

- No mitigation proposed.

Dwarf Bear-poppy

Construction

- A pre-construction botanical survey will be conducted in order to identify dwarf bear-poppy occupied habitat within the proposed ROW.
- Ground disturbance and removal of natural vegetation within the ROW will be limited in order to maintain native plant species composition and minimize impacts to pollinators.
- Temporarily disturbed areas will be revegetated with native shrubs and grasses.
- If necessary, environmental fencing will be installed around dwarf bear-poppy occupied habitat in order to create exclusionary zones where construction activities will be prohibited. The exclusionary zones will also include any new areas of dwarf bear-poppy occupied habitat that are discovered during pre-construction botanical surveys.

Project Features and Maintenance

- The alignment of Purgatory Road has been intentionally designed to avoid impacts to dwarf bear-poppy occupied habitat.
- Broadcast applications of herbicides will be prohibited in dwarf bear-poppy suitable habitat (Shnabkaib, Middle Red, and Upper Red members of the Moenkopi Formation) that occurs in the proposed ROW. Spot treatments of herbicides will be used to undesirable plants in these areas.

Mitigation

- No mitigation is proposed.

Holmgren Milkvetch

Construction

- A pre-construction botanical survey will be conducted in order to identify Holmgren milkvetch occupied habitat within the proposed ROW.
- Ground disturbance and removal of natural vegetation within the ROW will be limited in order to maintain native plant species composition and minimize impacts to pollinators.
- Temporarily disturbed areas will be revegetated with native shrubs and grasses.

Project Features and Maintenance

- The alignment of Purgatory Road has been intentionally designed to avoid impacts to Holmgren milkvetch designated Critical Habitat.
- Broadcast applications of herbicides will be prohibited in Holmgren milkvetch suitable habitat (Middle Red, Upper Red, and Virgin Limestone members of the Moenkopi Formation) that occurs in the proposed ROW. Spot treatments of herbicides will be used to undesirable plants in these areas.

Mitigation

- No mitigation is proposed.

Siler Pincushion Cactus

Construction

- A pre-construction botanical survey will be conducted in order to identify Siler pincushion cactus occupied habitat within the proposed ROW.
- Ground disturbance and removal of natural vegetation within the ROW will be limited in order to maintain native plant species composition and minimize impacts to pollinators.
- Temporarily disturbed areas will be revegetated with native shrubs and grasses.

Project Features and Maintenance

- Broadcast applications of herbicides will be prohibited in Siler pincushion cactus suitable habitat (Shnabkaib and Middle Red members of the Moenkopi Formation) that occurs in the proposed ROW. Spot treatments of herbicides will be used to undesirable plants in these areas.

Mitigation

- No mitigation is proposed.

Southwestern Willow Flycatcher

Construction

- To minimize the potential for impacts to spawning fish (April 1 – July 31) and the breeding season for southwestern willow flycatcher (breeding period is April 15 – August 15), project actions within the active channel of the Virgin River will not occur between April 1 and August 15. During this timeframe, project actions are permitted to occur above the active channel of the Virgin River within the 100-year floodplain, including for bridge construction activities such as the above ground structural work.
- Riparian vegetation will be disturbed as little as possible during construction.

Project Features and Maintenance

- The project will revegetate disturbed riparian areas in cooperation with the Virgin River Program at the conclusion of construction activities.

Mitigation

- Mitigation for effects to southwestern willow flycatcher Critical Habitat will be achieved through completion of a restoration project implemented at a 3:1 ratio for permanent impacts and a 2:1

ratio for temporary impacts in the Virgin River's 100-year floodplain. All mitigation will be developed, implemented, and monitored in coordination with the Virgin River Program, UDWR, and the USFWS and will follow USFWS Best Management Practices (BMPs). Currently, the acreage of permanent and temporary impacts to southwestern willow flycatcher Critical Habitat is unknown. Permanent and temporary impacts will be quantified during final design and will then be used to determine the amount of mitigation. Habitat restoration for both temporary and permanent impacts will be implemented prior to or concurrent with the start of project impacts in southwestern willow flycatcher Critical Habitat. A USFWS approved mitigation plan will need to be in place prior to the start of the aforementioned impacts.

Virgin River Chub and Woundfin

Construction

- To minimize the potential for impacts to spawning fish (April 1 – July 31) and the breeding season for southwestern willow flycatcher (breeding period is April 15 – August 15), project actions within the active channel of the Virgin River will not occur between April 1 and August 15. During this timeframe, project actions are permitted to occur above the active channel of the Virgin River within the 100-year floodplain, including for bridge construction activities such as the above ground structural work.
- Prior to in-stream construction, a USFWS approved biologist will clear the stream reach within the direct area of construction of any Virgin River chub and woundfin individuals using USFWS approved methodology. Biologists will prepare a report for USFWS that summarizes the number of fish handled of each species.
- Construction activities in designated Critical Habitat will not occur during active flooding events.
- All in-channel work associated with the construction of the bridge will take place "in the dry" and using a vibratory driver or drilled shafts to avoid adverse acoustic effects.
- Cast-in-place concrete for new bridge infrastructure not contained within a dewatered cofferdam will be secured using a watertight "diaphragm" or plate below the structure. Concrete will be poured atop it, with tarping or other appropriate measures to prevent the spill of wet concrete into waters below. Once poured, the concrete will be covered with protective Visqueen for several days to allow sufficient curing and protection from the elements. Concrete for overwater infrastructure use will be provided by one of two methods: (1) through a pipe attached to a pumper truck positioned near the shoreline or (2) from buckets lifted by crane from the bank. Either method requires the use of spill prevention and control measures, including tarps under buckets, positioning the pumper truck a sufficient distance from the shoreline, and ensuring a tight connection of the delivery pipe to the pumper truck.
- The project will immediately notify USFWS of any unforeseen impacts detected during project construction. Any implemented action that may be contributing to the introduction of toxic materials or other causes of fish mortality will be immediately stopped until the situation has been remedied. If investigative monitoring efforts demonstrate the source of fish mortality is not related to the authorized activity, the action may proceed only after notification of USFWS authorities.
- A ditch lining will be used on all channels dug for discharging water from the excavated area if flow velocities might possibly cause erosion within the channel.
- Dewatering in periods of intense heavy rain, when the infiltrative capacity of the soil is exceeded, will be avoided.
- Flow to a sediment settling basin may not exceed the basin's capacity to settle and filter flow or the structure's volume capacity.
- Sediment basin's will discharge wherever possible to a well-vegetated buffer through sheet flow and maximize the distance to the nearest water resources as well as minimize the slope of the buffer area.
- For trench excavation, trench length will be limited to 500 feet and the excavated material will be placed on the up-gradient side of the trench.
- Diversion ditches or berms will be installed to minimize the amount of clean stormwater runoff allowed into the excavation area.
- Stormwater from the bridge structure will be captured and treated as part of the stormwater system for the rest of the project.
- The project will revegetate disturbed riparian areas in accordance with the Virgin River Program at the conclusion of construction activities.

Project Features and Maintenance

- Design of riprap and abutments will avoid creating non-native fish species refuges (i.e. interstitial spaces). Voids in newly constructed riprap will be filled. The riprap will be backfilled and buried up to the corresponding water level for a 5-year flood event. In addition, riprap sections will be built or reconstructed such that cutoff walls are installed to limit fresh-water flow. These measures (filling voids, burying riprap walls, and limiting fresh-water flow) will be specified in any construction plans.
- A UPDES permit will be required for all stormwater runoff generated by the project. The project will abide by all applicable permit requirements and state laws for stormwater discharge. Water quality requirements could include the use of detention ponds or basins. Detention basins will be designed according the Utah Division of Water Quality by incorporating oil-skimming devices and grease traps and by providing 30 minutes of detention time to adequately capture sediment and pollutants before discharging stormwater. Detention basins or ponds will be designed to store runoff and discharge it within about 6 hours to minimize solar heating of the ponded water.

Mitigation

- Mitigation for effects to Virgin River chub and woundfin Critical Habitat will be achieved through completion of a restoration project implemented at a 3:1 ratio for permanent impacts and a 2:1 ratio for temporary impacts in the Virgin River's 100-year floodplain. All mitigation will be developed, implemented, and monitored in coordination with the Virgin River Program, UDWR, and the USFWS and will follow USFWS Best Management Practices (BMPs). Currently, the acreage of permanent and temporary impacts to Virgin River chub and woundfin Critical Habitat is unknown. Permanent and temporary impacts will be quantified during final design and will then be used to determine the amount of mitigation. Habitat restoration for both temporary and permanent impacts will be implemented prior to or concurrent with the start of project impacts in Virgin River chub and woundfin Critical Habitat. A USFWS approved mitigation plan will need to be in place prior to the start of the aforementioned impacts.

It should be noted that impacts to habitat and species within the Virgin River floodplain (southwestern willow flycatcher, Virgin River chub, and woundfin) will be mitigated for collectively, not individually.

Archaeological and Architectural Resources
No mitigation required.

Section 4(f) Properties
No mitigation required.

Paleontology
A permitted paleontologist is currently evaluating the project to determine potential impacts and mitigation measures.

Hazardous Waste
No mitigation required.

Visual Conditions
No mitigation required.

Invasive Species
No mitigation required.

Wild and Scenic Rivers
No mitigation required.

Energy
No mitigation required.

Construction
No mitigation is required for construction impacts since they are only temporary.

CHAPTER 4: COMMENTS AND COORDINATION

This chapter describes the early and ongoing coordination activities, summarizes key issues and pertinent information received from the public and agencies, and lists those agencies and persons that were consulted. Chapter 4 is organized as follows:

- **4.1 Public and Agency Coordination**: This section includes descriptions of key meetings with agencies and with the public in general.
- **4.2 Agency Correspondence**: This section details the correspondence letters and e-mails from agencies.

4.1 PUBLIC AND AGENCY COORDINATION

Public involvement activities included:

- Newsletters, flyers, and other public notices
- Agency and public meetings

The following is a list of meetings held as part of the coordination process for the Purgatory Road Environmental Assessment (EA), including a brief summary of the minutes. The minutes themselves are contained in the Administrative Record for the project. In addition, regular project team meetings were held monthly with representatives from the Federal Highway Administration (FHWA), the Utah Department of Transportation (UDOT), Hurricane City, Washington City, Washington County, and Horrocks Engineers.

- September 18, 2015 - Stakeholder Meeting with Washington County Solid Waste
- September 21, 2015 - Stakeholder Meeting with Site Select Plus (Economic Development)
- September 21, 2015 - Stakeholder Meeting with Washington County Regional Park
- October 1, 2015 - Stakeholder Meeting with Southern Utah Shooting Sports Park
- **October 8, 2015 - Public Scoping Meeting**
- November 2, 2015 - Stakeholder Meeting with Washington County Sheriff's Office
- December 8, 2015 - Meeting with US Fish and Wildlife Service
- January 7, 2016 - Hurricane City Council Meeting
- February 1, 2016 - Stakeholder Meeting with WC Solid Waste and Shooting Sports Park
- May 10, 2016 - Meeting with US Fish and Wildlife Service

September 18, 2015–Stakeholder Meeting with Washington County Solid Waste

A stakeholder meeting was held with Neil Schwendiman, District Manager. Concerns about a possible western alignment were discussed including loss of property, reduced capacity for the landfill, security, and potential public complaints from development in proximity to the landfill.

September 21, 2015–Stakeholder Meeting with Site Select Plus

A stakeholder meeting was held with Jeriah Threlfall, Executive Director of Site Select Plus, a public–private economic development corporation for Southwestern Utah. Items discussed included current limitations on development of the Purgatory Valley, utility considerations, and the Southern Utah Shooting Sports Park.

September 21, 2015–Stakeholder Meeting with Washington County Regional Park

A stakeholder meeting was held with Gerry Brown. The park expressed its opposition to a western alignment for the road and concerns about safety. Also discussed were current activities and needs of the park and future expansion plans.

October 1, 2015–Stakeholder Meeting with Southern Utah Shooting Sports Park
A stakeholder meeting was held with Ron Whitehead, a member of the Shooting Sports Park Board. Operations and visitation of the park were discussed as well as safety and operational concerns regarding various alignments.

October 8, 2015–Public Scoping Meeting
The public scoping meeting provided a chance for the public to learn about the project and provide comments about potential concerns and needs or resources for the project team to be aware of. The project team discussed the study area, transportation needs, previously considered concepts, environmental and other considerations, and the project schedule.

November 2, 2015–Stakeholder Meeting with Washington County Sheriff's Office
A stakeholder meeting was held with Sheriff Cory Pulsipher and Undersheriff Bart Bailey. Concerns discussed included the operation of the Sherrif's Office shooting range and expansion plans for public facilities in the area.

November 5, 2015–Stakeholder Meeting with Shooting Sports Park Board
A meeting was held with the president of the Shooting Sports Park Board, Commissioner Iverson, along with the board and other members of the organization. This group expressed opposition to the western alignment due to its impacts on their facility. They are also concerned about safety and security of the area.

November 6, 2015–Stakeholder Meeting with Western Rock
A meeting was held with Darrell Whitney, Vice President of Southern Utah and Arizona branch of Western Rock. The aggregate deposit Western Rock has is one of the largest in the area and it is not yet mined out. They support the road because they feel it will help them transport product to the customers more easily; however, because the material may go down 200+ feet, they will need to strategically mine so they can mine out the area where the road would run through the property before it is constructed.

December 8, 2015–Meeting with US Fish and Wildlife Service
A meeting was held with representatives of FHWA, UDOT, the US Fish and Wildlife Service, and Horrocks Engineers. The meeting discussed NEPA status, the purpose of and need for the project, the study area, and the potential to affect threatened and endangered species.

January 7, 2016–Hurricane City Council Meeting
At this meeting, the project team provided an update on the progress of the environmental assessment.

February 1, 2016–Stakeholder Meeting with Washington County Solid Waste and Southern Utah Shooting Sports Park
A stakeholder meeting was held with representatives of Washington County representing the Solid Waste District and the Shooting Sports Park. These representatives expressed their opposition to a western alignment. The remainder of the meeting focused on potential impacts of the west roadway option and potential mitigation measures.

May 10, 2016–Meeting with US Fish and Wildlife Service
A meeting was held with representatives of FHWA, UDOT, US Fish and Wildlife Service, and Horrocks Engineers. The meeting discussed project alternatives, the project schedule, and threatened and endangered species.

August 31, 2016–Meeting with US Fish and Wildlife Service
A meeting was held with representatives of FHWA, UDOT, US Fish and Wildlife Service, and Horrocks Engineers. The meeting discussed the Biological Assessment, preliminary effect determinations, and the project schedule.

4.2 AGENCY CORRESPONDENCE

Correspondence letters (both sent and received) are shown in Table 4-1 and are included in the following pages, in order by date.

Table 4-1. Correspondence

Date	To	From	Subject	Page No.
9/9/2015	Kathleen Clarke Utah Resource Development Coordinating Committee	David Cox FHWA	Initiation of Scoping	4-6
9/9/2015	Kyle Paisely School and Institutional Trust Lands Administration	David Cox FHWA	Initiation of Scoping	4-7
9/9/2015	Myron Lee Dixie Metropolitan Planning Organization	David Cox FHWA	Initiation of Scoping	4-8
9/9/2015	Bob Sangberg Red Cliffs Desert Reserve	David Cox FHWA	Initiation of Scoping	4-9
99/9/2015	Steve Meismer Virgin River Program	David Cox FHWA	Initiation of Scoping	4-10
9/9/2015	Ron Whitehead Southern Utah Shooting Sports Park	David Cox FHWA	Initiation of Scoping	4-11
9/9/2015	Neil Schwendiman Washington County Solid Waste	David Cox FHWA	Initiation of Scoping	4-12
9/9/2015	Cory Pulsipher Washington County Sherrif's Office	David Cox FHWA	Initiation of Scoping	4-13
9/9/2015	Jake Schultz Washington County Purgatory Correctional Facility	David Cox FHWA	Initiation of Scoping	4-14
9/9/2015	Gerry Brown Washington County Regional Park	David Cox FHWA	Initiation of Scoping	4-15
9/10/2015	Philip Strobel Environmental Protection Agency	David Cox FHWA	Request to Become a Cooperating Agency/ Scoping	4-16
9/10/2015	Bryan Bowker Bureau of Indian Affairs	David Cox FHWA	Request to Become a Cooperating Agency/ Scoping	4-18
9/10/2015	Najah Duvall-Gabriel Advisory Council on Historic Preservation	David Cox FHWA	Request to Become a Cooperating Agency/ Scoping	4-20
9/10/2015	Brian Tritle Bureau of Land Management	David Cox FHWA	Request to Become a Cooperating Agency/ Scoping	4-22
9/10/2015	Larry Crist US Fish & Wildlife Service	David Cox FHWA	Request to Become a Cooperating Agency/ Scoping	4-24
9/30/2015	Bryan Dillon FHWA	Teresa Burke BLM	Response to Scoping/ Invitation to Become a Cooperating Agency	4-28
10/16/2015	Bryan Dillon FHWA	Lisa Lloyd EPA	Response to Scoping/ Invitation to Become a Cooperating Agency	4-29

Date	To	From	Subject	Page No.
10/29/2015	David Cox FHWA	Charles Lewis BIA	Response to Scoping/ Invitation to Become a Cooperating Agency	4-30
10/30/2015	David Cox FHWA	Larry Crist USFWS	Response to Scoping/ Invitation to Become a Cooperating Agency	4-31
11/4/2015	David Cox FHWA	Charlene Dwin Vaughn ACHP	Response to Scoping/ Invitation to Become a Cooperating Agency	4-X
3/16/2016	Corrina Bow Kanosh Band of Paiutes	David Cox FHWA	Native American Consultation/Scoping/ Invitation to Become a Consulting Party	4-41
Agency specific copies of the above letter were submitted to the following:				
Herman G. Honanie, Chairman Pueblo of Hopi				
Leigh Kuwanwisiwma, Director Hopi Cultural Preservation Office Pueblo of Hopi				
Gari Lafferty, Tribal Chairperson Paiute Indian Tribe of Utah				
Dorena Martineau, Cultural Resources Manager Paiute Indian Tribe of Utah				
Richard Jenks, Jr., Chairperson Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation				
Betsy Chapoose, Director, Cultural Rights and Protection Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation				
Lora Tom, Band Chair Cedar Band of Paiute Indians				
Vala Parashonts, Cultural Resource Representative Cedar Band of Paiutes				
Jetta Wood, Chairwoman Shivwits Band of Paiute Indians				
Shanan Anderson, Cultural Resources Representative Shivwits Band of Paiute Indians				
Jeanine Borchardt Indian Peaks Band of the Paiutes				
3/22/2016	Southern Utah Wilderness Alliance	Eric Hansen UDOT	Invitation to Become a Section 106 Consulting Party	4-46
3/22/2016	Kristine Curry State and Institutional Trust Lands Administration	Eric Hansen UDOT	Invitation to Become a Section 106 Consulting Party	4-47
3/22/2016	Bureau of Land Management	Eric Hansen UDOT	Initial UDOT-BLM Consultation with Response	4-48
3/22/2016	Pat McQueary US Army Corps of Engineers	Eric Hansen UDOT	Request for Concurrence on Area of Potential Effects with Response	4-49
6/23/2016	Peter Steele Horrocks Engineers	Martha Hayden Department of Natural Resources	Paleontological Clearance	4-51

Date	To	From	Subject	Page No.
8/15/2016	Lora Tom, Band Chairwoman Cedar Band of Paiutes	Eric Hansen UDOT	Cultural Report Consultation	4-52
8/15/2016	Herman G Honanie, Chairman Pueblo of Hopi	Eric Hansen UDOT	Cultural Report Consultation	4-53
8/15/2016	Jeanine Borchardt Indian Peaks Band of the Paiutes	Eric Hansen UDOT	Cultural Report Consultation	4-54
8/15/2016	Darlene Arrum Kanosh Band of the Paiutes	Eric Hansen UDOT	Cultural Report Consultation	4-55
8/15/2016	Corina Bow, Tribal Chairwoman Paiute Indian Tribe of Utah	Eric Hansen UDOT	Cultural Report Consultation	4-56
8/15/2016	Jetta Wood, Chairwoman Shivwits Band of Paiute Indians	Eric Hansen UDOT	Cultural Report Consultation	4-57
8/15/2016	Jon Bow, Project Manager US Army Corps of Engineers	Eric Hansen UDOT	Cultural Report Consultation	4-58
8/15/2016	Manuel Heart, Chairperson Ute Indian Tribe of the Uintah/Ouray Res	Eric Hansen UDOT	Cultural Report Consultation	4-59
8/29/2016	Eric Hansen UDOT	Leigh J. Kuwanwisiwma Hopi Cultural Preservation Office	Cultural Report Consultation	4-60
9/15/2016			Cultural and Paleo Clearance with Tier 1 Screening Form	4-62

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Ms. Kathleen Clarke
Director of RDCC
Utah Resource Development Coordinating Committee
E-210 State Capitol Complex
Salt Lake City, UT 84114

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Ms. Clarke:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

At this time, we request your assistance in identifying potential resources that may occur in the project area, as well as any concerns, requirements, or recommendations that you may have in relation to the proposed project. You are also invited to a scoping meeting that will be held at the **UDOT St. George Office at 5340 West 200 South, Hurricane, Utah** on **October 8, 2015** at **3:00 p.m.** If you plan to attend the scoping meeting, please RSVP to Stan Jorgensen at Horrocks Engineers, 2162 West Grove Parkway, Suite 400; Pleasant Grove, Utah 84062 or by e-mail at stan@horrocks.com by October 7, 2015.

We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Kyle Paisely
State of Utah School and Institutional Trust Lands Administration
675 East 500 South, Suite 500
Salt Lake City, UT 84102

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Paisely:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Myron Lee
Director
Dixie Metropolitan Planning Organization
1070 West 1600 South, Bldg. B
St. George, UT 84770

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Lee:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Bob Sangberg
Administrator
Red Cliffs Desert Reserve
10 North 100 East
St. George, UT 84770

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Sangberg:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Steve Meismer
Local Coordinator
Virgin River Program
533 East Waterworks Drive
St. George, UT 84770

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Meismer:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Ron Whitehead
Chairman of the Board
Southern Utah Shooting Sports Park
197 East Tabernacle Street
St. George, UT 84770

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Whitehead:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Neil Schwendiman
District Manager
Washington County Solid Waste
260 West St. George Blvd
St. George, UT 84770

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Schwendiman:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Cory C. Pulsipher
Sheriff of Washington County
Washington County Sheriff's Office
620 South 5300 West
Hurricane, UT 84737

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Sheriff Pulsipher:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Jake Schultz
Chief Deputy
Washington County Purgatory Correctional Facility
750 South 5300 West
Hurricane, UT 84737

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Chief Deputy Schultz:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 9, 2015

In Reply Refer To:
HDA-UT

Mr. Gerry Brown
Executive Director
Washington County Regional Park
197 East Tabernacle Street
St. George, UT 84770

SUBJECT: Initiation of Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Brown:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City and Hurricane City, has initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to your input. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S.Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 10, 2015

In Reply Refer To:
HDA-UT

Mr. Philip Strobel
Director, NEPA Compliance and Review Program
Environmental Protection Agency – Region 8
1595 Wynkoop Street
Denver, CO 80202-1129

SUBJECT: Request to Become a Cooperating Agency/Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Strobel:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, and Hurricane City, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

Cooperating Agency Invitation
With this letter, we extend your agency an invitation to become a cooperating agency with UDOT and FHWA in the development of the Purgatory Road EA. According to 40 CFR 1508.5, a Cooperating Agency is any Federal agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative.

Please respond to FHWA in writing with an acceptance or denial of this invitation prior to October 15, 2015. If you have any questions or would like to discuss in more detail the project or our agencies' respective roles and responsibilities during the preparation of this EA, please contact me directly at (801) 955-3516 or at David.Cox@dot.gov.

Scoping
At this time, we request your assistance in identifying potential resources that may occur in the project area, as well as any concerns, requirements, or recommendations that you may have in relation to the proposed project. You are also invited to a scoping meeting that will be held at the **UDOT St. George Office at 5340 West 200 South, Hurricane, Utah on October 8, 2015** at **3:00 p.m.** If you plan to attend the scoping meeting, please RSVP to Stan Jorgensen at Horrocks Engineers, 2162 West Grove Parkway, Suite 400; Pleasant Grove, Utah 84062 or by e-mail at stan@horrocks.com by October 7, 2015.

We appreciate your participation on this project and look forward to the opportunity to work with you. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 10, 2015

In Reply Refer To:
HDA-UT

Mr. Bryan Bowker
Regional Director
Bureau of Indian Affairs, Western Region
2600 North Central Avenue
Phoenix, AZ 85044

SUBJECT: Request to Become a Cooperating Agency/Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Bowker:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, and Hurricane City, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

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We appreciate your participation on this project and look forward to the opportunity to work with you. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 10, 2015

In Reply Refer To:
HDA-UT

Ms. Najah Duvall-Gabriel
Historic Preservation Specialist
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington, DC 20001-2637

SUBJECT: Request to Become a Cooperating Agency/Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Ms. Duvall-Gabriel:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, and Hurricane City, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

Cooperating Agency Invitation

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Please respond to FHWA in writing with an acceptance or denial of this invitation prior to October 15, 2015. If you have any questions or would like to discuss in more detail the project or our agencies' respective roles and responsibilities during the preparation of this EA, please contact me directly at (801) 955-3516 or at David.Cox@dot.gov.

Scoping

At this time, we request your assistance in identifying potential resources that may occur in the project area, as well as any concerns, requirements, or recommendations that you may have in relation to the proposed project. You are also invited to a scoping meeting that will be held at the **UDOT St. George Office at 5340 West 200 South, Hurricane, Utah on October 8, 2015** at **3:00 p.m.** If you plan to attend the scoping meeting, please RSVP to Stan Jorgensen at Horrocks Engineers, 2162 West Grove Parkway, Suite 400; Pleasant Grove, Utah 84062 or by e-mail at stan@horrocks.com by October 7, 2015.

We appreciate your participation on this project and look forward to the opportunity to work with you. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 10, 2015

In Reply Refer To:
HDA-UT

Mr. Brian Tritle
Field Office Manager
Bureau of Land Management
345 East Riverside Drive
St. George, UT 84790

SUBJECT: Request to Become a Cooperating Agency/Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Tritle:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, and Hurricane City, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

Cooperating Agency Invitation

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Sincerely,

David Cox
Area Engineer

Enclosures (2)

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, STE 9-A
Salt Lake City, UT 84129-1874
801-955-3500
FAX 801-955-3539

September 10, 2015

In Reply Refer To:
HDA-UT

Mr. Larry Crist
Utah Field Office Supervisor
US Fish & Wildlife Service
2369 West Orton Circle, STE 50
West Valley City, UT 84119-7603

SUBJECT: Request to Become a Cooperating Agency/Scoping
Purgatory Road Environmental Assessment
Washington County, Utah
UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Crist:

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, and Hurricane City, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Washington Dam Road and State Route 9 in Washington County, Utah. Purgatory Road is a planned multi-modal facility that would connect two existing roadway facilities (see enclosed Project Location Map). The purpose of this project is to improve regional mobility and system linkage for travel in Washington County.

Cooperating Agency Invitation

With this letter, we extend your agency an invitation to become a cooperating agency with UDOT and FHWA in the development of the Purgatory Road EA. According to 40 CFR 1508.5, a Cooperating Agency is any Federal agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative.

Please respond to FHWA in writing with an acceptance or denial of this invitation prior to October 15, 2015. If you have any questions or would like to discuss in more detail the project or our agencies' respective roles and responsibilities during the preparation of this EA, please contact me directly at (801) 955-3516 or at David.Cox@dot.gov.

Scoping

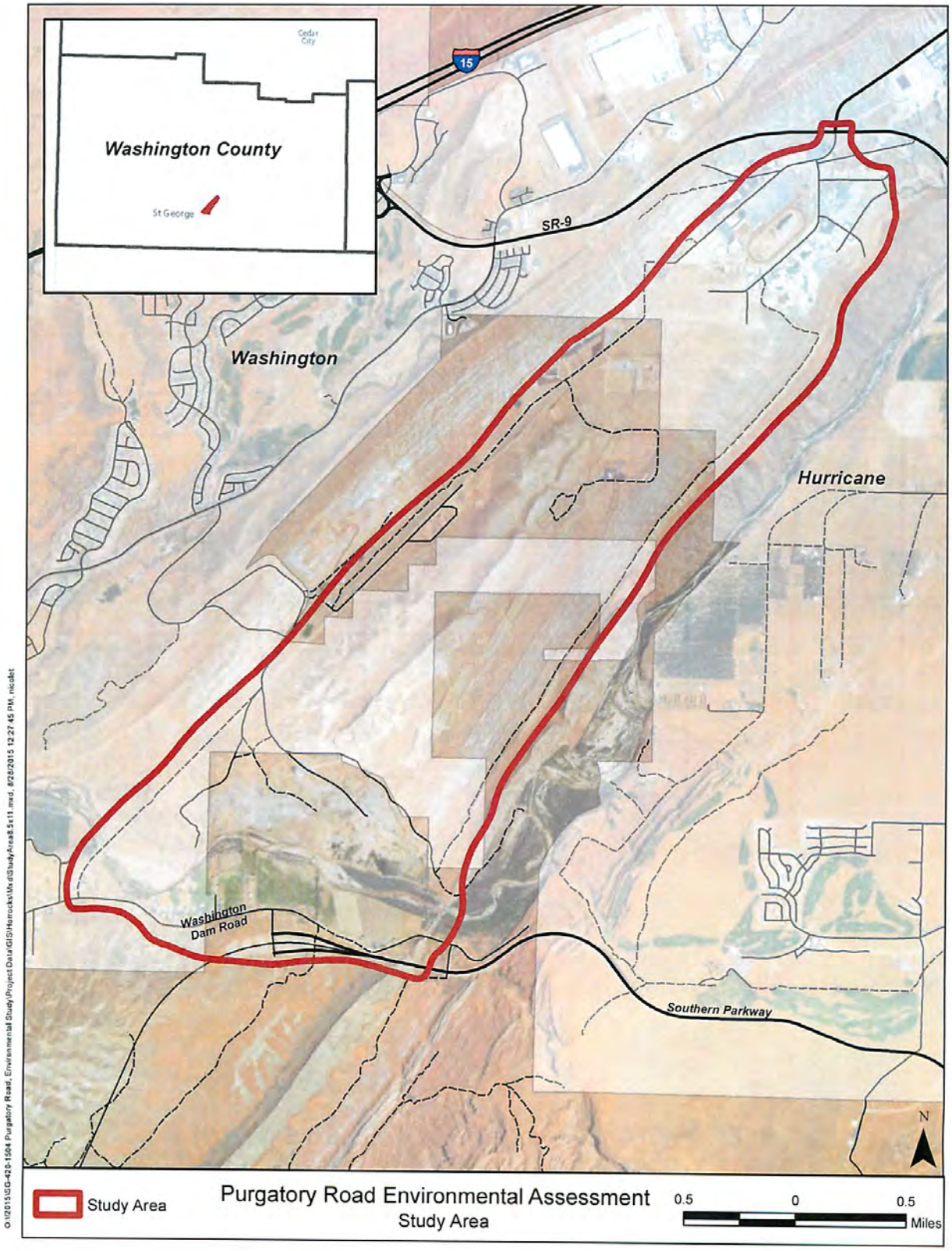
At this time, we request your assistance in identifying potential resources that may occur in the project area, as well as any concerns, requirements, or recommendations that you may have in relation to the proposed project. You are also invited to a scoping meeting that will be held at the **UDOT St. George Office at 5340 West 200 South, Hurricane, Utah on October 8, 2015** at **3:00 p.m.** If you plan to attend the scoping meeting, please RSVP to Stan Jorgensen at Horrocks Engineers, 2162 West Grove Parkway, Suite 400; Pleasant Grove, Utah 84062 or by e-mail at stan@horrocks.com by October 7, 2015.

We appreciate your participation on this project and look forward to the opportunity to work with you. In the meantime, if you have any questions or comments regarding this letter, please contact Stan Jorgensen at 801-763-5160.

Sincerely,

David Cox
Area Engineer

Enclosures (2)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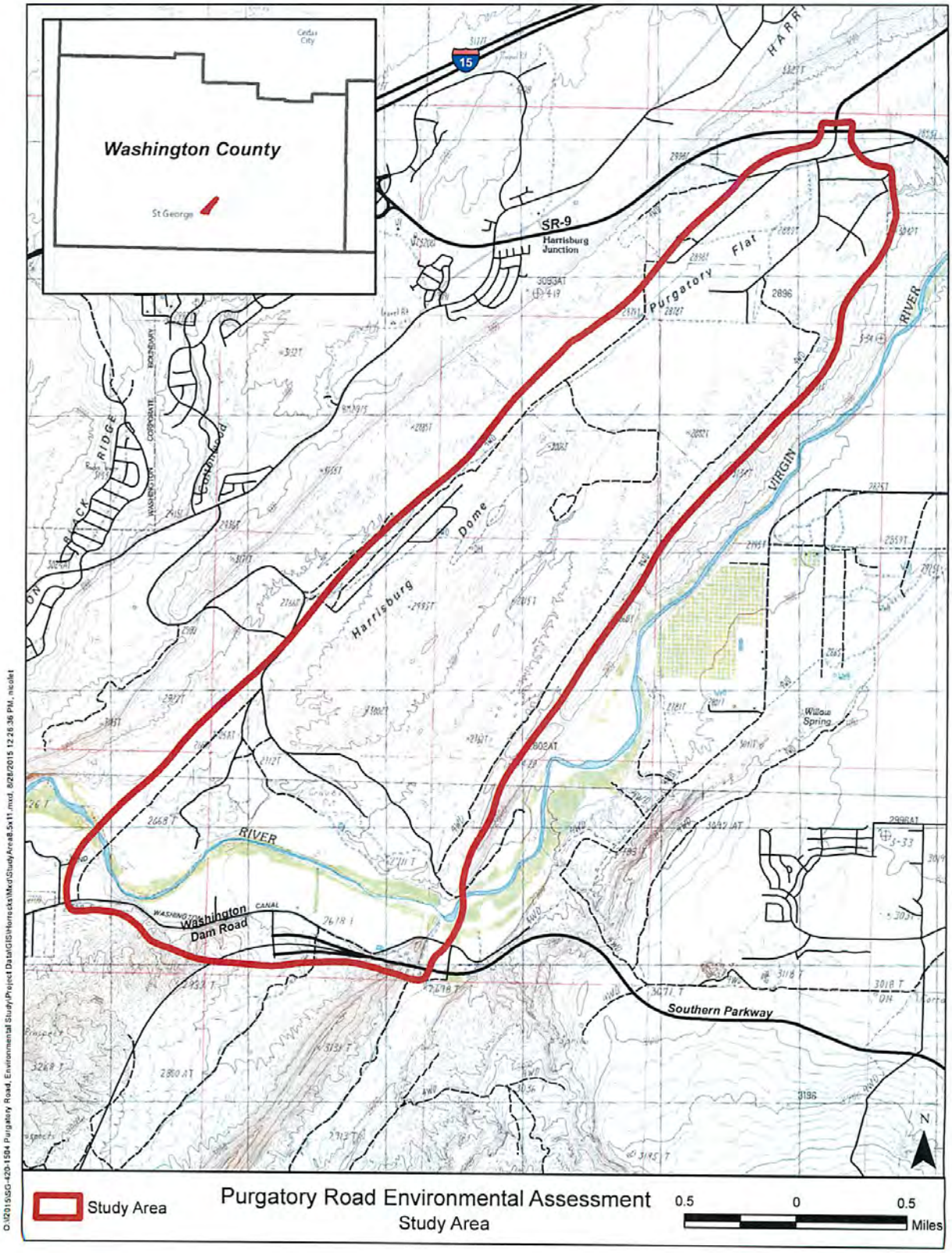
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From: Stan Jorgensen
To: Nicole Tolley
Subject: FW: Cooperating Agency for EA on Purgatory Road
Date: Wednesday, September 30, 2015 11:39:31 AM

From: bryan.dillon@dot.gov [mailto:bryan.dillon@dot.gov]
Sent: Wednesday, September 30, 2015 11:31 AM
To: Lee Cabell <Lee@horrocks.com>; Stan Jorgensen <Stan@horrocks.com>; branden@utah.gov
Subject: FW: Cooperating Agency for EA on Purgatory Road

Below is the response from the BLM accepting our invitation to be a Cooperating Agency on the project.

Teresa asked if an MOU will be developed defining roles and responsibilities?

Bryan Dillon
Urban Area Engineer
Local Public Agency Program Manager
FHWA - Utah Division
2520 West 4700 South, Ste 9A
Salt Lake City, UT 84129
801.955.3517

From: Burke, Teresa [mailto:tsburke@blm.gov]
Sent: Wednesday, September 30, 2015 10:54 AM
To: Dillon, Bryan (FHWA)
Cc: Brian Tritle
Subject: Cooperating Agency for EA on Purgatory Road

Hi Bryan,

It was nice talking to you on the phone today. The BLM accepts your invitation to be a cooperating agency for the EA to be prepared for the Purgatory Road project. I will plan to attend the scoping meeting on October 8th to get more information on the project. Will you be preparing an MOU for the agencies to sign regarding our roles and responsibilities?

Thanks,
Teresa

--
Teresa Burke
Realty Specialist
St. George Field Office
345 E. Riverside Dr.
St. George, UT 84770
435-688-3326

From: bryan.dillon@dot.gov
To: Lee Cabell; Stan Jorgensen; Nicole Tolley
Subject: FW: Purgatory Rd EA cooperating agency invitation
Date: Sunday, October 18, 2015 9:27:13 PM

EPA wishes to be a participating agency (to the extent their resources allow).

Bryan Dillon
Urban Area Engineer
Local Public Agency Program Manager
FHWA - Utah Division
2520 West 4700 South, Ste 9A
Salt Lake City, UT 84129
801.955.3517

From: Lloyd, Lisa [mailto:Lloyd.Lisa@epa.gov]
Sent: Friday, October 16, 2015 4:12 PM
To: Dillon, Bryan (FHWA)
Subject: RE: Purgatory Rd EA cooperating agency invitation

Bryan,

To the extent that our resources allow, we can be a participating agency in this EA project. If that changes as the EA processes moves forward, we will keep you informed.

Hope this provides that clarification you were seeking. If not give me a call, however, I will be out of the office on Monday and Tuesday of next week.

Lisa Lloyd
Acting Deputy Director
NEPA Compliance and Review Program
U.S. EPA Region 8 (EPR-N)
1595 Wynkoop St.
Denver, Colorado 80202-1129
(303) 312-6537 (office)

From: bryan.dillon@dot.gov [mailto:bryan.dillon@dot.gov]
Sent: Friday, October 16, 2015 7:37 AM
To: Lloyd, Lisa
Subject: RE: Purgatory Rd EA cooperating agency invitation

Lisa,

Declining to be a Cooperating Agency would make the EPA a Participating Agency by default.

Was that your intent? If not, would you please send me an email stating as much?

Bryan Dillon
Urban Area Engineer

From: Lewis, Charles [mailto:chip.lewis@bia.gov]
Sent: Thursday, October 29, 2015 11:43 AM
To: Cox, David (FHWA) <David.Cox@dot.gov>
Cc: Garry Cantley <garry.cantley@bia.gov>; Paul Schlafly <paul.schlafly@bia.gov>
Subject: Purgatory Road Environmental Assessment: UDOT Project No. F-LC(53)72; PIN No. 12747

Dear Mr. Cox,

Thank you for your letter dated September 10, 2015, inviting our participation as a Cooperating Agency for the purposes of preparing an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Washington Dam Road and State Route 9 in Washington County, Utah. The Bureau of Indian Affairs (BIA), Western Region, respectfully declines your invitation to be a participating agency for the subject EA.

The BIA Western Region has determined that our agency has no jurisdiction or authority with respect to the project; no expertise or information relevant to the project; and does not intend to submit comments on the project. The BIA does, however, recommend that the Federal Highway Administration consult with potentially affected tribes.

Should the scope of the project change or if we can be of assistance in any way, please contact myself or Mr. Gary Cantley at (602) 379-6750

Sincerely,

Chip Lewis
Acting Regional Environmental Compliance Officer

--
Chip Lewis
Environmental Protection Specialist
DOI-BIA/WRO/DOT
(602) 379-6782

United States Department of the Interior
FISH AND WILDLIFE SERVICE
UTAH FIELD OFFICE
2369 WEST ORTON CIRCLE, SUITE 50
WEST VALLEY CITY, UTAH 84119

October 30, 2015

FWS/R6
ES/UT
06E23000-2015-CPA-0034

David Cox, Area Engineer
Federal Highway Administration
Utah Division
2520 West 4700 South, Suite 9A
Salt Lake City, Utah 84129-1874

RE: Invitation to be a Cooperating Agency and Scoping for Purgatory Road Environmental Assessment, Washington County, Utah

Dear Mr. Cox:

We appreciate your invitation, received September 15, 2015, to be a cooperating agency on the Environmental Assessment (EA) for the subject project. With this letter, the U.S. Fish and Wildlife Service (Service) accepts your invitation to be recognized as a cooperating agency for the above referenced project. As a cooperating agency, the roles of the Service will include:

- Consulting on relevant technical studies required for the project;
- Reviewing project information including study results and document review in a timely manner;
- Expressing our views on subjects within our jurisdiction or expertise;
- Participating in joint public involvement activities;
- Identifying EIS content necessary to discharge our National Environmental Policy Act responsibilities and other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

We appreciate your coordination efforts including the agency scoping meeting held on October 8, 2015, which we attended by phone. We provide the following comments for your consideration.

Pursuant to the National Environmental Policy Act (NEPA), the Migratory Bird Treaty Act (MBTA), and the Endangered Species Act (ESA) of 1973, we are identifying issues that should

be addressed relative to fish and wildlife resources for this project. In Section 1 of this letter we convey our concerns that should be addressed in the NEPA compliance document for this project. Section 2 of this letter addresses your ESA section 7 responsibilities.

Section 1

Ecological Effects of Roads

Roads have significant ecological effects, creating permanent negative impact to the land on which they are built and to the terrestrial and aquatic habitats adjacent to the road. A new roadway in the study area is likely to have significant ecological impacts to sensitive Mojave Desert species and species associated with the Virgin River corridor. The study area contains the Virgin River, its floodplain and associated riparian corridor; sensitive desert soils, native vegetation, and pollinator habitat; and habitat for migratory birds including raptors.

Federally-listed species that may occur in the study area include: Holmgren milk-vetch (*Astragalus homgreniorum*), Shivwits milk-vetch (*Astragalus ampullarioides*), dwarf bear-poppy (*Arctomecon humilis*), and Siler pincushion cactus (*Pediocactus sileri*); Mojave desert tortoise (*Gopherus agassizii*); southwestern willow flycatcher (*Empidonax traillii extimus*) and western yellow-billed cuckoo (*Coccyzus americanus*); and Virgin River chub (*Gila seminuda)* and woundfin (*Plagopterus argentissimus*). The study area contains designated critical habitat for Holmgren milk-vetch, southwestern willow flycatcher, Virgin River chub, and woundfin. These species and our preliminary recommendations are discussed below, see *Endangered Species*.

The EA should fully analyze the direct, indirect and cumulative ecological effects of all build alternatives on the area's sensitive fish, wildlife, and plant species, their habitats, and designated critical habitat. Effects include but may not be limited to: direct mortality; direct habitat loss; on-road mortality; displacement of wildlife from noise, light and disturbance; introduction and spread of noxious weeds; increased dust generation and soil erosion; water quality impacts; impacts to pollinators from habitat loss, fragmentation and degradation of habitat; induced growth of residential and commercial development; and increased access and opportunity for recreational activities including off-highway vehicle use (Tepedino 1979, Everett 1980, Farmer 1993, Sharifi et al. 1997, Tepedino 1997, Forman and Alexander 1998, Debinski and Holt 2000, Forman 2000, Trombulak and Frissell 2000, Brigham and Schwartz 2003, Brock and Green 2003, Brooks 2003, Gelbard and Belnap 2003, Brooks and Lair 2005).

The EA should evaluate each alternative relative to its potential to induce development in the surrounding area and its corresponding impact to fish, wildlife, plants, and designated critical habitat. We recommend you analyze the anticipated land use changes, timing, and rate of change that the new road would induce, given the current absence of paved access in the area; new interchange locations or points of access are an important consideration as well. The analysis should include an examination of the spatial pattern of anticipated growth relative to the distribution of endangered plants and designated critical habitat. Although the Federal Highway Administration's NEPA policy may not require full evaluation of the effects of induced growth, the ESA regulations require analyses and minimization of indirect effects, including

growth/development associated with new highways (National Wildlife Federation v. Coleman, 5th Circuit March 25, 1976).

The EA should also evaluate changes in water drainage patterns from road construction and effects to water quality from the creation of an impervious road surface. Depending on the design of the road, modification of water drainage from road construction can alter wetlands or reduce available water in the Virgin River. Wetlands provide habitat for migratory birds (see *Migratory Birds* below), attenuate flood waters, and improve water quality by filtering out contaminants and sediment (EPA 2001). Any alteration of wetlands in the project area could reduce the ability of wetlands to fulfill these functions. Reductions in water flow in the Virgin River adversely affect native fishes by reducing available aquatic habitat and increasing water temperatures, potentially above critical levels for survival of fishes (Annear et al. 2004).

The introduction of impervious surfaces from road construction can also increase runoff during storm events and introduce contaminants, such as petroleum products or sediment into critical aquatic habitat. Contaminants can kill native vegetation, reduce amounts of potable water for human use, and reduce availability and quality of aquatic habitats for native species (Castro and Reckendorf 1995, Fleeger et al. 2003). We recommend the EA include appropriate best management practices and measures to mitigate impacts to water quantity and quality effects from road construction.

As with all projects that will create surface disturbance, there is potential for introduction and spread of invasive species. All possible measures should be taken to prevent the introduction or further proliferation of invasive species. Monitoring and control efforts should be implemented following construction. Revegetation seed mixes should contain native plants or non-natives that will not naturalize.

Endangered Species

The study area contains occupied habitat for several species listed under the ESA. As such, we recommend the EA evaluate an array of alignment alternatives in addition to the No Action alternative; fully evaluate all direct, indirect, and cumulative effects of the action; and identify appropriate conservation measures to fully mitigate impacts to listed species. We encourage you to work with our office to identify reasonable, appropriate, and meaningful measures that will not only mitigate the impacts of the project but will also assist in the conservation of the species, per direction to federal agencies under section 7(a)(1) of the ESA.

The project study area contains designated critical habitat for the endangered Holmgren milk-vetch (*Astragalus homgreniorum*), a species endemic to the Mojave Desert around St. George. Holmgren milk-vetch is typically found on the skirt edges of hill and plateau formations slightly above or at the edge of drainage areas; it occurs on soils characterized by small stone and gravel deposits and where living cover is less than 20 percent of the landscape. The species is threatened by urban development, off-road vehicle use, grazing, invasive plants, and mineral development. Recovery of the species and its eventual removal from the federal list depends on conservation of extant populations and establishment of enough additional populations to ensure long-term demographic and genetic viability. We recommend surveys be conducted within

suitable habitat for the species and any surface disturbing activities from this project avoid designated critical habitat and any other occupied habitat for this species by at least 300 feet. All effects of the project to the Holmgren milkvetch and its designated critical habitat should be analyzed in the EA, with impacts avoided or minimized to the maximum extent possible, and mitigation measures identified.

The project study area may contain suitable habitat for the endangered Shivwits milk-vetch (*Astragalus ampullarioides*), endangered dwarf bear-poppy (*Arctomecon humilis*), and the threatened Siler pincushion cactus (*Pediocactus sileri*). Shivwits milk-vetch is found in isolated pockets of clay soils of the Chinle and Moenave formations, while the dwarf bear-poppy and Siler pincushion cactus grow in soils of the Moenkopi Formation, with slightly basic soils, high in both gypsum and calcium carbonate, and including expanding clays. We recommend surveys be conducted in suitable habitat for these species and that any surface disturbance from this project be avoided by at least 300 feet from individual plants. All effects of the project to federally-listed plants should be analyzed in the EA, with impacts avoided to the maximum extent possible, and mitigation measures identified.

The study area contains suitable habitat for Mojave desert tortoise (*Gopherus agassizii*), an animal listed as threatened under the ESA. This species can be found on flats, alluvial fans, and rocky terrain including rocky slopes. Occurrence of the species within these areas typically coincides with specific soil types. Friable soil is necessary for the creation of burrows which provide protection from heat and predators. Desert tortoise habitat is also defined by certain plant species, and burrobush, blackbrush, mojave yucca, and creosote bush typically characterize its habitat. Surveys per Service protocol should be conducted within suitable habitat within the study area. Effects to this species include mortality on roadways, habitat changes from increased invasive plant species, and fragmentation of habitats from the highway and induced growth.

Critical habitat for the southwestern willow flycatcher (*Empidonax traillii extimus*) is designated within the study area along the Virgin River and its floodplain. Critical habitat is necessary to provide sufficient riparian habitat for breeding, non-breeding, territorial, dispersing and migrating southwestern willow flycatchers. Habitat for the southwestern willow flycatcher is typified by areas of dense riparian vegetation, which may include tamarisk, native willow, or both. Riparian habitat can occur in a mosaic with small openings of water or short vegetation. Breeding sites are normally near standing water or saturated soil.

Suitable habitat for southwestern willow flycatchers and western yellow-billed cuckoos (*Coccyzus americanus*) may occur along the Virgin River corridor within and adjacent to your study area. Western yellow-billed cuckoo breeding habitat generally consists of large tracts of low- and mid-elevation riparian habitat with dense shrubs and overstory forests, especially cottonwood-willow associations (see Attachment A, Guidelines for identification of suitable breeding, nesting, and foraging habitat for western yellow-billed cuckoo [2015]). We recommend you conduct surveys for these species per Service protocol in suitable habitats within 0.50 mile of project activities. Please coordinate any survey efforts with our office and the Utah Division of Wildlife Resources (UDWR) to prevent duplication of efforts.

The EA should analyze all direct, indirect, and cumulative effects of the project to western yellow-billed cuckoo and southwestern willow flycatcher and its designated critical habitat. Potential impacts include but are not limited to on-road mortality, habitat loss, noise, lights, disturbance, spread of noxious weeds, and increased human access and use of habitat areas (see *Ecological Effects of Roads*). Removal of riparian vegetation should be avoided to the maximum extent possible, and compensatory mitigation identified for temporary and permanent habitat loss. We recommend avoidance of disturbance during the nesting season (April 15 – August 15 for southwestern willow flycatcher and June 1 – August 31 for western yellow-billed cuckoo) unless surveys demonstrate no occupancy.

The Virgin River provides habitat for the woundfin (*Plagopterus argentissimus*) and Virgin River chub (*Gila seminuda*), both listed as endangered under the ESA. All effects of the project to the Virgin River or its floodplain should be analyzed in the EA, and impacts avoided or minimized to the maximum extent possible, with mitigation measures identified. If a new bridge is necessary, it should span as much of the floodplain as possible and be designed to pass stream bedload and large wood. Filling in the floodplain approaches for the bridge is not recommended as this may increase river incising and/or increase river velocities. If work within the wetted channel is necessary, we recommend you coordinate with UDWR to conduct fish clearances. Any work within the wetted channel should occur between August 1 and March 31 to avoid spawning fish.

Migratory Birds

The EA should specifically address potential short-term and long-term impacts to migratory birds and their habitat. Executive Order 13186 on the Responsibilities of Federal Agencies to Protect Migratory Birds directs agencies to avoid or minimize adverse impacts on migratory bird populations and their habitats when conducting agency actions. The Executive Order also identifies the need to restore and enhance the habitat of migratory birds. Long-term impacts to migratory bird habitats, including indirect and cumulative effects should be mitigated, and the EIS should identify additional opportunities to restore and enhance bird habitat.

While the prohibitions of take under the Migratory Bird Treaty Act (MBTA) apply year-round, we recommend that particular attention be given toward avoiding and minimizing impacts during the breeding season of migratory birds. For example, clearing vegetation used by nesting birds should occur outside of the nesting season. The EA should also consider mitigating the interim loss of this habitat.

Build alternatives should identify best management practices for construction and bridge maintenance, and include design features to reduce unintentional take of migratory birds. For example, we recommend avoiding or reducing lighting to the extent possible; if lighting is necessary, we recommend the use of low intensity, downward-facing lighting on short poles. If vehicle collisions are an issue, design features could include bird diversion structures such as short poles placed at regular intervals, which encourage birds to fly over the roadway (Egensteiner et al. 1998, Bard et al. 2001).

We recommend that particular emphasis be given to species on the Service's 2008 List of Birds of Conservation Concern (BCC) and those identified as Priority Species by the Utah Partners in Flight (PIF). Species on the BCC and PIF lists are considered high conservation priorities; to prevent further decline of these species, we encourage you to develop project alternatives to minimize impacts, identify conservation and mitigation measures to be incorporated in the alternatives, and include habitat improvements into the project plan where feasible. The *Utah Partners in Flight Avian Conservation Strategy* (Parrish et al. 2002) and the *Utah Comprehensive Wildlife Conservation Strategy* (UDWR 2005) may be useful in preparing this analysis. A newly revised Utah Wildlife Action Plan is expected to be released soon, which also should provide useful information.

We recommend use of the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* (USFWS 2002) which were developed, in part, to provide consistent application of raptor protection measures statewide and provide full compliance with environmental laws regarding raptor protection. Raptor surveys and mitigation measures are provided in the Raptor Guidelines as recommendations to ensure that proposed projects will avoid adverse impacts to raptors.

Section 2

Federal agencies have specific, additional responsibilities under section 7 of the ESA. You may obtain current county species lists from the Service's Information Planning and Conservation website at: http://ecos.fws.gov/ipac. We recommend that you check this website on a regular basis to confirm that you are working with the most current list.

Agencies should review the proposed action and determinate if the action may affect any listed species or their critical habitat. If it is determined by the Federal agency, with the written concurrence of the Service, that the action is not likely to adversely affect listed species or critical habitat, the consultation process is complete, and no further action is necessary unless project plans change or new information becomes available on species and critical habitat.

Formal consultation (50 CFR 402.14) is required if the Federal agency determines that an action is "likely to adversely affect" a listed species or will result in adverse modification of critical habitat (50 CFR 402.02). Federal agencies should also confer with the Service on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 CFR 402.10). A written request for formal consultation or conference should be submitted to the Service with a completed biological assessment and any other relevant information (50 CFR 402.12).

Only a Federal agency can enter into formal ESA section 7 consultation with the Service. A Federal agency may designate a non-Federal representative to conduct informal consultation or prepare a biological assessment by giving written notice to the Service of such a designation. The ultimate responsibility for compliance with ESA section 7, however, remains with the Federal agency.

Your attention is also directed to section 7(d) of the ESA, as amended, which underscores the requirement that the Federal agency or the applicant shall not make any irreversible or irretrievable commitment of resources during the consultation period which, in effect, would deny the formulation or implementation of reasonable and prudent alternatives regarding their actions on any endangered or threatened species.

We appreciate the invitation and look forward to working with you on this project as a cooperating agency. Our lead biologist on this project will be Betsy Herrmann, Supervisory Fish and Wildlife Biologist. She can be reached at the letterhead address or (801) 975-3330 ext. 139, or email: betsy_herrmann@fws.gov.

Sincerely,

for Larry Crist
Utah Field Supervisor

Enclosure

cc: Rhett Boswell, UDWR, 1470 N Airport Rd, Cedar City, UT 84720
Steve Meismer, Virgin River Program, 533 E Waterworks Drive, St. George, Utah 84770
Stan Jorgensen, Horrocks Engineers, Pleasant Grove, Utah – by email
Brandon Weston, UDOT – by email

Literature Cited

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Attachment A

Guidelines for identification of suitable breeding and nesting habitat for western yellow-billed cuckoo in Utah, Colorado, and Wyoming

The purpose of this guidance is to assist agencies and project proponents in identifying areas that meet minimum criteria as potentially suitable breeding and nesting habitat for yellow-billed cuckoo in Utah, Colorado and Wyoming. Areas that meet the minimum criteria should be (1) avoided by 0.5 mile[1], or (2) surveyed, and/or (3) carried forward for evaluation of potential effects.

Step 1: Identify and delineate all riparian habitats within 0.5 mile of the proposed action, below the elevation of 8,500 feet.

Step 2: Identify suitable cuckoo breeding and nesting habitat, including associated foraging areas.

Riparian patches used by breeding and nesting cuckoos vary in size and shape, ranging from a relatively contiguous stand of mixed native/exotic[2] vegetation to an irregularly shaped mosaic of dense vegetation with open areas. The following parameters characterize suitable breeding and nesting cuckoo habitat:

- Vegetation[3] that is predominantly multi-layered, with riparian canopy trees and at least one layer of understory shrubby vegetation;
- Patches of multi-layered vegetation (as described above) that are at least 12 acres (5 ha) or greater in extent and separated from other patches of suitable habitat by at least 300 meters;
- Somewhere within a patch, the multi-layered riparian vegetation (as described above) should be at least 100 meters wide by 100 meters long. This is to avoid patches that may be long enough to meet the minimum area (12 acres) but are so narrow that they are unsuitable-- 750 m x 75 m (length x width) for example; and,
- Open areas, or gaps of multi-layered vegetation within a patch are less than 300 meters.

Breeding and nesting cuckoos will forage in riparian patches that have an overstory canopy *only* and are within 300 meters (m) of the edge of suitable breeding and nesting habitat. Identify suitable foraging habitat of nesting cuckoo to include single layer overstory canopy that is within 300 meters of suitable breeding and nesting habitat.

References

Halterman, M., M.J. Johnson, J.A. Holmes and S.A. Laymon. 2015. A Natural History Summary and Survey Protocol for the Western Distinct Population Segment of the Yellow-billed Cuckoo: U.S. Fish and Wildlife Techniques and Methods, 45 p.

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[1] A 0.5-mile buffer is likely the largest buffer necessary to preclude impacts to the species from noise, light and human disturbance. Regardless, this buffer could be adjusted according to the type of activity and noise that is generated (for example, oil well drilling as opposed to construction vehicle traffic).

[2] Western yellow-billed cuckoo have been documented nesting in tamarisk, consequently, the presence of tamarisk should not eliminate a vegetation patch from a suitability determination. However the odds of cuckoo occurrence decrease rapidly as the amount of tamarisk cover increases.

[3] Riparian overstory and understory vegetation that supports suitable cuckoo habitat may include: cottonwood (*Populus spp*), willow (*Salix* spp), alder (*Alnus spp*), walnut (*Juglans spp*), boxelder (*Acer spp*), sycamore (*Plantanus spp*), ash (*Fraxinus spp*), mesquite (*Prosopis spp*), tamarisk (*Tamarix spp*), and Russian olive (*Elaeagnus angustifolia*). Suitable understory vegetation does not include grasses or forbs although herbaceous vegetation is often present alongside shrubby understory.

U.S. Department of Transportation
Federal Highway Administration

Utah Division

2520 West 4700 South, Suite 9-A
Salt Lake City, UT 84118-1847
801-955-3500
801-955-3539

March 22, 2016

In Reply Refer To:
HDA-UT

Ms. Corrina Bow
Kanosh Band of the Paiutes
476 South 700 West
Cedar City, Utah 84720

Dear Ms. Bow:

In cooperation with the Federal Highway Administration (FHWA), the Utah Department of Transportation (UDOT), Washington County, Hurricane City, Washington City, and the Dixie Metropolitan Planning Organization, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Southern Parkway (SR-7) and State Route 9 (SR-9) in Washington County, Utah (see attached maps). Purgatory Road is a planned facility that would connect two existing roadway facilities. The project area traverses private land and land managed by the St. George Field Office of the Bureau of Land Management (BLM). The project may be referenced under UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747).

The area of potential effects (APE) for the Project is shown in the enclosed project area maps. The APE includes the entire Purgatory Valley to account for potential indirect effects of the project. An archival records review of previous archaeological work within the project APE and a pedestrian survey of the area directly impacted by the proposed roadway will be conducted by a qualified archaeologist. This direct impact area measures 75 feet from either side of the proposed roadway center line. A copy of the inventory results report will be kept on file at the UDOT Dixie Division Office in Hurricane, Utah and will be available for your review upon request.

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and the *Second Amended Programmatic Agreement among the Federal Highway Administration, the Utah State Historic Preservation Officer, the Advisory Council on Historic Preservation, the United States Army Corps of Engineers, Sacramento District, and the Utah Department of Transportation Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah* (Section 106 PA) (signed into effect June 3, 2013), the FHWA will be responsible for consultation with Native American tribes/bands on this project. In accordance with Stipulation IV, Part B of the Section 106 PA, the UDOT has responsibility, assigned by the FHWA, for carrying out activities to ensure compliance with Section 106 of the NHPA, except for Native American consultation.

In compliance with the 106 PA, the FHWA requests that you review the information in this letter and enclosed project information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by the proposed undertaking. If you feel that there are any historic properties that may be impacted, we request your notification as such and your participation as a consulting party during the development of the environmental document. Please be assured that, in accordance with confidentiality and disclosure stipulations in Section 304 of the NHPA, the FHWA and the UDOT will maintain strict confidentiality about certain types of information regarding traditional religious and/or cultural places that may be affected by this proposed undertaking.

At your request, the FHWA and the UDOT staff will be available to meet with you to discuss any concerns you might have about the project. Should you have any questions or concerns about this project and/or wish to be a consulting party, feel free to contact me at 801-955-3516 or at David.Cox@dot.gov, or Eric Hansen at 435-772-

3516 or at erichansen@utah.gov. We would also appreciate any suggestions you might have about other groups or individuals that we should contact regarding this project or ways that we may more effectively consult with your Tribe/Band.

To facilitate our consultation with you regarding this project, we would greatly appreciate a response to this letter within 30 days of receipt.

Thank you for your attention to this project notification and any comments you may have.

Sincerely,

Bryan Dillon
Area Engineer, Region 4

Enclosures (3)

cc: Mr. Eric Hansen, NEPA/NHPA Specialist, UDOT Region Four

LIST OF OTHER TRIBES/BANDS NOTIFIED OF THE PROJECT:

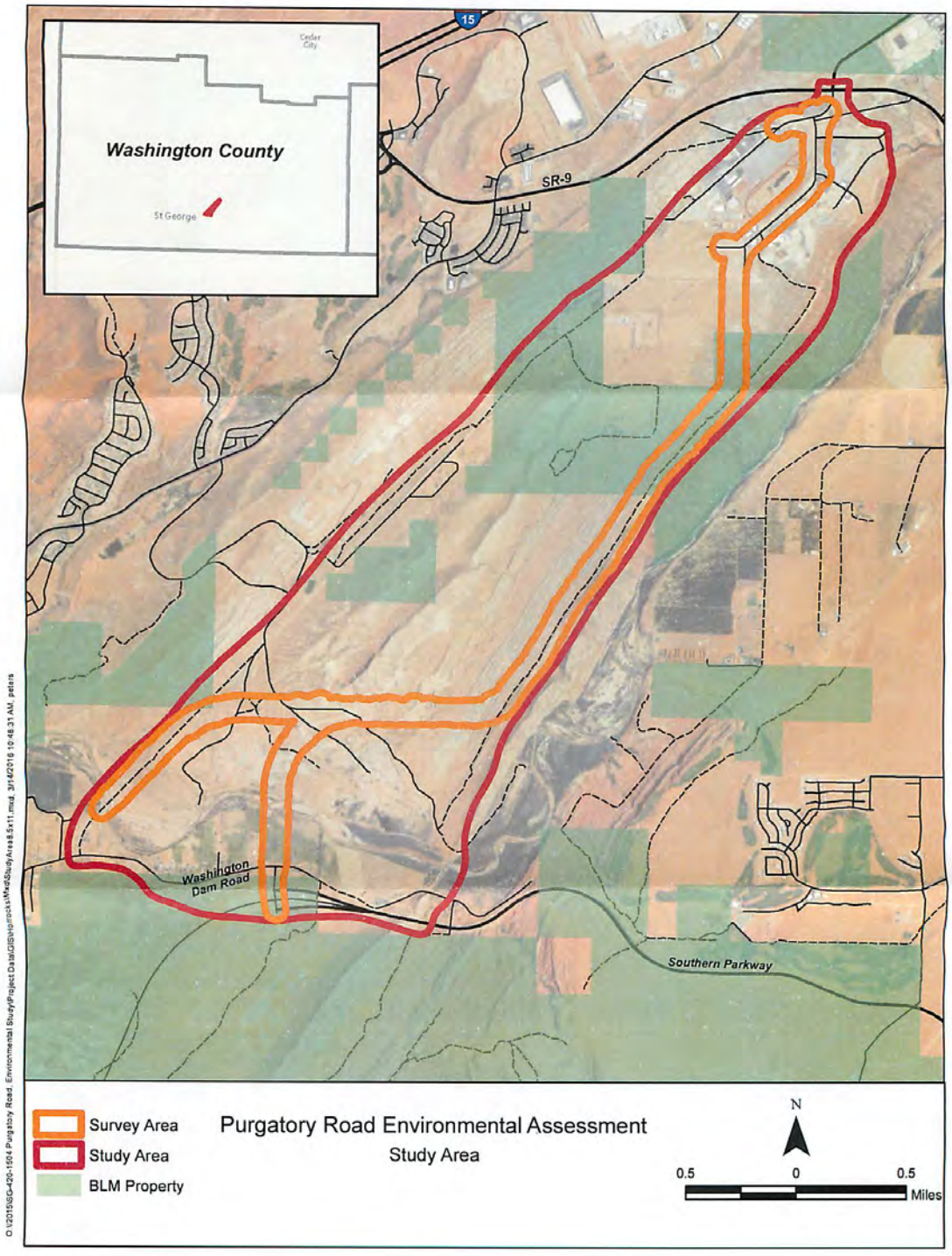
Tribal Contact List for: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747).

IDENTICAL COPIES OF THIS LETTER SENT TO THE FOLLOWING:

Original to:	CC to:
Mr. Herman G. Honanie, Chairman Pueblo of Hopi P.O. Box 123 Kykotsmovi, AZ 86039	Mr. Leigh Kuwanwisiwma, Director Hopi Cultural Preservation Office Pueblo of Hopi P.O. Box 123 Kykotsmovi, AZ 86039
Ms. Gari Lafferty, Tribal Chairperson Paiute Indian Tribe of Utah 440 North Paiute Drive Cedar City, UT 84720	Ms. Dorena Martineau, Cultural Resources Manager Paiute Indian Tribe of Utah 440 North Paiute Drive Cedar City, UT 84720
Mr. Richard Jenks, Jr., Chairperson Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026	Ms. Betsy Chapoose, Director, Cultural Rights and Protection Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation P.O. Box 190 Fort Duchesne, UT 84026
Ms. Corrina Bow Kanosh Band of the Paiutes 476 South 700 West Cedar City, Utah 84720	

PROJECT INITIAL TRIBAL NOTIFICATION FORM WITH PROJECT INFORMATION SENT TO THE FOLLOWING (IN ACCORDANCE WITH TRIBAL SECTION 106 PAs; SENT BY THE UDOT REGION ARCHAEOLOGIST):

Mail Original to:	Mail CC to:	Email to:
Ms. Lora Tom, Band Chairwoman Cedar Band of Paiutes 4655 North Utah Trail Enoch, UT 84720	Vala Parashonts Cultural Resource Representative 533 South 640 West Cedar City, UT 84721	lora.tom@ihs.gov (Lora Tom)
Jetta Wood (Chairwoman) Shivwits Band of Paiute Indians 6060 West 3650 North Ivins, UT 84738	Shanan Anderson (CR Representative) Shivwits Band of Paiute Indians 6060 W. 3650 N Ivins, UT 84738	martineau@shivwits.org
Jeanine Borchardt Indian Peaks Band of the Paiutes 526 South 940 West Cedar City, UT 84720		


Cedar City
Washington County
St George
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SR-9
Washington Dam Road
Southern Parkway
Survey Area
Study Area
BLM Property
Purgatory Road Environmental Assessment
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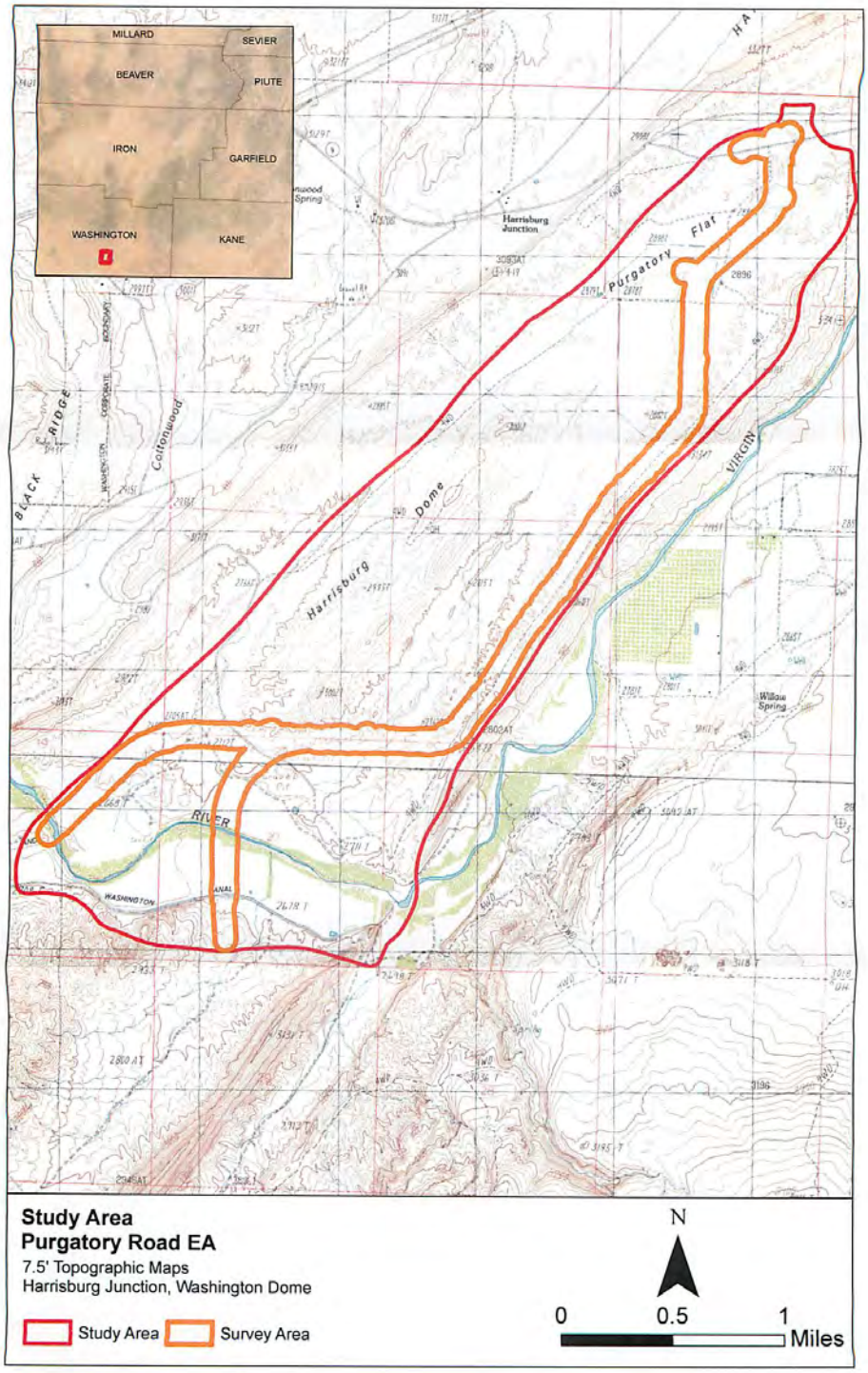
MILLARD
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IRON
GARFIELD
WASHINGTON
KANE
Harrisburg Junction
Purgatory Flat
Cottonwood
Harrisburg Dome
VIRGIN
RIVER
Willow Spring
Study Area
Purgatory Road EA
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Harrisburg Junction, Washington Dome
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State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

March 22, 2016

Southern Utah Wilderness Alliance
425 East 100 South
Salt Lake City, Utah 84111

Re: Purgatory Road Environmental Assessment

To Whom it may Concern:

In cooperation with the Federal Highway Administration (FHWA), the Utah Department of Transportation (UDOT), Washington County, Hurricane City, Washington City, and the Dixie Metropolitan Planning Organization, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Southern Parkway (SR-7) and State Route 9 (SR-9) in Washington County, Utah (see attached maps). Purgatory Road is a planned facility that would connect two existing roadway facilities. The project area traverses private land and land managed by the St. George Field Office of the Bureau of Land Management (BLM). The project may be referenced under UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747).

The area of potential effects (APE) for the Project is shown in the enclosed project area maps. The APE includes the entire Purgatory Valley to account for potential indirect effects of the project. An archival records review of previous archaeological work within the project APE and a pedestrian survey of the area directly impacted by the proposed roadway will be conducted by a qualified archaeologist. This direct impact area measures 75 feet from either side of the proposed roadway center line. A copy of the inventory results report will be kept on file at the UDOT Dixie Division Office in Hurricane, Utah and will be available for your review upon request.

UDOT requests that you review this information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by this undertaking. If your organization is aware of any historic properties that may be impacted by the proposed project, we request your notification as such and your participation as a consulting party during the development of the environmental document.

At your request, UDOT staff will be available to meet with you to discuss any concerns you might have. We would also appreciate any suggestions you might have about any other groups or individuals that we should contact regarding this project.

Thank you for your attention,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation

State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

March 22, 2016

Kristine Curry
State and Institutional Trust Lands Administration
675 East 500 South, Suite 500
Salt Lake City, Utah 84102

Re: Purgatory Road Environmental Assessment

Dear Ms. Curry:

In cooperation with the Federal Highway Administration (FHWA), the Utah Department of Transportation (UDOT), Washington County, Hurricane City, Washington City, and the Dixie Metropolitan Planning Organization, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Southern Parkway (SR-7) and State Route 9 (SR-9) in Washington County, Utah (see attached maps). Purgatory Road is a planned facility that would connect two existing roadway facilities. The project area traverses private land and land managed by the St. George Field Office of the Bureau of Land Management (BLM). The project may be referenced under UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747).

The area of potential effects (APE) for the Project is shown in the enclosed project area maps. The APE includes the entire Purgatory Valley to account for potential indirect effects of the project. Approximately 8.5 acres of SITLA property lies within the APE, but is expected to be unaffected by the current design. An archival records review of previous archaeological work within the project APE and a pedestrian survey of the area directly impacted by the proposed roadway will be conducted by a qualified archaeologist. This direct impact area measures 75 feet from either side of the proposed roadway center line. A copy of the inventory results report will be kept on file at the UDOT Dixie Division Office in Hurricane, Utah and will be available for your review upon request.

UDOT requests that you review this information to determine if there are any historic properties of traditional religious and/or cultural importance that may be affected by this undertaking. If your organization is aware of any historic properties that may be impacted by the proposed project, we request your notification as such and your participation as a consulting party during the development of the environmental document.

At your request, UDOT staff will be available to meet with you to discuss any concerns you might have. We would also appreciate any suggestions you might have about any other groups or individuals that we should contact regarding this project.

Thank you for your attention,

Eric Hansen, Region 4 NEPA/NHPA Specialist

INITIAL UDOT – BLM CONSULTATION

Submitted in accordance with the *Interagency Agreement between the Utah Department of Transportation and the Utah Bureau of Land Management, Utah State Office, regarding Coordination of Cultural Resource Consultation Requirements under Section 106 of the National Historic Preservation Act and the Utah State Antiquities Act* (executed May 3, 2013).

Project Name: Purgatory Road; SR-9 to Washington Dam Road
Project PIN/Number: 12747/F-LC53(72)
Contact Information: Eric Hansen, Region 4 Environmental Manager
(435) 772-6628; erichansen@utah.gov

Other Agencies (other land management or permitting agencies):
FHWA, USACE, USFWS

Project Description (include type and amount of BLM land):
In cooperation with the Federal Highway Administration (FHWA), the Utah Department of Transportation (UDOT), Washington County, Hurricane City, Washington City, and the Dixie Metropolitan Planning Organization, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Southern Parkway (SR-7) and State Route 9 (SR-9) in Washington County, Utah (see attached maps). Purgatory Road is a planned facility that would connect two existing roadway facilities. The project area traverses private land and land managed by the St. George Field Office of the Bureau of Land Management (BLM). The area of potential effects (APE) for the Project is shown in the enclosed project area maps. The APE includes the entire Purgatory Valley to account for potential indirect effects of the project. There are approximately 660 acres of BLM property within the APE. Approximately 8.8 acres of BLM property would be directly affected by the proposed roadway.

Proposed Area of Potential Effects (APE):
The APE includes the entire Purgatory Valley to account for potential indirect effects of the project.

Proposed Scope of Identification Efforts (file search, pedestrian survey, windshield/reconnaissance survey, etc.):
A file search will be conducted for the APE. An intensive-level pedestrian survey will be conducted for a direct impact area measuring 75 feet from either side of the proposed roadway center line.

Potential Consulting Parties (including Native American Tribes): BLM; UDSH; USACE; Shivwits, Cedar, Kanosh, and Indian Peaks Bands of Paiutes; Paiute Indian Tribe of Utah; Pueblo of Hopi; Ute Indian Tribe of the Uintah and Ouray Ute Indian Reservation; Utah School and Institutional Trust Lands Administration; Southern Utah Wilderness Alliance.

Concur: Brian Tritle Date: 3/22/2016
Title: Field Manager

_____ No Response Date: _____ Initials: _____

Comments:

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

March 22, 2016

Pat McQueary, Project Manager
US Army Corps of Engineers
St. George Regulatory Office
196 East Tabernacle Street, Room 30
St. George, Utah 84770-3474

RE: UDOT Project No. F-LC53 (72); Purgatory Road, Washington County, Utah (PIN 12747).
Request for concurrence on the Area of Potential Effects.

Dear Pat:

The Utah Department of Transportation (UDOT) is preparing to undertake the subject federal-aid project which will likely require a permit from the U.S. Army Corps of Engineer (USACE). In accordance with the *Second Amended Programmatic Agreement among the Federal Highway Administration, the Utah State Historic Preservation Officer, the Advisory Council on Historic Preservation, the USACE Sacramento District, and the UDOT Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah* (executed June 3, 2013), the UDOT is requesting your concurrence on the area of potential effects for this project.

In cooperation with the Federal Highway Administration (FHWA), the Utah Department of Transportation (UDOT), Washington County, Hurricane City, Washington City, and the Dixie Metropolitan Planning Organization, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road between Southern Parkway (SR-7) and State Route 9 (SR-9) in Washington County, Utah (see attached maps). Purgatory Road is a planned facility that would connect two existing roadway facilities. The project area traverses private land and land managed by the St. George Field Office of the Bureau of Land Management (BLM).

The area of potential effects (APE) for the Project is shown in the enclosed project area maps. The APE includes the entire Purgatory Valley to account for potential indirect and cumulative effects of the project. A permit from your agency is required for a potential new crossing of the Virgin River. Please verify if this proposed area adequately encompasses the jurisdictional permit area or provide UDOT with a revised APE boundary.

An archival records review of previous archaeological work within the project APE and a pedestrian survey of the area directly impacted by the proposed roadway will be conducted by a qualified archaeologist. This direct impact area measures 75 feet from either side of the proposed roadway center

line. Copies of any inventory reports will be provided. We will continue to consult with your office regarding any effects to historic properties.

Please review this document and, providing you agree with the information contained herein, sign and date the signature line at the end of this letter. A response is requested within 15 days. Should you have any questions or need additional information, please feel free to contact Eric Hansen at 435-772-6628 or erichansen@utah.gov.

Sincerely,

Name
NEPA/NHPA Specialist
UDOT Region

Regarding UDOT Project No. UDOT Project No. F-LC53 (72); Purgatory Road, Washington County, Utah (PIN 12747), I concur with the proposed area of potential effects as described above and depicted on the enclosed map.

Craig J. Brown

Name
Title

Date

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Utah Geological Survey
RICHARD G. ALLIS
State Geologist/Division Director

June 23, 2016

Peter Steele
Horrocks Engineers
2162 West Grove Parkway, Suite 400
Pleasant Grove UT 84062

RE: Paleontological File Search and Recommendations for the Proposed Roadway in Purgatory Valley Connecting SR-9 and the Southern Parkway, Washington County, Utah U.C.A. 79-3-508 (Paleontological) Compliance; Request for Confirmation of Literature Search according to the UDOT/UGS Memorandum of Understanding.

Dear Peter:

I have conducted a paleontological file search for the new road project in Purgatory Valley in response to your email of June 23, 2016. This project qualifies for treatment under the UDOT/UGS executed Memorandum of Understanding.

There are no paleontological localities recorded in our files for this project area. Quaternary and Recent alluvial and eolian deposits, the Triassic Moenkopi Formation and Shinarump Conglomerate, and the Permian Kaibab Formation deposits that are exposed within this project study area have a low to moderate potential for yielding significant fossil localities (PFYC 2 - 3). Because of the unknown potential for the Moenkopi Formation members with a PFYC 3 rating, we recommend that this project be evaluated by a permitted paleontologist in order to determine and mitigate any potential impacts to paleontological resources.

If you have any questions, please call me at (801) 537-3311.

Sincerely,

Martha Hayden

Martha Hayden
Paleontological Assistant

1594 West North Temple, Suite 3110, PO Box 146100, Salt Lake City, UT 84114-6100
telephone (801) 537-3300 • facsimile (801) 537-3400 • TTY (801) 538-7458 • *geology.utah.gov*

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Ms. Lora Tom, Band Chairwoman
Cedar Band of Paiutes
4655 North Utah Trail
Enoch, Utah 84721

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Ms. Tom:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

Cell Phone: 435-772-6628
erichansen@utah.gov

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Mr. Herman G Honanie, Chairman
Pueblo of Hopi
P.O. Box 123
Kykotsmovi, AZ 86039

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Mr. Honanie:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

Cell Phone: 435-772-6628
erichansen@utah.gov

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Jeanine Borchardt
Indian Peaks Band of the Paiutes
526 South 940 West
Cedar City, UT 84720

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Ms. Brochardt:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

Cell Phone: 435-772-6628
erichansen@utah.gov

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Ms. Darlene Arrum
Kanosh Band of the Paiutes
476 South 700 West
Cedar City, Utah 84720

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Ms. Arrum:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

Cell Phone: 435-772-6628
erichansen@utah.gov

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Corina Bow (Tribal Chairwoman)
Paiute Indian Tribe of Utah
440 North Paiute Drive
Cedar City, UT 84721

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Ms. Bow:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

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DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Jetta Wood (Chairwoman)
Shivwits Band of Paiute Indians
6060 West 3650 North
Ivins, UT 84738

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Ms. Wood:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

Cell Phone: 435-772-6628
erichansen@utah.gov

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Jon Bow, Project Manager
US Army Corps of Engineers
St. George Regulatory Office
196 East Tabernacle Street, Room 30
St. George, Utah 84770-3474

RE: UDOT Project No. F-LC53 (72); Purgatory Road, Washington County, Utah (PIN 12747).
Request for concurrence on the Area of Potential Effects.

Dear Jon:

In a letter dated March 22, 2016 you were notified of the development of an FHWA/UDOT environmental assessment for the proposed Purgatory Road that would traverse Purgatory flat to connect the Southern Parkway (SR-7) with State Route 9 (SR-9) in Washington County, Utah.

A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. No sites were recorded in areas under USACE jurisdiction. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Sincerely,

Name
NEPA/NHPA Specialist
UDOT Region

UDOT Dixie Division; 5340 West 200 South, Suite 300, Hurricane, UT 84737

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

DEPARTMENT OF TRANSPORTATION
CARLOS M. BRACERAS, P.E.
Executive Director

SHANE M. MARSHALL, P.E.
Deputy Director

August 15, 2016

Manuel Heart, Chairperson
Ute Indian Tribe of the Uintah /Ouray Res
PO Box 190
Ft. Duchesne, UT 84026

Re: UDOT Project F-LC53(72); Purgatory Road; SR-9 to Washington Dam Road (PIN 12747)

Dear Mr. Heart:

You were notified in a letter dated March 22, 2016 of a proposed new roadway through purgatory flat between SR-9 (Quail Creek Reservoir Interchange) and the Southern Parkway (Washington Dam Interchange. A Class III pedestrian cultural resources survey was conducted within the area potentially affected by the proposed construction activities in the spring of 2016. Two prehistoric sites (42WS2228 and 42WS5164) and segment of an historic canal originally associated with the Washington Canal (42WS4336) were recorded as a result of the survey. Both prehistoric sites will be avoided by the project as proposed. I am enclosing a copy of the survey report for your review and comment.

Should you have any comments or concerns about the findings or quality of the report, or have additional information about cultural resources, either described in the current report or undocumented, located along this segment of the I-15 corridor, please let me hear about it within 30 days of receiving this letter. Please feel free to contact me at (435) 979-4549, or via email at erichansen@utah.gov if you have any questions or need any additional information.

Thank you for your attention

Sincerely,

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, UT 84737

Cell Phone: 435-772-6628
erichansen@utah.gov

THE HOPI TRIBE

Herman G. Honanie
CHAIRMAN

Alfred Lomahquahu Jr.
VICE-CHAIRMAN

August 29, 2016

Eric Hansen, Region 4 NEPA/NHPA Specialist
Utah Department of Transportation
5340 West 200 South
Hurricane, Utah 84737

Re: Purgatory Road: SR-9 to Washington Dam Road

Dear Mr. Hansen,

Thank you for your correspondence dated August 15, 2016, with an enclosed cultural resources survey report, in response to our April 4, 2016 letter, regarding the Federal Highway Administration (FHWA), Utah Department of Transportation (UDOT) and other parties initiating an environmental assessment for the proposed construction of Purgatory Road between Southern Parkway (SR-7) and State Route 9 in Washington County.

The Hopi Tribe claims cultural affiliation to earlier identifiable cultural groups in Utah. The Hopi Cultural Preservation Office supports the identification and avoidance of our ancestral sites, and we consider the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. Therefore, we appreciate the FHWA and UDOT's continuing solicitation of our input and your efforts to address our concerns.

In our April 4, 2016 letter to FHWA, the Hopi Cultural Preservation Office reiterated we request consultation on any proposal with the potential to adversely affect prehistoric cultural resources. We have now reviewed the enclosed cultural resource survey report of the area of potential effect identifies two prehistoric sites, 42WS2228, described as a previously collected and excavated artifact scatter with slab lined cists, that will be avoided by project activities .

42WS5164 is described as a large open habitation, extensively excavated for the Southern Parkway Project during which nearly 10,000 artifacts were recovered, and at which the Bureau of Land Management (BLM) proposes to excavate the remaining portion of the site in the near future. Although site 42WS5164 may be avoided by this proposal, we are currently consulting with the BLM regarding additional adverse effects to site 42WS5164.

P.O. Box 123 KYKOTSMOVI, AZ 86039 (928) 734-3000

If you have any questions or need additional information, please contact Terry Morgart at the Hopi Cultural Preservation Office at 928-734-3619 or tmorgart@hopi.nsn.us. Thank you for your consideration.

Respectfully,

Leigh J. Kuwanwisiwma, Director
Hopi Cultural Preservation Office

Enclosures: Letters to BLM

xc: Bryan Dillon, FHWA, 2520 West 4700 South, Suite 9-A, Salt Lake City, Utah 84118-1847
Dawna Ferris-Rowley, BLM St. George
Utah State Historic Preservation Office

Cultural and Paleo Clearance with Tier 1 Screening Form

Federally funded projects classified as delegated categorical exclusions are processed in accordance with Stipulation II, Part A and Appendix B of the *Memorandum of Understanding, State Assumption of Responsibility for Categorical Exclusions (23 USC §326)*, by which the UDOT assumes responsibility, assigned by the FHWA, for ensuring compliance with Section 106 of the NHPA and with Section 4(f). Federally funded projects classified as documented categorical exclusions are approved by FHWA.

Pursuant to the *Second Amended Programmatic Agreement among the FHWA, the Utah SHPO, the ACHP, the USACE Sacramento District, and the UDOT Regarding Section 106 Implementation for Federal-Aid Transportation Projects in the State of Utah*, and the *Programmatic Agreement between the UDOT and the Utah SHPO Regarding Implementation of U.C.A. 9-8-404 for State Funded Transportation Projects in Utah*, UDOT has taken into account the effects of this undertaking on historic properties and has determined that the finding of effect is **No Historic Properties Affected**.

Pursuant to the *Memorandum of Understanding between the UDOT and the Utah Geological Survey Concerning Agency Responsibilities Pursuant to U.C.A. 79-3-508*, the UDOT has taken into account the effects of this undertaking on paleontological resources. If applicable, consultation letter from UGS is included in the environmental document.

PROJECT: PIN 12747 – F-R499(275), PURGATORY ROAD; SR-9 TO WASHINGTON DAM ROAD, WASHINGTON COUNTY

DATE: 9/15/2016
PREPARER: Eric Hansen, Region 4 Environmental Manager
CONTACT: erichansen@utah.gov, 435-772-6628

PROJECT STIPULATIONS

1) Clearance is contingent upon the contractor adhering to the proposed scope of work and remaining within cleared areas. **Notify Region Environmental of any scope changes.**
2) *UDOT Standard Specification 01355 Part 3.7, Environmental Clearances by Contractor*
3) *UDOT Standard Specification 01355 Part 3.8, Discovery of Historical Archaeological, or Paleontological Objects, Features, Sites or Human Remains*. **Notify Region Environmental immediately of any discoveries during construction.**

PROJECT DESCRIPTION

UDOT is using federal funds to develop an Environmental Assessment for a new county transportation corridor located between Southern Parkway (SR-7) and State Route 9 (SR-9) in Washington County. The newly proposed corridor is currently referred to as Purgatory Road and will consist of a three-lane roadway extending from SR-9 at the intersection of 5300 West to the Washington Fields Interchange of SR-7. The proposed transportation corridor traverses mostly undeveloped land and includes a newly proposed crossing of the Virgin River. As part of the development of the Environmental Assessment, environmental resource field studies, including a cultural resources inventory of proposed build alternatives, was conducted (see attached maps). Only the selected/preferred alternative will be affected by construction.

SCREENING PROCESS

Screened undertakings have the potential to affect historic properties, but have been determined by UDOT to require no further review or consultation under the Agreements. Screening may include any the following tasks and should be appropriate to the complexity, scale, and location of the undertaking. Documentation of the screening will be included in the project files, quarterly report submitted to SHPO, and environmental document.

Antiquities Project Number: U-16-HX-0170b,p

Literature Review

- ☒ Class I literature search (date completed and by whom): Peter Steele, March 14, 2016
- ☒ Records review (i.e. UDSH, UDOT, BLM, etc.): UDOT, UDSH
- ☐ Project plans
- ☐ As-built project plans
- ☒ Aerial photographs: NAIP 2014, Google Earth

☒Historic Maps: GLO Cadastral Plats (1870, 1902) and 1954 7.5' Quads (La Verkin 3 SW and NW)
☒Topographic Maps: Harrisburg Junction and Washington Dome
☒ROW/Ownership/Parcel Data: The proposed transportation corridor traverses private and BLM-administered (St. George Field Office) land.
☐Other:

Description of search results: Twenty-seven previous surveys have been conducted within 0.5 miles of the project area resulting in the identification of three sites (42WS2228, 42WS4336, and 42WS5164) that intersect the two build alternatives surveyed during the present investigation. 42WS4228 is a sparse ceramic and lithic scatter with slab-lined features that has undergone data recovery on two occasions. A segment of a cement ditch that was likely once associated with the Washington Canal (42WS4336) was also recorded. The Washington Canal no longer exists in this location. 42WS5164 is a Virgin Anasazi habitation site that underwent data recovery in 2012.

Field Review

☒Pedestrian survey (Class III) (survey interval): 15 m
☐Field review other than Class III (reconnaissance, windshield, etc.):
☐Other:
☐None

Description of survey results: No new sites were identified during the survey. 42WS2228, 42WS4336, and 42WS5164 were revisited and the site forms were updated. Only 42WS5164 was considered eligible for NRHP listing.

Supporting Documentation

Reports and/or forms generated from any cultural resource inventories shall be submitted quarterly to the Utah Division of State History (UDSH) for filing.
Title of report: *An Archaeological Investigation for the Purgatory Road Environmental Assessment*

Consultation

☒Utah SHPO (including APE consultation): APE Consultation (Concurrence March 16, 2016)
☐Certified Local Government (CLG):
☒Tribes: Hopi, Ute, PITU, and the Kanosh, Shivwits, Cedar, and Indian Peaks Bands of the PITU
☒State/Federal Agencies: Bureau of Land Management (St. George Field Office), Utah School and Institutional Trust Lands Administration (SITLA), US Army Corps of Engineers (USACE), Southern Utah Wilderness Alliance (SUWA)
☐Knowledgeable Informants:
☐Other:
☐None:

Description of consultation efforts (If no consultation was done, explain why not): SHPO APE consultation was mailed on March 13, 2016. SHPO concurred on March 16, 2016. Tribal notifications were mailed out on March 22, 2016. Hopi responded on April 4 requesting additional consultation if the project had potential to affect prehistoric cultural resources. Project notification and APE consultation was sent via email to USACE on March 22. USACE concurrence was received the same day. BLM, SITLA, and SUWA were also notified on March 22. BLM responded same day with no concerns. Responses were not received from SUWA or SITLA. Copies of the inventory report and a summary of UDOT's findings and determinations were mailed out to tribes and Agencies (except SITLA) on August 15. No responses were received from tribal parties. BLM responded on August 16 requesting revisions to the report and provided written concurrence with UDOT's Determinations of Eligibility and Findings of Effect. SITLA was informed on August 15 via email that none of the build alternatives studied crossed SITLA-administered land. No response was received. No response was received from USACE.

☐ Controversy based on historic preservation issues? If yes, consultation with SHPO and UDOT Central Environmental is required. Additional consultation with FHWA may be required.

Finding of Effect

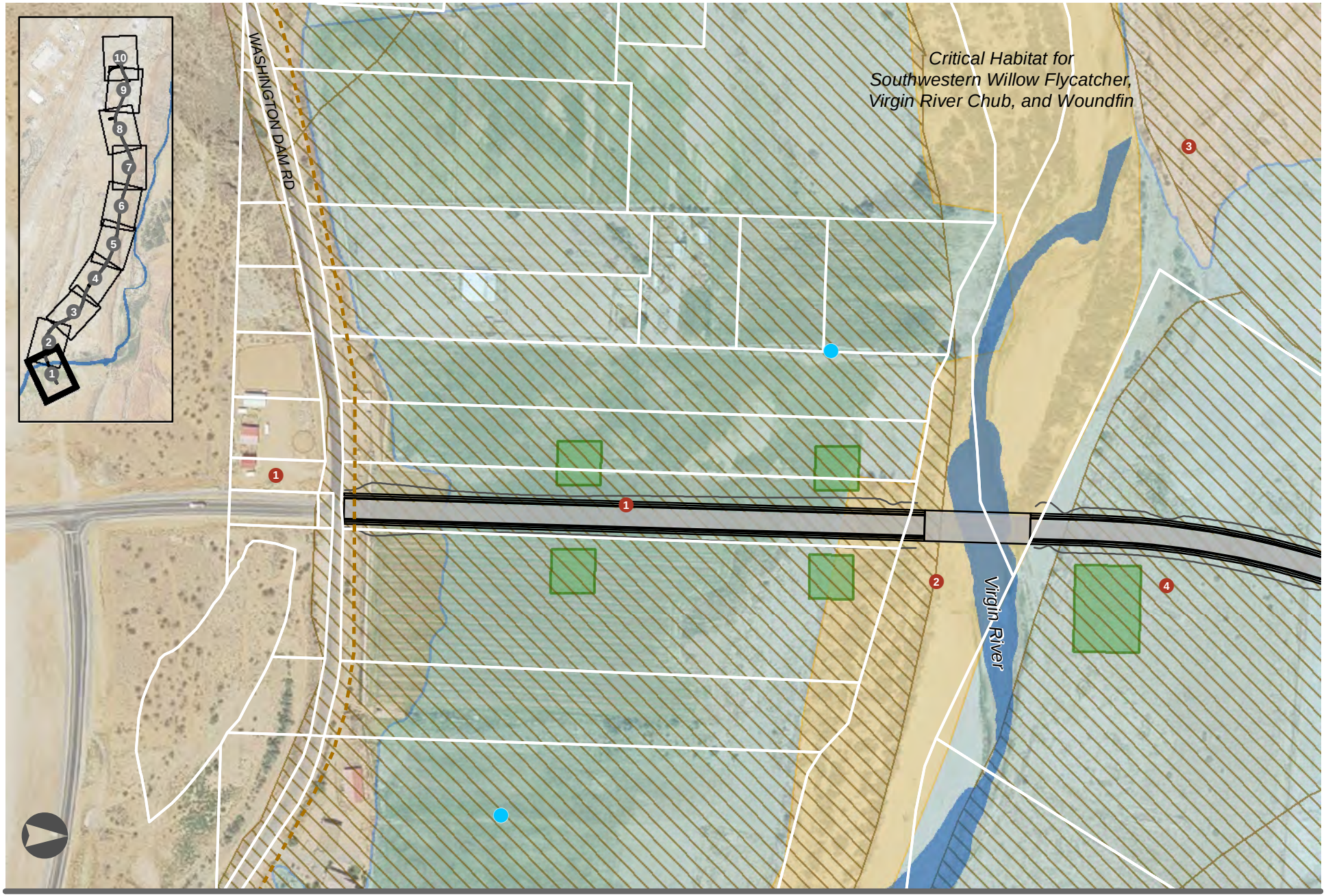
The undertaking will result in the following finding of effect:

☐ No Historic Properties Affected: no cultural resources present
☐ No Historic Properties Affected: cultural resources present but none eligible
☒ No Historic Properties Affected: historic properties present, but are completely avoided by the undertaking and the potential for substantial indirect effects is very low

Description of impacts: 42WS2228 and 42WS5164 will be avoided. A portion of the secondary ditch possibly associated with 42WS4336 (considered not eligible) will be impacted by the project as proposed.

Additional Information

APPENDIX A: PREFERRED ALTERNATIVE MAPS

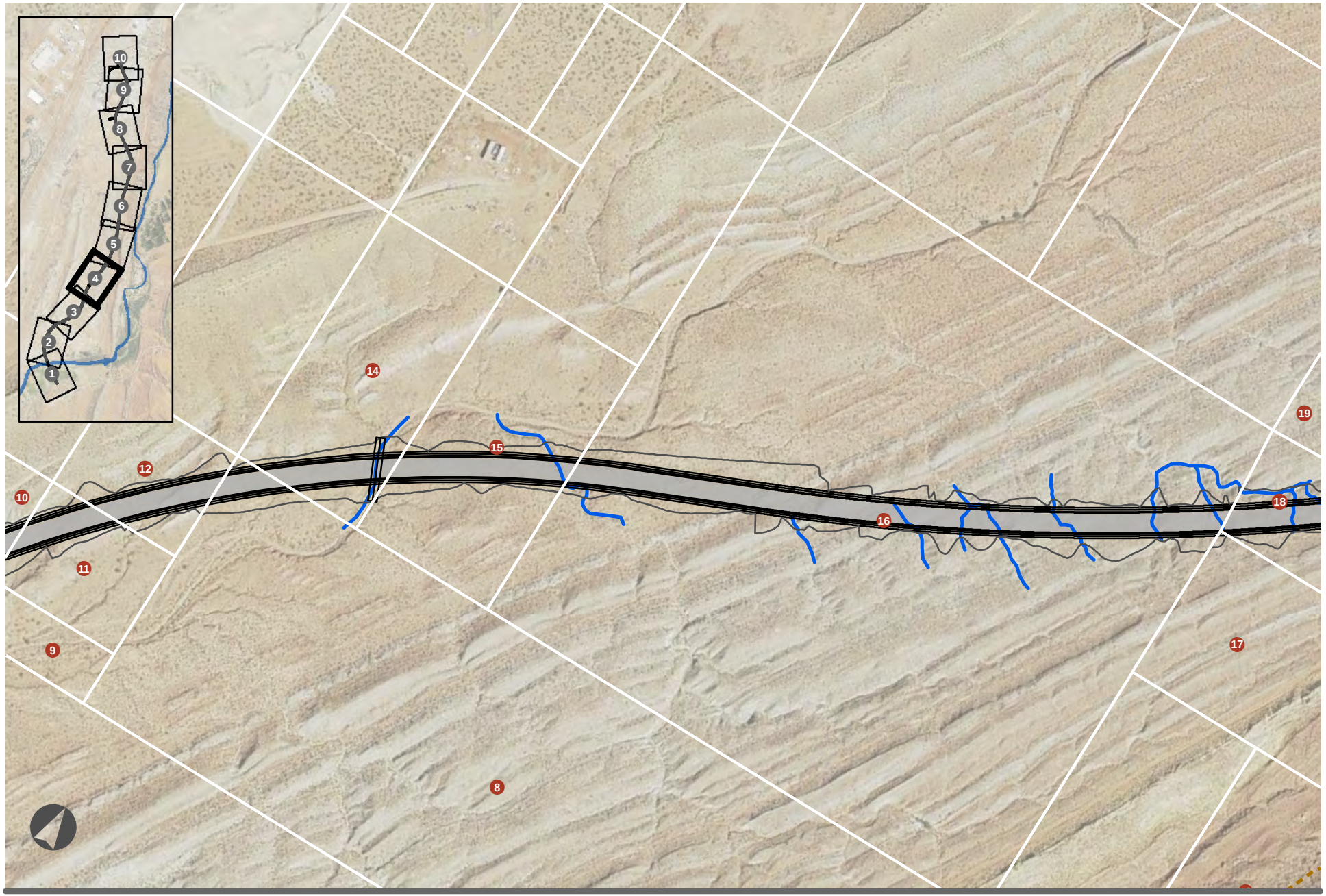


Map 1 of 10

Preferred Alternative and Environmental Resources

Preferred Alternative and Environmental Resources


Points of Diversion
Ephemeral Washes (non-jurisdictional)
Prime, Unique, or Statewide Important Farmland
Section 4(f)
Planned Trail
Potential Wetlands
Designated Critical Habitat
Potential Detention Basin Locations
Existing Trail
Waters of the U.S.
100 Year Floodplain
Right-of-Way Labels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Waters of the U.S.
100 Year Floodplain
Right-of-Way Labels


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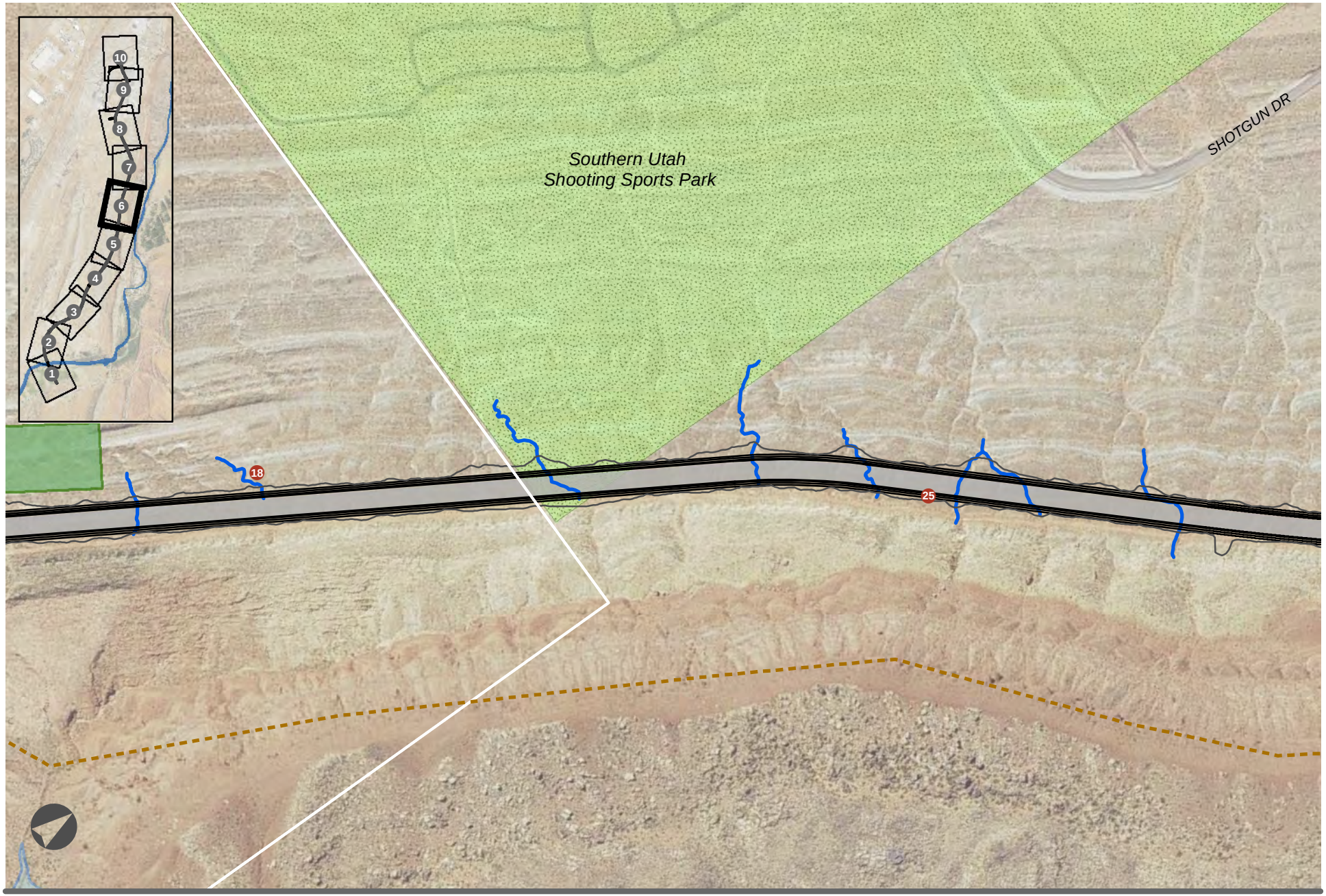
Southern Utah
Shooting Sports Park
SHOTGUN DR
18
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Points of Diversion
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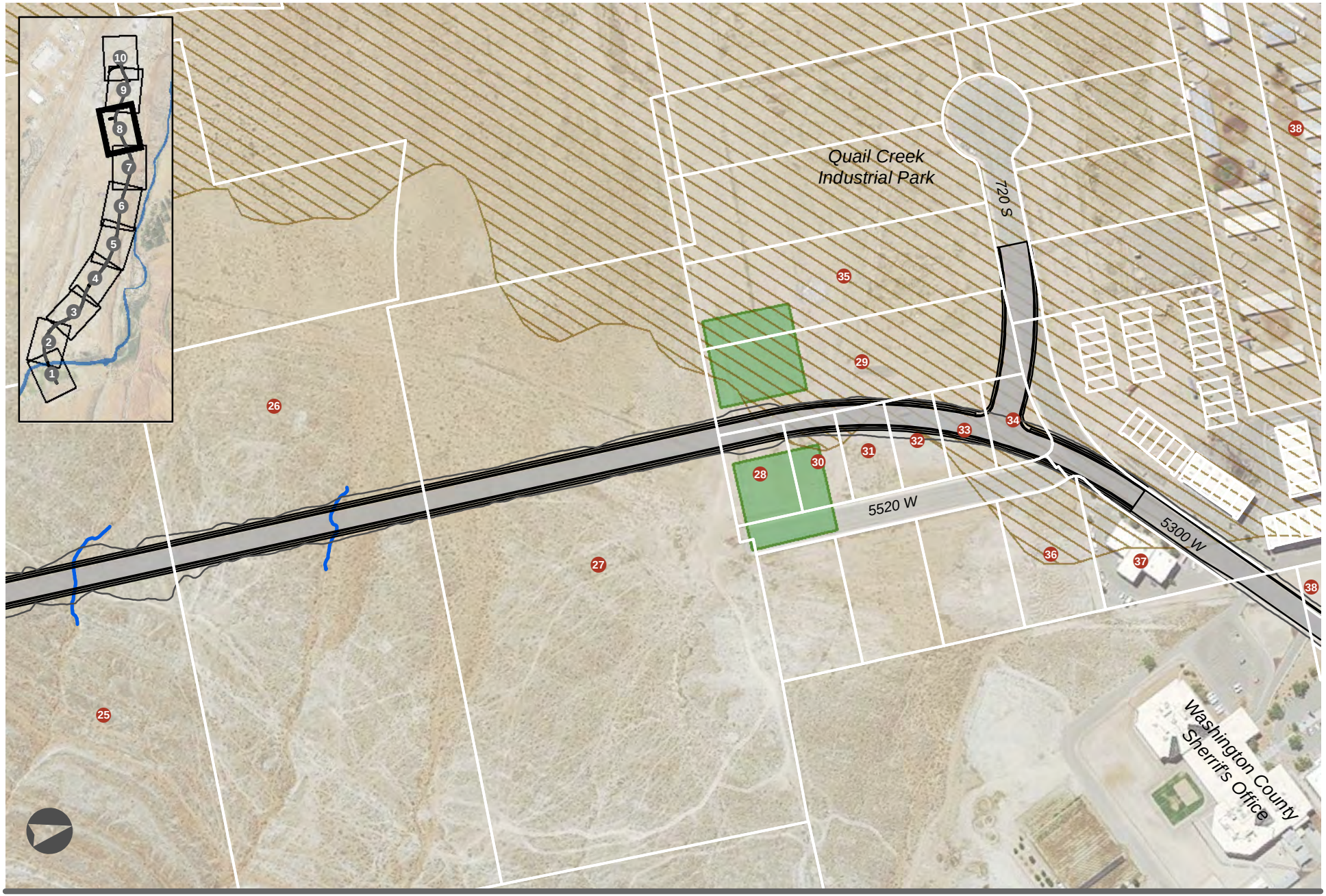
Preferred Alternative and Environmental Resources



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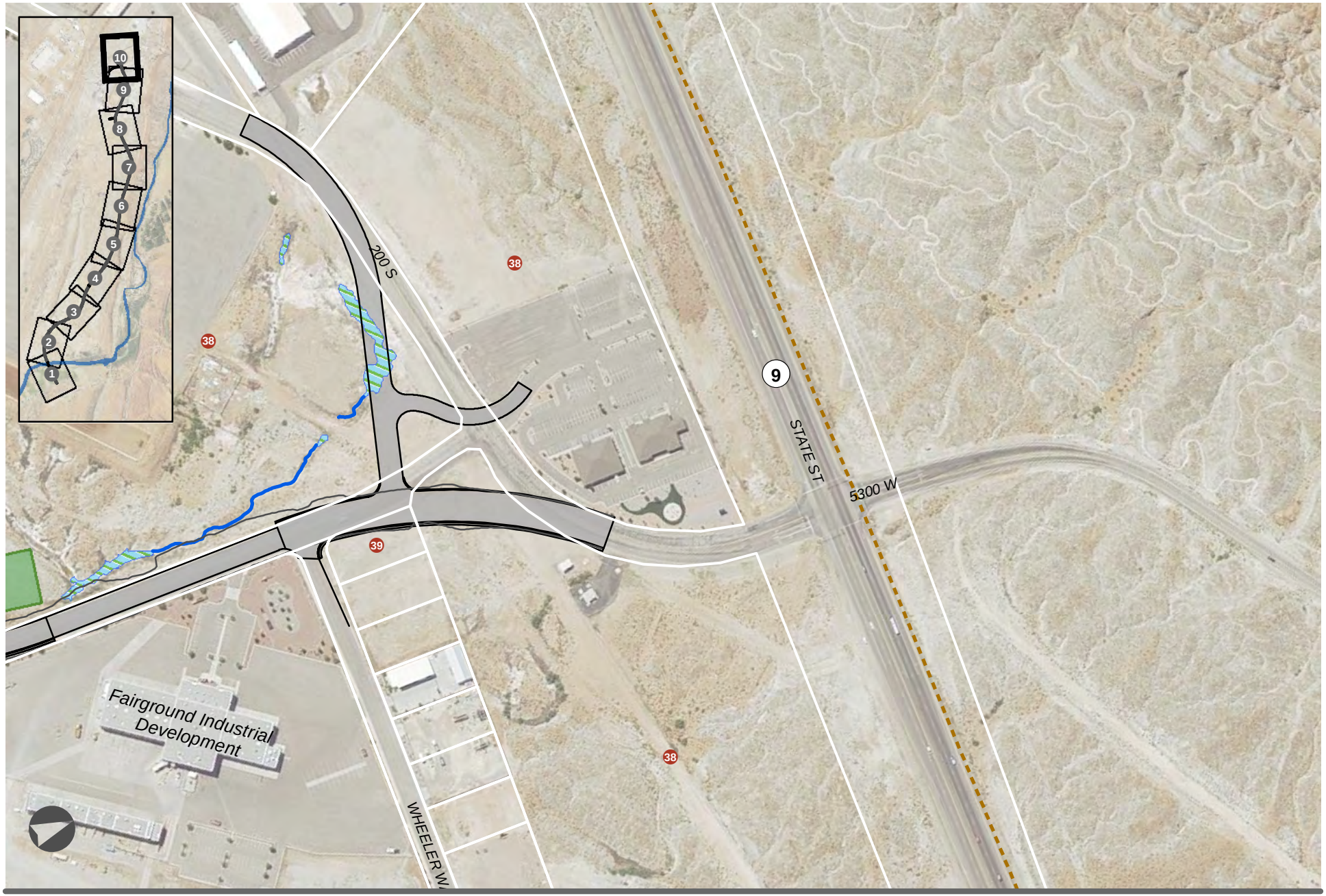
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Fairground Industrial Development
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100 Year Floodplain
Right-of-Way Labels

APPENDIX B: LIST OF TECHNICAL REPORTS

Technical Report Title	Prepared By:	Contact
Purgatory Road EA Traffic Memorandum	Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062	Aron Baker, P.E. Michael Heaps P.E. Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062
Biological Assessment	Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062	Ryan Pitts Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062
Wetlands and Waters of the U.S. Inventory Memorandum	Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062	Terry Johnson Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062
Noise Study	Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062	Peter Steele Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062
An Archaeological Investigation for the Purgatory Road Environmental Assessment	Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062	Peter Steele, MA RPA Horrocks Engineers 2162 West Grove Parkway Pleasant Grove, Utah 84062

To: Stan Jorgensen, P.E.
Environmental Manager

From: Aron Baker, P.E.
Michael Heaps, P.E.

Date: December 9, 2015

Memorandum

Subject: Purgatory Road EA Traffic Memo

INTRODUCTION

The Purgatory Road Environmental Assessment allows the opportunity to review what effect that the proposed road will have on traffic. It is apparent that It is an important circulation element, providing an important crossing over the Virgin River. This memo addresses the two primary issues with regard to traffic, which are the travel time savings and the shift in traffic volume after this road is in place. Both of these questions can be addressed by comparing existing traffic characteristics with the output from the Dixie MPO traffic demand model (TDM).

Several traffic counts, both tube and intersection movements, were performed on roads and intersections that were anticipated to experience the greatest impact as a result of the construction of Purgatory Road. These counts were performed between September 28 and October 19. Count locations are shown in Figure 1.

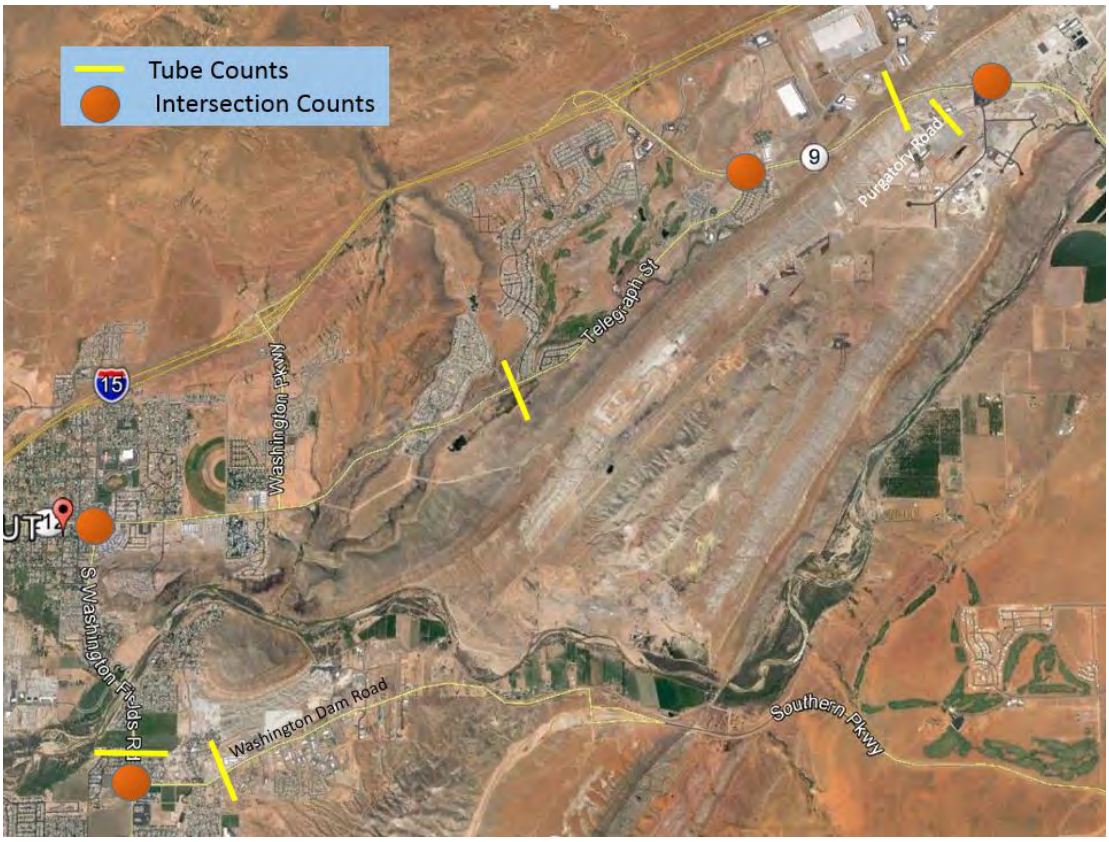


Figure 1: Count Locations

Existing Travel Time

To establish the exiting travel time, a series of "floating car" studies were performed, which consists of measuring the time it takes to drive a vehicle along a specified route from Point A to Point B (shown in Figure 2). It is called a

floating car study because your car ideally floats in traffic, staying on pace with the traffic. In theory, if a faster car passes the test car, the driver of the test car will pass another slower car. Therefore, it is not a race, it is a typical/average time for a driver to negotiate the route. We were interested in both the time required to drive Point A to Point B and the time to drive from Point B to Point A These trips were taken during a Tuesday, Wednesday, or Thursday for the A.M. peak time between 7:30 to 9:30, for the mid-day peak time between 11:30 to 1:30, and for the P.M. peak time between 4:00 to 6:00. Each time period had at least two runs that did not have unexpected delays and whose times are within 10% of each other. Table 1 shows the tabulated results of the study to establish the existing travel times for different times of the weekday.

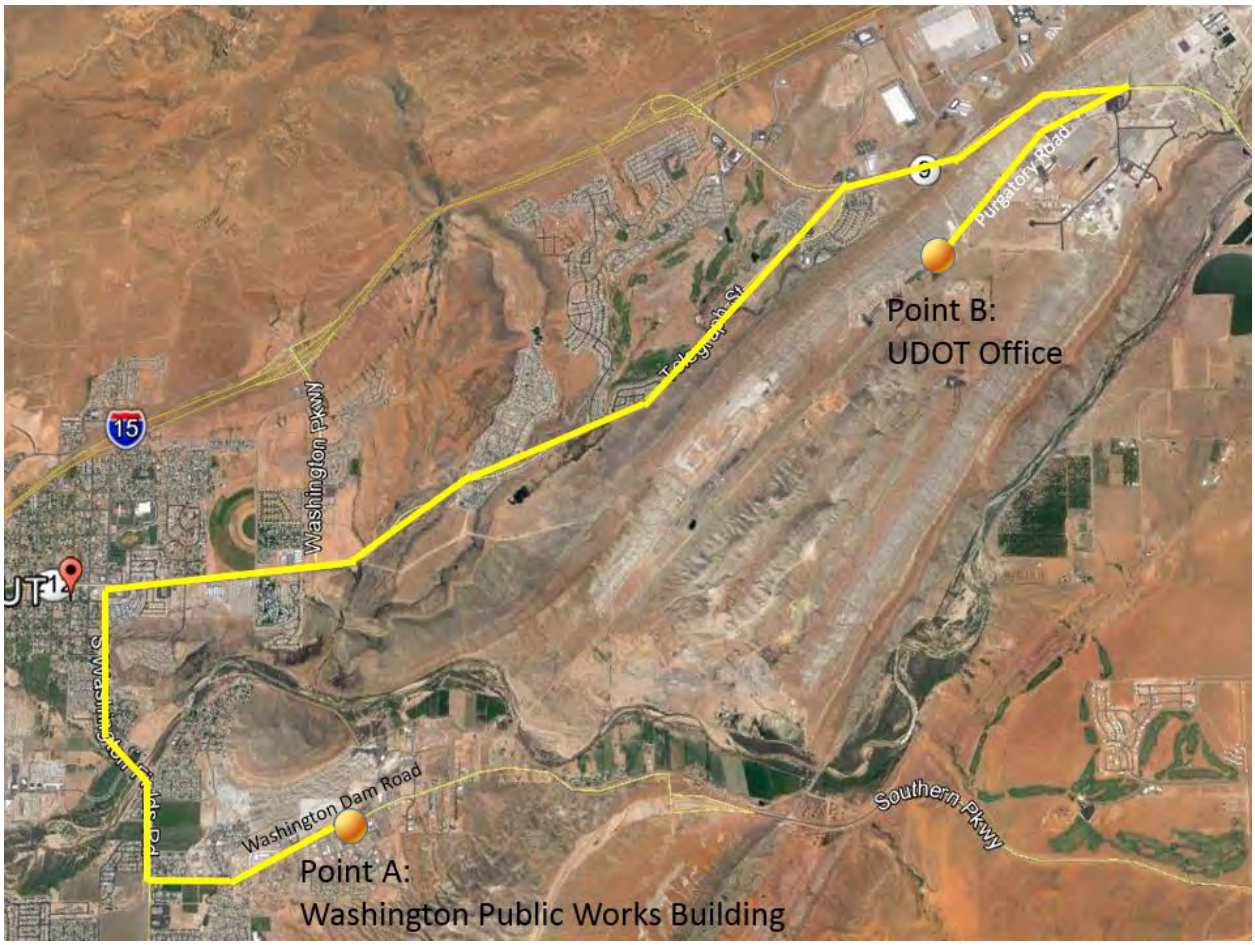


Figure 2: Floating Car Study Route

Table 1: Travel Time

Travel Time		
Time Interval	Time	
	Point A to Point B	Point B to Point A
A.M.	16:07	17:02
Mid-Day	16:11	18:30
P.M.	15:55	17:50

Forecasted Travel Time

The DMPO TDM was used to evaluate the travel time that it takes to traverse the route shown in Figure 2 for both the 2014 model and the 2040 model. It is important to assess the 2014 measured times versus the TDM so a time delta

can be calculated between actual times measured in the field versus the model times. This delta will then be applied to the 2040 model to arrive at a more accurate forecast of an estimated travel time.

Table 2 displays the times shown by the model under the indicated conditions:

Table 2: 2014 Model Travel Time Forecasts

Travel Time						
Time Interval	Time					
	Without Bridge		With Bridge			
	Point A to Point B	Point B to Point A	Point A to Point B	Point B to Point A	Point A to Point B, without using bridge	Point B to Point A, without using bridge
A.M.	13:07	13:08	7:59	7:59	13:05	13:05
Mid-Day	13:08	13:10	7:59	7:59	13:10	13:09
P.M.	13:21	13:16	8:00	8:00	13:21	13:18

The time deltas between the actual times collected in the field in Table 1 versus the travel times indicated by the TDM in Table 2 are shown in Table 3 by both time and percentage of the actual measured time.

Table 3: 2014 Measured Travel Times Versus 2014 TDM Travel Times to Calculate Travel Time Delta

Travel Time Delta						
Time Interval	Measured Time		TDM Time without Bridge		Time Delta	
	Point A to Point B	Point B to Point A	Point A to Point B	Point B to Point A	Point A to Point B	Point B to Point A
A.M.	16:07	17:02	13:07	13:08	Δ 3:00 (18.6%)	Δ 3:54 (22.9%)
Mid-Day	16:11	18:30	13:08	13:10	Δ 3:03 (18.8%)	Δ 5:20 (28.8%)
P.M.	15:55	17:50	13:21	13:16	Δ 2:34 (16.1%)	Δ 4:34 (25.6%)

Table 4 lists the results from the 2040 TDM of unadjusted travel times. Similarly, as in Table 3, these times will be shorter than if actual measurements were taken in the field. Therefore, the TDM times will be increased by the percentage shown in Table 3 for each condition which should result in a more accurate travel time for 2040 conditions. Table 5 contains the adjusted travel time to be used for comparison with measured 2014 travel times.

Table 4: 2040 Model Travel Time Forecasts

Travel Time						
Time Interval	Time					
	Without Bridge		With Bridge			
	Point A to Point B	Point B to Point A	Point A to Point B	Point B to Point A	Point A to Point B, without using bridge	Point B to Point A, without using bridge
A.M.	15:55	16:19	10:14	10:21	15:10	15:31
Mid-Day	16:31	16:56	10:43	10:44	15:37	16:02
P.M.	18:02	18:24	10:59	10:44	17:25	17:43

Table 5: Adjusted 2040 Model Travel Time Forecasts

Adjusted Travel Time						
Time Interval	Time					
	Without Bridge		With Bridge			
	Point A to Point B	Point B to Point A	Point A to Point B	Point B to Point A	Point A to Point B, without using bridge	Point B to Point A, without using bridge
A.M.	18:53	20:04	12:08	12:44	17:59	19:04
Mid-Day	19:38	21:49	12:43	13:49	18:33	20:39
P.M.	20:56	23:07	12:45	13:29	20:13	22:16

Based on these adjusted model forecasts, the travel times in 2040 will increase between 17% and 31% without the construction of the bridge as shown in Table 6, below. Just as dramatic is what happens if the bridge is built, as travel time has a potential to reduce by as much as 19 to 25%.

Table 6: Changes in Travel Time from 2014 to 2040

2040 Percent Change in Travel Time						
Time Interval	Time					
	Without Bridge		With Bridge			
	Point A to Point B	Point B to Point A	Point A to Point B	Point B to Point A	Point A to Point B, without using bridge	Point B to Point A, without using bridge
A.M.	17.2%	17.8%	-24.7%	-25.2%	11.6%	11.9%
Mid-Day	21.3%	17.9%	-21.4%	-25.3%	14.6%	11.6%
P.M.	31.5%	29.6%	-19.9%	-24.4%	27.0%	24.9%

Traffic Data

Tube counts were obtained in the locations shown in Figure 3. In addition to the tube counts, turning movement counts were taken at the intersections that will be significantly impacted by the installation of Purgatory Road. The counts are shown in Figures 4 through 6 for the A.M. peak hour, the mid-day peak hour, and the P.M. peak hour, respectively.

Table 7: Traffic Volumes

Roadway	Traffic Counts (veh/day, both directions)		
	2014 measured volumes	2040 TDM volumes	Anticipated Percent Increase
Washington Dam Road	5,847	18,603	218%
Washington Fields Road	14,189	35,507	150%
Telegraph Road	7,885	24,838	215%
SR-9	25,311	59,174	134%
Purgatory Road	485	3,412	604%

As shown on Figure 3, traffic counts were taken at five locations. Comparing these counts to the future 2040 counts without Purgatory Road in place are shown in Table 7. The future counts show a dramatic increase in traffic in the coming years, some up as much as 600%. It should be noted, however, to accommodate the amount of traffic that is expected on SR-9 in the future, SR-9 is proposed to be built to an expressway standard, being a future segment of the Southern Parkway. Therefore, intersections will be grade-separated with ramps, which allows trips to be attracted to this corridor in the future 2040 TDM model. Therefore, this reason is partially attributable to the high percent increase to the traffic volumes.

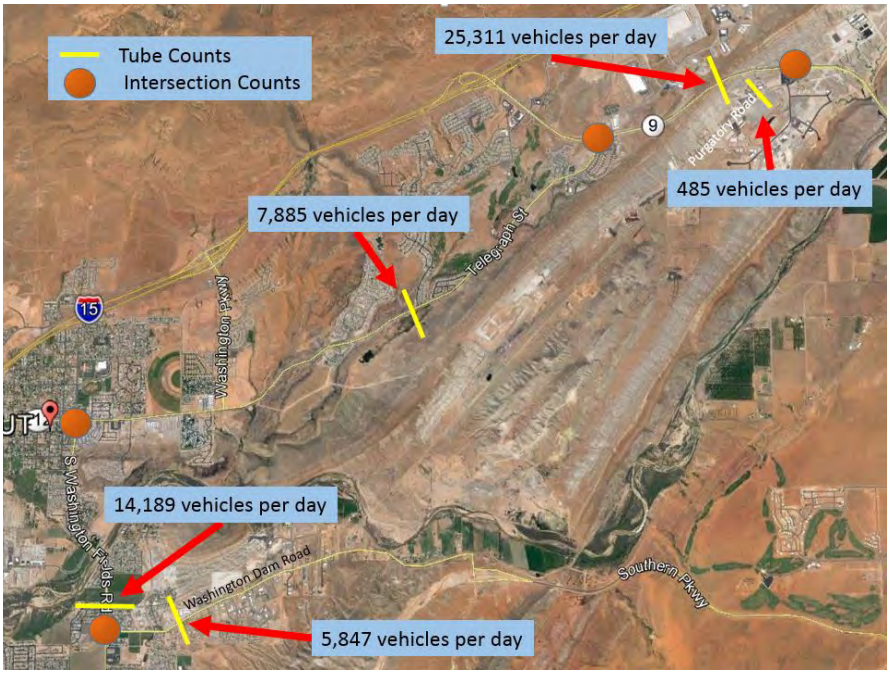


Figure 3: 2015 Traffic Volumes and Turning Movement Locations

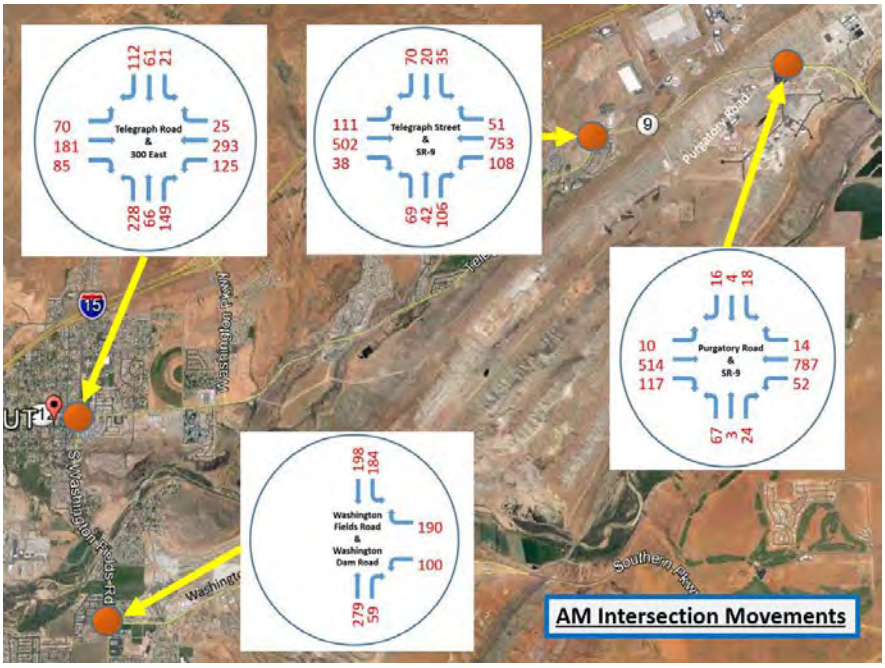


Figure 4: Existing A.M. Intersection Movements

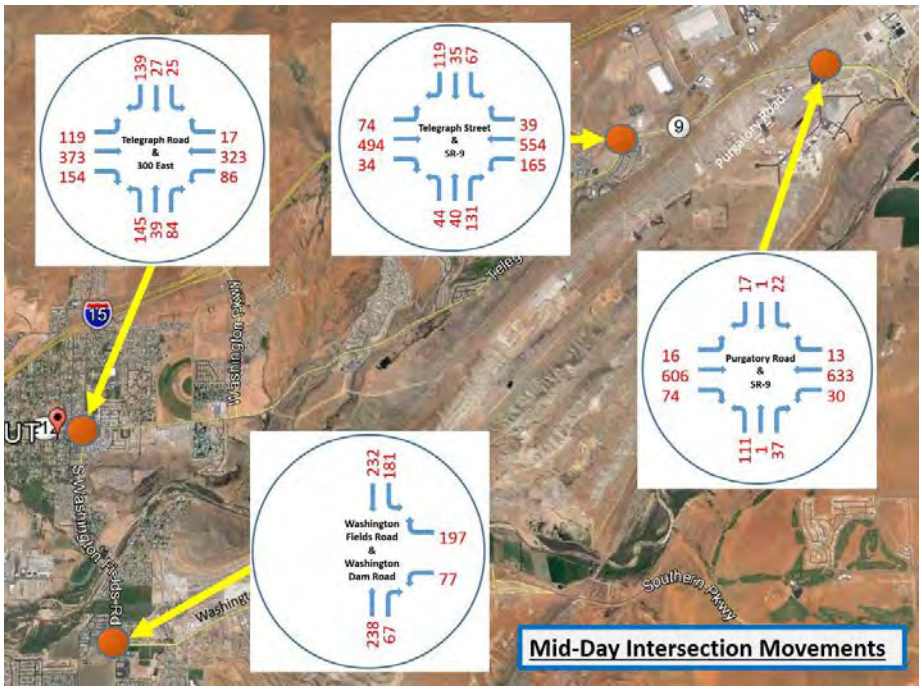


Figure 5: Existing Mid-Day Intersection Movements

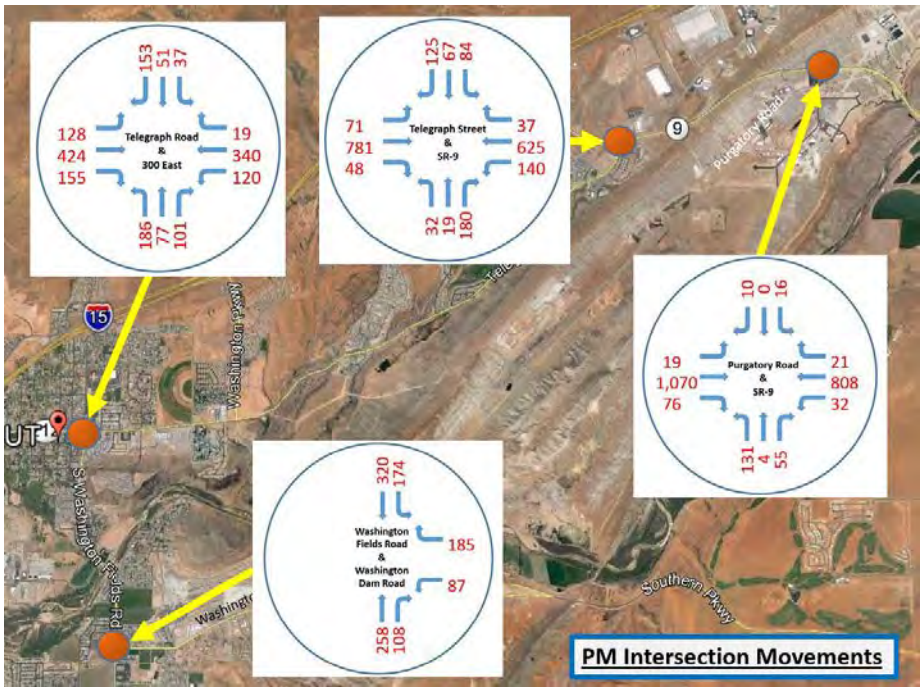


Figure 6: Existing P.M. Intersection Movements

Intersection Analysis

The study intersections were evaluated under existing conditions and using forecasted volumes in 2040 assuming Purgatory Road is placed in service, using the 2010 version of the Highway Capacity Software (HCS). The analysis of the existing traffic shows results for the AM peak hour, the mid-day timeframe, and the PM peak hour. The mid-day time period was reviewed and was found to not be a controlling factor, as either the AM or PM peak hours presented more congested conditions. Therefore, the mid-day period was not analyzed any further under 2040 conditions. Table 8 details the results of this analysis.

Table 8: Intersection Analysis

Intersection	Total Intersection Delay (sec/veh) / LOS*					
	2015 Pre- Road			2040 Post- Road		
	AM	Mid-Day	PM	AM	Mid -Day	PM
Washington Fields Road & Washington Dam Road	8.4/A	7.5/A	7.2/A	20.2/C	---	62.8/E
Telegraph Road & 300 East	15.0/B	17.4/B	18.1/B	19.3/B	---	131/F
Telegraph Road & SR-9**	21.7/C	21.9/C	22.6/C	WB ramp 9.4/A EB ramp 11.4/B	---	WB ramp 15.4/B EB ramp 12.2/B
Purgatory Road & SR-9**	19.8/B	19.5/B	20.3/C	WB ramp 5.2/A EB ramp 13.3/B	---	WB ramp 28.3/C EB ramp 7.2/A

*All intersections are signalized.
**These intersections were analyzed with grade-separated interchanges in 2040.

As shown in Table 8, all the study intersections operated at an acceptable LOS under existing conditions before the road is placed into operation. The existing capacity of the roadways are not the driving purpose of the road as much as the enhancement of traffic circulation and the future capacity of roadway intersections. The future of the above intersections show tremendous challenges. We can summarize some of the traffic impacts as follows:

Washington Fields Road & Washington Dam Road:

This intersection currently sees local traffic that is accessing neighborhoods and Washington's industrial park on Washington Dam Road. The intersection operates at an LOS A during all times of the day. When Purgatory Road is placed into operation under 2040 conditions, there will be a significant amount of traffic added to these local trips. The LOS for the intersection is anticipated to perform with an LOS E. The westbound left and southbound left directions will require additional turn lanes to operate in a more acceptable fashion.

Telegraph Road & 300 East

Telegraph Road is an active corridor that serves downtown Washington and connects the east side of town with the City's primary commercial hub at Green Springs interchange. The intersection at 300 East allows a connection to the downtown area with the Washington Fields region. The intersection operates at an LOS B throughout the day. With Purgatory Road in 2040 conditions, the westbound lefts, northbound lefts, and northbound through movements will struggle with congestion conditions, causing an intersection LOS of F in the PM peak hour. Expanding to dual left turn lanes in the northbound and westbound directions should help to rectify these conditions, resulting in an intersection LOS of D.

Telegraph Road & SR-9:

The intersection of Telegraph Road and SR-9 is an active at-grade intersection under today's conditions, operating at an LOS C in the AM and PM peak hours. By 2040, this segment of SR-9 will be improved to expressway standards

with grade-separated interchanges. With the addition of this grade-separation and including the Purgatory Road Project, the ramps will operate no worse than LOS B in either the AM or PM peak hour.

Purgatory Road & SR-9:
The impact at this intersection is similar to that at Telegraph Road & SR-9. The current at-grade signalized intersection experiences an LOS B in the AM peak hour and LOS C in the PM peak hour. This intersection is programmed to be improved to a grade-separated interchange by 2040. This will allow the eastbound and westbound ramps to operate no worse than LOS B during the AM peak hour and LOS C in during the PM peak hour.

Summary:
The implementation of the Purgatory Road Project will have positive impacts to traffic in the 2040 conditions. It will improve traffic circulation in this area of the region primarily because of the current lack of bridge crossings over the Virgin River.

The completion of the road will not prevent traffic capacity failures in the system, but the project is primarily intended to reduce travel times from Point A at the industrial zone on Washington Dam Road to Point B at the industrial zone by the Washington County fairgrounds in Hurricane. The travel times in 2040 will increase between 17% and 31% without the construction of the bridge as shown in Table 6. With the bridge, travel times reduce between these two points by as much as 25%.

The future traffic volumes will create challenges that will be difficult to deal with if Purgatory Road is not constructed. The intersections in the vicinity of the road operate at acceptable LOS's, but 2040 conditions will prove that congestion will degrade the LOS where the road will be a great asset to lessen these impacts. Table 8 allows the comparison of the existing LOS versus the future 2040 LOS, with and without the bridge.

HORROCKS ENGINEERS

Prepared By: Terry Johnson - PLA
Horrocks Engineers

Date: May 25, 2016

Memorandum

Subject: Purgatory Road Environmental Assessment
UDOT Project No. F-LC(53)72; PIN No. 12747
Wetlands and Waters of the U.S. Inventory

INTRODUCTION

The Federal Highway Administration (FHWA) and the Utah Department of Transportation (UDOT) in cooperation with Washington County, Washington City, and Hurricane City, have initiated an Environmental Assessment (EA) for the proposed construction of Purgatory Road, between Washington Dam Road and State Route 9 (SR-9) in Washington County, Utah (see Project Location Map in Appendix A). Purgatory Road is a planned facility that would connect two existing roadway facilities. As part of the EA the project must take into consideration potential project impacts to wetlands and waters of the U.S. (WOUS). On March 29 and 30, 2016, Terry Johnson and Marley Haupt of Horrocks Engineers made a field visit to conduct a WOUS inventory of the proposed project area. The purpose of the inventory was to perform an initial identification of wetlands and WOUS within the study area for inclusion in the environmental document. These identified features will be delineated at a later date according to U.S. Army Corps of Engineers (USACE) minimum standards. This memorandum details the results of the WOUS inventory.

METHODOLOGY

Prior to the field visit, aerial imagery, soils data, National Wetland Inventory maps, and National Hydrography maps were used to identify potentially jurisdictional features within the study area. Several features were identified through this initial search including the Virgin River and numerous ephemeral washes. Stream gauge data for the Virgin River was also checked before the inventory was conducted to verify flow volumes.

During the field visit to conduct the inventory, potentially jurisdictional features were identified using the USACE *1987 Wetland Delineation Manual and* the *Regional Supplement: Arid West Region Version 2,* as well as *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the United States.* Wetland boundaries and OWHM lines were surveyed using a handheld Trimble GeoExplorer XT global positioning system receiver. The survey data was downloaded into ArcGIS to produce a map that shows delineated wetland boundaries and the OHWM for ephemeral washes and the Virgin River. OHWM datasheets were completed for three locations along the Virgin River (see Appendix B). Datasheets were not filled out for other identified features. This will be completed as part of the final delineation to be conducted before project construction.

SITE CONDITIONS AND WEATHER

Limited commercial and recreational development exists in the northern portion of study area including the Southern Utah Shooting Sports Park, the Washington County Fairgrounds, FS Motor Cars, and a small commercial development near the and Purgatory Correctional Facility. The southern portion of the study area has been heavily disturbed through industrial activities by Western Rock Products and the Washington County Landfill. The remainder of the study are is undeveloped and largely undisturbed.

The weather on March 29 and 30, 2016 was cloudy with a high of 59˚F and a low of 36˚F. These temperatures are below the averages for this time of the year of 71˚F and 44˚F, respectively. The nearby weather station in Ivans recorded 0.31 inches of precipitation fell on March 29. The WOUS inventory was conducted inside the typical growing season for the region and native plant species were emerging or beginning to break bud. On average St. George and the surrounding areas receive 8.18 inches of annual precipitation. Precipitation over the previous 6 months has been 88 percent of normal. For the 2 weeks preceding the day of the field work, no measurable precipitation occurred (U.S. Climate Data 2015-2016). Snowpack in the Virgin River drainage as of April 1, 2016 is 98% of normal.

RESULTS

Four potential wetlands, 37 ephemeral washes, and the Virgin River were identified during the wetland inventory of the study area (see Appendix A for maps). Additional information about identified features is included in the paragraphs below.

Ephemeral Washes

The U.S. Fish and Wildlife Service's National Wetlands Inventory identifies three unnamed ephemeral washes within the study area. Two of these washes flow south down Purgatory Flat toward the Virgin River and are separated by the Harrisburg Dome in the middle of the valley. These two mapped washes do not show a direct connection to the Virgin River with the western most wash terminating in a disturbed flat area and the eastern wash ending as it enters the Western Rock gravel pit. There is also a small drainage northeast of the racetrack located in the northern part of the study area. This drainage enters a pipe under 5300 West and into a series of storm drains where it eventually daylights into an unnamed drainage that is piped under and parallels SR-9 to the Virgin River. Portions of this drainage within the study area pond water due to the raised elevation of the pipe inlet at 5300 West.

Aerial photos identified several small drainage features beginning in the steep 200-foot swale formation that runs down the eastern side of the valley. As storm water runoff flows off the swale and into more erosive soils, it concentrates into confined finger-like drainages. Although none of these drainages exceed a couple feet in width, many exhibit ordinary high water mark (OHWM) indicators. Drainages that had OHWMs were field surveyed and mapped. These small washes eventually connect to the larger wash along the bottom of the valley. The wash at the bottom of Purgatory Valley goes south toward the Virgin River but ends at the Western Rock Products property and does not connect to the River. The wash north of the racetrack was also surveyed.

The Virgin River

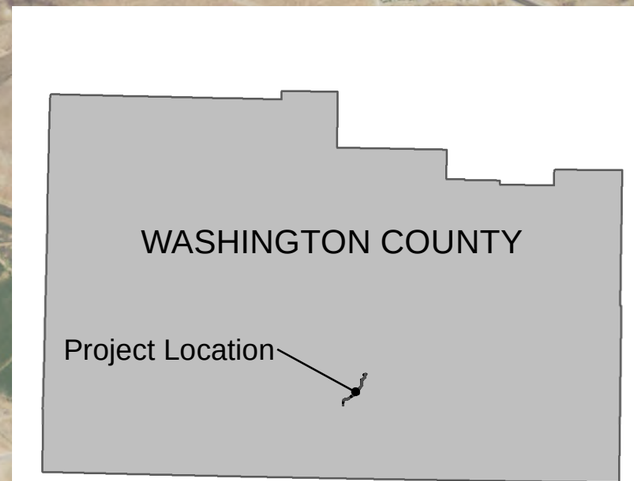
The Virgin River crosses the southern end of the study area and it is the largest river in Southwestern Utah. The Virgin River is an Interstate water and has been designated by USACE to be a Traditional Navigable Water (TNW) and is a tributary to Colorado River at Lake Mead. The Virgin River is within the Lower Virgin watershed (15010010 HUC) that covers a large area upstream of the study area and due to the Mohave Desert environment it is subject to flash floods during high precipitation events.

The gaging station (USGS 09413500 Virgin River near St. George, UT) records indicate on March 28, 2016 the Virgin River was flowing at approximately 98 ft^3/sec, which is about 66% of the average 146 ft^3/sec for the date. However, on March 29, 2016 during a precipitation event, the gage recorded a flow of 280 ft^3/sec., which is 192% of normal. Given the precipitation that fell on the day of the field visit, in addition to the normal spring runoff flows, the Virgin River experienced an OHWM event on March 29, 2016. The observed OHWM indicators were consistent with these conditions. OHWM data forms were completed for two locations along the Virgin River within the study area (see Appendix B for data forms and photos). The OHWMs for each bank were field surveyed and mapped.

Wetlands

There are some small seeps surfacing just south of 5300 West just northeast of the racetrack. These wet areas contain hydrophytic vegetation, had surface water present on the day of the field visit and connected to an ephemeral wash. No wetland data sheets were developed for the wet areas, but they would likely be identified as wetlands. The boundaries of these wetlands were surveyed and mapped. No other possible wetland features were identified within the study area.

Appendix A:
Delineation Map



9

Washington County
Fairgrounds

Possible New
Bridge

Southern
Pkwy

Road Alignment

0 1,600 3,200 6,400 Feet

1"=1,600'

Purgatory Road
Wetland Inventory
Project Location Map

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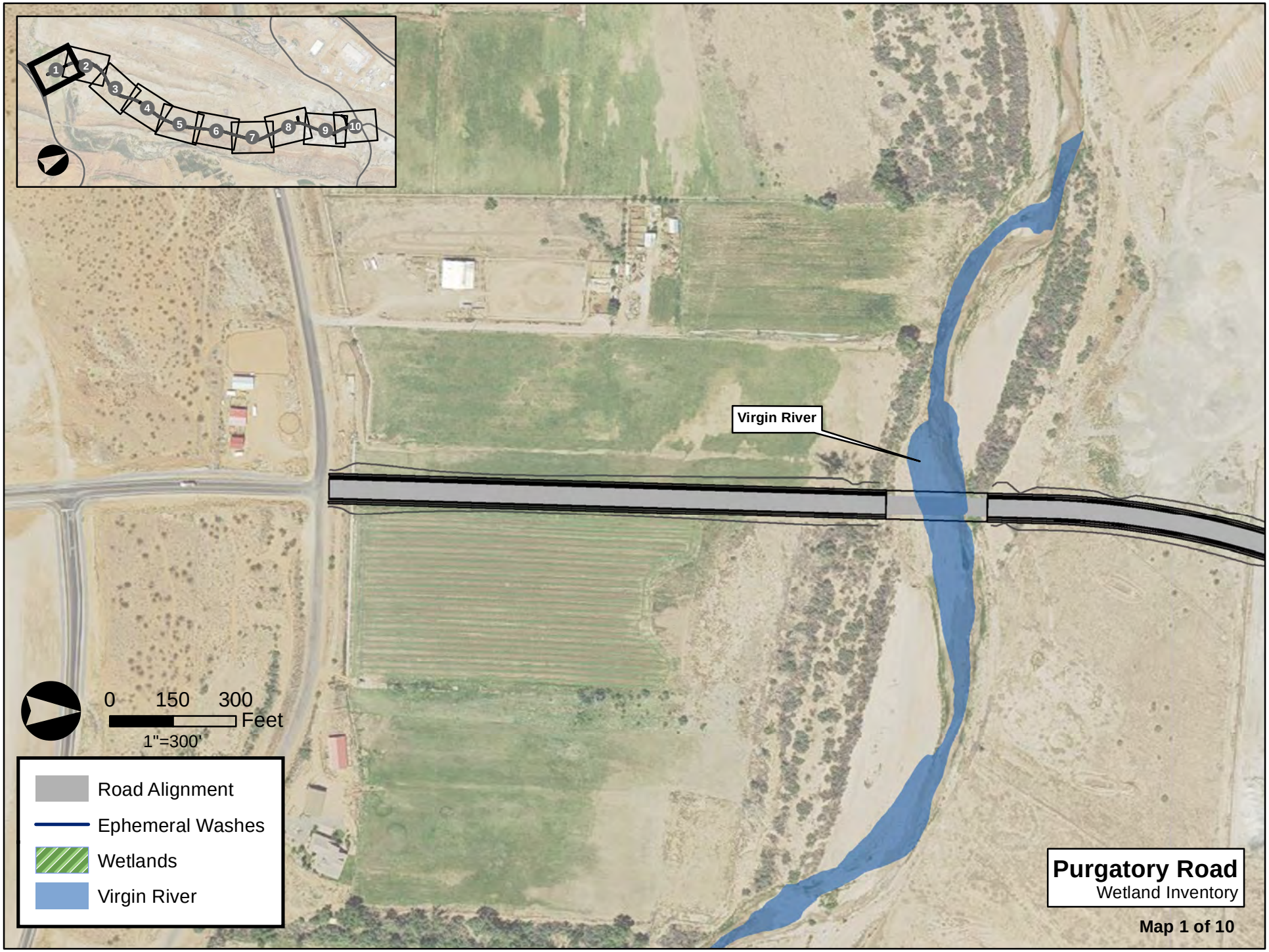
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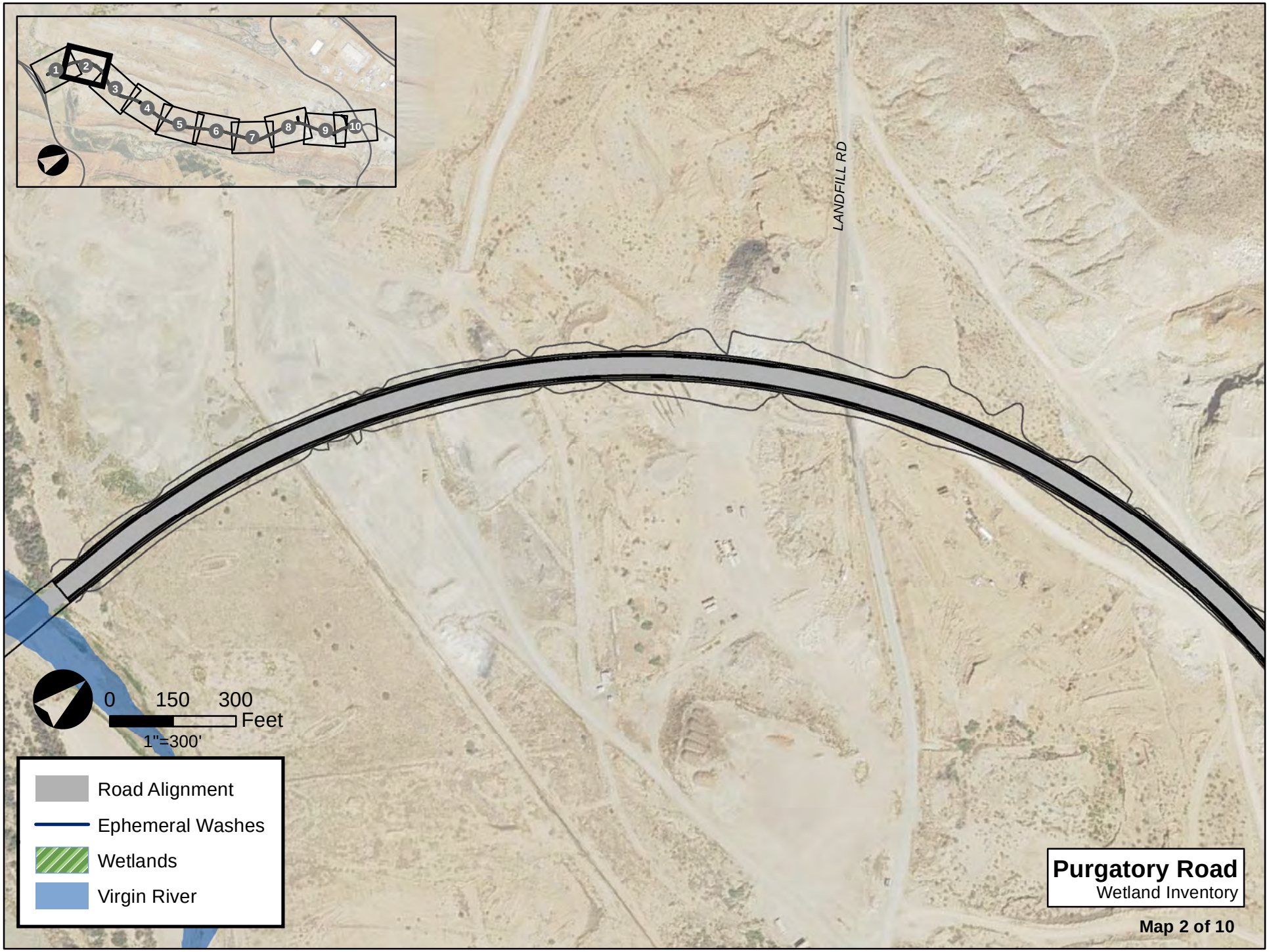
Road Alignment
Ephemeral Washes
Wetlands
Virgin River
Purgatory Road
Wetland Inventory
Map 1 of 10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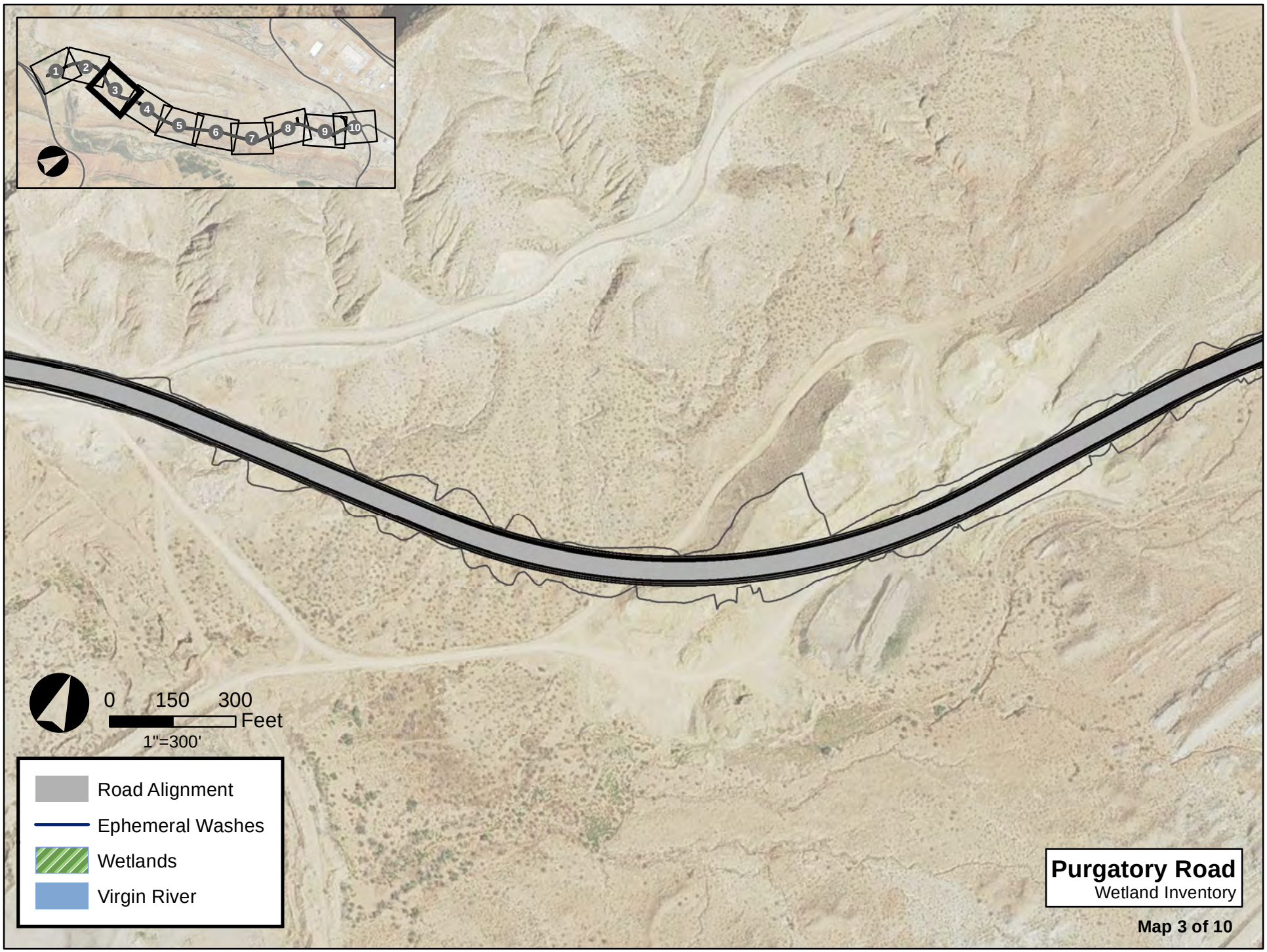
Wetland Inventory
Map 2 of 10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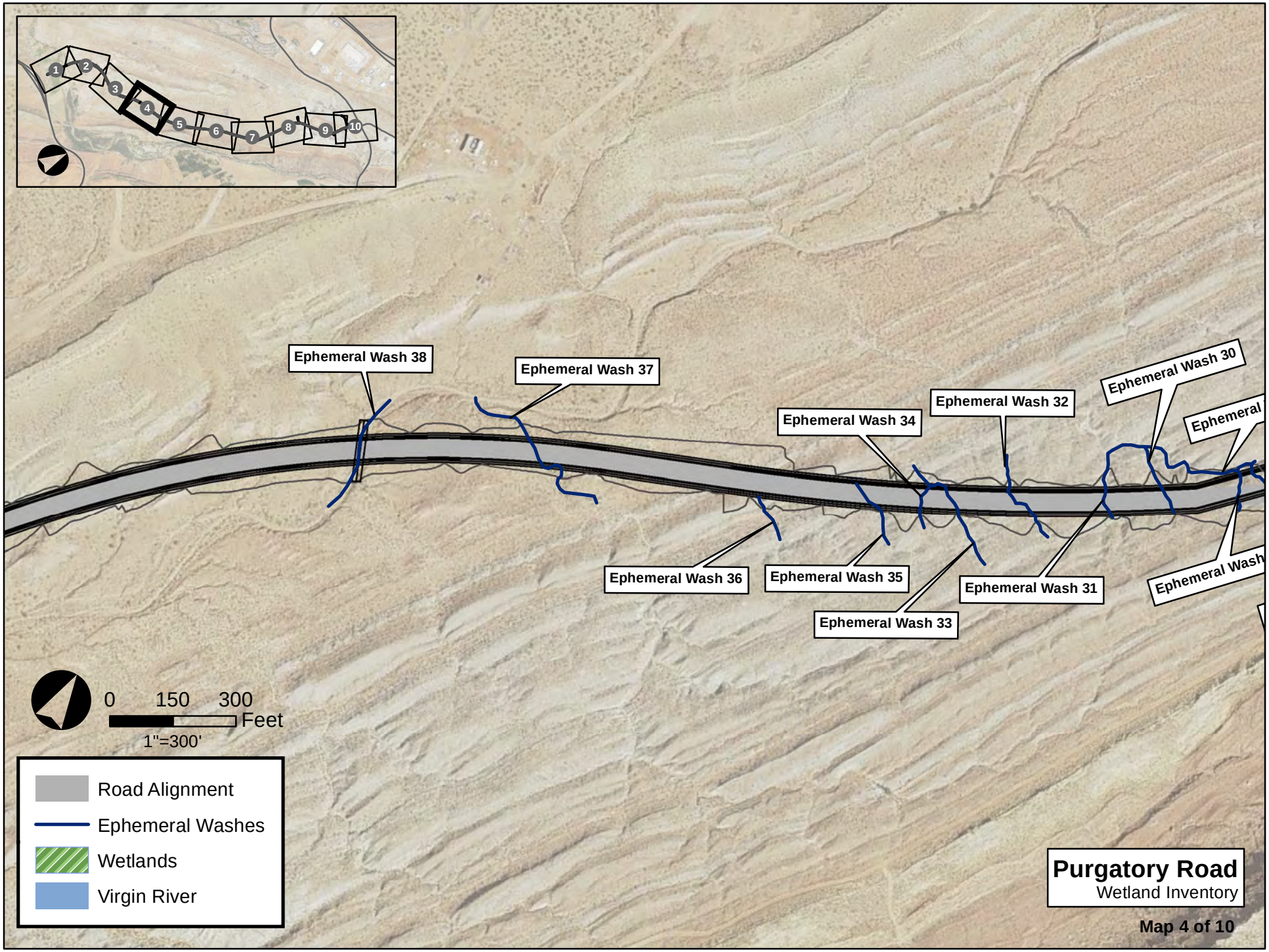
Wetland Inventory
Map 3 of 10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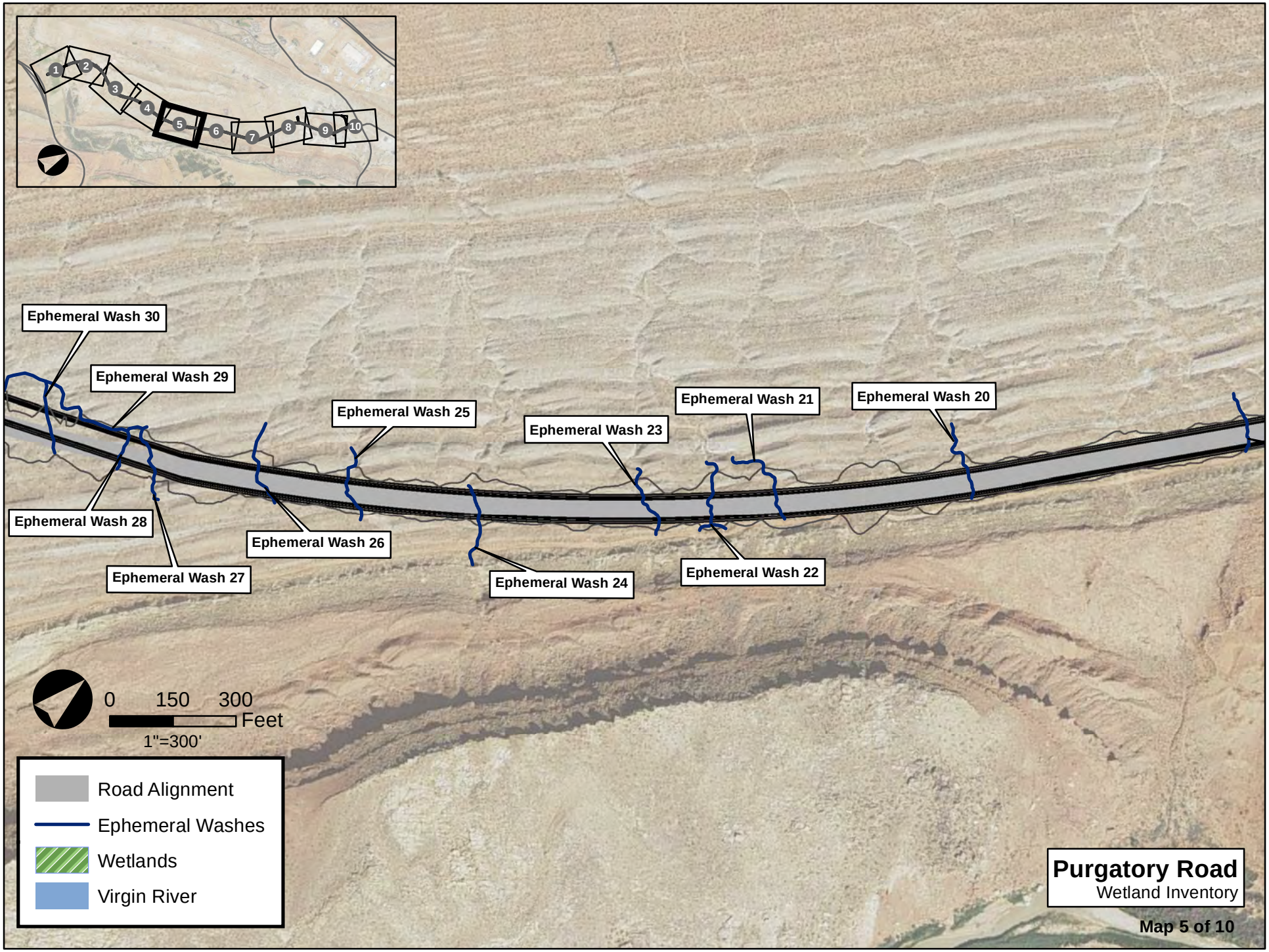
Wetland Inventory
Map 4 of 10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Ephemeral Washes
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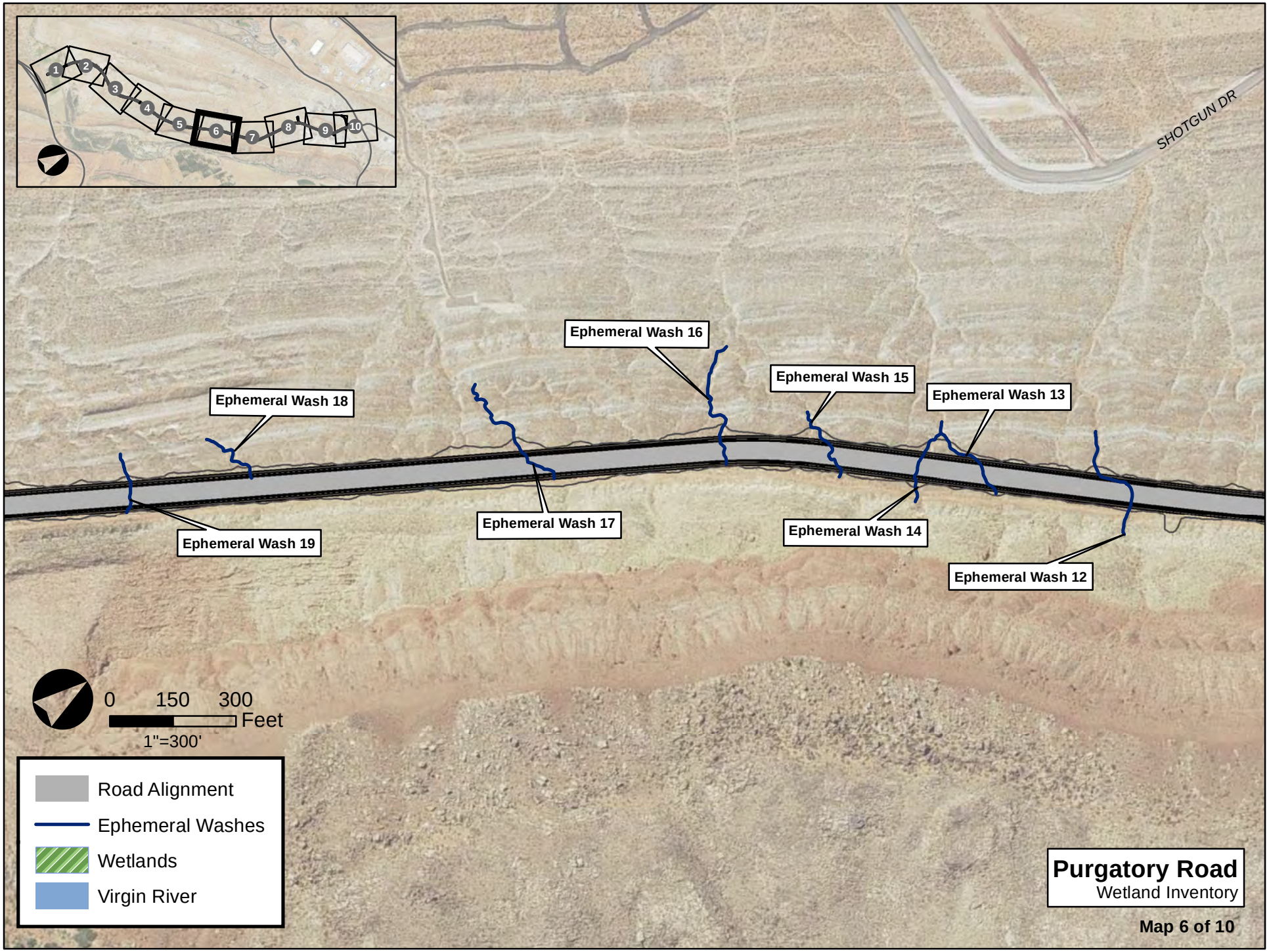
Wetland Inventory
Map 5 of 10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Ephemeral Washes
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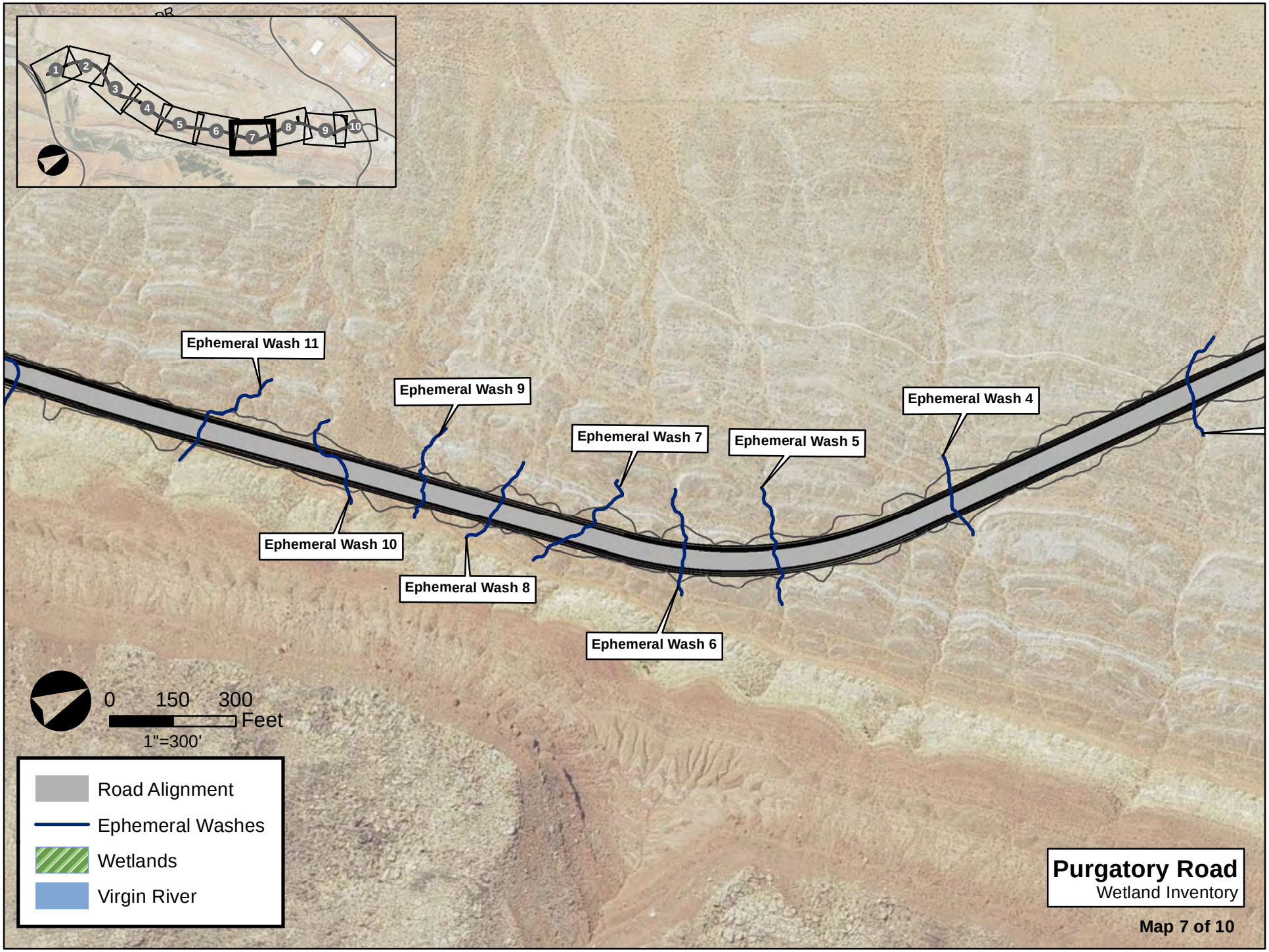
Wetland Inventory
Map 6 of 10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Road Alignment
Ephemeral Washes
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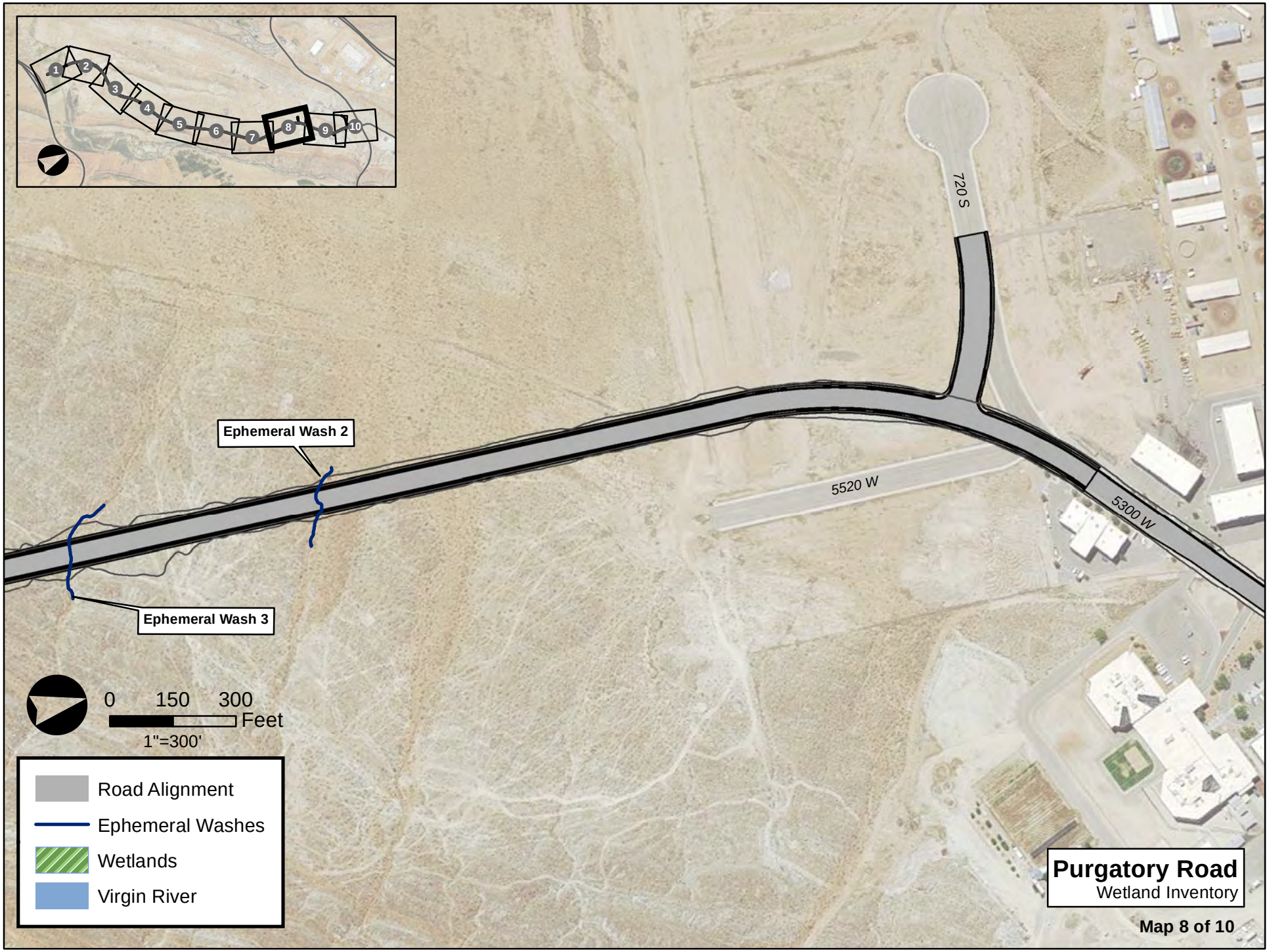
Wetland Inventory
Map 7 of 10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Road Alignment
Ephemeral Washes
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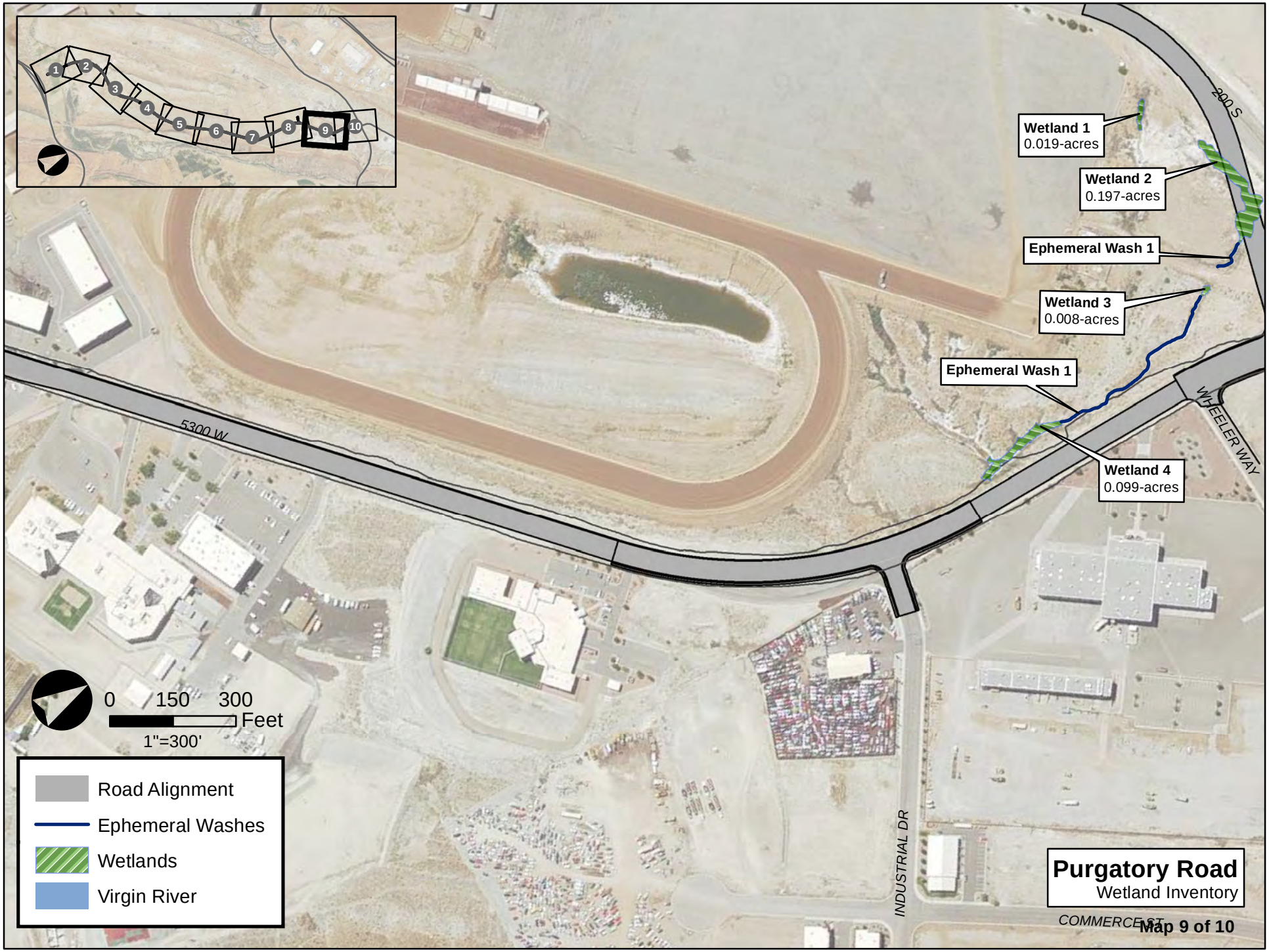
Wetland Inventory
Map 8 of 10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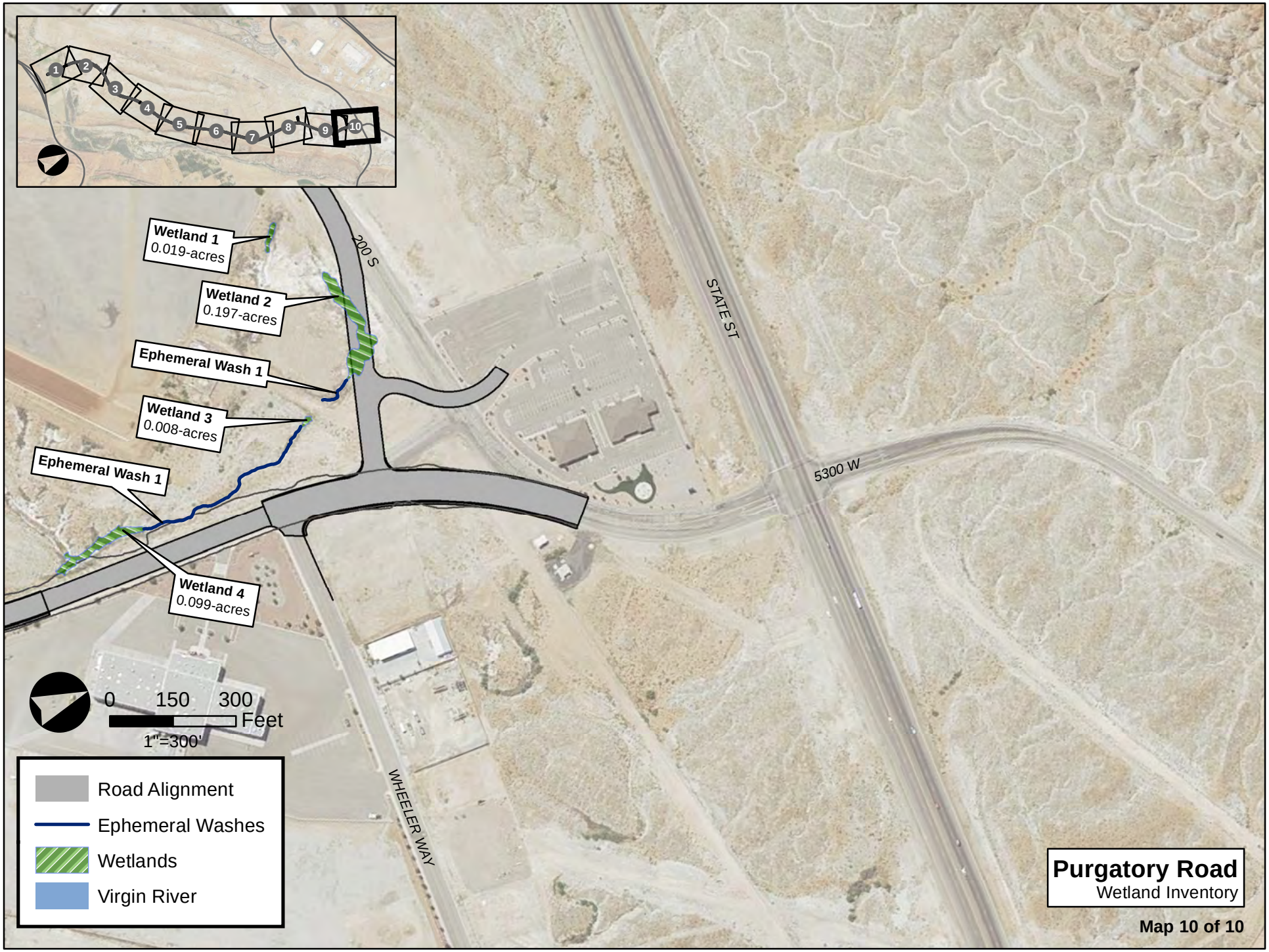
Road Alignment
Ephemeral Washes
Wetlands
Virgin River
Purgatory Road
Wetland Inventory
Map 9 of 10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Ephemeral Wash 1
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Road Alignment
Ephemeral Washes
Wetlands
Virgin River
Purgatory Road
Wetland Inventory
Map 10 of 10

Appendix B:
Data Forms and Photos

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Purgatory Road
Project Number:
Stream: Virgin River
Investigator(s): T. Johnson, M. Haupt

Date: March 30, 2016 **Time:** 09:00
Town: Washington **State:** Utah
Photo begin file#: **Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Crossing of the Virgin River - Upstream

Projection: **Datum:** NAD 83
Coordinates: 37.071413 N 113.270806 W

Potential anthropogenic influences on the channel system:
Washington Diversion Dam less than a mile upstream.

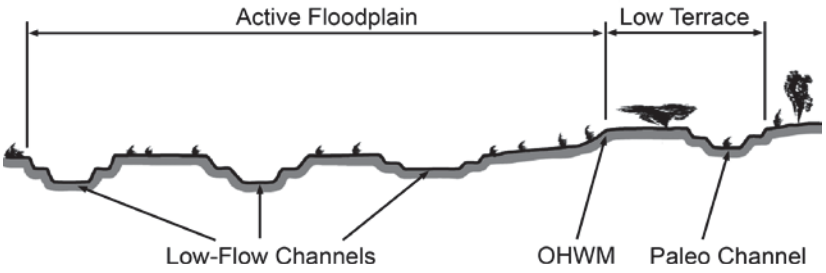
Brief site description:
River system in a desert ecosystem Phragmites is dominant species lining the banks with some tamarisk and willow. Large areas of unvegetated sand on floodplain where high flows are evident.

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies

- [X] Stream gage data
  Gage number:
  Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

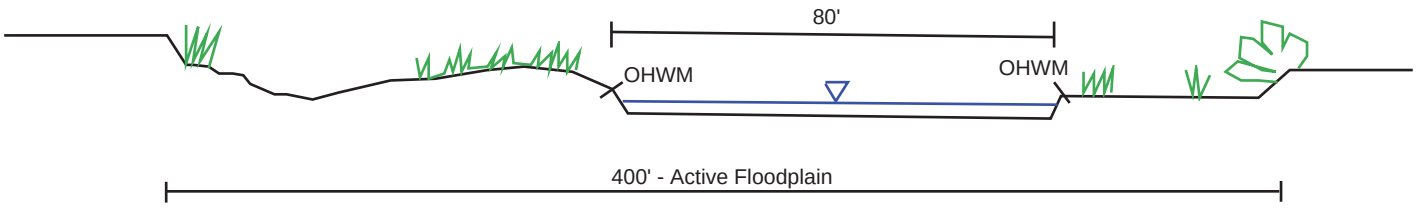


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] GPS
   - [ ] Digitized on computer
   - [ ] Other:

Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: _____

Indicators:

- [X] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

Steep bank at OHWM. River level is near OHWM due to spring runoff and recent storm event.

Floodplain unit: [ ] Low-Flow Channel [X] Active Floodplain [ ] Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: 25 % Tree: 0 % Shrub: 20 % Herb: 5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [X] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [X] Mudcracks
- [X] Ripples
- [X] Drift and/or debris
- [X] Presence of bed and bank
- [X] Benches
- [ ] Soil development
- [X] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

No low channel - perennial river

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Purgatory Road
Project Number:
Stream: Virgin River
Investigator(s): T. Johnson, M. Haupt

Date: March 30, 2016 **Time:** 09:30
Town: Washington **State:** Utah
Photo begin file#: **Photo end file#:**

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Crossing of the Virgin River - Downstream

Projection: **Datum:** NAD 83
Coordinates: 37.071377 N 113.271291 W

Potential anthropogenic influences on the channel system:
Washington Diversion Dam less than a mile upstream.

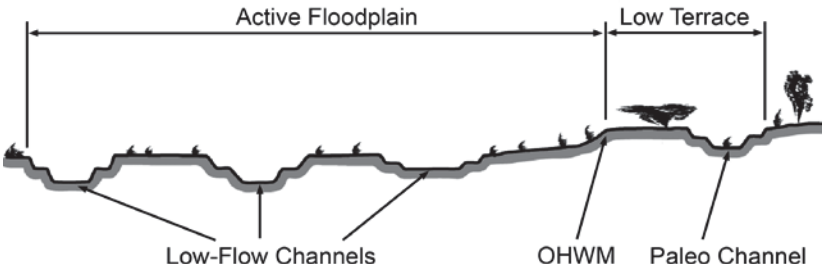
Brief site description:
River system in a desert ecosystem Phragmites is dominant species lining the banks with some tamarisk and willow. Large areas of unvegetated sand on floodplain where high flows are evident.

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies

- [X] Stream gage data
  Gage number:
  Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

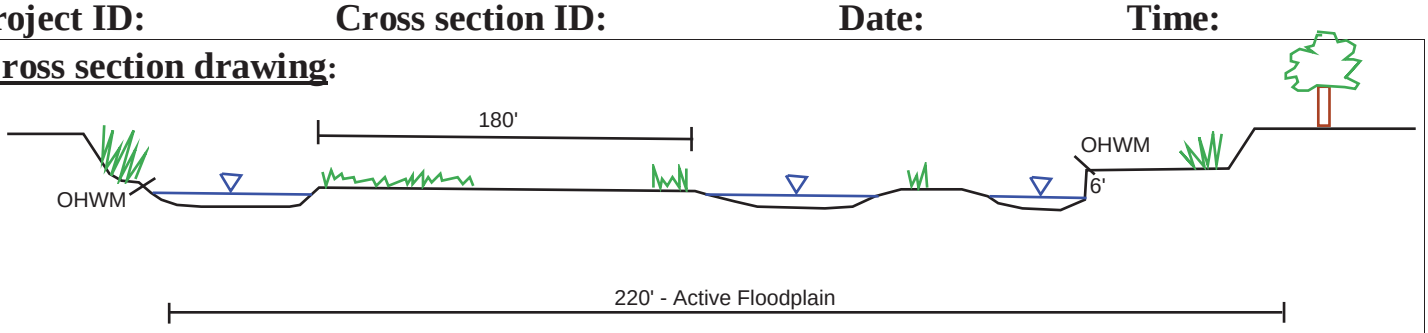


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] GPS
   - [ ] Digitized on computer
   - [ ] Other:

Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



OHWM

GPS point: _____

Indicators:

- [X] Change in average sediment texture
- [X] Change in vegetation species
- [X] Change in vegetation cover
- [X] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

Braided channel. River flowing near OHWM levels due to spring runoff and recent storm event.

Floodplain unit:

- [ ] Low-Flow Channel
- [X] Active Floodplain
- [ ] Low Terrace

GPS point: _____

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: 15 % Tree: 0 % Shrub: 10 % Herb: 5 %

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [X] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [X] Mudcracks
- [X] Ripples
- [X] Drift and/or debris
- [X] Presence of bed and bank
- [X] Benches
- [ ] Soil development
- [X] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

No low channel - perennial river

Virgin River

Virgin River – Looking East

Virgin River – Looking West

Ephemeral Wash Example

Example of an Inventoried Ephemeral Wash

Example of an Inventoried Ephemeral Wash

Potential Wetlands

Potential Wetland

Potential Wetland

NOISE STUDY

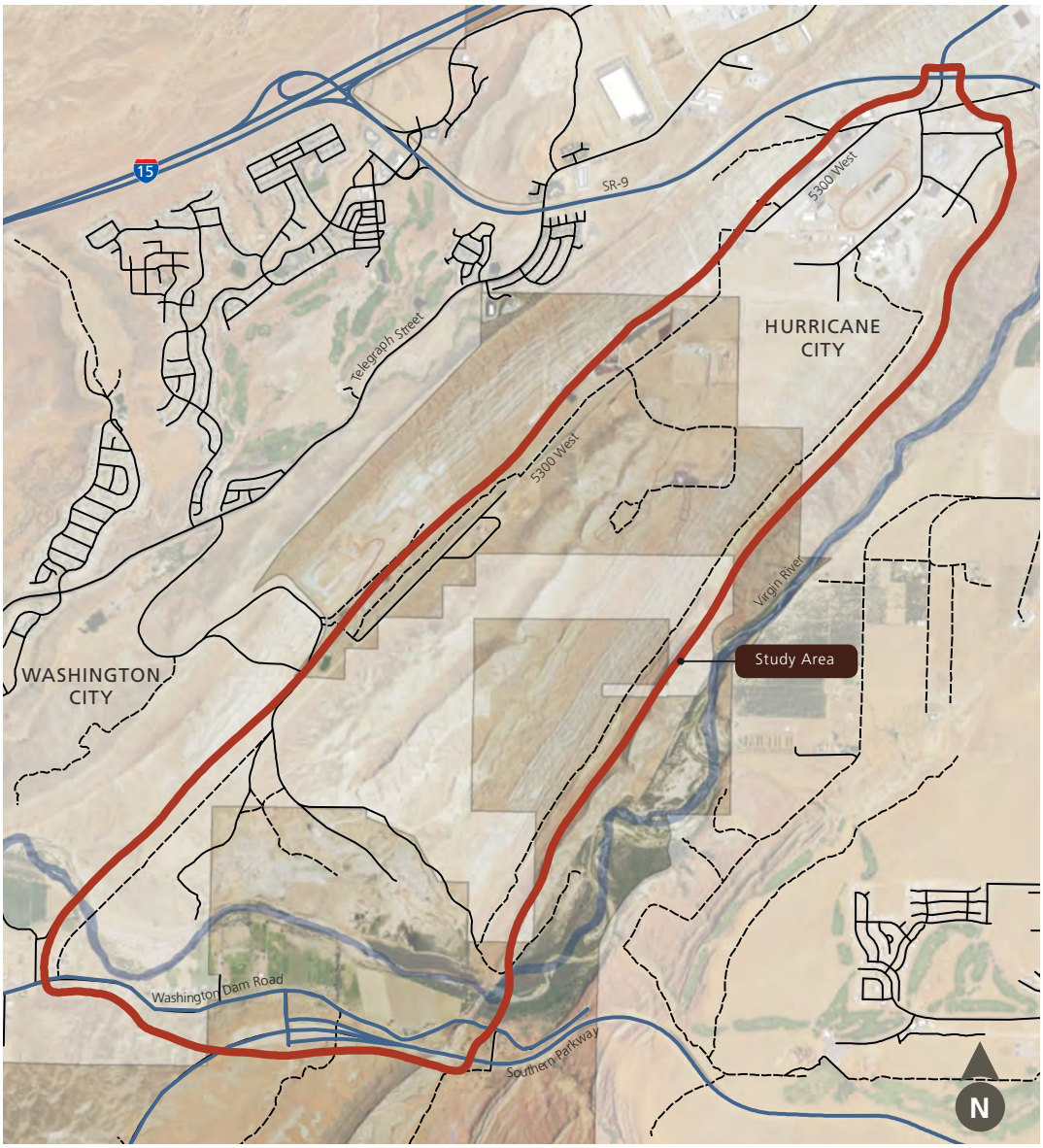
1.0 INTRODUCTION

This Noise Analysis was prepared in accordance with 23 CFR §772 and the UDOT Noise Abatement Policy, last revised February 13, 2014. This Noise Analysis was prepared for the Purgatory Road Environmental Assessment.

1.1 DESCRIPTION OF PROJECT

The proposed action for this study includes the construction of a new roadway in Washington County, Utah. These improvements include:

- Constructing a new three-lane roadway on new alignment between SR-9 and Southern Parkway. The proposed alignment would begin at SR-9 and follow the existing 5300 West alignment until the Quail Creek Industrial Park. The alignment would then run generally southward along the existing dirt road on the east side of the Purgatory Valley until approximately Landfill Road where it would swing to the west. The alignment would then cross the river at a new location to connect directly to Southern Parkway.



1.2 APPLICABILITY

The UDOT Noise Abatement Policy states that "noise abatement will be considered for all Type I projects where noise impacts are identified." Type I projects are projects that include any of the following: the construction of a highway at a new location, the physical alteration of an existing highway that substantially alters its alignment, the addition of a through traffic lane, the addition of an auxiliary lane, or the addition or relocation of interchange lanes or ramps. This project is considered a Type I project because of the construction of a highway at a new location.

2.0 ANALYSIS OF TRAFFIC NOISE IMPACTS

Traffic noise is measured in A-weighted sound levels in decibels (dBA) which most closely approximates the way the human ear hears sounds at different frequencies (see Figure 1). Since traffic noise varies over time, the sound levels for this noise analysis are expressed as "equivalent levels" or Leq, representing the average sound level over a one hour period of time. Unless noted otherwise, all sound levels in this noise analysis are expressed in the hourly equivalent noise level.

2.1 NOISE ABATEMENT CRITERIA

FHWA has established Noise Abatement Criteria for several categories of land use activities (see Table 1). FHWA's noise criteria is based on sound levels that are considered to be an impact to nearby property owners, also known as receptors. Primary consideration is to be given for exterior areas where frequent human use occurs.

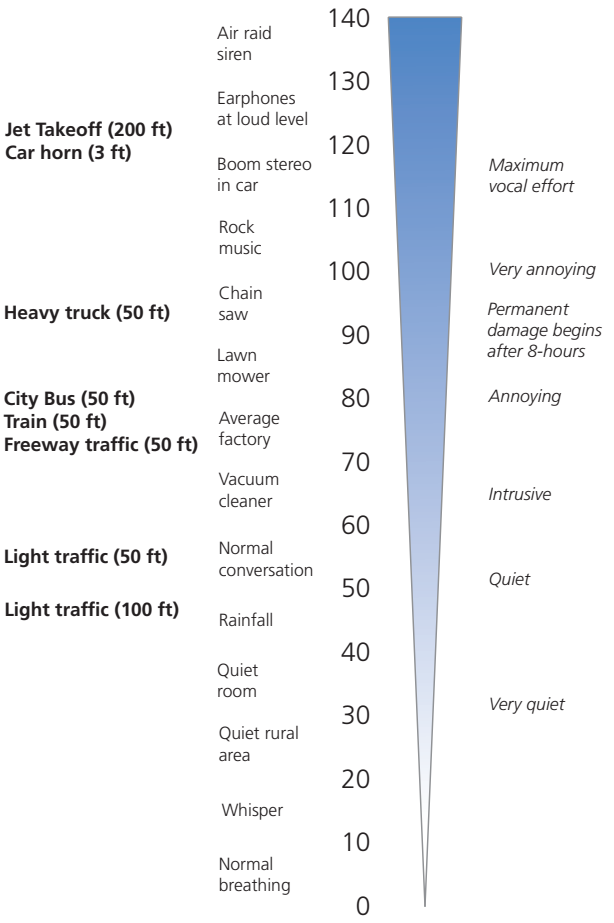


Figure 2. Sound Levels (in dBA) of Common Sounds (Compiled from Federal Transit Administration and Environmental Protection Agency Data)

UDOT has developed a Noise Abatement Policy for transportation projects, which conforms to FHWA noise abatement requirements outlined in 23 CFR §772. UDOT's Noise Abatement Policy states that a traffic noise impact occurs when either 1) the future worst case noise level is equal to or greater than the UDOT Noise Abatement Criteria for specified land use categories or, 2) the future worst case noise level is greater than or equal to an increase of 10 dBA over the existing noise level.

Table 1: Noise Abatement Criteria

Activity Category	FHWA Criteria Leq(h)	UDOT Criteria Leq (h)	Evaluation Location	Activity Description
A	57	56	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	66	Exterior	Residential.
C	67	66	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	51	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	---	---		Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	---	---		Undeveloped lands that are not permitted.

Source: UDOT Noise Abatement Policy

Noise impact and abatement analyses are required within Land Use Activity Categories A, B, C, D, and E (see Table 1) only when development exists or has been permitted (formal building permit issued prior to the date the final environmental decision document is approved). Activity Categories F and G include lands that are not sensitive to traffic noise. There are no impact criteria for these land use types and an analysis of noise impacts is not required.

2.2 NOISE SENSITIVE LAND USES

There are no Activity Category A or D land uses within the study area. Activity Category B land uses include all residences and the correctional facilities. Activity Category C land uses include the Washington County Fairground. Activity Category E land uses The UDOT Noise Policy states that a noise impact analysis will not be required for Activity Categories F and G.

2.3 EXISTING NOISE

The primary source of noise in the study area is automobile and truck traffic along US-40. Existing traffic sound levels for each receptor in the study area were calculated using the Traffic Noise Model (TNM) 2.5 software using existing conditions (travel lane configurations and the posted speed limit). Existing noise levels were determined using the greatest hourly traffic noise conditions likely to occur on a regular basis, or Level-of-Service (LOS) C traffic volumes.

On-site measurements were made to verify the accuracy of the model and are shown in Table 2 and the Existing Noise Levels figures in Appendix A. The number of receptors that currently experience a noise level that would be considered an impact is 3.

Table 2: Field Noise Measurements

Site #	Location	Field Noise Level (dBA)	TNM Output (dBA)	Difference
1	3110 East Washington Dam Road	58.1	55.2	2.9
2	Adjacent to Washington County Fairground track	46.1	44.3	1.8

2.4 PROPOSED ACTION NOISE

Projected traffic noise levels for the Proposed Action were calculated with TNM 2.5 software using build conditions (travel lane configurations and traffic volumes). Noise levels were determined using the greatest hourly traffic noise conditions likely to occur on a regular basis, or LOS C traffic volumes.

The Proposed Action would construct a 3-lane roadway from SR-9 to SR-7.

The Preferred Alternative would generally result in a small noise level increase throughout the study area, with the greatest increase being 1.8 dBA at Receptor 10C (see the maps in Appendix B). Overall, the average increase in noise levels for the study area would be about 0.4 dBA. No receptors would be impacted by traffic noise.

Projected future worst case noise levels and the locations of receptors can be seen in the Proposed Action Noise Levels figures in Appendix B.

2.5 SUMMARY

Table 3 shows a summary of Existing and Proposed Action noise levels (the suffix on the Map Label represents the activity category). Refer to the figures in Appendix A and B for receptor locations.

Table 3: Summary of Existing and Proposed Action Noise Levels

Map Label	Existing Noise Levels (dBA)	Impact	Proposed Action Noise Levels (dBA)	Impact
1B	58.1	No	58.4	No
2B	52.5	No	52.7	No
3B	52	No	52.2	No
4B	51.8	No	51.9	No
5B	51.3	No	51.3	No
6B	52.4	No	52.5	No
7B	52.7	No	52.8	No
8B	54.4	No	54.4	No
9B	54.7	No	54.7	No
10C	54.4	No	56.2	No
11C	54.9	No	55.8	No
12E	63.2	No	64	No
13E	59.2	No	60.8	No
14B	50.9	No	51.8	No
15B	47.5	No	48.1	No

Map Label	Existing Noise Levels (dBA)	Impact	Proposed Action Noise Levels (dBA)	Impact
16B	52.9	No	53.4	No
17E	60.6	No	59.2*	No
18E	67.4	No	68.6	No

**The noise level decreases slightly at this location because the project will shift a portion of the roadway further away from the receptor.*

3.0 NOISE ABATEMENT

According to the UDOT Noise Abatement Policy, specific conditions must be met before traffic noise abatement is implemented. Noise mitigation must be considered feasible and reasonable. Some of the factors considered when determining if mitigation is feasible and reasonable include, but are not limited to, the following:

- **Engineering Considerations:** Engineering considerations such as safety, presence of cross streets, sight distance, access to adjacent properties, barrier height, topography, drainage, utilities, maintenance access and maintenance of the abatement measure must be taken into account as part of establishing feasibility.
- **Safety on Urban Non-Access Controlled Roadways:** To avoid a damaged wall from becoming a safety hazard, in the event of a failure, wall height shall be no greater than the distance from the back of curb to the face of proposed wall.
- **Noise Abatement Design Goal:** Every reasonable effort should be made to obtain substantial noise reductions. UDOT defines the minimum noise reduction (design goal) from proposed abatement measures to be 8 dBA or greater for at least 75% of front-row receptors.
- **Cost Effectiveness:** The cost used to determine reasonable mitigation for Activity Category B is $30,000 per benefited receptor. (A benefited receptor is a noise-sensitive receptor that is predicted to receive a minimum of 8 dBA of noise reduction as a result of noise abatement.) The cost used to determine reasonable mitigation for Activity Categories A, C, D, or E is $360 per linear foot.
- **Viewpoints of Property Owners and Residents:** As part of the final design phase, public balloting would take place if noise abatement measures appear to meet the criteria outlined in UDOT's Noise Abatement Policy.

Under UDOT's Noise Abatement Policy, only Type I projects are eligible for noise abatement measures. Type I projects are projects that include any of the following: the construction of a highway at a new location, the physical alteration of an existing highway that substantially alters its alignment, the addition of a through traffic lane, the addition of an auxiliary lane, or the addition or relocation of interchange lanes or ramps. The Proposed Action is a Type I project so noise abatement could be considered. However, no receptors are impacted, so no noise abatement was evaluated.

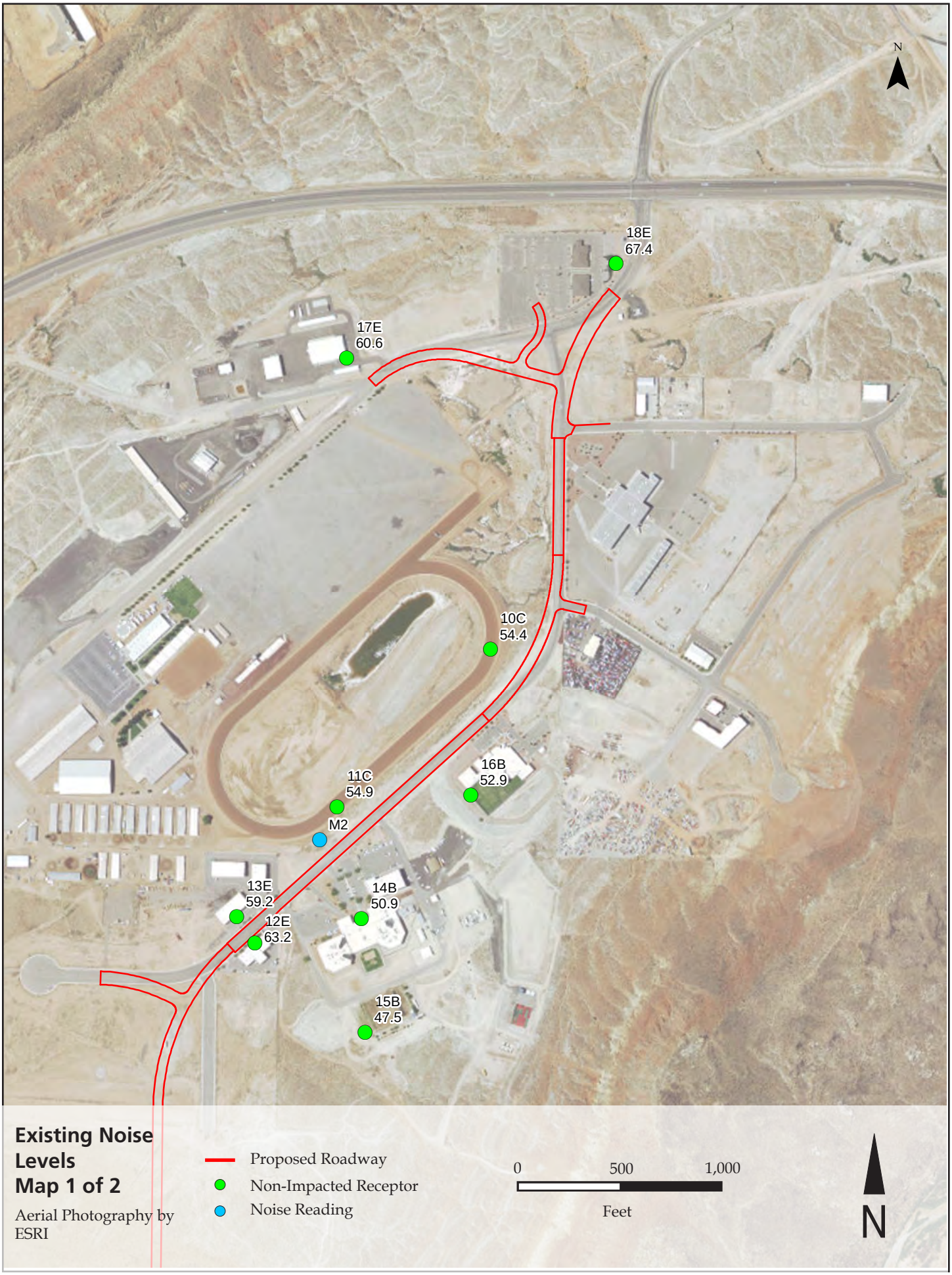
4.0 CONSTRUCTION IMPACTS

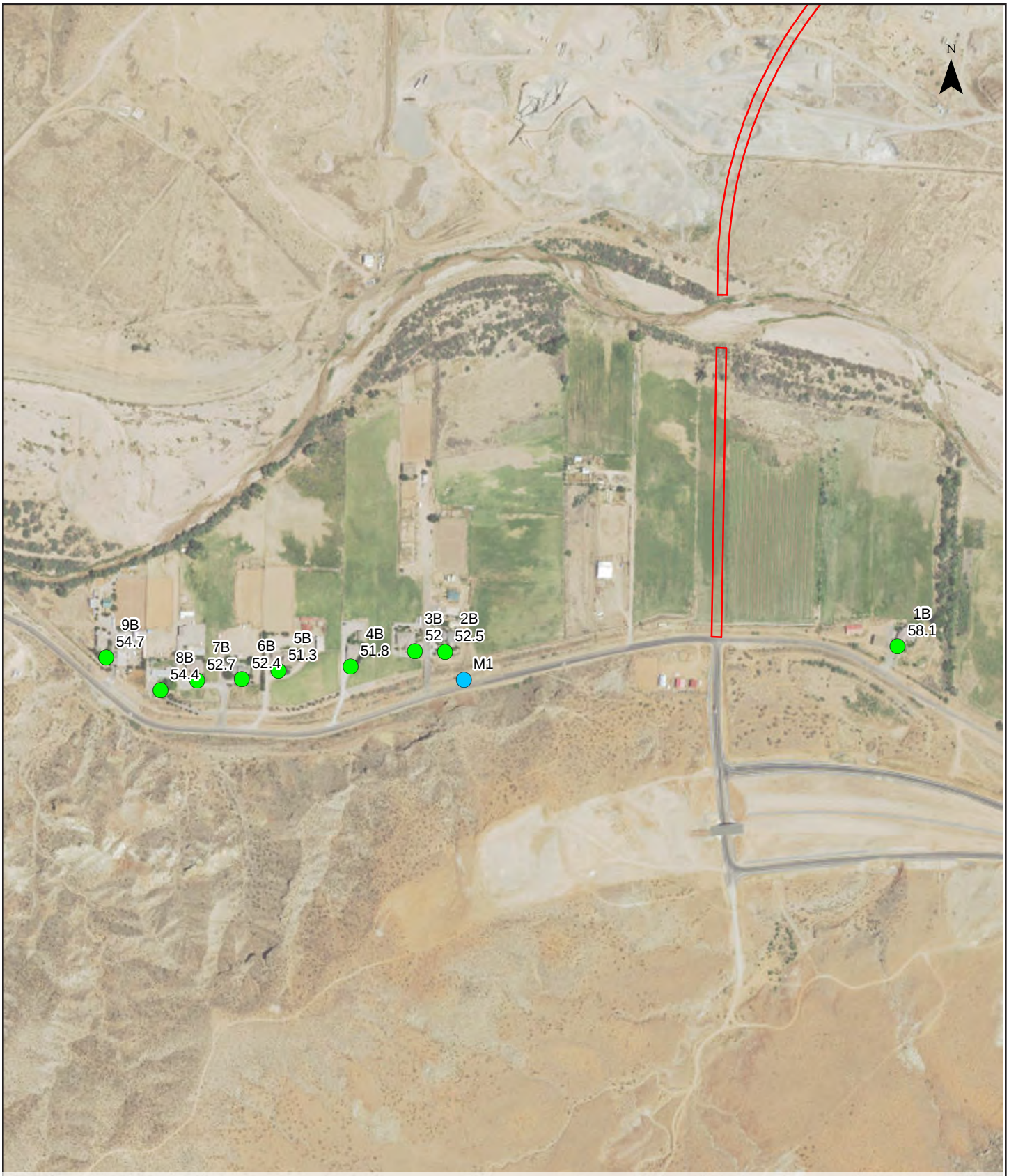
Construction noise impacts are considered temporary and will be minimized through adherence to UDOT Standard Specification 01355 Environmental Compliance, Part 3.6 - Noise Control. Extended disruption of normal activities is not anticipated, since no receptors are expected to be exposed to construction noise for a long duration of time.

5.0 CONCLUSION

The Proposed Action would result in noise levels increasing slightly throughout the study area, with an average increase of 0.4 dBA. See maps of Noise Levels in Appendix B. The Proposed Action would not impact any receptors.

APPENDIX A: EXISTING NOISE LEVELS MAPS


N
18E
67.4
17E
60.6
10C
54.4
16B
52.9
11C
54.9
M2
13E
59.2
14B
50.9
12E
63.2
15B
47.5
Existing Noise Levels
Map 1 of 2
Aerial Photography by ESRI
Proposed Roadway
Non-Impacted Receptor
Noise Reading
0
500
1,000
Feet
N



Existing Noise Levels
Map 2 of 2

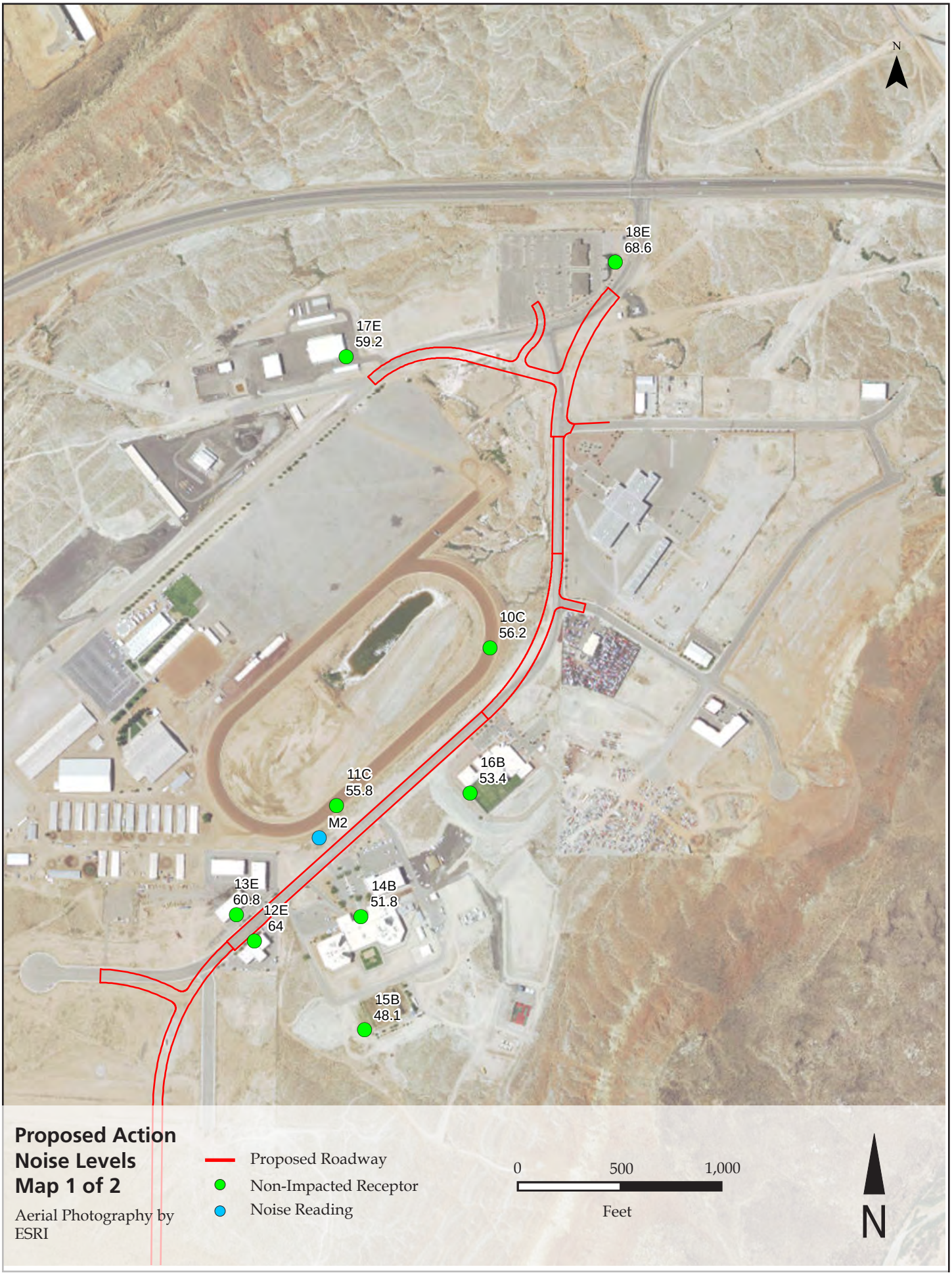
Aerial Photography by ESRI

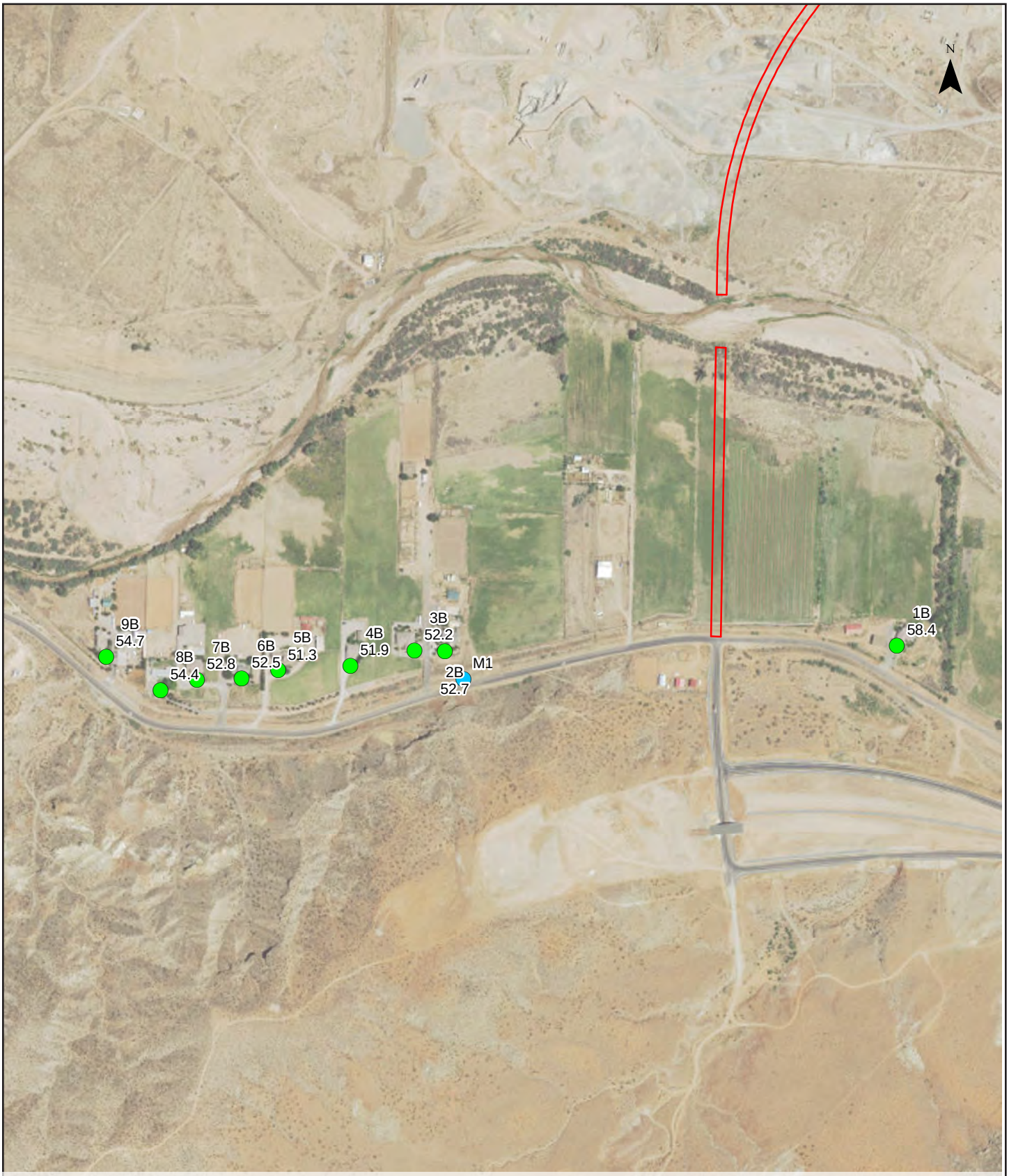
Proposed Roadway
Non-Impacted Receptor
Noise Reading

0 500 1,000
Feet

N

APPENDIX B: PROPOSED ACTION NOISE LEVELS MAPS


N
18E
68.6
17E
59.2
10C
56.2
16B
53.4
11C
55.8
M2
13E
60.8
12E
64
14B
51.8
15B
48.1
Proposed Action
Noise Levels
Map 1 of 2
Aerial Photography by ESRI
Proposed Roadway
Non-Impacted Receptor
Noise Reading
0
500
1,000
Feet
N



Proposed Action
Noise Levels
Map 1 of 2

Aerial Photography by ESRI

Proposed Roadway
Non-Impacted Receptor
Noise Reading

0 500 1,000
Feet

N