Appendix A
Major Federal, State, and Local Permits or Approvals

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
FEDERAL				
National Environmental Policy Act (NEPA) Compliance	Federal action: to grant right-or-way (ROW) across land under Federal jurisdiction	Lead agencies (Bureau of Land Management [BLM] and Western Area Power Administration [Western]); Affected land-managing agencies; Cooperating agencies	Environmental impact statement (EIS) and Record of Decision	NEPA (42 USC 4321); Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500-1508); Department of Energy (DOE) NEPA implementing Regulations (10 CFR 1021)
ROW Across Land Under Federal Management	Preconstruction surveys; construction, operation, maintenance, and abandonment	BLM	ROW grant and temporary use permit	Federal Land Policy and Management Act (FLPMA) of 1976 (PL 94-579); 43 United States Code (USC) 1761-1771; 43 CFR 2800
		BLM	Short-Term ROW Grant	Federal Land Policy and Management Act (FLPMA) of 1976 (PL 94-579); 43 United States Code (USC) 1761-1771; 43 CFR 2800
		BLM	Resource Management Plans	
		BLM	Plan of Development	
		BLM	Notice to Proceed	CFR 48
		U.S. Bureau of Reclamation	License Agreement	Technology Transfer Act of 1986 (Public Law 99-502), Section 11
		USBOR	Right of Use Authorization	Act of Congress of June 17, 1902 (32 Stat. 388), Act of Congress of August 4, 1939 (53 Stat. 1187), Section 10, and 43 CFR 429
		U.S. Forest Service (USFS)	Special use authorization permit or easement	36 CFR 251
		USFS	Operation and Maintenance Plan	
		USFS	Notice to Proceed	CFR 48
		USFS	Road Use Permit	16 USC 535 and 537, National Forest Roads and Trails Act Sections 4 and 6
		USFS	Pesticide Use Proposal	FS Manual 2150
		Bureau of Indian Affairs (BIA), tribe	ROW grant across American Indian lands	25 CFR 169
		National Park Service (NPS)	Authorization to cross NPS lands	16 USC 79
		U.S. Fish and Wildlife Service (USFWS)	Special use permit for crossing a national wildlife refuge	50 CFR 25
		Utah Reclamation Mitigation and Conservation Commission	License Agreement to cross Federal Lands	Central Utah Completion Act, 43 CFR 1000
	"Conversion of use" for a use other than recreation on lands reserved with Land and Water Conservation Fund Act (LWCF) monies	NPS	Review of transmission line corridor to identify conflicts with recreational area	Land and Water Conservation Fund Act, Public Law (PL) 88-578, Section 6(f)(3)
	Construction, operation, maintenance, and abandonment of transmission line across or within highway rights-of-way	Federal Highway Administration	Permits to cross Federal Aid Highway; 4 (f) compliance	Department of Transportation (DOT) Act, 23 CFR 1.23 and 1.27; 23 USC 109 and 315; 23 CFR 645; 23 CFR 771

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Biological Resources	Grant ROW by Federal land-managing agency	USFWS	Endangered Species Act (ESA) compliance by Federal land-managing agency and lead agency	ESA of 1973 as amended (16 USC 1531 et seq)
	BLM issuance of a ROW grant covering USFWS fee lands within National Wildlife Refuges	USFWS	Compatibility Determination	National Wildlife Refuge System Administration Act of 1966 as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee
	Protection of migratory birds	USFWS	Compliance	Migratory Bird Treaty Act of 1918, 16 USC 703-712; 50 CFR 1
	Protection of bald and golden eagles	USFWS	Compliance	Bald and Golden Eagle Protection Act of 1972 (16 USC 668)
Ground Disturbance and Water Quality Degradation	Construction sites with greater than five acres of land disturbed	U.S. Environmental Protection Agency (USEPA)	Section 402 National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges from Construction Activities	Clean Water Act (33 USC 1342)
	Construction across water resources	U.S. Army Corps of Engineers (USACE)	General easement	10 USC 2668 to 2669
	Crossing 100-year floodplain, streams and rivers	USACE	Floodplain use permits	40 USC 961
	Construction in or modification of floodplains	Federal lead agency	Compliance	42 USC 4321 Ex. Ord. No. 11988 Floodplains
	Construction in or modification of wetlands	Federal lead agency	Compliance	42 USC 4321 Ex. Ord. No. 11990 Wetlands
	Potential discharge into waters of the state (including wetlands and washes)	USACE (and states); USEPA on tribal lands	Section 401 permit	Clean Water Act (33 USC 1344)
	Discharge of dredge or fill material to a watercourse	USACE; USEPA on tribal lands	404 Permit (individual or nationwide)	Clean Water Act (33 USC 1344)
	Placement of structures and construction work in or across navigable waters of the U.S.	USACE	Section 10 permit	Rivers and Harbors Act of 1899 (33 USC 403)
	Protection of all rivers included in the National Wild and Scenic Rivers Systems	Affected land-managing agencies	Review by permitting agencies	Wild and Scenic Rivers Act (PL 90-542) (16 USC 1271-1287)
	Potential pollutant discharge during construction, operation, and maintenance	USEPA	Spill Prevention Control and Countermeasure (SPCC) Plan for substations	Oil Pollution Act of 1990 (40 CFR 112)
Cultural Resources	Disturbance of historic properties	Federal lead agency, State Historic Preservation Officers (SHPO), Advisory Council on Historic Preservation	Section 106 consultation and signed PA prior to Record of Decision	National Historic Preservation Act of 1966, (16 USC 470) (36 CFR 800)
	Potential conflicts with freedom to practice traditional American Indian religions	Federal lead agency, Federal land-managing agency	Consultation with affected American Indians	American Indian Religious Freedom Act (42 USC 1996)

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Cultural Resources (Continued)	Disturbance of graves, associated funerary objects, sacred objects, and items of cultural patrimony	Federal land-managing agency	Consultation with affected Native American group regarding treatment of remains and objects	Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001-3002)
	Investigation of cultural and paleontological resources	Affected land-managing agencies	Permit for study of historical, archaeological, and paleontological resources	Antiquities Act of 1906 (16 USC 432-433)
	Investigation of cultural resources; Excavation of archaeological resources	Affected land-managing agencies	Permits to excavate and remove archaeological resources on Federal lands; American Indian tribes with interests in resources must be consulted prior to issuance of permits	Archaeological Resources Protection Act of 1979 (16 USC 470aa to 470ee) (43 CFR 7)
	Protection of segments, sites, and features related to national trails	Affected land-managing agencies	National Trails System Act compliance	National Trails System Act (PL 90-543) (16 USC 1241 to 1249)
Paleontological Resources	Ground disturbance on Federal land or Federal aid project	BLM	Compliance with BLM mitigation and planning standards for Paleontological resources of public lands	FLPMA of 1976 (43 USC 1701-1771); Antiquities Act of 1906 (16 USC 431-433)
Air Traffic	Location of towers in regards to airport facilities and airspace	Federal Aviation Administration (FAA)	A "No-hazard Declaration" required if structure is more than 200 feet in height	FAA Act of 1958 (PL 85-726) (14 CFR 77)
			Section 1101 Air Space Permit for air space construction clearance	FAA Act of 1958 (PL 85-726) (14 CFR 77)
Rate Regulation	Sales for resale and transmission services	Federal Energy Regulatory Commission (FERC)	Federal Power Act compliance by power seller	Federal Power Act (16 USC 792)
TRIBAL				
UTE				
ROW Encroachment	Encroachment onto Uintah and Ouray Reservation Land	Ute Indian Tribe-BIA Department of Energy and Minerals	ROW easement	25 CFR 169
WYOMING				
STATE				
Wildlife Resources	Permitting within sage-grouse core areas	All State Agencies	Compliance with Executive Order (EO) 2011-5	Sections 1 and 2 of Article V of the Michigan Constitution of 1963; Executive Order 2011-5
Utility Siting	Primary permitting authority for transmission line siting, county level necessary	Public Service Commission (PSC)	Certificate of Public Convenience and Necessity	WS 37-2-101; PSC-R 202, 204, 205
	Construction of an industrial facility	Industrial Siting Division, Department of Environmental Quality (DEQ)	Industrial siting permit	WS 35-12
ROW Encroachment	ROW across State Lands	State Land Board	ROW Easement	WS 35-20 and 36-20
	Encroachment into state roadway ROW	DOT	ROW encroachment permit	WS 1-26-813
Ground Disturbance and Water Quality Degradation	Construction sites with greater than one acre of land disturbed	DEQ	Storm water permit	WS 35-11

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Fish and Wildlife	Project impacts to fish and wildlife species and associated habitat	WGFD	Compliance	
Air Quality	Fugitive dust emissions generated during construction	DEQ Air Quality Division	Construction Permit	40 CFR part 63
Cultural Resources	Disturbance of cultural resources	SHPO	Potential permit	Wyoming Protocol Agreement
	Disturbance of cultural resources	BLM and SHPO	Section 106 Consultation	National Historic Preservation Act of 1966, (16 USC 470) (36 CFR 800)
Explosives	Storage and use of explosives	Varies	Explosives Permit	18 U.S.C., Chapter 40
LOCAL				
Land Use	Construction and operation of Transmission Lines	Carbon County	Conditional Use	Conditional Use Permit in Ranching, Agriculture, Mining Zone
	Construction and operation of transmission lines	Sweetwater County	Potential conditional use	Permitted in agricultural zone, Conditional Use Permit in agricultural zone with growth area overlay
	Construction and operation of transmission lines	Sweetwater County	County Road Crossings and Access Permits, County Road Maintenance Agreements	
			Construction /Use Permits – County Zoning:	Required for all structures except Transmission Lines and Towers
			Small waste water permits	
			Recordation of Hazardous Material Storage	
			Grading Permits	
			Noxious Weed Control	
COLORADO				
STATE				
Utility Siting	Primary permitting authority for transmission line siting, county level necessary	Public Utility Commission (PUC)	Certificate of Public Convenience and Necessity	CRS 40-5-101-106; 4 CCR 723-3
ROW Encroachment	ROW across State Lands	State Lands Trust	ROW Easement	
	Encroachment into state roadway ROW	DOT	Utility/Special use permit	CRS 9-1.5-103
Ground Disturbance and Water Quality Degradation	Construction sites with greater than one acre of land disturbed	Water Quality Control Division, Department of Public Health and Environment	Storm water permit	5 CCR 1002-61
Cultural and Archaeological Resources	Disturbance of cultural or archeological resources	Office of the State Archaeologist, Office of Archaeology and Historic Preservation	Potential permit	CRS 24-80-401-410
Biological Resources	Habitat modification in wetland or riparian areas	Division of Wildlife	Wildlife certification	CRS 33-5-101-105
LOCAL				
Land Use	Construction and operation of transmission lines	Routt County	County special use permits	State Land Use Act
	Construction and operation of transmission lines	Moffat County	County special use permits	Permitted in non-residential, non-agricultural, and non-open
	Construction and operation of transmission lines	Rio Blanco County	County special use permits	State Land Use Act

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Land Use (Continued)	Construction and operation of transmission lines	Mesa County	County special use permits	
	Construction and operation of transmission lines	Garfield County	County special use permits	State Land Use Act
UTAH				
STATE				
Permitting Process	Proposed transmission line facility	Resource Development Coordinating Committee	Expedites Review of Permitting Process for all State Agencies	UCA 63-38d-501, UCA 63-38d-504
ROW Encroachment	Encroachment on, through or over state lands	Division of Forestry, Fire, and State Lands	Application approval	UCA Title 65A
	Encroachment into state roadway ROW	DOT	ROW encroachment permit	UCA 63-46b-3
Ground Surface Disturbance	Project construction	PSC	Certificate of Public Convenience and Necessity; Approve construction contracts	UCA 54-4-25, R 746-401
	Crossing state lands	Division of Forestry, Fire, and State Lands	Easement onto state lands. Bond may be required.	UCA 65A-7-8, R 652-40
Cultural, Paleontological, and Biological Resources	Crossing state lands	Division of Forestry, Fire, and State Lands	Provide a cultural and/or paleontological and/or biological survey and submit procedures for reasonable mitigation actions	R 652-40-500
Historical and Cultural Review	Impact on historical sites	Division of State History	Notification of Planning Stage and before Construction	UCA 9-8-306
Archaeological Resources	Survey or excavation of archaeological resources on lands owned or controlled by the state	Governor's Public Lands Policy Coordinating Office	Permit to survey or excavate	UCA 9-8-305, R 694-1
Encroachment on State Park Lands	Utility easement on state park lands	Division of Parks and Recreation	Agreement for Granting and Maintenance of Easements or Rights-of-Way across Park Lands	UCA 63-11-10.3
Air Quality	Construction and operation	Air Quality Board	Notice of Construction	UCA 19-2-108
Water Resources	Construction and operation	Water Quality Board	Discharge permit, spills	UCA 19-5-101, et. Seq.
Wildlife	Modification of habitat	Division of Wildlife Resources	Easement for Use of State Wildlife Resource lands	UCA Title 23
LOCAL				
Land Use	Construction and operation of transmission lines	Daggett County	Potential conditional use	Hearing not required; if it does, it must occur within 30 days of application
	Construction and operation of transmission lines	Uintah County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Duchesne County	Potential conditional use	Permitted in all zones, except residential 1/2 acre minimum lot size
	Construction and operation of transmission lines	Wasatch County	Potential conditional use	Wasatch County Land Use and Development Code 16.23
	Construction and operation of transmission lines	Utah County	Potential conditional use	Utah County Zoning Ordinance 3-45, 7-24-D
	Construction and operation of transmission lines	Juab County	Potential conditional use	Juab County Zoning Ordinance 12-1-15
	Construction and operation of transmission lines	Sanpete County	Potential conditional use	Sanpete County Land Use Ordinance 14.68
	Construction and operation of transmission lines	Carbon County	Potential conditional use	The Development Code of Carbon County, Utah 5.1.2, 5.5.3, 5.14

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Land Use (Continued)	Construction and operation of transmission lines	Grand County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Emery County	Potential conditional use	The Emery County Zoning Ordinance Article 10, 11-4-4
	Construction and operation of transmission lines	Sevier County	Potential conditional use	Permitted in Agricultural, GRF (Grazing, Recreation, and Forestry) zones; Not permitted in Residential-Agricultural zone
	Construction and operation of transmission lines	Millard County	Conditional use; potential General Plan Amendment	County rules and regulations
	Construction and operation of transmission lines	Beaver County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Piute County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Wayne County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	San Juan County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Iron County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Iron County	ROW encroachment permit	County rules and regulations
	Construction and operation of transmission lines	Washington County	Potential conditional use	County rules and regulations
	Construction and operation of transmission lines	Summit County	Potential conditional use	County rules and regulations
NEVADA				
STATE				
ROW Encroachment	ROW across State Lands	Division of State Lands	Easement	Nevada Revised Statutes (NRS) 322.050
	Encroachment into state roadway ROW	Nevada DOT	ROW encroachment permit	NRS 408.423, 408.210
Ground Surface Disturbance	Project construction	Nevada Division of Environmental Protection (NDEP)	Registration certificate	Nevada Administration Code (NAC) 445.704
	Construction of electric transmission line	Public Service Commission	Authority to construct and certificate of need	NRS 704.330, NRS 704.820, NRS 704.701
Ground Disturbance and Water Quality Degradation	100-year floodplain, streams and rivers, waters of the state	NDEP	Floodplain use permits, Clean Water Act 401, 402, and 404 permits	Nevada State Statutes - State Water Quality Certification rules
Storm Water and Water Quality Degradation	Pollution discharge	NDEP	Storm water pollution prevention plans, spill prevention, control, and countermeasures plan	Nevada State Statutes - State Water Quality Certification rules
Cultural and Paleontological Resources	Crossing state lands	Division of State Lands	Easement onto state lands	NRS 321.001
	Investigation of Paleontological, archaeological, and historic sites	Nevada State Museum	Permit to investigate antiquities	Nevada Antiquities Law (NRS 381.195 to 381.227)
	Disturbance of American Indian burial sites on state and private lands	Nevada SHPO	Notification of discoveries, consultation with affiliated groups	Nevada Protection of Indian Burial Sites (NRS 383.150) (NRS 383.190)
Air Quality	Construction and operation	NDEP	Authority to construct, permit to operate	NRS 445

Table A-1 Summary of Potential Federal and State Permits and Environmental Review Requirements

Issue	Action Requiring Permit, Approval, or Review	Agency	Permit, License, Compliance, or Review	Relevant Laws and Regulations
Biological Resources	Modification of sensitive plant species habitat	Division of Forestry	Compliance to survey for identification of plant species	NRS 527.270, NRS 527.050
	Disturbance of special status plant species	Division of Forestry	Permit for lawful take of protected plant	NRS 527.250
	Construction and operation in areas of rare and endangered animal species	Division of Wildlife	Compliance	NRS 501, NAC 503
	Modification of habitat of threatened and endangered species	Division of Wildlife	Special permit	NAC 5-4.510 through 4.550
LOCAL				
Land Use	Construction and operation of transmission lines	Lincoln County		
	Construction and operation of transmission lines	Clark County	Potential conditional use	
	Construction and operation of transmission lines	Clark County	Conditional special use	
Air Quality	Construction	Clark County, Department of Air Quality and Environmental Management	Air Quality	

Appendix B
TransWest Express Transmission Project Corridor Screening Report

AECOM

Submitted to:
Bureau of Land Management
Western Area Power Administration

Submitted by:
AECOM
Fort Collins, CO
60139683
May 2013

TransWest Express Transmission Project Corridor Screening Report

List of Acronyms

AC	Alternating Current
ACEC	Area of Critical Environmental Concern
APS	Arizona Public Service Company
BLM	Bureau of Land Management
DC	Direct Current
EGS Project	Energy Gateway South Project
EHV	Extra-High Voltage
EIS	Environmental Impact Statement
GIS	Geographic Information System
GWh/yr	Gigawatt hours per year
IA	Interim Agreement
IM	Instruction Memorandum
IPP	Intermountain Power Project
kV	Kilovolt
LRMP	Land and Resource Management Plan
MW	Megawatt
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NNL	National Natural Landmarks
POD	Plan of Development
RMP	Resource Management Plan
ROW	Right-of-Way
SIO	Scenic Integrity Objective
TAC	The Anschutz Corporation
TIP	Transmission Infrastructure Program
TWE	TransWest Express LLC
TWE Project	TransWest Express Transmission Project
U.S.	United States
USFS	U.S. Forest Service
VQO	Visual Quality Objective
VRM	Visual Resource Management
WECC	Western Electricity Coordination Council
Western	Western Area Power Administration
WIA	Wyoming Infrastructure Authority
WSA	Wilderness Study Area
WSR	Wild and Scenic River

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1.0 Introduction

1.1 Project Description

TransWest Express LLC (TransWest) and Western Area Power Administration (Western) are proposing to construct, own, and operate the TransWest Express Transmission Project (TWE Project), which would be an extra-high voltage (EHV) direct current (DC) transmission system extending from south-central Wyoming to southern Nevada. The TWE Project is intended to provide the transmission infrastructure and capacity necessary to deliver approximately 3,000 megawatts (MW) of electric power from renewable energy resources in south-central Wyoming to markets in the Desert Southwest region. The TWE Project would consist of an approximately 725-mile-long, 600-kilovolt (kV), DC transmission line and two Alternating Current (AC)/DC converter stations – a Northern AC/DC Converter Station to be located near Sinclair, Wyoming, and a Southern AC/DC Converter Station to be located at the Marketplace Hub in the Eldorado Valley, approximately 25 miles south of Las Vegas, Nevada (**Map 1, Attachment A**). TransWest also is retaining an option for a future interconnection with the Intermountain Power Project (IPP) transmission system in Millard County, Utah.

1.2 Corridor Screening Report Purpose

The Wyoming State Office of the Bureau of Land Management (BLM) and Western are co-lead federal agencies responsible for preparing an Environmental Impact Statement (EIS) under the requirements of the National Environmental Policy Act (NEPA). The results of this screening report will be used by BLM and Western to develop the EIS structure and content.

1.3 Definitions

- A **corridor** is a study area of a specific width and length in which a transmission line and ancillary facilities could be located. A corridor typically extends over many miles within a particular region, and is made up of shorter **corridor segments** that have been added together.
- The **applicant-proposed corridor** has been presented by TransWest as the preferred project location to meet its interests and objectives. **Alternative corridors** are different locations for transmission line facilities that may result in less environmental impacts than the applicant-proposed corridor.
- **Screening** is the process by which identified corridor segments are reviewed to determine the **opportunities** and **constraints** for locating transmission line facilities. Opportunities include ways to limit the magnitude of environmental impacts, and to insure consistency with federal, state, and local land management requirements. Constraints include areas where construction of transmission line facilities should be excluded or avoided, based on terrain and natural hazards, land management restrictions, or the presence of sensitive resources that could be adversely affected.

1.4 Corridor Screening Process

This Corridor Screening Report was prepared to document the process by which transmission line study corridors for the proposed project and alternativeswere identified and refined for public scoping and EIS analysis, or were eliminated from further consideration. The corridor screening process consisted of three primary steps and time frames:

1. Project feasibility. Studies of project feasibility were initiated in 2005, and included the development of preliminary transmission line corridors within a large study region. An initial corridor feasibility report was completed by TransWest and other project proponents in 2008. Additional federal agency input was received on corridor suitability in 2009.

2. Preliminary Corridor Screening. The BLM and Western initiated preliminary corridor screening in 2010 to determine which corridors to carry forward for EIS public scoping. The methods and results of this screening review are contained in this report.
3. EIS Alternatives. The BLM and Western selected corridors to carry forward in the NEPA analysis, and eliminate from further consideration, based on the results of public scoping completed in early 2011, and ongoing agency and public comments received through the beginning of 2013. The methods and results of this selection process are contained in this report.

1.5 Project Background and Feasibility

In 2005, Arizona Public Service Company (APS) announced plans to explore the feasibility of the TWE Project to meet its customers' long-term growth needs. The TWE Project, as originally conceived, was to transport fossil fuel and renewable wind energy from Wyoming to utilities in Arizona, California, Colorado, New Mexico, Nevada, and Utah. In addition to providing access to energy resources for rapid growth areas in the Southwest, the TWE Project was intended to benefit all western states by providing improved reliability of the western electrical grid. In March 2006, APS signed a Memorandum of Understanding with the Wyoming Infrastructure Authority (WIA) and National Grid (an international electricity and gas company) to collaborate on a transmission corridor study. In December 2006, APS completed a feasibility report that concluded that the TWE Project potentially would create significant benefits for its customers.

During the same timeframe, Rocky Mountain Power (a subsidiary of PacifiCorp) was investigating the feasibility of developing the Gateway South Transmission Project (later to become known as the Energy Gateway South Project [EGS Project]), a proposed transmission line from eastern Wyoming into Utah, terminating at the Crystal Substation in Nevada. The EGS Project shared many corridor location aspects with the TWE Project.

In August of 2007, National Grid, APS, Rocky Mountain Power, and the WIA entered into an interim agreement (IA) to plan for development of new EHV transmission lines for the western United States (U.S.). These proponents' system studies concluded that there was a demonstrated need to transmit electrical power from Wyoming to energy demand areas in Utah, Nevada, Arizona, and Southern California. Because both APS and Rocky Mountain Power had sponsored previous feasibility studies, those previous studies were incorporated into the collaborative effort to identify feasible transmission corridors developed under the IA.

The collaborative study area originally encompassed much of Wyoming, northwestern Colorado, southeastern Idaho, much of Utah, extreme eastern Nevada, and central Arizona. The analysis that resulted from the IA collaboration between National Grid, APS, Rocky Mountain Power, and WIA identified a preliminary set of EHV transmission corridors within which construction and operation of these facilities were considered to be environmentally feasible.

The APS interests in the TWE Project were acquired by National Grid, which filed a Standard Form 299 (SF 299) Application for Transportation and Utility Systems and Facilities on Federal Lands (Right-of-Way Grant application [ROW application]) with the BLM on November 30, 2007. In 2008, The Anschutz Corporation (TAC) formed TransWest (a wholly owned subsidiary of TAC) and acquired the TWE Project from National Grid. Subsequently, on September 2, 2008, National Grid and TransWest submitted an amended ROW application requesting the assignment of the unserialized application and related project file to TransWest. TransWest submitted an amended ROW application for the TWE Project in December 2008, and another amended ROW application in January 2010, as explained in more detail below.

1.6 TWE Transmission Project Interests and Objectives

Prior to 2008, most EISs typically referred to the purpose and need for a project as being the project proponent's purpose and need. In 2008, BLM published its revised NEPA Handbook (BLM 2008), in which the guidance states that the Council on Environmental Quality regulations direct that an EIS "*shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action*." The manual further states that the purpose and need statement for an externally generated action (such as the TWE Project) "*must describe the BLM purpose and need, not an applicant's or external proponent's purpose and need (40 CFR 1502.13)*." On February 7, 2011, BLM issued an Instruction Memorandum (IM) regarding NEPA compliance for utility-scale renewable energy ROW authorizations. In this IM, BLM further clarifies that "*the purpose and need statement as a whole describes the problem or opportunity to which the BLM is responding and what the BLM hopes to accomplish by the action*" (BLM 2011). The IM goes on to state that "*the purpose and need statement in a NEPA document for a renewable energy right-of-way application must describe the BLM's purpose and need for action, not the applicant's interests and* objectives." Therefore, for this document and throughout the remainder of the EIS documentation for this project, the applicant's "purpose and need," regardless of how it was referred to in the original document being referenced, will be referred to as interests and/or objectives, and only federal agency purpose and need statements will be identified as such.

According to TransWest, the primary "interest or objective" of the currently proposed TWE Project is to provide the transmission infrastructure and capacity necessary to reliably and cost-effectively provide up to 3,000 MW of electric power capacity from Wyoming to the Desert Southwest.

The broad objectives of the TWE Project are to:

- Allow consumers access to renewable energy sources and contribute to meeting national, regional, and state energy and environmental policies, including state mandated renewable portfolio and greenhouse gas reduction targets;
- Meet increasing customer demand with improved electrical system reliability;
- Allow consumers access to domestic energy sources and contribute to complying with national energy policy;
- Provide system flexibility and increased access to the grid for the third party transmission users;
- Expand regional economic development though increased employment and enlargement of the property tax base; and
- Maintain the standard of living associated with highly reliable electricity service.

To meet these broad objectives, TransWest has identified the following project-specific interests and objectives:

- Provide for the efficient, cost-effective, and economically feasible transmission of approximately 20,000 gigawatt hours per year (GWh/yr) of clean and sustainable electric energy from Wyoming to markets in the Desert Southwest region.
- Meet North American Electric Reliability Corporation (NERC) Reliability Standards and Western Electricity Coordination Council (WECC) planning criteria and line separation requirements.
- Maximize the use of existing and designated utility corridors and access roads in order to minimize environmental and social effects of the TWE Project to the extent practical.

- Deliver electricity to the Desert Southwest region and the broader Western U.S. in a timely manner to meet the regions pressing energy needs. TransWest has identified a need for the TWE Project by the expected in-service date of 2015 or as soon as the regulatory reviews can be completed.
- Provide for flexibility and maximize the use of transmission capacity that may become available by configuring the TWE Project to allow for future interconnection with the IPP transmission system near Delta, Utah.

1.6.1 Western Area Power Administration's Transmission Infrastructure Program

The American Recovery and Reinvestment Act was signed into law to jumpstart the economy and create or save millions of jobs. The Act includes measures to modernize the nation's infrastructure and enhance energy independence. The Recovery Act, Section 402, provides Western's Transmission Infrastructure Program (TIP) new authority to construct transmission lines to help deliver renewable resources to market and, provides a source of funds for this activity.

Program goals are to:

- Construct and/or upgrade transmission lines to help deliver renewable resources to market;
- Select, study and/or build projects under this authority that are in the public interest;
- Solicit public input in identifying potential projects;
- Ensure projects do not adversely impact system reliability or operations, or other statutory obligations;
- Ensure projects are economically feasible and are adequate to repay project costs; and
- Leverage borrowing authority by partnering with others.

Western's TIP establishes the policies and practices to implement Western's borrowing authority granted under Section 402 of the American Recovery and Reinvestment Act.

Program principles

The program establishes six project principles and four program principles to provide guidance in implementing the authority to borrow up to $3.25 billion from the U.S. Treasury to fund partnerships to develop transmission infrastructure that delivers renewable energy to market across the West.

Project principles ensure that each project approved for funding:

- Is in the public interest;
- Will not adversely impact system reliability or operations, or other statutory obligations;
- Offers reasonable expectation that proceeds will be adequate to meet repayment obligations;
- Uses a public process to set transmission rates;
- Has the necessary capability to obtain and deliver generation-related ancillary services; and
- Uses proceeds from the project to repay principal and interest of the loan from the Treasury.

Program principles ensure the program:

- Provides appropriate opportunities for participation by other entities;
- Uses revenue from the projects developed under this authority as the only source of revenue for repayment of the associated loan for the project and payment of expenses for ancillary services and operations and maintenance;
- Ensures each project, for accounting and repayment purposes, is treated as a separate and distinct project; and
- Ensures that project beneficiaries repay project costs.

2.0 Preliminary Corridor Screening Process

This section provides a summary of the previous corridor screening work completed for the TWE Project, as well as the incremental design changes in the project that were documented in amended ROW applications submitted to the BLM between 2008 and 2010.

2.1 2008 Corridor Study Report

2.1.1 2008 Corridor Study Area

The 2008 corridor study report (sponsored by National Grid, APS, Rocky Mountain Power, and the WIA) was prepared to co-develop the TWE and EGS projects, which have (or had, at the time) many common transmission line routing elements. The EGS Project is a separate EHV AC transmission project that may share some potential corridors with the TWE Project. The 2008 corridor study report (EPG 2008) defined its preliminary study area as "*most of the state of Utah, plus large sections of northwestern Colorado, southwestern Wyoming, southeastern Idaho, eastern Nevada, and north-central Arizona*." The preliminary study area included corridors previously investigated in the APS TransWest Feasibility Study and other studies completed by Rocky Mountain Power, National Grid, and WIA. In the 2008 report, the study area was established using the following criteria:

- Potential major substation interconnection points;
- Existing designated utility corridors;
- Existing EHV, as well as lower voltage, transmission lines;
- Topography; and
- Land use designations (e.g., national parks, conservation areas, etc.).

The final study area was generally defined by "*potential terminal locations in Wyoming, Utah, Nevada, and Arizona, and existing substations that could be expanded to allow the import and export of power from Wyoming into Utah, Nevada, and Arizona*."The final study area also was defined by the potential use of existing and future major linear corridors, as well as known management areas that would present barriers to development of a transmission line (e.g., national parks and monuments and other special designation areas). The final study area in the 2008 report extended farther north into Wyoming than does the current study area and it included a large part of north-central Arizona. TransWest's current proposed project would terminate at the Marketplace Hub in southern Nevada.

2.1.2 Opportunities and Constraints

An extensive data inventory was compiled for the 2008 corridor study report. Tabular information, maps, digital Geographic Information System (GIS) data layers, and other data from federal, state, and local agencies or organizations were collected to allow determination of environmental sensitivity and opportunity areas. For each environmental resource studied, the data were evaluated to identify areas of constraint or difficulty, as well as areas of opportunity for siting EHV transmission lines.

The 2008 corridor study report considered resource value, protective status, and present and future use in the study area, to which relative levels of sensitivity (very high, high, moderate, and low) were applied in association with the introduction of new transmission lines. These sensitivity levels were mapped by resource.

2.1.3 Identification of Potential Transmission Line Corridors

After the sensitivity analysis for each resource was completed, constraint and opportunity maps were prepared and composited to assist in identifying the preliminary transmission line corridors. The

constraint and opportunity maps were overlain to identify the preliminary 6-mile-wide corridors to allow for more detailed EHV siting analyses. Existing corridors were given preference over new corridors. Other criteria or guidelines used to identify the preliminary corridors to be studied included:

- Avoidance of resources and land uses with very high sensitivity.
- Minimization of proximity to resources and land uses with high and moderate sensitivity.
- Minimization of corridors through steep topography.
- Minimization of the overall corridor length.

The preliminary 6-mile-wide alternative corridors in the 2008 study generally paralleled existing transmission lines and other existing and planned linear facilities. The alternative corridors were further refined by attempting to maximize the locations of transmission alternatives within Resource Management Plan (RMP)- and Land and Resource Management Plan (LRMP)-designated corridors, as well as the energy corridors identified (at that point in time) in the draft West-wide Energy Corridor Programmatic EIS. The 2008 collaborative study concluded that the proposed and alternative corridors considered in the analysis were environmentally feasible and were recommended to be carried forward in the NEPA agency and public scoping process.

2.2 2008 Amended ROW Application and 2009 Plan of Development

In 2008, TransWest acquired the TWE Project from National Grid. Subsequently, on September 2, 2008, National Grid and TransWest submitted an amended ROW application requesting the assignment of National Grid's November 2007 unserialized ROW application and related project file to TransWest. Shortly thereafter, TransWest submitted another amended ROW application for the TWE Project in December 2008, amending the November 2007 application. TransWest also provided the BLM with an updated Plan of Development (POD) in January of 2009. The BLM compiled agency pre-scoping comments after submittals of both the 2007 ROW application and the amended 2008 ROW application.

2.2.1 2008 TWE Project Interests and Objectives

The primary difference between the TransWest ROW application submitted in 2007 and the amended ROW application submitted in December 2008 (aside from the change in project proponent from National Grid to TransWest) were the project end points. The amended 2008 ROW application indicated that the applicant-proposed corridor would originate farther south and west in Wyoming at the Aeolus Substation (**Map 2A, Attachment A**), rather than in northeastern Wyoming near Casper. Additionally, the 2007 ROW application indicated that National Grid was planning to deliver electric power to "*near Las Vegas, Nevada, and/or Phoenix, Arizona*"; whereas, TransWest proposed to terminate the project south of Las Vegas, at the Marketplace Hub (**Maps 2A** and **2B, Attachment A**).

The amended ROW application and POD submitted in December of 2008 and January 2009, respectively, stated that the objective of the TWE Project was to provide the transmission infrastructure necessary to deliver approximately 20,000 GWh/yr of electric power generated in Wyoming to the Desert Southwest (Arizona, Nevada, and southern California). The project would be constructed in accordance with standards developed and enforced by the NERC and WECC. These standards require a minimum separation distance between transmission lines for reliability and weather-related factors. The amended ROW application and POD also discussed Renewable Portfolio Standards adopted by Arizona, California, Nevada, and Utah, thereby giving further support to the need for the TWE Project.

2.2.2 2009 Agency Pre-scoping and Corridor Refinement

BLM reinitiated agency pre-scoping for the project in early 2009. BLM received additional comments based on the submittal of the December 2008 amended ROW application, and conducted a round of agency pre-scoping meetings throughout the spring of 2009. As the agencies continued to comment on

the project and provide their issues, concerns, and routing recommendations, BLM and TransWest continued to refine the proposed and alternative corridors.

In mid-2009, BLM separated the TWE and EGS projects for the NEPA analysis based on differences in the interests and objectives of the two projects. The study area was modified to consider only the proposed scope of the TWE Project. As a result, the Marketplace Hub became the proposed terminus for the project, and Arizona was removed from the study area.

2.3 2010 Amended ROW Application

In January of 2010, TransWest amended its 2008 ROW application, stating that "*this application provides additional detail and descriptive information concerning the proposed project and related structures and facilities based upon further engineering design and system studies conducted subsequent to 2008. In addition, this application provides further information and refinement of the TWE Project 'purpose and need'*." **Map 3** (**Attachment A**) depicts the proposed and alternative 6-mile-wide corridors that TransWest submitted with its January 2010 ROW application.

2.3.1 2010 Interests and Objectives

TransWest's current interests and objectives for the project were provided in Section 1.6, above. The primary difference between the amended 2008 ROW application and the amended 2010 ROW application is TransWest's stated need to allow for future interconnection with the IPP transmission system near Delta, Utah. In its January 2010 ROW application, TransWest "*identified a need to provide flexibility and maximize the use of transmission capacity that may become available by configuring the TWE Project to allow for future interconnections with other existing and planned electrical systems that can deliver … electric energy from Wyoming to markets in the Desert Southwest region. This need is met by providing for a potential interconnection with the IPP transmission system near Delta in Millard County, Utah, as well as to the Marketplace Hub near Boulder City, Nevada*." The 2010 ROW application also moved the project origination point farther south and west to the Sinclair, Wyoming area. However, the Aeolus Substation still would be considered an alternative origination point. Additionally, based on agency pre-scoping input, other corridors or segments were added, deleted, and/or modified to meet the revised project interests and objectives.

2.3.2 2010 Agency Pre-scoping and Corridor Refinement

In early 2010, Western became involved in the project as a potential project funding source, and also assumed the role as the federal co-lead with the BLM for the preparation of the EIS. Agency pre-scoping was re-initiated in response to the amended January 2010 ROW application. Pre-scoping agency conference calls and meetings were held during March and April of 2010. BLM, Western, and TransWest continued to refine the alternative corridors based on the pre-scoping input provided by the cooperating agencies.

2.3.3 EIS Public Scoping Corridors

Based on the 6-mile-wide, proposed and alternative corridors submitted with the amended January 2010 ROW application, additional pre-scoping agency comments, and the results of the screening analysis documented in this report, TransWest submitted a revised POD in July 2010 showing more narrowly defined proposed and alternative corridors (typically 2 miles wide).The corridors presented for public scoping in early 2011 were based on this further review and refinement process described in more detail in Section 3.2.

2.4 2011 and 2012 Amendments to ROW Application

In August 2011, TransWest submitted a letter to BLM and Western that amended the ROW application by reconfiguring TransWest's proposed route based on resolutions received from multiple counties in Wyoming, Colorado, and Utah. Sweetwater and Carbon counties in Wyoming, and Moffatt County,

Colorado submitted a joint resolution expressing their preference for the TransWest to follow a route along the Old Dad Road and Sevenmile Ridge in southern Wyoming and northwestern Colorado (an existing alternative) instead of the TransWest proposed route at that time. Likewise, Millard and Juab counties in Utah also submitted a joint resolution expressing their preference for the TransWest to follow the existing UNEV pipeline route and West Wide Energy Corridor (existing alternatives) instead of the TransWest proposed at that time. Subsequently, TransWest adjusted the proposed route to coincide with both these joint resolutions.

In August 2012, TransWest submitted another letter to BLM and Western to amend the ROW application by removing consideration of the proposed connection from the northern terminal near Sinclair, Wyoming to the planned Aeolus Substation. TransWest stated that interconnections have been requested with PacifiCorp's proposed transmission projects in the area, and that would negate the need for the connection to Aeolus.

In October 2012, TransWest submitted a third letter to BLM and Western amending the ROW application by modifying the proposed southern terminal siting area in the Eldorado Valley of Nevada. The modifications excluded areas that are part of a multi-species conservation easement and added portions of nearby public lands to provide adequate options to consider development congestion in the area. Two additional northern ground electrode system siting area alternatives were also added, while one was eliminated at this time.

TransWest's interests and objectives did not change from those stated in Section 2.3.1. Following public scoping, two preliminary draft EISs were prepared and reviewed by the lead and cooperating agencies. Refinements to the alternatives continued in response to scoping and agency input. These refinements are detailed in Section 5.

3.0 Methods Used for the Preliminary Corridor Screening Analysis (Pre-scoping)

3.1 Corridor Validation and Refinement

Evaluating potential transmission line corridors involves many decisions regarding land use and resource impacts, feasibility, cost, and other factors. The initial set of proposed and alternative corridor segments that were identified for the TWE Project in the 2008 feasibility study, and from subsequent cooperating agency interactions served as the basis for the corridor refinement conducted during 2010. During the corridor refinement process, attempts were made to avoid obvious land use and resource constraints, and minor corridor adjustments were made. In a few instances, new connecting corridor segments were added to the analysis to provide additional options through highly constrained areas. In general, the corridor refinement process focused on identifying potentially feasible corridors and eliminating corridors that were either duplicative or presented extensive resource constraints. Corridors for potential elimination were initially identified through a comparative process that assessed environmental resource data and other constraints within the corridors. This process is described in more detail in Section 3.2, below.

Due to the complexity and iterative nature of the corridor refinement process, this document does not present a chronological summary of each corridor refinement decision that was made. Rather, major decisions regarding eliminating corridors or adding new corridors prior to and subsequent to public scoping are described.

3.1.1 Constraints and Resource Data

No field data collection was conducted for the screening analysis. Previously gathered resource data within the study area from resource management agencies and state and local governments were provided by TransWest. These datasets were updated as necessary and were used to prepare GIS resource maps and to support the corridor refinement analysis. The types of data that were readily available and analyzed in the corridor screening study included: engineering, transportation, land use, structures, jurisdiction, recreation and conservation areas, cultural resources, water resources, biological resources, geologic hazards, soils, and visual resources.

The resource data were mapped in GIS format and combined with aerial photography to enable the identification of potential constraints. The environmental resources and land uses listed above were generally categorized as either avoidance criteria (to be avoided whenever possible) or exclusion criteria (to be avoided entirely by the project). Resource categories assigned avoidance criteria include sensitive areas that would potentially affect human populations, current land uses, or biological or culturally sensitive areas. If a sensitive area cannot be completely avoided, impacts can be minimized through route refinement, careful placement of access roads, seasonal restrictions, and other mitigation measures.

Categories assigned exclusion criteria include locations with the highest level of sensitivity, such as areas with regulatory or legislative designations or extreme physical constraints not compatible with construction and/or operation of a transmission line. In general, locating a transmission line within an area assigned with avoidance or exclusion criteria may not be possible or feasible because of regulatory constraints, public opinion, unacceptable environmental impacts or risks, and/or higher costs. The resources or aspects of a resource assigned with avoidance or exclusion criteria are identified in **Table 3-1**.

Table 3-1 Constraint Criteria

Resource	Avoidance Criteria	Exclusion Criteria
Engineering and Utility Corridors		
Underground-Only Utility Corridors	Within Underground-Only Corridors.	N/A
Existing Transmission Lines	Minimize crossings and minimize length within 1,500 feet.	N/A
Transportation		
Airports and Heliports	10,000 feet of Public Airport, 5,000 feet of private airport, or 4,000 feet of heliport.	Not defined for this corridor study.
Interstate, U.S. Highway, and State Highway crossings	Minimize crossings.	N/A
Scenic Byways	Minimize crossings and minimize length within 0.5 mile.	N/A
Land Use, Structures, and Jurisdiction		
FCC Radio and Communication Towers	Within 250 feet.	Not defined for this corridor study.
Occupied Structures	Within 250 feet.	Not defined for this corridor study.
Schools and Hospitals	Within 500 feet.	Not defined for this corridor study.
Municipal Boundaries	Minimize length within municipal boundary.	N/A
Indian Reservation Boundary	Minimize length within reservation boundary.	N/A
Military Operation Areas	Minimize length within these areas.	N/A
Mining and Energy Lease Areas	Minimize length within these areas.	N/A
Wild Horse and Herd Management Areas	Minimize length within these areas.	N/A
Irrigated Agricultural Land	Minimize length within irrigated agricultural land.	N/A
Recreation and Conservation Areas		
State Wildlife Management Areas, National Wildlife Refuges, State Parks, and Natural Areas	Minimize length within these areas.	N/A
Recreational Trails	Within 0.25 mile.	Not defined for this corridor study.

Table 3-1 Constraint Criteria

Resource	Avoidance Criteria	Exclusion Criteria
Designated Recreational Areas, BLM Special Recreation Management Area, and Campgrounds	Within 0.25 mile.	Not defined for this corridor study.
Areas of Critical Environmental Concern (ACECs)	Minimize length within these areas.	N/A
National Conservation Areas	Minimize length within these areas.	N/A
National Recreation Areas	Minimize length within these areas.	N/A
National Natural Landmarks (NNL)	--	Within areas defined as NNL.
Wilderness Areas and Wilderness Study Areas (WSAs)	--	Within Wilderness Areas and WSA.
Designated Roadless Areas	Minimize length within these areas.	N/A
Cultural and Historic Resources		
Cultural Resources—National Registered Historic Places, Landmarks and Monuments	Within 500 feet of point/region on National Register of Historic Places.	Not defined for this corridor study.
Historic Trails	Minimize crossings and minimize length within 0.25 mile of trails.	N/A
Water Resources and Wetlands		
Perennial Streams and Rivers	Minimize crossings.	N/A
Existing lakes and reservoirs and proposed reservoirs	Minimize crossings.	N/A
Biological Resources		
Raptor nests	Within 0.5 mile.	Not defined for this corridor study.
Bald eagle nests	Within 1.0 mile.	Not defined for this corridor study.
Bald eagle roost sites (point data)	Within 1.0 mile.	Not defined for this corridor study.
Bald eagle roosting areas and winter concentration areas	Minimize length within areas.	N/A
Sage grouse core areas, brooding areas, nesting habitat, and production areas (sage grouse and Columbia sharp-tailed grouse)	Minimize length within these areas.	Not defined for this corridor study.

Table 3-1 Constraint Criteria

Resource	Avoidance Criteria	Exclusion Criteria
Sage grouse leks	Within 0.6 mile.	Not defined for this corridor study.
Big game critical/crucial/severe winter range, and birthing/parturition range	Minimize length within these areas.	N/A
Desert tortoise habitat	To the extent possible, minimize length within these areas.	Not defined for this corridor study.
Geologic Hazards and Soils		
Geologic Hazards/Soils	Minimize length within areas of moderate to high landslide incidence.	Not defined for this corridor study.
Visual Resources		
BLM Visual Resource Classes	Within Class II areas.	Within Class I areas.
U.S. Forest Service (USFS) Visual Resource Classes	Within Visual Quality Objective (VQO) Retention or high Scenic Integrity Objective (SIO) areas.	Within VQO Preservation areas or very high SIO areas.
Wild and Scenic Rivers (WSRs)	Minimize number of crossings of WSR or suitable segments.	Not defined for this corridor study.

3.2 Comparative Evaluation of Corridors

3.2.1 Methodology

For the pre-scoping corridor screening analysis, all potential alternative corridors that had been developed as of December 2010 were displayed on a topographic base, in association with the federal utility corridors. The following analytical steps were then followed:

1. The 2-mile-wide transmission line alternative corridors were subdivided into regions, based on the project end points and intermediate destination points. This resulted in three regions for comparative analysis: 1) Wyoming to IPP Region; 2) IPP to Las Vegas Region (vicinity of Apex); and 3) Las Vegas to Marketplace Hub Region (**Map 4**, **Attachment A**).
2. Alternative corridors are made up of numbered segments that are displayed on **Maps 5**, **6**, and **7** (**Attachment A**). These segments are discussed individually in this report because segments can be recombined into new alternative corridors, depending on the characteristics of the constituent segments.
3. An overlay of the avoidance/exclusion areas was placed over the corridor segments to determine where these factors could affect the use of each corridor. Pre-scoping comments received from agencies were reviewed and summarized for the applicable corridor segments. This descriptive opportunities/constraint information and segment lengths were tabulated. Terrain conditions that affect transmission line construction also were considered based on a preliminary engineering review conducted by TransWest.

4. Comparative reviews of alternative corridor segments were conducted to arrive at a more limited range of alternative segments within each of the three regions described above to carry into public scoping. The screening review considered the identified environmental constraints, agency input, length within existing utility corridors, and overall length. The rationale for not carrying a particular corridor segment forward for further analysis was developed and tabulated. In some instances, corridor segments were added to address identified environmental concerns, or changes in the project design. A summary of both the constraints and opportunities for those segments that were carried forward for public scoping is contained in **Attachment B**.
5. The applicant-proposed corridor was then examined to identify avoidance and exclusion constraints that justified the consideration of other alternative corridors or corridor segments. Alternative corridor segments were compared with the equivalent applicant-proposed segments to determine if the alternatives offered potential advantages to the applicant-proposed segments in terms of the type and number of environmental constraints, and length. The regional-scale issues that led to the development of a range of alternatives, and the alternative corridors presented during public scoping are discussed in Chapter 4.0.

3.2.2 Preliminary Corridor Screening – Wyoming to IPP Region

For the purposes of this corridor screening report, the northern portion of the study area was identified as the Wyoming to IPP Region. The Wyoming to IPP Region consists of portions of Wyoming, Colorado, and Utah. The corridors within the Wyoming to IPP Region are presented on **Map 5** (**Attachment A**).

The corridor segments were evaluated for resource constraints, feasibility, and connectivity. As described below, several corridor segments were added in this region and a number of corridor segments were removed. The following sections describe the changes that were made to the corridors and the reasons for the changes.

Corridor Segments Removed from Further Consideration between Wyoming and IPP

The corridor segments between Wyoming and IPP that were removed from further consideration as a result of agency input and concerns, resource constraints, and/or comparative analysis, are identified in **Table 3-2**. Corridor segments are discussed in numerical order by state in the following tables.

Table 3-2 Corridor Segments Removed – Wyoming to IPP Region

Corridor Screening Segment ID	Justification for Removal
Diagonal through Carbon County Wyoming	This segment was removed prior to September 2009 based on wildlife concerns (sage grouse), historic trail concerns, and because it does not include existing transmission lines and other utilities, as compared to the Interstate 80 utility corridor.
W40	W40 follows a circuitous path to the northwest before turning to the southeast which adds substantial additional distance when compared with the more direct W35 [200]. In addition, more of W40 is located within Sage Grouse Core Breeding Area, when compared with W35.
W50	W50 was removed due to its slightly longer length in Visual Resource Management (VRM) Class II, ACECs, and overall length when compared with W55 [200].

Table 3-2 Corridor Segments Removed – Wyoming to IPP Region

Corridor Screening Segment ID	Justification for Removal
W70, C20, C30	W70 was removed because it is centered on the town of Baggs, Wyoming, which would present major conflicts with numerous structures within the town limits. When W70 crosses the state line into Colorado, the line becomes C20 and continues south as C30, so the removal of W70 resulted in the removal of C20 and C30, as well. W65 [190] provides an alternative north-south corridor to the east of Baggs, and W75 and W85 [170] provide an east-west alternative north of Baggs.
W80, C35	These segments were removed because they cross the Little Snake River valley and were no longer viable due to the removal of C45, C50, and C55 (discussed below).
C15, C50, C45	These segments run east-west on the south side of the Little Snake River and were removed due to the length within sage grouse core areas and sage grouse nesting habitat.
C55	C55 was removed because it runs through sage grouse core area habitat designated by the BLM Little Snake Field Office (comment received from the BLM Little Snake Field Office on 5/11/2010).
C61	C61 was removed because it would cross considerable sage grouse core area habitat designated by the BLM Little Snake Field Office and would run east-west in an area where the applicant-proposed and alternative corridors run north-south.
C75	C75 was removed due to the large number of residences within the corridor. Segment C802 [190] offers an opportunity for fewer conflicts with existing residential structures.
C80	C80 was removed because it traverses key habitat areas including numerous raptor nests and crosses a considerable amount of sage grouse core area habitat designated by the BLM Little Snake Field Office. In addition, the removal of alternatives C55 and C105 made this segment unnecessary.
C86	C86 was removed and replaced by C61B [180] because C86 traverses a portion of the sage grouse core area habitat designated by the BLM Little Snake Field Office. This request was made by the Little Snake Field Office.
C105, C130, C135	Portions of C105 and C130 follow underground-only utility corridors. A portion of C130 is located within VRM Class II. When combined with other segment deletions north and south of C105 (C80 and C160A, respectively), the segment combination of C105, C130, and C135 no longer provides a viable, unique alternative.
C150	C150 was removed due to its length within the municipal boundary of Rifle, the large number of occupied residences within the corridor, overall length, and potential impacts on a recreation area. The alternative C155 avoided many of these issues.

Table 3-2 Corridor Segments Removed – Wyoming to IPP Region

Corridor Screening Segment ID	Justification for Removal
C170	C170 was removed due to its proximity to the Colorado River and the large number of residences that are located within the corridor. In addition, the corridor passes through bald eagle roosting areas and there are two documented bald eagle nests within the corridor. The alternative C160 segment avoids many of these issues.
C185	C185 also was removed due to its proximity to the Colorado River. Three raptor nests are within the corridor and it crosses considerably more big game critical, crucial, and/or severe winter range than does the alternative segment. Segment C180 avoids many of these issues.
C160A, C240A, C192A	These segments generally follow underground only utility corridors. C160A and C240A are located within the range of the greater sage grouse. Comments were received from the White River Field Office (4/20/2010) that there have been previous routing problems with pipelines located within these corridor segments due to the Dudley Bluffs ACEC, Ryan Gulch ACEC, and the Cathedral Bluffs (construction on steep slopes and cliffs). The White River Field Office recommended that these segments be removed from further consideration.
C190A, C250A	These segments pass through the Canyon Pintado National Historic District and parallel the Dinosaur Diamond National Scenic Byway. Comments received from the White River Field Office (4/20/2010) indicated that the historic district is designated as an avoidance area in the current RMP and could become an exclusion area when the RMP is updated. These segments were removed because of these potential special management area conflicts.
General Comment on Uinta Basin Corridor Segments	The Uinta Basin is a broad geographic province located within the Green River drainage in northeastern Utah. In the corridor framework developed after the December 2008 ROW application filing, the Uinta Basin contained a criss-crossing network of a number of potential corridor segments. With the removal of segments U400A and U510A (discussed below), many of the segments in the Uinta Basin that represented connectors to U400A [217.1] and U510 were no longer viable. In addition, each of the alternative segments represented a longer or more circuitous option than the applicant-proposed corridor, and were therefore removed from further consideration.
C205A, U230A (Uinta Basin)	These segments were removed because they follow a zigzag path through the Uinta Basin and result in longer length with no clear environmental advantage over the applicant-proposed corridor.
C200A, C210A, C220A, U240A, U255A, U280A, U285A, U290 (Uinta Basin)	These corridors provide a set of optional connections to corridor U400A [217.1]. Once the preliminary decision was made to remove U400A [217.1] from further study, this set of optional connections was no longer viable.

Table 3-2 Corridor Segments Removed – Wyoming to IPP Region

Corridor Screening Segment ID	Justification for Removal
U15	The northeast corner of Utah presents some potentially difficult routing challenges, including visual resources constraints and the crossing of a Wild and Scenic-designated reach of the Green River. Segments U10 [200] and U15 were compared to each other. Of these two corridors, U15 was removed due to its substantially greater length along a scenic byway, greater length through sage grouse brooding areas, and slightly greater length through VRM Class II areas.
U25	U25 was removed because it does not provide a direct connection from the alternative corridor to IPP, would add an additional crossing of the Green River, and would pass through a raptor concentration area with a number of known nest sites.
U65	U65 [217.05, 222.05] was removed due to its significantly greater length when compared with the combination of segments U75, U80, and U90 to the south and west. Based on the preliminary analysis, the corridor did not provide a direct connection to IPP and would result in over 85 miles of increased distance through difficult mountainous terrain, portions of which are not within designed utility corridors. In addition, the current alignment crosses a section of inventoried roadless area in the Uinta National Forest. During agency pre-scoping in 2009, the following comment was received from the Price Field Office – "The corridor near Price comes down the Book Cliffs (1,000-foot escarpment), then back up, and down again." In 2012, portions of U65 were reinstated as EIS segments 217.05 and 222.05. See **Table 3-3**.
U95	Corridor U95 was removed because it does not provide a direct connection to IPP. A northern alternative consisting of U80 and U90 and a southern alternative consisting of U85 and U100 made corridor U95 unnecessary.
U125, U190, U195, U225, U230, U235, U240, U245	In the revised ROW application dated February 2, 2010, TransWest requested that corridors U125, U190, U195, U225, U230, U235, U240, and U245 be removed because they do not provide for interconnection with the IPP and, thus, do not meet TransWest's revised interests and objectives.BLM and Western concurred with these recommendations.
U400A, U510A	The combination of U400A [217] and U510A forms a single corridor that generally follows an RMP-designed utility corridor. However, both of these corridors were removed because of BLM special management area crossings. U400A crosses both the Lower Green River ACEC (scenery) and the designated Wild and Scenic River section of the Lower Green River (scenery – Class I and Class II VRM). Nine Mile Canyon ACEC has significant cultural and visual resource issues (VRM Class II). Nine Mile Canyon is proposed for designation as a National Archaeological District. U400A crosses Nine Mile Canyon within the ACEC. U400A and U510A cross approximately 6 miles of the Nine Mile Canyon ACEC, which is designated for cultural resources, high quality scenery, and special status species. Major concerns with transmission line construction

Table 3-2 Corridor Segments Removed – Wyoming to IPP Region

Corridor Screening Segment ID	Justification for Removal
U400A, U510A (Cont.)	through this area were expressed during pre-scoping meetings held with the Vernal and Price Field Office staff on March 13, 2009 at the BLM Vernal Field Office. In 2012, portions of U400A were reinstated as EIS Segment 217. See **Table 3-3**.
U430A	U430A [325] crosses an inventoried roadless area in the Ashley National Forest and would parallel an existing 138- to 161-kV transmission line. As part of the 2009 Ashley Forest Plan Revision, potential wilderness areas have been identified on either side of the existing Utah Power & Light Sowers Canyon transmission line. These potential wilderness areas include the Cottonwood Potential Wilderness No. 401407 and the Sowers Canyon East Potential Wilderness No. 401408. The 1986 Ashley National Forest LRMP indicated that the window corridor could be suitable for overhead electrical transmission line facilities; however, helicopter placement would be required on the south end, and tower placement would be prohibited on steep side slopes (Page H-42). Table D of Appendix H of the LRMP stated that the Sowers Canyon transmission line "crosses unstable shale soils, exhibiting considerable natural erosion – would be difficult to revegetate." In addition, "the adjacent NF land is characterized by steep slopes and incised side canyons. The route itself is located in a narrow canyon area. The adjacent slopes are susceptible to landslide activity." In 2012, U430A was reinstated as EIS Segment 325. See **Table 3-3**.
U536A, U537A, U590A	Segments U536A [223], U537A, U590A were removed from further study because they run nearly north-south and do not provide a direct connection to IPP. Use of these alternative segments would result in substantially greater length when compared with either the applicant-proposed corridor (U55-U70) or alternative segment (U90). In 2012, portions of U536A were reinstated as EIS Segment 223. See **Table 3-3**.

Note: Segment IDs in [brackets] reflect the EIS Segment ID. See Section 5.

Corridor Segments Added for Consideration between Wyoming and IPP

Various alternative segments were added for consideration based primarily on agency input. The corridors that were added are provided in **Table 3-3**.

Table 3-3 Corridor Segments Added – Wyoming to IPP Region

Corridor Screening Segment ID	Reason for Addition
W819	The Wyoming Game and Fish Department recommended adding a third north-south corridor in the area between the applicant-proposed corridor W25 and the alternative segment W15. This new segment traverses through an active oil and gas production area. The segment resolves some of the sage grouse habitat and leks issues associated with W25 and W15, but presents additional routing challenges associated with ongoing oil and gas development.
C61B	C61B was added in response to a request from the Little Snake Field Office to avoid sage grouse core areas. C61B replaced the original alternative C86.
C822	Corridor C822 in Rio Blanco County was added to provide an additional east-west connection between corridor C95 near Meeker, Colorado, and the previously identified corridor C130. Corridor C822 parallels State Highway 64 and the White River.
U821	On April 21, 2010, TransWest requested inclusion of an additional corridor in Utah that would provide an alternative north-south connection in the eastern portion of Millard County. This corridor would avoid much of the locally designated aboveground utility exclusion area in the county. TransWest requested the use of segment U821 in place of U125.

Note: Segment IDs in [brackets] reflect the EIS Segment ID. See Section 5.

Corridor Segments Modified between Wyoming and IPP

Table 3-4 provides the corridor segments in the Wyoming to IPP Region that were modified to avoid sensitive features.

Table 3-4 Corridor Segments Modified – Wyoming to IPP Region

Corridor Screening Segment ID	Reason for Suggested Modification
C70, C90 (C802, C804)	C70 was shifted to the east to avoid residential areas and to improve the crossing of the Yampa River east of Craig. C90 was shifted slightly to the north of an existing east-west transmission line to reduce the number of existing transmission line crossings. These segments were renumbered as C802 and C804, respectively, to reflect the adjustments.
C145 (C800)	C145 was shifted slightly to the north and west to avoid the Oil Spring Mountain WSA and ACEC and visually sensitive areas (Class II VRM) in the White River Field Office. This segment was renumbered as C800 to reflect the adjustment.
U130 (U812)	U130 was shifted slightly to the east to avoid extensive areas of sand dunes associated with the Little Sahara National Recreation Area. This segment was renumbered as U812 to reflect the adjustment.

3.2.3 Preliminary Corridor Screening – IPP to Las Vegas Region

The central portion of the study area was identified as the IPP to Las Vegas Region and consists of portions of western Utah and eastern Nevada. Corridor segments within this region originate at the IPP facility and terminate at the northern edge of the Las Vegas metropolitan area, generally to the north of NellisAir Force Base. The corridor segments within the IPP to Las Vegas Region are presented on **Map 6** (**Attachment A**).

Corridor Segments Removed from Further Consideration between IPP and Las Vegas

The corridor segments within the IPP to Las Vegas Region that were removed as a result of agency input and concerns, resource constraints, and/or comparative analysis are identified in **Table 3-5**.

Table 3-5 Corridor Segments Removed – IPP to Las Vegas Region

Corridor Screening Segment ID	Justification for Removal
U205	The elimination of segment U190 (discussed in previous section) made segment U205 unnecessary.
N35	N35 was removed because it does not provide a direct link from IPP to the Las Vegas area.
N35A, N40A, N90A, N75	These segments were considered for elimination because they parallel a highly constrained and congested transmission corridor across the Moapa Indian Reservation and offer no clear environmental advantages when compared to the applicant-proposed corridor. BLM and Western recommended that these corridors be removed due to the highly congested area near the Reid Gardner Power Plant. The requirement for a 1,500-foot separation between transmission lines would require expansion in the width of the existing approved utility corridor on Reservation land. In 2011, they were added back to the Project. See **Table 3-6**.
N60	N60 was removed because it would cross more of the Coyote Springs ACEC when compared with the ACEC crossing lengths of N55 and N85.
N65, N80	N65 and N80 were were considered for elimination because these corridors do not provide a direct connection to Marketplace and they are not located in a designated utility corridor. In addition, segment N80 crosses at least 5 existing transmission lines, including the 230-kV Reid Gardner to Harry Allen line and the 500-kV high voltage, DC IPP to Adelanto line. In 2011, they were added back to the Project. See **Table 3-6**.

Corridor Segments Added between IPP and Las Vegas

Table 3-6 provides the corridor segments in the IPP to Las Vegas Region that were added to avoid sensitive features.

Table 3-6 Corridor Segments Added – IPP to Las Vegas Region

Corridor Screening Segment ID	Reason for Addition
N35A, N40A, N90A, N75, N65, N80	These segments were reinstated at the request of the BLM Southern Nevada Field Office because they represent viable routes to site the Project along existing and designated utility corridors.

Corridor Segments Modified between IPP and Las Vegas

Table 3-7 provides the corridor segments in the IPP to Las Vegas Region that were modified to avoid sensitive features.

Table 3-7 Corridor Segments Modified – IPP to Las Vegas Region

Corridor Screening Segment ID	Reason for Suggested Modification
N15, N20, N25, N30 (N805, N806, N807, N808)	Segments N15, N20, N25, and N30 were adjusted slightly to reduce impacts to visually sensitive VRM Class II areas. These were then renumbered N805, N806, N807, and N808, respectively, to reflect the adjustment.

3.2.4 Preliminary Corridor Screening – Las Vegas to Marketplace Region

The Las Vegas to Marketplace Region consists of the Las Vegas metropolitan area and adjacent federal lands administered by the Department of Defense, BLM, National Park Service, and Bureau of Reclamation. This region is bounded on the north by the proposed Gass Peak Wilderness, on the east by the Lake Mead National Recreation Area, on the west by the Red Rocks Canyon National Conservation Area, and on the south by the South McCullough Wilderness. The southern terminus of the TWE Project is the Marketplace Substation siting area. The corridors within the Las Vegas to Marketplace Region are presented on **Map 7** (**Attachment A**).

Corridor Segment Removed from Further Consideration between Las Vegas and Marketplace

The segment within the Las Vegas to Marketplace Region that was removed as a result of agency input and concerns, resource constraints, and/or comparative analysis is identified in **Table 3-8**. Due to the highly constrained nature of available transmission line utility corridors in the Las Vegas metropolitan area, all but one of the alternative segments were retained for scoping.

Table 3-8 Corridor Segment Removed – Las Vegas to Marketplace Region

Corridor Screening Segment ID	Justification for Removal
N180A	N180A was removed because it crosses a portion of the proposed Gass Peak Wilderness area.

Corridor Segment Modified between Las Vegas and Marketplace

The segment within the Las Vegas to Marketplace Region that was modified as a result of agency input and concerns, resource constraints, and/or comparative analysis is identified in **Table 3-9**.

Table 3-9 Corridor Segment Modified – Las Vegas to Marketplace Region

Corridor Screening Segment ID	Reason for Suggested Modification
N90 (N810A)	Corridor segment N90 was modified to avoid Nellis Air Force Base. It was renumbered as N810A to reflect the adjustment.

4.0 Pre-scoping Applicant-proposed Corridor Key Constraint Areas

Several environmental and land use constraint areas were identified for the pre-scoping applicant-proposed corridor that indicated a need to consider other alternative corridor segments in the same region. The following figures outline these major regional issue areas, and the potential alternative corridors that are available to address identified issues.

4.1 Primary Issue Area 1 – Wyoming and Colorado

Prior to scoping, the applicant-proposed corridor in Sweetwater County, Wyoming, and Moffat County, Colorado, crossed extensive high quality sage grouse habitat (see Constraint 1, **Figure 4-1**). The alternative corridors shown on **Figure 4-1** were developed primarily to reduce sage grouse habitat impacts.

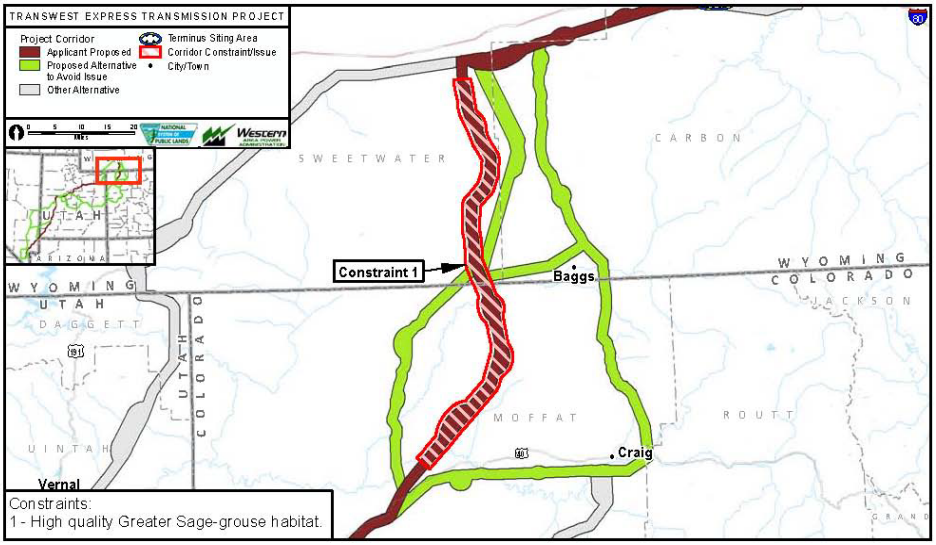


Figure 4-1 Applicant-proposed Corridor Issues and Alternatives – Wyoming and Colorado

4.2 Primary Issue Area 2 – Northern Utah

The applicant-proposed corridor in northern Utah has three primary constraint areas (see **Figure 4-2**). The first constraint area is the large area of private lands crossed north and east of Duchesne and the utility corridor encroachment into the community of Roosevelt, Utah. The second constraint area is the USFS inventoried roadless area crossed on the Uinta National Forest, and the third constraint area is the high degree of utility line congestion in and around Nephi. The alternative corridors farther south in Utah do not cross USFS-designated roadless areas and offer an opportunity to bypass Nephi outside the existing transmission line corridor congestion area.

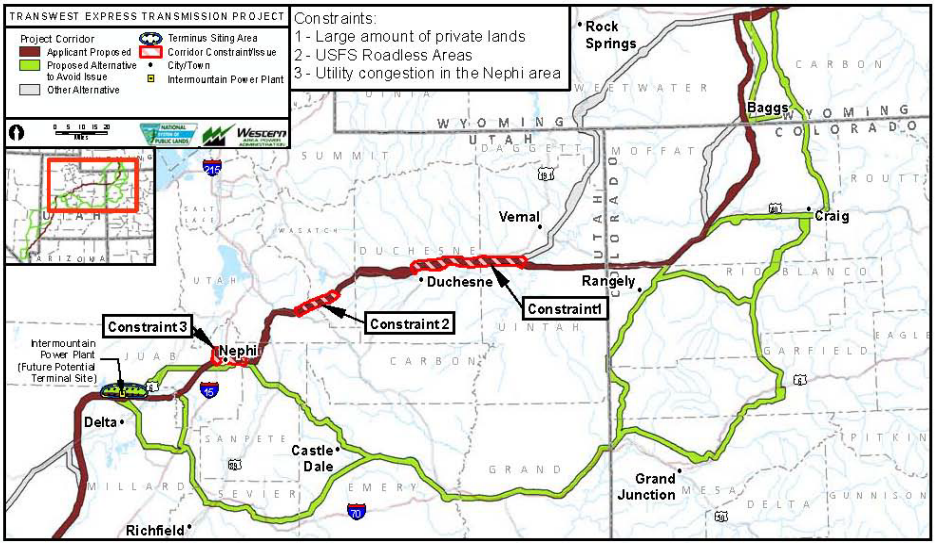


Figure 4-2 Applicant-proposed Corridor Issues and Alternatives – Northern Utah

4.3 Primary Issue Area 3 – Southwestern Utah

The applicant-proposed corridor in southwestern Utah has two primary constraints; both within the same general area (see Constraints 1a and 1b, **Figure 4-3**).The first constraint is the crossing of an inventoried roadless area in the Dixie National Forest and the second is the potential crossing in the vicinity of the Mountain Meadows Massacre Site. Alternative segments are available to the west that bypass the Dixie National Forest and the Mountain Meadows Massacre Site.

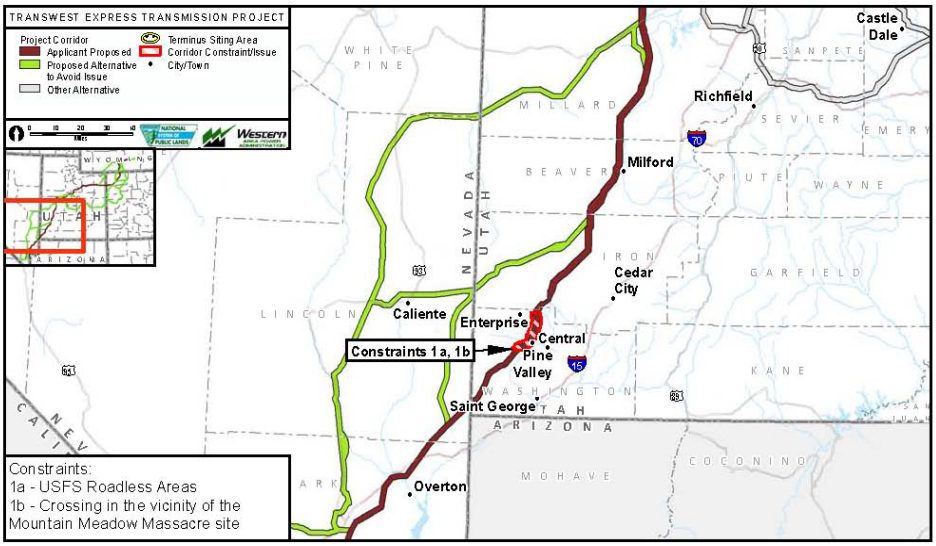


Figure 4-3 Applicant-proposed Corridor Issues and Alternatives – Southwestern Utah

4.4 Primary Issue Area 4 – Las Vegas Area

The applicant-proposed corridor in the Las Vegas area has three primary constraints; all within the same general area(see Constraints 1a, 1b, and 1c, **Figure 4-4**).

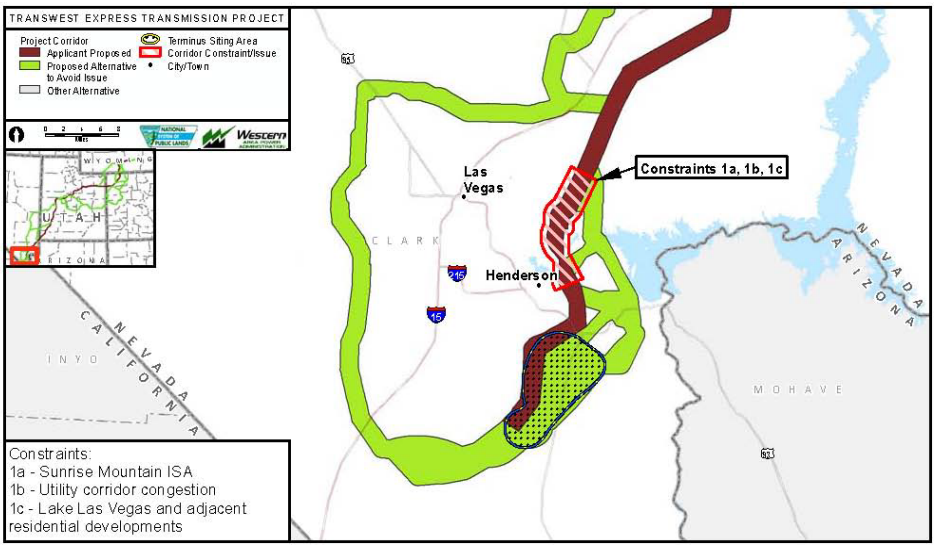


Figure 4-4 Applicant-proposed Corridor Issues and Alternatives – Las Vega Area

Constraint 1a. Sunrise Mountain Instant Study Area. The proposed corridor would be unable to avoid crossing within this area designated by Congress because there is insufficient width in the existing utility corridor to accommodate the TWE Project.

Constraint 1b. Congested utility corridors. The existing transmission corridors east of Las Vegas contain multiple high voltage transmission lines that are already located in the most favorable terrain. The TWE Project would be required to cross less favorable terrain (steep side slopes) to maintain required separation distances.

Constraint 1c. Proximity to residential developments. Recent residential development (Henderson, Lake Las Vegas) has expanded very close to the existing transmission line corridor proposed for use by TransWest. As a consequence, very little width remains in this corridor without crossing over residential areas.

Alternative corridors were developed to the east and the west in an attempt to avoid these issues. Some of these alternative corridors would cross portions of the Lake Mead National Recreation Area and bypass Boulder City; another would traverse around Las Vegas on the west side of the city.

4.5 Corridors Carried Forward into Public Scoping

Based upon the primary constraint areas identified along the applicant-proposed corridor and the alternatives developed to address the identified issues, the alternative corridors that were carried forward into the public scoping process are depicted on **Map 8** (**Attachment A**).

5.0 Corridors Carried Forward for Analysis in the EIS

This chapter describes the alternative corridors eliminated and those carried forward for evaluation in the Draft EIS as a result of public scoping and cooperating agency input during preliminary Draft EIS development. Below is a brief summary on methodology and a description of the corridors eliminated during the preliminary Draft EIS development along with rationale for their elimination, and a description of new alternative corridors that will be addressed under each of the project's four geographic regions. **Map 9** (**Attachment A**) provides an overview of the scoping corridors retained for analysis, the scoping corridors eliminated from further analysis, and the alternative corridors added or modified as a result of issues raised through scoping and preliminary Draft EIS development.

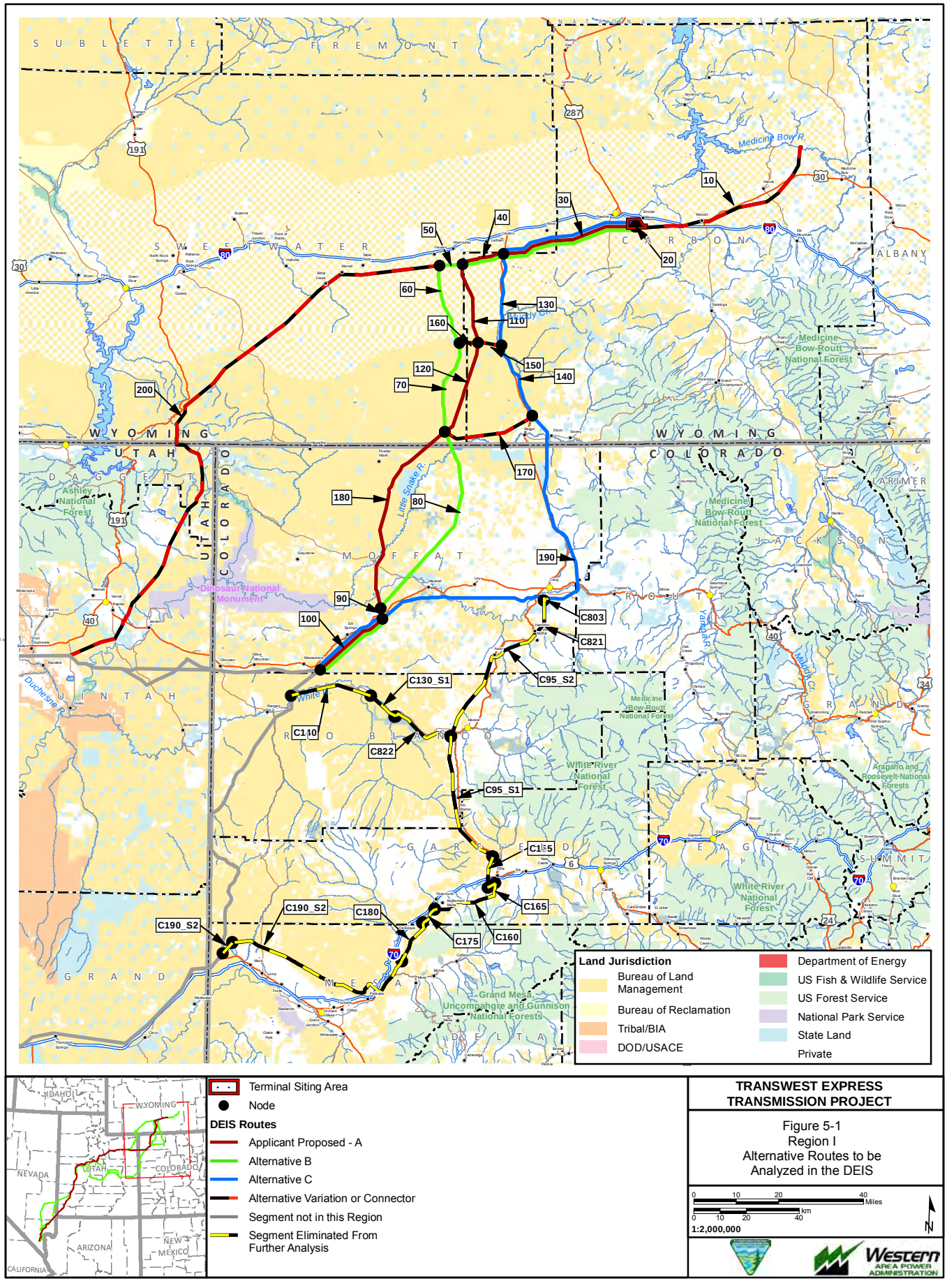
5.1 Methodology

Following the project public scoping period, BLM and Western (Agencies) compiled public comments and initiated the preliminary review of project corridor alternatives to carry forward for analysis in the Draft EIS. Several issues emerged during scoping that helped to inform the Agencies' decisions about the alternative corridors to eliminate and those to retain for further evaluation. New corridor alternative variations and alternative connectors were added to address specific regional or local concerns, or to provide additional routing flexibility in constrained areas.

In parallel with the scoping process, the Agencies engaged the BLM Field Offices and Forests to provide input on the potential need to amend existing land use planning documents for all the project alternative corridors. This input, in addition to the public comments, provided the Agencies with assistance in determining whether to eliminate or retain alternative corridors to be evaluated in the Draft EIS.

During the initial phases of the post-public scoping corridor alternatives analysis, route segments were simplified by combining and renumbering pre-scoping segments which resulted in a smaller list of longer segments for consideration in the EIS. An additional sub-region was also developed to provide a more regionally focused comparison of the alternative corridors. After public scoping, the Wyoming to IPP Region was subdivided into Regions I and II. Region I includes the alternative corridors from the project origination near Sinclair, Wyoming, to a point in northwestern Colorado where several alternative corridors converge. Region II covers the alternative corridors from northwestern Colorado, through central Utah to a destination point at the IPP. Alternative corridors from IPP to the north of Las Vegas are included in Region III. Region IV covers alternative corridors north of Las Vegas to the terminus point at Marketplace. These EIS segment numbers and the four regions are shown on **Figures 5-1** through **5-4**

Alternative corridor routes were identified within each of the four regions. Within each region, Alternative A represents the applicant's proposed route, which was modified in places after scoping, and the additional Agency Alternatives will be addressed in the Draft EIS as alternatives to the applicant's proposed corridor, by region.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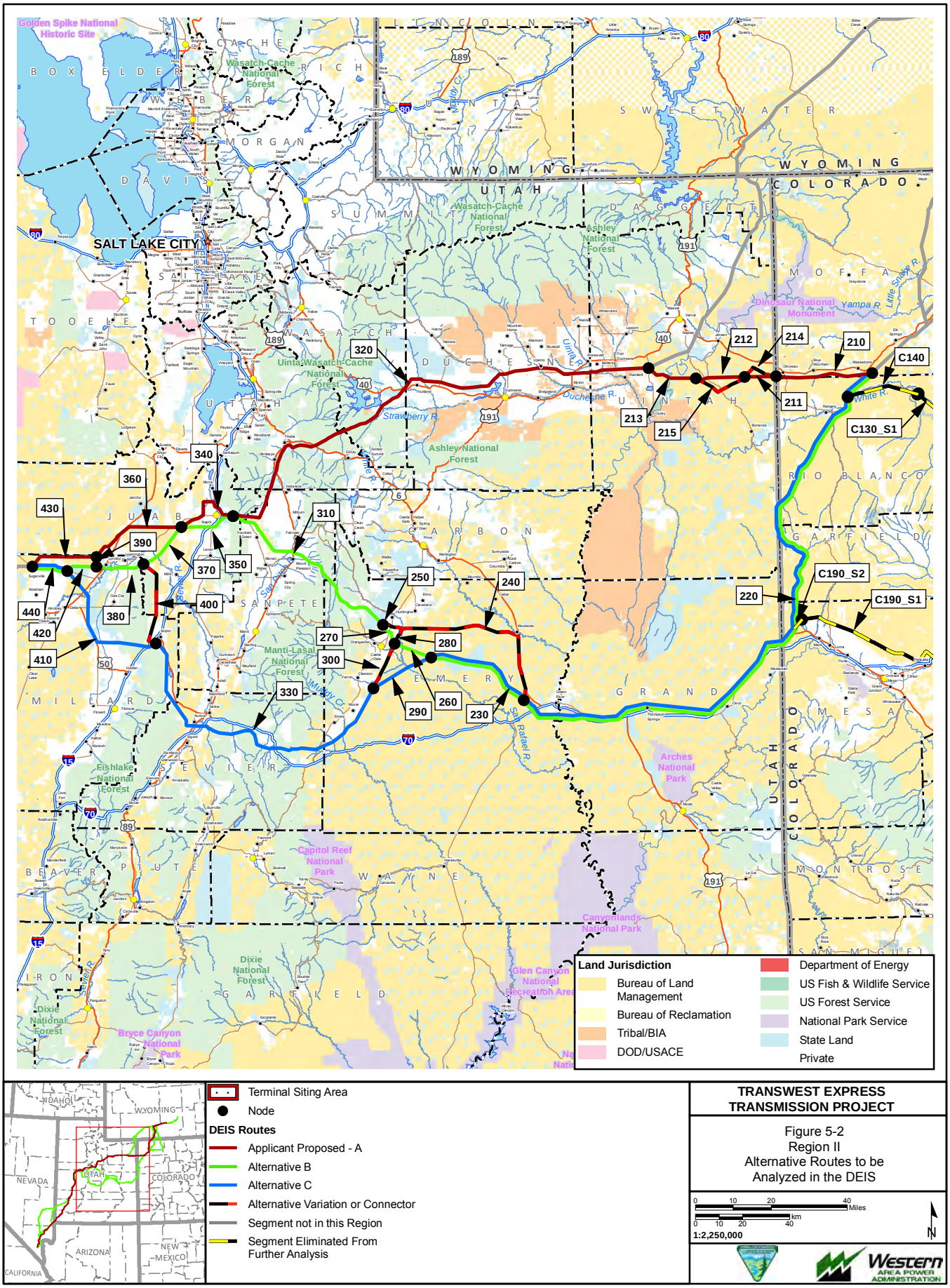
SUBLETTE
FREMONT
SWEETWATER
CARBON
ALBANY
WYOMING
UTAH
COLORADO
DAGGETT
UINTAH
MOFFAT
ROUTT
JACKSON
LARIMER
GRAND
EAGLE
SUMMIT
GARFIELD
MESA
DELTA
Medicine Bow R
Little Snake R
Yampa R
Duchesne R
Ashley National Forest
Dinosaur National Monument
Medicine Bow-Routt National Forest
White River National Forest
Arapaho and Roosevelt National Forests
Grand Mesa, Uncompahgre and Gunnison National Forests
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200
C803
C821
C95_S2
C130_S1
C110
C822
C95_S1
C155
C165
C160
C175
C180
C190_S2
C190_S2
Land Jurisdiction
Bureau of Land Management
Bureau of Reclamation
Tribal/BIA
DOD/USACE
Department of Energy
US Fish & Wildlife Service
US Forest Service
National Park Service
State Land
Private
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Terminal Siting Area
Node
DEIS Routes
Applicant Proposed - A
Alternative B
Alternative C
Alternative Variation or Connector
Segment not in this Region
Segment Eliminated From Further Analysis
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 5-1
Region I
Alternative Routes to be Analyzed in the DEIS
0 10 20 40 Miles
0 10 20 40 km
1:2,000,000
N
Western AREA POWER ADMINISTRATION



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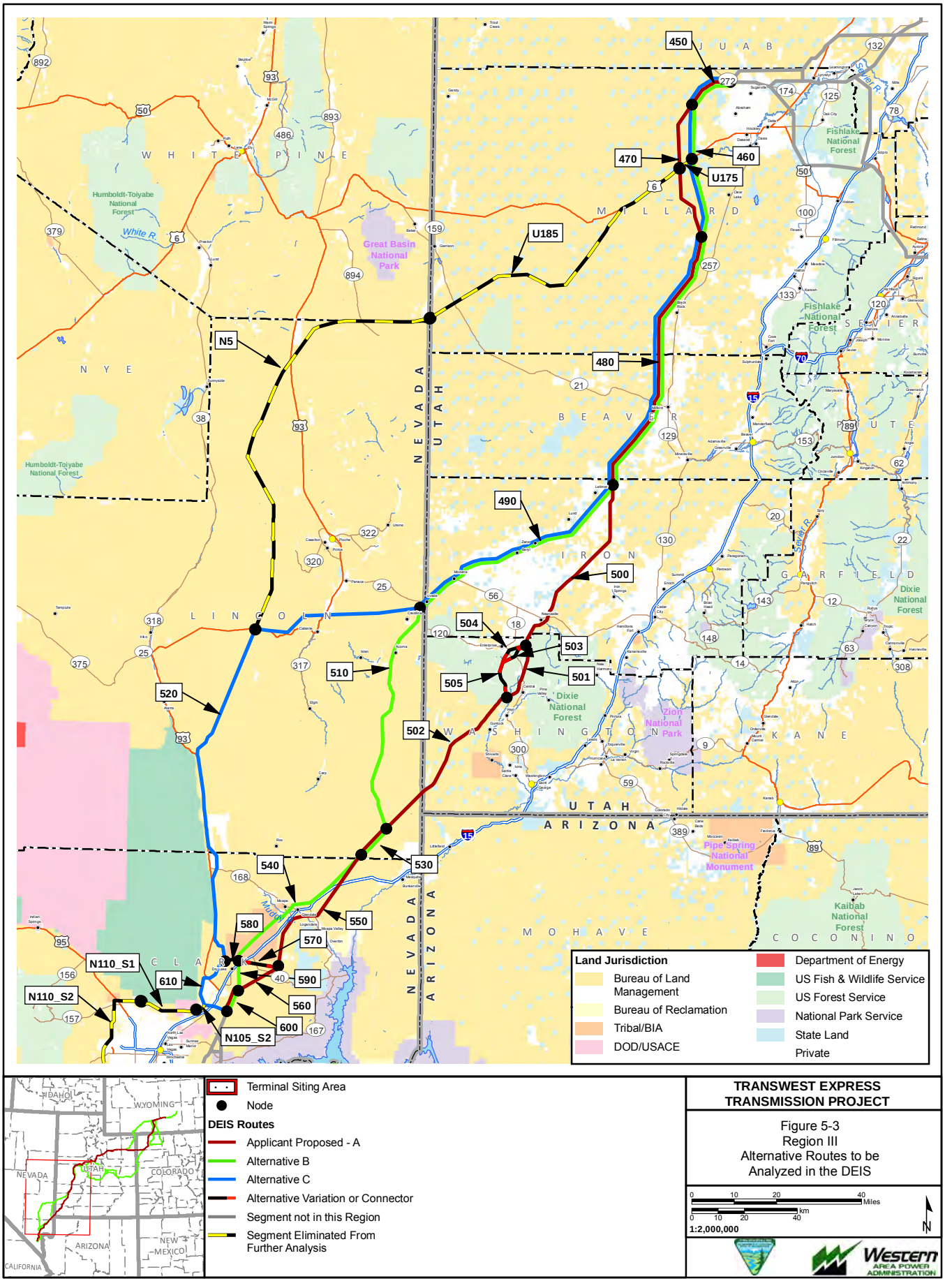
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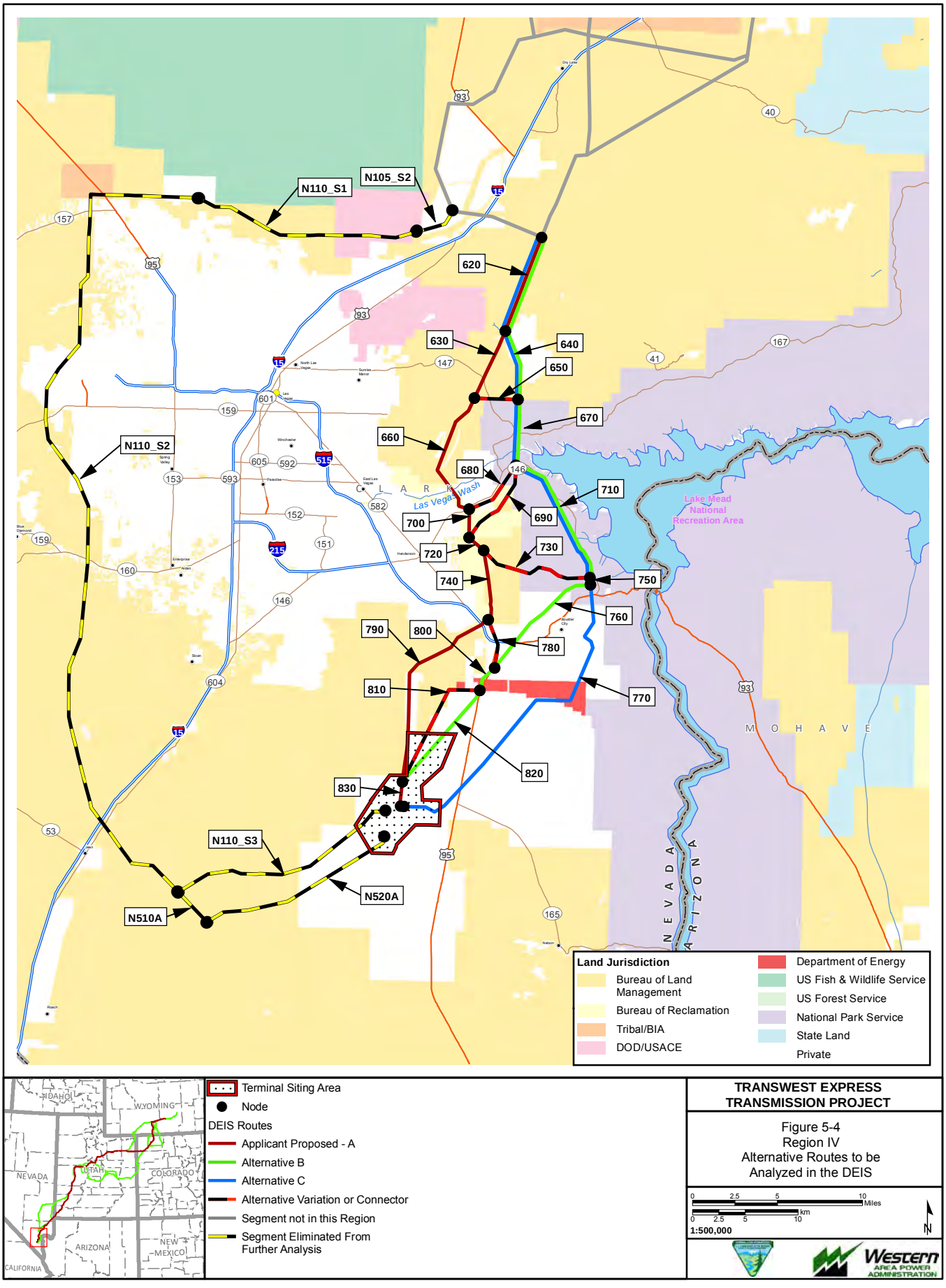
450
U185
N5
480
490
500
504
503
501
505
510
520
502
530
540
550
580
570
590
560
600
610
N110_S1
N110_S2
N105_S2
470
460
U175
Great Basin National Park
Humboldt-Toiyabe National Forest
Fishlake National Forest
Dixie National Forest
Zion National Park
Pipe Spring National Monument
Kaibab National Forest
NEVADA
UTAH
ARIZONA
Land Jurisdiction
Bureau of Land Management
Bureau of Reclamation
Tribal/BIA
DOD/USACE
Department of Energy
US Fish & Wildlife Service
US Forest Service
National Park Service
State Land
Private
Terminal Siting Area
Node
DEIS Routes
Applicant Proposed - A
Alternative B
Alternative C
Alternative Variation or Connector
Segment not in this Region
Segment Eliminated From Further Analysis
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 5-3
Region III
Alternative Routes to be Analyzed in the DEIS
1:2,000,000
Western AREA POWER ADMINISTRATION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N110_S1
N105_S2
N110_S2
N110_S3
N520A
N510A
620
630
640
650
660
670
680
690
700
710
720
730
740
750
760
770
780
790
800
810
820
830
Las Vegas Wash
Lake Mead National Recreation Area
CLARK
MOHAVE
NEVADA
ARIZONA
Land Jurisdiction
Bureau of Land Management
Bureau of Reclamation
Tribal/BIA
DOD/USACE
Department of Energy
US Fish & Wildlife Service
US Forest Service
National Park Service
State Land
Private
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Terminal Siting Area
Node
DEIS Routes
Applicant Proposed - A
Alternative B
Alternative C
Alternative Variation or Connector
Segment not in this Region
Segment Eliminated From Further Analysis
TRANSWEST EXPRESS TRANSMISSION PROJECT
Figure 5-4
Region IV
Alternative Routes to be Analyzed in the DEIS
0 2.5 5 10 Miles
0 2.5 5 10 km
1:500,000
N
Western AREA POWER ADMINISTRATION

5.2 Region I – Sinclair, Wyoming, to Northwest Colorado

5.2.1 Corridors Eliminated from Further Analysis

Alternative corridors were eliminated from further analysis in Region I based on comments received during scoping, agency input, and due to adjustments to the proponents design options. **Table 5-1** describes the alternative corridors that have been eliminated from further analysis.

Table 5-1 Region I – Eliminated Corridors

EIS Segment ID	Discussion/Rationale
Corridor Screening Segments C95_S1, C95_S2, C130_S1, C140, C155, C160, C165, C175, C180, C190_S1, C190_S2,C803, C821,C822	These segments were removed prior to the EIS renumbering and as a result of visual concerns in the Grand Valley, construction and engineering limitations, greater length of private lands affected, and the lack of benefit beyond those provided by existing alternatives.
Segment 10	This segment was removed as a result of the elimination of Design Option 1 by TransWest.
Segment 80	Segment 80 was removed at the request of the BLM Little Snake Field Office because of impacts to important greater-sage grouse populations. This segment did not offer resource benefits beyond provided by existing alternatives, including the new Segment 186 (see **Table 5-2**).
Segment 200	Segment 200 (Western Wyoming Alternative Variation) was removed because of visual concerns from Dinosaur National Monument and Flaming Gorge National Scenic Byway, the crossing of a ROW exclusion area (Red Creek ACEC), and the lack of benefit beyond those provided by existing alternatives.

5.2.2 New or Modified Corridors

New segments were added in Region I to address concerns expressed during scoping. These new or modified corridors are described in **Table 5-2**; **Figure 5-1** shows these corridors in more detail.

Table 5-2 Region I – New or Modified Corridors

EIS Segment ID	Discussion/Rationale
Segments 115, 115.05, 115.07, 115.10	Segments were added at the request of the Rawlins Field Office to avoid impacts to sage grouse habitat as well as sensitive visual resources.
Segments 150, 160	These alternative segments were added in response to public comment and provide bi-directional crossover options among all three alternatives. The alternative connector offers routing flexibility to avoid environmental issues expressed by the Western Resource Advocates and the Coalition of Local Governments (Wyoming).
Segment 180	The post-scoping applicant's proposed corridor in northwest Colorado was shifted slightly to the east to address public preference for an alignment in the Sevenmile Ridge area.

Table 5-2 Region I – New or Modified Corridors

EIS Segment ID	Discussion/Rationale
Segment 186	This Sevenmile Ridge area segment was added for consideration to minimize visual impacts along seven-mile ridge, recreation impacts at Yampa River crossing, and land use impacts on private lands at the request of the BLM Little Snake Field Office.

5.3 Region II – Northwest Colorado to IPP

5.3.1 Corridors Eliminated from Further Analysis

Alternative segments in Region II that have been eliminated from further consideration in the EIS after scoping are listed in **Table 5-3**.

Table 5-3 Region II – Eliminated Corridors

EIS Segment ID	Discussion/Rationale
Segment 240	This segment was added (see **Table 5-4**), then subsequently removed to minimize impacts to cultural and recreational resources of the San Rafael Swell such as the Cleveland Lloyd Dinosaur Quarry.
Segments 230, 260	These segments have been eliminated from further consideration as they impact segments of the Old Spanish National Historic Trail and the scenic quality to other historic sites. They provide no apparent benefit in reducing or resolving resource impacts, and only increase the complexity of the analysis.
USFWS Proposed Routes (2012)	These routes were removed from further study because they added no benefit beyond those provided by the existing range of alternatives, the stated intent was to avoid mapped greater-sage grouse habitat; however, existing alternatives to the south greater-sage grouse habitat. Additionally, the eastern reroute bisects IRAs for approximately 15 miles as well as passes through relatively undisturbed areas noted for scenic quality, and the western reroute deviates from the designated utility corridor and crosses private lands, including center-pivot irrigated private lands.

5.3.2 New or Modified Alternative Corridors

Two of the corridor segments presented during scoping in Region IIwere redefined as alternative connectors (segments 390 and 400 - see **Figure 5-2**). Also, as a result of scoping, new alternative variations were added in south-central Utah (segments 240, 250, 280, and 300) and eastern Utah(segments 214 and 215). BLM field office and USFS input has led to multiple new alternative segments. These segments are described in **Table 5-**4 below and shown on **Figure 5-2**.

Table 5-4 Region II – New or Modified Alternative Corridors

EIS Segment ID	Discussion/Rationale
Segments 222.05, 222.3, 225.2	Segments were added to minimize impacts to the Old Spanish Trail.

Table 5-4 Region II – New or Modified Alternative Corridors

EIS Segment ID	Discussion/Rationale
Segments 240, 250, 280, and 300	These alternative segments were added for further evaluation based on comments from the BLM Price Field Office and concerns about potential impacts to the Old Spanish Trail.
Segments 214 and 215	These alternative segments were reinstated for analysis and comparison to segments 211 and 212 in response to concerns expressed by the BLM Vernal Field Office. These segments would be longer than the applicant's proposed corridor, but would be located within designated utility corridors.
Segments 217, 217.05, 217.10, 217.15, 223, 325	Segments were added (including crossing Ashley National Forest) to provide a greater range of alternatives for crossing National Forest System lands at the request of USFS.
Segments 218, 219.1, 219.2, 219.3, 219.4, 219.5	These new segments were developed to address BLM Utah concerns over greater-sage grouse habitat and the associated planning effort currently underway.

5.4 Region III – IPP to North Las Vegas

5.4.1 Corridors Eliminated from Further Analysis

Alternative segments in Region III that have been eliminated from further consideration in the EIS after scoping are listed in **Table 5-5**.

Table 5-5 Region III – Eliminated Corridors

EIS Segment ID	Discussion/Rationale
Corridor Screening Segments U175, U185, N5	These segments were removed prior to the EIS renumbering and because they provide no benefit beyond those provided by the existing range of alternatives, greater length relative to other corridors near I-15, and visual resource concerns related to the proximity to Great Basin National Park as well as the route's lack of collocation with existing utilities.

5.4.2 New or Modified Alternative Corridors

Two alternative variations (composed of segments 503, 504, and 505) and two alternative connectors (segments 570 and 580) were added in Region III for further analysis in the Draft EIS. These alternative variations and connectors were developed to address public comments and to provide additional routing flexibility. **Table 5-6** describes the new alternative variations and connector; **Figure 5-3** shows these alternative variations and connector in more detail.

Table 5-6 Region III – New or Modified Alternative Corridors

EIS Segment ID	Discussion/Rationale
Segments 503, 504, 505, 506	These alternative segments were developed based on public comments during scoping. The alternatives traverse Ox Valley or the Pinto Creek drainage, west of Central, Utah, and then connect with the applicant proposed corridor south of Central. They avoid potential impacts to the Mountain Meadows National Historic Landmark and site, address local concerns expressed by residents in Central, Utah, as well as minimize USFS Inventoried Roadless Areas on the Dixie National Forest.

Table 5-6 Region III – New or Modified Alternative Corridors

EIS Segment ID	Discussion/Rationale
Segments 540, 570, 580, 590	Segments 540 and 590 were reinstated following the scoping period to address public concerns that the proposed project should follow the existing utilities and RMP-designated utility corridors. Segments 570 and 580 were reinstated to provide connectors between alternatives.

5.5 Region IV – North Las Vegas to Marketplace

5.5.1 Corridors Eliminated from Further Analysis

Alternative segments in Region IV that have been eliminated from further consideration in the EIS after scoping are listed in **Table 5-7**.

Table 5-7 Region IV – Eliminated Corridors

EIS Segment ID	Discussion/Rationale
Corridor Screening Segments N105_S2, N110_S1, N110_S2, N110_S3, N510A, N520A	These segments were removed prior to the EIS renumbering and as a result of providing no benefit beyond those provided by the existing range of alternatives, no available buffer to avoid both residential lands and Nellis Air Force Base and Red Rocks National Conservation Area, which would require an act of Congress.

5.5.2 New and Modified Alternative Corridors

Multiple segments were modified or added for further analysis in the Draft EIS. They were modified or developed in response to comments received during scoping or based on the applicant's request to allow for additional routing flexibility in a highly constrained area. These alternative connectors and variation are described in **Table 5-8** and shown on **Figure 5-4**.

Table 5-8 Region IV – New or Modified Alternative Corridors

Corridor Segment ID	Discussion/Rationale
Segment 680	This alternative connector represents a refinement to the corridor previously presented in scoping. It was developed to address comments received from the public. The connector would more closely follow Lake Mead Boulevard (State Highway 146). It was refined to address public concerns and to provide additional routing flexibility. The applicant requested the alternative connector be evaluated in the Draft EIS.
Segment 690	Similar to Segment 680, this alternative connector is a refinement to the corridor previously presented during scoping and was developed based on comments received from the public. The connector provides an additional option between Alternative B and Alternative C with the applicant's proposed corridor. Segment 690 would avoid potential impacts to anticipated future development of the Three Kids Mine site. The applicant requested that the alternative connector be analyzed in the Draft EIS.
Segment 730	Segment 730 alternative connector represents a refinement to the corridor previously presented in scoping. The applicant requested that the alternative connector be analyzed in the Draft EIS.

Table 5-8 Region IV – New or Modified Alternative Corridors

Corridor Segment ID	Discussion/Rationale
Segment 810	This alternative variation was added to provide an option to Segment 820. The alternative variation would avoid multiple transmission line crossings and encroachment on private property. The applicant requested this alternative variation based on engineering and design concerns.

5.6 Alternatives Carried Forward for Analysis

The alternative corridors, alternative variations, and alternative connectors to be carried forward in the EIS are shown on **Map 10** in **Attachment A.**

6.0 References Cited

Bureau of Land Management (BLM). 2011. *BLM/WO Instruction Memorandum No. 2011-059.* Addressed to all field office officials from the Director. Subject: National Environmental Policy Act Compliance for Utility-Scale Renewable Energy Right-of-Way Authorizations. February 8, 2011.

Bureau of Land Management (BLM). 2008. *BLM National Environmental Policy Act Handbook H-1790.*January 2008.

EPG. 2008. *Corridor Study Report for the Transwest Express and Gateway South Transmission Projects.* Prepared for National Grid, Arizona Public Service Company, Rocky Mountain Power, and Wyoming Infrastructure Authority, Prepared by EPG, Inc., February 2008.

Attachment A

Maps

Map 1
Applicant Proposed Corridor

Project Features
- Applicant Proposed Corridor
- Terminal Siting Area
- Project Endpoints/Interconnections

Transportation
- Interstate highway
- US Highway

Administrative Features
- State Capital
- County Seat
- State Boundary
- County Boundary

Jurisdiction
- Bureau of Indian Affairs/Tribal
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defence
- Department of Energy
- National Park Service
- US Fish and Wildlife Service
- US Forest Service
- State/Local

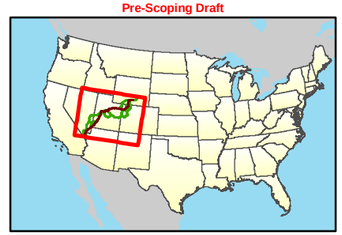
Data Sources
Transportation Features: TeleAtlas, 2008
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: US Forest Service, 2010

Applicant Proposed Segments: TransWest Express LLC
Alternative Proposed Segments: Joint Lead Agencies

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12

Pre-Scoping Draft



Date Last Revised : February 8, 2011

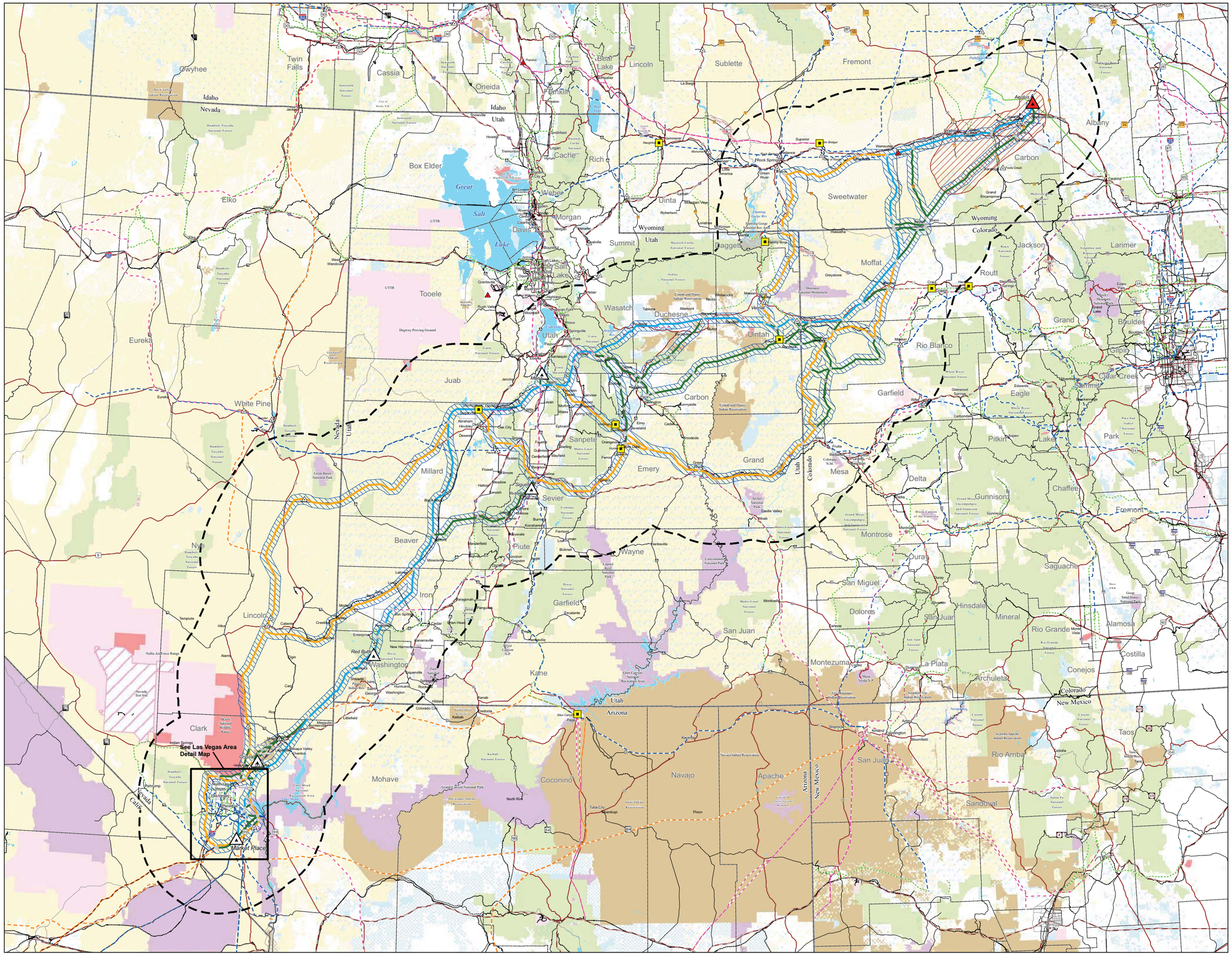
The alternative segments shown on this map are preliminary and may be revised and/or refined throughout the development of the project. No warranty is made by the Agencies for use of the data herein for purposes not intended by the Agencies.

0 10 20 40 60 80
Miles

NATIONAL SYSTEM OF PUBLIC LANDS

Western AREA POWER ADMINISTRATION

TRANSWEST EXPRESS TRANSMISSION PROJECT



MAP 2A

PROPOSED AND ALTERNATIVE CORRIDORS INCLUDED IN THE 2008 ROW APPLICATION TO BLM

Legend

Land Jurisdiction

- Bureau of Land Management
- Indian Reservation
- U.S. Forest Service
- National Park Service
- U.S. Fish & Wildlife Service
- Department of Defense
- Bureau of Reclamation
- Department of Energy
- State Land
- Private Land

Project Features

- Proposed Substation (Permitting in Progress)
- Study Area Boundary
- Proposed Route
- Proposed Alternative Route
- Alternatives Under Further Consideration
- 6 Mile Wide Corridor Buffer
- Link Node
- Terminal Siting Area

Utility Facilities

- Existing Power Plant
- Existing Substation
- 500kV+/- DC Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 115/138kV Transmission Line

Transportation Features

- Interstate Highway
- US Highway
- State Highway
- Railroad

Water Features

- River or Stream
- Lake, Pond, or Reservoir

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
POWERmap, powermap.platts.com
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NOTE: Substation locations are schematic and do not necessarily represent precise locations.

Print Date : December 12, 2008

DRAFT

0 12.5 25 50 75 100 Miles

TRANSWEST EXPRESS TRANSMISSION LINE PROJECT

TRANSWEST EXPRESS LLC

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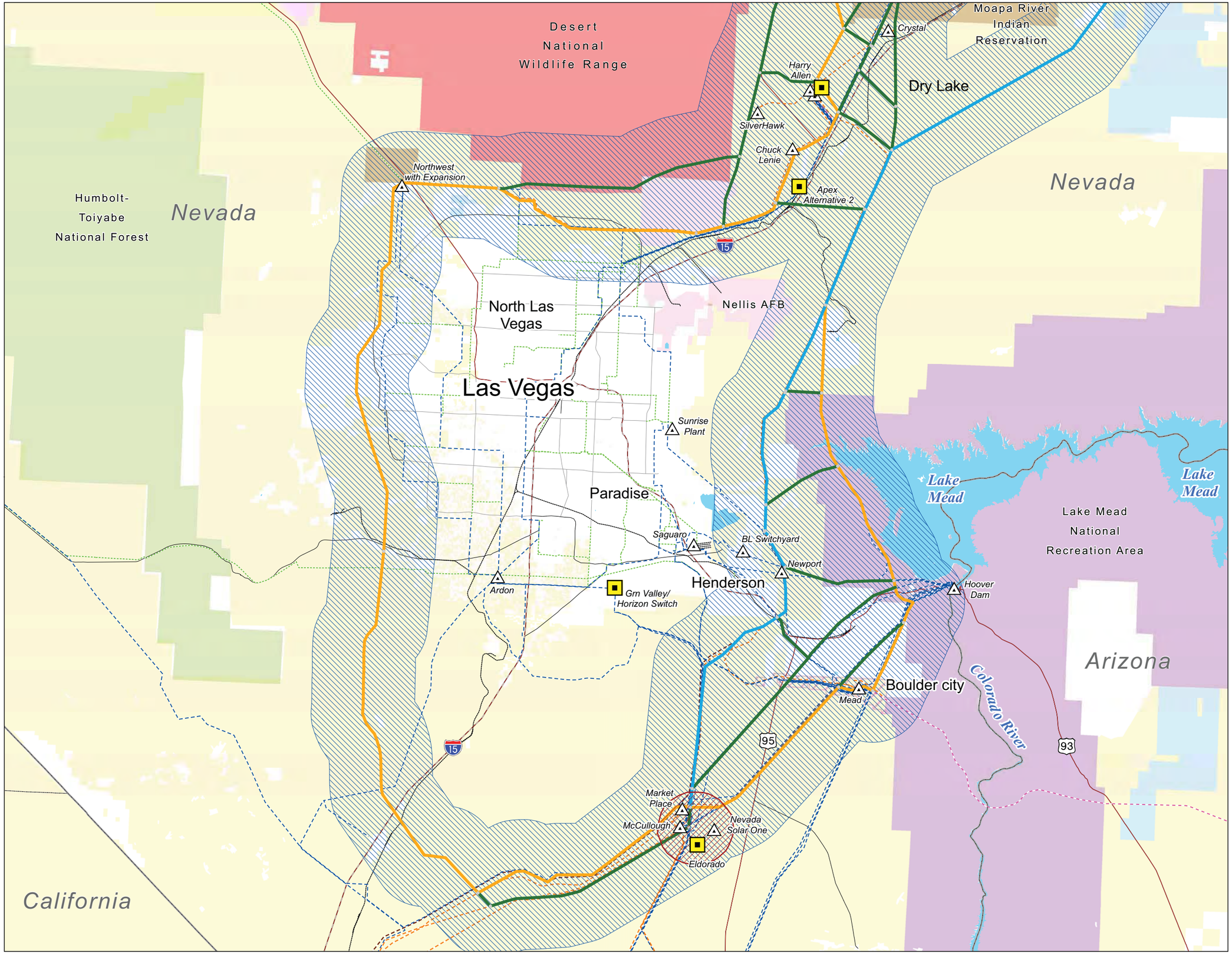

MAP 2B

PROPOSED AND ALTERNATIVE CORRIDORS INCLUDED IN THE 2008 ROW APPLICATION TO BLM

Legend

Land Jurisdiction

- Bureau of Land Management
- Indian Reservation
- U.S. Forest Service
- National Park Service
- U.S. Fish & Wildlife Service
- Department of Defense
- Bureau of Reclamation
- Department of Energy
- State Land
- Private Land

Project Features

- Proposed Route
- Proposed Alternative Route
- Alternatives Under Further Consideration
- 6 Mile Wide Corridor Buffer
- Link Node
- Terminal Siting Area

Utility Facilities

- Existing Power Plant
- Existing Substation
- 500kV+/- DC Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 115/138kV Transmission Line

Transportation Features

- Interstate Highway
- US Highway
- State Highway
- Railroad

Water Features

- River or Stream
- Lake, Pond, or Reservoir

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
POWERmap, powermap.platts.com
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NOTE: Substation locations are schematic and do not necessarily represent precise locations.

Print Date : December 12, 2008

DRAFT

0 1.25 2.5 5 7.5 10 Miles

TRANSWEST EXPRESS
TRANSMISSION LINE PROJECT

TRANSWEST EXPRESS LLC

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X:\0Projects\12907_003_Transwest_Express\Figures\DocumentFigures\SF299_20091217WE_FIG_2_SF299_11X17.mxd

MAP 3

PROPOSED AND ALTERNATIVE CORRIDORS INCLUDED IN THE 2010 REVISED ROW APPLICATION TO BLM

Legend

Project Features

- Proposed Route
- Proposed Alternatives
- Link Node
- 6-Mile-Wide Corridor
- Study Area
- Terminal Siting Area

Utility Facilities

- 500kV +/- Direct Current Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- 115kV Transmission Line
- Below 100kV Transmission Line
- Unknown Voltage Transmission Line

Transportation Features

- Interstate Highway
- U.S. Highway
- State Highway

Water Features

- Perennial Water Bodies

Land Jurisdiction

- Department of Defense
- Department of Energy
- Indian Reservation
- State Land
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- USDI National Park Service

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
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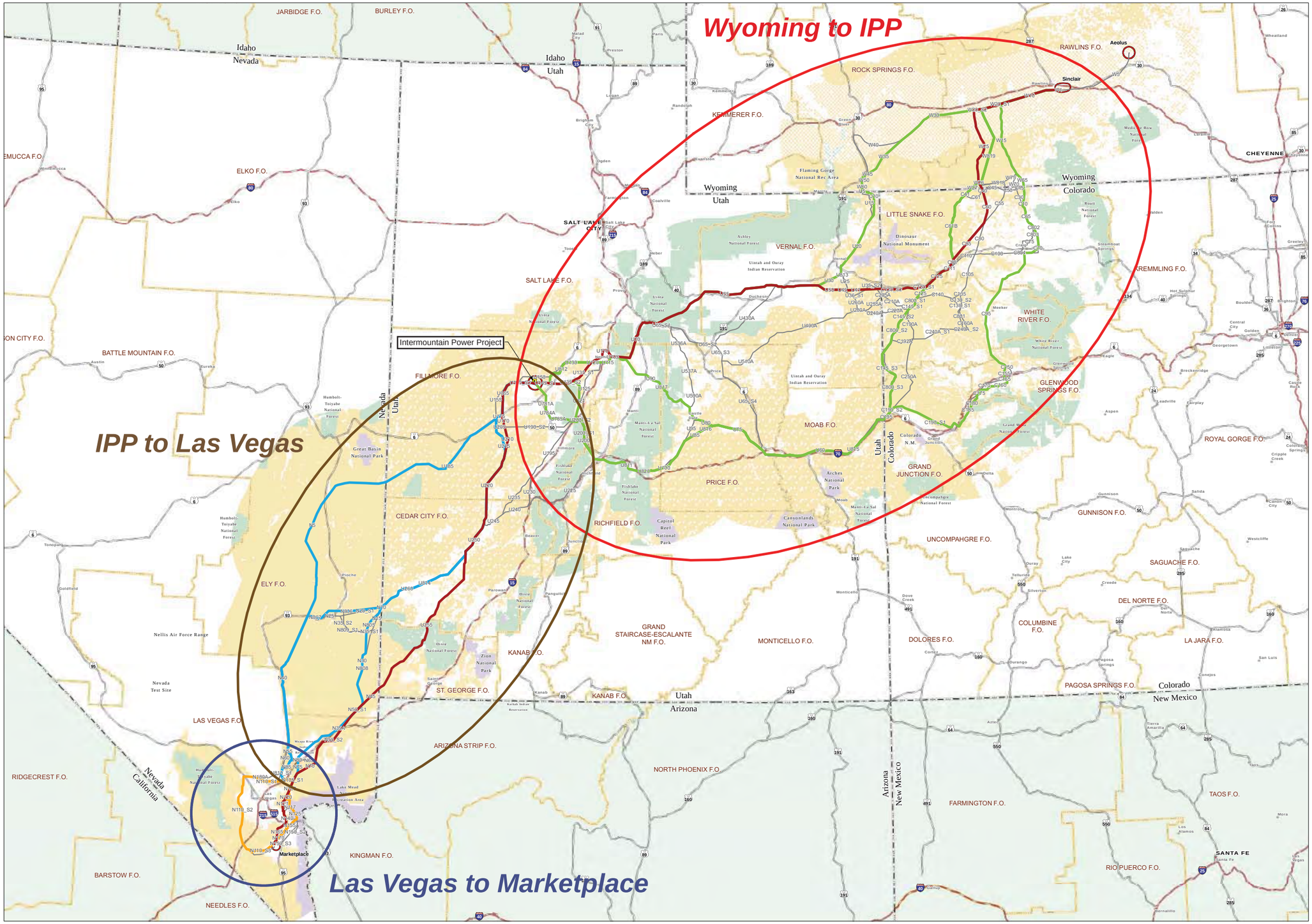
Print Date : January 22, 2010

0 20 40 80 120
Miles

TRANSWEST EXPRESS
TRANSMISSION PROJECT

NATIONAL SYSTEM OF PUBLIC LANDS

TRANSWEST EXPRESS LLC



MAP 4
PROJECT CORRIDOR REGIONS FOR ALTERNATIVE SCREENING ANALYSIS

Project Features
- Applicant Proposed Route
- Wyoming to IPP
- IPP to Las Vegas
- Las Vegas to Marketplace
- Corridor Not Recommended for Further Study - May 2010
- Intermountain Power Plant
- Terminus Siting Areas

Jurisdiction
- Bureau of Land Management
- Forest Service
- National Park Service

Administrative Features
- State Capital
- County Seat
- State Boundary
- BLM Field Office Boundary

Transportation Features
- Interstate highway
- US Highway

Data Sources

BLM Field Offices: USDI Bureau of Land Management, 2006.
Transportation Features: TeleAtlas, 2008.
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: Arizona Land and resource Information System, 2007; California Department of Forestry FRRAP, 2009; Bureau of Land Management, 2005 and 2007; National Ecology Research Center, 2007; State of Utah School and Institutional Trust Lands Administration (SITLA), 2009;

Applicant proposed and alternative corridors:
Transwest Express LLC.

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12

Date Last Revised : May 19, 2010

The alternative routes shown on this map are preliminary and may be revised and/or refined throughout the development of the project.

0 10 20 40 60 80 100
Miles

NATIONAL SYSTEM OF PUBLIC LANDS

Pre-Scoping Draft

TRANSWEST EXPRESS TRANSMISSION PROJECT

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MAP 5

PROJECT CORRIDOR SCREENING ANALYSIS
WYOMING TO IPP REGION

Project Features

- Applicant Proposed Corridor
- Alternative Corridor
- Corridor Not Recommended for Further Study - May 2010
- Intermountain Power Plant
- Terminus Siting Areas

Jurisdiction

- Bureau of Land Management
- Forest Service
- National Park Service

Administrative Features

- State Capital
- County Seat
- State Boundary
- BLM Field Office Boundary

Transportation Features

- Interstate Highway
- US Highway

Data Sources

BLM Field Offices: USDI Bureau of Land Management, 2006.
Transportation Features: TeleAtlas, 2006.
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: Arizona Land and resource Information System, 2007; California Department of Forestry FRRAP, 2009; Bureau of Land Management, 2005 and 2007; National Ecology Research Center, 2007; State of Utah School and Institutional Trust Lands Administration (SITLA), 2009;

Applicant proposed and alternative corridors:
Transwest Express LLC.

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12

Date Last Revised : October 28, 2010

The alternative routes shown on this map are preliminary and may be revised and/or refined throughout the development of the project.

0 10 20 40
Miles

Pre-Scoping Draft

TRANSWEST EXPRESS TRANSMISSION PROJECT

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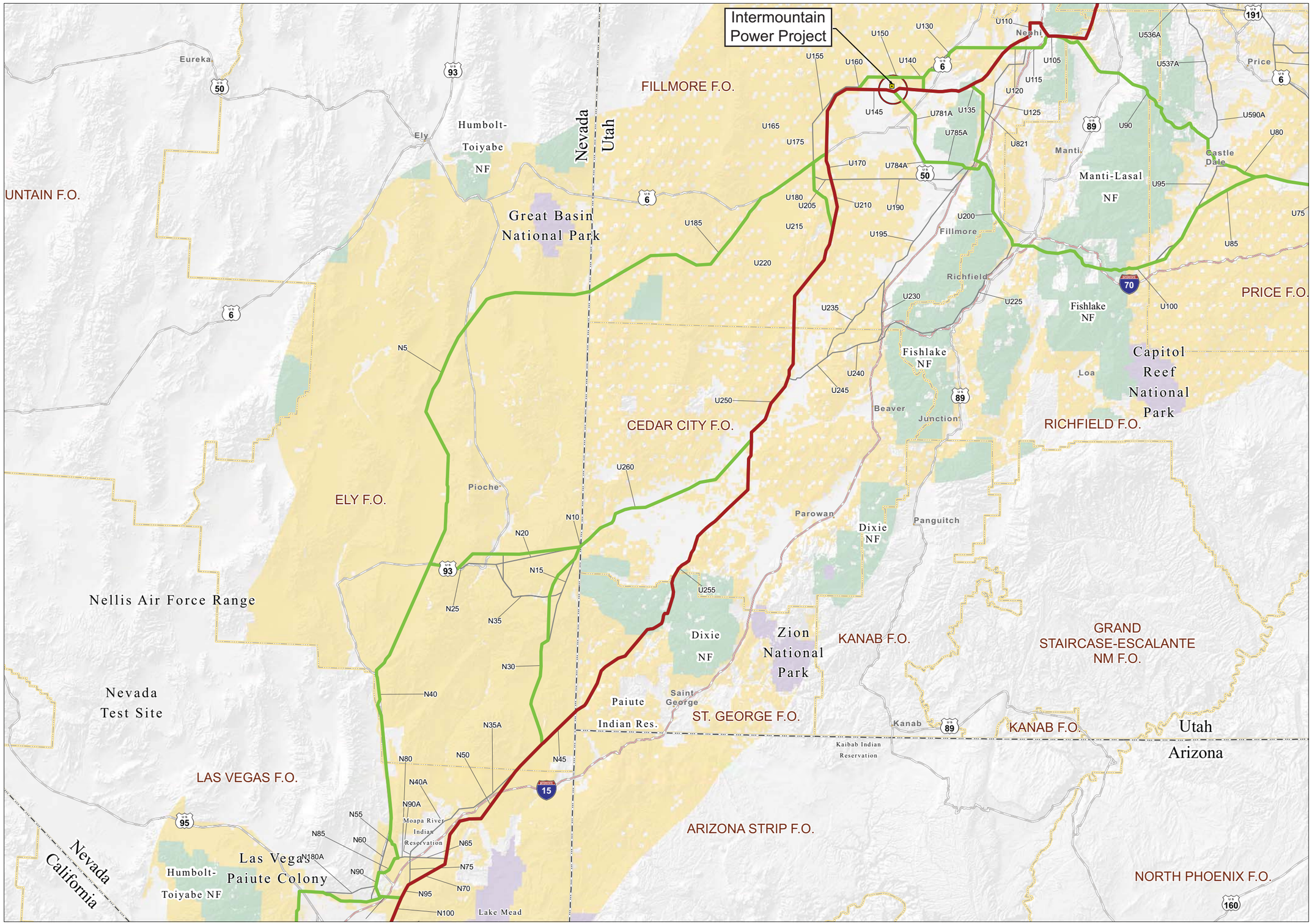


MAP 6

PROJECT CORRIDOR SCREENING ANALYSIS
IPP TO LAS VEGAS REGION

Project Features

- Applicant Proposed Corridor
- Alternative Corridor
- Corridor Not Recommended for Further Study - May 2010
- Intermountain Power Plant
- Terminus Siting Areas

Jurisdiction

- Bureau of Land Management
- Forest Service
- National Park Service

Administrative Features

- State Capital
- County Seat
- State Boundary
- BLM Field Office Boundary

Transportation Features

- Interstate Highway
- US Highway

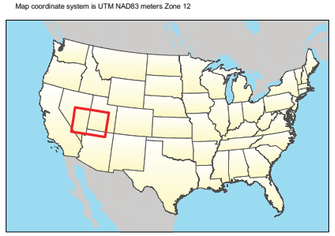
Data Sources

BLM Field Offices: USDI Bureau of Land Management, 2006.
Transportation Features: TeleAtlas, 2008.
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: Arizona Land and resource Information System, 2007; California Department of Forestry FRRAP, 2009; Bureau of Land Management, 2005 and 2007; National Ecology Research Center, 2007; State of Utah School and Institutional Trust Lands Administration (SITLA), 2009;

Applicant proposed and alternative corridors:
Transwest Express LLC.

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12



Date Last Revised : October 28, 2010

The alternative routes shown on this map are preliminary and may be revised and/or refined throughout the development of the project.

0 10 20 40
Miles

Pre-Scoping Draft

TRANSWEST EXPRESS TRANSMISSION PROJECT

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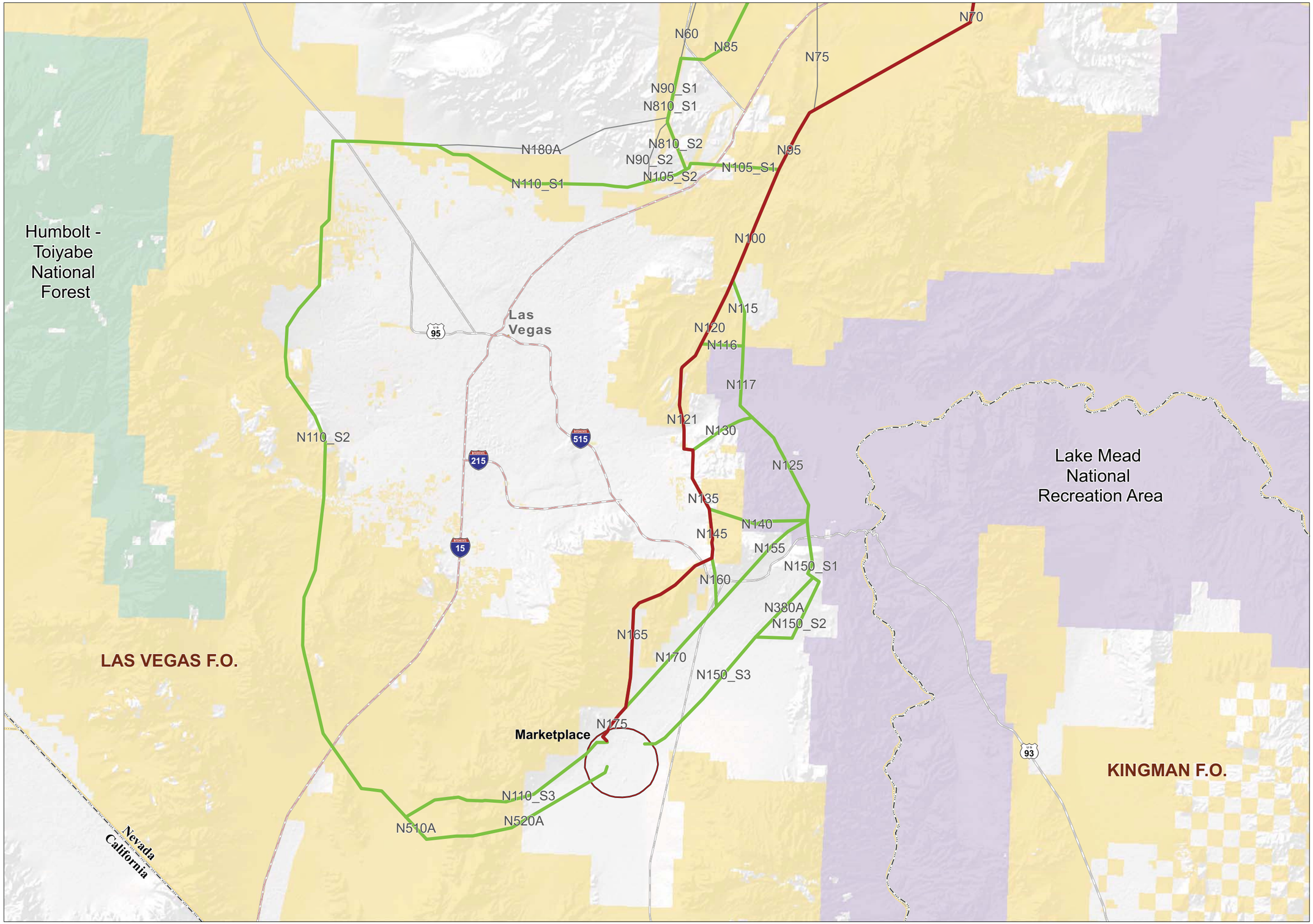
MAP 7

PROJECT CORRIDOR SCREENING ANALYSIS
LAS VEGAS TO MARKETPLACE REGION



Project Features

- Applicant Proposed Corridor
- TWE_Centerlines_Master_100521
- Corridor Not Recommended for Further Study - May 2010
- Terminus Siting Areas

Jurisdiction

- Bureau of Land Management
- Forest Service
- National Park Service

Administrative Features

- State Capital
- County Seat
- State Boundary
- BLM Field Office Boundary

Transportation Features

- Interstate Highway
- US Highway

Data Sources

BLM Field Offices: USDI Bureau of Land Management, 2006.
Transportation Features: TeleAtlas, 2008.
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: Arizona Land and resource Information System, 2007; California Department of Forestry FRRAP, 2009; Bureau of Land Management, 2005 and 2007; National Ecology Research Center, 2007; State of Utah School and Institutional Trust Lands Administration (SITLA), 2009;

Applicant proposed and alternative corridors:
Transwest Express LLC.

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12

Date Last Revised : October 28, 2010

The alternative routes shown on this map are preliminary and may be revised and/or refined throughout the development of the project.

0 2.5 5 10
Miles

NATIONAL SYSTEM OF PUBLIC LANDS

Pre-Scoping Draft

TRANSWEST EXPRESS
TRANSMISSION PROJECT

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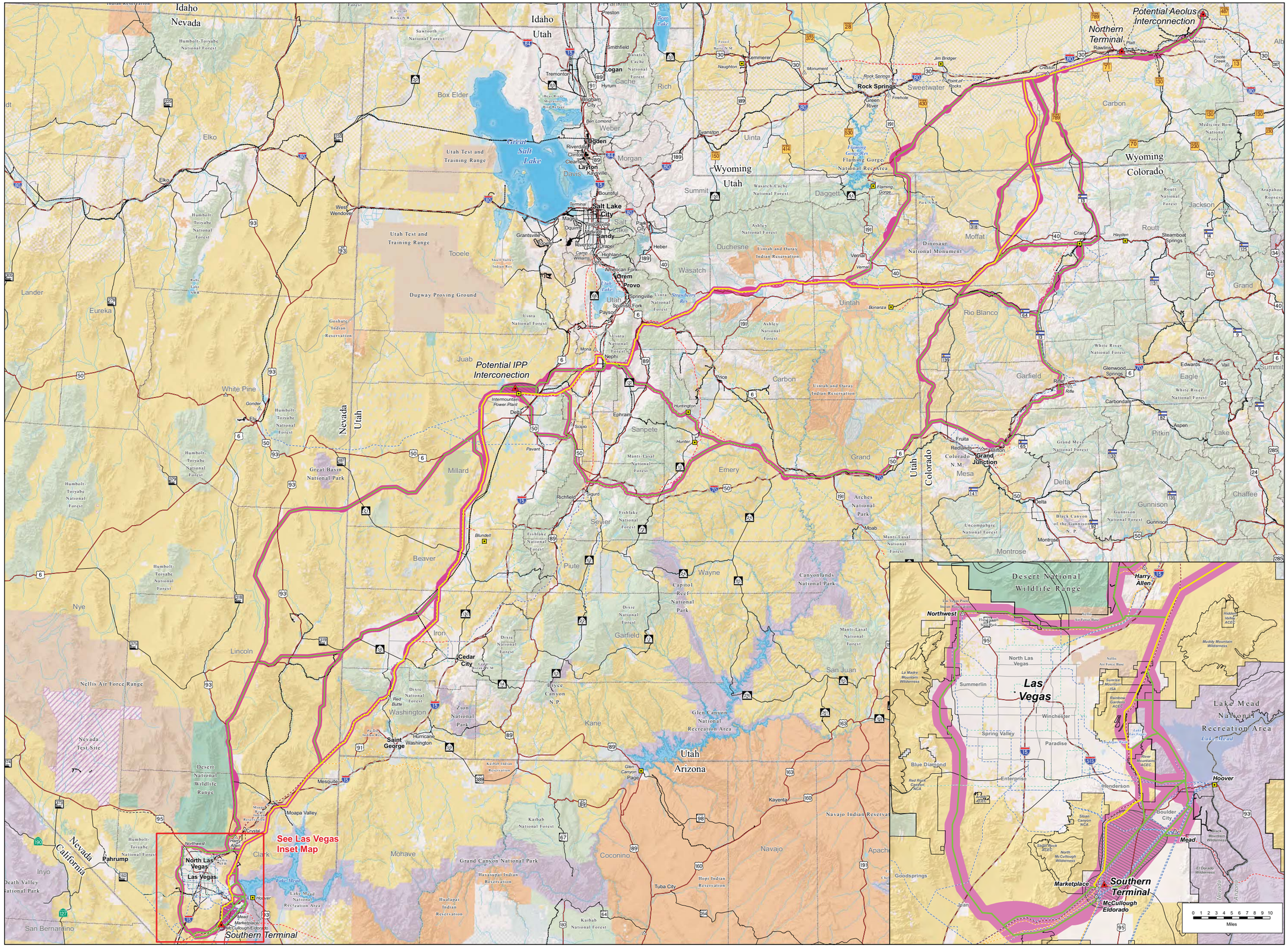

MAP 8

PROPOSED AND ALTERNATIVE CORRIDORS USED FOR PUBLIC SCOPING

Legend

Project Features

- Proposed Segment
- Alternative Segment
- Proposed & Alternative Corridors (Typical two miles wide)
- Proposed Substation/ Terminal
- Terminal Siting Area

Land Jurisdiction

- Department of Defense
- Department of Energy
- Indian Reservation
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- USDI National Park Service
- State Land
- State or Local Park
- Private Land

Existing Utilities

- Existing Power Plant
- Existing Substation
- 500kV+/- DC Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- 115kV Transmission Line

Transportation Features

- Interstate Highway
- US Highway
- State Highway
- Railroad

Water Features

- River or Stream
- Lake, Pond, or Reservoir

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
POWERmap, powermap.platts.com
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NOTE: Substation locations are schematic and do not necessarily represent precise locations.

Date updated: June 29, 2010
Routes Current as of June 23, 2010

The routes shown on this map are preliminary and may be revised and/or refined throughout the development of the project.

0 10 20 30 40 50 60 70 80
Miles
1:800,000

TRANSWEST EXPRESS TRANSMISSION PROJECT

POWER ENGINEERS
June 29, 2010

TRANSWEST EXPRESS LLC

Map 9
Corridor Changes Since Scoping
November 14, 2011

Project Features

Corridors - Scoping vs. DEIS

- Scoping Corridor - Carried Forward to DEIS
- Modified from Scoping Corridor - Carried Forward to DEIS
- Corridor Not In Scoping - Carried Forward to DEIS
- Scoping Corridor - Not Carried Forward in DEIS

Transportation

- Interstate highway
- US Highway

Administrative Features

- State Capital
- County Seat
- City/Town
- State Boundary
- County Boundary

Jurisdiction

- Bureau of Indian Affairs/Tribal
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense
- Department of Energy
- National Park Service
- US Fish and Wildlife Service
- US Forest Service
- State/Local

Data Sources

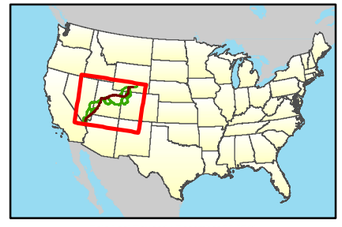
Transportation Features: TeleAtlas, 2008
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: US Forest Service, 2010

Applicant Proposed Segments: TransWest Express LLC
Alternative Proposed Segments: Joint Lead Agencies

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12

DRAFT



Date Last Revised : December 28 2011

The alternative segments shown on this map are preliminary and may be revised and/or refined throughout the development of the project. No warranty is made by the Agencies for use of the data herein for purposes not intended by the Agencies.

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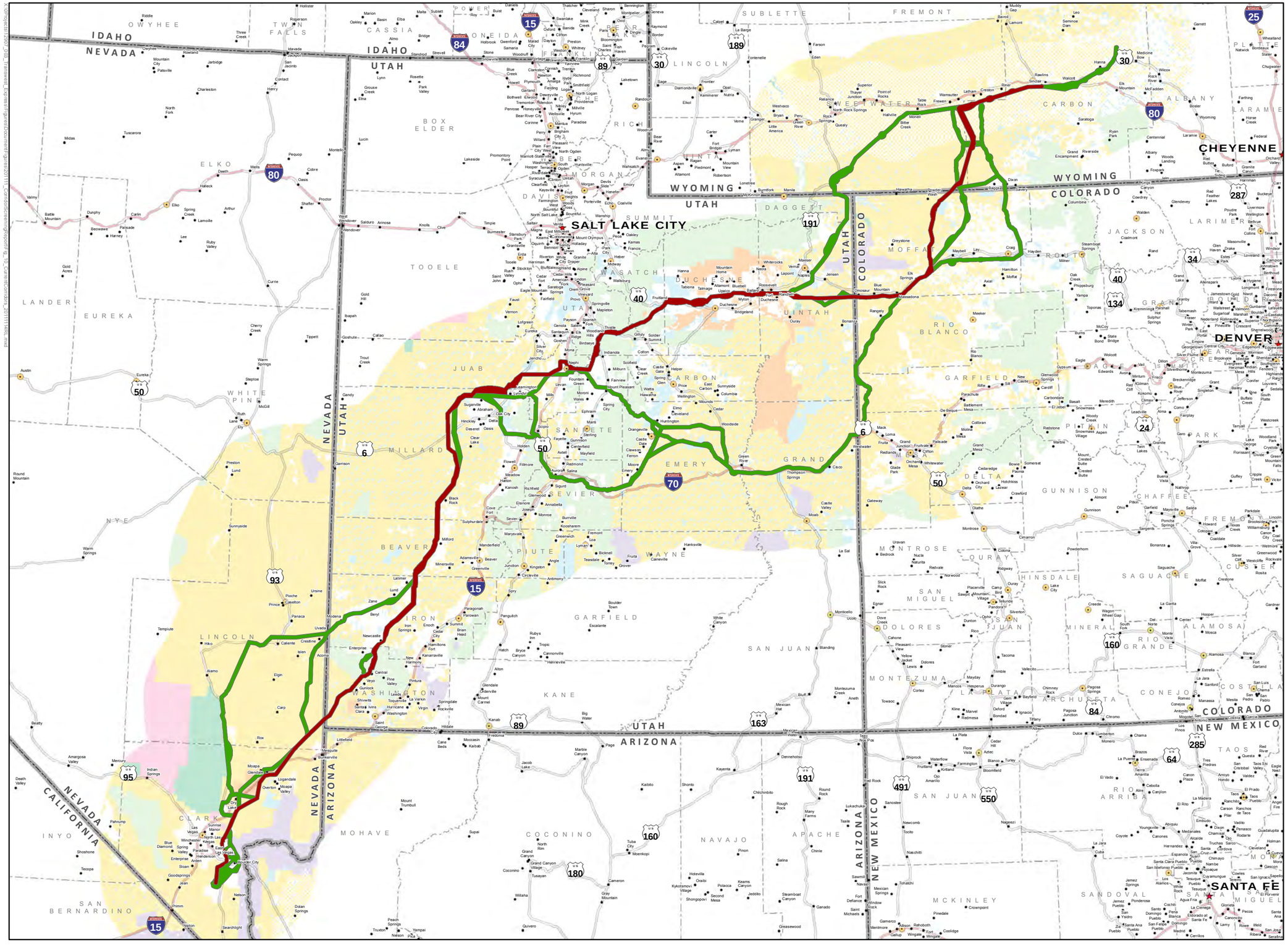
Miles

Western Area Power Administration

TRANSWEST EXPRESS TRANSMISSION PROJECT



Map 10
Alternatives to be Analyzed in the Draft EIS
November 14, 2011

Project Features

Project Corridors

- Applicant Proposed
- Alternative

Transportation

- Interstate highway
- US Highway

Administrative Features

- State Capital
- County Seat
- City/Town
- State Boundary
- County Boundary

Jurisdiction

- Bureau of Indian Affairs/Tribal
- Bureau of Land Management
- Bureau of Reclamation
- Department of Defense
- Department of Energy
- National Park Service
- US Fish and Wildlife Service
- US Forest Service
- State/Local

Data Sources

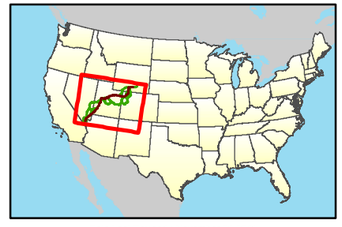
Transportation Features: TeleAtlas, 2008
Administrative and Hydrologic Features: National Atlas, 2002
Jurisdiction Features: US Forest Service, 2010

Applicant Proposed Segments: TransWest Express LLC
Alternative Proposed Segments: Joint Lead Agencies

Note:
Some corridors were proposed by BLM during pre-scoping.

Map coordinate system is UTM NAD83 meters Zone 12

DRAFT



Date Last Revised : November 21 2011

The alternative segments shown on this map are preliminary and may be revised and/or refined throughout the development of the project. No warranty is made by the Agencies for use of the data herein for purposes not intended by the Agencies.

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Miles

Western Area Power Administration

TRANSWEST EXPRESS
TRANSMISSION PROJECT

Attachment B

Analysis of Corridors Retained for Public Scoping

Analysis of Corridors Retained for Scoping

Wyoming to IPP – Applicant Proposed Corridor (2010 amended ROW application, see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
W1 / W10	Rawlins F.O.	Sage Grouse Core Breeding Area. Crosses through Red Rim-Daley Wildlife Habitat Management Area which is managed for winter pronghorn habitat and raptor protection. Crosses Continental Divide National Scenic Trail Crosses a Scenic Byway.	Follows an existing 230 – 287 kV transmission line and a designated utility corridor.
W20	Rawlins F.O.	Crosses a Scenic Byway.	
W25	Rawlins F.O. Sweetwater County	Follows an underground only corridor. Red Rock NRHP site is within corridor.	Corridor parallels an existing pipeline.
W26	Rawlins F.O.	Follows an underground only corridor.	Corridor parallels an existing pipeline.
W90	Rawlins F.O.	Follows an underground only corridor.	Parallels an existing pipeline with a 1000-foot offset.
C40	Moffat County Little Snake F.O.	Crosses Little Snake River. Sage Grouse Production Habitat. Follows an underground only corridor.	
C60	Moffat County Little Snake F.O.	Sage Grouse Production Habitat Follows an underground only corridor. Corridor goes through core sage grouse areas (LSFO comments). The Little Snake FO does not prefer the use of these pipeline corridors for overhead transmission lines (comment from pre-scoping meeting held on 6/12/2009).	
C85	Moffat County Little Snake F.O.	Sage Grouse Production Habitat. Crosses Yampa River and is located near Yampa River Fishing Access and boat launching area.	Generally follows RMP designated corridor, although corridor is discontinuous.

Wyoming to IPP – Applicant Proposed Corridor (2010 amended ROW application, see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
C88	Moffat County Little Snake F.O.	Does not follow a designated energy corridor. Sage Grouse Production Habitat.	
C115	Moffat County White River F.O.	Sage Grouse Production Habitat.	Follows a designated corridor and an RMP designated corridor, Parallels an existing 345-kV transmission line south of US 40.
C120	Moffat County White River F.O.	Sage Grouse Production Habitat. Crosses a Scenic Byway.	Follows a WWEC Use Type “All” corridor and an RMP designated corridor. Generally parallels an existing 345-kV transmission line south of US 40.
U40	Vernal FO	Does not follow designated corridor. Sage Grouse Production Habitat.	
U41	Vernal FO	Does not follow designated corridor Sage Grouse Production Habitat.	
U45	Vernal FO	Sage Grouse Production Habitat.	Follows a designated utility corridor. Parallels an existing 345-kV transmission line.
U50	Vernal FO	Crosses Green River. Consider collocating transmission line crossings within corridor. (Vernal FO comment – avoid disturbance of 100-year floodplain of Green River). Sage Grouse Production Habitat.	Follows a designated utility corridor. Parallels an existing 345-kV transmission line.
U55	Duchesne County (Vernal FO) Wasatch County	13.55 miles of corridor passes through edge of roadless area in Uinta National Forest; 16.38 miles total length in Uinta NF. Passes through three WMAs for a total distance of 4.98 miles: Rabbit Gulch WMA, Wildcat WMA, and Currant Creek WMA. Roosevelt Municipal Airport, near Roosevelt, UT is near corridor. Parallels a Scenic Byway. USFS Partial Retention VQOs. Sage Grouse Production Habitat.	Parallels an existing 345-kV transmission line.

Wyoming to IPP – Applicant Proposed Corridor (2010 amended ROW application, see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U70	Salt Lake FO Richfield FO (small portion)	Crosses roadless area in Manti-La Sal National Forest. At least one campground is located within the corridor. Five WMAs are located within the corridor: Dairy Fork WMA, Lake Fork WMA, Jackson WMA, Spencer Fork WMA, and Triangle Ranch WMA just east of Nephi. USFS Partial Retention VQOs.	Parallels an existing 345-kV transmission line.
U105	Fillmore FO	Narrow, constrained area east of Nephi. Passes Canyon Hills Golf Course and hiking trail. Abuts Triangle Ranch WMA.	
U110	Fillmore FO	Nephi Municipal Airport is near corridor. Corridor is within future annexation growth area of Nephi City. (Two plats have been approved and constructed – Deer Acre Plot B). Sage Grouse Production Habitat. Crosses four existing 345-kV transmission lines.	Parallels an existing 138 to 161-kV transmission line. North/south portion of corridor west of Nephi parallels two existing 345-kV transmission lines.
U135	Western portion in Millard County (Fillmore FO)	Corridor crosses Millard County Zoning Exclusion Area Sage Grouse Production Habitat.	Generally follows designated energy corridor across Fishlake National Forest. Parallels two existing 345-kV transmission lines.
U145	Millard County Fillmore FO	Corridor crosses Millard County Zoning Exclusion Area	Parallels two existing 345-kV transmission lines.

Wyoming to IPP – Aeolus Connection (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
W5	Rawlins F.O.	Crosses Sage Grouse Core Breeding Area. Crosses the North Platte River and is near Fort Steele.	Partially follows WWEC and RMP-designated corridor. Partially follows Highway 30.

Wyoming to IPP – Westernmost Alternative Corridor (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
W30	Rock Springs F.O.	Crosses extensive oil and gas production area outside of corridor south of Table Rock.	Generally follows RMP "window" corridor. Northern portions of corridor parallels an existing 230-kV transmission line.
W35	Rock Springs F.O.	Sage Grouse Core Breeding Area. W35 does not follow designated federal utility corridors. Crosses Red Creek Portion ACEC. VRM Class II – Avoidance Area.	
W45	Rock Springs F.O.	Sage Grouse Core Breeding Area. Corridor does not follow designated federal utility corridor. Crosses Greater Red Creek ACEC which is also designated as VRM Class II – Avoidance Area. NOTE: The Greater Red Creek ACEC will, in general, be managed as an avoidance area for rights-of-way and surface disturbing activities (RMP page 27). Located on edge of Red Creek Badlands WSA. Visual and soil issues in Red Creek Badlands WSA. NOTE: Discretionary uses within or adjacent to WSAs will be reviewed to ensure they do not create conflicts with management and preservation of wilderness values (RMP page 23).	
W55	Rock Springs F.O.	Sage Grouse Core Breeding Area. Corridor does not follow designated federal utility corridor. Red Creek Portion ACEC. Crosses into Sage Creek Portion Greater Red Creek ACEC. Parallels Flaming Gorge – Green River Basin Scenic Byway and crosses it twice. VRM Zone Class II – Avoidance Area.	
W60	Rock Springs F.O.	Red Creek Portion ACEC. VRM Zone Class II – Avoidance Area. Adjacent to Clay Basin State WMA.	Corridor is parallel to Clay Basin Pipeline Road and pipeline route.

Wyoming to IPP – Westernmost Alternative Corridor (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U5	Vernal FO	The following ACECs are within the corridor: Red Creek ACEC and Browns Park ACEC. Red Creek ACEC is designated to protect watershed.	
U10	Vernal FO	Crosses Upper Green River Designated Wild and Scenic River. Corridoris within Red Creek ACEC and Browns Park ACEC. Crosses a Scenic Byway. VRM Class II – Avoidance Area. Clay Basin State WMA. Sage Grouse Production Habitat.	Within an RMP designated utility corridor.
U20	Vernal FO	Crosses Dinosaur Diamond Prehistoric Byway. VRM Class II – Avoidance Area. Sears Canyon State WMA. Sage Grouse Production Habitat. Vernal FO comment – North-south alternative runs through a wild horse management area where multiple gathers are planned.	Generally follows designated utility corridor. Southern portion of corridor parallels an existing 138 to 161 kV transmission line.
U30	Vernal FO	Does not follow utility corridor or other linear facility. Sage Grouse Production Habitat.	

Wyoming to IPP – WGFD to Colorado (Central) Corridor (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
W819	Rawlins FO	Traverses oil & gas production area.	Generally avoids known sage grouse leks. Parallels Wamsutter Road
W27	Rawlins FO	Not in a utility corridor, does not appear to parallel any existing linear features.	

Wyoming to IPP – WGFD to Colorado (Central) Corridor (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
C41	Little Snake FO		Majority of corridor follows designated and proposed utility corridors.
C61B	Little Snake FO	Not within a designated utility corridor. Crosses Little Snake River. Crosses Yampa River. Located near East Cross Mountain River Access and Campground.	
C87	Little Snake FO	Not within a utility corridor. Does not appear to follow any linear features. Sage Grouse Production Habitat. Crosses US Highway 40.	

Wyoming to IPP – Wyoming and Colorado East-West Connectors (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
W75	Rawlins FO	Does not follow a designated utility corridor. Crosses a Scenic Byway.	
W85	Rawlins FO	Crosses a mining/oil and gas production area.	Roughly parallels a pipeline corridor.
C804	Little Snake FO	Not within a utility corridor. Crosses several transmission lines associated with Craig power plant. Crosses Yampa River. Consider collocating transmission line crossings.	Parallels several transmission lines associated with Craig power plant.

Wyoming to IPP – Wyoming and Colorado East-West Connectors (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
C100	Little Snake FO	East Juniper Mountain Trailhead within corridor. Crosses Yampa River. Consider collocating transmission line crossings. Bitter Brush State Wildlife Area within corridor. Sage Grouse Production Habitat.	Portions within designated utility corridor. Generally follows southern edge of utility corridor. Parallels a 138 to 161-kV and a 345-kV transmission line.
C110	Little Snake FO	Bitter Brush State Wildlife Area within corridor. Sage Grouse Production Habitat.	Generally follows designated utility corridor. Parallels a 138 to 161-kV and a 345-kV transmission line for entire length.
C111	Little Snake FO	Outside of designated utility corridor, but connects two portions of a designated corridor.	Parallels a 138 to 161-kV and a 345-kV transmission line for entire length.
C822	White River FO	Parallels White River west of Meeker. Portions of corridor are located within underground-only utility corridors. Piceance State Wildlife Area is within corridor (west of existing transmission line). Smith Gulch Trailhead is within corridor. Windy Gulch Hunter Camps are within corridor. Boat ramp and designated fishing area are within corridor. Portion of Black Mountain WSA is within corridor.	Parallels State Highway 64 Parallels an existing 138 to 161-kV transmission line.
C130_S1	White River FO	Follows WWEC Designated UNDERGROUND-ONLY utility corridor and RMP designated off/underground corridor. Parallels White River riparian corridor. VRM Zone Class II – Avoidance Area withincorridor. Piceance State Wildlife Area within corridor.	Portion of corridor follows existing pipeline.
C140	White River FO	Parallels White River. Portions of White River Riparian ACEC are within corridor.	Within RMP designated (off) utility corridor. Generally parallels an existing 138 to 161-kV transmission line.

Wyoming to IPP – Baxter Pass Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
C125	White River FO	Does not follow utility corridor. Does not appear to follow any linear feature. Crosses White River east of Rangely near isolated portions of White River ACEC. Sage Grouse Production Habitat.	
C800	White River FO Grand Junction FO (southern half)	Much of remainder of corridor follows RMP designated underground only utility corridor. Crosses edge of Oil Spring Mountain WSA and ACEC, and Demaree WSA. Visual issues in Demaree Canyon WSA. Wilderness Study Area (WSA within corridor. VRM Class I – Exclusion Area. VRM Class II – Avoidance Area. Shift in corridor was suggested to avoid these visually sensitive areas. Scenic Byway within corridor. BLM White River FO staff warned of landslide areas in Baxter Pass at the boundary of the BLM White River and Grand Junction FOs (March 18, 2009).	Northern portion of corridor follows RMP "designated" corridor.

Wyoming to IPP – Easternmost Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
W15	Rawlins FO	Parallels Muddy Creek. Approximately 14 Greater Sage-Grouse leks identified in within corridor. Parallels Scenic Byway	Follows utility corridor
W65	Rawlins FO	Crosses Little Snake River approximately 1 mile west of Dixon, Wyoming. Crosses cultivated fields in Little Snake River valley. Scenic Byway within corridor.	Parallels Carbon County Road 601.

Wyoming to IPP – Easternmost Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
C5	Little Snake FO	Generally follows a designated utility corridor. Crosses cultivated fields. Sage Grouse Production Habitat within corridor.	Parallels CO Rd 101
C10	Little Snake FO	Crosses Four Mile Creek riparian corridor. Several industrial parcels are located within corridor. Sage Grouse production.	Generally parallels existing roads.
C65	Little Snake FO	Landing strip within corridor (possibly associated with Mesa View Ranch House). Reservoir within corridor. Sage Grouse Production Habitat.	Short segments of corridor within discontinuous WWEC and RMP utility corridors. Parallels Hwy 789/Colorado Hwy 13.
C802	Little Snake FO	Not within utility corridor. Crosses Yampa River near Yampa River State Wildlife Area. Crosses oxbow lakes associated with historic meanders of Yampa River. The corridor crosses two parallel 345kV and 230-287kV transmission lines. Sage Grouse Production Habitat. Craig-Moffat Airport near corridor.	Southern portion of corridor parallels an existing 138 to 161kV transmission line.
C95	Little Snake FO, White River FO, Colorado River Valley FO	Corridor crosses a 345-kV transmission line near Rim Rock Campground. Crosses White River west of Meeker. Portion of corridor south of Meeker is generally parallel to existing transmission lines. Deer Gulch ACEC within corridor. Sage Grouse Production Habitat. Private airport near corridor. VRM Class II – Avoidance Area.	Corridor generally follows designated utility corridors. Generally parallels an existing 138 to 161kV transmission line. South of Meeker, the corridor parallels a 230-kV and a 138 to 161kV transmission line.

Wyoming to IPP – Easternmost Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
C155	Colorado River Valley FO	Not within utility corridor. Water treatment pond within corridor between I-70 and Hwy 6. Crosses Colorado River west of Rifle. Crosses cultivated fields and near residential area.	
C160	Colorado River Valley FO	Not within designated utility corridor.	Parallels an existing 345-kV transmission line.
C165	Colorado River Valley FO	Near a residential area.	Within a designated utility corridor. Parallels a pipeline. Parallels an existing 230-kV transmission line.
C175	Colorado River Valley FO	Crosses cultivated fields. Colorado River Valley FO RMP designates the lower Colorado River as sensitive for placement of utilities, for terrestrial habitat management.	Portions of corridor are located within a designated utility corridor. Parallels existing 230-kV and 345-kV transmission lines; however, required offset may force new transmission line into forested area.
C180	Grand Junction FO	With the exception of terrain, no obvious issues apparent from aerial photography.	Southern portion of corridor within WWEC utility corridor. Parallels existing 345-kV transmission line.
C190	Grand Junction FO	Western portion of corridor does not follow a designated corridor. Crosses Colorado River near Cameo power plant. Corridor follows edge of Little Bookcliffs WSA. Highline Lake State Recreation Area is located near corridor. Corridor crosses and parallels Dinosaur Diamond Prehistoric Byway. VRM Class II – Avoidance Area. Mt. Garfield, which is close to corridor, is a Class I visual resource in the GJFO RMP.	Eastern portion of corridor follows WWEC designated corridor. Portion of corridor parallels an existing 230-kV transmission line.
C195	Grand Junction FO	Corridor is in proximity to Rabbit Valley Paleo ACEC. Corridor is in proximity to National Historic Trail.	Follows an RMP designated utility corridor. Corridor avoids Colorado Canyons NCA.

Wyoming to IPP – Easternmost Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U60	Moab FO	Not located within a utility corridor. Parallels Interstate 70. Moab FO comments – concern regarding fugitive dust impacts on I-70 during construction. - High concentrations of kit fox, state species of concern near Cisco. - Impacts on visual setting. Occupied residence within corridor. Crosses and parallels Old Spanish Trail Parallels old railroad grade. Near Sego Canyon Rock Art Interpretive Site. Iron Wash Kiosk Site recreational trail is within corridor. Within 1 mile of Green River State Park. Crosses Green River. Consider collocating transmission line crossings. A natural area known as Crystal Geyser terraces is within the corridor. Historic structures including one-room school house in Thompson Springs, Utah are located within the corridor. Parallels Dinosaur Diamond Prehistoric Byway. A private airport (landing strip and portions of Green River Municipal Airport are within the corridor. Parallels Old Spanish Trail National Historic Trail. VRM Class II – Avoidance Area. Crosses military operating area south of I-70.	Parallels a pipeline route. Western portion of corridor parallels a 345-kV transmission line.

Wyoming to IPP – Easternmost Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U75	Price FO	Crosses large swath of state land. In proximity to San Rafael Canyon ACEC and Cottonwood Canyon ACEC. Big Hole ACEC which is designated for prehistoric rock art is located within the corridor. Black Dragon Petroglyph Recreation Site is located within corridor. Cedar Mountain Recreation Site, Cedar Mountain Overlook Recreation Site, and Sam's Hollow Recreation Site and Campground are within corridor. Parallels Old Spanish Trail National Historic Trail and a Scenic Byway.	With the exception of state land, follows an existing utility corridor. Parallels an existing 345-kV transmission line.

Wyoming to IPP – Utah Northern Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U80	Price FO	Parallels Old Spanish Trail National Historic Trail and a Scenic Byway.	Within an RMP-designated utility corridor. Parallels County Road 401
U90	Price FO & Richfield FO	Crosses irrigated agricultural land. Passes near Huntington Canyon coal plant. Crosses Manti – La Sal National Forest. A State WMA is within the corridor. Parallels Old Spanish Trail National Historic Trail and a Scenic Byway. Sage Grouse Production Habitat	Corridor generally follows RMP (Forest)-designated utility corridor and parallels two existing 345-kV transmission lines; however, required offset would push transmission line into areas of unbroken forest.
U115	Fillmore FO	Crosses two existing 345-kV transmission lines. With the exception of terrain and the transmission line crossings, no obvious issues apparent from review of aerial photography.	South end of Nephi, avoids agricultural fields.

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U120	Fillmore FO	Sage Grouse Production Habitat. Crosses two existing 345-kV transmission lines.	
U812	Fillmore FO	Corridorcrosses Little Sahara National Recreation Area (NRA). Original corridor appeared to cross extensive areas of sand dunes in the NRA. Shift in corridor suggested to avoid Little Sahara NRA and sand dunes. Sage Grouse Production Habitat. Crosses one existing 138 to 161-kV transmission line.	Follows WWEC utility corridor.
U140	Fillmore FO	Does not follow a designed utility corridor. Short segment with no obvious issues apparent from review of aerial photography.	
U150_S1	Fillmore FO	There are recent and pending lease sales on BLM land for oil, gas, and geothermal development in the area north and east of the IPP power plant.	Follows WWEC utility corridor. Passes to the north of the IPP power plant.

Wyoming to IPP – Utah Southern Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U85	Price FO	Not within a utility corridor and does not appear to follow any linear feature. Crosses San Rafael River at unusual angle, may encounter some terrain issues. Corridor crosses a Scenic Byway.	

Wyoming to IPP – Utah Southern Alternative (see Map 5)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U100	Price FO and Richfield FO	Dry Wash ACEC which is designated for prehistoric rock art is within the corridor. There are proposed ACECs in the Sevier Canyon, Kingston Canyon, and Painted Hills areas. Corridor parallels Old Spanish Trail National Historic Trail and a Scenic Byway. VRM Class II – Avoidance Area (Along Highway 50). Sage Grouse Production Habitat.	Corridor generally parallels an existing 345-kV transmission line through Fishlake National Forest. Approximately 25 miles of forest land crossed. Parallels designed Forest corridor for entire length; however required offset would likely force transmission line onto an area of steep slopes at eastern end of Forest.
U200	Richfield FO and Fillmore FO	Corridor crosses Millard County Zoning Exclusion Area. Corridor crosses I-15.	Corridor follows along eastern edge of RMP/Forest-designated utility corridor. Parallels an existing 230-kV transmission line.
U821	Fillmore FO	Crosses 3 existing transmission lines. Corridor crosses small portion of Millard County Exclusion Area, but avoids main areas of exclusion	Southern portion of corridor follows an RMP designated utility corridor.
U190_S1	Fillmore FO	Short segment with no obvious issues.	
U781A	Fillmore FO	Corridor crosses Millard County Exclusion Area Crosses small area of sand dunes north of Sevier River. Crosses Sevier River.	Corridor generally parallels an RMP designated utility corridor.
U784A	Fillmore FO	Not within a federal utility corridor. Corridor crosses Millard County Exclusion Area	Parallels US Highway 50. Parallels an existing 138 to 161-kV transmission line. Generally avoids center pivot irrigation.
U785A	Fillmore FO	Not within a federal utility corridor. Corridor crosses Millard County Exclusion Area	Avoids center pivot irrigation.

IPP to Las Vegas – Applicant Proposed Corridor (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U165	Millard County Fillmore FO	Corridor passes through the University of Utah Telescope Array scintillation detector field. Corridor is within military operating area (100 foot height restriction. USAF prefers collocating transmission lines within existing corridors).	Follows edge of Millard County utility corridor. Parallels an existing 500-kV transmission line.
U170	Millard County Fillmore FO	Corridor passes through the University of Utah Telescope Array scintillation detector field. Crosses at least one parcel of state land. Corridor is within military operating area (100 foot height restriction. USAF prefers collocating transmission lines within existing corridors).	Follows edge of Millard County utility corridor. Parallels an existing 500-kV transmission line.
U210	Millard County Fillmore FO	Northern portion of corridor passes through the University of Utah Telescope Array scintillation detector field.	Follows edge of Millard County utility corridor. Parallels an existing 500-kV transmission line.
U220	Northern portion in Millard County (Fillmore FO) Southern portion in Beaver County (Cedar City FO)		Parallels an existing 500-kV transmission line. Follows designated utility corridor.
U250	Beaver County (Cedar City FO)	Passes through hog farming area (should not pose a significant concern for routing).	Generally follows designated utility corridor. Parallels an existing 500-kV transmission line.
U255	Iron County (Cedar City FO) Washington County (St. George FO)	Crosses into roadless area in Dixie National Forest in several locations. Corridor crosses Beaver Dam Wash National Conservation Area (NCA) and Beaver Dam Slope ACEC (designated for desert tortoise habitat). Parallels Old Spanish Trail National Historic Trail.	Generally follows WWEC Use Type “All” utility corridor. Avoids center pivot agriculture near New Castle. Northern portion parallels an existing 500-kV transmission line and pipeline. In southern portion of Iron County and into Washington County, parallels a 345-kV and a 500-kV transmission line.

IPP to Las Vegas – Applicant Proposed Corridor (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N45	Ely FO	Corridor crosses Beaver Dam Slope ACEC which is designated for critical desert tortoise habitat. Per RMP, the ACEC is an avoidance area for transmission lines. No surface activity allowed between March 1 – Oct 1 to protect Desert Tortoise. (Table 17 RMP).	Follows designated utility corridor. Parallels a 345-kV and a 500-kV transmission line.
N50	Lincoln County (Ely FO) Clark County (Las Vegas FO)	Corridor crosses Mormon Mesa – Ely ACEC (Ely FO) and Mormon Mesa ACEC (LVFO). Both ACECs are designated for critical desert tortoise habitat. Crosses Old Spanish Trail National Historic Trail.	Mostly within designated WWEC corridor; however, departs from utility corridor near Moapa Valley.
N70	Las Vegas FO	Corridor crosses Muddy Mountains SRMA which is managed "to provide semi-primitive recreation opportunities and integrated management of wildlife habitat, cultural resources and other recreational uses." (RMP p.21). Most of this area is managed for **non-motorized**, semi-primitive recreational uses.	Within designated WWEC utility corridor.
N95	Las Vegas FO	Corridor crosses Old Spanish Trail National Historic Trail.	Follows designated utility corridor. Parallels 2 existing 500-kV transmission lines.

IPP to Las Vegas – Short Alternative Corridors – Millard County (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U150	Fillmore FO	There are recent and pending lease sales on BLM land for oil, gas, and geothermal development in the area north and east of the IPP power plant. Corridor enters military operating area (100 foot height restriction. USAF prefers collocating transmission lines within existing corridors).	Follows WWEC utility corridor.
U160	Fillmore FO	None identified.	Within WWEC utility corridor and RMP designated utility corridor. Short segment with no obvious issues.

IPP to Las Vegas – Short Alternative Corridors – Millard County (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U175	Fillmore FO	None identified.	Within RMP designated utility corridor
U180	Fillmore FO	Corridor passes through the University of Utah Telescope Array scintillation detector field.	Within WWEC utility corridor.
U215	Fillmore FO	Northern portion of corridor passes through the University of Utah Telescope Array scintillation detector field. Portion of corridor within military operating area (100 foot height restriction. USAF prefers collocating transmission lines within existing corridors).	Within WWEC utility corridor.

IPP to Las Vegas – Western Alternative Corridor (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U185	Fillmore FO	Most of corridor within military operating area (100 foot height restriction. USAF prefers collocating transmission lines within existing corridors).	Northern portion of corridor follows designated utility corridor.
N5	Ely FO	Crosses Humbolt-Toiyabe NF. Crosses scenic byway near Mt. Grafton Wilderness. Crosses 100-115kV transmission line north of Hwy 93. Crosses Robber Roost Hills which may present topography issues. Crosses the Dry Lake and Highland Wild Horse Management Areas (WHMAs). Parallels Highway 93, a Scenic Byway. VRM Class II – Avoidance Area. Sage Grouse Production Habitat.	Portion of corridor is within RMP designated utility corridor. Southern portion of corridor is within WWEC utility corridor.

IPP to Las Vegas – Western Alternative Corridor (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N40	Ely FO (Northern portion) Las Vegas FO (southern portion)	Crosses Coyote Springs ACEC and Kane Springs ACEC which are designated for critical desert tortoise habitat. Adjacent to Delamar Mountains Wilderness, Unit 5 – Hole-in-the-Rock WSA, Unit 3 – Sheep Range WSA, Fish and Wildlife #1 WSA, and Arrow Canyon Wilderness. Corridor runs along edge of Fish and Wildlife #2 WSA. Crosses the Delamar Mountains WHMA. A Scenic Byway is within the corridor. Corridor is within portion of Desert National Wildlife Range (NWR).	Within both a WWEC corridor and an RMP designated utility corridor. Parallel to existing ~100kV transmission line.
N55	Las Vegas FO	Corridor crosses Coyote Springs ACEC which is designated for critical desert tortoise habitat.	Within RMP designated utility corridor and designated WWEC utility corridor.
N85	Las Vegas FO	Corridor passes near Harry Allen Power Plant.	Generally within RMP designated utility corridor.
N810	Las Vegas FO	Crosses at least one transmission line. Apex and Silverhawk Power Plants are within corridor. Centerline is immediately adjacent to DOD managed lands. Corridor crosses Coyote Springs ACEC which is designated for critical desert tortoise habitat. Corridor is within portion of Desert National Wildlife Range (NWR).	Within designated WWEC utility corridor. Parallel to one transmission line. Corridor shift avoids Nellis AFB.

IPP to Las Vegas – Central Alternative Corridors (see Map 6)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
U260	Cedar City FO	A private airport is within the corridor. The Modena Elementary School NRHP site is within the corridor as are a number of structures in town of Modena. There are steep slopes in the area south of Modena, and this corridor would constitute new disturbance. Corridor enters military operating area (100 foot height restriction. USAF prefers collocating transmission lines within existing corridors).	Corridor is located within RMP-designated utility corridor.
N10	Ely FO	Short segment. No obvious issues	
N805	Ely FO	Corridor passes near Tunnel Spring Wilderness. VRM Class II – Avoidance Area. Suggested shift to avoid VRM Class II.	
N806	Ely FO	Crosses the Miller Flat and Little Mountain Wild Horse Management Areas (WHMA). A Scenic Byway is within the corridor. Original corridor was within VRM Class II – Avoidance Area. Suggested shift to avoid VRM Class II.	
N807	Ely FO	Crosses the Little Mountain, Highland, and Delamar Mountains WHMAs. Parallels scenic byway Hwy 93. Original corridor within VRM Class II – Avoidance Area. Suggested shift to avoid VRM Class II.	Within existing utility corridor.
N808	Ely FO	Crosses the Clover Mountain and Bluenose Peak WHMAs. Crosses Beaver Dam Slope ACEC. Parallels a Scenic Byway. Within VRM Class II – Avoidance Area. Suggested shift to avoid VRM Class II.	Within existing utility corridor near Clover Mountains Wilderness.

Las Vegas Area – Applicant Proposed Corridor (see Map 7)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N100	Las Vegas FO	Crosses Rainbow Gardens ACEC which is designated for geological, scientific, scenic, cultural, and sensitive plants. Parallels Old Spanish Trail National Historic Trail.	Within RMP designated utility corridor and designated WWEC utility corridor. Parallel to two 500-kV transmission lines.
N120	Las Vegas FO	Crosses DOD managed lands. Crosses Rainbow Gardens ACEC and Gypsum Spring ACEC. Rainbow Gardens ACEC designated for geological, scientific, scenic, cultural, and sensitive plants. Crosses Sunrise Mountain Instant Study Area (ISA). Crosses Old Spanish Trail Historic Trail twice.	Follows designated WWEC utility corridor. Parallel to two 500-kV transmission lines.
N121	Las Vegas FO	Crosses Rainbow Gardens ACEC. Parallels Old Spanish Trail National Historic Trail.	Follows designated WWEC utility corridor. Parallel to two 500-kV transmission lines.
N135	Las Vegas FO	Crosses River Mountains ACEC which is designated for bighorn sheep habitat, scenic viewshed for Henderson and Boulder City. Restrictions on permitted activities Mar 1-May 31 and July 1-Aug 31 for occupied bighorn sheep habitat.	Follows designated WWEC utility corridor. Parallel to two 500-kV and one 230-kV transmission lines.
N145	Las Vegas FO	Crosses River Mountains ACEC. Parallels Old Spanish Trail National Historic Trail.	Follows designated WWEC utility corridor. Parallel to two 500-kV and one 230-kV transmission line. (Note: required offset would likely push new transmission line into rugged terrain east of existing transmission lines and into portions of ACEC that are located within the designated corridor.)
N165	Las Vegas FO	Crosses portion of active mining operation. Crosses one existing transmission line. A private airport is located within and/or near the corridor.	Follows WWEC utility corridor or RMP designated corridor. Parallels two 500-kV and two 230-kV transmission lines. Federal corridor narrows and does not include all existing transmission lines.
N175	Las Vegas FO	Crosses 5 existing transmission lines.	

Las Vegas Area – Alternative Corridors – East Side (see Map 7)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N115	Las Vegas FO	Not within a designated utility corridor. Crosses Rainbow Gardens ACEC and Gypsum Spring ACEC. Rainbow Gardens ACEC designated for geological, scientific, scenic, cultural, and sensitive plants.	Avoids Sunrise Mountain Instant Study Area.
N116 (east-west option)	Las Vegas FO		Western portion of corridor within WWEC utility corridor. Follows southern edge of Rainbow Gardens ACEC. Avoids Lake Mead National Recreation Area (NRA).
N117	Las Vegas FO	Not within a designated utility corridor. Crosses Lake Mead National Recreation Area. Parallels Old Spanish Trail National Historic Trail andcrosses trail twice.	
N125	Las Vegas FO	Crosses Lake Mead National Recreation Area. Crosses 2 transmission lines. Crosses Lake Mead Marina parking lot and boat storage yard.	Parallel to one 230-kV transmission lines.
N130 (east-west option)	Las Vegas FO	Not within a designated utility corridor. Crosses Lake Mead National Recreation Area. Retention ponds and residential subdivision (Lake Las Vegas) are located within the corridor. Crosses a gravel pit/mine near marker 3. Crosses River Mountains ACEC. Parallels and crosses Old Spanish Trail National Historic Trail.	
N140 (east-west option)	Las Vegas FO	Crosses Lake Mead National Recreation Area. Crosses one 230-kV transmission line. Corridor crosses Old Spanish Trail National Historic Trail. Crosses River Mountains ACEC.	Parallel to two 230-kV transmission lines.

Las Vegas Area – Alternative Corridors – East Side (see Map 7)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N150	Las Vegas FO	Crosses Lake Mead National Recreation Area. Crosses multiple transmission lines and crosses some transmission lines twice. Crosses Historic Railroad Hiking Trail. Parallels Old Spanish Trail National Historic Trail.	Parallel to four 230-kV transmission lines.
N155	Las Vegas FO	Crosses Lake Mead National Recreation Area. One trailhead is within corridor. Crosses through Bootleg Canyon. Crosses Historic Railroad Hiking Trail. Crosses three transmission lines near marker 1. Boulder City Municipal Airport is located near the corridor. Parallels Old Spanish Trail National Historic Trail.	Parallel to two 230-kV transmission lines.
N160	Las Vegas FO	Crosses Old Spanish Trail National Historic Trail. Crosses two transmission lines. Gravel pit/mine is within corridor. Trailhead is within corridor.	
N170	Las Vegas FO	Corridor crosses existing industrial mining area near marker 2. Crosses roadless area. Crosses Old Spanish Trail National Historic Trail.	Parallelstwo 230-kV transmission lines.
N380A	Las Vegas FO	Crosses multiple transmission lines.	Parallels three 230-kV transmission lines.

Las Vegas Area – Alternative Corridors – West Side (see Map 7)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N105	Las Vegas FO	Crosses 4 transmission lines. Crosses Old Spanish Trail National Historic Trail. Nellis AFB is within corridor. Crosses DOD managed lands. Parallels Old Spanish Trail National Historic Trail.	Eastern portion of corridor is within RMP designated utility corridor and WWEC utility corridor. Western portion parallels one 500-kV, three 230-kV, and one 138 to 161-kV transmission line.
N110	Las Vegas FO	Crosses Nellis C WSA, Nellis B WSA, and Nellis A WSA. Crosses Unit 1 – Gass Peak WSA and Quail Spring WSA. Crosses portion of Red Rock Canyon National Conservation Area. Crosses tribal lands. Crosses portion of Nellis AFB. Crosses triangular shaped formations within Nellis AFB. Corridor is adjacent to subdivided lots in Las Vegas. Existing gravel pit is within corridor. Crosses existing transmission line just south of gravel pit. Crosses extensive industrialized mining area at marker 29. Six campgrounds are within or just outside corridor near marker 35 (11-mile Campground is within the corridor). Crosses Old Spanish Trail Historic Trail. Crosses additional 2 transmission lines. Corridor is near Sloan Canyon National Conservation Area (Tule Springs Conservation Transfer Area may also be within corridor). Parallelssegment of Old Spanish Trail National Historic Trail. Crosses VRM Zone Class II – Avoidance Area.	Northern portion parallels one 500-kV and one 230-kV transmission line. Northwestern portion parallels two 230-kV transmission lines. Southern portion of corridor is within designated WWEC utility corridor.
N510A	Clark County (Las Vegas FO)	Crosses four transmission lines.	Provides a southern alternative to N110. Generally within WWEC utility corridor and RMP designated utility corridor.

Las Vegas Area – Alternative Corridors – West Side (see Map 7)

Corridor/ Route ID	BLM Field Office	Corridor Constraints	Corridor Opportunities
N520A	Clark County (Las Vegas FO)	Near South McCullough Wilderness Area.	Provides a southern alternative to N110. Generally within WWEC utility corridor and RMP designated utility corridor. Parallel to two 500-kV and one 230-kV transmission lines.

Appendix C
Best Management Practices, Design Features, and State and BLM FO-specific Stipulations, and Forest Standards and Guidelines

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Introduction

This appendix includes the following five sections:

Section C.1: Westwide Energy Corridor Final Programmatic EIS Best Management Practices

The table included in Section C-1 outlines the best management practices (BMPs)obtained from the Record of Decision (ROD) for the Westwide Energy Corridor (WWEC) that would be applied to all portions of the proposed transmission line to reduce impacts to resources. These practices are organized by resource tables and include resource subtopics and the project phase (planning, construction, operation, and decommissioning phases) during which each BMP would be implemented. The BMPs address specific environmental impacts or localized conditions, and would be prescribed on a case-by-case basis. Typically, the applicability of selective BMPs to a given action is determined in the course of the environmental analysis and during the engineering and design phase of a Project.

Section C.2: Applicant-committed Design Features (DFs)

The table included in Section C-2 outlines the applicant-committed environmental protection measures or design features (DF) proposed by the Applicant, TWE, that are being taken into account to further reduce impacts to resources. These may be similar to or more restrictive than the BMPs or stipulations contained in the land use plans.TWE will continue to review BMPs in connection with the environmental and engineering studies for the proposed and alternative transmission line routes identified for the Project and prepare updated tables identifying generic and selective BMPs for the Project.

Section C.3: State and BLM Land Use Stipulations Applicable to Transmission Line ROWs

The tables in Section C-3 identify the following BLM or State use stipulations:

- No Surface Use (NSU) areas: These are where surface use would not be permitted, or areas where permanent structures are not allowed and include all identified ROW exclusion areas.
- Controlled Surface Use (CSU) areas: These stipulations include all identified ROW avoidance areas or other areas where surface is permitted but requires adherence to certain constraints (for example, use of certain construction methods, commitments for surveys, etc.).
- Timing Limitation (TL) areas: There stipulations identify areas where surface use is not allowed during time periods key to a specific resource. These stipulations may also include an avoidance buffer (for example, a restriction on surface use within a 0.25 miles from raptor nests during the nesting period).

The stipulations contained in this section were compiled from each BLM RMP through which the proposed transmission line passes. NSU, CSU, and TL stipulations are organized by management area (State or BLM FO).The 15 BLM FOs that the proposed transmission line corridor crosses are as follows:

- Wyoming: Rawlins and Rock Springs FOs.
- Colorado: Little Snake, Grand Junction, and White River FOs.
- Utah: Vernal, Moab, Price, Richfield, Salt Lake, Fillmore, Cedar City, and Saint George FOs.
- Nevada: Ely District/Caliente FO; Las Vegas FO.

In addition, **Figures C-1** through **C-4** identify NSU areas by Region. CSU stipulations are not mapped because surface use is not prohibited in these areas. It is important to note that each FO RMP contains other BMPs or Standard Design Practices to be applied to surface-disturbing activities. Due to the sheer

number of these BMPs, Appendix C does not include a full BLM list by FO; however, each of the FO subsections contained in Section C-3 identifies the RMP and applicable appendices where these can be located.

Section C.4: Applicable USFS Standards and Guidelines

The proposed transmission line crosses portions of five national forests within in Utah: Ashley, Manti-La Sal, Fishlake, Uinta, and Dixie. Within their forest plans (LMRPs), each national forest has developed management units to protect resources or specific opportunities and have provided specific direction, goals, standards, and guidelines for each of those areas.

The tables in Section C-4 identify all management units within the analysis area by national forest, and contain all applicable standards and guidelines for these areas, as provided by the USFS.

Section C.5: Additional Mitigation Measures Prescribed for the TWE Project

The TransWest Express EIS prescribes additional mitigation measures to minimize resource impacts. These mitigation measures go beyond the agency requirements listed in the previous sections and the applicable management plans.

Section C-5 contains a comprehensive listing of the mitigation measures prescribed in the resource sections of the EIS.

C.1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
Regulatory Compliance			
RC-1	1	P	The appropriate agency, assisted by the applicant, must conduct project-specific NEPA analyses in compliance with Section 102 of NEPA. The scope, content, and type of analysis shall be determined on a project-by-project basis by the Agencies and the applicants.
RC-2	2	P	The appropriate agency, assisted by the project applicant, must comply with Section 106 of the NHPA on a project by-project basis. Consultation with SHPOs, any federally recognized Tribes, and other appropriate parties as per regulations (36 CFR 800) must begin early in the planning process and continue throughout project development and execution. The ACHP retains the option to comment on all undertakings (36 CFR 800.9).
RC-3	3	P	The appropriate agency, assisted by the project applicant, must consult with the USFWS and the NMFS as required by Section 7 of ESA. The specific consultation requirements, as set forth in regulations at 50 CFR Part 402, would be applied on a project-by-project basis. Applicants shall identify known occupied sites, such as nest sites, for threatened and endangered species and special status species.
RC-4	4	P	The appropriate agency, assisted by the project applicant, must coordinate and consult with NMFS regarding potential impacts to essential fish habitat (EFH) as required by the 1996 reauthorization of the Magnuson-Stevens Fishery Conservation and Management Act.
Agency Coordination			
AC-1	1	P	Applicants seeking to develop energy transport projects within corridors located on or near DOD facilities or flight training areas (see Appendix L for applicable corridors) must, early in the planning process and in conjunction with the appropriate agency staff, inform and coordinate with the DOD regarding the characteristics and locations of the anticipated project infrastructure.
AC-2	2	P	Early in the planning process, applicants seeking ROW authorization within a Section 368 energy corridor that is located within five miles of a unit of the NPS should contact the appropriate Agency staff and work with the NPS regarding the characteristics and locations of anticipated project infrastructure. In those instances where corridors cross lands within the boundaries of a unit of the NPS, the National Park Service Organic Act and other relevant laws and policies shall apply.
AC-3	3	P	In those instances where projects using energy corridors are proposed to also cross National Wildlife Refuge System lands, the National Wildlife System Administration Act and other relevant laws and policies pertinent to national wildlife refuges shall apply.
AC-4	4	P	For electricity transmission projects, the applicant shall notify the Federal Aviation Administration (FAA) as early as practicable in the planning process in order to identify appropriate aircraft safety requirements.
AC-5	5	P	All project applications must consider applicable findings, mitigation, and/or standards contained in regional land management plans, such as the Northwest Forest Plan, when such regional plans have been incorporated into agency planning guidelines and requirements. Modification of some standards may be needed to reasonably allow for energy transport within a corridor.
Government-to-Government Coordination			
GG-1	1	P	The appropriate agency, assisted by the project applicant, must initiate government-to-government consultation with affected Tribes at the outset of project planning and shall continue consultation throughout all phases of the project, as necessary. Agencies should determine how to consult in a manner that reflects the cultural values, socioeconomic factors, and administrative structures of the interested Tribes.
GG-2	2	P	The agency POC may require the project proponent to prepare an ethnographic study when Tribal consultation indicates the need. The study shall be conducted by a qualified professional selected in consultation with the affected Tribe.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
General			
GEN-1	1	P	Applicants seeking to develop an electricity transmission or pipeline project will develop a project-specific plan of development (POD). The POD should display the location of the project infrastructure (i.e., towers, power lines) and identify areas of short- and long-term land and resource impacts and the mitigation measures for site-specific and resource-specific environmental impacts. The POD should also include notification of project termination and decommissioning to the agencies at a time period specified by the agencies.
GEN-2	2	P	Applicants, working with the appropriate agencies, shall design projects to comply with all appropriate and applicable Agency policies and guidance.
GEN-3	3	P	Project planning shall be based on the current state of knowledge. Where corridors are subject to sequential projects, project-related planning (such as the development of spill-response plans, cultural resource management plans, and visual resource management plans) and project-specific mitigation and monitoring should incorporate information and lessons learned from previous projects.
GEN-4	4	P	Applicants shall follow the best management practices for energy transport project siting, construction, and operations of the states in which the proposed project would be located, as well as federal agency practices.
GEN-5	5	P	Corridors are to be efficiently used. The applicant, assisted by the appropriate agency, shall consolidate the proposed infrastructure, such as access roads, wherever possible and utilize existing roads to the maximum extent feasible, minimizing the number, lengths, and widths of roads, construction support areas, and borrow areas.
GEN-6	6	P	When concurrent development projects are proposed and implemented within a corridor, the agency POCs shall coordinate among projects to ensure consistency with regard to all regulatory compliance and consultation requirements, and to avoid duplication of effort.
GEN-7	7	P	Applicants, assisted by the appropriate agency, shall prepare a monitoring plan for all project-specific mitigation activities.
GEN-8	8	P	Potential cumulative impacts to resources should be considered during the early stages of the project. Agency POCs must coordinate various development projects to consider and minimize cumulative impacts. A review of resource impacts resulting from other projects in the region should be conducted and any pertinent information be considered during project planning.
GEN-9	1	C	To avoid conflict with federal and nonfederal operations, the applicant shall be aware of liabilities pertaining to environmental hazards, safety standards, and military flying areas.
GEN-10	2	C	The applicant shall locate all stationary construction equipment (i.e., compressors and generators) as far as practicable from nearby residences.
GEN-11	3	C	Applicants will pay fair market value to the land management agency for any merchantable forest products that will be cut during ROW clearing. The local land management agency will determine the fair market value, which will be paid prior to clearing. The applicant will either remove the forest products from the area or will stack the material at locations determined by the local land management agency. Treatment of unmerchantable products will be determined by the local land management agency.
GEN-12	1	D	Where applicable, decommissioning activities will conform to agency standards and guidance for mitigation and reclamation (e.g., BLM's Gold Book).
GEN-13	2	D	Applicants shall locate desired projects within energy corridors to promote effective use of the corridors by subsequent applicants and to avoid the elimination of use or encumbrance of use of the corridors by ROW holders. Proposed projects should be compatible with identified energy transport modes and avoid conflicts with other land uses within a corridor.
GEN-14	3	D	Gravel work pads will be removed; gravel and other borrow material brought to the ROW during construction will be disposed of as approved by the agency.
GEN-15	4	D	Any wells constructed on the ROW to support operations will be removed and properly closed in accordance with applicable local or state regulations.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
GEN-16	5	D	All equipment, components, and aboveground structures must be cleaned and removed from the site for reclamation, salvage, or disposal; all below-ground components will be removed to a minimum depth of three feet to establish a root zone free of obstacles; pipeline segments and other components located at greater depths may be abandoned in place provided they are cleaned (of all residue) and filled with inert material to prevent possible future subsidence.
GEN-17	6	D	Dismantled and cleaned components will be promptly removed; interim storage of removed components or salvaged materials that is required before final disposition is completed will not occur on federal land.
GEN-18	7	D	At the close of decommissioning, applicants will provide the federal land manager with survey data precisely locating all below-grade components that were abandoned in place.
Project Design			
PD-1	1	P	Applicants shall locate desired projects within energy corridors to promote effective use of the corridors by subsequent applicants and to avoid the elimination of use or encumbrance of use of the corridors by ROW holders. Proposed projects should be compatible with identified energy transport modes and avoid conflicts with other land uses within a corridor.
PD-2	2	P	Applicant shall identify and delineate existing underground metallic pipelines in the vicinity of a proposed electricity transmission line project and design the project to avoid accelerating the corrosion of the pipelines and/or pumping wells.
Soils, Excavation, and Blasting			
SOIL-1	1	C	Applicants shall salvage, safeguard, and reapply topsoil from all excavations and construction activities during restoration.
VEG-1	2	C	All areas of disturbed soil shall be restored by the applicant using weed free native grasses, forbs, shrubs, and trees as directed by the agency. Restoration should not be unnecessarily delayed. If native species are not available, noninvasive vegetation recommended by agency specialists may be used.
SOIL-2	3	C	The applicant must not create excessive slopes during excavation. Areas of steep slopes, biological soil crusts, erodible soil, and stream channel crossings would often require site-specific and specialized construction techniques by the applicant. These specialized construction techniques should be implemented by adequately trained and experienced employees.
WAT-1	4	C	Blasting activities will be avoided or minimized in the vicinity of sole source aquifer areas to reduce the risk of releasing sediments or particles into the groundwater and inadvertently plugging water supply wells.
SOIL-3	5	C	The applicant must backfill foundations and trenches with originally excavated material as much as possible. Excess excavation materials should be disposed of by the applicant only in approved areas.
SOIL-4	6	C	The applicant shall obtain borrow (fill) material only from authorized sites. Existing sites should be used in preference to new sites.
PHS-1	7	C	The applicant shall prepare an explosives use plan that specifies the times and meteorological conditions when explosives will be used and specifies minimum distances from sensitive vegetation and wildlife or streams and lakes.
PHS-2	8	C	If blasting or other noisy activities are required during the construction period, the applicant must notify nearby residents in advance.
Mitigation and Monitoring			
MIT-1	1	C	All control and mitigation measures established for the project in the POD and other required plans must be maintained and implemented by the applicant throughout construction. Necessary adjustments may be made with the concurrence of the appropriate agency.
MIT-2	1	O	All control and mitigation measures established for the project shall be maintained and implemented by the applicant throughout the operation of the project. Necessary adjustments may be made with the concurrence of the appropriate agency.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
MIT-3	1	D	All control and mitigation measures established for the project in the POD and other required plans will be incorporated into a decommissioning plan that will be approved by the federal land manager(s); the decommissioning plan will include a site reclamation plan and a monitoring program and will be coordinated with owners and operators of other systems on the corridor to ensure no disruption to the operation of those systems.
Transportation			
TRAN-1	1	P	The applicant shall prepare an access road siting and management plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. Corridors will be closed to public access unless determined by the appropriate federal land manager to be managed as part of an existing travel and transportation network in a land use plan or subsequent travel management plan(s).
TRAN-2	2	P	The applicant shall prepare a comprehensive transportation plan for the transport of transmission tower or pipeline components, main assembly cranes, and other large equipment. The plan should address specific sizes, weights, origin, destination, and unique equipment handling requirements. The plan should evaluate alternative transportation routes and should comply with state regulations and all necessary permitting requirements. The plan should address site access roads and eliminate hazards from truck traffic or adverse impacts to normal traffic flow. The plan should include measures such as informational signage and traffic controls that may be necessary during construction or maintenance of facilities.
TRAN-3	3	P	Applicants shall consult with local planning authorities regarding increased traffic during the construction phase, including an assessment of the number of vehicles per day, their size, and type. Specific issues of concern (e.g., location of school bus routes and stops) should be identified and addressed in the traffic management plan.
TRAN-4	1	D	Additional access roads needed for decommissioning will follow the paths of access roads established during construction to the greatest extent possible; all access roads not required for the continued operation and maintenance of other energy systems present in the corridor shall be removed and their footprints reclaimed and restored.
Groundwater			
WAT-2	1	P	Applicants must identify and delineate all sole source aquifers in the vicinity of a proposed project and design the project to avoid disturbing these aquifers or to minimize potential risks that the aquifers could be contaminated by spills or leaks of chemicals used in the projects.
WAT-3	2	P	In instances where a project within an energy corridor crosses sole source aquifers, the applicant must notify the U.S. Environmental Protection Agency (EPA) and the agencies that administer the land as early as practicable in the planning process. Section 1424(e) of the Safe Drinking Water Act and other relevant laws and policies pertinent to the corridors that cross sole source aquifers shall apply.
Surface Water			
WAT-4	1	P	Applicants must identify all wild and scenic rivers (designated by act of Congress or by the Secretary of the Interior under Section 3(a) or 2(a)(ii) of the Wild and Scenic Rivers Act, respectively), congressionally authorized wild and scenic study rivers, and agency identified (eligible or suitable) wild and scenic study rivers in the vicinity of a proposed project and design the project to avoid the rivers or minimize the disturbance of the rivers and their vicinity.
WAT-5	2	P	In instances where a project within an energy corridor crosses a wild and scenic river or a wild and scenic study river, the appropriate federal permitting agency, assisted by the project applicant, must coordinate and consult with the river-administrating agency regarding the protection and enhancement of their free-flowing condition, water quality, and outstandingly remarkable natural, cultural, and recreational values.
WAT-6	3	P	Applicants shall identify all streams in the vicinity of proposed project sites that are listed as impaired under Section 303(d) of the Clean Water Act and provide a management plan to avoid, reduce, and/or minimize adverse impacts on those streams.
WAT-7	1	D	A SWPPP permit will be obtained and its provisions implemented for all affected areas before any ground disturbance activities commence.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
Surface and Groundwater Resources			
WAT-8	1	C	The applicant must safeguard the possibility of dewatering shallow groundwater and/or wetland in the vicinity of project sites during foundation excavations or excavations for buried pipelines.
WAT-9	2	C	The applicant must implement erosion controls complying with county, state, and federal standards, such as jute netting, silt fences, and check dams, and secure all necessary storm water pollution prevention plan (SWPPP) permits.
WAT-10	3	C	The applicant shall minimize stream crossings by access roads to the extent practicable. All structures crossing intermittent and perennial streams should be located and constructed so that they do not decrease channel stability, increase water velocity, or impede fish passage.
WAT-11	4	C	Applicants shall not alter existing drainage systems and should give particular care to sensitive areas such as erodible soils or steep slopes. Soil erosion should be reduced at culvert outlets by appropriate structures. Catch basins, roadway ditches, and culverts should be cleaned and maintained.
WAT-12	5	C	Applicants must not create hydrologic conduits between aquifers.
Paleontological Resources			
PAL-1	1	P	The applicant shall conduct an initial scoping assessment to determine whether construction activities would disturb formations that may contain important paleontological resources. Potential impacts to important paleontological resources should be avoided by moving or rerouting the site of construction or removing or reducing the need for surface disturbance. When avoidance is not possible, a mitigation plan should be prepared to identify physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries. The scoping assessment and mitigation plan should be conducted in accordance with the managing agency's fossil management practices and policies.
PAL-2	2	P	If paleontological resources are known to be present in the project area, or if areas with a high potential to contain paleontological material have been identified, the applicant shall prepare a paleontological resources management and mitigation plan. If adverse impacts to paleontological resources cannot be avoided or mitigated within the designated corridors, the agency may consider alternative development routes to avoid, minimize, or mitigate adverse effects.
PAL-3	3	P	A protocol for unexpected paleontological discoveries should be developed. Unexpected discovery during construction should be brought to the immediate attention of the responsible federal agency's authorized officer. Work should be halted in the vicinity of the discovery to avoid further disturbance of the resource while the resource is being evaluated and appropriate mitigation measures are being developed.
PAL-4	1	C	Project construction activities will follow the protective measures and protocols identified in the paleontological resources mitigation plan.
PAL-5	2	C	All paleontological specimens found on federal lands remain the property of the U.S. government. Specimens, therefore, may only be collected by a qualified paleontologist under a permit issued by the managing agency and must be curated in an approved repository.
Ecological Resources			
ECO-1	1	P	Applicants shall identify important, sensitive, or unique habitats and BLM sensitive, FS sensitive, and state-listed species in the vicinity of proposed projects and, to the extent feasible, design the project to avoid, minimize, or mitigate impacts to these habitats and species.
ECO-2	2	P	To restore disturbed habitats, the applicant will prepare a habitat restoration plan that identifies the approach and methods to be used to restore habitats disturbed during project construction activities. The plan will be designed to expedite the recovery to natural habitats supporting native vegetation, and require restoration to be completed as soon as practicable after completion of construction, minimizing the habitat converted at any one time. To ensure rapid and successful restoration efforts, the plan will include restoration success criteria, including time frames, which will be developed in coordination with the appropriate agency and which must be met by the applicant. Bonding to cover the full cost of restoration will be required.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
ECO-3	3	P	In consultation with the U.S. Army Corps of Engineers, the appropriate agency, assisted by the project applicant, will identify wetlands (including ephemeral, intermittent, and isolated wetlands), riparian habitats, streams, and other aquatic habitats in the project area and, to the extent feasible, design the project to avoid, minimize, or mitigate impacts to these habitats.
ECO-4	1	C	Areas that are known to support ESA-listed species, BLM-sensitive, FS-sensitive, and state-listed species or their habitats must be identified and marked with flagging or other appropriate means to avoid direct impacts during construction activities. Construction activities upslope of these areas should be avoided to prevent indirect impacts of surface water and sediment runoff.
ECO-5	2	C	All construction activities that could affect wetlands or waters of the United States must be conducted in accordance with permit requirements identified in permits issued by the U.S. Army Corps of Engineers.
ECO-6	1	O	Applicants shall review existing information regarding plant and animal species and their habitats in the vicinity of the project area and identify potential impacts to the applicable agencies.
ECO-7	2	O	Project staff shall avoid harassment or disturbance of wildlife, especially during reproductive courtship, migratory, and nesting seasons.
ECO-8	3	O	Observations by project staff of potential wildlife problems, including wildlife mortality, will be immediately reported to the applicable agency authorized officer.
Vegetation Management			
VEG-2	1	P	Applicants shall develop an integrated vegetation management plan consistent with applicable regulations and agency policies for the control of unwanted vegetation, noxious weeds, and invasive species (E.O. 13112). The plan should address monitoring; ROW vegetation management; the use of certified weedseed-free hay, straw, and/or mulch mulching; the cleaning of vehicles to avoid the introduction of invasive weeds; education of personnel on weed identification; the manner in which weeds spread; and the methods for treating infestations (BLM 2006a, 2007b,c, 2008c).
Pesticide and Herbicide Use			
VEG-3	1	O	If pesticides are used, the applicant shall ensure that pesticide applications as specified in the integrated vegetation management plan are conducted within the framework of agency policies and entail only the use of EPA registered pesticides that are applied in a manner consistent with label directions and state pesticide regulations. Pesticide use should be limited to non persistent immobile pesticides and may be applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications (BLM 2007b).
VEG-4	2	O	Pesticide and herbicide uses must be avoided in the vicinity of sole source aquifer areas (BLM 2007b).
Cultural Resources			
CULT-1	1	P	Cultural resources management services and individuals providing those services shall meet the Secretary of the Interior's Standards for Archaeology and Historic Preservation.
CULT-2	2	P	The project applicant may, with the approval of the agency POC, assign a Cultural Resource Coordinator to ensure an integrated compliance process across administrated and jurisdictional boundaries. The Cultural Resource Coordinator will facilitate and coordinate compliance with multiple laws, policies, regulations, and existing pertinent agreements (PAs, MOAs, or MOUs) among multiple agencies and other entities, jurisdictions, and federally recognized Tribes. The coordinator may assist with development of pertinent agreements among concerned parties during the course of the project. The coordinator shall be a qualified professional with experience in cultural resource compliance. Where appropriate, the Cultural Resource Coordinator may also serve as the Tribal Coordinator. Alternatively, the agency POC may assign such coordinators, to be paid for through project cost-recovery funds. The agencies, through the POC, remain responsible for consultation.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
CULT-3	3	P	The project applicant may, with the approval of the agency POC, assign a Tribal Coordinator to facilitate and coordinate consultation and compliance with multiple laws, agencies, and Tribes in order to ensure effective government-to- government consultation throughout the life of the project. Alternatively, the agency POC may assign such coordinators, to be paid for through project cost-recovery funds. The agencies, through the POC, remain responsible for consultation.
CULT-4	4	P	All historic properties in the Area of Potential Effect (APE) will be identified and evaluated. The APE shall include that area within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties and shall include a reasonable construction buffer zone and laydown areas, access roads, and borrow areas, as well as a reasonable assessment of areas subject to effects from visual, auditory, or atmospheric impacts, or impacts from increased access.
CULT-5	5	P	Project proponents must develop a cultural resources management plan (CRMP) to outline the process for compliance with applicable cultural resource laws during pre-project planning, management of resources during operation, and consideration of the effect of decommissioning. CRMPs should meet the specifications of the appropriate agency and address compliance with all appropriate laws. CRMPs should include the following, as appropriate: identification of the federally recognized Tribes, State Historic Preservation Offices (SHPOs), and consulting parties for the project; identification of long- and short-term management goals for cultural resources within the APE of the project; the definition of the APE; appropriate procedures for inventory, evaluation, and identification of effects to historic properties; evaluation of eligibility for the NRHP for all resources in the APE; description of the measures to avoid, minimize, or mitigate adverse effects to historic properties; procedures for inadvertent discovery; procedures for considering Native American Graves Protection and Repatriation Act (NAGPRA) issues, monitoring needs, and plans to be employed during construction; curation procedures; anticipated personnel requirements and qualifications; public outreach and interpretation plans; and discussion of other concerns. The draft CRMP should be reviewed and approved by the agency POC in consultation with historic preservation partners, including appropriate SHPOs, Tribes, and consulting parties. CRMPs must specify procedures that would be followed for compliance with cultural resource laws, should the project change during the course of implementation.
CULT-6	6	P	Project applicants will provide cultural resources training for project personnel regarding the laws protecting cultural resources, appropriate conduct in the field (such as procedures for the inadvertent discovery of human remains), and other project-specific issues identified in the CRMP. Training plans should be part of the CRMP and should be subject to the approval of the POC. When government-to-government consultation identifies the need and the possibility, Tribes may be invited to participate in or contribute to relevant sessions.
CULT-7	7	P	If adverse effects to historic properties will result from a project, a Historic Property Treatment Plan will be developed in consultation with the SHPO, the appropriate federally recognized Tribes, and any consulting parties. The plan will outline how the impacts to the historic properties would be mitigated, minimized, or avoided. Agency officials will give full consideration to the applicable mitigation measures found in Section 3.10.5.2 of the Final PEIS when consulting during the project preplanning stages to resolve adverse effects on historic properties.
CULT-8	8	P	As directed by the agency POC, project proponents will prepare a public education and outreach component regarding cultural resources such as a public presentation, a news article, a publication, or a display. Public education and outreach components will be subject to Agency approval and Tribal review and consultation when the content or format is of interest to affected Tribes.
CULT-9	9	P	Cultural resources inventory, evaluation, and mitigation practices should incorporate modeling and sampling strategies to the extent practicable, in concurrence with SHPOs and other relevant parties, and as approved by the agency POC.
CULT-10	10	P	Project applicants shall provide all cultural resources reports and data in an electronic format that is approved by the Agency POC and integrated across jurisdictional boundaries, that meets current standards, and that is compatible with SHPO systems. The Agency will submit this data to the SHPO in a timely fashion. Project proponents should submit cultural resources data on a regular basis to ensure that SHPO systems are kept up to date for reference as the different phases of the project proceed. Paper records may also be required by the agency.
CULT-11	11	P	Cultural resources inventory procedures, specified in the CRMP, will include development of historic contexts based on the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716) sufficient to support the evaluation of cultural resources encountered in the APE.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
CULT-12	1	C	Project applicants shall provide all cultural resources reports and data in an approved electronic format that is integrated across jurisdictional boundaries, that meets current standards, and that is compatible with SHPO systems. Project proponents shall submit cultural resources data on a regular basis to ensure that SHPO systems are kept up to date for reference as the different phases of the project proceed.
CULT-13	2	C	When an area is identified as having a high potential for cultural resources but none are found during a pre-construction field survey, a professionally qualified cultural resources specialist will be required to monitor ground-disturbing activities during project construction, and to complete a report when the activities are finished. The protocol for monitoring should be identified in the CRMP.
CULT-14	3	C	When human remains, funerary objects, sacred objects, or objects of cultural patrimony are inadvertently discovered, the provisions of NAGPRA shall apply and the process identified in the CRMP must be followed.
Tribal Traditional Cultural Resources			
CULT-15	1	P	The appropriate agency, assisted by the applicant, must comply with all laws, policies, and regulations pertaining to government-to-government consultation with federally recognized Tribes. Agencies shall initiate consultation with affected Tribes at the outset of project planning and shall continue consultation throughout project planning, construction, operation, and decommissioning. Consultation shall include, but not be limited to, the following: (a) identification of potentially affected Tribes; (b) identification of appropriate Tribal contacts and the preferred means of communication with these Tribes; (c) provision to the Tribes of project specific information (e.g., project proponents, maps, design features, proposed ROW routes, construction methods, etc.) at the outset of project planning and throughout the life of the project; (d) identification of issues of concern specific to affected Tribes (e.g., potential impacts to culturally sensitive areas or resources, hazard and safety management plans, treaty reserved rights and trust responsibilities); (e) identification of areas and resources of concern to Tribes; and (e) resolution of concerns (e.g., actions to avoid, minimize, or mitigate impacts to important resources; Memoranda of Agreement stating what actions would be taken to mitigated project effects; or agreements for Tribal participation in monitoring efforts or operator training programs).
CULT-16	2	P	The appropriate agency, assisted by the applicant, must comply with all pertinent laws, policies, and regulations addressing cultural and other resources important to Tribes, including the NHPA, ARPA, NAGPRA, and other laws and regulations as listed in Table 3.11-2 of this EIS.
CULT-17	3	P	The agencies shall recognize the significance to many Tribes of traditional cultural places, such as sacred sites, sacred landscapes, gathering grounds, and burial areas, and shall seek to identify such areas through consultation with affected Tribes early in the project planning process. Agencies shall seek to avoid, minimize, or mitigate impacts to such places in consultation with the Tribes, project proponents, and other relevant parties. Where confidentiality concerning these areas is important to an affected Tribe, agencies shall honor such confidentiality unless the Tribe agrees to release the information.
CULT-18	4	P	A protocol must be developed for inadvertent discovery of Native American human remains and funerary items to comply with the NAGPRA in consultation with appropriate federally recognized Tribes. Unexpected discovery of such items during construction must be brought to the immediate attention of the responsible federal agency's authorized officer. Work must be halted in the vicinity of the find of Native American graves and funerary items to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation measures are being developed. The procedures for reporting items covered under NAGPRA must be identified in the CRMP.
Visual Resources			
VIS-1	1	P	Applicants shall identify and consider visual resource management (VRM) and scenery management (SMS) issues early in the design process to facilitate integration of VRM and scenery treatments into the overall site development program and construction documents. Visual/scenery management considerations, environmental analyses, mitigation planning, and design shall reference and be in accordance with the land management agency visual/scenery management policies and procedures applicable to the jurisdiction the project lies within. Applicants shall coordinate between multiple agencies on visual/scenery sensitive issues when projects transition from one jurisdiction to another, especially when transitions occur within a shared viewshed.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
VIS-2	2	P	Applicants shall prepare a VRM or scenery management plan. The applicant's planning team shall include an appropriately trained specialist, such as a landscape architect with demonstrated VRM and/or SMS experience. The VRM/SMS specialist shall coordinate with the BLM/FS on the availability of the appropriate visual or scenic inventory data, VRM management class delineations, Scenic Integrity Objectives (SIOs), and federal agency expectations for preparing project plans and mitigation strategies to comply with RMP or LRMP direction related to scenery and/or visual resources. Applicants shall confirm that a current Visual Resource Inventory and/or Scenic Class inventory is available and that the resource management plan (RMP) or land resource and management plan (LRMP) VRM classifications or SIOs have been designated in the current land management plan. Project plans shall abide by the VRM class designations and SIOs and consider sensitivities defined within the visual or scenic resource Inventory. If visual or scenic management objectives are absent, then the proper inventory and classification process shall be followed to develop them in accordance with the BLM VRM manual and handbooks or FS SMS process, depending on the agency. When the VRM management classes or SIOs are absent, then the project alternatives must reflect a range of management options related to scenery and visual resources that reflect the values identified in the visual/scenic inventory. Responsibility for developing an inventory or VRM management classes (or in the case of the FS, Scenic Classes and SIOs) will remain with the respective agency, but how to accomplish these tasks will be determined by the Field Office Manager or Forest Supervisor, who will consider the applicant's role and financial participation in completing the work.
VIS-3	3	P	Visual and scenic mitigation planning/design and analysis shall be performed through integrated field assessment, applied global positioning system (GPS) technology, field photo documentation, use of computer-aided design and development software, 3-D modeling GIS software, and visual simulation software, as appropriate. Proposed activities, projects, and site development plans shall be analyzed and further developed using these technologies to meet visual and scenic objectives for the project area and surrounding areas sufficient to provide the full context of the viewshed. Visual simulations shall be prepared according to BLM Handbook H-8432-1, or other agency requirements, to create spatially accurate depictions of the appearance of proposed facilities, as reflected in the 3-D design models. Simulations shall depict proposed project appearance from sensitive/scenic locations as well as more typical viewing locations. Transmission towers, roads, compressor stations, valves, and other aboveground infrastructure should be integrated esthetically with the surrounding landscape in order to minimize contrast with the natural environment.
VIS-4	4	P	Applicants shall develop adequate terrain mapping on a landscape/viewshed scale for site planning/design, visual impact analysis, visual impact mitigation planning/design, and for full assessment and mitigation of cumulative visual impacts through applied, state-of the-art design practices using the cited software systems. The landscape/ viewshed scale mapping shall be geo-referenced and at the same Digital Elevation Model (DEM) resolution and contour interval within the margin of error suitable for engineered site design. This level of mapping shall enable proper placement of proposed developments into the digital viewshed context. Final plans shall be field verified for compliance.
VIS-5	5	P	The full range of visual and scenic best management practices shall be considered, and plans shall incorporate all pertinent best management practices (BMPs). Visual and scenic resource monitoring and compliance strategies shall be included as a part of the project mitigation plans.
VIS-6	6	P	Compliance with VRM/SMS objectives shall be determined through the use of the BLM Contrast Rating procedures defined in BLM Handbook H-8431-1 Visual Contrast Rating, or the FS SMS Handbook 701. Mitigation of visual impacts shall abide by the requirements of these handbooks.
VIS-7	1	C	A pre-construction meeting with BLM/FS landscape architects or other designated visual/scenic resource specialist shall be held before construction begins to coordinate on the VRM/SMS mitigation strategy and confirm the compliance-checking schedule and procedures. Applicants shall integrate interim/final reclamation VRM/SMS mitigation elements early in the construction, which may include treatments such as thinning and feathering vegetation along project edges, enhanced contour grading, salvaging landscape materials from within construction areas, special revegetation requirements, etc. Applicants shall coordinate with BLM/FS in advance to have BLM/FS landscape architects or other designated visual/scenic resource specialists onsite during construction to work with implementing BMPs.
VIS-8	1	O	Terms and conditions for VRM/SMS mitigation compliance shall be maintained and monitored for compliance with visual objectives, with adaptive management adjustments and modifications as necessary and approved by the BLM/FS landscape architect or other designated visual/scenic resource specialist.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
Public Health and Safety			
PHS-3	1	P	An electricity transmission project shall be planned by the applicant to comply with FAA regulations, including lighting regulations, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.
PHS-4	2	P	A health and safety program shall be developed by the applicant to protect both workers and the general public during construction, operation, and decommissioning of an energy transport project. The program should identify all applicable federal and state occupational safety standards, establish safe work practices for each task (e.g., requirements for personal protective equipment and safety harnesses, Occupational Safety and Health Administration [OSHA] standard practices for safe use of explosives and blasting agents, measures for reducing occupational electromagnetic field [EMF] exposures), and define safety performance standards (e.g., electrical system standards). The program should include a training program to identify hazard training requirements for workers for each task and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies should be established.
PHS-5	3	P	The health and safety program shall establish a safety zone or setback from roads and other public access areas that is sufficient to prevent accidents resulting from various hazards. It should identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or decommissioning activities. It should also identify measures to be taken during the operations phase to limit public access to those components of energy facilities that present health or safety risks.
PHS-6	4	P	Applicants will develop a comprehensive emergency plan that considers the vulnerabilities of their energy system to all credible events initiated by natural causes (earthquakes, avalanches, floods, high winds, violent storms, etc.), human error, mechanical failure, cyber attack, sabotage, or deliberate destructive acts of both domestic and international origin and the potential for and possible consequences of those events. Vulnerability, threat, and consequence assessment methodologies and criteria in the sector-specific plan (SSP) for energy will be used and appropriate preemptive and mitigative response actions will be identified. The applicant must coordinate emergency planning with state, local, and Tribal emergency and public safety authorities and with owners and operators of other energy systems collocated in the corridor or in adjacent corridors that could also be impacted.
PHS-7	5	P	In addition to directives contained in other IOPs in this chapter, the applicant must identify all federal, state, and local regulations pertaining to environmental protection, worker health and safety, public safety, and system reliability that are applicable throughout the construction, operation, and decommissioning phases of their facility's life cycle and must develop appropriate compliance strategies, including securing all necessary permits and approvals.
Hazardous Materials Management			
PHS-8	1	P	Applicants for petroleum pipelines and projects involving oil-filled electrical devices shall develop a spill prevention and response plan identifying spill prevention measures to be implemented, training requirements, appropriate spill response actions, and procedures for making timely notifications to authorities. The spill prevention and response plan should include identification of any sensitive biotic resources and locations (such as habitats) that require special measures to provide protection, as well as the measures needed to provide that protection.
Hazardous Materials and Wastewater Management			
PHS-9	1	C	Any wastewater generated by the applicant in association with temporary, portable sanitary facilities must be periodically removed on a schedule approved by the agency, by a licensed hauler and introduced into an existing municipal sewage treatment facility. Temporary, portable sanitary facilities provided for construction crews should be adequate to support expected on-site personnel and should be removed at completion of construction activities.
PHS-10	2	C	All hazardous materials (including vehicle and equipment fuels) brought to the project site will be in appropriate containers and will be stored in designated and properly designed storage areas with appropriate secondary containment features. Excess hazardous materials will be removed from the project site after completion of the activities in which they are used.
PHS-11	1	O	The applicant shall provide secondary containment for all on-site hazardous materials and waste storage areas.
PHS-12	2	O	The applicant shall ensure that wastes are properly containerized and removed periodically for disposal at appropriate off-site permitted disposal facilities.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
PHS-13	3	O	In the event of an accidental release to the environment, the applicant must initiate spill cleanup procedures and document the event, including a cause analysis; appropriate corrective actions taken; and a characterization of the resulting environmental or health and safety impacts. Documentation of the event should be provided to the land management agency's authorized officer and other federal and state agencies, as required.
Hazardous Materials and Waste Management			
PHS-14	1	D	All fuels, hazardous materials, and other chemicals will be removed from the site and properly disposed of or reused.
PHS-15	2	D	Incidental spills of petroleum products and other chemicals will be removed and the affected area cleaned to meet applicable standards.
PHS-16	3	D	Solid wastes generated during decommissioning will be accumulated, transported, and disposed in permitted off-site facilities in accordance with state and local requirements; no solid wastes will be disposed of within the footprint of the ROW or the corridor.
PHS-17	4	D	Hazardous wastes generated as a result of component cleaning will be containerized and disposed of in permitted facilities.
Fire Management			
FIRE-1	1	P	Applicants shall develop a fire management strategy to implement measures to minimize the potential for a human-caused fire during project construction, operation, and decommissioning. The strategy should consider the need to reduce hazardous fuels (e.g., native and non-native annual grasses and shrubs) and to prevent the spread of fires started outside or inside a corridor, and clarify who has responsibility for fire suppression and hazardous fuels reduction for the corridor.
FIRE-2	2	P	Applicants must work with the local land management agency to identify project areas that may incur heavy fuel buildups, and develop a long-term strategy on vegetation management of these areas. The strategy may include land treatment during project construction, which may extend outside the planned ROW clearing limits.
Fire Safety			
FIRE-3	1	C	The applicant must ensure that all construction equipment used is adequately muffled and maintained and that spark arrestors are used with construction equipment in areas with, and during periods of, high fire danger.
FIRE-4	2	C	Flammable materials (including fuels) will be stored in appropriate containers.
Air Emissions			
AIR-1	1	C	The applicant shall cover construction materials and stockpiled soils if these are sources of fugitive dust.
AIR-2	2	C	To minimize fugitive dust generation, the applicant shall water land before and during surface clearing or excavation activities. Areas where blasting would occur should be covered with mats.
Air Quality			
AIR-3	1	O	Dust abatement techniques (e.g., water spraying) shall be used by the applicant on unpaved, unvegetated surfaces to minimize airborne dust. Water for dust abatement should be obtained and used by the applicant under the appropriate state water use permitting system. Used oil will not be used for dust abatement.
Noise			
NOISE-1	1	C	The applicant shall limit noisy construction activities (including blasting) to the least noise-sensitive times of day (i.e., daytime only between 7 a.m. and 10 p.m.) and weekdays.
NOISE-2	1	O	The applicant shall ensure that all equipment has sound-control devices no less effective than those provided on the original equipment.

Table C.1-1 Westwide Energy Corridor Final Programmatic EIS Best Management Practices

PDEIS BMP No.	WWEC IOP No.	Phase(s)[1]	WWEC IOP Description
Restoration			
REST-1	1	D	Topsoil removed during decommissioning activities shall be salvaged and reapplied during final reclamation; all areas of disturbed soil shall be reclaimed using weed-free native shrubs, grasses, and forbs or other plant species approved by the land management agency; grades will be returned to pre-development contours to the greatest extent feasible.
REST-2	2	D	The vegetation cover, composition, and diversity shall be restored to values commensurate with the ecological setting, as approved by the authorizing officer.

[1] Phase definitions: P-Planning, C-Construction, O-Operation, D-Decommission

Note: This tabulation does not contain the resource-specific potential mitigation measures that are recommended in the WWEC Preliminary Final EIS.

Source: USDOE et al. 2008.

C.2 Applicant Committed Design Features to be Applied to the TWE Transmission Line

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
General Design Features			
TWE-1	P	General, compliance with agency stipulations and RODs	The TWE Project will be planned, constructed, operated, and decommissioned in accordance with the agencies' Records of Decision (RODs), the BLM's ROW Grant stipulations, USFS Special Use Permit stipulations, and requirements of other permitting agencies.
TWE-2	P	General, compliance with laws and regulations	The Applicant will comply with all applicable environmental laws and regulations. Applicable laws and regulations may include, but are not limited to, the Clean Water Act (CWA) Section 303(d) and Section 404; the Wild and Scenic Rivers Act, Section 3(a) or 2(a) ii; the Endangered Species Act (ESA), Section 7; the National Historic Preservation Act (NHPA), Section 106; and the Native American Graves Protection and Repatriation Act (NAGPRA). Compliance with all applicable laws and regulations will be documented in the Final Plan of Development (POD)/Construction, Operation, and Maintenance (COM) Plan.
TWE-3	P	General, mitigation monitoring plan	The COM Plan will include a mitigation monitoring plan that will address how each mitigation measure required by permitting agencies in their respective decision documents and permits will be monitored for compliance.
TWE-4	P	General, environmental training	Prior to construction, all personnel will be instructed on the protection of cultural, paleontological, ecological resources, and other natural resources in accordance with the COM Plan provisions. To assist in this effort, the construction contract would address (a) federal, state, and tribal laws regarding cultural resources, fossils, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
Project Design, Access, and Construction			
TWE-5	P	General, compliance with laws and regulations	The COM Plan will display the location of Project infrastructure (i.e. towers, access roads, substations) and identify short-term and long-term land and resource impacts and the mitigation measures that will be implemented for site-specific and resource-specific environmental impacts.
TWE-6	P	General, Access Road Plan	The COM Plan will include an Access Road Plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. The Access Road Plan will incorporate best management practices, stipulated by the agencies in their respective decision documents and permits.
TWE-7	P	Access, visual	The alignment of any new access roads will follow the designated area's landform contours where practical, providing that such alignment does not additionally impact resource values. This will minimize ground disturbance and reduce scarring (visual contrast).
TWE-8	P, C	Access, tower placements, surface water, vegetation management, drainage, dust control	Crossings of streams and waterways will be done in compliance with federal, state, and local regulations. Roads will be built as near as possible at right angles to the streams and washes (Arizona crossing). Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. In addition, road construction will include dust-control measures during construction in sensitive areas. All existing roads will be left in a condition equal to, or better than, their condition prior to the construction of the transmission line. Structures will be sited with a minimum distance of 200 feet from streams, wherever possible.
TWE-9	C, O	Access	All construction vehicle movement outside the ROW normally will be restricted to pre-designated access or public roads.
TWE-10	P, C	General ROW, visual	The area limits of construction activities will normally be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.
TWE-11	P, C	Access, visual	In construction areas where re-contouring is not required, vegetation will be left in place, wherever possible, and original contour will be maintained to avoid excessive root damage and to allow for re-sprouting.

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
TWE-12	P, C, O	Access, soils, vegetation, water, cultural visual resources	Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive feature or reduce visual contrast.
TWE-13	C	Vegetation management, restoration, erosion control	In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches.
TWE-14	P, C	General, soils, erosion control, visual	The COM Plan will show the location of borrow sites, from which material will be obtained. Borrow pits will be stripped of topsoil to a depth of approximately six inches. Stripped topsoil will be stockpiled and, upon completion of borrow excavation, spread to a uniform depth of six inches over areas of borrow pits from which removed. Before replacing topsoil, excavated surfaces will be reasonably smooth and uniformly sloped. The sides of borrow pits will be brought to stable slopes with slope intersection shaped to carry the natural contour of adjacent undisturbed terrain into the pit to give a natural appearance. When necessary, borrow pits will be drained by open ditches to prevent accumulation of standing water.
TWE-15	C	Clean-up	The COM Plan will include a Clean-up Work Management Plan, and a Flagging, Fencing, and Signage Plan. Except for permanent survey markers and material that locate proposed facilities, stakes, pins, rebar, spikes, and other material will be removed from the surface and within the top 15 inches of the topsoil as a part of final clean-up. Fences on ROW will be removed where necessary and replaced to the original condition or better when the work is finished. Where existing fences are removed to facilitate the work, temporary fence protection for lands adjacent to the ROW will be provided at all times during the continuation of the Contract. Such temporary fence protection will be adequate to prevent public access to restricted areas. Temporary fencing constructed on the ROW will be removed by the Contractor as part of the clean-up operations prior to final acceptance of the completed work.
TWE-16	C	Site restoration and clean-up, water resources, land use	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) will be repaired or replaced, if damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency.
TWE-17	C	Site restoration and clean-up	Existing vegetation such as landscape plants, gardens, and field crops, which are damaged by the application of the soil-applied herbicide, will be replaced by the Contractor at its expense.
TWE-18	C	Site clean-up	The Applicant will pay fair market value to the land management agency for any merchantable forest products that will be cut during ROW clearing. Merchantable forest products will either be removed or stacked at locations determined by the land management agency.
Geology and Soils			
TWE-19	C	Drainage, soil erosion control	The COM Plan will include an Erosion Control Plan. Grading will be performed to provide adequate drainage around structure sites and sufficient clearance under conductors. Excavated material will be spread around the site from which excavated. Topsoil will be piled separately and replaced after work completion.

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
Groundwater, Surface Water and Wetlands			
TWE-20	P	Water quality	As part of the CWA 404 Permit for the TWE Project, the COM Plan will include a Wetlands and Waters of the U.S. Plan, which will incorporate measures to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical. The COM Plan will include a Storm Water Pollution Prevention Plan. The Applicant will identify all streams in the vicinity of the proposed project sites that are listed as impaired under Section 303(d) of the CWA and develop a management plan to avoid, reduce, and/or minimize adverse impacts to those streams.
TWE-21	P	Water quality	The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) prior to construction.
TWE-22	C	Water quality	Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact the environment.
TWE-23	C	Water quality	Washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water will not be permitted. Concrete wastes will be disposed of in accordance with all federal, state and local regulations.
TWE-24	C, O	Surface water, wetlands	Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and streams. Spill prevention and containment measures or practices will be incorporated as needed.
TWE-25	P	Dewatering	A dewatering permit will be obtained from the appropriate agencies if required for construction dewatering activities.
Vegetation and Soils Management			
TWE-26	P, C	Vegetation management and noxious weeds	The COM Plan will include a Vegetation Management Plan and a Noxious Weed Management Plan. The Vegetation Management Plan will address plant removal and selective clearing. The Noxious Weed Management Plan will be developed in accordance with appropriate land management agencies' standards, consistent with applicable regulations and agency permitting stipulations for the control of noxious weeds and invasive species (Executive Order (E.O.) 13112). Included in the Noxious Weed Management Plan will be stipulations regarding construction, restoration, and operation (use of weed-free materials, washing of equipment, etc.).
TWE-27	C	Vegetation management	In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-sprouting.
TWE-28	C	Vegetation management, visual	Clearing will be performed so as to minimize marring and scarring the countryside and preserve the natural beauty to the maximum extent possible. Except for danger trees, no clearing will be performed outside the limits of the ROW.
Ecological Resources			
TWE-29	P, C	Ecological, special status species	The COM Plan will include a Biological Protection Plan, which will identify important, sensitive, or unique habitats and BLM sensitive, USFS sensitive, and state-listed species in the vicinity of the TWE Project. The COM Plan will identify measures to be taken to avoid, minimize, or mitigate impacts to these habitats and species.
TWE-30	P	Ecological, raptors	In applicable areas, the TWE Project will be designed to meet or exceed the raptor safe design standards described in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee (APLIC) 2006).
TWE-31	P, C, O	Ecological, special status species	Mitigation measures that will be developed during the consultation period with the BLM and under Section 7 of the ESA will be adhered to, along with mitigation developed in conjunction with state authorities.

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
TWE-32	P, C	Ecological, special status species	Seasonal restrictions may be implemented in certain areas to mitigate impacts on wildlife. With the exception of emergency repair situations, ROW construction, restoration, maintenance, and termination activities in designated areas will be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed or listed threatened and endangered, or other sensitive animal species, as required by permitting agencies. Potential seasonal restrictions and avoidance buffers for nesting raptors will be identified in the DEIS. The Biological Protection Plan will incorporate the seasonal restrictions and stipulations contained in the federal agency RODs.
TWE-33	P, C	Ecological, special status species and habitats	Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during or following final inspection of the Project.
TWE-34	C	Ecological, special status species and habitats	If evidence of a protected species not previously identified or known is found in the Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings.
Cultural Resources – Historic, Archaeological, and Tribal Traditional			
TWE-35	P, C	Cultural resources	In consultation with the appropriate land management agencies and state historic preservation officers (SHPOs), and in accordance with the Programmatic Agreement (PA), a Cultural Resources Treatment Plan will be prepared as part of the COM Plan to address the specific mitigation measures for cultural resources that will be developed and implemented to mitigate any identified adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.
TWE-36	P, C	Native American cultural resources	The Applicant will comply with all laws, policies, and regulations pertaining to consultations with federally recognized Tribes.
TWE-37	P	General, cultural	Prior to construction, all construction personnel will be instructed on the protection of cultural resources, including the provisions of federal, state, and tribal laws regarding cultural resources, including prohibition of collection and removal; and the importance of these resources and the purpose and necessity of protecting them.
Paleontological Resources			
TWE-38	P, C, O	Paleontology	If paleontological resources are known to be present in the Project area, or if areas with a high potential to contain paleontological material has been identified through the NEPA process and DEIS, the Applicant will prepare a Paleontological Resources Management and Mitigation Plan as part of the COM Plan.
TWE-39	P	Paleontology	Paleontological mitigation may be required in areas of greatest disturbance and areas likely to have significant fossils. Preconstruction surveys of such areas may be conducted as agreed upon by the land-managing and lead federal agency.
Land Use and Visual Resources			
TWE-40	P, C, O	Land Use, agriculture	On agricultural land, the ROW will be aligned, in so far as practical, to reduce the impacts to farm operations and agricultural production.
TWE-41	C	Land Use, agriculture	In cultivated agricultural areas, soils that have been compacted by construction activities will be disked to uncompact soils.
TWE-42	C	Land Use, ranching	In grazing areas, excessive amounts of pine needles left by clearing of trees, will be removed from the ROW and disposed of in a location to prevent harm to grazing domestic animals.

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
TWE-43	C	Access, land use, gates	The COM Plan will include a Flagging, Fencing, and Signage Plan. Fences and gates will be repaired or replaced to their original pre-disturbed condition as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or the land management agency, and will be restored to their original pre-disturbed condition following construction. Cattle guards will be installed where new permanent access roads cut through fences, at the request of the land management agency.
TWE-44	P, C, O	Visual	Non-specular conductors and shield/ground wires will be used to reduce potential visual impacts.
TWE-45	P, C, O	Structure design and public safety	Structures and/or shield/ground wire will be marked with high-visibility devices where required by governmental agencies (Federal Aviation Administration (FAA)). Structure heights will be less than 200 feet, where feasible, to minimize the need for aircraft obstruction lighting.
TWE-46	P, C, O	Visual resources	The Applicant will comply with federal permitting agency stipulations regarding visual resources.
Air Quality			
TWE-47	P, C	Air quality, dust control	The COM Plan will include a Dust Control and Air Quality Plan. Requirements of those entities having jurisdiction over air quality matters will be adhered to and dust control measures will be developed. Open burning of construction trash will not be allowed unless permitted by appropriate authorities.
TWE-48	P, C	Air quality, emissions	The Contractor and Subcontractor(s) will be required to have and use air emissions control devices on construction machinery, as required by federal, state or local regulations or ordinances.
Corona Effects			
TWE-49	P, C, O	Corona	Transmission line materials will be designed to minimize corona. The proposed hardware and conductor will limit the audible noise, radio interference, and TV interference due to corona. Tension will be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution will be exercised during construction to avoid scratching or nicking the conductor surface that may provide points for corona to occur.
TWE-50	O	TV, radio interference	The Applicant will respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line will be patrolled on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.
Public Health and Safety			
TWE-51	P, C, O	Safety standards	The TWE Project will be designed, constructed, and operated to meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Applicant's requirements for safety and protection of landowners and their property.
TWE-52	O	Induced currents	The Applicant will apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing ROW, to the mutual satisfaction of the parties involved.
TWE-53	P, C	Blasting	The COM Plan will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.
TWE-54	P, C, O	Noise, electrostatic, and EMF	Research studies performed to determine the effects of audible noise and electrostatic and electromagnetic fields (EMF) will be regularly monitored by the Applicant to ascertain whether these effects are significant.
TWE-55	P, C, O	FAA regulations	The TWE Project will be designed to comply with FAA regulations, including lighting regulations, to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
TWE-56	P	Worker health and safety	As part of the COM Plan, the Applicant will provide a Health and Safety Plan, which will outline measures to protect workers and the general public during construction, operation, and decommissioning of the TWE Project. The Plan will identify applicable federal and state occupational safety standards, establish safe work practices, and define safety performance standards.
Hazardous Materials, Waste, and Wastewater Management			
TWE-57	P	Hazardous materials	As part of the COM Plan, the Applicant will provide a Spill Prevention Notification and Clean-up Plan. The Plan will address compliance with all applicable federal, state, and local regulations, and will include: spill prevention measures, notification procedures in the event of a spill, employee awareness training, and commitment of manpower, equipment, and materials to respond to spills, if they occur.
TWE-58	P	Hazardous materials	As part of the COM Plan, the Applicant will provide a Pesticide Use Plan. The Plan will address compliance with all applicable federal, state and local regulations.
TWE-59	P	Hazardous materials	As part of the COM Plan, the Applicant will provide a Clean-up Work Management Plan that has been approved by applicable federal, state or local environmental regulatory agencies. The plan will address on-site excavation of contaminated soils and debris and will include: identification of contaminants, methods of excavation, personnel training, safety and health procedures, sampling requirements, management of excavated soils and debris, and disposal methods.
TWE-60	C	Waste management	No non-biodegradable debris will be deposited in the ROW. Slash and other biodegradable debris will be left in place or disposed of in accordance with agency requirements.
TWE-61	C, O	Hazardous materials, waste management	As part of the COM Plan, the Applicant will provide a Hazardous Materials Management Plan. Hazardous materials will not be drained onto the ground or drainage areas. Totally enclosed containment will be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
TWE-62	C, O	Hazardous materials	If a reportable release of hazardous substance occurs at the work site, the Contractor will immediately notify the Applicant and all environmental agencies, as required by law. The Contractor will be responsible for the clean-up.
Fire Protection			
TWE-64	P, C	Fire, safety	The COM Plan will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will: Operate all internal and external combustion engines on federally-managed lands per 36 CFR 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified; Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes; Initiate fire suppression actions in the work area to prevent fire spread to or on federally-administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area; Notify the appropriate fire center immediately of the location and status of any escaped fire;

Table C.2-1 Applicant Committed Design Features

DEIS No.	Phase(s)[1]	Topic	Design Feature Description
TWE-64 (Cont)			Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness; Operate all vehicles on designated roads, and park in areas free of vegetation; Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.

[1]Phase definitions: P-Planning, C-Construction, O-Operation, D-Decommission

C.3 State and BLM Land Use Stipulations Applicable to Transmission Line ROWs

C.3.1 State Stipulation References

The following section details the stipulations references to the State NSU, CSU, and TL stipulations applicable to proposed transmission line corridor.

C.3.1.1 State of Wyoming

Reference: Wyoming Executive Order 2012-019.

Table C.3-1 State of Wyoming No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Sage grouse	Sage-grouse leks inside core/connectivity areas	Surface occupancy and/or disruptive activities are prohibited on or within a six tenths (0.6) mile radius of the perimeter 1 of occupied sage-grouse leks. Other actions *may* be consistent with the State's strategy when authorized (e.g., buried power and flowlines) with adherence to seasonal restrictions in nesting/early brood-rearing habitat and/or winter concentration areas, where the action(s) would not result in adverse impacts to core sage-grouse populations.	NSU	0.6 mile
Wildlife-SSS	Sage grouse	Sage-grouse outside core/connectivity areas	Surface occupancy and/or disruptive activities are prohibited on or within a one-quarter (0.25) mile radius of the perimeter of occupied sage-grouse leks. Other actions *may* be consistent with the State's strategy when authorized (e.g., buried power and flowlines) with adherence to seasonal restrictions in nesting/early brood-rearing habitat and/or winter concentration areas, where the action(s) would not result in adverse impacts to core sage-grouse populations.	CSU	0.25 mile

Table C.3-2 State of Wyoming Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-SSS	Sage grouse	Sage-grouse nesting/early brood-rearing habitat in core areas	Surface disturbing and/or disruptive activities are prohibited from March 15–June 30 to protect sage-grouse nesting and early brood rearing habitat. Apply this restriction to all nesting and early brood-rearing habitats inside core areas regardless of distance from the lek. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.	TL	3/15 to 6/30	None
Wildlife-SSS	Sage grouse	Sage-grouse nesting/early brood-rearing habitat in connectivity areas	Surface disturbing and/or disruptive activities are prohibited from March 15–June 30 to protect nesting and early brood-rearing habitats within 4 miles of the lek or lek perimeter of any occupied sage-grouse lek within identified connectivity areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by 14 days prior or subsequent to the above dates.	TL	3/15 to 6/30	4 miles

Table C.3-2 State of Wyoming Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-SSS	Sage grouse	Sage-grouse nesting/early brood-rearing habitat outside core or connectivity areas	Surface disturbing and/or disruptive activities are prohibited from March 15–June 30 to protect sage-grouse nesting and early brood rearing habitats within 2 miles of the lek or lek perimeter of any occupied lek located outside core or connectivity areas. Where credible data support different timeframes for this restriction, dates may be expanded by 14 days prior or subsequent to the above dates.	TL	3/15 to 6/30	2 miles
Wildlife-SSS	Sage grouse	Sage-grouse late brood-rearing and Winter Concentration Areas (WCAs):	Surface disturbing and/or disruptive activities in sage-grouse WCAs are prohibited from December 1–March 14 to protect core populations of sage-grouse that use these winter concentration habitats. While the bulk of winter and late brood rearing habitat necessary to support core area populations is available within core population areas, it may be necessary to protect additional areas of winter concentration that are not located within the current core area boundaries. Appropriate seasonal timing restrictions and habitat protection measures must be considered and evaluated where WCAs or important late brood-rearing areas are identified as supporting populations of Greater Sage-Grouse that attend leks within core.	TL	12/1 to 3/14	No buffer

C.3.1.2 State of Utah

Table C.3-3 State of Utah Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-SSS	California condor	Roosts	Temporary activities within 0.5 miles of established roosting sites or areas will not occur during the season of use, August 1 to November 31, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	August 1 to November 31	0.5 mile
Wildlife-SSS	California condor	Roosts	No permanent infrastructure will be placed within 0.5 miles of established roosting sites or areas.	NSO		0.5 mile
Wildlife-SSS	California condor	Nests	Temporary activities within 1.0 mile of nest sites will not occur during the breeding season.	TL	January 1 to August 31	1 mile
Wildlife-SSS	Bald eagle	Roosts	Temporary activities within 0.5 miles of winter roost areas, e.g., cottonwood galleries, will not occur during the winter roost season of November 1 to March 31, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	November 1 to Mach 31	0.5 mile
Wildlife-SSS	Bald eagle	Nests	Temporary activities within 1.0 mile of nest sites will not occur during the breeding season of January 1 to August 31, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	January 1 to August 31	1 mile

C.3.1.3 State of Colorado

None.

C.3.1.4 State of Nevada

None.

C.3.2 BLM Field Office Stipulation References

The following section details the stipulations and references to the BLM Field Office NSU, CSU, and TL stipulations applicable to the proposed transmission line corridor.

C.3.2.1 Rawlins Field Office, Wyoming

References: Record of Decision and Approved Rawlins Resource Management Plan for Public Lands Administered by the Bureau of Land Management Rawlins Field Office, December 2008. (Chapter 2, Management Decision by Resource; Appendix 1—Wyoming Bureau of Land Management Mitigation Guidelines for Surface Disturbing and Disruptive Activities; Appendix 9—Exception, Modification, and Waiver Criteria; Appendix 13—Reducing Nonpoint Source Pollution with Best Management Practices; Appendix 14—Programmatic Biological Opinion For The Wyoming Bureau of Land Management's Rawlins Resource Management Plan; Appendix 15—Best Management Practices for Reducing Surface Disturbance and Disruptive Activities; and Appendix 34—Designated Right-of-Way Corridor Criteria.

Table C.3-4 Rawlins Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Cultural Resources		Historic trails	Surface disturbance and disruptive activities will be prohibited within either one-quarter mile or the visual horizon (whichever is closer) of historic trails.	NSU	0.25 mile
Cultural Resources		NRHP-eligible sites	Surface disturbing activities will not be allowed within one-quarter mile of a cultural property or the visual horizon, whichever is closer, if the setting contributes to NRHP eligibility.	NSU	0.25 mile
Lands and Realty		Transmission line corridor	CIG/Entrega/WIC Transmission line corridor-Buried utilities only. 1, 320' width.	CSU	No buffer
Soils		Erodible, fragile soils and unstable soils	Surface disturbing activities will be avoided on unstable areas, such as landslides, slumps, and areas exhibiting soil creep. Reclamation practices and BMPs will be applied as appropriate for surface disturbing activities (Appendix 13).	CSU	No buffer
Soils		Slopes > 25%	Surface disturbance will be prohibited in slopes in excess of 25 percent.	NSU	No buffer
Visual		VRM Class I and II areas	Surface disturbance will be prohibited within important scenic areas (Class I and II Visual Resource Management Areas).	NSU	No buffer
Water Resources		100-year floodplains	Surface disturbing activities will be avoided in identified 100-year floodplains	CSU	No buffer

Table C.3-4 Rawlins Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water Resources		All surface water	Surface disturbance will be prohibited within 500 feet of surface water. Stream crossings for roads and pipelines will be constructed during the period of lowest flow (i.e., late summer or fall) and perpendicular to flow. No surface water or shallow ground waters in connection with surface waters will be utilized for proposed projects. Proper erosion control techniques, such as water bars, netting, rip-rap, etc.	NSU	500 feet
Water Resources		Ephemeral drainages	Surface disturbing activities will be avoided within 100 feet from the inner gorge of ephemeral channels.	CSU	100 feet
Wildlife-Raptors	Bald eagle	Roosts	No ground disturbing activities will be permitted within 0.5 miles of active bald eagle communal winter roost sites year-round. This buffer zone restriction may be adjusted based on site-specific information through coordination with (including written concurrence) the Service, Wyoming Field Office.	NSU	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	Year round, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be allowed within 1,200 feet of active ferruginous hawks nests. Distance may vary depending on factors such as nest activity, natural topographic barriers, and line-of-sight distances.	NSU, CSU	1,200 feet
Wildlife-Raptors	Bald eagle	Nests	Surface disturbing and disruptive activities potentially disruptive to nesting raptors are prohibited within a 1-mile buffer (no seasonal buffer).	NSU	1 mile
Wildlife-SSS	Black-footed ferret	White-tailed prairie dog towns/ complexes >200 acres in size	All white-tailed prairie dog towns/complexes greater than 200 acres in size will be avoided. If avoidance is not possible, these areas will be assessed and mapped at the proposed project level. Associated burrow densities of potentially affected towns will be determined, and, when habitat is present, a black-footed ferret survey will be conducted pursuant to the Service and Bureau-approved techniques. If prairie dog towns/complexes suitable as black-footed ferret habitat are present, attempts will be made to avoid locating surface disturbing activities within 164 feet (50 meters) of a town. If a black-footed ferret non-block cleared town/complex cannot be avoided, then a black-footed ferret survey is required (Appendix 14). (Continental Divide non-block cleared complex criterion: > 1,000 acre in size, 27 burrows/ acre, and towns within .09 miles of each other).	CSU	164 feet
Wildlife-SSS	Western boreal toad	Known habitat	Any action that would result in stream channel instability, erosion, and sedimentation within known Western boreal toad habitat will be avoided.	CSU	No buffer
Recreation		Recreation sites, developed and undeveloped	Lands within one-quarter mile of developed and undeveloped recreation sites (17,590 acres) are closed to locatable mineral entry, mineral material disposals, and operation of the public land laws, including sale (Map 3-7). Withdrawals will be pursued. Buried utilities will be allowed with adequate reclamation of the surface. Above-ground facilities will be avoided unless adequately mitigated to protect the recreation site viewshed.	CSU	0.25 mile
Recreation – SRMAs	NA	Upper Platte SRMA	Surface disturbing activities on public lands within one-quarter mile on either side of the river will be intensively managed to maintain the quality of the visual resource OHV use is limited to designated roads or vehicle routes. Open to oil and gas leasing with an NSO stipulation. Existing oil and gas leases will be intensively managed. Surface disturbing and disruptive activities will be restricted to maintain the quality of the visual resource.	CSU	0.25 mile

Table C.3-4 Rawlins Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-Wildlife Habitat Management Area		Red Rim-Daley Wildlife Habitat Management Area	Surface disturbing and disruptive activities will be intensively managed to prevent loss of significant habitat. Management will be applied on a case-by-case basis. Developments, uses, and facilities will be managed to avoid damage to vegetation and wildlife habitat. Off-road motor vehicle use for "necessary tasks" (as defined in the Glossary) is allowed. OHV use is limited to designated roads and vehicle routes and closed to over-the-snow vehicles.	CSU	No buffer
Special Designations-Wildlife Habitat Management Area		Upper Muddy Creek Watershed/Grizzly WHMA	Upper Muddy Creek Watershed/Grizzly WHMA is a ROW avoidance area. Surface disturbing and disruptive activities will be intensively managed to prevent loss of significant habitat. Surface disturbing activities will avoid identified 100-year floodplains, 500 feet from perennial surface water and/or wetland and riparian areas, and 100 feet from ephemeral channels. Exceptions to this would be granted by the BLM based on an environmental analysis and site-specific engineering and mitigation plans. Only those actions within areas that cannot be avoided and that provide protection for the aquatic resources in the Muddy Upper Muddy Creek Watershed/Grizzly WHMA will be approved. Surface disturbing and disruptive activities in aspen communities will be avoided.	CSU	No buffer
Vegetation-SSS	Blowout penstemon	Known blowout penstemon habitat	All proposed rights-of-way projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 mile from any known blowout penstemon habitat to minimize disturbances. If the avoidance of adverse affects is not possible, the Bureau will re-initiate consultation with the Service.	CUS	0.25 mile
Vegetation-SSS	Colorado butterfly plant	Known Colorado butterfly plant habitat	All proposed rights-of-way projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known Colorado butterfly plant habitat to minimize disturbances. If the avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service. All proposed projects will be designed and locations selected to minimize disturbances to known Colorado butterfly plant populations, and if the avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	0.25 mile
Vegetation-SSS	Ute ladies'-tresses	0.25 miles from any known orchid habitat	All proposed rights-of-way projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known orchid habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	0.25 mile

Table C.3-4 Rawlins Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-Raptors	Bald eagle	Nests	Well locations, roads, and ancillary facilities, and other surface structures requiring a repeated human presence, will not be allowed within 1/2 mile of active bald eagle nests. The distance may vary depending on factors such as nest activity, nest topographic barriers, and line-of-sight distance. Surface disturbing and other identified activities, as well as habitat alterations, that may disturb bald eagles will be restricted within suitable habitats that occur within the following bald eagle buffer zones: Zone 1: This area is intended to protect active and alternative nests located within ½ mile of the proposed surface disturbing activity. Between February 1 and August 15, minimal human activity levels will be allowed during the period of first occupancy to two weeks after fledging in this area. Zone 2: This area is intended to protect bald eagle primary use areas located within ½-1 mile of the proposed surface disturbing activity. Light human activity levels will be allowed in this area. Zone 3: This area is designated to protect foraging/concentration areas year-round and would include one of two larger areas, depending on habitat types: a) 2.5 miles extending in all directions from the nest or b) ½ mile from the stream-bank of all streams within 2.5 miles of the nest. Site-specific habitat types and foraging areas will be evaluated to determine which Zone 3 buffer applies. Zone delineation depends on habitat types. No ground disturbing activities will be permitted within 1 mile of active roost sites year round. Other activities that may disturb bald eagles within 1 mile of known communal winter roosts will be restricted during the period of November 1 through April 1.	CSU	825 feet
Wildlife-Raptors	Raptors, all	Nests	Year-round, well locations, roads, ancillary facilities, and other surface structures requiring a repeated human presence will not be allowed within 825 feet of active raptor nests (ferruginous hawks, 1,200 feet). Distance may vary depending on factors such as nest activity, species, natural topographic barriers, and line-of-sight distances.	CSU	825 feet
Wildlife-SSS	Sage grouse	Leks	High-profile structures (overhead power lines) will be authorized on a case by-case basis from one-quarter mile to 1 mile of an occupied greater sage-grouse and sharp-tailed grouse lek.	CSU	0.25 mile to 1 mile
Wildlife-SSS	Sage grouse	Leks	“Controlled surface use” stipulation will be applied to a one-half mile radius of active sage-grouse strutting grounds, including no aboveground facilities (power lines. storage tanks, fences, etc.).	CSU	0.5 mile

Table C.3-5 Rawlins Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Game Birds	All unspecified	Winter concentration areas	To protect important game bird winter concentration areas, activities or surface use will not be allowed from November 15 to April 30 within certain areas encompassed by the authorization.	TL	11/15 to 4/30	No buffer
Wildlife-Raptors	All unspecified	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.5 to 1.0 mile

Table C.3-5 Rawlins Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	All unspecified	Nests	To protect important raptor nesting habitat, activities or surface use will not be allowed from February 1 to July 31. Areas encompassed by the authorization (½ or 1 mile of raptor nests) may be shortened, depending on nesting chronology of individual species, nest site location, and topography).	TL	2/1 to 7/31	0.5 to 1 mile
Wildlife-Raptors	All unspecified	Winter concentration areas	Activities or surface use will not be allowed from November 15 to April 30.	TL	11/15 to 4/30	No buffer
Wildlife-Raptors	Barn owl	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Burrowing owl	Nests	Seasonal buffer April 15–September 15.	TL	4/15 to 9/15	0.75 mile
Wildlife-Raptors	Cooper's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Ferruginous hawk	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	1.0 mile
Wildlife-Raptors	Golden eagle	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	1.0 mile
Wildlife-Raptors	Great horned owl	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Kestrel	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Long-eared owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Merlin	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Northern goshawk	Nests	Seasonal nest buffer of April 1–August 31.	TL	4/1 to 8/31	0.75 mile
Wildlife-Raptors	Northern harrier	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Osprey	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Peregrine falcon	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Prairie falcon	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Red-tailed hawk	Nests	Seasonal buffer of February 1–July 15.	TL	2/1 to 7/15	0.75 mile
Wildlife-Raptors	Screech owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Short-eared owl	Nests	Seasonal buffer of March 1–July 31.	TL	3/1 to 7/31	0.75 mile

Table C.3-5 Rawlins Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Swainson's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-Raptors	Swainson's hawk	Nests	Seasonal nest buffer of April 1–July 31.	TL	4/1 to 7/31	0.75 mile
Wildlife-SSS	Sage grouse	Leks, nesting and early brood rearing habitat	Nesting/early brood-rearing habitat: Avoid surface disturbing and disruptive activities, geophysical surveys, and organized recreational activities (events) that require a special use permit in suitable greater sage-grouse and sharp-tailed grouse nesting and early brood rearing habitat within 2 miles of the perimeter of an occupied greater sage-grouse lek, and within 1 mile of the perimeter of a sharp-tailed grouse lek, or in identified greater sage-grouse and sharp-tailed grouse nesting and early brood rearing habitat, from March 1 to July 15. Avoidance of surface disturbance or other disruptive activity from March 1 through July 15 within 2 miles from an "active" lek or in suitable greater sage-grouse nesting and early brood rearing habitat.	TL	3/1 to 7/15	1 mile sharp-tailed, 2 miles greater sage grouse
Wildlife-SSS	Sage grouse	Nesting habitat	To protect important sage and sharp-tailed grouse nesting habitat, activities or surface use will not be allowed from February 1 to July 31 within certain areas encompassed by the authorization.	TL	2/1 to 7/31	None specified
Wildlife-SSS	Sage grouse	Winter concentration areas	Surface disturbing and disruptive activities potentially disruptive to delineated greater sage-grouse and sharp-tailed grouse winter concentration areas are prohibited during the period of November 15 to March 14 for the protection of greater sage-grouse and sharp-tailed grouse winter concentration areas.	TL	11/5 to 3/14	No buffer
Wildlife-SSS	Yellow-billed cuckoo	Identified habitat	Surface disturbing or other disruptive activities will be prohibited within 1/2-mile of identified habitat during the period April 15 to August 15 for the protection of nesting Western yellow-billed cuckoos.	TL	4/15 to 8/15	0.5 mile

C.3.2.2 Rock Springs Field Office, Wyoming

References: Green River Resource Area Record of Decision and Green River Resource Management Plan, Rock Springs District Office, October 1997. (Management Decision by Resource; Appendix 2—Wyoming Bureau of Land Management Mitigation Guidelines for Surface Disturbing and Disruptive Activities; Appendix 5-1— Standard Practices, Best Management Practices, and Guidelines for Surface Disturbing Activities; Appendix 7—Procedures for Processing Applications in Areas of Seasonal Restriction; Appendix 10-1— Biological Assessment; Appendix 13—BMPs for nonpoint source pollution; water and wildlife stipulations).

Table C.3-6 Rock Springs Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/
Cultural Resources		Native American burial sites	Known Native American Burial Sites are ROW Exclusion Areas.	NSU	no buffer
Cultural Resources		Historic trails	Surface disturbance and disruptive activities will be prohibited within either one-quarter mile or the visual horizon (whichever is closer) of historic trails.	NSU	0.25 mile
Land Use		ROW avoidance area	An avoidance area for major utility lines will be located along 1-80 between Point of Rocks and Green River. Due to topography, congestion in the concentration area, and surface mining, this area will be restricted to local distribution service lines, All other utilities will be located, if possible, in the northern or southern east-west windows.	CSU	No buffer
Recreation		Pine Mountain RA	The Pine Mountain area will be managed as an avoidance area for rights-of-way and surface disturbing activities.	CSU	No buffer
Special Designations-ACEC		Greater Red Creek ACEC - original Red Creek ACEC	Greater Red Creek ACEC - original Red Creek ACEC portion is an Exclusion Area and VRM II. Note: The one pipeline right-of-way concentration area in the watershed is an avoidance area for any additional rights of-way. However, that part of the right-of-way concentration area, from the Red Creek escarpment south to Richards Gap, is closed to any new rights-of-way development for at least 10 years to allow soils to stabilize from previous disturbance. At the end of the 10-year period, new rights-of-way in the area could be reconsidered if satisfactory stabilization has occurred. The remainder of the BLM-administered public lands that lie east of the right-of-way concentration area will also be managed as an exclusion area for rights-of-way (see Table 2, Map 7. and Map 8).	NSU	No buffer
Special Designations-Wilderness Areas		Red Creek Wilderness	Red Creek Wilderness identified as an Exclusion Area.	NSU	No buffer
Vegetation-SSS	All	SSS known habitat	Special status plant populations are closed to activities that could adversely affect these species and their habitat. Management requirements in habitat areas may include prohibiting or limiting motorized vehicle use, surface uses, and explosive charges or any other surface disturbing or disruptive activity that may cause adverse effects to the plants.	CSU	No buffer
Wild Horses		Wild horse viewing areas	Suitable wild horse herd viewing area(s) may be developed to enhance public viewing of horses. Viewing areas plus a 1/2 mile distance surrounding them will be closed to long-term or permanent intrusions and surface disturbing activities that could interfere with opportunities to view horses (e.g., structures, mineral activities, powerlines, roads. etc.) (Table 7 and Table 2). Short- term intrusions that will blend with the landscape or will benefit the intent of the wild horse herd viewing areas will be considered on a case-by-case basis.	NSU	0.5 mile
Wildlife-Raptors	Raptors, all	Nests	Project components, such as permanent and high profile structures, i.e., buildings, storage tanks, powerlines, roads, well pads, etc. are prohibited within an appropriate distance of active raptor nests. The appropriate distance (usually less than 1/2 mile) will be determined on a case by- case basis and may vary depending upon the species involved, natural topographic barriers, and line-of-sight distances, etc. Placement of facilities, "on" (very low profile) or below ground, and temporary disruptive activities, such as occur with pipeline construction, seismic activity, etc., could be granted exceptions within 1/2 mile of active raptor nests, in certain circumstances (Appendix 7).	NSU	0.5 mile

Table C.3-6 Rock Springs Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/
Wildlife-SSS	Sage grouse	Leks	Aboveground facilities (power lines, storage tanks fences, etc.) are prohibited on or within 1/4 mile of grouse breeding grounds (leks). Placement of facilities, "on" (very low profile) or below ground, and temporary disruptive activities, such as occur with pipeline construction, seismic activity, etc., could be granted exceptions within 1/4 mile of leks, in certain circumstances. Identified ROW avoidance areas in Table 2.	CSU	0.25 mile
Visual		VRM Class I and II areas within Rock Springs FO	Surface disturbance will be prohibited within important scenic areas (Class I and II Visual Resource Management Areas).	NSU	No buffer
Soils		Slopes > 25%	Surface disturbance will be prohibited in slopes in excess of 25 percent.	NSU	No buffer
Soils		Erodible, fragile soils	Areas where the soils are highly erodible or difficult to reclaim will receive increased attention, and are avoidance areas for surface disturbing activities. Surface disturbing activities could be allowed in these areas if site specific analysis determines that soil degradation will not occur and that water quality will not be adversely affected. When applicable, an erosion control plan will be prepared as part of the site specific analysis process for activity and implementation planning. Rehabilitation plans will be developed and implemented for disturbed areas, as needed. If avoidance is impracticable then a plan of operation that addressed erosion control and mitigation will be required. Reclamation practices and BMPs will be applied as appropriate for surface disturbing activities.	CSU	No buffer
Water Resources		100-year floodplains	All surface disturbance, permanent facilities, etc., shall remain a minimum of 500 feet away from the edge of 100-year floodplains unless it is determined through site specific analysis and the Area Manager approves in writing, that there is no practicable alternative to the proposed action. If such a circumstance exists, then all practicable measures to mitigate possible harm to these areas must be employed. These mitigating measures would be determined case by case and may include, but are not limited to, diking, lining, screening, mulching, terracing, and diversions. Therefore, floodplains should have no permanent structures constructed within their boundaries unless it can be demonstrated on a case-by-case basis that there is no physically practical alternative. In cases where floodplain construction is approved, additional constraints could be applied. The 100-year floodplains are closed to any new permanent facilities (e.g., storage tanks, structure pits, etc.). Proposals for linear crossings in these areas will be considered on a case-by-case basis (Table 7). Surface disturbing and construction activities (e.g., mineral exploration and development activities, pipelines, powerlines, roads, recreation sites, fences, wells, etc.) that could adversely affect water quality and wetland and riparian habitat will avoid the area within 500 feet of or on 100-year floodplains. Proposals for linear crossings in these areas will be considered on a case-by-case basis. Activities could be allowed if a site specific analysis determines that no adverse impacts will occur to floodplains or water quality, and a plan to mitigate impacts to water quality is approved (Map 25 and Table 7).	NSU, CSU	500 feet

Table C.3-6 Rock Springs Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/
Water Resources		All surface water	Surface disturbance will be prohibited within 500 feet of surface water unless it is determined through site specific analysis and the Area Manager approves in writing, that there is no practicable alternative to the proposed action. If such a circumstance exists, then all practicable measures to mitigate possible harm to these areas must be employed. These mitigating measures would be determined case by case and may include, but are not limited to, diking, lining, screening, mulching, terracing, and diversions. Activities could be allowed if a site specific analysis determines that no adverse impacts will occur to floodplains, wetlands, perennial streams, or water quality, and a plan to mitigate impacts to water quality is approved. Proposals for linear crossings in these areas will be considered on a case-by-case basis.	CSU	500 feet
Water Resources		Perennial streams	Surface disturbance will be prohibited within 500 feet of perennial streams unless it is determined through site specific analysis and the Area Manager approves in writing, that there is no practicable alternative to the proposed action. If such a circumstance exists, then all practicable measures to mitigate possible harm to these areas must be employed. These mitigating measures would be determined case by case and may include, but are not limited to, diking, lining, screening, mulching, terracing, and diversions. Surface disturbing and construction activities (e.g., mineral exploration and development activities, pipelines, powerlines, roads, recreation sites, fences, wells, etc.) that could adversely affect water quality, and wetland and riparian habitat will avoid the area within 500 feet of perennial streams. Proposals for linear crossings in these areas will be considered on a case-by-case basis. Activities could be allowed if a site specific analysis determines that no adverse impacts will occur to floodplains, wetlands, perennial streams, or water quality, and a plan to mitigate impacts to water quality is approved (Map 25 and Table 7. Appendix 5, BMPs and Guidelines for surfacing disturbing activities.	CSU	500 feet
Water Resources		Riparian areas	Surface disturbing and construction activities (e.g., mineral exploration and development activities, pipelines, powerlines, roads, recreation sites, fences, wells, etc.) that could adversely affect water quality, and wetland and riparian habitat will avoid the area within 500 feet of or on wetlands. Proposals for linear crossings in these areas will be considered on a case-by-case basis. Activities could be allowed if a site specific analysis determines that no adverse impacts will occur to floodplains, wetlands, perennial streams, or water quality, and a plan to mitigate impacts to water quality is approved (Map 25 and Table 7). Surface disturbance will be prohibited within 500 feet of riparian areas, wetlands unless it is determined through site specific analysis and the Area Manager approves in writing, that there is no practicable alternative to the proposed action. If such a circumstance exists, then all practicable measures to mitigate possible harm to these areas must be employed. These mitigating measures would be determined case by case and may include, but are not limited to, diking, lining, screening, mulching, terracing, and diversions.	CSU	500 feet
Water Resources		Wetlands	Surface disturbing and construction activities (e.g., mineral exploration and development activities, pipelines, powerlines, roads, recreation sites, fences, wells, etc.) that could adversely affect water quality, and wetland and riparian habitat will avoid the area within 500 feet of or on wetlands. Proposals for linear crossings in these areas will be considered on a case-by-case basis. Activities could be allowed if a site specific analysis determines that no adverse impacts will occur to floodplains, wetlands, perennial streams, or water quality, and a plan to mitigate impacts to water quality is approved (Map 25 and Table 7).	CSU	500 feet

Table C.3-6 Rock Springs Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/
Cultural Resources		Prehistoric rock quarry site	The site is an exclusion area and is closed to surface disturbing activities that could adversely affect it. Only those surface disturbing activities related to data recovery would be allowed.	NSU	No buffer
Special Designations-ACEC		Greater Red Creek ACEC - Currant Creek Drainage	Greater Red Creek ACEC - Currant Creek Drainage portion (from headwaters west to Currant Creek Ranch) identified Exclusion Area. VRM II.	NSU	No buffer
Special Designations-ACEC		Greater Red Creek ACEC-Sage Creek drainage	Greater Red Creek ACEC- Sage Creek drainage is identified avoidance area. VRM III.	CSU	No buffer
Water Resources		Ephemeral drainages	Surface disturbing activities will be avoided within 100 feet from the inner gorge of ephemeral channels.	CSU	100 feet
Cultural Resources		Cultural site management areas	Vehicular travel is restricted to designated roads in cultural site management areas.	CSU	No buffer
Wildlife-SSS	Sage grouse	Leks	A "controlled surface use" stipulation will be applied from February 1 through May 15, within 1/4 mile radius of active strutting grounds from 6 p.m. to 9 AM, daily. The actual timing of this stipulation can be modified by weather conditions such as fog and cloudy conditions, or clear, bright moonlit nights.	CSU, TL (2/1-5/15)	0.25 mile
Special Designations-Wilderness Study Areas (WSA)		Red Creek Badlands WSA	A controlled surface use stipulation would be applied for activities within 1/4 mile or the visual horizon of the WSA boundary. Actions within or adjacent to the WSAs would be evaluated on a case-by-case basis to determine if appropriate mitigation would be necessary.	CSU	0.25 mile
Water Resources		Sensitive watersheds	Vehicular travel is restricted to designated roads in sensitive watersheds.	CSU	No buffer

Table C.3-7 Rock Springs Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	All	Winter range, crucial	All surface disturbing activities restricted from Nov. 15 - April 30 in Antelope, elk, moose, and mule deer crucial winter ranges.	TL	11/15 to 4/30	No buffer
Wildlife-Big Game	All	Parturition areas	All surface disturbing activities restricted from May 1 - June 30 in designated parturition areas.	TL	5/1 to 6/30	No buffer
Wildlife-Fish		Game fish spawning areas	All surface disturbing activities restricted during spring or fall spawning, buffer determined on case by case basis.	TL	TBD	No buffer
Wildlife-Raptors	All unspecified	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile

Table C.3-7 Rock Springs Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	All unspecified	Winter concentration areas	Activities or surface use will not be allowed from November 15 to April 30 to defined raptor and game bird winter concentration areas.	TL	11/15 to 4/30	No buffer
Wildlife-Raptors	Burrowing owl	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile
Wildlife-Raptors	Cooper's hawk	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within a one-mile (1-mile) radius of nests.	TL	2/1 to 7/31	1.0 mile
Wildlife-Raptors	Golden eagle	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile
Wildlife-raptors	Merlin	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile
Wildlife-Raptors	Osprey	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile
Wildlife-Raptors	Swainson's hawk	Nests	All surface disturbing activities restricted from Feb. 1 - July 31 within 1/2 mile radius of nests.	TL	2/1 to 7/31	0.5 mile
Wildlife-SSS	Sage grouse	Leks	Seasonal restrictions would be applied through Feb. 1 - July 31, within an additional 1.75-mile radius from leks to protect sage grouse nesting habitat. Areas within that radius not used for nesting can be excepted provided actual nesting areas are not affected.	TL	2/1 to 7/31	2 miles
Wildlife-SSS	Sage grouse	Leks	To protect grouse nesting habitat, seasonal restrictions will apply within appropriate distances from the grouse lek. Appropriate distances (up to two miles) and time frames (usually from March 1 through June 30) will be determined on a case-by-case basis (Table 8). Exceptions to seasonal restrictions may be granted, provided the criteria in Appendix 7 can be met.	TL	3/1 to 6/30	≤2 miles
Wildlife-SSS	Sage grouse	Leks	All surface disturbing activities restricted within an up to 2-mile radius of lek between Feb. 1 - July 31.	TL	2/1 to 7/31	≤2 miles

C.3.2.3 Little Snake Field Office, Colorado

References: Record of Decision and Approved Resource Management Plan for Public Lands Administered by the Bureau of Land Management Little Snake Field Office, October 2011 (Chapter 2, Management Decision by Resource; Appendix D—Special Status Species Conservation Measures and Recommendations), Water and Mineral stipulations.

Table C.3-8 Little Snake Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Lands and Realty		WWEC corridor	Designated WWEC corridor is for buried utilities only.	NSU	No buffer
Recreation		Recreation sites, developed	Developed recreation sites (40-acre blocks) are NSU.	NSU	No buffer
Recreation-SRMAs		Juniper Canyon SRMA	NSO, ROW avoidance area; portions are VRM II.	CSU	No buffer
Recreation-SRMAs		Little Yampa SRMA	Portion of Little Yampa Canyon SRMA (within line of sight from the river within the SRMAs)-VRM II, NSO; ROW avoidance areas.	CSU	No buffer
Soils	NA	Erodible, fragile soils and unstable soils	Fragile soils: areas rated as highly or severely erodible by wind or water as described by the Natural Resources Conservation Service (NRCS) in the Area Soil Survey Report or as described by onsite inspection. Fragile soil criteria are also slopes greater than or equal to 35 percent if they have one of the other following soil characteristics: surface texture that is sand, loamy sand, very fine sandy loam, silty clay, or clay; a depth to bedrock of less than 20 inches; an erosion condition rated as "poor"; or a K factor greater than 0.32. Surface disturbing activities will be allowed on isolated sites that meet fragile soil criteria, but only when performance standards and objectives can be met. Surface occupancy on public land will be permitted only where adherence to performance objectives for surface disturbing activities within fragile-soil areas is assured.	CSU	No buffer
Special Designations-Wilderness Study Areas (WSA)		Cross Mountain WSA	WSAs will be managed to preserve their wilderness values according to the IMP (BLM-H-8550-1) and will continue to be managed in that manner until Congress either designates them as wilderness or releases them for other uses. While managed as WSAs, these areas will be managed with a VRM Class I designation. The areas will be closed to oil and gas operations, recommended for withdrawal from mineral location, closed to mineral material sales and non energy leasables, and will not be available for coal leasing. They will be managed as ROW exclusion areas, and will be closed to OHV use. If Congress releases Cross Mountain from wilderness study, it would be managed as an ACEC and would be a ROW exclusion area unless associated with valid existing rights.	NSU	No buffer
Special Designations-WSR		Yampa River segment 1	Manage Yampa River segment 1 (2.8 miles from River Mile #126 to Milk Creek area) as suitable for inclusion in the NWSR System, with the tentative classification of "recreational." Manage to protect the outstandingly remarkable values, including recreation and fish. Specific management prescriptions within 0.25 miles of each side of the river include OHV limited to designated roads and trails, NSO for oil and gas operations, recommended for withdrawal from locatable minerals, and will not be available for coal leasing.	NSU	0.25 mile
Special Designations-WSR		Yampa River segment 2	Yampa segment 2 (Milk Creek to Duffy Tunnel, scenic) Manage Yampa River segment 2 (15.9 miles from Milk Creek to Duffy Tunnel) as suitable for inclusion in the NWSR System, with the tentative classification of "scenic." Manage to protect the outstandingly remarkable values, including recreation and fish. Specific management prescriptions within 0.25 miles of each side of the river include OHV limited to designated roads and trails, NSO for oil and gas operations, recommended for withdrawal from locatable minerals, and will not be available for coal leasing.	NSU	0.25 mile

Table C.3-8 Little Snake Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation-SSS	All	Occupied habitat	There will be CSU stipulations on habitat areas containing special status species, such as federally listed, proposed, and candidate species.	CSU	No buffer
Vegetation-SSS	Utes ladies'-tresses	Known habitat	All proposed ROW projects (powerlines, pipelines, roads, etc.) will be designed and locations selected at least 0.25 miles from any known Ute ladies'-tresses orchid habitat to minimize disturbances. If avoidance of adverse effects is not possible, the Bureau will re-initiate consultation with the Service.	CSU	0.25 mile
Water Resources		Perennial streams	Establish no surface occupancy (NSO) stipulations for up to 0.25 mile from perennial water sources, if necessary, depending on type and use of the water source, soil type, and slope steepness.	NSU	0.25 mile
Wildlife-Aquatic Species-SSS	Colorado River fishes	Critical or occupied habitat	Require NSO stipulations within critical or occupied habitat of Colorado pikeminnow (*Ptychocheiluslucius*), razorback sucker (*Xyrauchentexanus*), humpback chub (*Gila cypha*), and bonytail (*Gila elegans*).	NSU	No buffer
Wildlife-Raptors	All except bald eagle and peregrine falcon	Nests	0.25 miles from nest sites raptors (golden eagle, osprey, all accipiters, falcons [except the kestrel], buteos, and owls, and not including special status species raptors Bald Eagle and Peregrine Falcon).	NSU	0.25 mile
Wildlife-Raptors	Bald eagle	Nests, abandoned	NSO within 100 meter radius of abandoned nests (unoccupied for 5 consecutive years, but with all or part of the nest remaining).	NSU	328 feet
Wildlife-Raptors	Bald eagle	Nests, occupied and unoccupied	Year-round NSO will be applied within a 0.25 mile radius of roost sites and both occupied and unoccupied nests. The definition of an "occupied nest" (from the Northern States Bald Eagle Recovery Plan 1983, page D4) includes (a) young were observed, (b) eggs were laid (eggs or eggshell fragments observed), (c) one adult was observed in incubating ("sitting low") posture on the nest during the incubation period, (d) two adults were observed at an empty nest or within the breeding area, or (e) one adult eagle and one eagle in immature plumage were observed at or near a nest, especially if mating or reproductive behavior (display flights, copulation, nest repair, etc.) was observed.	NSU	0.25 mile
Wildlife-Raptors	Bald eagle	Roosts	New roads and bridges on BLM lands should be located at least 1/2 mile from critical night roosts.	CSU	0.5 mile
Wildlife-Raptors	Peregrine Falcon	Cliff nesting complexes	NSO will be allowed within a 0.25 mile radius of cliff nesting complexes. NSO areas may be altered depending upon the active status of the nesting complex or upon the geographical relationship of topographical barriers and vegetation screening.	NSU	0.25 mile
Wildlife-SSS	All	T&E and candidate species habitat	There will be CSU stipulations on habitat areas containing special status species, such as federally listed, proposed, and candidate species.	CSU	No buffer
Wildlife-SSS	Black-footed ferret	Black-footed ferret reintroduction areas	Active white-tailed prairie dog colonies will continue to be avoidance areas for surface disturbing activities within the black-footed ferret reintroduction area.	CSU	No buffer

Table C.3-8 Little Snake Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Black-footed ferret	Occupied habitat	Occupied black-footed ferret habitat is designated as a ROW avoidance area. ROWs on public land with the potential to disturb occupied black-footed ferret habitat will be rerouted to avoid those prairie dog towns.	CSU	No buffer
Wildlife-SSS	Black-footed ferret	Prairie dog towns	ROWs on public land with the potential to disturb occupied black-footed ferret habitat will be rerouted to avoid those prairie dog towns.	CSU	No buffer
Wildlife-SSS	Canada lynx	Mapped lynx habitat	NSO will be applied to all mapped lynx habitat.	NSU	No buffer
Wildlife-SSS	Mexican spotted owl	PACs	NSO will be applied to all protected activity centers (PAC).Other surface disturbing activities within protected or restricted habitats, such as prescribed fires and fuels reduction, may occur in specific cases but will require separate Section 7 consultation.	NSU	No buffer
Wildlife-SSS	Mountain plover	Plover nest site	Establish 0.125 mile NSO stipulations around all plover nest sites. The boundaries of the stipulated area may be modified if the authorized officer determines that surface occupancy will not harm the integrity of the nest or nest location.	NSU	0.125 mile
Wildlife-SSS	Prairie dog, white-tailed	Colonies	Surface disturbing activities occurring over more than 1 acre will not be permitted in active prairie dog towns less than 10 acres in size. These activities will be relocated to the edge of the active prairie dog town.	NSU	No buffer
Wildlife-SSS	Sage srouse, Columbian sharp-tailed	Leks	NSO will be allowed within a 0.25 mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek or the geographical relationship of topographical barriers and vegetation screening to the lek site.	NSU	0.25 mile
Wildlife-SSS	Sage grouse, greater	Leks	To reduce potential impacts on greater sage-grouse lek integrity, NSO will be applied within a 0.6 mile radius of a lek site. The NSO area may be altered depending upon the active status of the lek, habitat characteristics, or the geographical relationship of topographical barriers and vegetation screening to the lek site.	NSU	0.6 mile
Wildlife-SSS	Yellow-billed cuckoo	Suitable habitat	Prohibit permanent surface disturbing activities within 0.25 mile of any suitable yellow-billed cuckoo habitat. Exceptions should be evaluated on a case-by-case basis to avoid adverse impact.	NSU	0.25 mile
Wildlife-Waterfowl	Waterfowl	Waterfowl habitat management areas and rookeries	NSO will be allowed on significant production areas, such as waterfowl habitat management areas and rookeries. NSO areas may be altered depending upon the active status of the production areas or upon the geographical relationship of topographical barriers and vegetation screening.	NSU	No buffer

Table C.3-9 Little Snake Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Livestock Grazing	Domestic sheep	Lambing grounds	Exploration (including seismic exploration, drilling, or other development or production activity) will generally not be allowed on domestic sheep lambing grounds during lambing activity. Lambing activities usually fall between April 10 and June 30 and last for approximately 6 weeks. Dates for the six week closure will be determined for each operation as local conditions dictate.	TL	4/1 to 6/30	No buffer
Wild Horses		Entire HMA	No oil- and gas related helicopter or motor vehicle use will be allowed in the wild horse HMA during foaling season, which runs from March 1 to June 30.	TL	3/1 to 6/30	No buffer
Wild Horses		Water sources	No drilling or development operations will be permitted within a 1 mile radius from wild horse water sources from March 1 to December 1.	TL	3/ to 12/1	1 mile
Wildlife-Big Game	All	Winter habitat, crucial	Crucial winter habitat will be closed to surface disturbing activities from December 1 to April 30, with the intent that this stipulation will be applied after the big game hunting season.	TL	12/1 to 4/30	No buffer
Wildlife-Big Game	Big horn sheep	Parturition areas	Bighorn sheep lambing areas will be closed to surface disturbing activities from May 1 to July 15.	TL	5/1 to 7/15	No buffer
Wildlife-Big Game	Elk	Parturition areas	Elk calving areas will be closed to surface disturbing activities from April 16 to June 30.	TL	4/16 to 6/30	No buffer
Wildlife-Big Game	Pronghorn	Parturition areas	Pronghorn antelope fawning areas will be closed to surface disturbing activities from May 1 to July 15.	TL	5/1 to 7/15	No buffer
Wildlife-Fish	Colorado River fishes	Critical or occupied habitat	No work in the active river channel will take place between July 1 and September 30 to prevent adverse effects from sedimentation during spawning; also, no work will take place when larval fishes are drifting in the river channel. Other than pipelines, controlled surface uses crossing any critical or occupied habitat of the Colorado River fishes will require separate Section 7 consultation.	TL	7/1 to 9/30	No buffer
Wildlife-Raptors	Bald eagle	Critical night roosts	Human activity within 0.5 miles of bald eagle critical night roosts on BLM land should be restricted from November 15 to March 15. Buffers can be reduced to 0.25 miles for night roosts if the activity is visually screened by vegetation or topography. Development may be permitted at other periods. If periodic visits, such as those that occur with oil well maintenance work, are required within the buffer zone after development, such activity should be restricted to between the hours of 10 a.m. and 2 p.m. during the period November 15 to March 15.	TL	11/15 to 3/15	0.5 mile
Wildlife-Raptors	Bald eagle	Critical night roosts	If BLM chooses to construct a road or bridge within 1/2 mile of critical night roosts, then the road must be closed to all use from November 15 to March 15. If topography or vegetation provides a visual screen, the buffer can be reduced to 1/4 mile, but the seasonal closure would still be required.	TL	11/15 to 3/15	No buffer
Wildlife-Raptors	Bald eagle	Nests, occupied	No human activity or surface disturbance will be allowed within a 0.5 mile radius of occupied nests from November 15 through July 31.	TL	11/15 to 7/31	0.5 mile

Table C.3-9 Little Snake Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Bald eagle	Winter hunting perches	Human activity within 0.25 miles of known bald eagle winter hunting perches should be restricted from November 15 to March 15. Buffers can be reduced to 0.125 miles for hunting perches if the activity is visually screened by vegetation or topography. Development may be permitted at other periods. If periodic visits, such as those that occur with oil well maintenance work, are required within the buffer zone after development, such activity should be restricted to between the hours of 10 a.m. and 2 p.m. during the period November 15 to March 15.	TL	11/15 to 3/15	0.25 mile
Wildlife-Raptors	Ferruginous hawk	Nesting and fledgling habitat	From February 1 to August 15, a 1 mile buffer around nesting and fledgling habitat will be closed to surface disturbing activities to avoid nest abandonment.	TL	2/1 to 8/15	1 mile
Wildlife-Raptors	Osprey	Nesting and fledgling habitat	Osprey nesting and fledgling habitat will be closed to surface disturbing activities from April 1 to August 31. This closure will apply to a 0.5 mile buffer zone around the habitat to avoid nest abandonment.	TL	4/ tp 8/15	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nesting complex	Peregrine falcon cliff nesting complexes will be closed to surface disturbing activities from March 16 to July 31 within a 0.5 mile buffer area around the nesting complex to prevent abandonment and desertion of established territories. However, during years when a nest is unoccupied, or unoccupied by or after May 15, the seasonal stipulation may be excepted. The stipulations may also be excepted once the young have fledged and dispersed from the nest.	TL	3/16 to 7/31	0.5 mile
Wildlife-Raptors	Raptors (golden eagle, osprey, all accipiters, falcons [except the kestrel], buteos, and owls)	Nests	Raptor nesting and fledgling habitat will be closed to surface disturbing activities from February 1 to August 15 within a 0.25 mile buffer zone around the nest site. However, during years when a nest site is unoccupied, or unoccupied by or after May 15, these seasonal limitations may be excepted; they may also be excepted once the young have fledged and dispersed from the nest.	TL	5/1 to 8/15	0.25 mile
Wildlife-SSS	Columbian sharp-tailed grouse	Winter habitat, crucial	Nesting habitat will be closed to surface disturbing activities from March 1 to June 30.	TL	3/1 to 6/30	No buffer
Wildlife-SSS	Columbian sharp-tailed grouse	Winter habitat, crucial	Crucial winter habitat will be closed from December 16 to March 15.	TL	12/16 to 3/15	No buffer
Wildlife-SSS	Greater sage-grouse	Leks	To prevent disturbing up to 75 percent of nesting birds, between March 1 and June 30, greater sage-grouse nesting and early brood-rearing habitat (Map 5) will be stipulated as CSU for oil and gas operations and avoidance areas for other surface disturbing activities within a 4 mile radius of the perimeter of a lek. All surface disturbing activities will avoid only nesting and early brood-rearing habitat within the 4 mile radius of the lek during this time period. Exceptions, modification, or waivers will be granted according to criteria established in Appendix B. The actual area to be avoided will be determined on a case-by-case basis, depending on applicable scientific research and site-specific analysis and in coordination with commodity users and other appropriate entities.	TL	6/1 to 6/30	4 mile
Wildlife-SSS	Greater sage-grouse	Winter habitat, crucial	Crucial winter habitat will be closed from December 16 to March 15. In addition, exceptions would be granted according to criteria established in Appendix B.	TL	12/16 to 3/15	No buffer

Table C.3-9 Little Snake Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-SSS	Greater sandhill crane	Nesting and staging habitat	Nesting and staging habitat areas will be closed to surface disturbing activities from March 1 to October 16.	TL	3/1 to 10/16	No buffer
Wildlife-SSS	Mexican spotted owl	PACs	Activities in PACs that are not surface disturbing will avoid the Mexican spotted owl breeding season, which runs from March 1 through August 31.	TL, CSU	3/1 to 831	No buffer
Wildlife-SSS	Mountain plover	Nest sites	Prohibit surface occupancy and use from April 1 to July 15 within 0.25 mile of all plover nest sites.	TL	4/1 to 7/15	0.25 mile
Wildlife-SSS	Prairie dog, white-tailed	Prairie dog towns	To protect prairie dog pups, surface disturbing activities will not be permitted in prairie dog towns between April 1 and June 15.	TL	4/1 to 6/15	No buffer
Wildlife-SSS	Yellow-billed cuckoo	Suitable habitat	Construction of roads, pipelines, and powerlines through riparian habitat should be placed near the edge of the current YBC habitat. This construction should not occur from June 1 through August 1. Roads, new trails, and rights of way (ROW) should be combined where possible, and stream crossings should be at right angles to YBC habitat to minimize impacts.	TL	6/1 to 8/1	No buffer

C.3.2.4 Grand Junction Field Office, Colorado

References: Grand Junction Resource Area Resource Management Plan and Record of Decision, January 1987 (Management Decisions by Resource; Chapter 2, Resource Decisions; Appendix B—Standard Design Practices; Appendix D—Oil and Gas Leasing Stipulations).

Table C.3-10 Grand Junction Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Cultural Resources		Indian Creek, Rough Canyon, Cactus Park, Sieber Canyon, McDonald Creek, 5ME1358, Ladder Springs and Transect 7	Actively-managed cultural resource sites (Indian Creek, Rough Canyon, Cactus Park, Sieber Canyon, McDonald Creek, 5ME1358, Ladder Springs and Transect 7) are NSO and unsuitable for utilities.	NSU	No buffer
Lands and Realty		Black Ridge corridor	No surface-disturbing activities shall be allowed within the Black Ridge corridor. Designated as unsuitable for public utilities.	NSU	No buffer
Recreation		Recreation sites, developed	Developed recreation sites (Mud Springs, Miracle Rock, Dominguez, The Falls, Island Acres, Vega Reservoir, and Highline Reservoir) are NSO and unsuitable for public utilities.	NSU	No buffer

Table C.3-10 Grand Junction Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Soils		Slopes > 40%	No surface-disturbing activities shall be allowed on lands with 40 percent slope or greater; allow other surface disturbing activities only after analyzing site-specific conditions and potential for safety hazards and reclamation. In order to avoid or mitigate unacceptable impacts to soil, water, and vegetation resources on these lands, special design practices may be necessary and higher than normal costs may result. Where impacts cannot be mitigated to the satisfaction of the authorized office, no surface-disturbing activities shall be allowed. Designated as public utility sensitive area.	CSU	No buffer
Soils	Baxter Pass, Douglas Pass, and Plateau Creek	Erodible, fragile soils and unstable soils	No surface-disturbing activities shall be allowed on unstable and slumping soils in the areas of Baxter Pass, Douglas Pass, and Plateau Creek; allow other surface disturbing activities only after analyzing site-specific conditions and potential for safety hazards and reclamation. Designated as public utility unsuitable area.	NSU	No buffer
Soils	Cactus Park	Erodible, fragile soils and unstable soils	No surface-disturbing activities shall be allowed on critically-eroding soils (Cactus Park).	NSU	No buffer
Special Designations-ACEC		Badger Wash ACEC	ROW avoidance area.	CSU	No buffer
Special Designations-ACEC		Rabbit Valley paleontological site RNA	No surface-disturbing activities shall be allowed in Rabbit Valley paleontological site RNA. Also designated as unsuitable for utilities.	NSU	No buffer
Special Designations-Wilderness Study Areas (WSA)		Demaree WSA	WSA, however, is not deemed as suitable for wilderness and not ID'd as utility unsuitable area.	NSU, CSU	No buffer
Vegetation		Black Ridge Angiosperm areas	Designated as unsuitable for public utilities.	NSU	Vegetation
Vegetation		Pine Mountain Roadsite	Designated as public utility sensitive area.	CSU	No buffer
Vegetation-SSS	All	SSS known habitat	Known habitat designated as public utility sensitive areas. The lessee/operator shall submit a plan for avoidance or mitigation of impacts on the identified species to the authorized officer. This may require completion of an intensive inventory by a qualified biologist. The plan must be approved prior to any surface disturbance. The authorized officer may require additional mitigation measures such as relocation-of proposed roads, drilling sites, or other facilities. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.	CSU	No buffer

Table C.3-10 Grand Junction Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation-SSS	*Crypanthaelata*	*Crypanthaelata* site	Identified *Crypanthaelata* sites are designated as public utility sensitive areas. The lessee/operator shall submit a plan for avoidance or mitigation of impacts on the identified species to the authorized officer. This may require completion of an intensive inventory by a qualified biologist. The plan must be approved prior to any surface disturbance. The authorized officer may require additional mitigation measures such as relocation-of proposed roads, drilling sites, or other facilities. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.	CSU	No buffer
Vegetation-SSS	Spineless hedgehog cactus	Occupied habitat	Leasing stipulations and designated as public utility sensitive areas. The lessee/operator shall submit a plan for avoidance or mitigation of impacts on the identified species to the authorized officer. This may require completion of an intensive inventory by a qualified biologist. The plan must be approved prior to any surface disturbance. The authorized officer may require additional mitigation measures such as relocation-of proposed roads, drilling sites, or other facilities. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.	CSU	No buffer
Vegetation-SSS	Uinta basin hookless cactus	Occupied habitat	Leasing stipulations and designated as public utility sensitive areas. The lessee/operator shall submit a plan for avoidance or mitigation of impacts on the identified species to the authorized officer. This may require completion of an intensive inventory by a qualified biologist. The plan must be approved prior to any surface disturbance. The authorized officer may require additional mitigation measures such as relocation-of proposed roads, drilling sites, or other facilities. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.	CSU	No buffer
Visual		VRM Class I and II within Grand Junction FO	Class I and II visual resource management areas (Juanita Arch, The Goblins, Ruby Canyon, Dolores River corridor, Gunnison River corridor, Mount Garfield cliffs, Bang's Canyon cliffs, Sinbad Valley cliffs, Granite Creek cliffs, Unaweep Canyon cliffs, Hunter/Garvey Canyons cliffs, Vega Reservoir viewshed) and black ridge corridor are NSO and unsuitable for utilities.	NSU	No buffer

Table C.3-10 Grand Junction Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Visual		VRM Class III areas with outstanding scenic and landscape values within Grand Junction FO	Special design and reclamation measures may be required to protect the outstanding scenic and natural landscape values of located on the following areas: a. Gunnison River corridor valley bottoms and benches. b. South Shale Ridge. c. Grand Mesa slopes. d. Bang's Canyon benches and mesa tops. e. Sinbad Valley, valley floor, benches. f. Granite Creek benches and mesa tops. g. Unaweep Canyon valley bottoms. h. Hunter/Garvey Canyons benches and mesa tops. i. Face of the Book Cliffs. j. Highway corridors (I-70, 50, 139, 141, and Baxter Pass road). k. Little Book Cliffs Wild Horse Range. l. BLM campground viewshed (Mud Springs, Miracle Rock, and Dominguez). Special design and reclamation measures may include transplanting trees and shrubs, fertilization, mulching, special erosion control structures, irrigation, site recontouring to match the original contour, buried tanks and low profile equipment, and painting to minimize visual contrasts. Surface-disturbing activities may be denied in sensitive areas, such as unique geologic features and rock formations, visually prominent areas, and high recreation use areas.	CSU	No buffer
Water Resources		Municipal/culinary/ public water/reservoirs	All proposed activities will avoid interference with the Jerry Creek Reservoirs' watershed. This may include the relocation of proposed uses, facilities, or application of appropriate mitigation measures.	CSU	No buffer
Water Resources		Municipal/culinary/ public water/reservoirs	All proposed activities will avoid interference with the Palisade municipal watershed. This may include the relocation of proposed uses, facilities, or application of appropriate mitigation measures.	CSU	No buffer
Water Resources		Municipal/culinary/ public water/reservoirs	No surface-disturbing activities shall be allowed on Grand Junction municipal watershed.	CSU	No buffer
Water Resources		Perennial streams	No surface-disturbing activities shall be allowed on Lands within 100 feet of perennial streams, except for essential roads and utility crossings. Designated as public utility sensitive area.	CSU	100 feet
Water Resources		Riparian areas	No surface-disturbing activities shall be allowed on riparian areas.	NSU	No buffer
Water Resources, area specific		Badger Wash Study Area	No surface-disturbing activities shall be allowed on Badger Wash hydrologic study area. Designated as public utility unsuitable area.	NSU	No buffer
Water Resources, area specific		Indian Wash Dam	No surface-disturbing activities shall be allowed on Indian Wash dam. Designated as public utility unsuitable area.	NSU	No buffer

Table C.3-10 Grand Junction Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-Aquatic Species	Colorado cutthroat trout	Colorado cutthroat trout	Leasing stipulations and designated as public utility sensitive areas. The lessee/operator shall submit a plan for avoidance or mitigation of impacts on the identified species to the authorized officer. This may require completion of an intensive inventory by a qualified biologist. The plan must be approved prior to any surface disturbance. The authorized officer may require additional mitigation measures such as relocation-of proposed roads, drilling sites, or other facilities. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.	CSU	No buffer
Wildlife-Big Game		Skipper's Island and Rough Canyon	No surface-disturbing activities shall be allowed on Skipper's Island and Rough Canyon wildlife habitat areas. Designated as unsuitable for public utilities; NSO.	NSU	No buffer
Wildlife-Big Game	All	Badger Wash uplands	Badger Wash uplands is designated as public utility sensitive area.	CSU	No buffer
Wildlife-Big Game	Elk	Elk calving areas	No surface-disturbing activities shall be allowed on elk calving sites. Designated as sensitive for public utilities.	NSU, CSU	No buffer
Wildlife-SSS	Black-footed ferret	Black-footed ferret habitat	Leasing stipulations and designated as public utility sensitive areas. The lessee/operator shall submit a plan for avoidance or mitigation of impacts on the identified species to the authorized officer. This may require completion of an intensive inventory by a qualified biologist. The plan must be approved prior to any surface disturbance. The authorized officer may require additional mitigation measures such as relocation-of proposed roads, drilling sites, or other facilities. Where impacts cannot be mitigated to the satisfaction of the authorized officer, surface occupancy on that area must be prohibited.	CSU	No buffer

Table C.3-11 Grand Junction Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wild Horses		Coal Canyon wintering and foaling areas	Prohibit disturbing activities in the Coal Canyon area from December 1 to July I to protect the wild horse wintering and foaling areas.	TL	12/1 to 7/1	No buffer
Wild Horses		Winter range	During periods critical to wild horses, the following restrictions will be applied: (I) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip. Critical periods are December 1 to May 1.	TL	12/1 to 5/1	No buffer
Wildlife-Big Game	Big horn sheep	Winter range	During periods critical to bighorn sheep the following restrictions will be applied: (I) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip. Critical periods are: Bighorn winter range - December 1 to May 1.	TL	12/1 to 5/1	No buffer

Table C.3-11 Grand Junction Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	Mule deer, elk	Winter range	During periods critical to deer, elk, the following restrictions will be applied: (I) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip. Critical periods are December 1 to May 1.	TL, CSU	12/1 to 5/1	No buffer
Wildlife-Big Game	Elk	Parturition areas	In elk Calving areas the following restrictions will be applied: (I) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip. Critical periods are May 15 to June 15.	TL, CSU	5/15 to 6/15	No buffer
Wildlife-Raptors	Bald eagle	Winter concentration areas	Protect bald eagle concentration areas from surface-disturbing activities from December 1 to April 1.	TL	12/1 to 4/1	No buffer
Wildlife-Raptors	Peregrine falcon	Nest (only includes active nest buffer area)	Protect active peregrine falcon nests from surface-disturbing activities from March 15 to July 1.	TL	3/15 to 7/1	No buffer
Wild Horses		Foaling areas	During periods critical to wild horses, the following restrictions will be applied: (I) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip. Critical periods are March 1 to July 1.	TL	3/1 to 7/1	No buffer

C.3.2.5 White River Field Office, Colorado

References: White River Field Office Record of Decision and Approved Resource Management Plan, July 1997 (Chapter 2, Resource Management Decisions; Appendix A—Surface Stipulations Applicable to All Surface Disturbing Activities; Appendix B—Conditions of Approval).

Table C.3-12 White River Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Lands and Realty		Dragon Trail-Atchee Ridge corridor	Dragon Trail-Atchee Ridge corridor follows the route once proposed as the Rangely loop segment of the Northwest Pipeline Expansion Project. It runs south from Rangely, to the vicinity of Baxter Pass, is approximately 1-mile wide, and will accommodate all buried linear facilities.	CSU	No buffer
Soils		Erodible, fragile soils and unstable soils	Identified soils are considered unstable and subject to slumping and mass movement. Surface occupancy will not be allowed in such areas delineated from USDA SCS Order III Soil Surveys.	NSU	No buffer

Table C.3-12 White River Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-ACEC		Coal Oil Rim ACEC	These ACECs are known to contain, or have acres potential to contain, T/E plants or plants that are candidates for listing as T/E. State of Colorado plant -White River species of concern, BLM sensitive plants, remnant Riparian (950 vegetation associations, and/or unique plant acres) communities. A plant inventory will be conducted prior to approving any surface disturbing activities within the ACEC boundaries. Surface disturbance will not be allowed within mapped locations of these plants. The presence of the above listed plants would require relocating surface disturbance or facilities more than 200 meters. The timing required for (18,260 acres) conducting the plant inventories may require deferring activities longer than 60 days. NSO stipulations will be attached to all use authorizations encompassing these areas. Motorized vehicle travel within designated ACECs will be allowed only on designated roads and trails.	CSU	No buffer
Special Designations-ACEC		Oil Spring Mountain ACEC	These ACECs are known to contain, or have acres potential to contain, T/E plants or plants that are candidates for listing as T/E. State of Colorado plant -White River species of concern, BLM sensitive plants, remnant Riparian (950 vegetation associations, and/or unique plant acres) communities. A plant inventory will be conducted prior to approving any surface disturbing activities within the ACEC boundaries. Surface disturbance will not be allowed within mapped locations of these plants. The presence of the above listed plants would require relocating surface disturbance or facilities more than 200 meters. The timing required for (18,260 acres) conducting the plant inventories may require deferring activities longer than 60 days. NSO stipulations will be attached to all use authorizations encompassing these areas. Motorized vehicle travel within designated ACECs will be allowed only on designated roads and trails.	CSU	No buffer
Special Designations-ACEC		White River Riparian ACEC	Managed for recreation as roadless natural. These ACECs are known to contain, or have acres potential to contain, T/E plants or plants that are candidates for listing as T/E. State of Colorado plant -White River species of concern, BLM sensitive plants, remnant Riparian (950 vegetation associations, and/or unique plant acres) communities. A plant inventory will be conducted prior to approving any surface disturbing activities within the ACEC boundaries. Surface disturbance will not be allowed within mapped locations of these plants. The presence of the above listed plants would require relocating surface disturbance or facilities more than 200 meters. The timing required for (18,260 acres) conducting the plant inventories may require deferring activities longer than 60 days. NSO stipulations will be attached to all use authorizations encompassing these areas. Motorized vehicle travel within designated ACECs will be allowed only on designated roads and trails.	CSU	No buffer
Vegetation-SSS	All	BLM sensitive plants and RVAs	No surface occupancy will be allowed within known populations of BLM sensitive plants and remnant vegetation associations (RVAs). Motorized travel within known locations of sensitive plants and high priority RVAs that are located outside ACECs is limited to designated roads and trails.	NSU, CSU	No buffer

Table C.3-12 White River Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation-SSS	All	Federally listed species known and potential habitat	No Surface Occupancy (NSO) stipulation will be placed on known and potential habitat of federally-listed and candidate T/E plants. New T/E plant habitat mapped as a result of future surveys will also be protected by a NSO stipulation. This stipulation will apply to all surface disturbing activities within these areas. All known and potential T/E habitat, including ACECs, will be exclusion areas for new Rights-of-Way authorizations. Land use authorizations will be denied in exclusion areas, with the exception of short-term land use permits involving no development, and projects that are consistent with management objectives for the area.	NSU	No buffer
Water Resources		Riparian areas	Surface disturbing activities would be required to avoid riparian habitat.	CSU	No buffer
Wildlife-Raptors	Bald eagle	Nests	Surface Occupancy is not allowed within 0.25 mile of Bald Eagle nests. Prior to authorizing surface disturbance within Nest, Roost, and Perch habitat, and pending conferral consultation with the USFWS as required by the Endangered Species Act, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that: 1) involvement of cottonwood stands or cottonwood regeneration areas have been avoided to the extent practicable; 2) special reclamation measures or design features are incorporated that would accelerate recovery and/or reestablishment of affected cottonwood communities: 3) the pre-development potential of affected floodplains to develop or support riverine cottonwood communities has not been diminished: and 4) the current/future utility of such cottonwood substrate for bald eagle use would not be impaired.	NSU, CSU	0.25 mile
Wildlife-Raptors	Bald eagle	Roosts	Surface Occupancy is not allowed within 0.25 mile of Bald Eagle Roost/Concentration Areas. Prior to authorizing surface disturbance within Nest, Roost, and Perch habitat, and pending conferral consultation with the USFWS as required by the Endangered Species Act, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that: 1) involvement of cottonwood stands or cottonwood regeneration areas have been avoided to the extent practicable; 2) special reclamation measures or design features are incorporated that would accelerate recovery and/or reestablishment of affected cottonwood communities: 3) the pre-development potential of affected floodplains to develop or support riverine cottonwood communities has not been diminished: and 4) the current/future utility of such cottonwood substrate for bald eagle use would not be impaired.	NSU, CSU	0.25 mile
Wildlife-Raptors	Raptors, non-SSS	Nests	Disruptive surface occupation or adverse habitat modification will be prohibited within l/8 mile of non-listed members (i.e. not listed, proposed, candidate, and BLM sensitive) of the raptor group.	NSU	0.125 mile
Wildlife-Raptors	Raptors, SSS (listed, proposed, candidate, and BLM sensitive)	Nests	Disruptive surface occupation or adverse habitat modification will be prohibited within l/4 mile of functional nest sites of special status species (i.e. listed, proposed, candidate, and BLM sensitive).	NSU	0.25 mile
Wildlife-SSS	Sage grouse	Leks	This area encompasses sage grouse leks. Surface Occupancy is not allowed within l/4 mile of identified lek sites.	NSU	0.25 mile

Table C.3-12 White River Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-Wilderness Study Areas (WSA)		Bull Canyon WSA	Bull Canyon WSA will be managed under the Interim Management Policy For Lands Under Wilderness Review. Except for certain valid existing rights, activities will not be allowed to occur in WSAs that will impair wilderness values or the area's suitability for preservation as wilderness. WSAs are ROW exclusion areas. Land use authorizations will be denied in exclusion areas, with the exception of short-term land use permits involving no development, and projects that are consistent with management objectives for the area.	NSU, CSU	No buffer
Special Designations-Wilderness Study Areas (WSA)		Willow Creek WSA	Skull Mountain WSA will be managed under the Interim Management Policy For Lands Under Wilderness Review. Except for certain valid existing rights, activities will not be allowed to occur in WSAs that will impair wilderness values or the area's suitability for preservation as wilderness. WSAs are ROW exclusion areas. Land use authorizations will be denied in exclusion areas, with the exception of short-term land use permits involving no development, and projects that are consistent with management objectives for the area.	NSU, CSU	No buffer
Special Designations-Wilderness Study Areas (WSA)		Skull Mountain WSA	Skull Mountain WSA will be managed under the Interim Management Policy For Lands Under Wilderness Review. Except for certain valid existing rights, activities will not be allowed to occur in WSAs that will impair wilderness values or the area's suitability for preservation as wilderness .WSAs are ROW exclusion areas. Land use authorizations will be denied in exclusion areas, with the exception of short-term land use permits involving no development, and projects that are consistent with management objectives for the area.	NSU, CSU	No buffer
Cultural Resources		Canyon Pintado National Historic District	This is a controlled surface use area for the protection of cultural resources. The Area Manager may approve actions within this area if an environmental analysis and inventory indicates that the proposed action is compatible with the intent of the Historic District, and can comply with Historic District cultural resource protection requirements. All proposed actions will be reviewed for conflicts with known archaeological or historical resources. In areas of conflicts, a pedestrian inventory of the proposed project area will be completed by a qualified archaeologist using standards specified by the BLM. The Area Manager may require that a qualified archaeologist be present to monitor operations during surface disturbing activities. If archaeological resources are located during the inventory, the proposed action will be relocated to avoid and protect the cultural values. Proposed actions that produce vibrations will be located a distance far enough away from rock art or structural features to allow full attenuation of the vibration before it gets to the resource of concern. All inventories are required to be submitted to the BLM in report form and are subject to review by the Colorado State Historic Preservation Office and the Advisory Council on Historic Preservation prior to approval of the proposed action. Surface Occupation may not be allowed to occur in order to protect cultural resources.	CSU	No buffer
Soils		Saline Soils derived from Manco shale	Surface disturbing activities will be allowed in these areas only after an engineered soils derived construction/reclamation plan is submitted by the operator and approved by the Area Manager.	CSU	No buffer
Soils		Slopes > 35%	Surface disturbing activities will be allowed in fragile soils on Slopes >35% only after an engineered soils derived construction/reclamation plan is submitted by the operator and approved by the Area Manager.	CSU	No buffer

Table C.3-12 White River Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation		Aspen, serviceberry and chokecherry communities	Blue Mountain Deciduous Browse/Aspen/Serviceberry/Chokecherry Communities are a controlled surface use area in order to maintain and the distribution, condition, and functional capacity of deciduous browse and aspen communities integral to high priority big game and blue grouse habitats. Prior to authorizing activities in this area, the proponent/applicant would be required to submit a plan of development that would demonstrate that: 1) involvement of aspen, serviceberry, and chokecherry associations have been avoided to the extent possible: 2) special reclamation measures or design features would promote accelerated recovery or establishment of desirable plant community components: 3) the potential or capacity of the area to support viable, self-sustaining aspen, serviceberry, and chokecherry communities has not been diminished; 4) involvement of community derived values are mitigated through project life commensurate with projected impacts. Surface disturbance or occupation within aspen, serviceberry, and chokecherry communities may be prohibited.	CSU	No buffer
Visual		VRM Class II and III areas within White River FO	Measures may be required to protect scenic and natural landscape values. These design and measures may include transplanting trees and shrubs, mulching and fertilizing disturbed areas, use of low profile permanent facilities, and painting to minimize visual contrasts. Surface disturbing activities may be moved up to 200 meters to avoid sensitive areas or to reduce the visual effects of the proposal. These measures would be applied to the following VRM Class II and III areas: Canyon Pintado National Historic District; Highways 13, 40, 64, and 139 corridors; Viewsheds in the Blue Mountain/Moosehead GRA; White River Corridor; Douglas and Baxter Pass divide; Cathedral Bluffs; and VRM Class II areas around Meeker. These measures may also be applied to other areas on a case by case basis.	CSU	No buffer
Wildlife-Aquatic Species	Colorado cutthroat trout	Aquatic trout habitat (habitats occupied by populations of Colorado River cutthroat trout)	Prior to authorizing surface disturbance of occupied stream reaches or within watersheds contributing to occupied habitats, the Area Manager may require the proponent/applicant to submit a plan of development that would demonstrate that the proposed action would not: 1) increase stream gradient: 2) result in a net increase in sediment contribution; 3) decrease stream channel sinuosity: 4) increase the channel width to depth ratio; 5) increase water temperature; 6) decrease vegetation derived stream shading; and 7) degrade existing water quality parameters, including specific conductance, turbidity, organic/inorganic contaminant levels, and dissolved oxygen in occupied reaches or contributing perennial or intermittent tributaries. If approvals are granted and development results in these standards being exceeded, additional measures would be required to correct the deficiencies.	CSU	No buffer
Wildlife-Avian	Avian	Nest sites of all special status and tree-nesting species	Permitted land use activities within l/4 mile of functional nest sites of cavity, cliff, and ground-nesting species, and within l/2 mile of functional nest sites of special status and tree-nesting species, will be subject to relocation or design modifications to preclude, or reduce to acceptable levels, long-term reduction or deterioration.	CSU	No buffer

Table C.3-12 White River Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Black-footed ferret	Potential habitat for wild or reintroduced populations	Lands within this lease parcel involve prairie dog ecosystems that constitute potential habitat for wild or reintroduced populations of the federally endangered black footed ferret. Conservation and recovery efforts for the black-footed ferret are authorized by the Endangered Species Act of 1973 (as amended). The successful lessee may be required to perform special conservation measures prior to and during lease development. These measures may include one or more of the following: 1. Performing site-specific habitat analysis and/or participating in ferret surveys. 2. Participating in the preparation of a surface use plan of operations with BLM, USFWS, and COW, which integrates and coordinates long term lease development with measures necessary to minimize adverse impacts to black-footed ferrets or their habitat. 3. Abiding by special daily and seasonal activity restrictions on construction, drilling, product transport, and service activities. 4. Incorporating special modifications to facility siting, design, construction, and operation. 5. Providing in-kind compensation for habitat loss and/or displacement (e.g. special on-site rehabilitation/revegetation measures or off-site habitat enhancement).	CSU	No buffer
Wildlife-SSS	Black-footed ferret	Black-footed ferret Reintroduction Area	Prior to authorizing activities in this area, the Area Manager will confer or consult with the USFWS as required by Section I of the Endangered Species Act. Depending on the scope of the proposed action, a plan of development may be required that demonstrates how the proposed activities would be conducted or conditioned to: 1) avoid the direct or indirect loss of black-footed ferrets: or 2) avoid affecting the capability of the site to achieve reestablishment objectives. The Area Manager may impose land use measures and limitations derived from a site specific ferret reintroduction and management plan. The measures and limitations would be designed to avoid, or reduce to acceptable levels, the short and long term adverse effects on ferret survival, behavior, reproductive activities, and/or the area's capacity to sustain ferret population objectives.	CSU	No buffer
Wildlife-SSS	Sage grouse	Sage grouse habitat	Conversion or adverse modification of the following sage grouse habitats will be avoided: 1) sagebrush stands with ≤50 percent canopy and ≤30" in height, and ≤2 miles from a lek; 2) sagebrush stands with ≤30 percent canopy and ≤30" in height; >2 miles from a lek on occupied summer ranges; 3) any sagebrush stand on slopes ≤0 20 percent in defined winter concentration areas; and 4) sagebrush stands on slopes ≤20 percent showing evidence of winter use.	CSU	2 mile

Table C.3-13 White River Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wild Horses		Foaling areas	During periods critical to wild horses, the following restrictions will be applied: (I) No new construction activities will occur; (2) All activities will be conducted during daylight hours only; (3) Vehicular access on a daily basis will be limited to a single trip. Critical periods are March 1 to July 1.	TL	3/1 to 6/15	No buffer

Table C.3-13 White River Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wild Horses		Foaling areas	In order to protect wild horses within this area, intensive development activities may be delayed for a specified 60 day period within the spring foaling period between March 1 and June 15.	TL	3/1 to 6/15	No buffer
Wildlife-Big Game	All	Winter range, severe	No development activity in big game severe winter range is allowed from December 1 through April 30. Exceptions apply.	TL	12/1 to 4/30	No buffer
Wildlife-Big Game	Mule deer, elk	Summer range	This stipulation will not take effect until direct and indirect impacts to suitable summer range habitats exceed 10% of that available within the individual Game Management Units. When this threshold has been reached, no further development activity will be allowed from May 15 through August 15. Exceptions apply.	TL	5/15 to 8/15	No buffer
Wildlife-Big Game	All	Parturition areas	All surface disturbing activities restricted from May 1 - June 30 in designated parturition areas.	TL	5/1 to 6/30	No buffer
Wildlife-Raptors	All listed, candidate T/E &/ BLM sensitive species except bald eagle and ferruginous hawks)	Nests	No development activities are allowed within ½ mile of identified nest sites from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	All raptors other than T/E and candidate T/E species	Nests	No development activities are allowed within ¼ mile of identified nests from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	0.125 mile
Wildlife-Raptors	Bald eagle	Nests	No development is allowed within 1/2 mile of identified nests from December 15 through July 15, or until fledgling and dispersal of young.	TL	12/15 to 7/15	0.5 mile
Wildlife-Raptors	Bald eagle	Roosts, winter concentration areas	No development is allowed within ½ mile of identified sites from November 15 through April 15. Exceptions apply.	TL	11/15 to 4/15	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No development is allowed within one (1) mile of identified nests from February 1 through August 15, or until fledgling and dispersal of young. Exceptions apply.	TL	2/1 to 8/15	1.0 mile
Wildlife-SSS	Sage grouse	Leks	If direct and indirect impacts to suitable nesting cover exceeds 10 percent of the habitat available within 2 miles of identified leks, further development will not be allowed from April 15 through July 7. (Development can occur until 10 percent of the habitat associated with a lek is impacted, from then on, additional activity can occur from July 8 through April 14).	TL	4/15 to 7/7	2 miles
Wildlife-SSS	Sage grouse	Winter habitat	This area encompasses sagebrush habitats that are occupied by wintering concentrations of grouse, or represent the only habitats that remain available for use during periods of heavy snowpack. No development activity will be allowed between December 16 and March 15.	TL	12/16 to 3/15	No buffer

C.3.2.6 Vernal Field Office, Utah

References: Vernal Field Office Record Of Decision And Approved Resource Management Plan, October 2008 (Management Decision by Resource; Appendix A—Best Management Practices for Raptors and Their Associated Habitats In Utah, August 2006; Appendix K—Surface Stipulations Applicable to all Surface-Disturbing Activities; Appendix L—Utah's Threatened and Endangered Species Lease Notices for Oil and Gas Development and BLM-committed Conservation Measures; Appendix R—Fluid Minerals BMPs).

Table C.3-14 Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Cultural Resources		Little Hole and Devils Hole area	The Little Hole and Devils Hole areas will be open for oil and gas leasing, subject to controlled surface-use (CSU) stipulations to protect cultural sites that include lithic scatters, burials, tool manufacturing sites, structures, and rock shelters.	CSU	No buffer
Cultural Resources		Upper Willow Creek area of the Book Cliffs	To preserve the unique representation of the Archaic period, the surface disturbing activities would be subject to timing and controlled surface use stipulations.	CSU, TL	No buffer
Cultural Resources		Four Mile Wash area (Section 18, T10S, R19E)	To protect traditional sacred properties, the area would be open for oil and gas leasing and other surface disturbing activities subject to timing and controlled surface-use stipulations or NSO. *[Per the RMP, ROWs exclusion and avoidance areas are consistent with areas closed to oil and gas leasing or with a no surface occupancy stipulation, respectively.]*	CSU	No buffer
Cultural Resources		Uinta foothills area	The area would be open for oil and gas leasing and other surface disturbing activities subject to timing and controlled surface-use stipulations or NSO. *[Per the RMP, ROWs exclusion and avoidance areas are consistent with areas closed to oil and gas leasing or with a no surface occupancy stipulation, respectively.]*	CSU	No buffer
Lands and Realty		ROW corridors	Future ROWs that cross the Lower or Upper Green River will be placed in the Four Mile Bottom Area or at the Head of Little Swallow Canyon.	CSU	No buffer
Recreation		Recreation sites, developed	All developed recreation sites within VFO will be closed to all forms of surface-disturbing activities not directly related to recreation development. Developed recreation sites would be closed to the shooting of firearms, grazing, and all forms of surface-disturbing activities. An exemption would be granted if the disturbance were related to recreational infrastructure support.	NSU	No buffer
Soils		Slopes between 21-40%	If surface-disturbing activities cannot be avoided on slopes from 21-40% a plan would be required. The plan would be approved by BLM prior to construction and maintenance and include: • An erosion control strategy• GIS modeling• Proper survey and design by a certified engineer. The surface operating standards for oil and gas exploration and development (Gold Book) would be used as a guide for surface-disturbing proposals on steep slopes/hillsides.	CSU	No buffer

Table C.3-14 Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Soils		Slopes > 40%	For slopes greater than 40%, allow NSO. If after an environment analysis the authorized officer determines that it would cause undue or unnecessary degradation to pursue other placement alternatives, surface occupancy in the NSO area may be authorized. Additionally a plan would be submitted by the operator and approved by BLM prior to construction and maintenance and include: • An erosion control strategy; • An erosion control strategy; • Proper survey and design by a certified engineer. Modifications also may be granted if a more detailed analysis, i.e. Order I, soil survey conducted by a qualified soil scientist finds that surface disturbance activities could occur on slopes greater than 40% while adequately protecting the area from accelerated erosion.	CSU	No buffer
Special Designations-ACEC		Lears Canyon ACEC (1,375 ac)	ROW avoidance area. Leasing NSO in Lears Canyon ACEC to protect relict vegetation areas, OHV use will be closed or limited to designated routes. VRM II.	NSU	No buffer
Special Designations-ACEC		Lower Green River ACEC - (8,470 acres)	ROW avoidance area. Leasing NSO allowed within line of sight or up to one-half mile from the centerline of the river, whichever is less. OHV use will be limited to designated routes. VRM Class II. Approximately 71 acres will be open to leasing subject to moderate constraints such as TLs and CSU. Approximately 8,079 acres will be open to leasing subject to major constraints such as NSO stipulations. No areas open to standard tips, no areas unavailable for leasing. Future facilities would be placed within the existing ROW corridor near the Four Mile Bottom area where an existing pipeline crosses the Green River. 8,079 NSO; 71 CSU/TL.	CSU	No buffer
Special Designations-ACEC		Nine Mile Canyon ACEC	ROW avoidance area. Managed to enhance cultural and special status plant FO species while enhancing scenic vistas, recreation, and wildlife resource values. A comprehensive integrated activity plan will be developed / implemented. OHV use will be limited to designated routes.	CSU	No buffer
Special Designations-National Monuments		Areas adjacent to Dinosaur National Monument	Minimize noise and light pollution adjacent to Dinosaur National Monument using best available technology such as installation of multi-cylinder pumps, hospital sound reducing mufflers, and placement of exhaust systems to direct noise away from the monument. Additionally, there would be a requirement to reduce light pollution by using methods such as limiting height of light poles, timing of lighting operations (meaning limiting lighting to times of darkness associated with drilling and work over or maintenance operations), limiting wattage intensity, and constructing light shields. However, this requirement is not applicable if it affects human health and safety. Movement of operations to mitigate sound and light impacts would be required to be at least 200 m from the Monument boundary for VRM Classes II, III and IV. Exception: An exception may be granted if a determination is made that natural barriers or view sheds would meet these mitigation objectives or if human health and safety were adversely affected.	CSU	200 meters (656 feet)
Special Designations-WSR		Lower Green River from the public land boundary south of Ouray to the Carbon County line	The segment of the Lower Green River from the public land boundary south of Ouray to the Carbon County line will continue to be managed as previously recommended as a suitable scenic segment to protect its outstandingly remarkable values. Management will include: Oil and Gas Leasing – NSO; Mineral Materials – Closed; OHV – Closed and limited to designated routes; VRM – Classes I and II.	NSU	No buffer

Table C.3-14 Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation-SSS	Clay reed-mustard	Occupied habitat	Clay reed-mustard conservation measures: 4. Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: a. Where standard surveys are technically infeasible, infrastructure and activities will avoid all suitable habitat (avoidance areas) and incorporate 300' buffers, in general; however, site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat; b. Follow the above recommendations (#3) for project design within suitable habitats; c. To avoid water flow and/or sedimentation into occupied habitat and avoidance areas, silt fences, hay bales, and similar structures or practices will be incorporated into the project design; appropriate placement of fill is encouraged; d. Construction of roads will occur such that the edge of the right of way is at least 300' from any plant and 300' from avoidance areas; f. The edge of the well pad should be located at least 300' away from plants and avoidance areas, in general; however, site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat; and k. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat. Roads will be graveled within occupied habitat.	CSU	300 feet
Vegetation-SSS	Shrubby reed-mustard	Occupied habitat	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: a. Follow the above (#3) recommendations for project design within suitable habitats; b. Construction of roads will occur such that the edge of the right of way is at least 300' from any plant,; d. The edge of the well pad should be located at least 300' away from plants; g. Before and during construction, areas for avoidance should be visually identifiable in the field (e.g., flagging, temporary fencing, rebar, etc.); h. Where technically and economically feasible, use directional drilling or multiple wells from the same pad, ;i. Designs will avoid concentrating water flows or sediments into occupied habitat; j. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat. Roads will be graveled within occupied habitat.	CSU	300 feet from plants
Vegetation-SSS	Ute ladies'-tresses	Occupied habitat	Within occupied habitat, project infrastructure will be designed to avoid direct disturbance and minimize indirect impacts to populations and to individual plants: a. Follow the above (#3) recommendations for project design within suitable habitats; b. Buffers of 300 feet minimum between right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated; c. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, using stabilizing and anchoring techniques when the pipeline crosses habitat to ensure the pipelines don't move towards the population; f. Designs will avoid altering site hydrology and concentrating water flows or sediments into occupied habitat; g. Place produced oil, water, or condensate tanks in centralized locations, away from occupied habitat, with berms and catchment ditches to avoid or minimize the potential for materials to reach occupied or suitable habitat.	CSU	300 feet

Table C.3-14 Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water Resources		100-year floodplains, municipal/culinary /public water/reservoirs, riparian areas	Allow no new surface-disturbing activities within active flood plains, public water reserves, or 100 meters of riparian areas unless there are no practical alternatives, impacts will be fully mitigated, and the action is designed to enhance the riparian resources. The following mitigation measures could be included as applicable: • Keep construction of all new stream crossings to a minimum. Stream crossings with culverts will be designed and constructed to allow fish passage, where needed. All stream crossings will be designed and constructed to keep impacts to riparian and aquatic habitat to a minimum. • Relocate existing routes out of riparian areas where feasible or necessary to restore watershed and riparian stability.	NSU	100 meters (328 feet)
Wildlife-Aquatic species-SSS	Bonytail, Colorado pikeminnow, humpback chub, and razorback sucker	Colorado, Green, Duchesne, Price, White, and San Rafael rivers.	Colorado Pikeminnow, Humpback Chub, and Razorback Sucker Conservation Measures: 3.b. Surface-disturbing activities [other than oil and gas activities] maybe restricted within 1/4 mile of the channel centerline of the Colorado, Green, Duchesne, Price, White, and San Rafael Rivers.	NSU	0.25 miles of channel centerline
Wildlife-Big Game	Deer	Crucial deer winter range	Within crucial deer winter range, no more than 10% of such habitat will be subject to surface disturbance and remain un-reclaimed at any given time. (Exception: This stipulation may be excepted if either the resource values change or the lessee/operator demonstrates to BLMs satisfaction that impacts can be mitigated.)	CSU	No buffer
Wildlife-Big Game	Deer	Crucial deer winter range – recommendation only	It is preferred that surface-disturbing actions within crucial deer winter range will be located in pinyon juniper rather than browse where both vegetation types occur.	CSU	No buffer
Wildlife-Raptors	Raptors, all	Nests	Raptor management will be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (Utah BLM, 2006, Appendix A), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses. Spatial and temporal buffers applied to disturbances in the vicinity of nesting raptors will be tailored to the individual raptor species involved and based on factors such as line of sight distance between nest and disturbance, type and duration of disturbance, nest structure security, sensitivity of the species to disturbance, observed responses to related disturbances, and the amount of other disturbances already occurring in the vicinity. Land use activities which would have an adverse impact on an occupied raptor nest, would not be allowed within the spatial or seasonal buffer.	NSU	Refer to Raptor Guide

Table C.3-14 Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Canda Lynx	Occupied denning habitat	Avoid all surface disturbing actions within occupied denning habitat. Limit disturbance to and within suitable habitat by staying on approved access routes. Limit new access routes created by the project. Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be paved or otherwise upgraded (e.g., straightening of curves, widening of roadway etc.) in a manner that is likely to lead to significant increases in traffic volume, traffic speed, increased width of the cleared ROW, or would foreseeably contribute to development or increases in human activity in lynx habitat. When these types of upgrades are proposed, a thorough analysis of potential direct and indirect impacts to lynx and lynx habitat should be conducted. Minimize impacts to habitats that support lynx prey.	CSU	No buffer
Wildlife-SSS	Mexican spotted owl	Nests or PACs	No actions will occur within 0.5 mile of identified nest site. -If nest site is unknown, no activity will occur within the designated Protected Activity Center (PAC). –Avoid placing permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied. –Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5mile from suitable habitat, including canyon rims (Delaney et al. 1997). Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims. -Limit disturbances to and within suitable owl habitat by staying on designated routes. –Limit new access routes created by the project. A permanent action continues for more than one breeding season and/or causes a loss of owl habitat or displaces owls through disturbances, i.e., creation of a permanent structure. For all temporary actions that may impact owls or suitable habitat: -If action occurs entirely outside of the owl breeding season, and leaves no permanent structure or permanent habitat disturbance, action can proceed without an occupancy survey. -If action will occur during a breeding season, survey for owls prior to commencing activity. If owls are found, activity should be delayed until outside of the breeding season. -Eliminate access routes created by a project through such means as raking out scars, revegetation, gating access points, etc. Temporary activities are defined as those that are completed prior to the start of the following raptor breeding season, leaving no permanent structures and resulting in no permanent habitat loss.	NSU	0.5 mile
Wildlife-SSS	Prairie dog, white-tailed	White-tailed prairie dogs	No surface-disturbing activities within 660 feet of prairie dog colonies identified within prairie dog habitat. No permanent aboveground facilities are allowed within the 660-foot buffer. Exception: An exception may be granted by the AO if the applicant submits a plan that indicates that impacts of the proposed action can be adequately mitigated or, if due to the size of the town, there is no reasonable location to develop a lease and avoid colonies the AO will allow for loss of prairie dog colonies and/or habitat to satisfy terms and conditions of the lease. The AO may modify the boundaries of the stipulation area if portions of the area does not include prairie dog habitat or active colonies are found outside the current defined area, as determined by the BLM.	NSU	660 feet from colonies
Wildlife-SSS	Sage grouse	Leks	No surface-disturbing activities within 0.25 mile of active Sage-grouse leks will be allowed year round.	NSU	0.25 mile

Table C.3-14 Vernal Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Sage grouse	Leks	No permanent facilities or structures will be allowed within 2 miles of active sage grouse leks when possible.	CSU	2 miles
Wildlife-SSS	Sage grouse	Leks	Within 0.5 mile of known active leks, the best available technology will be used to reduce noise, e.g., installation of multi-cylinder pumps, hospital sound-reducing mufflers, and placement of exhaust systems.	CSU	0.5 mile

Table C.3-15 Vernal Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Vegetation-SSS	Clay reed-mustard	Occupied habitat	Construction activities not related to oil and gas development may be restricted from May 1st through June 5 within occupied habitat; the operator is encouraged to apply water for dust abatement to such areas from May 1 to June 5 (flowering period); dust abatement applications will be comprised of water only.	TL, CSU	5/1 to 6/5	No buffer
Vegetation-SSS	Shrubby reed-mustard	Occupied habitat	Construction activities not related to oil and gas development may be restricted from April 15th through May 30th within occupied habitat. The operator is encouraged to apply water for dust abatement to such areas from April 15 to May 30 (flowering period); dust abatement applications will be comprised of water only.	TL, CSU	4/15 to 5/30	No buffer
Wildlife- Big Game	Deer, elk	Parturition areas	In order to protect crucial elk calving and deer fawning habitat, exploration, drilling, and other development activity will not be allowed from May 15 through June 30. Maintenance of producing wells will be allowed. Specific exceptions may be granted by the BLM if the proposed activity will not seriously disturb wildlife habitat values being protected. This determination will be made by a BLM wildlife biologist in coordination with the UDWR and, if appropriate, the USFS. Such a determination may result if fawning is completed early and the fawning area is abandoned earlier to allow for disturbing activities for fluid mineral leasing and exploration to start earlier than July 31.	TL	5/15 to 6/30	No buffer

Table C.3-15 Vernal Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife- Big Game	Deer, elk	Winter habitat, crucial	Activities that will result in adverse impacts to deer and elk within crucial winter range will not be allowed from December 1 through April 30. This restriction will not apply if deer and/or elk are not present, or if it is determined through analysis and coordination with UDWR that impacts will be mitigated. Factors to be considered will include snow depth, temperature, snow crusting, location of disturbance, forage quantity and quality, animal condition, and expected duration of disturbance. The stipulation could be modified based on findings of collaborative monitoring and analysis. For example, the winter range configuration and time frames could be changed if current animal use patterns are determined to be inconsistent with the dates and boundaries established. This stipulation could be waived if it is determined through collaborative monitoring and analysis that the area is not crucial winter range or that timing restrictions are unnecessary.	TL	12/1 to 4/30	No buffer
Wildlife- Big Game	Pronghorn	Parturition areas	Do not allow activities that will result in adverse impacts to antelope from May 1 through June 30 to minimize stress and disturbance during crucial antelope birthing time. An exception may be granted to these dates by the authorized officer if the operator submits a plan which demonstrates that impacts from the proposed action can be adequately mitigated or if it is determined the habitat is not being utilized for fawning in any given year. The authorized officer may modify the boundaries of the stipulation area if a portion of the area is not being used as fawning grounds or if habitat is being utilized outside of stipulation boundaries as crucial fawning grounds and needs to be protected. May be granted if the fawning grounds are determined to be unsuitable or unoccupied and there is no reasonable likelihood of future use of the fawning grounds.	TL	5/1 to 6/30	No buffer
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	1/1 to 8/31	1 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	No surface disturbance within 1 mile buffer of active nests during breeding season (undefined).	TL	undefined	1.0 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile

Table C.3-15 Vernal Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-Raptors	Western screech owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-SSS	Black-footed ferret	Known home ranges	Activities involving the development or construction of temporary or permanent surface disturbances would be prohibited within 1/8 mile boundaries of known home ranges of female ferrets during the "critical" period from May 1 thru July 15. Exceptions: Ephemeral surface disturbance (disturbance in prairie dog habitat for less than six months, after which it again becomes or can be made suitable for prairie dog use), such as prescribed fire or herbicide treatment, may be conducted within 1/8 mile of the boundary of the home range of a female from March 1 to May 1. In general, the disturbance should be completed before the critical period begins. The Service, UDWR, and the land management agencies would determine if this exemption applies. Normal travel and surveying activities would not be restricted.	TL	5/1 to 7/15	0.125 mile
Wildlife-SSS	Canada lynx	Potential denning habitat	Avoid construction and surface disturbing actions in proximity to potential denning habitat during the breeding season (mid-April to July).Avoid construction and surface disturbing actions in proximity to potential denning habitat during the breeding season (mid-April to July). Activities involved with routine maintenance and operation will only occur during daytime hours, when lynx are least active.	TL	Mid-April to July	No buffer
Wildlife-SSS	Sage grouse	Leks	No surface-disturbing activities within two miles of active Sage-grouse leks will be allowed from March 1 through June 15.	TL	March 1 through June 15	2 miles

C.3.2.7 Moab Field Office, Utah

References: Record of Decision for the Approved Moab Resource Management Plan and FEIS, October 1998 (Management Decisions by Resource; Appendix A—Stipulations and Environmental Best Practices Applicable to Oil and Gas Leasing and Other Surface-disturbing Activities; Appendix Q—Conservation Measures for Threatened and Endangered Species of Utah from the Use Plan Programmatic Bas and Section 7 Consultation; Appendix R—Best Management Practices for Raptors and their Associated Habitats in Utah), Maintenance Forms.

Table C.3-16 Moab Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Minerals		Three Rivers and Westwater mineral withdrawal area	There will be no surface-disturbing activities within the area of the Three Rivers and Westwater mineral withdrawals which includes suitable Wild and Scenic River segments. Where the NSO area is physically inaccessible to oil and gas drilling by current directional drilling technology (1 mile from outside the NSO area), it will be closed to oil and gas leasing. However, these lands remain NSO for all other surface-disturbing activities.	NSU	No buffer
Minerals-Split estate		Thompson Springs	No surface-disturbing activities are allowed on private surface/Federal minerals within Thompson springs. An exception could be granted if it can be demonstrated that the action would not result in any surface use conflicts.	NSU	No buffer
Water Resources		100-year floodplains	No surface disturbing activities within 100 year floodplains.	NSU	No buffer
Water Resources		Municipal/culinary/ public water/ reservoirs	No surface disturbing activities within public water reserves.	NSU	No buffer
Water Resources		Riparian areas	No surface disturbing activities within 100 meters of riparian areas.	NSU	100 meters (328 feet)
Water Resources		Springs	No surface disturbing activities within 100 meters of springs.	NSU	100 meters (328 feet)
Wildlife-Aquatic species-SSS	Colorado River fishes	100-year floodplain of the Colorado River, Green River, and at the Dolores/Colorado River confluence	Surface-disturbing activities within the 100 year floodplain of the Colorado River, Green River, and at the Dolores/Colorado River confluence will not be allowed. In areas adjacent to 100-year floodplains, particularly in systems prone to flash floods, BLM will analyze the risk for flash floods to impact facilities. Potential techniques may include the use of closed loop drilling and pipeline burial or suspension as necessary to minimize the potential for equipment damage and resultant leaks or spills.	NSU, CSU	No buffer
Wildlife-Aquatic species-SSS	Colorado River fishes	Colorado, Green, Duchesne, Price, White, and San Rafael fivers	Surface-disturbing activities will be restricted within ¼ mile of the channel centerline of the Colorado, Green, Duchesne, Price, White, and San Rafael Rivers.	NSU	0.25 of channel centerline
Wildlife-Kit fox	Kit fox	Kit fox habitat	No surface disturbance within 200 meters of kit fox dens in suitable habitat.	NSU	200 meters (656 feet)

Table C.3-16 Moab Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-Raptors	Bald eagle	Nests	No permanent structures allowed within 1.0 mile of nest sites. A permanent action continues for more than one breeding or roosting season and/or causes a loss of eagle habitat or displaces eagles through disturbances, i.e., creation of a permanent structure.	NSU	1.0 mile
Wildlife-Raptors	California condor	Nests	No surface disturbance within a 1 mile buffer of active nests. No permanent structures allowed within 1.0 mile of nest sites.	NSU, CSU	1.0 mile
Wildlife-SSS	Mexican spotted owl	MSO habitat and nest sites	For all permanent actions that may impact owls or suitable habitat: -Survey two consecutive years for owls according to established protocol prior to commencing of activity. -If owls are found, no actions will occur within 0.5 mile of identified nest site. -If nest site is unknown, no activity will occur within the designated Protected Activity Center (PAC). -Avoid placing permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied. -Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims (Delaney et al. 1997). Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims. -Limit disturbances to and within suitable owl habitat by staying on designated routes. -Limit new access routes created by the project. A permanent action continues for more than one breeding season and/or causes a loss of owl habitat or displaces owls through disturbances, i.e., creation of a permanent structure.	NSU, CSU	0.5 mile
Wildlife-SSS	Mexican spotted owl	MSO habitat and nest sites	For all temporary actions that may impact owls or suitable habitat: -If action occurs entirely outside of the owl breeding season, and leaves no permanent structure or permanent habitat disturbance, action can proceed without an occupancy survey. -If action will occur during a breeding season, survey for owls prior to commencing activity. If owls are found, activity should be delayed until outside of the breeding season. -Eliminate access routes created by a project through such means as raking out scars, revegetation, gating access points, etc. Temporary activities are defined as those that are completed prior to the start of the following raptor breeding season, leaving no permanent structures and resulting in no permanent habitat loss.	NSU, CSU	No buffer
Wildlife-SSS	Prairie dog, white-tailed	Colonies	No surface disturbing activities within 660 feet of prairie dog colonies within prairie dog habitat. No permanent above ground structures within the 660 foot buffer.	NSU, CSU	660 feet
Wildlife-SSS	Southwestern willow flycatcher	Suitable riparian habitats	Activities will maintain a 300 feet buffer from suitable riparian habitat year long.	NSU	300 foot
Wildlife-SSS	Southwestern willow flycatcher	Suitable riparian habitats	All surface-disturbing activities should be restricted within a 0.25 mile buffer from suitable riparian habitats.	NSU	0.25 mile

Table C.3-16 Moab Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Soils		Slopes > 30%	A controlled surface use stipulation is applied in the Approved RMP to protect fragile soils on steep slopes from erosion. This stipulation prohibits construction on slopes greater than 30% unless an engineering plan can demonstrate that erosion on these slopes would be prevented.	CSU	No buffer
Vegetation-SSS	All	Listed or candidate plants or animals	As required by the Endangered Species Act, the protection of habitat for listed and non-listed plant and animal species will be considered prior to authorizing any actions that could alter or disturb such habitat. No management action will be permitted on public lands that will jeopardize the continued existence of plant or animal species that are listed or are officially proposed or are candidates for listing as T&E. Surveys of habitat or potential habitat for special status species (including any sensitive species under consideration for formal designation as T&E) will be made prior to taking any action that could affect these species. Surveys will be conducted using protocols established for potentially affected species.	CSU	No buffer
Visual		VRM Class II areas within Moab FO	Within VRM II areas (rims of Canyon Rims SRMA, Wilson Arch, the Kane Creek Corridor, and the Gemini Bridges area), surface-disturbing activities must meet the objectives of VRM II class objectives. The level of change to the landscape should be low; management activities may be seen, but should not attract attention of the casual observer. Any change to the landscape must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. Surface-disturbing activities that are determined to be compatible and consistent with the protection or enhancement of the resource values are exempted. Recognized utility corridors are exempted only for utility projects which would be managed according to VRM III objectives.	CSU	No buffer
Wildlife-Aquatic species-SSS	Colorado River fishes	Current populations and known habitats	Designs must avoid as much direct disturbance to current populations and known habitats as is feasible. Designs should include: protections against toxic spills into rivers and floodplains; plans for sedimentation reduction; minimization of riparian vegetation loss or degradation; pre-activity flagging of critical areas for avoidance; design of stream-crossings for adequate passage of fish; and measures to avoid or minimize impacts on water quality at the 25-year frequency runoff.	CSU	No buffer
Wildlife-Aquatic species-SSS	Colorado River fishes	Floodplains or riparian areas	Surface-disturbing activities proposed to occur within floodplains or riparian areas will be avoided unless there is no practical alternative or the development would enhance riparian/aquatic values. If activities must occur in these areas, construction will be designed to include mitigation efforts to maintain, restore, and/or improve riparian and aquatic conditions. If conditions could not be maintained, offsite mitigation strategies should be considered.	CSU	No buffer
Wildlife-Aquatic species-SSS	Colorado River fishes	Upper Colorado River drainage basin above Lake Powell	Water depletions from any portion of the Upper Colorado River drainage basin above Lake Powell are considered to adversely affect and adversely modify the critical habitat of these endangered fish species. Section 7 consultation will be completed with the Service prior to any such water depletions.	CSU	No buffer
Wildlife-Raptors	Bald eagle	Roosts	No permanent structures allowed within 0.5 miles of winter roost areas. A permanent action continues for more than one breeding or roosting season and/or causes a loss of eagle habitat or displaces eagles through disturbances, i.e., creation of a permanent structure.	CSU	0.5 mile
Wildlife-Raptors	California condor	Roosts	No permanent structures allowed within 0.5 miles of established roost areas or sites.	CSU	0.5 mile

Table C.3-16 Moab Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Mexican spotted owl	MSO habitat and nest sites	BLM will require monitoring of activities in designated critical habitat, identified PACs, or breeding habitats, wherein it has been determined that there is a potential for take. If any adverse impacts are observed to occur in a manner, or to an extent that was not considered in the project-specific Section 7 Consultation, then consultation must be reinitiated. Monitoring results should document what, if any, impacts to individuals or habitat occur during project construction/implementation. In addition, monitoring should document successes or failures of any impact minimization, or mitigation measures. Monitoring results would be considered an opportunity for adaptive management, and as such, would be carried forward in the design and implementation of future projects. For all survey and monitoring actions: -Reports must be provided to affected field offices within 15 days of completion of survey or monitoring efforts. -Report any detection of Mexican spotted owls during survey or monitoring to the authorized officer within 48 hours.	CSU	No buffer
Wildlife-SSS	Mexican spotted owl	MSO habitat and nest sites	BLM will, as a condition of approval (COA) on any project proposed within identified PACs, designated critical habitat, or within spatial buffers for Mexican spotted owl nests (0.5 mile), ensure that project proponents are notified as to their responsibilities for rehabilitation of temporary access routes and other temporary surface disturbances, created by their project, according to individual BLM Field Office standards and procedures, or those determined in the project-specific Section 7 Consultation.	CSU	0.5 mile
Wildlife-SSS	Mexican spotted owl	MSO habitat and nest sites	BLM will, in areas of designated critical habitat, ensure that any physical or biological factors (i.e., the primary constituent elements), as identified in determining and designating such habitat, remains intact during implementation of any BLM-authorized activity. For all BLM actions that "may adversely affect" the primary constituent elements in any suitable Mexican spotted owl habitat, BLM will implement measures as appropriate to minimize habitat loss or fragmentation, including rehabilitation of access routes created by the project through such means as raking out scars, revegetation, gating access points, etc. Prior to surface-disturbing activities in Mexican spotted owl PACs, breeding habitats, or designated critical habitat, specific principles should be considered to control erosion. These principles include: -Conduct long-range transportation planning for large areas to ensure that roads will serve future needs. This will result in less total surface disturbance. -Avoid surface disturbance in areas with high erosion hazards to the greatest extent possible. Avoid mid-slope locations, headwalls at the source of tributary drainages, inner valley gorges, and excessively wet slopes such as those near springs. In addition, avoid areas where large cuts and fills would be required. -Locate roads to minimize roadway drainage areas and to avoid modifying the natural drainage areas of small streams. Project developments should be designed, and located to avoid direct or indirect loss or modification of Mexican spotted owl nesting and/or identified roosting habitats. Water production associated with BLM authorized actions should be managed to ensure maintenance or enhancement of riparian habitats.	CSU	No buffer
Wildlife-SSS	Southwestern willow flycatcher	Suitable riparian habitats	Permanent surface disturbances should be avoided within 0.5 mile of suitable Southwestern willow flycatcher habitat.	CSU	0.5 mile

Table C.3-17 Moab Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Soils		Saline soils in Mancos Shale (330,142 acres)	No surface-disturbing activities are allowed during the period from December 1 to May 31. This restriction includes heavy equipment traffic on existing roads associated with drilling operations.	TL	12/1 – 5/31	No buffer
Wildlife-Big Game	All	Parturition areas	All surface disturbing activities restricted from May 1 - June 15 in designated parturition areas.	TL	5/1 to 6/15	No buffer
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1-mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts, winter concentration areas	Temporary activities or habitat alterations that may disturb bald eagles will be restricted within 0.5 mile of known winter concentration areas [winter roost areas (cottonwood galleries)] from November 1st to March 31st unless the area has been surveyed according to protocol and determined to be unoccupied. Additionally, where daily activities must occur within these spatial buffers, and are approved through subsequent consultation, activities should be properly scheduled to occur after 9 a.m. and terminate at least one hour before official sunset to ensure that bald eagles using these roosts are allowed the opportunity to vacate their roost in the morning and return undisturbed in the evening. A temporary action is completed prior to the following breeding or roosting season leaving no permanent structures and resulting in no permanent habitat loss.	TL	11/ 1 to 3/31	0.5 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance or occupancy within a 0.25 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/31).	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities will not occur within 1.0 mile of occupied nest sites during breeding season. A temporary action is completed prior to the following important season of use, leaving for habitat functionality.	TL	breeding season (undefined)	1.0 mile
Wildlife-Raptors	California condor	Roosts	Temporary activities will not occur within 0.5 miles of occupied roost areas between 8/1 – 11/31. A temporary action is completed prior to the following important season of use, leaving for habitat functionality.	TL	8/1 – 11/31	0.5 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance or occupancy within a 0.5 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/1).	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile

Table C.3-17 Moab Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-SSS	Mexican spotted owl	Nests	No temporary actions within 0.5 miles of suitable habitat during breeding season. A temporary action is completed prior to the following breeding season leaving no permanent structures and resulting in no permanent habitat loss.	TL	3/1 – 8/15	0.5 mile
Wildlife-SSS	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-SSS	Southwestern willow flycatcher	Occupied breeding habitat	Activities within 0.25 mile of occupied breeding habitat will not occur during the breeding season of May 1 to August 15.	TL	5/1 – 8/15	0.25 mile
Wildlife-SSS	Yellow-billed cuckoo	Habitat (riparian areas)	No surface-disturbing activities will be conducted within 100 meters of Yellow-billed Cuckoo habitat (riparian areas) from May 15th through July 20th.	TL	5/15 – 7/20	100 meters (325 feet)

C.3.2.8 Price Field Office, Utah

References: Price Field Office Record of Decision for the Approved Resource Management Plan, October 2008 (Appendix R-3—Stipulations for Surface Disturbing Activities; Appendix R-5—Best Management Practices for Raptors and Their Associated habitats in Utah, August 2006).

Table C.3-18 Price Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Cultural Resources	Historic trails	Old Spanish Trail- Big Flat to Walker Flat (Emery/Sevier County Line) Segment	The following will be implemented along the Old Spanish Trail: Big Flat to Walker Flat (Emery/Sevier County Line) Segment: Limit OHV use to designated routes; Manage for motorized recreation uses; ROWs allowed within the designated corridor; Manage for VRM objectives in areas open to oil and gas leasing subject to minor constraints (these areas of overlap are VRM Class III).	NSU outside corridor	No buffer
Cultural Resources	Historic trails	Old Spanish Trail-Green River Crossing (via Cottonwood Wash) to Big Flat Segment	The following will be implemented along the Old Spanish Trail: Green River Crossing (via Cottonwood Wash) to Big Flat Segment:• Limit OHV use to designated routes• Manage for VRM objectives (overlaps VRM Classes I, II, and III)• ROWs allowed within the designated corridor• CSU for leasing.	NSU outside corridor	No buffer
Cultural Resources	Historic trails	Old Spanish Trail-Lost Springs Wash/Trail Springs Wash segment	NSO within Trail Springs/Lost Springs Wash segment of the Old Spanish National Historic Trail to retain the historic character of the trail.; Avoid ROWs except where the designated corridor crosses the trail; Limit OHV use to designated routes; VRM Class III (existing).	NSU outside corridor	No buffer
Lands and Realty		All areas outside of designated corridors	All utility corridors within the PFO are designated for any size utility and transportation uses needed. The corridors are 1 mile in width crossing any BLM-administered public lands. These approved corridors will be the preferred location for future major linear ROWs that meet the following criteria: • Transmission (not distribution) lines with a voltage capacity of 69 kV or greater • Significant conduits requiring a permanent width greater than 50 feet Any new utility corridors will require a plan amendment.	NSU	No buffer
Recreation		Recreation sites, developed	NSO within developed recreation and administrative sites not consistent with the purpose of the site, including those authorized under a Recreation and Public Purpose Act.	NSU	No buffer
Soils		Slopes > 40%	NSO on slopes greater than 40 percent (except as allowed through exceptions, waivers, or modifications as described in Appendix R-3).	NSU	No buffer
Soils		Slopes between 20 and 40%	In surface disturbing proposals regarding construction on slopes of 20 percent to 40 percent, include an approved erosion control strategy and topsoil segregation/restoration plan. Such construction must be properly surveyed and designed by a certified engineer and approved by the BLM prior to project implementation, construction, or maintenance	CSU	No buffer
Special Designation-Non-WSAs with Wilderness Characteristics		Mexican Mountain non-WSA	The following stipulations will be applied within the Mexican Mountain WSA: • VRM Class II• Limit OHV use and all mechanical travel to designated routes• Closed to activities related to geophysical operations• Avoidance area for ROWs.	CSU	No buffer
Special Designations-ACEC		Heritage Sites ACEC (Wilsonville; Smith Canyon)	New utility corridor exclusion areas.	NSU	No buffer

Table C.3-18 Price Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-ACEC		Nine Mile Canyon ACEC	Price: NSO for leasing; VRM Class II and III; Utility corridor will be allowed as shown on Map R-21; other utility restrictions not discussed. Within Vernal: Will be managed to enhance cultural and special status plant FO species while enhancing scenic vistas, recreation, and wildlife resource values. A comprehensive integrated activity plan will be developed / implemented. OHV use will be limited to designated routes.	CSU	No buffer
Special Designations-ACEC		Rock Art ACEC (Big Hole, Cottonwood Canyon, Dry Wash, Grassy Trail, Kings Crown, Molen Seep, North Salt Wash, Pictographs, Sand Cove, Short Creek	New utility corridor exclusion areas. NSO for cultural values within areas of critical environmental concern (ACEC) to retain the cultural character and context of the area. The existing ACEC will be maintained (Black Dragon, Head of Sinbad, Rochester/Muddy Petroglyphs, and Lone Warrior); however, the following sites will be managed as part of the Rock Art ACEC (5,300 acres): King's Crown, Short Creek, Molen Seep, Big Hole, North Salt Wash, Pictographs, and Cottonwood Canyon. (The portion of the Rock Art ACEC that is overlain by the Mexican Mountain and San Rafael Reef WSAs will be managed in accordance with the IMP, where the IMP is more restrictive than the prescriptions below.) The Rock Art ACEC will be excluded from ROW grants. OHV use will be limited to designated routes. NSO for leasing.	NSU	No buffer
Special Designations-ACEC		San Rafael Canyon ACEC	The San Rafael Canyon ACEC will be avoided from ROW grants and managed as a VRM Class II. OHV use will be limited to designated routes. NSO for leasing. New utility corridor avoidance area.	CSU	No buffer
Special Designations-ACEC		Uranium Mining District ACEC	Oil and gas will be open to leasing subject to major constraints (NSO); No disturbance of historic structures until the historic features have been recorded and oral history has been conducted.	CSU	No buffer
Special Designations-Wilderness Study Areas (WSA)		Mexican Mountain WSA	All WSAs are utility corridor exclusion areas. All WSAs will be managed according to the Interim Management Policy for Lands Under Wilderness Review (BLM Handbook H-8550-1) until legislation is enacted to either designate the areas as wilderness or release them for uses other than wilderness. All WSAs are VRM I and either closed for limited to designated for OHV. All WSAs will be managed as VRM Class I in accordance with BLM IM 2000-096 Use of Visual Resource Management Class I Designation in WSAs.	NSU, CSU	No buffer
Special Designations-Wilderness Study Areas (WSA)		Sids Mountain/Sids Cabin WSA	All WSAs are utility corridor exclusion areas. All WSAs will be managed according to the Interim Management Policy for Lands Under Wilderness Review (BLM Handbook H-8550-1) until legislation is enacted to either designate the areas as wilderness or release them for uses other than wilderness. All WSAs are VRM I and either closed for limited to designated for OHV. All WSAs will be managed as VRM Class I in accordance with BLM IM 2000-096 Use of Visual Resource Management Class I Designation in WSAs.	NSU, CSU	No buffer
Vegetation-SSS	All	Listed or candidate plants or animals or critical habitat	Surface disturbances will be prohibited that may affect listed species or critical habitat of listed or candidate plants or animals without consultation or conference (ESA, Section 7) between the BLM and USFWS.	CSU	No buffer
Visual Resources		VRM Class II areas within Price FO	Within VRM II areas, surface disturbing activities would comply with BLM Manual Handbook 8431-1 to retain the existing character of the landscape. Recognized utility corridors are exempt. Temporary exceedance may be allowed during initial development phases.	CSU	No buffer

Table C.3-18 Price Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water Resources		Perennial streams; intermittent streams	No new surface disturbance (excluding fence lines) would be required in areas equal to the 100-year floodplain or 100 meters (330 feet) on either side from the centerline, whichever is greater, along all perennial and intermittent streams, streams with perennial reaches, and riparian areas.	NSU	300 feet or 100-yr floodplain, whichever greater
Water Resources		Springs	No surface disturbance or occupancy would be maintained around natural springs to protect the water quality of the spring. The distance would be based on geophysical, riparian, and other factors necessary to protect the water quality of the springs. If these factors cannot be determined, a 660-foot buffer zone would be maintained. The BLM will allow development of spring sources but will require protection of the spring source to maintain water quality and avoid detrimental impacts.	NSU	660 feet
Wildlife-SSS	All	T&E and candidate species habitat	Surface disturbances will be prohibited that may affect listed species or critical habitat of listed or candidate plants or animals without consultation or conference (ESA, Section 7) between the BLM and USFWS.	NSU	No buffer
Wildlife-SSS	Mexican spotted owl	Designated critical habitat	Any surface use or occupancy within designated critical habitat would be strictly controlled through close scrutiny of any surface use plan filed to protect habitat values and the use of the area by Mexican spotted owls. Modifications to the Surface Use Plan of Operations may be required for the protection of these resources. This limitation may apply to operation and maintenance of producing wells.	CSU	No buffer
Wildlife-SSS	Mexican spotted owl	Nests	NSO within 1/2 mile of known Mexican Spotted Owl (MSO) nests.	NSU	0.5 mile
Wildlife-SSS	Prairie dog, white-tailed	Colonies	NSO within 660 feet of prairie dog colonies within identified prairie dog habitat, No permanent above ground structures within 660 feet.	NSU	660 feet
Wildlife-SSS	Sage grouse	Leks	All surface disturbing activities will be prohibited within ½ mile of greater sage-grouse leks on a year-round basis.	NSU	0.5 mile

Table C.3-19 Price Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Water		Watersheds above 7,000 feet in elevation	To minimize watershed damage to the watersheds above 7,000 feet in elevation, no construction activities will be allowed in these areas during the period beginning December 1 through April 15	TL	12/1 to 4/15	No buffer
Wildlife-Big Game	All	Winter range, crucial	Mule deer, moose, and elk winter range would be closed seasonally from December 1 to April 15 within crucial winter habitat	TL	12/1 to 4/15	No buffer

Table C.3-19 Price Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	Big horn sheep	Spring/lambing range	Desert bighorn sheep and Rocky Mountain bighorn sheep spring/lambing range would be closed seasonally from April 15 to June 15 within desert bighorn sheep and Rocky Mountain bighorn sheep crucial year-long habitat.	TL	4/15 to 6/15	No buffer
Wildlife-Big Game	Mule deer, elk	Parturition areas	Mule deer fawning and elk calving areas would be closed seasonally from May 15 to July 5 within crucial fawning and calving areas as located within the crucial summer habitat.	TL	5/15 to 7/5	No buffer
Wildlife-Migratory Birds	All	High-value breeding habitat	Migratory bird nesting areas would be closed seasonally from April 15 to August 1 within high-value breeding habitat. Birds designated as BLM Special Status Species would have the highest priority.	TL	4/15 to 8/15	No buffer
Wildlife-Raptors	All not specified	Nesting complexes and known raptor nest sites	Raptor nesting complexes and known raptor nest sites would be closed seasonally February 1 to July 15 (within ½ mile of nests occupied within past 3 years) and raptor crucial cliff-nesting complex habitats.	TL	2/1 to 7/15	0.25 mile
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer from Feb 1 to August 31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile

Table C.3-19 Price Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-SSS	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-SSS	Sage grouse	Leks	Allow no surface disturbing or otherwise disruptive activities within two miles of a known greater sage-grouse lek from March 15 to July 15 to protect nesting and brood rearing habitat.	TL	3/15 to 7/15	2 miles
Wildlife-SSS	Sage grouse	Winter habitat	Allow no surface disturbing activities or otherwise disruptive activities within greater sage-grouse in winter habitat from December 1 to March 14.		12/1 to 3/14	No buffer

C.3.2.9 Richfield Field Office, Utah

References: Richfield Field Office Record of Decision for the Approved Resource Management Plan, October 2008 (Appendix 6—Wildland Fire Management; Appendix 10—Raptor Best Management Practices; Appendix 11—Oil and Gas Leasing Stipulations and Lease Notices; Appendix 14 — Committed Conservation Measures and Best Management Practices (BMPs) for Federally Listed Species).

Table C.3-20 Richfield Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Cultural Resources		NRHP-listed sites	Manage sites listed on the NRHP as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	No buffer
Lands and Realty		Administrative sites	Manage BLM administrative sites as open to leasing with NSO, except as otherwise provided in other management decisions…."All NSO areas are ROW avoidance areas."	CSU	No buffer
Lands and Realty		Cemeteries	Manage all cemeteries as open to leasing with NSO, except as otherwise provided in other management decisions:. "All NSO areas are ROW avoidance areas."	CSU	No buffer
Lands and Realty		Incorporated municipalities	Manage Incorporated municipalities as closed to leasing. All closed areas are ROW exclusion areas.	NSU	No buffer

Table C.3-20 Richfield Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Lands and Realty		Landfills	Manage landfills—existing and closed-as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	No buffers
Lands and Realty		R&PP lease areas	Manage lands managed under a R&PP lease as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	No buffer
Non-WSA Lands with Wilderness Characteristics		All non WSAs	Manage the following as ROW avoidance areas: a. ACECs; b. Non-WSA lands with wilderness characteristics; c. Areas open to oil and gas leasing with NSO stipulations.	CSU	No buffers
Recreation		Developed Recreation Sites	Manage developed recreation sites as open to leasing with NSO, except as otherwise provided in other management decisions. NSO areas are ROW avoidance areas.	CSU	No buffer
Soils		Erodible, fragile soils and unstable soils	Soils identified by the NRCS as having high potential for wind erosion are to be avoided. If avoidance is impracticable then a plan of operation that addressed erosion control and mitigation will be required.	CSU	No buffer
Soils		Slopes > 30%	Routing through areas with slopes of 30% or greater is to be avoided. If the action cannot be avoided, rerouted, or relocated than a proposed project would include an erosion control strategy, reclamation and a site plan with a detailed survey and design completed by a certified engineer. This proposed project must be approved by the BLM prior to construction and maintenance.	CSU	No buffer
Special Designations-ACEC		All ACECS in FO	Manage the following as ROW avoidance areas: a. ACECs; b. Non-WSA lands with wilderness characteristics; c. Areas open to oil and gas leasing with NSO stipulations.	CSU	No buffer
Vegetation-SSS	Barneby reed-mustard	Occupied habitat	Construction of roads will occur such that the edge of the right of way is at least 300’ from any plant and 300’ from avoidance areas. The edge of the well pad should be located at least 300’ away from plants and avoidance areas, in general; however, site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Surface pipelines will be laid such that a 300’ buffer exists between the edge of the right of way and plants and 300’ between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crosses suitable habitat to ensure pipelines don’t move towards the population; site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Roads and utilities should share common right-of-ways where possible. Roads will be graveled within occupied habitat.	CSU	300 feet
Vegetation-SSS	Last Chance townsendia	Occupied habitat	Within occupied habitat, access roads will be graveled.	CSU	No buffer

Table C.3-20 Richfield Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation-SSS	Maguire daisy	Occupied habitat	Construction of roads will occur such that the edge of the right of way is at least 300' from any plant and 300' from avoidance areas. The edge of the well pad should be located at least 300' away from plants and avoidance areas, in general; however, site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Surface pipelines will be laid such that a 300' buffer exists between the edge of the right of way and plants and 300' between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crosses suitable habitat to ensure pipelines don't move towards the population; site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Within occupied habitat, access roads will be graveled.	CSU	300 feet
Vegetation-SSS	San Rafael cactus	Occupied habitat	Buffers of 100 feet minimum between the edge of the right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated. Occupied San Rafael cactus habitats within 100' of the edge of the surface pipelines' right-of-ways, 100' of the edge of the roads' right-of-ways, and 100' from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Surface pipelines will be laid such that a 100 foot buffer exists between the edge of the right of way and the plants, use stabilizing and anchoring techniques when the pipeline crosses the habitat to ensure the pipelines don't move towards the population.	CSU	100 feet
Vegetation-SSS	Ute ladies'-tresses	Occupied habitat	Buffers of 300 feet minimum between right of way (roads and surface pipelines) or surface disturbance (well pads) and plants and populations will be incorporated. Occupied Ute ladies'-tresses habitats within 300' of the edge of the surface pipelines' right-of-ways, 300' of the edge of the roads' right-of-ways, and 300' from the edge of the well pad shall be monitored for a period of three years after ground disturbing activities. Monitoring will include annual plant surveys to determine plant and habitat impacts relative to project facilities. Habitat impacts include monitoring any changes in hydrology due to project related activities. Annual reports shall be provided to the BLM and the Service. To ensure desired results are being achieved, minimization measures will be evaluated and may be changed after a thorough review of the monitoring results and annual reports during annual meetings between the BLM and the Service. Surface pipelines will be laid such that a 300-foot buffer exists between the edge of the right of way and the plants, using stabilizing and anchoring techniques when the pipeline crosses habitat to ensure the pipelines don't move towards the population.	CSU	300 feet

Table C.3-20 Richfield Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Vegetation-SSS	Winkler pincushion cactus	Occupied habitat	Construction of roads will occur such that the edge of the right of way is at least 300' from any plant and 300' from avoidance areas. The edge of the well pad should be located at least 300' away from plants and avoidance areas, in general; however, site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Surface pipelines will be laid such that a 300' buffer exists between the edge of the right of way and plants and 300' between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crosses suitable habitat to ensure pipelines don't move towards the population; site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Within occupied habitat, access roads will be graveled.	CSU	300 feet
Vegetation-SSS	Wright fishhook cactus	Occupied habitat	Construction of roads will occur such that the edge of the right of way is at least 300' from any plant and 300' from avoidance areas. The edge of the well pad should be located at least 300' away from plants and avoidance areas, in general; however, site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Surface pipelines will be laid such that a 300' buffer exists between the edge of the right of way and plants and 300' between the edge of right of way and avoidance areas; use stabilizing and anchoring techniques when the pipeline crosses suitable habitat to ensure pipelines don't move towards the population; site specific distances will need to be approved by FWS and BLM when disturbance will occur upslope of habitat. Within occupied habitat, access roads will be graveled.	CSU	300 feet
Visual		Existing ROWs	To avoid potential conflicts with the construction, operation, maintenance, and termination of facilities and improvements located on existing ROWs on public land, apply the following: Where a ROW grant specifically identifies an area and/or width, the VRM class within the specified area/width would be VRM Class IV. Where no width is specified, the VRM class within the interior boundaries of the area disturbed when the facility or improvement was initially constructed would be VRM Class IV.	CSU	No buffer
Visual Resources		All VRM classes	All ROWs must comply with the applicable visual resource management (VRM) classification objectives.	CSU	No buffer
Water Resources		Perennial streams; intermittent streams	Prohibit surface disturbing activities within the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater, of streams with intermittent or perennial reaches, resulting in NSO in this area, for protection of habitat for riparian-obligate species.	NSU	300 feet or 100-yr floodplain, whichever greater
Water Resources		Riparian areas	A buffer zone of the 100 year floodplain or 330 feet either side of centerline, whichever is greater, will be maintained around riparian areas (NSO).	NSU	300 feet or 100-yr floodplain, whichever greater
Water Resources		Springs	Maintain buffer zones of no surface disturbance and/or occupancy around natural springs. Base the size of the buffer on hydrological, riparian, and other factors necessary to protect the water quality of the springs. If these factors cannot be determined, maintain a 330-foot buffer zone from outer edge. (Maintain a buffer zone of the 100-year floodplain or 330 feet on either side from the centerline, whichever is greater.)	NSU	300 feet or 100-yr floodplain, whichever greater

Table C.3-20 Richfield Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water Resources		Wetlands	No surface occupancy on wetland soils or soils identified as having hydric properties. Consider exceptions to NSO if a site-specific environmental analysis determines that other placement alternatives would cause undue or unnecessary degradation to resources. In addition, require the operator to submit a plan prior to commencing operations that addresses: • Erosion control strategies • Mitigation to protect surface from rutting, compaction, and displacement, and disruption of surface and subsurface hydrologic function • Mitigation or restoration measures to restore hydrologic function to site • Proper survey and design by a certified engineer.	NSU	No buffer
Wildlife-Raptors	Bald eagle	Nests	No permanent infrastructure will be placed within 1.0 mile of nest sites.	NSU	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts	No permanent structures are permitted within 0.5 miles of bald eagle winter concentration areas/roosts.	CSU	0.5 mile
Wildlife-Raptors	Bald eagle	Roosts	No permanent infrastructure will be placed within 0.5 miles of winter roost areas.	NSU	0.5 mile
Wildlife-Raptors	California condor	Nests	No permanent infrastructure will be placed within 1.0 mile of nest sites.	NSU	1.0 mile
Wildlife-Raptors	California condor	Roosts	No permanent infrastructure will be placed within 0.5 miles of established roosting sites or areas.	NSU	0.5 mile
Wildlife-SSS	Prairie dog, Utah	Historic and/or occupied Utah prairie dog colonies	Project related vehicle maintenance activities will be conducted in maintenance facilities. Should it become necessary to perform vehicle or equipment maintenance on-site, these activities will avoid identified Utah prairie dog colonies or within a 350-foot distance from colonies. Precautions shall be taken to ensure that contamination of maintenance sites by fuels, motor oils, grease, etc. does not occur and such materials are contained and properly disposed of off-site. Inadvertent spills of petroleum based or other toxic materials shall be cleaned up and removed immediately.	CSU	350 feet
Wildlife-SSS	Prairie dog, Utah	Historic and/or occupied Utah prairie dog habitat	Permanent surface disturbance or facilities will be avoided within 0.5 mile of potentially suitable, unoccupied prairie dog habitat, identified and mapped by Utah Division of Wildlife Resources since 1976. Within occupied habitat, a 25 mph speed limit will be set.	CSU	0.5 mile
Wildlife-SSS	Prairie dog, Utah	Historic and/or occupied Utah prairie dog habitat	Surface occupancy or other surface disturbing activity will be avoided within 0.5 mile of active prairie dog colonies.	CSU	0.5 mile
Wildlife-SSS	Sage grouse	Leks	Surface disturbing activities would be limited to a year-round, 0.5 mile NSO around Greater sage-grouse leks.	NSU	0.5 mile
Wildlife-SSS	Southwestern willow flycatcher	Suitable riparian habitats	Drilling activities will maintain a 300 ft. buffer from suitable riparian habitat year long.	NSU	300 foot
Wildlife-SSS	Southwestern willow flycatcher	Suitable riparian habitats	No surface disturbing activities within 0.25 miles of suitable Southwestern willow flycatcher riparian habitat.	NSU	0.25 mile
Wildlife-SSS	Southwestern willow flycatcher	Suitable riparian habitats	Permanent surface disturbances should be avoided within 0.5 mile of suitable Southwestern willow flycatcher habitat.	CSU	0.5 mile

Table C.3-21 Richfield Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Vegetation-SSS	Barneby reed-mustard	Occupied habitat	Within occupied habitat, construction activities will not occur between 4/15 – 6/5. Within occupied habitat, access roads will be graveled and dust abatement (watering) is encouraged from 4/15 – 6/5.	TL, CSU	4/15 to 6/15	No buffer
Vegetation-SSS	Last Chance townsendia	Occupied habitat	Within occupied habitat, construction activities will not occur between 4/15 – 6/30. Within occupied habitat, dust abatement (watering) is encouraged from 4/15 – 6/30.	TL	4/15 to 6/30	No buffer
Vegetation-SSS	Maguire daisy	Occupied habitat	Within occupied habitat, construction activities will not occur between 5/1 – 6/30. Within occupied habitat, dust abatement (watering) is encouraged from 5/1 – 6/30.	TL	5/1 to 6/30	No buffer
Vegetation-SSS	Winkler pincushion cactus	Occupied habitat	Within occupied habitat, construction activities will not occur between 3/15 – 6/1. Within occupied habitat, dust abatement (watering) is encouraged from 3/15 – 6/1.	TL	3/1 to 6/1	No buffer
Vegetation-SSS	Wright fishhook cactus	Occupied habitat	Within occupied habitat, construction activities will not occur between 4/15 – 6/15. Within occupied habitat, dust abatement (watering) is encouraged from 4/1 – 6/15.	TL	4/15 to 6/15	No buffer
Wildlife-Big Game	All	Winter range, crucial	Surface disturbing activities are restricted in crucial winter habitat from December 15 through April 15.	TL	12/15 to 4/15	No buffer
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31. Temporary activities or habitat alterations that could disturb nesting bald eagles are restricted from 1/1 – 8/31 within 1 miles of nest sites, unless the area has been surveyed according to protocol and determined to be unoccupied.	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Bald eagle	Roosts	Temporary activities within 0.5 miles of winter roost areas, e.g., cottonwood galleries, will not occur during the winter roost season of November 1 to March 31, unless the area has been surveyed according to protocol and determined to be unoccupied. In addition, require daily activities approved through subsequent consultation within these spatial buffers to start after 9 a.m. and terminate at least 1 hour before sunset to ensure that bald eagles using these roosts have the opportunity to vacate their roost in the morning and return undisturbed in the evening.	TL	11/1 to 3/31	0.5 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities within 1.0 mile of nest sites will not occur during the breeding season.	TL	breeding season (undefined)	1.0 mile
Wildlife-Raptors	California condor	Roosts	Temporary activities within 0.5 miles of established occupied roosting sites or areas will not occur between 8/1 – 11/31.		8/1 – 11/31	0.5 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile

Table C.3-21 Richfield Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife-SSS	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-SSS	Prairie dog, Utah	Historic and/or occupied Utah prairie dog habitat	Unavoidable surface disturbing activities in Utah prairie dog habitat should be conducted between April 1 and September 30 (the period when prairie dogs are most likely to be found above ground). BLM projects will be designed to avoid direct disturbance to Utah prairie dog populations and habitat wherever possible. Designs should consider flow of water, slope, buffers, possible fencing, and pre-activity flagging of critical areas for avoidance.	TL	4/1 to 9/30	No buffer
Wildlife-SSS	Sage grouse	Leks	Surface or other disruptive activities are not allowed within 2 miles of leks between March 15 – July 15.	TL	3/15 to 7/15	2 miles
Wildlife-SSS	Sage grouse	Winter habitat	Surface or other disruptive activities are not allowed within winter habitat between 12/15 – 3/14.	TL	12/15 to 3/14	No buffer

Table C.3-21 Richfield Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-SSS	Southwestern willow flycatcher	Suitable habitat	No surface disturbing activities within 0.25 miles of suitable Southwestern willow flycatcher breeding habitat from 5/1 – 8/15. Unavoidable ground disturbing activities in occupied Southwestern willow flycatcher habitat should only be conducted when preceded by current year survey, should only occur between August 16 and April 30 (the period when Southwestern willow flycatcher are not likely to be breeding), and should be monitored to ensure that adverse impacts to Southwestern willow flycatcher are minimized or avoided, and to document the success of project specific mitigation/protection measures.	TL, CSU	5/1 to 8/15	0.25 mile

C.3.2.10 Salt Lake Field Office, Utah

References: Record of Decision for the Pony Express Resource Management Plan and Rangeland Program Summary for Utah County, January 1990 (Utility Corridor, Wildlife, Mineral Leasing, and Fluid Leasing stipulations).

Table C.3-22 Salt Lake Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Hazardous Materials		Lands with known or suspected hazardous materials	Rights-of-way, whether within or outside a corridor, will avoid lands with known or suspected hazardous materials.	CSU	No buffer
Lands and Realty		ROW corridors	Future proposals for major rights-of-way such as pipelines, large power lines and permanent improved roads must utilize identified corridors as shown in Figure 10. Otherwise, a planning amendment and appropriate environmental analysis will be required.	NSU	No buffer
Soils		Slopes > 30%	Rights-of-way, whether within or outside a corridor, will avoid lands with slopes greater than 30 percent. Surface disturbing activities will be allowed in fragile soils on Slopes >35% only after an engineered soils derived construction/reclamation plan is submitted by the operator and approved by the Area Manager.	CSU	
Visual		Ridge tops, narrow drainages	Rights-of-way, whether within or outside a corridor, will avoid lands where an above-ground right-of-way would be an obvious visual or physical intrusion such as ridge tops or narrow drainages.	CSU	No buffer
Visual		VRM Class II and III areas within Salt Lake FO	Rights-of-way, whether within or outside a corridor, will avoid lands within VRM Class II and III areas.	CSU	No buffer
Water Resources		Riparian areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities from within 1,200 feet of riparian habitats. Rights-of-way, whether within or outside a corridor, will avoid lands within 1200 feet of riparian/aquatic habitats.	CSU	1,200 feet

Table C.3-22 Salt Lake Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-SSS	Sage grouse	Leks	Rights-of-way, whether within or outside a corridor, will avoid lands within 0.5 mile of sage grouse strutting grounds if the disturbance would adversely impact the effectiveness of the lek.	NSU	0.5 mile
Wildlife-Big Game	Big horn sheep	Crucial winter and lambing areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities from within bighorn sheep crucial winter and lambing areas. Once these ranges have been established by the reintroduced animals, appropriate dates and crucial habitats will be delineated.	CSU	No buffer
Wildlife-Waterfowl	Waterfowl	Marsh and wetlands areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities in the following areas within waterfowl habitat, i.e. marsh and wetland areas.	CSU	No buffer

Table C.3-23 Salt Lake FO Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	Elk	Winter range, crucial	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within crucial elk winter range December 1 to April 30.	TL	12/1 to 4/30	Wildlife-Big Game
Wildlife-Big Game	Mule deer	Winter range	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within mule deer winter range December 1 to April 15.	TL	12/1 to 4/15	Wildlife-Big Game
Wildlife-Big Game	Elk	Parturition areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within elk calving areas May 1 to June 30.	TL	5/1 to 6/30	Wildlife-Big Game
Wildlife-Big Game	Mule deer	Parturition areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within crucial mule deer summer/fawning habitats from April 15 to July 31.	TL	4/15 to 7/31	Wildlife-Big Game
Wildlife-Big Game	Pronghorn	Parturition areas	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within antelope fawning areas from April 15 to July 1.	TL	4/15 to 7/1	Wildlife-Big Game
Wildlife-Raptors	All	Nests	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within 0.5 mile of active raptor nest sites between March l to July 15.	TL	3/1 to 7/15	Wildlife-Raptors

Table C.3-23 Salt Lake FO Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Bald eagle	Roosts	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within .5 mile radius of the roosts sites from November 15 to March 15.	TL	11/15 to 3/15	Wildlife-Raptors
Wildlife-SSS	Sage grouse	Leks and crucial nesting habitat	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within 0.5 mile of sage grouse strutting grounds (leks) and crucial sage grouse nesting habitat between February 15 and June 15 each year.	TL	2/15 to 6/15	Wildlife-SSS
Wildlife-SSS	Sage grouse	Winter crucial habitat	BLM will protect important wildlife habitat values from disturbing activities by restricting seismic work, well development, new road construction, rights-of-way, organized recreational activities, military exercises, and other disturbing activities excluding maintenance activities within winter crucial habitat areas December 1 through March 1.	TL	12/1 to 3/1	Wildlife-SSS

C.3.2.11 Fillmore Field Office, Utah

References: Warm Springs Resource Area Resource Management Plan and Record of Decision, April 1987 (Management Decision by Resource), Wildlife and Recreations sections; Table 2-11; House Range Resource Area Resource Management Plan and Record of Decision, October 1987 (Management Decision by Resource).

Table C.3-24 Fillmore Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Lands and Realty		Sigurd to Nevada, IPP to NV, and IPP to CA transmission corridors	Rights-of-way will be processed on a case-by-case basis, generally in the order received. Existing major rights-of-way are designated as corridors. New rights of- way will be restricted to these corridors wherever feasible. Existing transmission line access roads shall be used, and only the roads to new tower sites shall be constructed for new ROWs. Transmission lines ROWs shall be adjacent to each other or as close as possible.	CSU	No buffer
Lands and Realty		Highway 50, 6, and 257 ROW corridor	All land disturbed by new ROW except authorized new access roads shall be rehabilitated to as close to natural conditions as possible, All rights-of-way must comply with the applicable Visual Resource Management Class guidelines. Roads that are needed for construction of a new ROW shall be temporary and fully rehabilitated. The road or highway within the right-of-way corridor shall be used to the maximum extent possible for construction and maintenance of new ROWs.	CSU	No buffer
Lands and Realty		Interstate Highway 15 ROW corridor	All rights-of-way must comply with the applicable Visual Resource Management Class guidelines. New rights of way shall be limited to below the surface of the ground uses only.	CSU	No buffer
Lands and Realty		ROW corridors	Existing transmission line access roads shall be used and only roads to new tower sites shall be constructed for new rights-of-way.	CSU	No buffer
Lands and Realty		ROW corridors	Transmission line rights-of-way shall be adjacent or located as close together as possible.	CSU	No buffer

Table C.3-24 Fillmore Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations		All SDAs	All Special management designation areas in this FO are right-of-way avoidance areas.	CSU	No buffer
Visual Resources		VRM II areas	VRM Class II areas [within the Warm Springs Resource Area] are right-of-way avoidance areas.	CSU	No buffer
Wildlife-SSS	Sage grouse	Leks	OHV use restricted within a 2 mile buffer around established lek sites from March 1 to July 31.	CSU, TL (3/1 to 7/31)	2 miles
Wildlife-SSS	Sage grouse	Leks	There is a 2 mile buffer around established lek sites where sagebrush manipulation is prohibited.	CSU	2 miles

Table C.3-25 Fillmore Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Raptor management will be guided by the use of "Best Management Practices for Raptors and Their Associated Habitats in Utah" (Utah BLM, 2006, Appendix A), utilizing seasonal and spatial buffers, as well as mitigation, to maintain and enhance raptor nesting and foraging habitat, while allowing other resource uses. Spatial and temporal buffers applied to disturbances in the vicinity of nesting raptors will be tailored to the individual raptor species involved and based on factors such as line of sight distance between nest and disturbance, type and duration of disturbance, nest structure security, sensitivity of the species to disturbance, observed responses to related disturbances, and the amount of other disturbances already occurring in the vicinity. Land use activities which would have an adverse impact on an occupied raptor nest, would not be allowed within the spatial or seasonal buffer.					
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1-mile buffer of active nests from 1/1 – 8/31	TL	1/1 to 8/31	1.0 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance or occupancy within a 0.25 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/31).	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	California condor	Nests	Temporary activities will not occur within 1.0 mile of occupied nest sites during breeding season. A temporary action is completed prior to the following important season of use, leaving for habitat functionality.	TL	Breeding season (undefined)	1.0 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance or occupancy within a 0.5 mile buffer of active nests during breeding/nesting season (from 3/1 – 8/1).	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/30.	TL	12/1 to 9/30	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile

Table C.3-25 Fillmore Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1.0 mile
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/15.	TL	3/15 to 8/15	0.5 mile
Wildlife-Raptors	Screech owl, western	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile

Note: As a result of apparent high population densities and ability to adapt to human activity, a spatial buffer is currently considered not necessary (NN) for maintenance of American kestrel or common barn owl populations. Actions resulting in direct mortality of individual birds and "take" of known nest sites are unlawful.

C.3.2.12 Cedar City Field Office, Utah

References: Pinyon MFP, 1997 Amendment, page 195 (Management Decision by Resource); Beaver, Cedar, Garfield, Antimony ROD/RMP 1986.

Table C.3-26 Cedar City Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Lands and Realty		ROW avoidance/exclusion areas	Rights-of-way will not be authorized in Category 3 (NSO) or 4 (withdrawn or No lease) oil and gas designation areas.	NSU	No buffer
Water Resources		Municipal/culinary/public water/reservoirs/wells	Within a designated corridor, blasting and other surface disturbances would be prohibited within 500 feet of reservoirs or water wells.	NSU	500 feet
Water Resources		Springs	Within a designated corridor, blasting and other surface disturbances would be prohibited within 500 feet of all live springs.	NSU	500 feet

Table C.3-26 Cedar City Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water/Soils		Stream channels, areas of unstable soils, and seeps	Construct roads to avoid stream channels, areas of unstable soils, and seeps. Avoid constructing long, down slope straightaways, providing instead curves with water drainages off the road bed.	CSU	No buffer
Wildlife-multiple species		Deer habitat, prairie dog, sage grouse, bald & golden eagle dens, burrows, nests, and roosting sites.	Following the advice of a qualified wildlife biologist as designated by the appropriate federal official, roads, railroads, towers, and other ground disturbing activities would be located 200 yards from identified active dens, burrows, nests, or roosting sites to protect deer, Utah prairie dog, bald and golden eagles, and sage grouse.	NSU	200 yards (600 feet)
Wildlife-SSS	Prairie dog, white-tailed	Prairie dog towns	Prairie dogs require Category 3 protection of no occupancy or drilling within prairie dog towns.	CSU	No buffer

Table C.3-27 Cedar City Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	Mule deer	Sigurd to Paragonah transmission corridor crucial winter range	During Jan 1 to April 30 within the Sigurd to Paragonah transmission line corridor, transmission line construction would cease along the transmission lines. Transmission line construction would cease along the transmission lines to protect mule deer crucial winter range.	TL	1/1 to 4/30	No buffer
Wildlife-Raptors	Bald/golden eagles	Paragonah to St. George transmission corridor golden eagle roost sites	During Feb 15 to June 30 within Paragonah to St. George transmission line construction would cease along the transmission lines to protect bald and golden eagle roost sites.	TL	2/15 to 6/30	No buffer
Wildlife-Raptors	All raptors	Nests	Raptors are protected during their nesting season by a special stipulation which requires no drilling or exploration around nest sites from February 15 through June 30.	TL	2/15 to 6/31	No buffer
Wildlife-Raptors	All raptors	Nests	In order to protect important raptor nesting areas, exploration, drilling, and other development activity will be allowed only during the period from July 1 to February 14. TL-Feb 15 to June 30.	TL	2/15 to 6/30	No buffer
Wildlife-SSS	Sage grouse	Leks	Sage grouse mating is protected by special stipulation prohibiting drilling or exploration on strutting grounds from March 1 through May 15.	TL	3/1 to 5/15	No buffer
Wildlife-SSS	Sage grouse	Sage grouse – Pinyon Planning Unit	In order to protect important sage grouse strutting and nesting areas, exploration, drilling, and other development activity will be allowed only during the period from May 16 to February 28. TL from 3/1 to 5/15.	TL	5/16 to 2/28	No buffer
Wildlife-SSS	Sage grouse	Sigurd to Paragonah transmission corridor strutting grounds	During March 15 to May 1 within the Sigurd to Paragonah transmission line corridor, transmission line construction would cease along the transmission lines to protect sage grouse strutting areas.	TL	3/15 to 5/1	No buffer

C.3.2.13 Saint George Field Office, Utah

References: St. George Field Office Record of Decision and Resource Management Plan, March 1999 (Chapter 2, Management Decision by Resource; Appendix 4—U.S. Fish and Wildlife Service Terms and Conditions for Authorized Activities within Desert Tortoise Habitat).

Table C.3-28 Saint George Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-ACEC	Desert tortoise	Beaver Dam Slope ACEC	The Bureau shall strongly discourage new rights-of-way and temporary use permits within the Beaver Dam Slope ACEC and the Upper Virgin River DWMA; such rights-of-way and temporary use permits within the DWMA or ACEC shall only be authorized if no reasonable alternative exists and impacts to tortoises and their habitat can be mitigated. Surface disturbance (before restoration) resulting from all new rights-of-ways and temporary use permits in the DWMAs/ACECs shall not exceed 40 acres through the life of the project In DWMAs/ACECs, vehicles associated with Bureau-authorized projects traveling on unpaved roads in desert tortoise habitat shall not exceed speed limits established by the Bureau as necessary to protect desert tortoises. These speed limits will generally not exceed 40 mph even on the best unpaved roads, but may be much less than this on some roads. In regard to new rights-of-way within the Beaver Dam Slope ACEC and the Upper Virgin River DWMA, such rights-of-way shall be routed away from high-density tortoise populations, and along the edges of DWMAs/ACECs. Linear right-of-ways shall be placed adjacent or parallel to existing rights-of-way and share vehicular access. Utilities shall be co-located with other utility projects whenever feasible. No new paved roads shall be authorized in the DWMA or ACEC. Temporary upgrading of existing roads and construction of new unpaved roads in the DWMA or ACEC could be authorized only if positive benefits to tortoise management occur. Concurrence from the Service that positive benefits would accrue is required prior to authorizing new roads in DWMAs/ACECs.	CSU	No buffer
Wildlife-SSS	All	T&E and candidate species habitat	T&E and Candidate Species Habitat are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available.	CSU	No buffer
Water Resources		Riparian areas	Riparian Areas are Rights-of-Way avoidance areas (subject to designated corridors).	CSU	No buffer
Wildlife-SSS		Desert tortoise habitat	Outside of the HCP Reserve and the Beaver Dam Slope ACEC, tortoise habitat now designated as critical will be protected by designating such habitats as right-of-way avoidance areas (outside of utility corridors).	CSU	No buffer
Travel		OHV closed areas	OHV Closed Areas are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available.	CSU	No buffer
Travel		OHV designated roads & trails areas	OHV Designated Roads & Trails Areas are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available.	CSU	No buffer
Visual Resources		VRM Class I and II areas	VRM Class I and II areas are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available.	CSU	No buffer

Table C.3-29 Saint George Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife- Big Game	Elk	Parturition areas	Elk calving areas will be closed for the same reason from May 1 to July 30. These seasonal use restrictions will also be applied to mineral materials sales, forest product sales, and rights-of-way construction.	TL	5/1 to 7/30	No buffer
Wildlife- Big Game	Mule deer	Winter range	Crucial mule deer winter range will be protected from the potential effects of fluid mineral leasing with a Category 2 seasonal stipulation to close the lands to exploration or development from November 1 to April 15. Elk calving areas will be closed for the same reason from May 1 to July 30. These seasonal use restrictions will also be applied to mineral materials sales, forest product sales, and rights-of-way construction.	TL	11/1 to 4/15	No buffer
Wildlife-Raptors	Golden eagle	Nests	Fluid mineral leasing Category 2 seasonal stipulation will be applied to a 0.5 mile area around known active nest sites closing the lands to exploration and drilling for the following species: golden eagle (February 1 to June 30). These seasonal restrictions will also be applied to all authorizations for fuelwood permits, mineral materials sales, construction activity, and competitive recreation permits issued for the lands involved.	TL	2/1 to 6/30	0.5 mile
Wildlife-Raptors	Peregrine falcon	Nests	fluid mineral leasing Category 2 seasonal stipulation will be applied to a 0.5 mile area around known active nest sites closing the lands to exploration and drilling for the peregrine falcon (March 15 to June 30). These seasonal restrictions will also be applied to all authorizations for fuelwood permits, mineral materials sales, construction activity, and competitive recreation permits issued for the lands involved.	TL	3/15 to 6/30	0.5 mile
Wildlife-SSS	Desert tortoise	Habitat	To the extent possible, project activities shall be scheduled when tortoises are inactive (October 15 through March 15). The following project activities shall only occur from October 15 through March 15: surface disturbance associated with mineral leasing; organized, non-speed vehicular events in the DWMA and/or ACEC; construction and nonemergency maintenance activities in rights-of- ways; and non-emergency maintenance of existing roads. During the tortoise active season (March 15 through October 15), project features that might trap or entangle desert tortoises such as open trenches, pits, open pipes, etc., shall be covered or modified to prevent entrapment.	TL, CSU	3/16 to 10/14	No buffer
Wildlife-SSS	Mexican spotted owl	Nests	fluid mineral leasing Category 2 seasonal stipulation will be applied to a 0.5 mile area around known active nest sites closing the lands to exploration and drilling for the Mexican spotted owl (February 1 to August 31). These seasonal restrictions will also be applied to all authorizations for fuelwood permits, mineral materials sales, construction activity, and competitive recreation permits issued for the lands involved. The bald eagle winters but does not nest in this area.	TL	2/1 to 8/31	0.5 mile
Wildlife-SSS	Southwestern willow flycatcher	Known active nests	Where known active nest sites are located on public lands, BLM will implement seasonal closures for the period of April 1 to August 30 within 0.5 mile of nests for discretionary permits authorizing construction or other disruptive activity.	TL	4/1 to 8/30	0.5 mile

C.3.2.14 Ely District/Caliente Field Office, Utah

References: Ely District Record of Decision and Approved Resource Management Plan, August 2008 (Chapter 2, Alternatives, page 2.4-52; Appendix A—Resource Program Best Management Practices, page A1-8), Wildlife section; Clark County Conservation of Public Land and Natural Resources Act of 2002 (Public Law 107-282-Nov. 6, 2002), Title II; Wilderness Act of 1964.

Table C.3-30 Ely Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Geology (Karst)		Caves	Ground disturbing activities are not allowed within 100 yards (horizontally or vertically) of known cave resources including entrances, drainage areas, subsurface passages, and developed recreation sites.	NSU	300 feet
Wildlife-SSS	Sage grouse	Leks	Outside of designated corridors, above-ground facilities will not be constructed within 0.25 mile of greater sage-grouse leks. Underground facilities will not be installed within 0.25 mile of greater sage-grouse leks unless the vegetation can be established to pre-disturbance conditions within a reasonable period of time. No new roads will be constructed within 0.25 mile of greater sage-grouse leks. Exceptions may be granted by the authorized officer, in consultation with Nevada Department of Wildlife, if the project can be designed so that it will not affect breeding activity nor degrade the integrity of the habitat associated with the lek, or if the lek has been inactive for at least 5 consecutive years or the habitat has changed such that there is no likelihood that the lek will become active.	NSU, CSU	0.25 mile
Special Designations-ACEC		Kane Springs ACEC	Limited/avoidance/exclusion area. [Limited = Rights-of-way; limit authorization of future communication sites to existing established rights-of-way unless technically unfeasible and encourage use of existing corridors for all future rights-of-way when possible. Avoidance= Avoidance area; granting rights-of-way (surface, subsurface, aerial) within the area will be avoided, but rights-of-way may be granted if there is minimal conflict with identified resource values and impacts can be mitigated.]. In general, proposed ACECs are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available. Manage rights-of-way in desert tortoise habitat the same as that described for the Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs.	CSU	No buffer
Special Designations-ACEC		Beaver Dam Slope ACEC	Limited Rights-of-way area. Limited: Rights-of-way; limit authorization of future communication sites to existing established rights-of-way unless technically unfeasible and encourage use of existing corridors for all future rights-of-way when possible. Avoidance: Avoidance area; granting rights-of-way (surface, subsurface, aerial) within the area will be avoided, but rights-of-way may be granted if there is minimal conflict with identified resource values and impacts can be mitigated . In general, proposed ACECs are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available. Manage rights-of-way in desert tortoise habitat the same as that described for the Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs.	CSU	No buffer

Table C.3-30 Ely Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-ACEC		Mormon Mesa ACEC	Limited/avoidance/exclusion area: Limited: Rights-of-way; limit authorization of future communication sites to existing established rights-of-way unless technically unfeasible and encourage use of existing corridors for all future rights-of-way when possible. Avoidance: Avoidance area; granting rights-of-way (surface, subsurface, aerial) within the area will be avoided, but rights-of-way may be granted if there is minimal conflict with identified resource values and impacts can be mitigated. Manage rights-of-way in desert tortoise habitat the same as that described for the Beaver Dam Slope, Kane Springs, and Mormon Mesa ACECs.	CSU	No buffer
Special Designations-Wilderness Areas	Delamar Mountains Wilderness Area	All wilderness areas	Clover Mountain and Delamar Mountains Wilderness areas are designated ROW exclusion areas.	NSU	No buffer
Special Designations-Wilderness Areas	Clover Mountain wilderness Area	All wilderness areas	Clover Mountain and Delamar Mountains Wilderness areas are designated ROW exclusion areas.	NSU	No buffer

Table C.3-31 Ely Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	All	Parturition areas	Where appropriate, restrict permitted activities in big game calving/fawning/kidding/lambing grounds and crucial summer range from April 15 through June 30.	TL	4/15 to 6/30	No buffer
Wildlife-Big Game	All	Winter habitat, crucial	Where appropriate, restrict permitted activities in crucial winter range from November 1 through March 31.	TL	11/1 to 3/31	No buffer
Wildlife-Big Game	Big horn sheep	Occupied habitat	Where appropriate, restrict permitted activities within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.	TL	3/1 to 5/31	No buffer
Wildlife-Big Game	Big horn sheep	Occupied habitat	Where appropriate, restrict permitted activities within occupied desert bighorn sheep habitat from March 1 through May 31 and from July 1 through August 31.	TL	7/1 to 8/31	No buffer
Wildlife-Raptors	Raptors	Nests	Where appropriate, restrict permitted activities from May 1 through July 15 within 0.5 mile of raptor nest sites unless the nest site has been determined to be inactive for at least the previous 5 years.	TL	6/1 to 7/15	0.5 mile
Wildlife-SSS	Desert tortoise	Habitat	Where appropriate, restrict permitted activities from March 1 through October 31 within desert tortoise habitat.	TL	3/1 to 10/31	No buffer
Wildlife-SSS	Sage grouse	Leks	Where appropriate, restrict permitted activities in all occupied ranges from 3/1 – 5/15 within 2 miles of active leks.	TL	3/1 to 5/15	2 miles

Table C.3-31 Ely Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-SSS	Sage grouse	Winter range	Where appropriate, restrict permitted activities from 11/1 – 3/31 within GSG winter range.	TL	11/1 to 3/31	No buffer

C.3.2.15 Las Vegas Field Office, Utah

References: Record of Decision for the Approved Las Vegas Resource Management Plan and FEIS, October 1998 (Management Decisions by Resource); Clark County Conservation of Public Land and Natural Resources Act Of 2002 (Public Law 107-282-Nov. 6, 2002), Title II; Wilderness Act of 1964.

Table C.3-32 Las Vegas Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-ISA		Sunrise ISA	No rights-of-way could be authorized within the Sunrise Instant Study Area, unless it is released from further wilderness consideration. There is a corridor 1,400 feet wide from the north side of the Sunrise Instant Study Area south through Rainbow Gardens to the Lake Mead crossover. This corridor is described as west of the east boundary of the IPP-McCullough powerlines. Activation and use of this corridor is contingent upon Congressional action releasing the Instant Study Area from further wilderness consideration and study.	NSU	No buffer
Special Designations-Wilderness Areas.		Arrow Canyon Wilderness Area	There shall be no commercial enterprise and no permanent road within any wilderness area designated. There shall be no temporary road. No use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area. Motorized equipment and equipment used for mechanical transport are generally prohibited on all federal lands designated as wilderness.	NSU	No buffer
Special Designations-Wilderness Areas.		Black Mountain Wilderness Area	There shall be no commercial enterprise and no permanent road within any wilderness area designated. There shall be no temporary road. No use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area. Motorized equipment and equipment used for mechanical transport are generally prohibited on all federal lands designated as wilderness.	NSU	No buffer
Special Designations-Wilderness Areas.		Muddy Mountain Wilderness Area	There shall be no commercial enterprise and no permanent road within any wilderness area designated. There shall be no temporary road. No use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area. Motorized equipment and equipment used for mechanical transport are generally prohibited on all federal lands designated as wilderness.	NSU	No buffer

Table C.3-32 Las Vegas Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-ACEC		Mormon Mesa ACEC	Critical tortoise habitat ACEC. ROW avoidance area except within designated corridor; NSO for leasing; "Limited to designated roads and trails" for all motorized and mechanized vehicles. Limit utility corridors to 3,000 feet or less in width. On a case-by-case basis, support fencing of highways and moderately-to-heavily traveled dirt roads with tortoise-proof fencing and installation of culverts to allow tortoises to cross under the highway and roads. Require reclamation of disturbed lands resulting from activities that result in loss or degradation of tortoise habitat with habitat be reclaimed so that pre-disturbance condition can be reached within a reasonable time frame. Reclamation may include salvage and transplant of cactus and yucca, recontouring of the area, scarification of compacted soil, soil amendments, seeding, and transplant of seedling shrubs. Subsequent seeding or transplanting efforts may be required if monitoring indicates that the original effort was not successful. Require reclamation of temporary roads. Authorize new roads in response to specific proposed actions where no feasible alternative exists. Ensure access to private property. In general, proposed ACECs are Rights-of-Way avoidance areas (subject to designated corridors). New rights-of-way will be granted in these areas only when feasible alternative routes or designated corridors are not available.	CSU	No buffer
Special Designations-ACEC		Arrow Canyon ACEC	Designate as ROW avoidance area except within corridors. Close to mineral material ROWs. NSO. Requires reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property. R&I: Paleontological (Miocene bird tracks); Geological (candidate for the midcarboniferous Boundary stratotype section); cultural (prehistoric rock art).	CSU	No buffer
Special Designations-ACEC		Coyote Springs Desert Tortoise ACEC	Designated ACEC for Desert Tortoise. ROW avoidance area except within corridors. Closed to mineral material ROWs. NSO to fluid leasing. Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.	CSU	No buffer
Special Designations-ACEC		Rainbow Garden ACEC	Critical tortoise habitat ACEC. ROW avoidance area except within designated corridor; NSO for leasing; Limited to designated roads and trails" for all motorized and mechanized vehicles. Limit utility corridors to 3,000 feet or less in width. On a case-by-case basis, support fencing of highways and moderately-to-heavily traveled dirt roads with tortoise-proof fencing and installation of culverts to allow tortoises to cross under the highway and roads. Require reclamation of disturbed lands resulting from activities that result in loss or degradation of tortoise habitat with habitat be reclaimed so that pre-disturbance condition can be reached within a reasonable time frame. Reclamation may include salvage and transplant of cactus and yucca, recontouring of the area, scarification of compacted soil, soil amendments, seeding, and transplant of seedling shrubs. Subsequent seeding or transplanting efforts may be required if monitoring indicates that the original effort was not successful. Require reclamation of temporary roads. Authorize new roads in response to specific proposed actions where no feasible alternative exists. Ensure access to private property.	CSU	No buffer
Special Designations-ACEC		River Mountains ACEC	Designated ACEC for geological, scientific, scenic, cultural, plants. ROW avoidance area except within corridors. Closed to mineral material ROWs. NSO to fluid leasing. Require reclamation of temporary roads. Authorize new roads in response to specific authorized actions only, ensure access to private property.		No buffer
Geology (Karst)		Caves	All lands within 0.25 mile of significant caves, exclusive of any designated corridors, are designated as right-of-way avoidance areas.	CSU	0.25 mile

Table C.3-32 Las Vegas Field Office No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water Resources		All artificial and natural waters	Protect artificial and natural waters that provide benefit to wildlife by providing a minimum buffer of 0.25 mile for permitted activities (such as for off-road vehicle events).	CSU	0.25 mile
Special Designations-NCA		Sloan Canyon NCA	Outside the Wilderness, applications for new linear or site-type ROWs, or any amendments to existing ROWs, will be considered on a case-by-case basis within the NCA if the action furthers the purpose of the NCA in Section 602 of the Sloan Canyon NCA Act (Figure 2.11). Evaluation criteria will include, in part— Direct benefit to the NCA, such as utilities to serve NCA facilities; Maintaining or decreasing visual contrast; • Reduction of disturbed areas; Improvement in road/ROW alignments to minimize resource impacts. Designation and construction of trails, facilities, and ROWs will be limited within known lambing areas of bighorn sheep. Trail construction will be avoided in areas of known bighorn sheep movement between the North and South McCullough Mountains. In areas identified as having a medium to high potential for cultural resource sites (Duke et al. 2004), a Class III cultural resources inventory (100 percent) is required prior to any land disturbing undertaking. For areas with a low potential density for cultural resource sites, a reconnaissance-level inventory is required prior to land disturbing activities. Areas with a low potential will be considered for elimination of inventory requirements when sufficient information is available. All physical contact with petroglyphs, such as touching, chalking, and making impressions through rubbings or casting is prohibited except for traditional cultural purposes with a special use permit. Air quality dust control permits would be obtained from the Clark County Department of Air Quality and Environmental Management prior to the approval of any activity within the NCA .Special Status Species habitat will be maintained and protected to ensure suitable habitat conditions and viable populations. Disturbance or development will be avoided in areas of Special Status Species potential habitat. Disturbance or development will be mitigated in areas of Special Status Species habitat discovered during pre-activity site-specific surveys. Within Zone 2 (Semi–Primitive, Non-Motorized MEA)—Conduct restoration if the surface disturbing activity may have a short-term impact on natural vegetation community processes or if it reduces the viability of local species populations. The NCA is VRM II—Retain the existing character of the landscape. The level of change to the characteristic landscape should be low and may not attract the attention of casual viewers.	CSU	No buffer

Table C.3-33 Las Vegas Field Office Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	Big horn sheep	Sloan Canyon NCA	Surface disturbing activities will be limited within known lambing areas from January through May.	TL	1/1 to 5/1	No buffer
Wildlife-Raptors	All unspecified	Nests within Sloan Canyon NCA	Construction of trails, facilities, or ROWs will be seasonally restricted within an appropriate distance of occupied raptor nesting sites.	TL	No dates given	None specified

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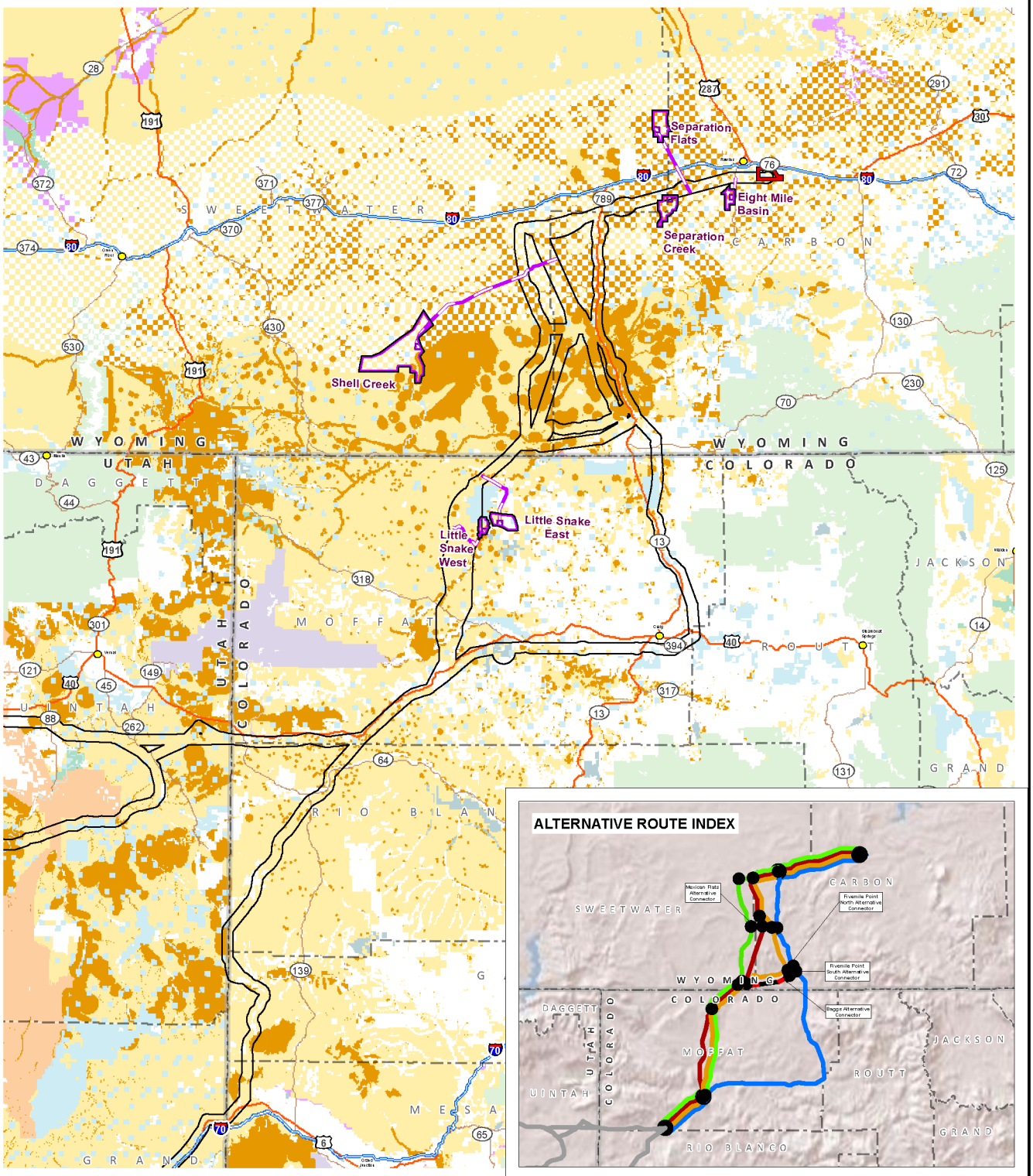

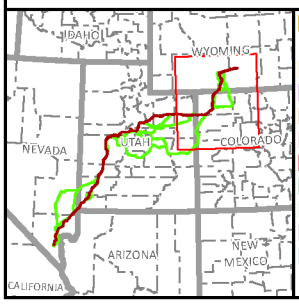

Land Jurisdiction

- NSU Restriction
- Bureau of Land Management
- Bureau of Reclamation
- Tribal/BIA
- DOD/USACE
- Department of Energy
- US Fish & Wildlife
- US Forest Service
- National Park Service
- State Land
- Private

- Project Corridor
- Terminal Siting Area
- Potential Ground Electrode Siting Area
- Potential Ground Electrode Site
- Potential Ground Electrode Overhead Electrical Line

DEIS Alternative Routes

- Applicant Proposed I-A
- Alternative I-B
- Alternative I-C
- Agency Preferred I-D
- Alternative Variation or Connector
- Segment not in this Region

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure C-1
Region I
No Surface Use

0 5 10 20 Miles
0 5 10 20 km
1:1,750,000

N

Western AREA POWER ADMINISTRATION

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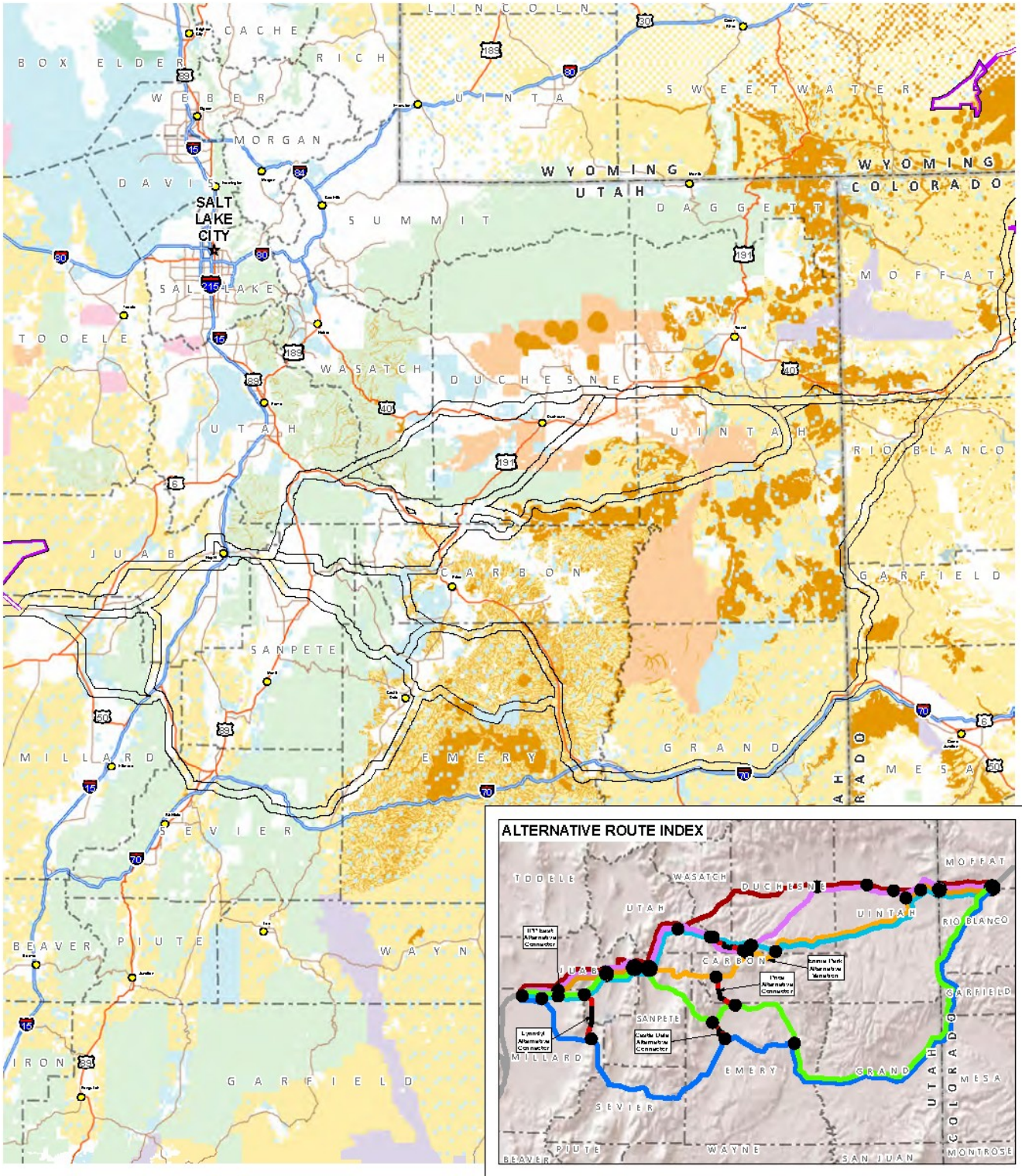

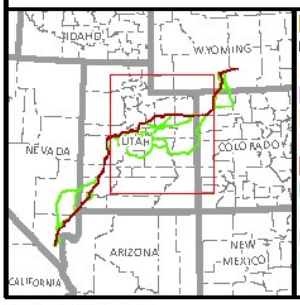

NSU Restriction

Land Jurisdiction

- Bureau of Land Management
- Bureau of Reclamation
- Tribal/BIA
- DOD/USACE
- Department of Energy
- US Fish & Wildlife
- US Forest Service
- National Park Service
- State Land
- Private

- Project Corridor
- Potential Ground Electrode Siting Area
- Potential Ground Electrode Site
- Potential Ground Electrode Overhead Electrical Line

DEIS Alternative Routes

- Applicant Proposed II-A
- Alternative II-B
- Alternative II-C
- Alternative II-D
- Alternative II-E
- Agency Preferred II-F
- Alternative Variation or Connector
- Segment not in this Region

TRANSWEST EXPRESS TRANSMISSION PROJECT

Figure C-2
Region II
No Surface Use

0 10 20 40 Miles
0 10 20 40 km
1:2,250,000

N

Western AREA POWER ADMINISTRATION

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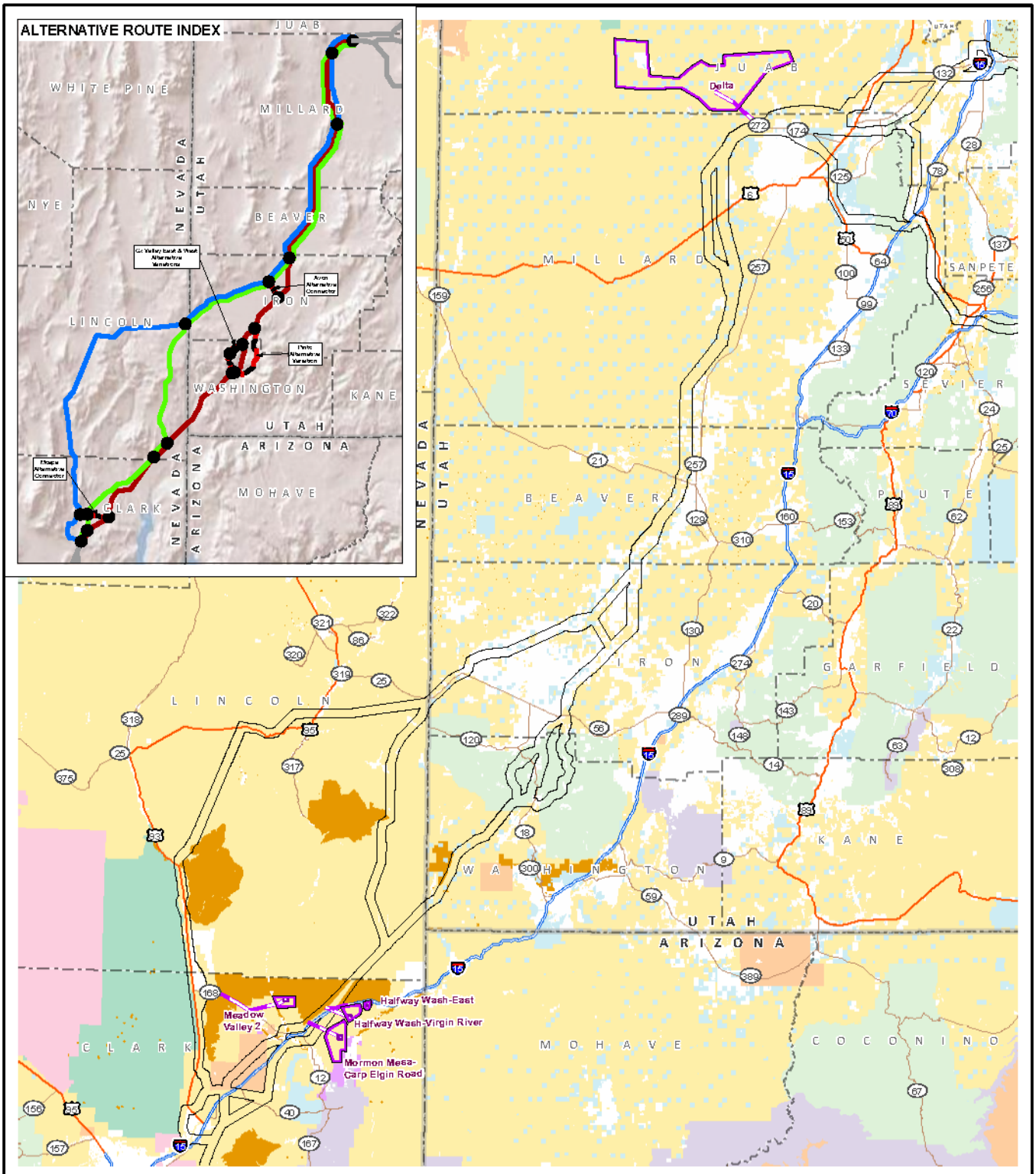

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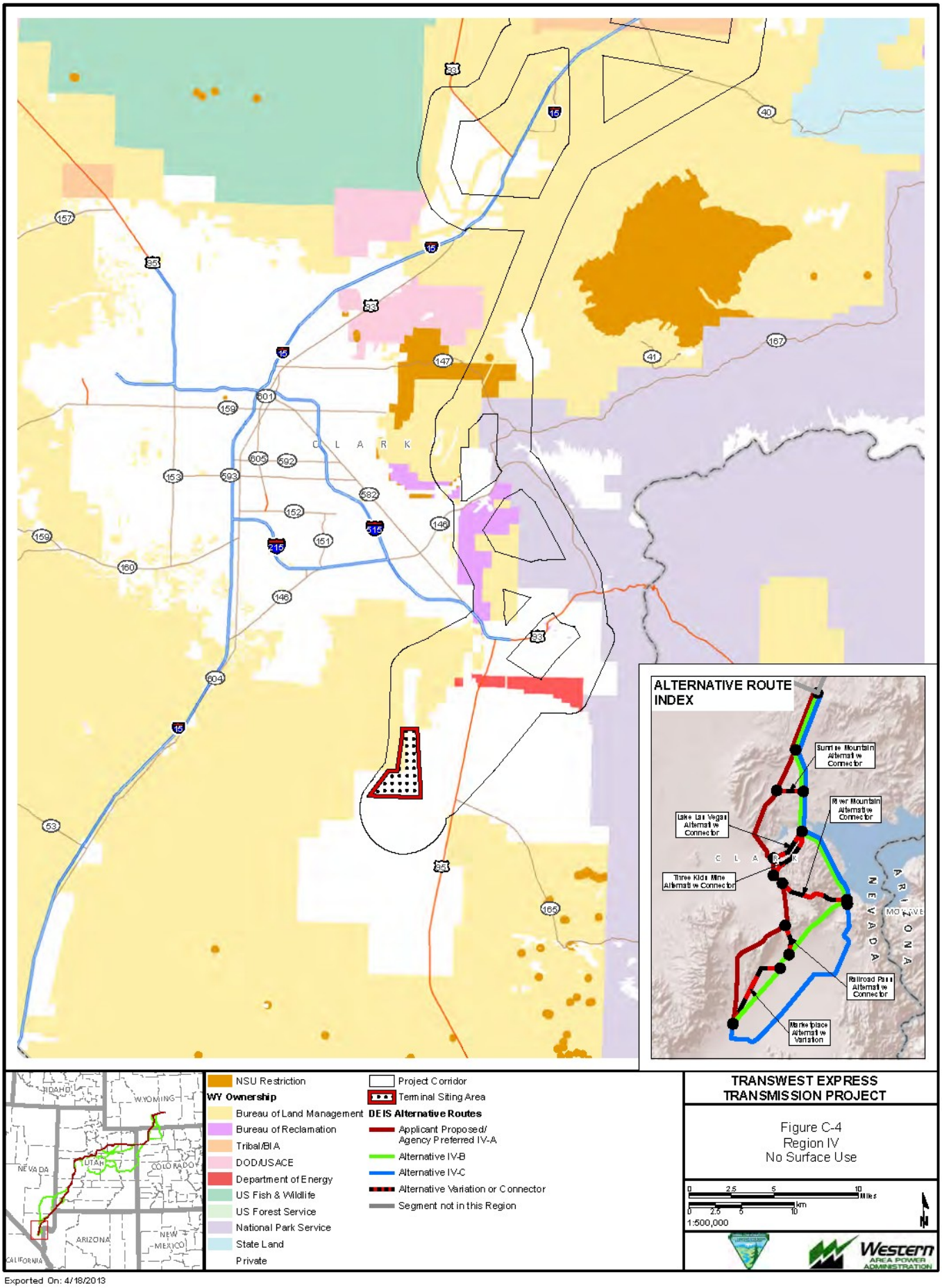

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C.4 Applicable USFS Standards and Guidelines

C.4.1 National Forest System Stipulation References

The following section details the Standards and Guidelines and references to the National Forest System NSU, CSU, and TL stipulations applicable to the proposed transmission line corridor.

C.4.1.1 Ashley National Forest, Utah

References: IRA map; Land and Resource Management Plan for the Ashley National Forest, 1986 (Appendix G—References, page 4; Appendix H—Exhibit No. 2 - Mitigation Measures Required of Applicants by Federal Agencies for High Voltage/Extra High Voltage Electrical Transmission Lines); RMP, Management Area Stipulations; Ashley Forest Plan Amendment CC-1, Guideline A; Ashley Plan Amendment CC-1, Guideline S.

The following four management areas are within the Project area.

- **Management Area D (Livestock Grazing)**: Managed for livestock grazing. Open to all recreation uses and generally all travel. Other construction is permitted if conflicts with livestock grazing are mitigated. Riparian areas maintained to protect streambank stability.
- **Management Area E (Wildlife Habitat Emphasis)**: Includes portions of summer and winter ranges, T&E habitat, strutting areas, calving and fawning areas and spawning areas. Recreation may be closed or restricted during key use periods. Road closures are common to in stress seasons for featured species. Livestock grazing may be limited or excluded and mineral development may have seasonal or NSO restrictions. New construction would be mitigated for wildlife needs. Riparian areas are protected.
- **Management Area F (Dispersed Recreation Roaded**): Area receiving a variety of uses in a variety of landforms and vegetation types in a roaded environment. Dispersed recreation is favored over other resources. Improvements designed to enhance recreation opportunities and optimize species diversity. Construction allowed as needed. Maintenance at high levels on main roads. May have road closures to protect resources.
- **Management Area N (Existing Low Management Emphasis)**: Resource protection as needed. Access may be controlled to enhance wildlife habitat. Improvements allowed on low investment basis. Habitat diversity. No restrictions to mineral development other than standard s and guidelines.

Within the Ashley National Forest, the Standards and Guidelines that are applicable to the TWE Project are applicable to all four Management Areas and are included in **Table C.4-1**.

Table C.4-1 Ashley National Forest Standard and Guidelines by Resource

MA	Resource	Description
General Management (all MAs)	Soils	IV-34.1. Use logging systems and techniques capable of minimizing soil loss, compaction, and other resource impacts. IV-37.2. Stabilize road corridors and control road use to reduce soil erosion. IV-37.2. Stabilize areas damaged by fire, mining, or other events.
General Management (all MAs)	Water	Water (General) (IV-37) Water Objective 1: Maintain or improve soil stability, site productivity and repair or stabilize damaged watersheds. Standards and Guidelines to meet Objective Obtain at least 80% of original ground cover within 5 years after project completion. Design activities to minimize project-caused sediment rates, not to exceed a 125% increase of the pre-project rates the first year and a 105% increase at the end of five years. Allow no activity that will lower water levels of natural water storage areas (lakes, ponds, etc.) that are currently undeveloped. Evaluate flood hazard and resource values for construction or reconstruction projects within the 100-year floodplain or riparian zone where facilities will not be allowed unless other alternatives have been reviewed and rejected as being more environmentally damaging. Avoid channelization of natural streams. Where necessary for flood control or fisheries enhancement, use stream geometry relationships to reestablish meanders, width/depth ratios, etc. All dredged material shall be removed above the high-water line or stabilized with armor such as riprap. Rehabilitate disturbed areas based on these priority considerations: Aquatic ecosystems; Riparian ecosystems; Riparian areas outside of aquatic and riparian ecosystems.
General Management (all MAs)	Riparian	Riparian (IV-45) Riparian Objective 1: Maintain or improve riparian areas and riparian dependent resource values including wildlife, fish, vegetation, watershed, and recreation in a stable or upward trend. Manage for species diversity. Standards and Guidelines to meet Objective Complete a riparian inventory and implement riparian management. Maintain the hiding and thermal cover qualities of forested riparian areas giving priority to the preservation of old growth for cavity dependent species, the preservation of hiding cover adjacent to mineral licks, wallows, and calving or fawning areas, and the preservation of hiding and thermal cover along waterways. Maintain natural complexity and high relative productivity of riparian areas. Maintain capability of riparian areas to act as an effective sediment buffering zone in relation to upslope activities. Riparian area dependent resources will be given preferential consideration in cases of unresolvable conflicts. Restrict facilities and ground disturbing activities to areas outside riparian areas unless alternative routes have been reviewed and rejected as being more environmentally damaging. Only land application of approved herbicides to control noxious weeds will be allowed provided that herbicides are not allowed to contaminate surface water. Riparian Objective 2: Manage vegetation to enhance the riparian ecosystem. Standards and Guidelines to meet Objective Manage vegetation in riparian areas to be in good or excellent ecological condition, with a stable or upward trend. Special harvesting techniques to protect riparian zones, such as directional felling and cable yarding, will be applied when needed to protect the riparian ecosystem. Prohibit landings and decking areas and limit temporary roads within riparian areas.

Table C.4-1 Ashley National Forest Standard and Guidelines by Resource

MA	Resource	Description
General Management (all MAs)	Wildlife-Big Game	Provide habitat capable of supporting a minimum of 5,600 elk and 43,700 deer. Maintain adequate wildlife cover within 100 feet of an opening of 10 acres or more. Maintain adequate downed material and standing snags for wildlife habitat as identified below: Aspen: 70% of maximum population potential or 1.3 snags/acre Douglas fir: 50% of maximum population potential or 1 snag/acre Lodgepole pine: 40% or maximum population potential or 0.7 snag/acre (Spruce-Alpine fir) Ponderosa Pine: 80% of maximum population potential or 2.7 snag/acre Riparian: any species, 70% of maximum population potential or 1.3 snag/acre Identify and map elk calving areas, deer and antelope fawning areas, and sage grouse strutting and nesting areas for assessing cumulative impacts. Establish and maintain thermal and security cover needs to meet the Forest's big game habitat objectives. Resource management activities will be allowed if they will not adversely affect any T&E or sensitive species. Consult with the U.S. Fish and Wildlife Service when actions have the potential to affect any threatened or endangered species. Maintain the hiding and thermal cover qualities of forested riparian areas giving priority to the preservation of old growth for cavity dependent species, the preservation of hiding cover adjacent to mineral licks, wallows, and calving or fawning areas, and the preservation of hiding and thermal cover along waterways. Eliminate special uses that conflict with wildlife in identified wintering areas. Design and construct roads to avoid adversely affecting critical wildlife areas.
General Management (all MAs)	Wildlife-Goshawk	(Standard) When non-vegetative management activities (for example, land exchanges, recreation facility development, ski resort construction, utility corridors, etc.) are proposed that would result in a loss of suitable goshawk habitat, sufficient mitigation measures will be employed to ensure an offset of the loss. The biological evaluation (BE) process will be used to document findings, recommend mitigation measures, and evaluate consistency with the intent of the Conservation Strategy and Agreement for Management of the Northern Goshawk in Utah. (Guideline) Utilize native plant species from locally adapted seed sources in management activities when and where practical. Non-native plant species have the potential to cause systems to move outside of HRV; therefore, the use of non-native species should be justified to indicate how their use is important to maintain or restore a cover type to functioning conditions. (Standard) Use the latest Regionally accepted Biological Prefield Research form (USFS Region 4) to determine the level of goshawk field survey(s) needed to complete the BE. Completion of this form is required to document where surveys are not required. (Standard) Where goshawk field surveys are required, complete surveys for territory occupancy within suitable habitat. Surveys will be completed during the nesting and/or post-fledgling period, and must be conducted at least one year prior to implementation of management actions. (Guideline) Where goshawk field surveys are required and when project planning permits, two consecutive years of surveys for territory occupancy prior to implementation of management actions is preferred. (Guideline) If a historic nest is not associated with an active nest area, management direction for home range habitat should be applied. (Standard) When an active nest area has been identified, identify 2 alternate nest areas and 3 replacement nest areas. The next two guidelines provide recommended direction for implementation of this standard. (Guideline) Each nest area (active, alternate, and replacement) should be approximately 30 acres (total of approximately 180 acres) in size when sufficient suitable habitat exists. If sufficient amounts of suitable habitat are not present, use existing suitable habitat that is available. (Guideline) Alternate nest areas should be identified in suitable habitat with similar vegetative structures as the active nest areas. Replacement nest areas should be identified in habitat which will develop similar vegetative structures as the active nest area at the time the nest was active and alternate nest areas are projected to no longer provide adequate nesting habitat.

Table C.4-1 Ashley National Forest Standard and Guidelines by Resource

<table>
<tr><th>MA</th><th>Resource</th><th>Description</th></tr>
<tr><td></td><td></td><td>(Standard) Prohibit forest vegetative manipulation (timber harvest, prescribed burning, fuelwood, thinnings, weedings, etc.) within active nest areas (approximately 30 acres; i.e., Guideline p.) during the active nesting period. The active nesting period will normally occur between March 1 and September 30. For non-vegetative activities (such as road maintenance, oil and gas exploration, recreation sites, etc.), adjacent to a new nest site, or a new activity adjacent to an established nest, the following Guideline applies.
(Guideline) In active nest areas (approximately 30 acres; i.e., Guideline p.), restrict Forest Service management activities and human uses for which Forests issue permits during the active nesting period (does not include livestock permits) unless it is determined that the disturbance is not likely to result in nest abandonment. If the disturbance is likely to result in abandonment, a BE must be completed. To implement the action, the BE must conclude that the action is consistent with the intent of the Conservation Strategy and Agreement for Management of the Northern Goshawk in Utah.
(Guideline) Forest vegetative manipulation within active, alternate, and replacement nest areas should be designed to maintain or improve desired nest area habitat. Use the active nest area habitat characteristics as an indicator of the desired nest area habitat, and as the best available information for nest area habitat for that cover type.
(Guideline) Identify a Post-Fledgling Area (PFA) which encompasses the active, alternate, and replacement nest areas and additional habitat needed to raise fledglings. A PFA should be approximately 420 acres in size (exclusive of nest area acres) when sufficient suitable habitat exists. If sufficient amounts of suitable habitat are not present, use existing suitable habitat that is available.
(Guideline) Forest vegetative manipulation within the PFA should be designed to maintain or improve the same habitat features as discussed for the goshawk home range (i.e., stand structure, snags, downed logs, nest trees important in the life histories of the goshawk and its prey species common to the geographic location), except:
i) Openings, as defined in glossary and Reynolds et al., created as a result of mechanical vegetative treatments (does not include wildland fire) should not exceed the following by cover type:
<table>
<tr><th>Cover Type</th><th>Maximum Created Opening Size</th></tr>
<tr><td>Ponderosa Pine and Mixed Conifer</td><td>2 acres</td></tr>
<tr><td>Spruce/Fir</td><td>1 acre</td></tr>
<tr><td>Aspen and Lodgepole Pine</td><td>Follow current management direction</td></tr>
</table>
ii) Management activities should be restricted during the active nesting period. The active nesting period will normally occur between March 1 and September 30.
iii) Where timber harvest is prescribed to achieve desired forest conditions, plan the transportation system to minimize disturbance to the PFAs. For example, small permanent skid trails should be used in lieu of roads to minimize disturbance in goshawk PFAs. Variance may occur if it is determines that a combination of new permanent or temporary roads and permanent skid trails would result in less overall disturbance to PFA habitat.</td></tr>
</table>

Table C.4-1 Ashley National Forest Standard and Guidelines by Resource

MA	Resource	Description
General Management (all MAs)	Recreation	Implement the Forest District Travel Plans. Review annually and revise if necessary using the following guidelines: 1. Retain travel route and include it on the Forest's transportation system if: a) Road or trail is required for Forest Service management and public access. Road or trail may be restricted: 1) Seasonally - to protect road bed or reduce maintenance expenditures; to protect wildlife species and habitat. 2) Temporarily - to provide for public safety. b) Road or trail is required for access to private or State land, mining claims, and special use permits. Road or trail use may be restricted : 1) Seasonally - to protect road bed; to protect wildlife species and habitat. 2) Permanently - use would be authorized by a special use permit. c) Resource planning shows a future anticipated need. Road or trail use may be restricted: 1) Seasonally - to protect road bed; to protect wildlife species and habitat. 2) Permanently - to protect wildlife habitat (administrative or authorized use could be permitted) - to protect the investment. i) Road or trail shows trend leading to vegetative damage or soil displacement. ii) Road or trail is located in such a way that siltation caused from use reaches live streams. iii) Road or trail is interrupting or degrading the natural value or functions of unique ecosystems (i.e., riparian, alpine). 2. Obliterate road or trail and exclude it from the Forest's transportation system if: a) The road or trail is not necessary to meet Forest Service management objectives. b) The road or trail and its associated use is causing resources damage by: 1) Displacing soil and/or degrading water quality. 2) Degrading VQOs. 3) Displacing wildlife. 4) Subjecting Forest users to excessive noise or dust pollution. 5) Allowing access to sensitive sites leading to: i) Vegetative damage through trampling or compaction. ii) Degradation of water quality through poor sanitation. 6) Interrupting or degrading natural values or functions of unique, limited ecosystems. 3. Areas may be closed or restricted: a) To protect the public in concentrated use areas. b) To protect unique resources (i.e., cultural, geologic). c) To protect natural resources and prevent damage to the natural values or functions of the ecosystems. d) To achieve a variety of recreational opportunities. 4. Construct and maintain structures to protect financial investment, provide for public safety, and protect other resources. Provide and ensure compliance with specifications for the construction, maintenance, and operation of utilities, including powerlines, pipelines, and radio/TV microwave sites, compatible with adjacent land uses, as prescribed in the Corridor Plan and by operating licenses/permits.

Table C.4-1 Ashley National Forest Standard and Guidelines by Resource

MA	Resource	Description
General Management (all MAs)	Aquatic Resources	Identify and manage habitats capable of supporting self-sustaining trout populations. (Ashley National Forest) Provide appropriate aquatic and terrestrial habitat analysis input to all resource management activities. (Ashley National Forest) Maintain all streams for a biotic condition index (BCI) or 75 or above and a habitat condition index (HCI) or 42 or above. (Ashley National Forest) Resource management activities will be allowed if they will not adversely affect any T&E or sensitive species .(Ashley National Forest) Give priority to structural habitat improvement work in streams containing Colorado River cutthroat trout strains. (Ashley National Forest) Consult with the U.S. Fish and Wildlife Service when actions have the potential to affect any threatened or endangered species. (Ashley National Forest) See additional for “Soils, Water, and Air” related to riparian and aquatic habitat. (Ashley National Forest)

C.4.1.2 Manti-LaSal National Forest

References: IRA map; Land and Resource Management Plans for the Manti-La Sal National Forest, 1986.

The following seven management areas are within the Project area.

- **General Big-Game Winter Range (GWR)**: Management emphasis is on providing general big-game winter range. These are areas wildlife traditionally use. Treatments of various types are applied to increase forage production and plant species composition. Investments in compatible resource activities may occur. Permanent roads and special uses may be permitted. Short-term or temporary roads are obliterated and rehabilitated within one year after intended use. Motorized use is managed as appropriate to prevent unacceptable stress on big-game animals during the primary use season. Specific cover opening ratios, opening width, and stand design are maintained in pinyon-juniper chaining areas.
- **Key Big-Game Winter Range (KWR)**: Management emphasis is on providing winter forage and cover for big-game species in areas that must be available and unencumbered for wildlife use each year during the critical winter period. Vegetative treatments are applied to increase forage production of grass, forb, and especially browse species and/or to create and maintain thermal and hiding cover. Conflicting uses are not permitted on a continuing basis, but may be permitted outside the critical season if there is no long-term degradation. New roads other than short-term (temporary) roads are located outside of the management unit. Short-term roads will be rehabilitated to provide for wildlife use within one season after completed use. Prohibit motorized use to prevent unacceptable stress on big game during critical use periods.
- **Developed Recreation Sites (DRS)**: Management emphasis is for developed recreation facilities such as campgrounds, picnic grounds, trailheads, visitor information facilities, summer homes areas, ski areas, and water-related support facilities. Proposed sites) are managed to maintain the site attractiveness until developed. Facilities such as roads, trails, signs, etc., may dominate or subordinate, but should harmonize and blend with the characteristic landscape. As appropriate, existing developed sites should be withdrawn from locatable mineral entry, and closed to surface occupancy for leasable and saleable minerals. The prescription can be considered for application to all existing developed recreation sites and proposed sites identified for development.
- **Minerals Management Area (MMA)**: Management emphasis is on making land surface available for existing and potential major mineral developments. This prescription is applies where the lands surface is or will be used for facilities needed for the extraction of leasable minerals over an extended period. The areas associated with known, potential, development sites are included in this unit. Additional areas may be added to this unit as mines or fields are located and developed. As the developments are removed and restoration is completed, these areas may be changed to other appropriate management units. In units where mineral development is pending, renewable resource activities strive to be compatible with the management goals of adjacent management units. Long-term investments, such as timber planting, generally are not made. However, short-term investments, such as range and wildlife revegetation projects, may be made on these units.
- **Range Forage Production (RNG)**: Emphasis is on production of forage and cover for domestic livestock and wildlife. Intensive grazing management systems are generally favored. Some periodic heavy forage utilization may occur. Opportunities for investments in structural and non-structural improvements to increase forage production is moderate to high. Investments are made in compatible resource activities. Dispersed recreation opportunities vary between semi-primitive non-motorized and roaded natural appearing. Management activities are evident, but harmonize with the natural setting

- **Utility Corridor (UC)**: Emphasis is on providing transportation corridors for major cross-country pipelines, electrical transmission lines, and telephone lines. Management activities within these linear corridors strive to be compatible with the management goals of the adjacent management units.
- **Wood Fiber Production and Utilization (TBR)**: Emphasis is on management for the production and use of wood-fiber for a variety of wood products. The harvest methods by Forest cover type are single tree and group selection and shelterwood in Englemann spruce-subalpine fire, Douglas-fire, ponderosa pine, mixed conifers, and clear cutting in aspen. Harvesting will be accomplished with methods including cable, conventional crawler tractor, or rubber-tired skidders. Pre-commercial thinning and intermediate harvest will be used to increase or maintain fiber production. Dispersed recreation opportunities vary between semi-primitive non-motorized and roaded natural appearing. Wildlife habitat diversity may be enhanced by vegetative manipulation. Livestock grazing may be permitted. This prescription could alter water yield through vegetation management, as well as decreased evapotranspiration and maximize snow retention in small openings on low energy slopes.
- **Research, Protection, and Interpretation of Lands and Resource (RPI)**: Management emphasis for these units is to manage unique ecological, geological, paleontological, archeological, or historical sites or features of the Forest for research, protection, and/or interpretation of land and resources condition while making them available for study and viewing. Other resource use may be made of these units as long as they do not conflict with the purpose for which they exist. Activities that might cause impairment or occupancy of the unit for any reason other than interpretive are usually prohibited.
- **Special Land Designation (SLD)**: Management emphasis is on making lands available for existing and potential specialized uses. Sites that may be considered for application of this prescription include Ranger or Guard Stations and other administrative sites, electronic sites, and similar special land uses. Generally, other resource development and use activities within these units strive to be compatible with the management goals of the adjacent management units. However, this is often limited by the special activity or use authorized on the unit.
- **Undeveloped Motorized Recreation Sites (UDM)**: Management emphasis is on providing high quality dispersed recreation opportunities in areas characteristically receiving moderate to heavy levels of use. Visual resources are managed so that activities of man remain visually subordinate or are not evident. Range, timber, wildlife, and mineral resource activities and use may occur subject to maintaining appropriate ROS user experience or setting characteristics visual quality objectives, not permanently exceeding threshold levels for noise and air quality, or seriously impairing recreation use. These units generally occur along arterial and collector roads, although they may occur along local roads or trails and generally near water bodies.

Within the Manti-LaSal National Forest, the Standards and Guidelines that are applicable to the TWE Project are applicable to all four Management Areas and are included in **Table C.4-2**.

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
General Management (all MAs)	Water	Water Quality Management (General) (F00) (III-30) Water Objective 1: Maintain or improve water quality. Standard 1: Meet Utah and Colorado State Water Quality Standards (FSM 2532). Water Quality Management Objective 2: Implement best management practices relative to water quality in all resource activities. Standard 1: Follow Nonpoint Source Water Quality Management Plan for Utah and Colorado.

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

<table>
<tr><th>MA</th><th>Resource</th><th>Description</th></tr>
<tr><td rowspan="3">General Management (all MAs)</td><td rowspan="3">Wildlife</td><td>Provide habitat needs, as appropriate, for Management Indicator Species.
A. Deer and Elk
(1) Maintain adequate hiding cover around calving areas.
(2) Optimum habitat mix for the daily normal range is 25 percent hiding cover, 15 percent thermal cover, 10 percent hiding or thermal cover and 50 percent foraging area.
(4) Manage key deer and elk habitat so as to minimize disturbance during the period of use.
B. Golden Eagle
(1) Avoid activities that could cause abandonment of actives nests.</td></tr>
<tr><td>6) Provide for habitat needs of cavity nesting birds, raptors, and small animals by:
A. Through coordination with project work or resource uses, insure the appropriate density of snags are available and protected in vegetative types.
B. Selecting and utilizing live trees to create snags.
a. A snag is defined as a completely or partially dead standing tree at least 4 inches DBH and at least 6 feet in height.
b. Maintain various size classes of standing snags with the approximate density per 100 acres based on broad vegetative types.
<table>
<tr><th></th><th>No./100 Acres</th></tr>
<tr><td>(1) Ponderosa pine</td><td>110</td></tr>
<tr><td>(2) Mixed Conifer (Spruce/Fir/Douglas</td><td>90</td></tr>
<tr><td>(3) Aspen</td><td>120</td></tr>
<tr><td>(4) Pinyon-Juniper</td><td>15</td></tr>
<tr><td>(5) Riparian</td><td>120</td></tr>
</table>
c. R-4 Supplement 26 to FSM 2631.</td></tr>
<tr><td>7) Manage down timber to provide habitat for wildlife.
b. Manage to provide at least two logs per acre in timber habitat types.</td></tr>
</table>

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
General Management (all MAs)	Wildlife-Goshawk	(Standard) When non-vegetative management activities (for example, land exchanges, recreation facility development, ski resort construction, utility corridors, etc.) are proposed that would result in a loss of suitable goshawk habitat, sufficient mitigation measures will be employed to ensure an offset of the loss. The biological evaluation (BE) process will be used to document findings, recommend mitigation measures, and evaluate consistency with the intent of the Conservation Strategy and Agreement for Management of the Northern Goshawk in Utah. (Guideline) Utilize native plant species from locally adapted seed sources in management activities when and where practical. Non-native plant species have the potential to cause systems to move outside of HRV; therefore, the use of non-native species should be justified to indicate how their use is important to maintain or restore a cover type to functioning conditions. (Standard) Use the latest Regionally accepted Biological Prefield Research form (USFS Region 4) to determine the level of goshawk field survey(s) needed to complete the BE. Completion of this form is required to document where surveys are not required. (Standard) Where goshawk field surveys are required, complete surveys for territory occupancy within suitable habitat. Surveys will be completed during the nesting and/or post-fledgling period, and must be conducted at least one year prior to implementation of management actions. (Guideline) Where goshawk field surveys are required and when project planning permits, two consecutive years of surveys for territory occupancy prior to implementation of management actions is preferred. (Guideline) If a historic nest is not associated with an active nest area, management direction for home range habitat should be applied. (Standard) When an active nest area has been identified, identify 2 alternate nest areas and 3 replacement nest areas. The next two guidelines provide recommended direction for implementation of this standard. (Guideline) Each nest area (active, alternate, and replacement) should be approximately 30 acres (total of approximately 180 acres) in size when sufficient suitable habitat exists. If sufficient amounts of suitable habitat are not present, use existing suitable habitat that is available. (Guideline) Alternate nest areas should be identified in suitable habitat with similar vegetative structures as the active nest areas. Replacement nest areas should be identified in habitat which will develop similar vegetative structures as the active nest area at the time the nest was active and alternate nest areas are projected to no longer provide adequate nesting habitat. (Standard) Prohibit forest vegetative manipulation (timber harvest, prescribed burning, fuelwood, thinnings, weedings, etc.) within active nest areas (approximately 30 acres; i.e., Guideline p.) during the active nesting period. The active nesting period will normally occur between March 1 and September 30. For non-vegetative activities (such as road maintenance, oil and gas exploration, recreation sites, etc.), adjacent to a new nest site, or a new activity adjacent to an established nest, the following Guideline applies. (Guideline) In active nest areas (approximately 30 acres; i.e., Guideline p.), restrict Forest Service management activities and human uses for which Forests issue permits during the active nesting period (does not include livestock permits) unless it is determined that the disturbance is not likely to result in nest abandonment. If the disturbance is likely to result in abandonment, a BE must be completed. To implement the action, the BE must conclude that the action is consistent with the intent of the Conservation Strategy and Agreement for Management of the Northern Goshawk in Utah. (Guideline) Forest vegetative manipulation within active, alternate, and replacement nest areas should be designed to maintain or improve desired nest area habitat. Use the active nest area habitat characteristics as an indicator of the desired nest area habitat, and as the best available information for nest area habitat for that cover type. (Guideline) Identify a Post-Fledgling Area (PFA) which encompasses the active, alternate, and replacement nest areas and additional habitat needed to raise fledglings. A PFA should be approximately 420 acres in size (exclusive of nest area acres) when sufficient suitable habitat exists. If sufficient amounts of suitable habitat are not present, use existing suitable habitat that is available. (Guideline) Forest vegetative manipulation within the PFA should be designed to maintain or improve the same habitat features as discussed for the goshawk home range (i.e., stand structure, snags, downed logs, nest trees important in the life histories of the goshawk and its prey species common to the geographic location), except: i) Openings, as defined in glossary and Reynolds et al., created as a result of mechanical vegetative treatments (does not include wildland fire) should not exceed the following by cover type:

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
		<table><tr><th>Cover Type</th><th>Maximum Created Opening Size</th></tr><tr><td>Ponderosa Pine and Mixed Conifer</td><td>2 acres</td></tr><tr><td>Spruce/Fir</td><td>1 acre</td></tr><tr><td>Aspen and Lodgepole Pine</td><td>Follow current management direction</td></tr></table> ii) Management activities should be restricted during the active nesting period. The active nesting period will normally occur between March 1 and September 30. iii) Where timber harvest is prescribed to achieve desired forest conditions, plan the transportation system to minimize disturbance to the PFAs. For example, small permanent skid trails should be used in lieu of roads to minimize disturbance in goshawk PFAs. Variance may occur if it is determines that a combination of new permanent or temporary roads and permanent skid trails would result in less overall disturbance to PFA habitat.
General Direction	Dispersed Recreation Management (A14 and 15) (III-17)	3) Classify areas as to whether vehicular travel use is restricted.
General Direction	Special-Use Management (Non-Recreation) (J01) (III-37)	2) Encourage burying utility and lines, except when: A. Visual quality objectives of the area can be met using an overhead line. B. Burial is not feasible due to soil erosion or geologic hazard or unfavorable geologic conditions. C. Greater long-term site disturbance would result. D. It is not technically feasible, or economically reasonable.
		3) Approve special-use applications for areas adjacent to developed sites only when the proposed use is compatible with the purpose and use of the developed site.
KWR	Wildlife-Big Game	1) Provide big-game forage, cover, and habitat to help achieve the wildlife population objectives identified in interagency herd unit plans. a. Maintain at least 30% of shrub plants in mature age, and at least 10% in young age classes. b. Maintain at least two shrub species on shrub lands capable of growing two or more shrub species.
		1) Forest habitat types within this unit will be managed to provide big-game forage, thermal cover, and security in association with the other vegetative habitat types.
		1) Prohibit and/or eliminate special uses that conflict with wintering animals.
		2) Authorize only those uses that would enhance or improve winter range condition.
		Use road or area closures to maintain habitat effectiveness. a. Prohibit activities during critical periods of big-game use. b. Approved activities must be short-term and prompt reclamation must be assured.
		2) Prohibit new permanent roads in the unit.
		3) Allow short-term (temporary) roads where the use would not conflict with wintering big game.
		1) Manage recreational activities so they do not conflict with wildlife use of habitat. a. Close management units to vehicular travel and to snowmobile use during the critical use season.

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
GWR	Wildlife-Big Game	1) Provide big-game habitat needed to help achieve the big- game population objectives identified in interagency herd unit plans. a. Maintain at least 30% of shrub plants in mature age, and at least 10% in young age classes. b. Maintain at least two shrub species on sites capable of growing two or more shrub species. c. Maintain habitat capability at a level at least 50% of potential for big game. d. Activities or uses which induce human activity within the area may be modified, rescheduled, or denied if the combination of accumulated impacts on vegetation, behavior, and /or mitigation reduce effective habitat use below 80% of base year 1980 capacity of this unit.
		Allow new roads to meet management needs. Obliterate and rehabilitate temporary toads within one season after planned use ends. a. New roads may be constructed when; (1) There is no acceptable alternative to build the road outside the unit, and the road is essential to achieve priority goals and objectives of contiguous management units, or to provide access to land administered by other government agencies or to contiguous private land. (2) Winter road use will not significantly disturb wintering big-game animals. (3) Roads cross the winter range in the minimum distance feasible to facilitate the needed use.
		2) Close and/or restrict road use as appropriate to reduce stress on big-game animals.
	Dispersed Recreation Management (A14 and 15)	1) Manage recreational activities so they do not conflict with wildlife use of habitat. a. Restrict snowmobile use to designated routes if conflicts with wintering animals occur. b. Restrict vehicular travel on non-roaded areas if conflicts with habitat needs.
	Special Use Management (Non-recreation) (J01)	1) As appropriate, permit special uses if they do not conflict with big-game wintering.
	Special Use Management (Non-Recreation) (J01)	3) Discourage or prohibit any uses which contribute to impairment of the values for which the unit is established.
	Transportation System Management (L01 and 20)	1) Generally, transportation system facilities are permitted where the facility is compatible with the purpose for which the unit is established.
DRS (Developed Recreation Sites)	Management of Developed Recreation Sites (A08, 09, 11, and 13)	1) Construct, reconstruct, and maintain developed sites in accordance with the established Recreation Opportunity Spectrum (ROS) classification for the management unit.
	Transportation System Management (L01 to 20)	1) Design, construct, and maintain roads to assure they are compatible insofar as possible with developed recreation sites use unit objectives. a. FSM 2300.
	Air Resource Management (P16)	1) Manage facilities in and adjacent to recreation sites to maintain acceptable levels of air quality.
	Noise Abatement (P23)	1) Restrict uses that cause noise levels to that which should provide desirable recreation opportunities. a. Noise levels within these units will generally be restricted to 30 decibels or less except for noises generated by normal conservation and developed recreation activities.

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
TBR (Wood-fiber Production and Harvest) (III-67)	Dispersed Recreation Management (A14 and 15)	1) Semi-primitive non-motorized, semi-primitive motorized, roaded natural and rural recreation opportunities may be provided.
		2) Prohibit recreation use (including snowmobiles, vehicular travel, cross-crounty skiing etc.) where needed to protect forest plantations.
RNG	Dispersed Recreation Management (A14 and 15)	1) Semi-primitive non-motorized, semi-primitive motorized, roaded natural and rural recreation opportunities may be provided. a. Specific vehicular travel restrictions if any based on vehicular travel use management (FSM 2355).
RPI	Wildlife	1) Prohibit any direct wildlife habitat manipulation that will detract from those values for which the unit is established.
	Dispersed Recreation Management (A14 and 15)	1) Semi primitive non- motorized, semi-primitive motorized, roaded natural, and rural recreation opportunities may be provided. a. Prohibit or restrict motorized vehicle use as appropriate. b. Limit or restrict camping in existing or proposed units
	Aquatic	1) Manage soil and water resource activities to be compatible with the values of the unit. Provide habitat needs, as appropriate, for Management Indicator Species. Macroinvertebrate deleted through amendment – any other aquatic MIS? (Manti-La Sal National Forest) Manage habitat for recovery of endangered and threatened species. Where activities or uses may impact T&E species or their habitats, initiate consultation procedures. Include the results of consultation in determining the viability of the activity or use. (Manti-La Sal National Forest) Implement activities to meet the Forests' share of approved recovery plans. (Manti-La Sal) Manage habitat of sensitive species to keep them from becoming threatened or endangered. (Guideline) Management actions should be designed to encourage conditions that are within the historic range of variation (HRV) as defined by Regional or local properly functioning condition (PFC) assessments. PFC operates within the range of HRV where extreme events are not desired. Actions should remain within the variability of size, intensity, and frequency of native disturbance regimes characteristic of the subject landscape and ecological processes. See amendment 14 for additional standards and guidelines. (Manti-La Sal National Forest) Maintain and/or improve habitat and habitat diversity for minimum viable populations of existing vertebrate wildlife species. (Manti-La Sal) Manage waters capable of supporting self-sustaining fish populations to provide for those populations. Manage stream habitat to at least 50% of potential where existing self-sustaining fisheries occur. Proposed management activities which may cause unfavorable conditions in existing fisheries will include mitigation measures. (Manti-La Sal National Forest) Improve or maintain water quality. Meet Utah and Colorado State Water Quality Standards (FSM 2532). (Manti-La Sal National Forest) Implement best management practices relative to water quality in all resource activities. Nonpoint Source Water Quality Management Plan for Utah and Colorado. (Manti-La Sal National Forest) Prior to implementation of project activities, delineate and evaluate riparian areas and or wetlands that may be impacted. FSM 2542. (Manti-La Sal National Forest) Give preferential consideration to riparian area dependent resources in cases of unresolvable resource conflicts. FSM 2536. (Manti-La Sal National Forest) Flood plains should be identified and, as appropriate, a risk/hazard analysis performed for project sites where long-term occupancy is proposed. FSM 2527. (Manti-La Sal National Forest) Protect present and necessary future facilities that cannot be located out of the 100-year floodplain by structural mitigation (deflection structures, riprap, etc.). Implement mitigation measures when present or unavoidable future facilities are located in active floodplain to ensure that public and facility safety requirements, State water quality standards, sediment threshold limits, bank stability criteria, flood hazard reduction and instream flow standards are met during and immediately after construction. (Manti-La Sal National Forest) Secure favorable flows of water to: Ensure that stream flows maintain stable and efficient channels and to provide for administrative and protection use,

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
		pursuant to 1897 Organic Act. Provide for fish and wildlife habitat, recreation and livestock use pursuant to the Multiple Use and Sustained Yield Act of 1960.FSH 2509.17. (Manti-La Sal National Forest)
		Obtain through the State, where appropriate, water rights for consumptive uses and instream flows as needed for the purposes of National Forest management. FSM 2541. (Manti-La Sal National Forest).
		Maintain instream flows to protect Forest resources and uses. Special-use permits, easements, rights-of-way, and similar authorization for use of National Forest System lands shall contain stipulations to maintain bypass flows necessary to fulfill National Forest uses and purposes. FSM 2541.
		Prohibit new or expansion of existing spring or other water source development and related facilities when; A. Loss of water results in unacceptable impacts on riparian, vegetation, fisheries, or other Forest resources and uses. B. Development and/or facilities would result in unacceptable erosion, road damage, land instability, or disruption or damage of other facilities or resources. (Manti-La Sal National Forest)
		Provide habitat diversity through vegetation treatments, and/or structural developments in conjunction with other resource activities, designed to maintain or approve wildlife or fisheries habitat. (Manti-La Sal National Forest)
		Provide for instream flows to support a sustained-yield of natural fisheries resources. (Manti-La Sal National Forest)
		Maintain a current fish habitat inventory in cooperation with State wildlife agencies. (Manti-La Sal National Forest)
		Vegetate disturbed soils in sites where adverse impacts would occur according to the following priorities: Aquatic ecosystems; Riparian ecosystems, Riparian areas outside of aquatic and riparian ecosystems. (Manti-La Sal National Forest)
		Minimize surface disturbing activities that alter vegetative cover, result in stream channel instability or loss of channel crosssectional areas, or reduce water quality. (Manti-La Sal National Forest)
		Prior to implementation of project activities, delineate and evaluate riparian areas and or wetlands that may be impacted. FSM 2526. Where site-specific development adversely affects long-term productivity or management, those authorized to conduct development will be required to replace loss through appropriate mitigations. (Manti-La Sal National Forest)
		Obtain 404 permits when needed for proposed activities causing disturbance to floodplains and wetlands. (Manti-La Sal National Forest)
		Prevent or remove unacceptable debris accumulations that reduce stream channel stability and capacity. (Manti-La Sal National Forest)
		Avoid channelization of natural streams. Where channelization is necessary for flood control or other purposes use stream geometry relationships to reestablish meanders, width/depth ratios, etc. consistent with each major stream type. (Manti-La Sal National Forest)
		Treat disturbed sites resulting from resource development or use activities, to reduce sediment yields to the natural erosion rates in the shortest possible time. (Manti-La Sal National Forest)
		Stabilize streambanks which are damaged beyond natural recovery in a reasonable period with appropriate methods or procedures. (Manti-La Sal National Forest)
		Minimize significant soil compaction and disturbance in riparian ecosystems. Allow use of heavy construction equipment during period when the soil is less susceptible to compaction or rutting. (Manti-La Sal National Forest)
		Maintain or enhance the long-term productivity of soils within the riparian ecosystem. (Manti-La Sal National Forest)
		Permit special uses which are complementary and compatible with the kind and level of development within the unit. (Manti-La Sal National Forest)
		Locate new roads and trails outside riparian areas unless alternative routes have been reviewed and rejected. Do not parallel streams when road location must occur in riparian areas except where absolutely necessary. Cross streams at points that best complement riparian and aquatic ecosystems as well as road and stream geometry. Locate crossing (fords) at points of low bank slope and firm surfaces. (Manti-La Sal National Forest)
		Minimize detrimental disturbance to the riparian unit by construction and maintenance activities. Initiate timely and effective rehabilitation of disturbed sites and restore riparian areas so that a vegetation ground cover or suitable substitute protects the soil from erosion and prevents increased sediment yield. (Manti-La Sal National Forest)

Table C.4-2 Manti-La Sal National Forest Standard and Guidelines by Resource

MA	Resource	Description
RPN Riparian Area Management-	Dispersed Recreation Management (A14 and 15)	1) Semi-primitive non-motorized, semi-primitive motorized, roaded natural, and rural recreation opportunities may be provided.
	Special Use Management (Non-recreation) (J01)	1) Permit special uses which are complementary and compatible with the kind and level of development within the unit.
MMA (Leasable Minerals Development) (III-80)	Special Use Management (Non-Recreation) (J01)	1) Coordinate developments that may conflict with the intended purpose of existing or potential units to minimize or eliminate the conflict.
SLD (Special Land Designation) (III-92)	Special Use Management (Non-Recreation) (J01)	1) Approve special-use applications for areas adjacent to existing SLD units only when the proposed use is compatible with the purpose and use of the existing unit.
UC (Utility Corridors) (III-95)	Dispersed Recreation Management (A14 and 15)	1) Manage dispersed recreation opportunities to avoid conflicts with the permitted uses of the unit.
		2) Restrict vehicular travel as appropriate.
	Transportation System Management (L and 20)	1) Avoid the establishment of service roads for maintenance.
	Aquatic	Manage to the extent possible consistent or compatible with wildlife and fish habitat prescriptions from adjacent management units. (Manti-La Sal National Forest)
UDM (Undeveloped Motorized Recreation Sites) (III-52)	Dispersed Recreation Management (A14 and 15)	1) Emphasize semi-primitive non-motorized, semi-primitive motorized, and roaded natural appearing recreation opportunities.
		2) Close specific land areas or travel routes either permanently or seasonally to maintain compatibility with adjacent area management, or prevent resource damage, for economic reasons, to prevent conflicts of use, and provide for user health and safety.
		3) Manage motorized vehicle use (including snowmobiles) on and off Forest Development Roads and Trails. a. Title Code 36 CFR, part 261.
	Special-Use Management (Non recreation) (J01)	1) Permit special uses which are complementary and compatible with the kind and level of development within the unit.
	Transportation System Management (L01 and 20)	1) Design, construct, and maintain roads to assure they are compatible insofar as possible with Undeveloped Motorized Recreation management unit objectives. a. FSM 2300.

C.4.1.3 Fishlake National Forest

References: IRA map; Land and Resource Management Plan for the Fishlake National Forest, 1986.

The following five management areas are within the Project area.

- **2B Rural and Roaded-Natural Recreation Opportunities**: Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and no motorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross--country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes to protect physical and biological resources. Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used. Minimum visual quality objective (VQO) shall be partial retention. Arterial and collector roads and trails are Sensitivity level 1. Permit special uses which are complementary and compatible with the kind and development level of forest service facilities within the area may be permitted.
- **4B Management Indicator Species**: Management emphasis is on the habitat needs of one or more management indicator species. Species with compatible habitat needs are selected for an area. The prescription can be applied to emphasize groups of species, such as early succession dependent or late succession dependent, in order to increase species richness or diversity. Vegetation characteristics and human activities are managed to provide optimum habitat for the selected species, or to meet population goals jointly agreed to with the Utah Division of Wildlife Resources. Recreation and other human activities are regulated to favor the needs of the designated species. Roaded natural recreation opportunities are provided along forest arterial and collector roads. Local roads and trails are either open or closed to public motorized travel. Semi primitive motorized recreation opportunities are provided on those local roads and trails that remain open. Semi-primitive non-motorized opportunities are provided on those that are closed. Investments in other compatible resource uses may occur but will be secondary to habitat requirements. Management activities may dominate in foreground and middleground, but harmonize and blend with the natural setting.
- **5A Big Game Winter Range**: Management emphasis is on winter range for deer, elk, and bighorn sheep if introduced. Treatments are applied to increase forage production of existing grass, forb, and browse species or to alter plant species composition. Investments in compatible resource activities occur. Management activities are not evident, remain visually subordinate, or are dominant in the foreground or middleground but harmonize or blend with the natural setting. Eliminate special uses that conflict with management wintering animals. New roads other than short-term (temporary) roads are located outside of the management area. Short term roads are obliterated within one season after intended use. Selected local roads are closed and motorized recreation use is managed to prevent unacceptable stress on big game animals during the primary big game use season. Minimum VQO shall be modification. Roads cross winter range in the minimum distance feasible. When road construction is allowed, lost wildlife, habitat will be mitigated.
- **6B Livestock Grazing**: Intensive management of range resources through structural and non-structural improvement with associated maintenance Investments are made in compatible resource activities. Dispersed recreational opportunities vary between semi-primitive non motorized and roaded natural. Management activities are evident but harmonize and blend with the natural setting. Minimum VQO shall be modification.
- **9F Improved Watershed Condition**: Management emphasis is on improving watershed condition and thus eliminating the watershed improvement needs backlog. Emphasis is also on maintenance of projects already completed. Management activities in the foreground,

middleground, and background may dominate, but should be designed to harmonize and blend with the natural setting to the extent possible. Motorized travel is prohibited except for over-snow machines and for designated routes. Routes may have seasonal closures.

C.4.1.4 Uinta National Forest

References: IRA map; Land and Resource Management Plan for the Uinta National Forest, May 2003 (Chapter 3, Standards and Guidelines; Chapter 4, Management Prescriptions; Appendix C—Recommended Raptor Buffers; Appendix D—Riparian Habitat Conservation Area Criteria; Correction No. 4, 2003 Uinta National Forest Land and Resource Management Plan, November 27, 2006).

The following seven management areas are within the Project area.

- **3.1 Aquatic, Terrestrial, and Hydrologic Resources**: Emphasis is on maintaining or improving existing quality aquatic, terrestrial, and hydrologic conditions through limited to moderate management activity. This prescription includes areas where multiple habitat and resource values are present. These values are recognized as important and may require restoration to reach desired conditions. Other uses and activities may be allowed provided they do not inhibit attainment of objectives for the areas. Vegetation management activities, including timber harvest, may be used to address vegetation needs for wildlife habitat, watershed improvement, and/or forest health needs. Additional motorized trails may be constructed. Livestock grazing is allowed where compatible with desired aquatic, terrestrial, and hydrologic conditions. Leasing stipulations are CSU for all areas except, semi-primitive non-motorized, which is NSO.
- **3.3 Aquatic and Terrestrial Habitat**: These areas are managed for quality habitat to contribute toward maintenance and/or recovery of plant and animal species. Resources are maintained or improved to achieve desired conditions for habitats of threatened, endangered, sensitive, and Management Indicator Species (MIS). Most, but not all, of the critical deer and elk winter range is included within this prescription. This prescription applies to areas with multiple habitats (big game winter range, Lynx Analysis Units [LAUs], greater sage grouse habitat in the Vernon and Strawberry Reservoir Management Areas, etc.). Where habitats overlap, the most restrictive standard or guideline will take precedence. No additional winter recreation facilities may be constructed in the areas of this prescription managed as Lynx Analysis Units (LAUs). Leasing stipulations are TL/CSU for all areas except, semi-primitive non-motorized, which is NSO.
- **4.4 Dispersed Recreation**: The emphasis in this prescription is on providing opportunities for and/or facilitating dispersed recreation. This management prescription includes areas of existing or anticipated concentrations of recreational use. Intensive vegetation management may be required to maintain desired conditions. Additional motorized trails may be constructed. Development is limited to a level that facilitates the dispersed recreation experience and addresses resource impacts. Leasing stipulations are TL/CSU for all areas except, semi-primitive non-motorized, which is NSO.
- **5.1 Forested Ecosystems – Limited Development**: Emphasis is on maintaining or restoring vegetation to achieve multiple resource values. Additional motorized trails may be constructed. Management of forested ecosystems enhances wildlife habitats, improves watershed stability, and improves vegetative diversity. Management encompasses the full range of land and resource treatment activities. Additional motorized trails may be constructed. Grazing by livestock is allowed, but forage production for livestock use is limited to meet requirements for wildlife, riparian, water quality, or other objectives. Leasing stipulations are CSU for all areas except, semi-primitive non-motorized, which is NSO.
- **5.2 Forested Areas -Vegetation Management**: Emphasis is on maintaining or restoring vegetation to achieve multiple resource values and provide for multiple uses. Management area direction also includes timber resource goals and objectives, but achievement of high yields is not the primary purpose. The Forest's suitable timber base is located within this management prescription. Timber volumes harvested are applied to

the Forest's allowable sale quantity (ASQ). Management encompasses the full range of activities and uses. Road densities and designs are compatible with multiple resource values. Additional motorized trails may be constructed. Recreation and other developments requiring the construction and reconstruction of roads and trails will be considered.

- **6.1 Non-forested Ecosystems**: Emphasis is on maintaining or restoring vegetation conditions to achieve ecosystem health. Additional motorized trails may be constructed. Standard lease terms for all ROS except for semi-primitive non-motorized (NSO) and semi-primitive motorized (CSU).
- **8.2 Utility Corridor/Communication Sites**: Features in these areas may include various non-recreation special uses such as utility corridors or communication sites allocated for long-term site investment. Vegetation management should be limited to activities consistent with installation and maintenance of the utility line or communication site and mitigation against potential erosion and visual quality impacts. Recreation use is limited to incidental dispersed use, such as a trail crossing through the area. Public access restrictions may be imposed within energy transmission, utility, and communication corridors and sites for health, safety, or resource considerations, or to be compatible with management direction for surrounding areas. CSU for all leasing. See other management areas for surrounding area stipulations.

Table C.4-3 Uinta National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Special Designations-IRA		#418028	Inventoried Roadless Area where road construction or reconstruction is allowed	CSU	No buffer
Special Designations-IRA		#418008 Chipman Creek	Inventoried Roadless Area where road construction or reconstruction is allowed	CSU	No buffer
Special Designations-IRA		#418009	Inventoried Roadless Area where road construction or reconstruction is allowed	CSU	No buffer
Special Designations-IRA		#418017	Inventoried Roadless Area where road construction or reconstruction is allowed	CSU	No buffer
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot buffers long perennial streams identified as recovery streams for Bonneville or Colorado River cutthroat trout, regardless of the area's management prescription (class I)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot buffer along perennial streams with adjacent populations of Ute ladies'-tresses (*Spiranthes diluvialis*). (Class I)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot buffer associated with major drainages where volumes of base water flows are at least 10 cubic feet per second (cfs). (Class I)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot buffer along perennial waterbodies within management prescription 3.1, Aquatic, Terrestrial, and Hydrologic Resources, not previously classified as a Class I RHCA. (Class I)	NSO	200 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot buffer for areas identified as a locally significant sport fishery, or provides important fish spawning habitat for reservoirs, or high riparian or fisheries potential. (class III_	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot buffer for areas with moderate sport fishery, or moderate to high riparian or fisheries potential. (Class II)	NSO	200 feet

Table C.4-3 Uinta National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot buffer for areas associated with drainages where volumes of base water flows are 3 to 10 cfs. (Class II)	NSO	200 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot buffer for water resources used directly for culinary or municipal water. (class I)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot buffer for areas within management prescription 2.1, Wild and Scenic Rivers - Wild, 2.2, Wild and Scenic Rivers - Scenic, 2.3, Wild and Scenic Rivers - Recreational, 2.4, Research Natural Areas, 1.4, Wilderness, or 1.5, Recommended Wilderness. (class I)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot buffer along waterbodies that are used indirectly for culinary or municipal water, or could indirectly affect management prescriptions 2.1, Wild and Scenic Rivers - Wild, 2.2, Wild and Scenic Rivers - Scenic, 2.3, Wild and Scenic Rivers - Recreational, 2.4, Research Natural Areas, 1.4, Wilderness, or 1.5, Recommended Wilderness. (class II)	NSO	200 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot riparian buffer within or directly adjacent to an outstanding local recreational resource (i.e., one that is significant to recreation users throughout northern Utah and is a destination site). (Class I)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot riparian buffer for water resources within or directly adjacent to a moderately important local recreational resource (i.e., most recreation users do not typically travel great distances to use this resource). (Class II)	NSO	200 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot riparian buffer for areas containing critical or limiting habitat for threatened or endangered species. (Class III)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	300-foot riparian buffer for areas containing limiting habitat for a dependent Management Indicator Species (MIS). (Class III)	NSO	300 feet
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot riparian buffer for areas s characterized by excellent vertical and horizontal diversity as representative of the surrounding vegetation community. (Class II)	NSO	200 feet
Water Resources		Riparian habitat conservation areas (RHCA)	200-foot riparian buffer for areas with Forest Service sensitive species. (class II)	NSO	200 feet
Water Resources		Riparian habitat conservation areas (RHCA)	100-foot buffer for all perennial waterbodies not identified as Class I or Class II areas, and lands adjoining wetlands greater than one acre in size. (Class III)	NSO	100 feet
Water Resources		Riparian habitat conservation areas (RHCA)	100-foot buffer for all lands that lie within 50 feet of seasonally flowing or intermittent streams, and wetlands less than one acre in size. (Class III)	NSO	100 feet
Wildlife-Raptors	California condor	Nests	No surface disturbance within a 1 mile buffer of active nests.	NSO	1 mile
Wildlife-SSS	Sage grouse	Leks	Locate energy transmission, mining, or other large structures and facilities that could be used as perch sites for raptors at least two miles from greater sage grouse leks	NSO	2 miles
Land Use		Deseret generating and transmission utility corridor	Corridor is limited to the right-of-way for currently permitted power transmission facilities. Any additional power will be accommodated on existing facilities or upgraded facilities.	CSU	No buffer

Table C.4-3 Uinta National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Geology		Caves	If there is a potential for causing damage to a known cave, restrict ground-disturbing activities such as the use of heavy equipment or blasting above or in the vicinity of a known cave, or within a drainage that empties into a known cave. Alteration or redirection of natural surface drainage into or away from known caves should not be allowed. Retain vegetation within 50 feet of a known cave or above a known cave if the vegetation protects the cave's microenvironment (e.g., hydrology, habitat, climate, vegetation).	CSU	No buffer
Wildlife-Sage Grouse		Greater sage-grouse nesting habitats in the Vernon and Strawberry Reservoir Management Areas	Avoid removing sagebrush cover within 300 yards of foraging area of greater sage grouse foraging areas along riparian zones, meadows, lakebeds, and farmland.	CSU	No buffer
Wildlife-Sage Grouse		Greater sage-grouse leks and habitat	Avoid building power lines and other tall structures that could become potential perch sites for raptors within two miles of greater sage grouse habitats (nesting, brood-rearing, and winter) in the Vernon and Strawberry Reservoir Management Areas. Bury power lines or, if structures must be built or currently exist, modify the structures to prevent raptors from using the structures.	CSU	2 miles
Land Use-Management Areas		3.1 Aquatic, Terrestrial, and Hydrologic Resources	Emphasis is on maintaining or improving existing quality aquatic, terrestrial, and hydrologic conditions through limited to moderate management activity. This prescription includes areas where multiple habitat and resource values are present. These values are recognized as important and may require restoration to reach desired conditions. Other uses and activities may be allowed provided they do not inhibit attainment of objectives for the areas. Vegetation management activities, including timber harvest, may be used to address vegetation needs for wildlife habitat, watershed improvement, and/or forest health needs. Additional motorized trails may be constructed. Livestock grazing is allowed where compatible with desired aquatic, terrestrial, and hydrologic conditions. Leasing stipulations are CSU for all areas except, semi-primitive non-motorized, which is NSO.	CSU	No buffer
Land Use-Management Areas		3.3 Aquatic and Terrestrial Habitat	These areas are managed for quality habitat to contribute toward maintenance and/or recovery of plant and animal species. Resources are maintained or improved to achieve desired conditions for habitats of threatened, endangered, sensitive, and Management Indicator Species (MIS). Most, but not all, of the critical deer and elk winter range is included within this prescription. This prescription applies to areas with multiple habitats (big game winter range, Lynx Analysis Units [LAUs], greater sage grouse habitat in the Vernon and Strawberry Reservoir Management Areas, etc.). Where habitats overlap, the most restrictive standard or guideline will take precedence. No additional winter recreation facilities may be constructed in the areas of this prescription managed as Lynx Analysis Units (LAUs). Leasing stipulations are TL/CSU for all areas except, semi-primitive non-motorized, which is NSO.	CSU	No buffer
Land Use-Management Areas		4.4 Dispersed Recreation	The emphasis in this prescription is on providing opportunities for and/or facilitating dispersed recreation. This management prescription includes areas of existing or anticipated concentrations of recreational use. Intensive vegetation management may be required to maintain desired conditions. Additional motorized trails may be constructed. Development is limited to a level that facilitates the dispersed recreation experience and addresses resource impacts. Leasing stipulations are TL/CSU for all areas except, semi-primitive non-motorized, which is NSO.	CSU	No buffer

Table C.4-3 Uinta National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Land Use-Management Areas		5.1 Forested Ecosystems – Limited Development	Emphasis is on maintaining or restoring vegetation to achieve multiple resource values. Additional motorized trails may be constructed. Management of forested ecosystems enhances wildlife habitats, improves watershed stability, and improves vegetative diversity. Management encompasses the full range of land and resource treatment activities. Additional motorized trails may be constructed. Grazing by livestock is allowed, but forage production for livestock use is limited to meet requirements for wildlife, riparian, water quality, or other objectives. Leasing stipulations are CSU for all areas except, semi-primitive non-motorized, which is NSO.	CSU	No buffer
Land Use-Management Areas		5.2 Forested Areas - Vegetation Management	Emphasis is on maintaining or restoring vegetation to achieve multiple resource values and provide for multiple uses. Management area direction also includes timber resource goals and objectives, but achievement of high yields is not the primary purpose. The Forest's suitable timber base is located within this management prescription. Timber volumes harvested are applied to the Forest's allowable sale quantity (ASQ). Management encompasses the full range of activities and uses. Road densities and designs are compatible with multiple resource values. Additional motorized trails may be constructed. Recreation and other developments requiring the construction and reconstruction of roads and trails will be considered.	CSU	No buffer
Land Use-Management Areas		6.1 Non-forested Ecosystems	Emphasis is on maintaining or restoring vegetation conditions to achieve ecosystem health. Additional motorized trails may be constructed. Standard lease terms for all ROS except for semi-primitive non-motorized (NSO) and semi-primitive motorized (CSU).	CSU	No buffer
Land Use-Management Areas		8.2 Utility Corridor/Communication Sites	Features in these areas may include various non-recreation special uses such as utility corridors or communication sites allocated for long-term site investment. Vegetation management should be limited to activities consistent with installation and maintenance of the utility line or communication site and mitigation against potential erosion and visual quality impacts. Recreation use is limited to incidental dispersed use, such as a trail crossing through the area. Public access restrictions may be imposed within energy transmission, utility, and communication corridors and sites for health, safety, or resource considerations, or to be compatible with management direction for surrounding areas. CSU for all leasing. See other management areas for surrounding area stipulations.	CSU	No buffer
Special Designation Areas		Research natural areas	No specific restrictions for transmission lines, but no road construction is allowed. NSO to mineral development. Vegetation management activities are only allowed when necessary to help perpetuate the unique and/or representative ecosystem.	CSU	No buffer
Water		Riparian habitat conservation areas (RHCA)	Road crossings and other structures should not disrupt the migration or other movement of aquatic organisms inhabiting the water body unless a barrier is desired to protect specific species.	CSU	No buffer
Wildlife-Aquatic Species	Bonneville cutthroat trout	Tie Fork	Bonneville cutthroat trout could potentially occur in Tie Fork. Avoid management actions could reduce riparian habitat or retard recovery of the species. Unspecified restrictions could exist. For streams identified as conservation and persistence streams for Bonneville and Colorado River cutthroat trout, total soil resource commitment should be limited to no more than 4 percent of the riparian area acreage within this prescription within the watershed.	CSU	No buffer

Table C.4-3 Uinta National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Wildlife-Aquatic Species	Colorado River cutthroat trout	Willow Creek	Colorado River cutthroat trout potentially could occur in Tie Fork and Willow Creek. Avoid management actions could reduce riparian habitat or retard recovery of the species. Unspecified restrictions could exist. Willow creek is within the North Tavaputs Plateau Subunit of the Northeastern GMU (Conservation Plan, UDWR 1997b, p. 39). For streams identified as conservation and persistence streams for Bonneville and Colorado River cutthroat trout, total soil resource commitment should be limited to no more than 4 percent of the riparian area acreage within this prescription within the watershed.	CSU	No buffer

Table C.4-4 Uinta National Forest Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Bald eagle	Nests	No surface disturbance within a 1 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	1 mile
Wildlife-Raptors	Boreal owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 7/31.	TL	2/1 to 7/31	0.25 mile
Wildlife-Raptors	Burrowing owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Northern saw-whet owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Mexican spotted owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.25 mile
Wildlife-Raptors	Cooper's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Red-tailed hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Sharp-shinned hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/15 – 8/31.	TL	3/15 to 8/31	0.5 mile
Wildlife-Raptors	Ferruginous hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.5 mile
Wildlife-Raptors	Flammulated owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 9/30.	TL	4/1 to 9/30	0.25 mile
Wildlife-Raptors	Golden eagle	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 1/1 – 8/31.	TL	1/1 to 8/31	0.5 mile
Wildlife-Raptors	Great horned owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 12/1 – 9/31.	TL	12/1 to 9/31	0.25 mile
Wildlife-Raptors	Long-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 2/1 – 8/15.	TL	2/1 to 8/15	0.25 mile
Wildlife-Raptors	Merlin	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Osprey	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.5 mile
Wildlife-Raptors	Northern goshawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern harrier	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 4/1 – 8/15.	TL	4/1 to 8/15	0.5 mile
Wildlife-Raptors	Northern pygmy owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/1.	TL	4/1 to 8/1	0.25 mile
Wildlife-Raptors	Peregrine falcon	Nests	No surface disturbance within a 1 mile buffer of active nests from 2/1 – 8/31.	TL	2/1 to 8/31	1 mile

Table C.4-4 Uinta National Forest Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Raptors	Prairie falcon	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 4/1 – 8/31.	TL	4/1 to 8/31	0.25 mile
Wildlife-Raptors	Short-eared owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/1.	TL	3/1 to 8/1	0.25 mile
Wildlife-Raptors	Swainson's hawk	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 3/1 – 8/31.	TL	3/1 to 8/31	0.5 mile
Wildlife-Raptors	Western screech owl	Nests	No surface disturbance within a 0.25 mile buffer of active nests from 3/1 – 8/15.	TL	3/1 to 8/15	0.25 mile
Wildlife-Raptors	Turkey vulture	Nests	No surface disturbance within a 0.5 mile buffer of active nests from 5/1 – 8/15.	TL	5/1 to 8/15	0.5 mile
Wildlife	Three-toed woodpecker	30 -acre nest areas	Vegetation manipulation is prohibited from 4/15 – 9/1 in 30-acre nest areas.	TL	4/15 to 9/1	30-acre nest areas.
Wildlife-Raptors	Northern goshawk	420-acre Post-Fledgling Areas	In active Post-Fledgling Area (PFA), for goshawks, restrict all Forest Service management activities (including vegetation manipulation) and permitted uses, except livestock grazing, during the active nesting season (normally from March 1 to September 30) unless it is determined that the disturbance is not likely to result in nest abandonment. A PFA should be approximately 420 acres in size (exclusive of nest area acres) when sufficient suitable habitat exists.	TL	3/1 to 8/15	420-acre PFAs
T&E Species	Greater sage-grouse-Strawberry population	Leks	Adjust timing and location of activities to minimize disturbance of greater sage-grouse breeding sites in the Vernon and Strawberry Reservoir Management Areas. Activities should not take place within sight distance or 0.5 miles of leks (whichever is less) annually from March 1 to June 15.	TL	3/1 to 6/15	0.5 mile or sight distance, whichever less
Wildlife-Big Game	Elk	Critical elk winter range	Classified roads not needed for through travel, or that do not provide access to an active project or a designated recreation destination (e.g., cross-country ski and snowmobile trailheads) should be closed from December 1 to March 30. If classified roads are open to through travel or provide access to recreation destinations (e.g., cross-country ski and snowmobile trail heads), they should be designed, constructed, and managed to accommodate passenger car traffic and snow removal.	TL	12/1 to 3/30	No buffer
Wildlife	Boreal toad	Known habitat	Protect known boreal toad habitat from disturbance during the active breeding season (4-5 weeks following snowmelt).	TL	None given	No buffer

C.4.1.5 Dixie National Forest, Utah

References: IRA map; Land and Resource Management Plan for the Dixie National Forest, 1986 (Chapter IV, Forest Management Direction, IV-6); Goshawk Plan Amendment

The following seven management areas are within the Project area.

- **1-General Forest Direction**: Forest-wide general management standards and guidelines apply in this area.
- **2b Roaded Natural Recreation**: Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and non-motorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes, to protect physical and biological resources. Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.
- **4c Wildlife Habitat - Brushy Range**: Management emphasis is on wildlife habitat in hardwood and shrub-dominated draws and other areas of woody vegetation to sustain their inherent biological, physical, and visual values. Recreational opportunities vary between semi-primitive non-motorized and roaded natural. Management activities may dominate in foreground or middle ground but harmonize and blend in the natural setting. Do not go below VQO of modification. Recreation should not conflict with habitat needs of MIS. Semi-primitive non-motorized, semi-primitive motorized.
- **5a Big-Game Winter Range**: Management emphasis is on winter range for deer, elk, and pronghorn. Treatments are applied to increase forage production of existing grass, forb, and browse species or to alter plant species composition. Investments in compatible resource activities occur. Management activities are not evident, remain visually subordinate, or are dominant in the foreground or middleground but harmonize or blend with the natural setting. New roads other than short-term (temporary) roads are located outside of the management area. Short-term roads are obliterated within one season after intended use. Existing roads are closed and new motorized recreation use is managed to protect unacceptable stress on big game during the primary big game season. Design and implement management activities to blend with the natural landscape Do not go below VQO of modification.
- **6a Livestock Grazing**: The area is managed for livestock grazing through structural and non-structural improvement with associated maintenance Investments are made in compatible resource activities. Dispersed recreational opportunities vary between semi-primitive nonmotorized and roaded natural. Management activities are evident but harmonize and blend with the natural setting. Minimum VQO shall be modification. Design and implement management activities to blend with the natural landscape. Do not go below VQO of modification. When project require clearing of vegetation and/or soils disturbances, use irregular clearing edges and shaped to blend with the natural landscape. Prohibit motorized vehicle use off Forest System roads and trails (except snowmobiles operating on snow) in subalpine and other ecosystems where needed to protect soils, vegetation, or special wildlife habitat.
- **9a Riparian Management**: The goals of management are to provide healthy, self-perpetuating plant communities, meet water quality standards, provide habitats for viable populations of wildlife and fish, and provide stable stream channels and still water body shorelines. The aquatic ecosystem may contain fisheries habitat improvement and channel stabilizing facilities that harmonize with the visual setting and maintain or improve wildlife or fish habitat. Management area is located adjacent to perennial streams and across the forest. Includes aquatic ecosystems. Riparian ecosystem and adjacent eco systems that are within 100 from edges of perennial streams and other waterbodies. Developed recreation restricted/modified within 100-year floodplain. Minimum VQO shall be partial retention.

- **10B Municipal Water Supply Watersheds**: Management emphasis is to protect or improve the quality and quantity of municipal water supplies. Management practices are modified. Allow motorized travel only on established roads and trails. Close watershed to all travel when the road or trail surfaces could be damaged to the degree that water quality would be degraded. Generally roads are not permitted. VQO of retention. Immediately rehabilitate man-caused disturbances and restore burned areas. Inspect rehabilitated areas annually and provide maintenance necessary to protect the watershed. Within riparian areas apply management direction in riparian area management prescription except as amended by the direction in this prescription. Use Chapter 6 of State of Utah Public Drinking Water regulations as a guide. Provide for special protection zone within 1,500 feet up gradient and 100 feet down gradient of spring sources of Municipal water supplies.

Table C.4-5 Dixie National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Land Use-Management Areas		1-General Forest Direction	Forest-wide general management standards and guidelines apply in this area.	CSU	No buffer
Land Use-Management Areas		2b Roaded Natural Recreation 131,700 acres.	Management emphasis is for rural and roaded-natural recreation opportunities. Motorized and non-motorized recreation activities such as driving for pleasure, viewing scenery, picnicking, fishing, snowmobiling, and cross-country skiing are possible. Conventional use of highway-type vehicles is provided for in design and construction of facilities. Motorized travel may be prohibited or restricted to designated routes, to protect physical and biological resources. Visual resources are managed so that management activities maintain or improve the quality of recreation opportunities. Management activities are not evident, remain visually subordinate, or may be dominant, but harmonize and blend with the natural setting. Landscape rehabilitation is used to restore landscapes to a desirable visual quality. Enhancement aimed at increasing positive elements of the landscape to improve visual variety is also used.	CSU	No buffer
Land Use-Management Areas		4c Wildlife Habitat - Brushy Range 72,900 acres.	Management emphasis is on wildlife habitat in hardwood and shrub-dominated draws and other areas of woody vegetation to sustain their inherent biological, physical, and visual values. Recreational opportunities vary between semi-primitive non-motorized and roaded natural. Management activities may dominate in foreground or middle ground but harmonize and blend in the natural setting. Do not go below VQO of modification. Recreation should not conflict with habitat needs of MIS. Semi-primitive non-motorized, semi-primitive motorized.	CSU	No buffer
Land Use-Management Areas		5a Big-Game Winter Range	Management emphasis is on winter range for deer, elk, and pronghorn. Treatments are applied to increase forage production of existing grass, forb, and browse species or to alter plant species composition. Investments in compatible resource activities occur. Management activities are not evident, remain visually subordinate, or are dominant in the foreground or middleground but harmonize or blend with the natural setting. New roads other than short-term (temporary) roads are located outside of the management area. Short term roads are obliterated within one season after intended use. Existing roads are closed and new motorized recreation use is managed to protect unacceptable stress on big game during the primary big game season. Design and implement management activities to blend with the natural landscape Do not go below VQO of modification.	CSU	No buffer

Table C.4-5 Dixie National Forest No Surface Use and Controlled Surface Use Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Buffer/ Avoidance Area
Land Use-Management Areas		6a Livestock Grazing	The area is managed for livestock grazing through structural and non-structural improvement with associated maintenance Investments are made in compatible resource activities. Dispersed recreational opportunities vary between semi-primitive nonmotorized and roaded natural. Management activities are evident but harmonize and blend with the natural setting. Minimum VQO shall be modification. Design and implement management activities to blend with the natural landscape. Do not go below VQO of modification. When project require clearing of vegetation and/or soils disturbances, use irregular clearing edges and shaped to blend with the natural landscape. Prohibit motorized vehicle use off Forest System roads and trails (except snowmobiles operating on snow) in subalpine and other ecosystems where needed to protect soils, vegetation, or special wildlife habitat.	CSU	No buffer
Land Use-Management Areas		9a Riparian Management	The goals of management are to provide healthy, self-perpetuating plant communities, meet water quality standards, provide habitats for viable populations of wildlife and fish, and provide stable stream channels and still water body shorelines. The aquatic ecosystem may contain fisheries habitat improvement and channel stabilizing facilities that harmonize with the visual setting and maintain or improve wildlife or fish habitat. Management area is located adjacent to perennial streams and across the forest. Includes aquatic ecosystems. Riparian ecosystem and adjacent eco systems that are within 100 from edges of perennial streams and other waterbodies. Developed recreation restricted/modified within 100-year floodplain. Minimum VQO shall be partial retention.	CSU	No buffer
Land Use-Management Areas		10B Municipal Water Supply Watersheds	Management emphasis is to protect or improve the quality and quantity of municipal water supplies. Management practices are modified. Allow motorized travel only on established roads and trails. Close watershed to all travel when the road or trail surfaces could be damaged to the degree that water quality would be degraded. Generally roads are not permitted. VQO of retention. Immediately rehabilitate man-caused disturbances and restore burned areas. Inspect rehabilitated areas annually and provide maintenance necessary to protect the watershed. Within riparian areas apply management direction in riparian area management prescription except as amended by the direction in this prescription. Use Chapter 6 of State of Utah Public Drinking Water regulations as a guide. Provide for special protection zone within 1,500 feet up gradient and 100 feet down gradient of spring sources of Municipal water supplies.	CSU	No buffer

Table C.4-6 Dixie National Forest Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Big Game	All	Critical winter ranges	Restrict or eliminate vehicular traffic (including over-the-snow vehicles) from November 1 through May 1 on identified critical winter ranges.	TL	11/ to 5/1	No buffer

Table C.4-6 Dixie National Forest Timing Restrictions

Resource	Species (if Applicable)	Area of Restriction	Description	Constraint Type	Timing	Buffer/ Avoidance Area
Wildlife-Northern Goshawk	Northern goshawk	Active nest areas	In active nest areas (approximately 30 acres; i.e. *Guideline n.*), restrict Forest Service management activities and human uses for which Forests issue permits during the active nesting period (does not include livestock permits) unless it is determined that the disturbance is not likely to result in nest abandonment. The active nesting period will normally occur between March 1st and September 30th. If the disturbance is likely to result in abandonment, a biological evaluation (BE) must be completed. To implement the action the BE must conclude that the action is consistent with the intent of the Conservation Strategy and Agreement for Management of the Northern Goshawk in Utah.	TL	3/1 to 9/30	No buffer

C.5 Additional Mitigation Measures Prescribed for the TWE Project

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
Climate and Air Quality	
AQ-1	In Region II, the Alternative B transmission line route passes within about 10 miles of Arches NP. No concrete batch plants would be located within 30 miles of NP; therefore, concrete required for structure foundations should be acquired from local sources in the vicinity of Moab.
AQ-2	In Region III, the Proposed Action (Alternative A) passes within about 20 miles of Zion N P. No concrete batch plants would be located within 30 miles of NP; therefore, concrete required for structure foundations should be acquired from local sources in the vicinity of Cedar City or St. George, Utah.
AQ-3	The Clark County nonattainment area is located in both Region III and Region IV. No new concrete batch plants are to be located within the nonattainment area; concrete required for structure foundations and other construction are to be acquired from existing local vendors.
Geological, Paleontological, and Mineral Resources	
GE-1	In areas with geologic hazards (e.g., ground shaking, liquefaction, landslides, subsidence from karst, groundwater withdrawal, underground mining, historic mining) and active mining; placement of project structures and other project related disturbance would be avoided to the extent practical. Where avoidance is not possible a site specific geotechnical investigation and engineering design would be implemented during construction and operation of the Project. Depending on the type of potential geologic hazards, the designs may vary and should address specific needs for enhanced structural supports. Site specific assessment of geologic hazards shall include review of available information concerning areas of hazards, and consultation with appropriate governmental agency (USFS, BLM, UGS, USGS) personnel who are knowledgeable about the hazards. Assessment also shall include, if necessary, field surveys and gathering of geotechnical information to determine what engineering design methods would mitigate or lessen potential risks. If active mines cannot be avoided, applicant will conduct similar due diligence in regard to hazards from underground and historic mining to ensure that project facilities will not hinder access to mineral resources or create dangers to mining activities.
Soil Resources	
S-1	Where permanent facilities or structures would be located, the entire topsoil horizon would be salvaged for use in reclamation, prior to surface disturbance. Topsoil would be spread evenly around the permanent structure (not left in piles) and revegetated for future use.
S-2	Construction, excavation, or re-spreading with frozen or saturated soils is prohibited.
S-3	During reclamation, compacted areas (typically any area that receives repeated traffic or 3 or more passes by heavy equipment) will be decompacted, to the depth of compaction, by subsoiling, paraplowing, or parabolic ripping on the contour to the depth of compaction. This would help prepare the seed bed, encourage infiltration and help to prevent accelerated runoff and erosion. Scarification would only be used on shallow soils. Compaction depth would be determined on a case by case basis, by a qualified environmental inspector or soil scientist.
S-4	During decommissioning, where a soil sterilizer has been applied, sterile soils will be removed prior to the replacement of topsoil and seeding.
S-5	Surface activities are prohibited when soils or road surfaces become saturated to a depth of 3 inches or less if mixing of the topsoil and subsoil will occur or the soil surface becomes unsafe for vehicular travel.
S-6	During construction, erosion control measures will be inspected after every storm event and maintained.
S-7	Permanent access roads will not be constructed on slopes over 25 percent.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
S-8	Temporary and permanent access roads will be gated to restrict motorized use by the public. In some instances, other methods may need to be employed to prevent public access. After construction is complete, permanent access roads would remain gated at the land management agency or landowner's discretion. If the road is no longer needed for operations, it would be obliterated with the following procedures: Remove all stream crossings and restore stream banks to natural contours; Reestablish natural drainage patterns; Decompact the road surface by subsoiling along the entire disturbed length; Recontour the road prism to the original land contours; Seed with an agency or landowner approved seed mixture. Gates and closure signage should be left in place until adequate regeneration/rehabilitation occurs.
S-9	Excess subsoil that is excavated for foundations will not be spread on the soil surface (on top of topsoil) or on access roads. Excess subsoil would be disposed of in accordance with federal, state, and local requirements.
S-10	Prime farmlands will be avoided to the extent possible for permanent project facilities and structure foundations.
S-11	Permanent erosion control measures will be installed on all project access roads used for operations and maintenance. Erosion control measures will be inspected and maintained bi-annually.
S-12	All concrete foundations will be removed during decommissioning, unless they are permanently anchored into stable bedrock.
S-13	Follow-up seeding using native seed or corrective erosion control measures are required on areas of surface disturbance that experience reclamation failure.
S-14	TWE would avoid constructing in areas of unstable soils prone to slumping or mass wasting. Prior to construction, a hazard plan would be developed by TWE depicting the landslide-prone avoidance areas. This Plan would be included in the POD submitted to the agencies for approval prior to the Notice to Proceed.
Water Resources	
WR-1	Use of existing stream crossings would be utilized wherever requested by agencies. This would be developed on a site-specific basis during POD development.
WR-2	When existing crossings were not used, drive through (Arizona) crossings would not be utilized when un-protected (bare soil) streambeds are wet or when the stream is flowing water. This additional mitigation would reduce erosion and stream stability by limiting the crossing during times when the soil is highly susceptible to erosion.
Vegetation	
NX-1	The noxious weed management plan to be developed as part of the Construction, Operation and Maintenance (COM) would include the following: Pre-construction surveys for noxious weeds in the footprints of the ROW, access roads, and ancillary facilities, Pre-construction weed control, Education of construction and operation personnel in each project region, Washing of vehicles and equipment before entering and leaving the ROW, Herbicide spraying, and Annual monitoring and reporting. Survey information collected during pre-construction surveys would include species name, global positioning system location of weed infestations, percent cover, and approximate size of weed infestations. Control of noxious and invasive species could include chemical, physical, and biological methods and will be developed in consultation with the land agencies and private landowners. The plan will identify species of concern for each BLM FO and USFS Forest, and focus monitoring and control methods on these species. The plan would comply with the existing BLM, USFS, USFWS, state and federal regulations concerning noxious weed management.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
NX-2	Herbicide spraying would be conducted following all applicable state and federal laws regarding chemical use, adverse weather, chemical storage, and chemical drift. Further guidelines and protocols for herbicide spraying on BLM land is provided in the Final BLM Vegetation Treatment Using Herbicides Programmatic EIS (BLM Vegetation EIS) (BLM 2007f). Standard operating procedures for herbicide spraying include buffers for sensitive areas such as riparian and wetland areas and threatened and endangered species habitat, timing restrictions, and safety protocols.
NX-3	On lands managed by the BLM, an approved Pesticide Use Proposal (PUPs) would be obtained from each BLM FO prior to herbicide spraying. PUPs would have site-specific information about the herbicides to be used. The PUPs and associated reporting requirements would be submitted on the schedule required for each BLM FO. Herbicide spraying in desert tortoise habitat in Nevada would require consultation with the BLM and USFWS.
NX-4	The cut-stumps of mature salt cedar stands that are cut as part of vegetation clearing will be immediately painted with herbicides. The specific control methods, and herbicide to be used will be determined in consultation with the Nevada BLM State and FO offices. Additional control measures could the planting of native or desired plant species following treatment to provide erosion control, and the use of biocontrols.
VG-1	Native seed mixes to be used for reclamation would be developed in consultation with the land managers for the various regions crossed by the Project. Seed mixes would meet the requirements of the individual agency FO's crossed by the Project. Site-specific seed mixes for soils with low reclamation potential (LRP) would be developed. The LRP seed mixes would be specifically designed for alkaline, saline, or sodic soils and would be used in areas where reclamation would potentially be difficult based on soil conditions. Additional soil amendments may be required in these areas, and would be implemented at the direction of the land manager.
VG-2	Woody areas such as pinyon-juniper, which are on average taller than the 6 ft minimum clearance, but with wide spacing between the trees allowing vehicle and equipment access to the transmission line ROW, would not be cleared during construction activities. This measure would consider conductor clearance requirements.
VG-3	A vegetation reclamation and monitoring plan will be developed as part of the Construction, Operation, and Maintenance (COM). The reclamation monitoring plan would define reclamation success for each land management agency, list reclamation seed mixes, and detail reclamation monitoring for both interim and final reclamation. Interim and final reclamation success would be monitored quarterly for the first year, and then annually for at least three years, or until reclamation success as defined by each land management agency crossed by the project is achieved. Reporting of construction, reclamation progress, and monitoring results would be submitted to each land management agency per each office's reporting requirements.
VG-4	During vegetation clearing, if chipping and spreading woody material in the ROW, wood chips will not exceed 3 inches in depth. Distribute chips in discontinuous patches that do not result in a continuous chip mat (<40% of surface covered by 3 inches of chips).
VG-5	Masticated material from spread in the ROW will not exceed a depth of 3-6 inches. Distribute material in discontinuous patches that do not result in a continuous chip mat (<40% of surface covered 3-6 inches thick).
WET-1	Wetland surveys would be conducted at terminal, ROW, ancillary facilities, and along proposed access roads corridors to identify wetland, WUS, and riparian areas located in these areas. Survey information collected would include wetland type, type and cover of hydrophytic and riparian vegetation species present, soil characteristics, site hydrology, global positioning system location of the wetland, and associated information required to determine jurisdictional status. Based on survey results, no surface disturbance including temporary and permanent facilities, the placement of fill material or vegetation clearing for storage, parking, construction activities, or construction work areas as feasible will occur within the avoidance buffer, or surface use restriction defined in the resource management plan for each BLM FO and USFS national forest. If avoidance is not feasible, USACE, BLM, USFS, and USFWS crossing and construction techniques for wetlands and riparian areas will be employed. The wetland crossing and construction techniques will be approved by the USACE, BLM, USFS, and USFWS and will be outlined in the Final POD.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
WET-2	For any features identified during field surveys as jurisdictional under the USACE and EPA guidance under Section 4 of the Clean Water Act, consultation with the USACE will occur prior to construction. Mitigation for these features will be determined in consultation with the USACE and BLM.
WET-3	Access roads will be routed around riparian areas, wetlands, intermittent or perennial drainages, and ephemeral channels to the extent practical. If jurisdictional wetlands or WUS cannot be avoided, USACE approved construction techniques for construction in wetlands and WUS will be applied. BLM and USFS construction techniques for non-jurisdictional wetlands, riparian areas, intermittent drainages, and ephemeral channels would be applied on BLM and USFS lands, as appropriate. These include the use of timber mats, erosion controls, and the placement of equipment outside of the wetland, riparian areas, intermittent drainages, and ephemeral channels boundaries.
Special Status Plant Species	
SS-1	(Species-specific Surveys for Federally-listed Species) – Site- and species-specific surveys for federally listed plant species would be conducted prior to the Biological Assessment (BA) to identify the precise location of known individuals and populations and ground-truth modeled habitats. Surveys would be conducted in areas identified as potential habitat through models developed for the EIS, or from agency provided models for specific species. Surveys would be conducted as described in the TWE Project Special Status Species Survey Plan, and subsequent Survey Plan Memos. Species not requiring surveys prior to the BA would be identified by the USFWS and BLM. For these species, pre-construction surveys would still be required. If individuals or populations are identified during surveys in potential habitat areas, species-specific avoidance through structure and ROW design modifications would be developed and implemented. For species that cannot be avoided, species specific mitigation would need to be developed in consultation with the USFWS and BLM. Species specific mitigation may include compensatory mitigation, and transplanting of individuals.
SS-2	(Species-specific Surveys for Forest Sensitive) - Site- and species-specific surveys for USFS sensitive plant species would be conducted prior to the Biological Evaluation (BE) to identify the precise location of known individuals and populations and ground-truth modeled habitats. Surveys would be conducted in areas identified as potential habitat through models developed for the EIS, or from agency provided models for specific species. Surveys for USFS sensitive species would be conducted only in the national forests crossed by the proposed project. Surveys would be conducted as described in the TWE Project Special Status Species Survey Plan, and subsequent Survey Plan Memos. Species not requiring surveys prior to the BE would be identified by the USFS and BLM. For these species, pre-construction surveys would still be required. If individuals or populations are identified, species-specific avoidance through structure and ROW design modifications would be developed and implemented. If individuals or populations are identified during surveys in potential habitat areas, species-specific avoidance through structure and ROW design modifications would be developed and implemented. For species that cannot be avoided, species specific mitigation would need to be developed in consultation with the USFS and BLM. Species specific mitigation may include compensatory mitigation, and transplanting of individuals.
SS-3	(Species-specific Surveys for BLM Sensitive, NPS Sensitive, and Nevada State Protected Species) - Site- and species-specific surveys for BLM sensitive, NPS sensitive, and Nevada state-protected plant species would be conducted prior to construction to identify the precise location of known individuals and populations and ground-truth modeled habitats. Surveys would be conducted as described in the TWE Project Special Status Species Survey Plan and subsequent Survey Plan Memos. If individuals or populations are identified, species-specific avoidance through structure and ROW design modifications would be developed and implemented.
SS-4	(Avoidance of Ute Ladies'-tresses Orchid Species and Habitat) - Known individuals and populations and areas identified as potential habitat through consultation with the USFWS would be spanned by the transmission line. Surface disturbance associated with facilities, access roads, and other project related construction activities would not occur within the areas identified potential habitat or as having known occurrences. Presence of species in modeled habitat would be assumed for USFWS mitigation purposes. If potential habitat cannot be avoided, 2 years of surveys in potential habitat would be required, and USFWS formal consultation may be necessary.
SS-5	Construction will occur down slope of special status plants and populations where feasible; if surface disturbance must be sited upslope, a 300 ft minimum buffer between surface disturbances and plants and populations will be incorporated. Erosion controls would be implemented at the direction of the BLM, USFS, or USFWS, as appropriate, to prevent sedimentation and erosion from upslope surface disturbance.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
SS-6	A minimum 300-foot buffer distance would be incorporated between federally listed individuals and populations and surface disturbance. Avoidance areas will be visible during construction through fencing, signing, rebar, etc. during construction. Construction and operation traffic will stay on designed routes, and other cleared or approved areas.
SS-7	The Dust Control and Air Quality Plan will include dust abatement measures to minimize impacts to special status plant species; including slower speed limits on unpaved roads, using gravel for roads in occupied habitat and avoidance areas, and the application of water for dust abatement.
SS-8	(Avoidance of Deseret Milkvetch Species and Habitat) - Known individuals and populations and areas identified as ground-truthed suitable habitat would be spanned by the transmission line. Surface disturbance associated with facilities, access roads, and other project related construction activities would not occur within the areas identified as having known occurrences or suitable habitat. Presence of species would be assumed for development of USFWS conservation measures as appropriate.
SS-9	(Avoidance of Clay Phacelia and Minimization of Indirect Impacts) – Known individuals and populations would be spanned by the transmission line. Surface disturbance associated with facilities, access roads, and other project-related construction activities would not occur within the areas identified as having known occurrences or suitable habitat. Additional site specific erosion control measures would be developed with the USFWS and implemented during construction to minimize erosion in areas near known clay phacelia populations.
SS-10	(Avoidance of High Quality Habitats) – In instances where complete habitat avoidance is not possible (due to, for example, topographical, biological, or engineering constraints), all “high quality” habitats as determined during site- and species-specific surveys would be avoided by all direct disturbances during construction and operational activities. High quality habitat are defined as areas that are within the geographic range of the species, have been field verified as having the majority of required habitat characteristics; and/or the species has been observed in the area or near vicinity.
SS-11	(Uinta Basin Hookless Cactus Core Conservation Area Mitigation Measures) – Construction within Uinta Basin Hookless Cactus Level 1 and Level 2 Core Conservation areas will follow the Draft Energy Development Management Guidelines for *Sclerocactus wetlandicus* and *Sclerocactus brevispinus* Core Conservation Areas as appropriate. These include limited to no surface disturbance in core conservation areas; and having an on-site botanist during construction activities. If these measures are not implemented, mitigation measures will need to be developed in consultation with the BLM and USFWS.
Wildlife	
WLF-1	For the protection of breeding migratory birds, WLF-1 requires TWE to avoid migratory bird habitat removal on currently undisturbed lands, to the extent possible, between approximately February 1 and July 31 (depends on state) or, alternately, to conduct breeding migratory bird surveys and implement appropriate mitigation in coordination with the BLM, U.S. Bureau of Reclamation, CPW, NDOW, UDWR, USFS, USFWS, Western, and WGFD. In addition, in order to avoid impacts to raptors during the breeding season (January 1 to August 31 for most eagles, hawks, falcons, and owls and April 15 to September 15 for burrowing owls), TWE would be required to conduct a breeding raptor survey and implement appropriate mitigation measures, such as buffer zones around active nests, as needed.
Special Status Wildlife Species	
SSWS-1	In order to protect nesting mountain plovers, TWE would follow the USFWS 2002 Mountain Plover Survey Guidelines and would conduct mountain plover nest surveys if construction were to occur during the mountain plover breeding season (April 10 to July 10). If a nest is located, a 0.25 mile protection buffer would be implemented around the active nest until the birds fledge from the nest.
SSWS-2	Prior to construction activities in suitable pygmy rabbit habitat, TWE would conduct presence/absence surveys following appropriate protocols. Areas within 0.5 mile of proposed disturbance that show characteristics of pygmy rabbit habitat will be surveyed in accordance with the Interagency Pygmy Rabbit Working Group Survey Protocols (Ulmschneider et al. 2004). If the surveys conclude that pygmy rabbits occur, the “Habitat Preservation and Restoration” conservation measures would apply (Keinath and McGee 2004).

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
SSWS-3	Prior to construction activities in suitable Wyoming pocket gopher habitat, TWE would conduct presence/absence surveys following appropriate protocols. If active pocket gopher mounds are identified, the proposed surface disturbing activities would avoid the active pocket gopher mounds by 75 m (BLM 2009). If avoidance of the active pocket gopher mounds by 75 m is not possible, classification surveys (via live capture) must be completed to identify the pocket gopher responsible for the mounds to the species level. If the results conclude that the Wyoming pocket gopher is responsible for the mounds, the "Occupied Wyoming Pocket Gopher Habitat Protection Measures" would apply (BLM 2009). If the results conclude that the associated species is a northern pocket gopher, then the proposed surface disturbance may proceed without mitigation. If the classification survey fails to conclusively identify the associated pocket gopher to the species level, then it will be assumed that the species is a Wyoming pocket gopher and the "Occupied Wyoming Pocket Gopher Habitat Protection Measures" will apply (BLM 2009).
SSWS-4	To avoid and minimize impacts to the desert tortoise and its habitat, TWE would conduct field surveys in identified desert tortoise habitat following approved USFWS protocols. TWE would coordinate with the BLM, Western, Boulder City, Clark County, Nevada, Bureau of Reclamation, and USFWS to implement appropriate mitigation measures during construction, including but not limited to, fencing, preconstruction surveys, and relocating desert tortoises.
SSWS-5	To reduce impacts to greater sage-grouse from operation of the proposed Project, several design features specific to black-footed ferret would be implemented. To limit raptor and corvid predation on greater sage-grouse, TWE would be required to construct anti-perching devices on segments of the proposed Project near high quality greater sage-grouse habitat (e.g., within 4 miles of occupied/active leks, within core areas, within PPH, etc.) in consultation with the BLM, Western, and applicable state wildlife agencies. To limit the potential for greater sage-grouse collisions with guy wires, TWE would be required to outfit guy wires with agency approved bird diverters within high quality greater sage-grouse habitat, or alternatively, to construct alternative structures such as self-supporting steel lattice structures or self-supporting tubular H-frame structures instead of guyed lattice structures within greater sage-grouse habitat.
SSWS – 5A*	- Within 4 miles of leks located within occupied habitat, stipulations would be applied to ROWs. Within 4 miles of a lek in occupied habitat, ROWs would be excluded. Within 4 miles of a lek, but outside occupied habitat, ROWs would be avoided (noise/tall structures); - The activity meets noise restrictions (noise at occupied leks does not exceed 10 decibels above ambient sound levels at sunrise during breeding season); - The activity meets permanent (structure persists through subsequent breeding season) tall structure restrictions (e.g., the structure is not visible from the lek); and - Environmental compliance documents associated with the activity consider how to limit habitat fragmentation (regardless of the GRSG seasonal habitat). Exceptions to the seasonal restrictions and use restrictions could be granted under the following conditions: - If surveys determine that the lek is not active that year, and the proposed activity will not take place beyond the season being excepted; - If surveys determine that the lek is no longer occupied, and the proposed activity will not take place beyond the season being excepted; and - If the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated.
SSWS-6	To prevent impacts to the western yellow-billed cuckoo during the breeding season, TWE would avoid construction within potentially suitable habitat from March 15 to October 15, or, alternatively, would conduct breeding western yellow-billed cuckoo surveys and implement appropriate mitigation in coordination with the BLM, Western, USFWS, and applicable state wildlife agencies.
SSWS-7	To reduce impacts to Utah prairie dogs, TWE would be required to conduct a preliminary habitat assessment along portions of the proposed Project that is within historic Utah prairie dog habitat. Based on the results of the habitat survey, additional surveys may be required by the USFWS to determine whether occupied habitat occurs within the disturbance footprint of the proposed Project. If occupied habitat is found, appropriate mitigation measures such as reroutes, reducing the width of the ROW, and constructing alternative structures types (e.g. H-frame tubular) with anti-perching devices on transmission line segments within occupied habitat, would be implemented in coordination with the BLM, Western, UDWR, and USFWS.
SSWS-8	To prevent impacts to southwestern willow flycatchers during the breeding season, TWE would avoid construction within suitable habitat from March 15 to October 15, or, alternatively, conduct breeding southwestern willow flycatcher surveys and implement appropriate mitigation in coordination with the BLM, Western, USFWS, and applicable state wildlife agencies.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
SSWS-9	To reduce impacts to black-footed ferret from operation of the proposed Project, several design features specific to black-footed ferret would be implemented. To limit raptor predation on black-footed ferret, TWE would be required to construct anti-perching devices and alternative structure types on segments of the proposed Project near high quality black-footed ferret habitat (e.g., within areas of active white-tailed prairie dog colonies) in consultation with the BLM, Western, and applicable state wildlife agencies.
SSWS-10*	To reduce impacts to Mexican spotted owl in Utah, TWE will ensure that; - No actions will occur within 0.5 mile of an identified nest site; - If nest site activity status is unknown, no activity will occur within the designated Protected Activity Center (PAC); - Avoid placing permanent structures within 0.5 mi of suitable habitat unless surveyed and not occupied; - Reduce noise emissions (e.g., use hospital-grade mufflers) to 45 dBA at 0.5 mile from suitable habitat, including canyon rims (Delaney et al. 1997). Placement of permanent noise-generating facilities should be determined by a noise analysis to ensure noise does not encroach upon a 0.5 mile buffer for suitable habitat, including canyon rims; - Limit disturbances to and within suitable owl habitat by staying on designated routes; and - Limit new access routes created by the project. A permanent action continues for more than one breeding season and/or causes a loss of owl habitat or displaces owls through disturbances, i.e., creation of a permanent structure. For all temporary actions that may impact owls or suitable habitat: - If action occurs entirely outside of the owl breeding season, and leaves no permanent structure or permanent habitat disturbance, action can proceed without an occupancy survey; - If action will occur during a breeding season, survey for owls prior to commencing activity. If owls are found, activity should be delayed until outside of the breeding season; and - Eliminate access routes created by a project through such means as raking out scars, re-vegetation, gating access points, etc. (Temporary activities are defined as those that are completed prior to the start of the following raptor breeding season, leaving no permanent structures and resulting in no permanent habitat loss)
SSWS-11*	To reduce impacts to Canada lynx, TWE would: - Limit disturbance to and within suitable habitat by staying on approved access routes. - Limit new access routes created by the project. - Dirt and gravel roads traversing lynx habitat (particularly those that could become highways) should not be paved or otherwise upgraded (e.g., straightening of curves, widening of roadway etc.) in a manner that is likely to lead to significant increases in traffic volume, traffic speed, increased width of the cleared ROW, or would foreseeably contribute to development or increases in human activity in lynx habitat. - When these types of upgrades are proposed, a thorough analysis of potential direct and indirect impacts to lynx and lynx habitat should be conducted. - Minimize impacts to habitats that support lynx prey.
* Mitigation measure proposed by the BLM Utah State office that will be applied in the State of Utah only.	
Aquatic Biological Resources	
AB-1	(Fish Passage): When avoidance of perennial streams with fish populations is not feasible and a culvert is required during construction, flow would be maintained in a portion of the stream to allow unrestricted fish passage. Any plan for dewatering the stream at the culvert site must be approved by the appropriate federal and state agencies. Culvert size and type would be selected to facilitate the continued and long-term connectivity and movement of target aquatic species. If the culvert is proposed to be in place during project operation, approval must be obtained from the federal or state agency management authority. An alternative crossing method may be required.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
AB-2	(Avoid Game Fish Spawning Periods): If spawning areas for game fish species are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period. The exact dates for avoidance would be determined through discussions with WGFD, CPWD, or UDWR. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season.
AB-3	(Invasive Aquatic Species Protection): It is assumed that any waterbody could contain aquatic invasive species and invasive weed species. If work occurs in or near a waterbody, all equipment would be decontaminated. Decontamination would occur before arrival at a project site to avoid the transfer of aquatic invasive species from a previous work site in or near water. Decontamination would consist of either of these actions: 1) Drain all water from equipment and compartments; clean equipment of all mud, plants, debris, and aquatic organisms; and dry equipment for specified time by season (5 days in June through August, 18 days in March through May, and 3 days in December through February when temperatures are at or below freezing); or 2) Use a high pressure (2,500 psi) hot water (140°F) pressure washer to thoroughly clean equipment and flush all compartments that may hold water. A field monitor would be present to ensure that the cleaning was completed prior to vehicle and equipment moving to other streams and drainages.
AB-4	(Herbicide Use Plan): As part of vegetation management, the applicant would prepare an Herbicide Use Plan. The Plan would identify a list of approved herbicides that may be used as well as locations of areas that may be treated. Licensed herbicide applicators would be used in the treatment process. All herbicides would be used in accordance with label instructions for the chemical. The Plan also would discuss compliance with applicable federal, state, and local agencies.
Special Status Aquatic Species	
SSS-1	(Water Use): No new surface water or groundwater withdrawals that are hydrologically connected to streams containing Colorado River cutthroat trout and Bonneville cutthroat trout would be allowed. Any water necessary for construction, operation, or maintenance (including dust abatement) would not be acquired from existing water sources.
SSS-2	(No Permanent Structures or New Roads in Critical Habitat for Federally Listed Fish Species): No permanent structures or new roads would be constructed in critical habitat for federally endangered fish species. Any temporary disturbance to soils in the 100-year floodplain within critical habitat would be minimized to the extent possible and restoration would be completed to maintain existing conditions.
SSS-3	(Avoid Spawning Habitat Disturbance for Special Status Trout Species): If spawning areas for Colorado River cutthroat trout are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period from April through May. The exact dates for avoidance would be determined through discussions with WGFD, CPW, or UDWR. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season. The state agencies also would determine if a habitat survey would be required prior to any project disturbance, which would assist in defining habitat conditions for restoration.
SSS-4	(Avoid Spawning Habitat Disturbance for Southern Leatherside Chub): If spawning areas for southern leatherside chub are known to occur at streams proposed for vehicle crossing or culvert construction, instream disturbance would be scheduled to avoid the spawning period from April through June. The exact dates for avoidance would be determined through discussions with UDWR. All disturbed areas would be restored to pre-construction conditions prior to the next spawning season.
SSS-5	(Avoid Direct Disturbance to Habitat for Southern Bonneville Pyrg): No vehicle or equipment disturbance from ROW work or access road construction would be allowed within 300 feet of the unnamed spring located near Thistle Creek that contains southern Bonneville pyrg.
SSS-6	(Survey to Avoid Direct Disturbance to California Floater Habitat): If instream construction is proposed for Currant Creek, a survey would be conducted to determine if California floater is present. If the species is absent, construction would be allowed after meeting UDWR requirements for restoration. If the species is present, relocation would be considered to avoid impacts to it.
SSS-7	(Reduce Crossings of Sowers Creek to Protect Boreal Toad Breeding Habitat): The ROW alignment would be evaluated so that the number of Sowers Creek crossings can be reduced. The portion of the creek crossed by the ROW also would be evaluated as breeding habitat for boreal toad to identify any priority areas that should be avoided if possible.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
SSS-8	(No Vehicle Crossings or New Roads in the Muddy River): No vehicle crossings or new roads would be constructed for the Muddy River. This measure would protect habitat for special status fish species (Virgin River chub, Moapa speckled dace, Moapa White River springfish, Meadow Valley Wash desert sucker, and Meadow Valley Wash speckled dace) in the Muddy River.
SSS-9	(Avoid Direct Disturbance to Abe and Hiway Springs Used by Arizona Toad): No vehicle or equipment disturbance from ROW work or access road construction would be allowed in Abe and Hiway Springs to protect Arizona toad breeding habitat.
Cultural Resources	
No additional mitigation measures cited in this section.	
Visual Resources	
VR-1	Remove pinyon-juniper trees only as necessary for construction and maintenance of transmission towers and access roads. Feather the edges of any clearings. Pinyon-juniper trees in the ROW that are outside of the tower and road construction zone are left in place. Leave other trees in the ROW that would not present a safety or engineering hazard or otherwise interfere with operations. Where feasible, top rather than remove trees that exceed the allowable height. Openings in vegetation for facilities, structures, and roads should mimic, to the extent possible, the size, shape, and characteristics of naturally occurring openings.
VR-2	Use BLM environmental colors (Standard Environmental Colors, Color Chart CC-001, 2008) for surface coatings of permanent buildings, fences, gates, and tanks at terminal sites. Color selection is based on site-specific assessment at each location. Paint grouped structures the same color to reduce visual complexity and color contrast.
VR-3	Locate structures, roads, and other project elements as far back from road, trail, and river crossings (linear KOPs) as possible, and, where feasible, employ terrain and vegetation to screen views from crossings.
VR-4	In areas with no existing transmission lines move the transmission line (reference line) away from the immediate foreground of stationary (non-linear) KOPs to a distance of 0.5 miles or more. Where feasible, approach and cross linear KOPs such as roads and trails at right angles.
VR-5	Materials and surface treatments of transmission line structures, conductors, and insulators, and ancillary structures, and land disturbances should repeat and/or blend with the existing form, line, color, and texture of the landscape and have little or no reflectivity (non-specular).
VR-6	Where paralleling an existing transmission line, where possible, place the structures to match the locations of structures in the existing line.
VR-7	Where possible, position roads at the toe of a slope, at the edge of vegetation openings, and perpendicular with the line of sight.
VR-8	Minimize lighting at terminal and construction facilities to the extent permitted by OSHA and down-shield lights to reduce night glare and light pollution.
VR-9	Where possible in tree-covered moderate to steep terrain, conduct construction operations for towers and conductors with helicopters to reduce the need for access roads and laydown clearings.
Recreation Resources	
REC-1	Where practicable, operation phase vegetation maintenance activities within dispersed 36 recreation areas or key hunting locales would not occur during big game hunting seasons.
REC-2	Within designated recreation management areas, access shall be limited to existing roads whenever practicable. If new and improved access cannot be avoided within these areas, access roads shall be closed or rehabilitated through methods and monitoring developed through consultation with the landowner or land management agency. Methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour or vegetation.
REC-3	If designated corridors exist within the SDA, new roads and ancillary construction areas shall only be located within designated utility corridors.
REC-4	Where practicable, construction activities within key hunting locales such as WHMAs would not occur during big game hunting seasons.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
REC-5	No construction shall be allowed after 5:00 p.m. on weeknights, and no construction shall be allowed on weekends, holidays, or the opening of big game hunting seasons in areas that are adjacent to developed recreation sites.
REC-6	Construction zones will be sited such that access to high use recreational areas and trails is not impeded. If public safety concerns are such that current access or use cannot be maintained, the applicant will work with the appropriate land manager to develop alternative access points or redirect users to alternative existing points of access.
REC-7	Construction shall be scheduled to occur when the fewest students are at Wasatch Academy.
REC-8	Due to the conservation easement, there should be no ground disturbance within the Northwest Manti WMA-Hilltop Unit.
REC-9	The applicant shall plan construction activities to occur outside of specially permitted event areas or times; or work with organizers to ensure adequate access and use if feasible given notice of permit timing.
REC-10	The applicant shall consider the view from key recreational areas in its placement of the 250-foot-wide transmission line ROW to locate the line where it best blends in with the surrounding environment, and/or is collocated with other existing transmission lines.
Land Use	
AGRI-1	Coordinate with farm and ranch operators to identify problems with structure placement and determine structure locations to ensure implementation of design feature TWE-40. Locate structures along fence lines, field lines, or adjacent to roads. Use longer spans between structures to clear fields. Consider use of non-guyed free-standing transmission structures in agricultural areas.
AGRI-2	Schedule construction activities to avoid planting and harvesting activities.
AGRI-3	Minimize locating access roads within the 2-mile transmission line corridor in areas with croplands. For croplands that cannot be avoided by access roads, establish procedures for determining temporary and permanent access road locations with landowners and operators, and establish protection methods for roads over croplands that cannot be avoided by construction activities. Restore locations of temporary access roads to pre-construction conditions and leave permanent access roads intact through mutual agreement with the landowner and operator.
AGRI-4	Minimize the use of guy wires in crop and hay lands to the extent possible. If guy wires have to be used in crop and hay lands, highly visible shield guards will cover the wires.
LU-1	The proponent will develop an approved POD and shall coordinate with land managers on final structure placement, including all aboveground components, access roads, and permanent disturbance areas, to ensure optimal compatible land use.
LU-2	Access roads and other construction facilities shall not be constructed in greater sage grouse foraging areas within the Strawberry Reservoir Management Area.
RANGE-1	Prior to construction of each segment, access road, or ancillary facility crossing a BLM or USFS grazing allotments, TWE shall coordinate with the associated BLM FOand USFS national forest concerning planned development and operations that will occur and identify potential livestock management issues. TWE will provide a schedule and locations of construction activities on affected grazing allotments to the BLM FO and USFS national forest to be provided to the affected grazing permittees. The construction activities schedule and construction activity locations shall be provided on a date early enough to allow grazing permittees sufficient time to make decisions and allocate their resources during the construction time period.
RANGE-2	Prior to construction of transmission line segments, access road, or ancillary facilities, active range improvement locations shall be inventoried. Based on the results of these inventories, no roads, or ancillary facilities would be placed within 200 meters of range improvements, including livestock and wildlife water sources/systems. If avoidance is not feasible, features would be relocated to an alternate location per BLM, USFS, or state wildlife agency guidance.
RANGE-3	Damage to livestock and livestock facilities shall be reported as quickly as possible to BLM, USFS, and affected livestock operators. If damage is caused by the construction, operation/maintenance of this project, TWE will be financially responsible for the replacement of the livestock and/or livestock facilities.

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
RANGE-4	The Flagging, Fencing, and Signage Plan would include: Prevention measures to avoid damaging fences, gates, and cattleguards during construction and operation activities. Mitigation to prevent livestock from passing through breaks in fences as a result of construction and operation activities. Measures would include the installation of temporary gates, or cattleguards, and coordination with landowners and grazing permittees. Limit the placement of guy wires where livestock water or where they would fall in stock driveways. Shield guards would be used as appropriate. Upgrading cattleguard gate widths and load-bearing requirements as appropriate for construction and operation vehicles on access roads. Require heavy equipment to use by-pass gates to avoid damage to cattleguards. If a by-pass gate is not already in place, install a by-pass gate adjacent to existing cattleguards to 41 prevent damage by heavy equipment. Mitigation for loss of livestock due to damaged fences and gates that were result of construction and operation activities. Mitigation for loss of livestock as a result of construction and operation vehicle collisions.
RANGE-5	If construction or operation activities disrupt the transport of water to water locations for livestock or wildlife, an alternative water source will be provided until the transport of water is resumed. Alternative water sources could include the hauling of water to watering locations, an alternate pipeline, or the establishment of a temporary watering facility for the livestock and wildlife.
RANGE-6	Prior to construction and placement of permanent facilities and access roads, TWE shall coordinate with the associated BLM Field Office and USFS forest to identify areas where the placement of tower structures, facilities, and access roads would prevent access to either a portion or all of a livestock grazing allotment resulting in the livestock grazing allotment becoming unusable or decreasing the AUMs available to a point that requires the grazing permit to be modified. In these areas, corrective actions would then be identified including rearranging of grazing allotment fences, additional access roads to the grazing allotment, re-arrangement of project facilities and access roads as feasible, etc.
RANGE-7	Speed limits would be followed and signs would be erected in lambing/calving areas, shipping pastures, or adjacent to working corrals to warn vehicle operators of the agricultural operations.
Special Designations	
SDA-1	Within special designation areas, access shall be limited to existing roads whenever practicable. ROWs that currently are not sited within special designation areas shall not be placed within the special designation area during subsequent micro-siting efforts associated with the Plan of Development.
SDA-2	If new or improved access roads cannot be avoided within SDAs, roads shall be closed or rehabilitated through methods developed through consultation with the landowner or land management agency. Methods for closure could include gates, obstructions such as berms or boulders, or partial or full restoration to natural contour or vegetation.
SDA-3	Ground electrode systems shall be sited outside of any designated SDAs located within the ground electrode siting areas.
SDA-4	Within IRAs and other SDA of high scenic quality, Level 2 or Level 3 vegetation management methods would be utilized as needed to reduce impact to wildlife habitat and reduce the level of habitat fragmentation during operations.
SDA-5	Roadless construction techniques shall be applied within all portions of unroaded/undeveloped areas located outside of IRA, until the National Forests have completed their LRMP revisions including IRA and/or wilderness designation decisions.
SDA-6	If designated corridors exist within the SDA, new roads and ancillary construction areas shall only be located within designated utility corridors.
SDA-7	ROW, road, or ground electrode placement within river segments that are eligible for inclusion in the NWSRS shall be micro-sited in coordination with BLM to minimize surface disturbance or visual disturbance from towers, roads, or other facilities to the outstandingly remarkable features that led to segment eligibility.
Transportation and Access	
No additional mitigation measures cited in this section.	

Table C.5-1 Mitigation Measures

Draft EIS Mitigation Measure Number	Mitigation Measures
Social and Economic Resources	
SOCIO-1	TWE must address temporary housing needs in conjunction with a Wyoming Industrial Siting Permit that must be obtained prior to the commencement of construction. That plan should address the combined housing need of the northern terminal, ground electrode, and Spread 1, particularly given potential competition for housing from other development in the area. Local officials should be consulted in the development of that plan. The housing plan should address housing needs associated with construction related indirect and induced jobs that would be supported.
SOCIO-2	TWE should encourage its contractors, to the maximum extent practicable, to purchase materials, equipment and supplies locally, have construction materials delivered on an FOB basis to the counties in which the materials will be utilized, and complete all reports regarding taxable purchases in a timely manner so that proper attribution of sales and use tax payments can occur.
SOCIO-3	TWE should conduct annual coordination meetings with local emergency management officials (law enforcement, fire, health care, state prison. etc.) to review and update emergency coordination and situation management.
SOCIO-4	If not required by existing regulations or included in the various operations plans to be developed (see Section 2.4), TWE should develop and implement a plan for on-going communications with local county and municipal governments to inform them of construction progress, specifically as it relates to the anticipated timing of activity across each spread.
Public Health and Safety	
PH-1	Develop, implement, and maintain a noise complaint reporting and review process to deal with potential queries and issues as they arise. This would include a toll-free telephone number for receiving question or complaints during Project construction and a public liaison person before and during Project construction to respond to concerns over noise.
Wild Horse Management Areas	
WH-1	Construction activities would be suspended as needed during wild horse gathers, as determined through consultation with the BLM.
Lands with Wilderness Characteristics	
No additional mitigation measures cited in this section.	

Appendix D
Project Description Technical Report (TWE 2012)

TransWest Express Transmission Project

Project Description Technical Report

Submitted by

TRANSWEST EXPRESS LLC

Submitted to

NATIONAL SYSTEM OF PUBLIC LANDS

Wyoming State Office

Western AREA POWER ADMINISTRATION

October 2012

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AC	alternating current
AC/DC	alternating current/direct current
ACSR	aluminum conductor steel reinforced
ANSI	American National Standards Institute
APLIC	Avian Power Line Interaction Committee
APS	Arizona Public Service
ATV	all terrain vehicles
BLM	Bureau of Land Management
BMP	Best Management Practices
COM Plan	Construction, Operation and Maintenance Plan
CWA	Clean Water Act
DC	direct current
DEIS	Draft Environmental Impact Statement
DOE	U.S. Department of Energy
DOT	Department of Transportation
EHV	extra high voltage
EIS	Environmental Impact Statement
EMF	Electromagnetic Field
E.O.	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FERC	Federal Energy Regulatory Commission
FLPMA	Federal Land Policy and Management Act of 1976
FPEIS	Final Programmatic Environmental Impact Statement
GIS	Geographic Information System
HV	high voltage
HVDC	high voltage direct current
IPP	Intermountain Power Plant
IRA	Inventoried Roadless Areas
IVM	integrative vegetation management
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LP	liquid propane
LPP	laminated polypropylene paper
MI	Mass impregnated
MVCD	Minimum Vegetation Clearance Distance
MW	megawatt
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act of 1969
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NHPA	National Historic Preservation Act
NOI	Notice of Intent

NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NTTG	Northern Tier Transmission Group
OPGW	optical ground wire
PA	Programmatic Agreement
PDTR	Project Description Technical Report
POD	Plan of Development
POWER	POWER Engineers, Inc.
ROD	Record of Decision
ROW	Right-of-Way
RPPR	Regional Planning Project Review
SCADA	Supervisory Control and Data Acquisition
SCFF	Self-contained fluid filled
SHPO	State Historic Preservation Office
STS	Southern Transmission System
TransWest	TransWest Express LLC
TWE Project	TransWest Express Transmission Project
UHF	ultra high frequency
USACE	U.S. Army Corps of Engineers
USDI	United States Department of Interior
USFS	United States Forest Service
VHF	very high frequency
VRM	Visual Resource Management
WECC	Western Electricity Coordinating Council
Western	Western Area Power Administration
WIA	Wyoming Infrastructure Authority
WWEC	West-wide Energy Corridor
XLPE	Cross linked polyethylene

1.0 INTRODUCTION

1.1 PDTR Purpose and Scope

TransWest Express LLC (TransWest/Applicant) has prepared this Project Description Technical Report (PDTR) in support of the Draft Environmental Impact Statement (DEIS) for the TransWest Express Transmission Project (TWE Project). The DEIS is being prepared by the U.S. Department of the Interior (USDI), Bureau of Land Management (BLM), the U.S. Department of Energy (DOE), and Western Area Power Administration (Western), in compliance with the requirements and guidelines of the National Environmental Policy Act of 1969 and the Federal Land Policy and Management Act of 1976 (FLPMA). The PDTR provides a description of the TWE Project for the lead agencies' use in preparing Chapter 2 (Project Description and Alternatives) of the DEIS. The PDTR addresses the proposed TWE Project and alternatives presented by the lead agencies during public scoping. The PDTR also contains detailed design, construction, operation and maintenance information for the agencies' use in the analyses of environmental impacts and mitigation measures adopted by the Applicant for the proposed TWE Project and DEIS alternatives.[1]

The PDTR is presented in the following major sections:

Section 2.0 TransWest Proposed Action, including: a summary of the TWE Project components; purpose and need; technical reliability and commercial requirements; and the TWE Project history, including early planning studies and alternatives considered by the Applicant in determining the proposed TWE Project.

Section 3.0 Project Description, including: the typical design characteristics of the proposed transmission system, terminal stations, ground electrode systems and communication systems; the construction, operation, and maintenance practices; and environmental protection measures adopted by TransWest as part of the TWE Project.

Section 4.0 Alternatives including alternative locations for the terminals and ground electrodes; two system alternatives; and undergrounding.

The appendices provide pertinent background information to the PDTR. Appendix A contains information regarding the methodology used for estimating temporary and permanent disturbances resulting from the TWE Project components and access roads. Appendix B contains maps related to early planning studies and environmental constraint analyses. Appendix C provides supplemental information requested by the lead agencies regarding the TWE Project Vegetation Management Program; and Appendix D provides technical information regarding the potential for induced currents on alternating current (AC) and direct current (DC) transmission lines (AECOM 2010).

1.2 Definitions of Key Terms

Key terms used throughout the PDTR are defined below.

[1] The PDTR does not address the full range of alternatives, which the lead agencies will determine for the DEIS. The PDTR provides information pertinent to the proposed TWE Project and National Environmental Policy Act (NEPA) scoping alternatives.

Transmission Line Corridors – Corridors are defined as geographic areas generally varying in width between two and six miles within which the proposed 250 foot-wide TWE Project transmission line right-of-way (ROW) would be located. Corridor widths have varied among the various studies completed for TWE Project planning. For purposes of the DEIS analysis, the Proposed and Alternative Corridors have been refined to generally two miles wide. In limited areas, the corridor widths may be greater or lesser due to routing constraints, as requested by the joint lead agencies. These corridors will be evaluated in the DEIS to document the range of resource impacts which could result from transmission line construction, operation, and maintenance within the corridors. Corridor locations and widths have been, and will continue to be, refined throughout the National Environmental Policy Act (NEPA) process.

Transmission Reference Lines – Reference lines are preliminary, non-engineered routes within corridors that were determined based on environmental and engineering constraints and constructability review. The reference line is generally bounded on each side by one mile of corridor. For purposes of the DEIS analysis, reference lines serve as preliminary centerlines for the location of the ±600 kV DC transmission line ROW. Reference line locations will be refined within the transmission line corridors throughout the NEPA process.

Route Segments – Reference lines defined above are divided into route segments, which are identified by a nomenclature of letters and numbers. The route segments will be used to identify alternative end-to-end routes for the transmission line and to quantify and compare potential impacts resulting from these alternative routes.

Alternative Routes – Alternative routes for the TWE Project are defined as a series of corridor segments, which, when combined, define a potential corridor and reference line location for the TWE Project between common geographic points. For the TWE Project DEIS analysis, the lead agencies are identifying and comparing alternative routes according to four distinct regions: Region I - Sinclair, Wyoming, to Northwest Colorado near Rangely, Colorado; Region II - Northwest Colorado to IPP near Delta, Utah; Region III – IPP to North Las Vegas, Nevada; and Region IV - North Las Vegas to Marketplace Hub near Boulder City, Nevada.

TWE Project Alignment – The TWE Project alignment is defined as an engineered route, which will be prepared for the Agency Preferred Alternative. The Project Alignment will be based on engineering and design of the transmission line including specific structure locations. The Agency Preferred Alternative will be determined by the lead agencies, following the public review period on the DEIS, and in consultation with federal, state, and local cooperating agencies.

System Alternatives – System alternatives are alternative transmission configurations, which may have the potential to meet the TWE Project purpose and need, depending on future energy market conditions and permitting decisions for other regional transmission systems. Two system alternatives are described in the PDTR.

2.0 TRANSWEST PROPOSED ACTION

2.1 TWE Project Components

The proposed TWE Project consists of the following components:

- A ±600 kV DC transmission line between south-central Wyoming and southern Nevada. A 250 foot wide ROW will generally be required for the ±600 kV DC transmission line.

- Two terminals for the alternating current/direct current (AC/DC) converter stations and related substations, to be located at either end of the ±600 kV DC transmission line. The proposed TWE Project includes a Northern Terminal near Sinclair, Wyoming, and a Southern Terminal south of Boulder City, Nevada near the Marketplace Hub in the Eldorado Valley, with interconnections to the existing and planned regional AC transmission grid.

- Two independent communications systems, including a dedicated fiber optic network, for command and control of the transmission system. The fiber optic network will require regeneration sites at periodic distances along the ±600 kV DC transmission line. In most cases the regeneration sites will be located within the transmission line ROW. The second communication system will use existing private networks. Microwave antennas may be located at the terminals to connect into these private systems.

- Two ground electrode systems, to be located within approximately 100 miles of the terminals. A low voltage overhead line will be needed to connect the ground electrode systems and AC/DC converter stations.

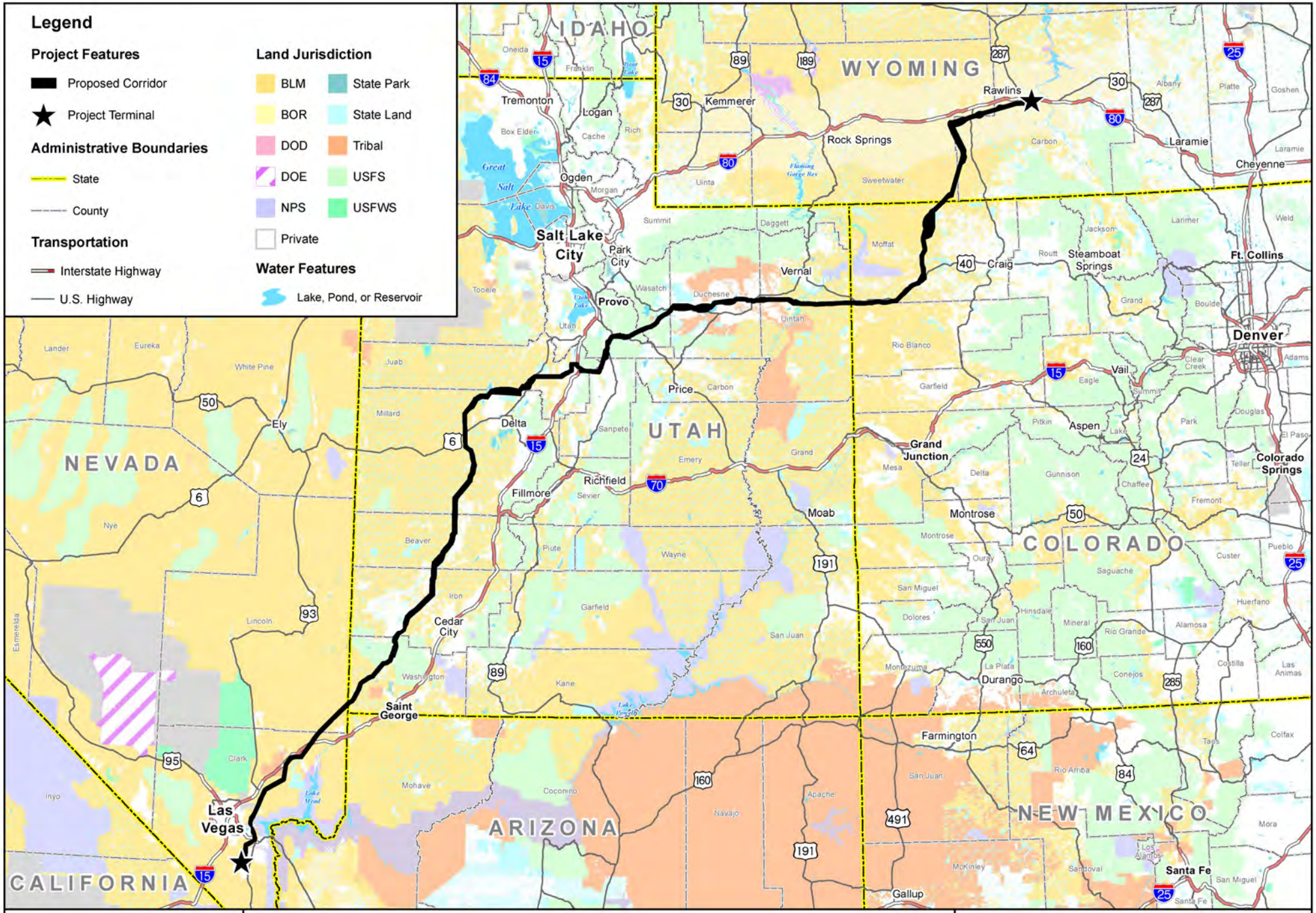
- Access roads to the TWE Project facilities. The TWE Project's proposed Access Road Plan entails making improvements to existing roads, constructing new roads and using overland access methods for the construction, operation, and maintenance of the TWE Project. Existing roads will be used to the extent feasible. Roadless construction methods are proposed in limited areas where the transmission line would cross Inventoried Roadless Areas (IRAs).

- Temporary work areas will be required during construction of the TWE Project including terminals; ground electrode systems; structures; staging areas; material storage areas; fly yards; pulling, tensioning, and splicing sites; communication and regeneration sites; and batch plants.

2.2 TWE Project Location

2.2.1 Regional Vicinity

The proposed TWE Project crosses portions of Wyoming, Colorado, Utah and Nevada. Map Exhibit 1 shows the regional setting of the proposed TWE Project with respect to state and counties crossed.


Legend
Project Features
Proposed Corridor
Project Terminal
Administrative Boundaries
State
County
Transportation
Interstate Highway
U.S. Highway
Land Jurisdiction
BLM
BOR
DOD
DOE
NPS
Private
State Park
State Land
Tribal
USFS
USFWS
Water Features
Lake, Pond, or Reservoir
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Salt Lake City
Provo
Ogden
Logan
Tremonton
Kemmerer
Rawlins
Rock Springs
Laramie
Cheyenne
Ft. Collins
Denver
Colorado Springs
Steamboat Springs
Craig
Vernal
Price
Delta
Fillmore
Richfield
Cedar City
Saint George
Las Vegas
Ely
Moab
Grand Junction
Montrose
Durango
Farmington
Gallup
Santa Fe
Aspen
Vail
0 25 50
Miles
Map Exhibit 1
Proposed Corridor, Regional Vicinity
TransWest Express Transmission Project | October 2012 | DRAFT
POWER ENGINEERS
TRANSWEST EXPRESS LLC

2.2.2 Designated Utility Corridors

The TWE Project transmission line will be approximately 725 miles long, and will follow designated utility corridors for approximately 78 percent of the entire length of the line. Map Exhibit 2 shows the location of the proposed TWE Project corridor and identifies where the transmission line follows utility corridors. Designated corridors, identified on Map Exhibit 2, include corridors designated: (1) by the Department of Energy in November 2008 as West-wide Energy Corridors (WWEC) pursuant to Section 368 of the Energy Policy Act; (2) by the Bureau of Land Management (BLM) and the United States Forest Service (USFS) in their respective land management plans (various dates); (3) by state and county land use plans (i.e., Millard County, Utah major utilities corridor); (4) by connection to federally designated corridors on private and state lands because of their proximity to the federal lands with these designations; and (5) by locating the line adjacent to existing utility line corridors.

2.3 TWE Project Technical Requirements

2.3.1 NERC Standards and WECC Regional Criteria Guidelines

The Reliability Standards used within the electric utility industry for the bulk power electrical grid are developed by the North American Electric Reliability Corporation (NERC). The Western Electricity Coordinating Council (WECC) develops Regional Criteria that supplement the NERC Standards. The West-Wide Energy Corridor (WWEC) Final Programmatic Environmental Impact Statement (FPEIS) includes a comprehensive overview of this subject in Chapter 2, Section 2.6.3, *What Steps Are Being Taken To Ensure The Reliability of Bulk Electricity Transmission* (DOE et al. 2008). The overview includes a description of how NERC and WECC regulate the industry through a wide series of standards that address all facets of the bulk electricity transmission grid, including design, planning, operations, infrastructure and cyber security, communication, coordination and operational safety.

These reliability standards affect the technical aspects of the TWE Project in several ways. Reliability standards limit the operational capacity of any single transmission system element based on a complex contingency analysis that considers the impact to grid operations following various events (e.g. equipment failures, line outages).

Reliability standards affect the TWE Project ROW requirements and separation requirements from other high voltage lines. As a single transmission system element, the TWE Project is effectively limited in capacity to approximately 3,000 megawatts (MW).

The contingency analysis required for new transmission projects such as the TWE Project involves examining several types of events including the loss of "Adjacent Transmission Circuits" and the loss of multiple transmission lines within a corridor.

WECCs Regional Criteria addresses separation distances based upon the location of a project from Adjacent Transmission Circuits. WECC requires a minimum separation distance between high voltage transmission lines. The WECC Regional Criteria specifies that to avoid being rated as Adjacent Transmission Circuits, or common transmission system elements, circuits must be separated by "at least 250 feet between the transmission circuits" (WECC 2012). The applicability of this portion of the Regional Criteria is for circuits greater than or equal to 300 kV. The loss of multiple lines within a corridor involves analyzing impacts after a line outage of the TWE Project transmission

line and any other transmission line(s) within the corridor. The most likely event would be the loss of the TWE Project and an adjacent transmission line.

The likelihood of having a line outage of two transmission lines is even higher at places where transmission lines cross one another. The mechanical failure of the top line would typically cause the line below to also fail. The practicality of needing transmission lines to cross is recognized in the standards; however, the number of crossings needs to be minimized to reduce the likelihood of such an event. This same concept of the practical need for line crossings and the treatment of these within the siting criteria have been extended to develop a TWE Project Transmission Line Co-location Framework. The framework allows for the use of various separation distances depending on localized siting constraints and the voltages of other transmission lines within the corridor.

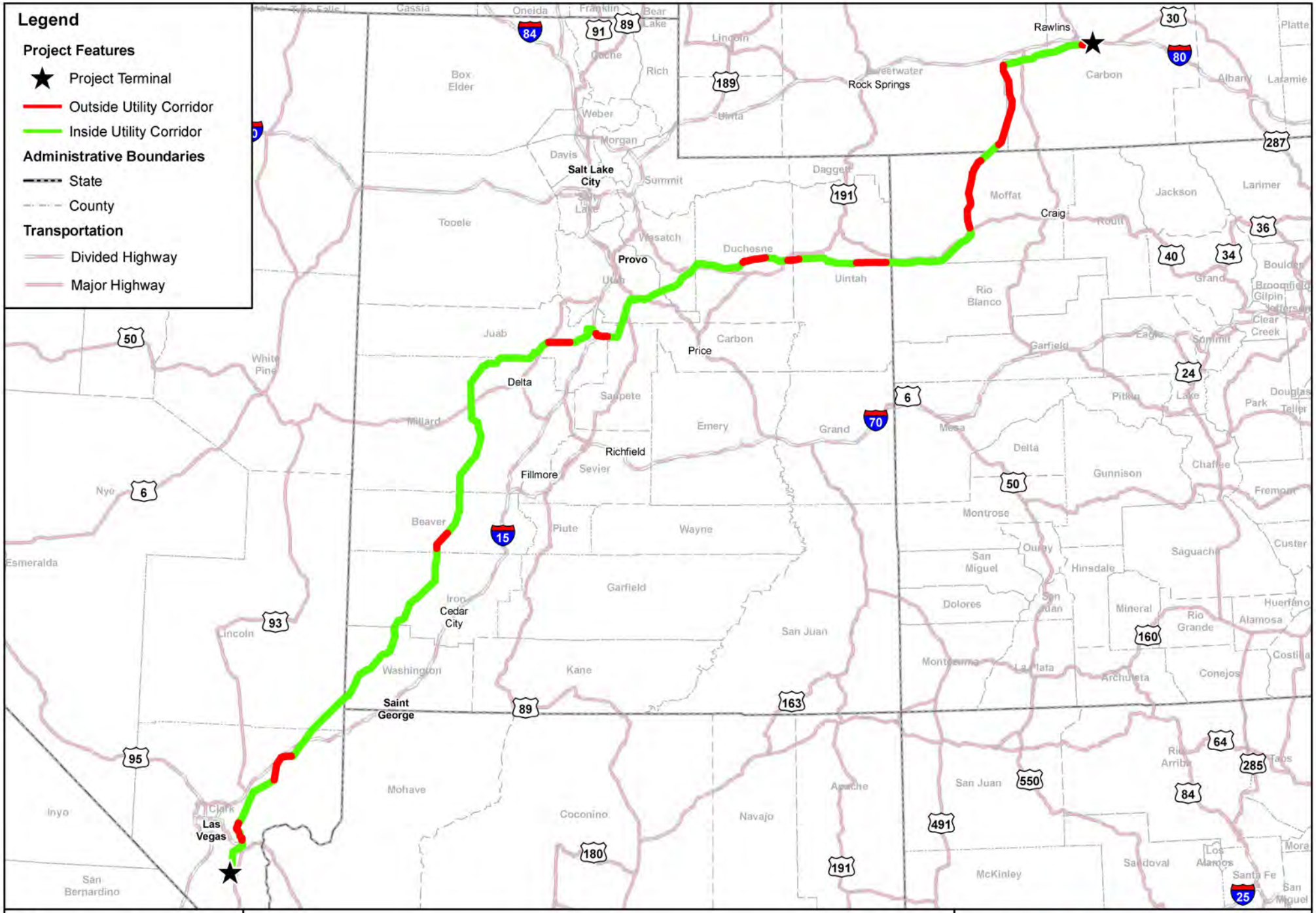
Reliability analysis examining the scenario where multiple lines are lost including the TWE Project has shown this loss will have a significant impact on transmission grid performance, including local and widespread transmission grid blackouts. This reliability analysis has found that the higher the capacity of the line lost along with the TWE Project, the more severe the transmission grid performance consequences. The reliability analysis also demonstrated that it is not feasible for the TWE Project and another transmission project to use common structures for any portion of the route.

The TWE Project Co-location framework outlined below provides for: (1) the application of TransWest's desired separation criteria; and (2) the selective use of a less stringent separation criteria depending on the circumstances. The framework utilizes two different separation distances, either a tower span distance of 1,500 feet or a tower height distance of 250 feet; separation distances in the framework are applied based on different variables including the TWE Project design, the voltage of the Adjacent Transmission Circuit(s), and the localized siting conditions and constraints. The 250 foot separation distance represents the absolute minimum separation distance for the TWE Project and other transmission lines of any voltage. The framework set out below addresses co-location requirements and implementation measures for three levels or situations: (1) standard co-location distances; (2) selective situational co-location distances; and (3) extreme situational co-location distances.

2.3.1.1 Level 1 – Standard Co-Location Distances

Level 1 represents the TWE Project separation criteria to be applied to the majority of situations involving Adjacent Transmission Circuits and is TransWest's preferred standard. Meeting Level 1 separation criteria is the most effective and prudent way to meet and exceed the Reliability Standards and WECC Regional Criteria. Level 1 will allow TransWest to meet its objectives for the TWE Project of providing 3,000 MW of transmission capacity while improving electrical grid reliability, and utilizing existing and designated utility corridors. Level 1 entails:

- Maintaining a separation distance of at least 1,500 feet between the TWE Project and transmission lines with a voltage rating of 345 kV and above, and
- Maintaining a minimum separation distance of at least 250 feet between the TWE Project and transmission lines with a voltage rating below 345 kV.



Map Exhibit 2
Proposed Route Utility Corridor Utilization
TransWest Express Transmission Project | October 2012 | DRAFT

POWER ENGINEERS
TRANSWEST EXPRESS LLC

2.3.1.2 Level 2 – Selective Situations Co-location Distances

Level 2 represents separation criteria that will be acceptable for limited portions of the TWE Project transmission line route depending on the situation. Level 2 can be utilized where impacts to highly sensitive resources or land use areas identified through the environmental analysis process can be effectively mitigated by using Level 2 co-location distances. Level 2 co-location distances would meet the Reliability Standards, but is less desirable than Level 1 given the increased impact on reliability. Consequently Level 2 would be applied selectively to only those portions of the route where the TWE Project would be co-located near 345 kV transmission lines and where the implementation of Level 2 would effectively mitigate potential impacts to highly sensitive resources or land use areas. Level 2 entails:

- Maintaining a separation distance of at least 1,500 feet between the TWE Project and transmission lines with a voltage rating above 345 kV, and
- Within selective areas of highly sensitive resources or land uses, maintaining a separation distance of at least 250 feet between the TWE Project and transmission lines with a voltage rating of 345 kV, and
- Maintaining a minimum separation distance of at least 250 feet between the TWE Project and transmission lines with a voltage rating below 345 kV.

2.3.1.3 Level 3 – Extreme Situations Co-location Distances

Level 3 represents separation criteria to be utilized only for very limited portions of the TWE Project transmission line route and only in extreme situations. For instance, Level 3 Extreme Situations Co-location Distances can be used where there are extreme physical or other siting constraints or where the environmental analysis identifies impacts that can be effectively mitigated with Level 3 co-location distances. Level 3 Extreme Co-location Distances would meet the Reliability Standards, but only if they are applied to the shortest possible distance and for a very limited number of times. System analysis has shown that outage of the TWE Project along with other 500 kV transmission lines would result in extreme consequences for the transmission grid in the form of widespread blackouts. The Level 1 Standard Co-location Distances for the TWE Project and other 500 kV lines reduces the likelihood of a failure of the transmission grid resulting in blackouts as compared to utilizing the 250 foot distance. The Reliability Standards require an examination of the possibility of single and multiple line failures and their potential impact on transmission grid performance. The Reliability Standards also require the development of additions to the grid, such as the TWE Project, to be designed in such a way to decrease the likelihood of these events occurring over the life of the project. The Level 1 Standard Co-location Distances meet this requirement for the TWE Project. Any deviation from the Standard Co-location Distances for the TWE Project and other 500 kV lines increases the likelihood of transmission grid blackouts from the loss of multiple lines. Therefore, the number and extent of these deviations need to be minimized to meet the Reliability Standards. Consequently, Level 3 Extreme Situations Co-location Distances would be applied very selectively for short distances where its implementation would effectively mitigate potential impacts to extreme physical or other siting constraints. Level 3 entails:

- Reducing the separation distance within areas of extreme physical or other siting constraints for as short a distance as practical and for only a limited number of occurrences to no less than 250 feet between the TWE Project and transmission lines with a voltage rating above 345 kV; and

- Within selective areas of highly sensitive resources or land uses, maintaining a separation distance of at least 250 feet between the TWE Project and transmission lines with a voltage rating of 345 kV, and
- Maintaining a minimum separation distance of at least 250 feet between the TWE Project and transmission lines with a voltage rating below 345 kV.

The Transmission Line Co-location Distances Framework for the TWE Project has been established based on preliminary reliability analysis in accordance with industry reliability standards. This analysis is ongoing and is subject to the review of WECC members. Therefore, if underlying assumptions used in the preliminary analysis are found to be inaccurate or if those assumptions change, then the minimum siting criteria for the TWE Project may need to be revised further.

2.3.2 Commercial Requirements

In addition to the NERC and WECC standards and guidelines, TransWest has identified a commercial need for the TWE Project to include the potential for a future interconnection with the IPP system. Planning for a possible interconnection will provide future flexibility for transmitting available renewable energy resources through the existing transmission grid if and when transmission capacity becomes available (TWE 2010b).

2.4 TWE Project History

The history of alternatives considered in early planning studies, and documented in the ROW Application SF 299 and POD submittals to BLM, is described below. Map Exhibits referenced in this PDTR section are located in Appendix B.

2.4.1 Alternatives Considered Early On (Pre-BLM Application Filings)

2.4.1.1 2006-2008 Electrical Transmission System Planning Studies

Electrical transmission system planning studies were initially undertaken in September 2006 to assist in identifying a range of alternatives for the TWE Project and other regional-scale transmission projects planned to facilitate the transmission of power to markets in the Desert Southwest region.

Pertinent early planning studies included:

- In 2007, the TWE Project was the subject of a Regional Planning Project Review (RPPR), conducted in accordance with WECC Planning Procedures. The purpose of the planning process was to review projects on a regional basis, using an open and transparent process to identify, and potentially reconfigure or combine, the proposed projects under review. This review was conducted jointly with the Energy Gateway South 500 kV Project, sponsored by PacifiCorp, doing business as Rocky Mountain Power, which was originally planned to start in Wyoming and terminate in southern Nevada. As a result of this review, the TWE Project was reconfigured to have the Northern Terminal moved from northeast Wyoming to south central Wyoming and the Southern Terminal moved from central Arizona to southern Nevada. The findings of the RPPR Conceptual Technical Report concluded that the TWE Project's proposed ±600 kV DC transmission system, coupled with Energy Gateway South's 500 kV AC Project, would serve the needs of the broader region of Utah, Arizona, Nevada and Southern California most cost effectively, while minimizing potential environmental impacts (TWE 2008a).

- The TWE Project was included in the study work performed as part of the Northern Tier Transmission Group (NTTG) 2007 Annual Planning Report (NTTG 2007). The NTTG is a sub-regional transmission group that, among other responsibilities, coordinates regional planning efforts in the Northwest and Mountain states.

- The TWE Project was included in the WestConnect 2008-2017 Transmission Plan. WestConnect is another sub-regional transmission group that coordinates regional planning efforts in Nevada, Arizona, New Mexico, and Colorado (WestConnect 2005).

2.4.1.2 2006-2008 Regional Corridor Studies

Initial regional corridor studies were conducted in 2006 (APS 2006). The study area extended from Wyoming to Arizona, including corridors in the states of Idaho, Utah, Colorado, Nevada, and New Mexico. Regional environmental studies were conducted during the same time period, using available secondary data. A series of preliminary corridors up to four miles wide, which had been identified as desirable by electrical system planners, were evaluated. Results of these studies indicated the general environmental feasibility of system planning alternatives.

A second regional corridor study was initiated in September 2007 to identify preliminary alternative transmission corridors for both the TWE Project and Energy Gateway South 500 kV Project. This study was completed in February 2008 (APS, et al. 2008) to document environmental constraints and opportunities within the region and to identify and refine potential alternative corridors that would meet the electrical system planning requirements of the TWE Project. During this study, a more detailed review of environmental data and federal land management plans was completed, as well as communication and consultation with federal agencies.

2.4.2 Transmission Corridors and Facility Sites Identified in BLM Application Filings

The TWE Project Preliminary ROW Application SF 299 submitted in 2007 initiated the BLM's review of the Project and NEPA compliance process. This section of the PDTR provides a chronology of the BLM filings for the TWE Project and documents the alternative corridors considered in those submittals (NGTSC 2007, TWE 2008b, TWE 2009, TWE 2010b and TWE 2010c). Map Exhibits B-1 to B-6 in Appendix B show the results of these early planning studies in relationship to the proposed and alternative corridors and reference lines.

- *TransWest Express Transmission Project, Preliminary ROW Application SF 299, November 2007 – prepared by National Grid.*

The Preliminary ROW Application SF 299 and preliminary POD submitted in November 2007 identified a broad array of potential alternative corridors, extending between east-central Wyoming and central Arizona. These alternatives had been identified through the APS 2006 corridor studies. The proposed corridor extended approximately 1,300 miles. Map Exhibit B-1 shows the proposed and alternative corridors associated with the November 2007 application. At that point in the planning process, both AC and DC transmission systems were under study; and alternative corridors were typically four miles wide.

- *TransWest Express Transmission Project, Preliminary ROW Application SF 299, December 2008 and Preliminary POD, January 2009 (Amended from November 2007) – prepared by TransWest Express LLC.*

TransWest acquired the TWE Project in 2008 and filed an amended Preliminary ROW Application SF 299 with the BLM Wyoming State Office for a ±600 kV DC transmission line in December 2008. The amended preliminary POD was subsequently submitted in January 2009. The Project area was amended to extend between renewable energy sources in south-central Wyoming and southern Nevada, where Project power could connect to transmission systems for load centers in the southwest. A proposed corridor and seven corridor alternatives were addressed in the amended Preliminary ROW Application SF 299. The proposed TWE Project corridor was routed to follow designated energy corridors to the greatest extent possible, including those designated by the DOE in November 2008 as WWEC, pursuant to Section 368 of the Energy Policy Act of 2005; and corridors identified by the BLM and the USFS in their respective land management plans (various dates).

Alternatives shown in the December 2008 Preliminary ROW Application SF 299 incorporated pre-scoping alternatives that were under review by the BLM at the time. Preliminary reference lines for corridors were defined based on available information on environmental constraints (APS 2006), designated energy corridors, existing utilities and transportation systems, and land ownership. Map Exhibits B-2 and B-3 show the proposed and alternative reference lines and six mile-wide corridors from the December 2008 Preliminary ROW Application SF 299.

- *TransWest Express Transmission Project, Preliminary ROW Application SF 299 (Amended from December 2008) January 2010 - prepared by TransWest Express LLC.*

In January 2010, TransWest submitted an amended Preliminary ROW Application SF 299 to provide additional information and clarifications regarding the TWE Project purpose and need, and proposed Project facilities. The amended Preliminary ROW Application SF 299 identified the need to provide for a potential interconnection with IPP near Delta, Utah. Based on TransWest's review of the BLM's October 2009 alternative route segments, which were under review by BLM as part of the pre-scoping process with federal, state, and local cooperating agencies, TransWest recommended that certain route segments be eliminated from further consideration because they would not facilitate an interconnection with IPP. These eliminated segments included: U125, U190, U195, U225, U230, U235, U240, and U245. Concurrently, TransWest recommended that several route segments, which BLM had eliminated early on from consideration, be reconsidered, specifically segments U781, U784, and U785 (TWE 2010d). In June 2010, TransWest further recommended that alternative routes N35A, N40A, and N90A also be eliminated, based on routing congestion in Nevada (TWE 2010e). Map Exhibits B-4 and B-5 show the proposed and alternative routes from the January 2010 amended Preliminary ROW Application SF 299, which includes some of these route segment eliminations.

- *TransWest Express Transmission Project, Preliminary POD (Amended from January 2009) July 2010 - prepared by TransWest Express, LLC.*

The proposed and alternative TWE Project corridors and preliminary reference lines were subsequently refined in 2010. At the request of BLM, TransWest provided recommendations to BLM and Western on the refinement of corridors and revisions to reference lines (POWER 2010).

Corridors were generally recommended to be reduced in width from six miles to two miles based on pre-scoping agency input and known environmental constraints. The reference lines were refined,

based on the most current available information on environmental constraints and engineering criteria. Updated information included, but was not limited to, proposed wilderness areas identified in the Colorado Wilderness Act of 2009, updated sage-grouse lek data for Wyoming, and more precise data on the locations of existing utilities. Recommendations on the narrowed corridors and revised preliminary reference lines were submitted to BLM as part of the amended preliminary POD in July 2010. The amended POD also provided additional information on TransWest's ancillary facilities, NERC standards, WECC criteria for transmission reliability and line separation, and TransWest's committed mitigation measures. Map Exhibit B-6 illustrates the July 2010 refined corridors.

- *TWE Project Corridor Reference Line Refinements - March 2011*

In March 2011, further refinements to the TWE Project proposed and alternative corridor reference lines were submitted to BLM (TWE 2010f). Refinements were made to the corridor reference lines, where necessary, to ensure the DEIS alternatives would meet TransWest's updated line separation criteria (TWE 2010a, 2010f). All reference line adjustments were made within the boundaries of the corridors presented by BLM and Western during public scoping.

- *TransWest Express Transmission Project, Preliminary ROW Application SF 299 (Amended from January 2010) – August 2011 - prepared by TransWest Express LLC.*

In August 2011, TransWest submitted a letter that amended the Preliminary ROW Application SF 299 to incorporate corridors supported by certain counties in Wyoming, Colorado and Utah. By Joint Resolution Regarding Preferred Power Line Corridors between the Boards of County Commissioners of Moffat County, Colorado; Carbon County, Wyoming; and Sweetwater County, Wyoming adopted in July 2011, the counties expressed their preference that the TWE Project transmission line follow the Old Dad Road corridor in Wyoming, and the Seven Mile Ridge corridor in Colorado. TransWest supported siting of the transmission line in both of these corridors and revised its Proposed Action to incorporate the Old Dad Road corridor in Carbon and Sweetwater Counties and the Seven Mile Ridge corridor in Moffat County as TransWest's proposed route. By Joint Resolution Regarding Preferred Power Line Corridors between the Boards of County Commissioners of Millard, Utah, and Juab counties, Utah adopted in August 2011, the counties expressed their preference that the TWE Project transmission line follows the UNEV route in Juab County and the West Wide Corridor in Millard County. TransWest supported siting of the transmission line in these corridors and revised its Proposed Action to incorporate the UNEV route in Juab County and the West Wide Corridor in Millard County.

- *TransWest Express Transmission Project, Preliminary ROW Application SF 299 (Amended from August 2011) – August 2012 - prepared by TransWest Express LLC.*

In August 2012, TransWest submitted a letter that amended the Preliminary ROW Application SF 299 to eliminate System Alternative 1 from further consideration. As stated in the ROW Application, System Alternative 1 would be required if interconnections with PacifiCorp's planned 500 kV system, which consists of the Energy Gateway West and Energy Gateway South Projects could not be made near the TWE Project Northern Terminal. TransWest has requested interconnections with PacifiCorp's existing 230 kV system and planned 500 kV system in Wyoming. To best utilize existing and planned transmission infrastructure and to minimize environmental impacts associated with building additional infrastructure, TransWest is seeking the shortest possible interconnection distance between the TWE Project and PacifiCorp's system. Therefore, the need for System Alternative 1 has been dependent on the design, construction and routing of the Energy Gateway

Projects in south-central Wyoming. TransWest understands that all routing alternatives under consideration for the Energy Gateway Projects are located within the Interstate 80 (I-80) corridor between Fort Steel and Rawlins, Wyoming. Placing the Energy Gateway Projects in the I-80 corridor facilitates interconnection with the TWE Project Northern Terminal and eliminates the need for System Alternative 1. In addition, locating the Energy Gateway Projects within the I-80 corridor complies with BLM's policy to avoid proliferation of ROW and has the least cumulative impacts.

- *TransWest Express Transmission Project, Preliminary ROW Application SF 299 (Amended from August 2012) – October 2012 - prepared by TransWest Express LLC.*

TransWest submitted a letter that amended the Preliminary ROW Application SF 299 to modify the Southern Terminal siting area to exclude certain lands with a conservation easement and other lands for which there may be development conflicts and to include a feasible location for the TWE Project Southern Terminal on lands administered by the BLM within the Eldorado Valley near Boulder City, Nevada. The ROW application describes the Southern Terminal as being located on private land. After review of the siting constraints and opportunities for the Southern Terminal, TransWest has modified the terminal siting area to exclude the Multi-Species Habitat Conservation Easement and to include a portion of BLM land immediately east of the existing transmission line corridor running directly north of the existing 500 kV substations. This area has been added due to reduction of the area within the conservation easement and the congestion caused by the existing and potential transmission facilities that may be sited within the area. The BLM administered portion of the Southern Terminal siting area provides a site that is in alignment with the Applicant Proposed Route, will avoid the need for additional line crossings and has adequate terrain. Map Exhibit 4 shows the modified terminal siting area and the potential location of the terminal site on BLM land.

2.4.3 System Alternatives Identified by Applicant

A range of system configurations has been evaluated for the TWE Project. TransWest identified three system alternatives in the *TransWest Express Transmission Project ROW Application SF 299 (Amended from December 2008) January 2010*, which may have the potential to meet the TWE Project purpose and need (TWE 2010b). In August 2012, TransWest submitted an amendment to this application eliminating System Alternative 1 from further consideration in the EIS (TWE 2012). Consideration of the remaining System Alternatives 2 and 3 in the NEPA process would provide the TWE Project flexibility to adapt to potential regional transmission system changes, which could occur in the next two to three years. The feasibility of these system alternatives depends on future permitting decisions for other regional systems and/or future energy and transmission market conditions. System alternatives are described in PDTR Section 4.3.

3.0 PROJECT DESCRIPTION

Sections 3.1 through 3.4 describe the typical design characteristics for the proposed TWE Project facilities:

- Section 3.1 – the TWE Project ±600 kV DC Transmission Line, including structure designs and foundations, conductors, insulators and associated hardware, overhead shield (ground) wires, grounding rods, and minor hardware; and grid interconnection lines.
- Section 3.2 – the TWE Project Northern and Southern Terminals, including the AC/DC converter stations, and substation equipment.
- Section 3.3 – the TWE Project ground electrode systems, including the ground electrode facilities and low voltage electrode connector line(s).
- Section 3.4 – the TWE Project communications system for command and control of the transmission system.

Sections 3.5 describes the construction practices that would be performed for the TWE Project, including standard construction activities, schedules and equipment/manpower requirements, and special construction practices which will be used in selective or sensitive environments.

Section 3.6 discusses operation and maintenance practices for the TWE Project, including routine maintenance and vegetation management of the transmission line ROWs, emergency response, fire protection, and ROW safety requirements.

Section 3.7 summarizes the TWE Project mitigation measures, which are part of the proposed TWE Project Description, and would be common to all the DEIS Alternatives.

3.1 TWE Project ±600 kV DC Transmission Line

The TWE Project proposed ±600 kV DC transmission line will be approximately 725 miles long, located in a ROW 250 feet wide. The design characteristics of the ±600 kV DC transmission line are summarized in Table 1 and are described in this section.[2]

TransWest has determined that a ROW width of 250 feet is sufficient for the long-term maintenance and operation of the transmission line and will accommodate any of the transmission structure designs under consideration. Increased ROW width may be required in a small number of site specific locations to accommodate rough terrain or unusually long spans. These exceptions will be identified and addressed on a case-by-case basis during final design and engineering of the transmission line. ROW width for the TWE Project is based upon engineering studies that considered:

- Structure configuration (horizontal vs. vertical configurations), pole spacing, and insulator configuration (I-string vs. V-string insulator configurations)

[2] Short segments of 500 kV AC and 230 kV AC transmission lines will be required near the Northern and Southern Terminals to connect to the existing and planned regional transmission grid. The design characteristics of these transmission structures are described in Section 3.1.8.

- Operating voltage, elevation and clearance criteria (National Electrical Safety Code (NESC) and project-specific)
- Conductor size, weight, number and configuration of conductors in the bundle, tensions, and sag
- Span length between structures and conductor blowout (conductor movement envelope under pre-defined wind conditions)
- Structure footprint (guyed vs. self-supported), terrain and maintenance access (space requirements for maintenance equipment at each structure site)
- Audible noise levels at the edge of the ROW
- Potential co-location with buried underground high pressure natural gas and other petroleum pipelines within the same corridor. The DC transmission line can be located in its ROW adjacent to the ROW for such pipelines.

TABLE 1 TYPICAL ±600 KV DC TRANSMISSION LINE DESIGN CHARACTERISTICS

FEATURE	DESCRIPTION
Physical Properties	
Line Length	Would vary by routing alternative.
Structure Design	Proposed Structure Design: guyed steel lattice; Alternative Structure Designs: self supporting steel lattice, tubular steel poles
Structure Height	Guyed steel lattice -120 to 180 feet; self supporting steel lattice -120 to 180 feet; tubular steel poles - 100 to 150 feet
Span Length	Guyed lattice - 900 to 1,500 feet; self supporting steel lattice - 900 to 1,500 feet; tubular steel poles - 700 to 1,200 feet
Number of Structures per Mile	Four to eight - depending on structure type, terrain, and other factors to be identified through detailed design studies
ROW Width	250 feet; Increased ROW may be required in a small number of site specific locations to accommodate rough terrain or unusually long spans
Land Temporarily Disturbed	
Structure Work Area	ROW width x 200 feet per structure
Wire-Pulling and Tensioning Sites	ROW width x 500 feet for dead-end structure (two sites at all dead-end structures) ROW width x 500 feet for mid-span conductor and shield wire (approximately every 9,000 feet) 100 x 500 feet for fiber optic cable set-up sites (approximately every 18,000 feet)
Material Storage Yards	Located approximately every 30 miles Typical material storage yard area: approximately 20 acres
Staging Areas / Fly Yards	Located approximately every 5 miles. Typical fly yards/staging areas: approximately 7 acres
Batch Plant Sites	Located approximately every 15 miles Stand-alone temporary batch plants, estimated size: approximately 5 acres
Guard Structures	100 x 100 feet at road and existing electrical line crossings
Land Permanently Disturbed	
Structure Base[3]	Guyed lattice (tangent) - 500 square feet (100 square feet mast foundation + 4 x 100 square feet for anchors) Self Supporting Lattice (tangent) - 900 square feet (30 x 30 feet tower base)

[3] Structure types to be used in site-specific settings will be determined during engineering and design of the Agency Preferred Alternative.

TABLE 1 TYPICAL ±600 KV DC TRANSMISSION LINE DESIGN CHARACTERISTICS	
FEATURE	DESCRIPTION
	Self Supporting Lattice (angle) - 1,225 square feet (35 x 35 feet tower base) Self Supporting Lattice (dead-end) - 1,600 square feet (40 x 40 feet tower base) Tubular Steel Pole (tangent) - 40 square feet (7-foot diameter foundation) Tubular Steel Pole (dead-end/angle) - 100 square feet (two poles x eight-foot diameter foundations)
Regeneration Sites	Located approximately every 50 miles, most located on the transmission line ROW and each approximately 10,000 square feet (100 x 100 feet).
Access Roads	
Paved Roads	These roads are typically highways and state routes, and will be used for travel to existing and new dirt roads to access the ROW.
Dirt/Gravel Roads (no improvement)	Requires no improvement to dirt/gravel roads.
Dirt Road (with improvements)	Improvement of existing dirt roads 16 to 24 feet wide depending on terrain.
New Access Road (bladed)	Typically, 14 foot wide bladed surface with two to three foot berms or ditches on either side, but can be wider in steep and mountainous terrain because of cut and fill requirements according to ground slope.
Overland Access	Non-graded overland access ("drive & crush") where terrain and soil conditions are suitable.
Electrical Properties	
Nominal Voltage	±600 kV DC
Nominal Capacity	3,000 MW (as measured at the Southern Terminal)
Circuit Configuration	DC Bi-Pole Bundled
Conductor Size	Approximately 1.5 inch diameter ACSR conductor bundled with three or four subconductors per pole.
Ground Clearance of Conductor	37 feet minimum at a conductor temperature of 176 degrees Fahrenheit
Notes: ACSR = aluminum conductor steel reinforced	

3.1.1 Structure Designs

The TWE Project ±600 kV DC transmission line will be constructed primarily with guyed lattice structures (Figure 1). Self supporting steel lattice and single shaft tubular steel poles (Figures 2 and 3) would be used in selective locations where engineering or other site-specific considerations determine that the guyed lattice steel structure is not appropriate. Table 2 indicates the general suitability of the transmission structure designs by characteristic settings. Figure 4 shows each structure design within a typical 250 foot-wide ROW.

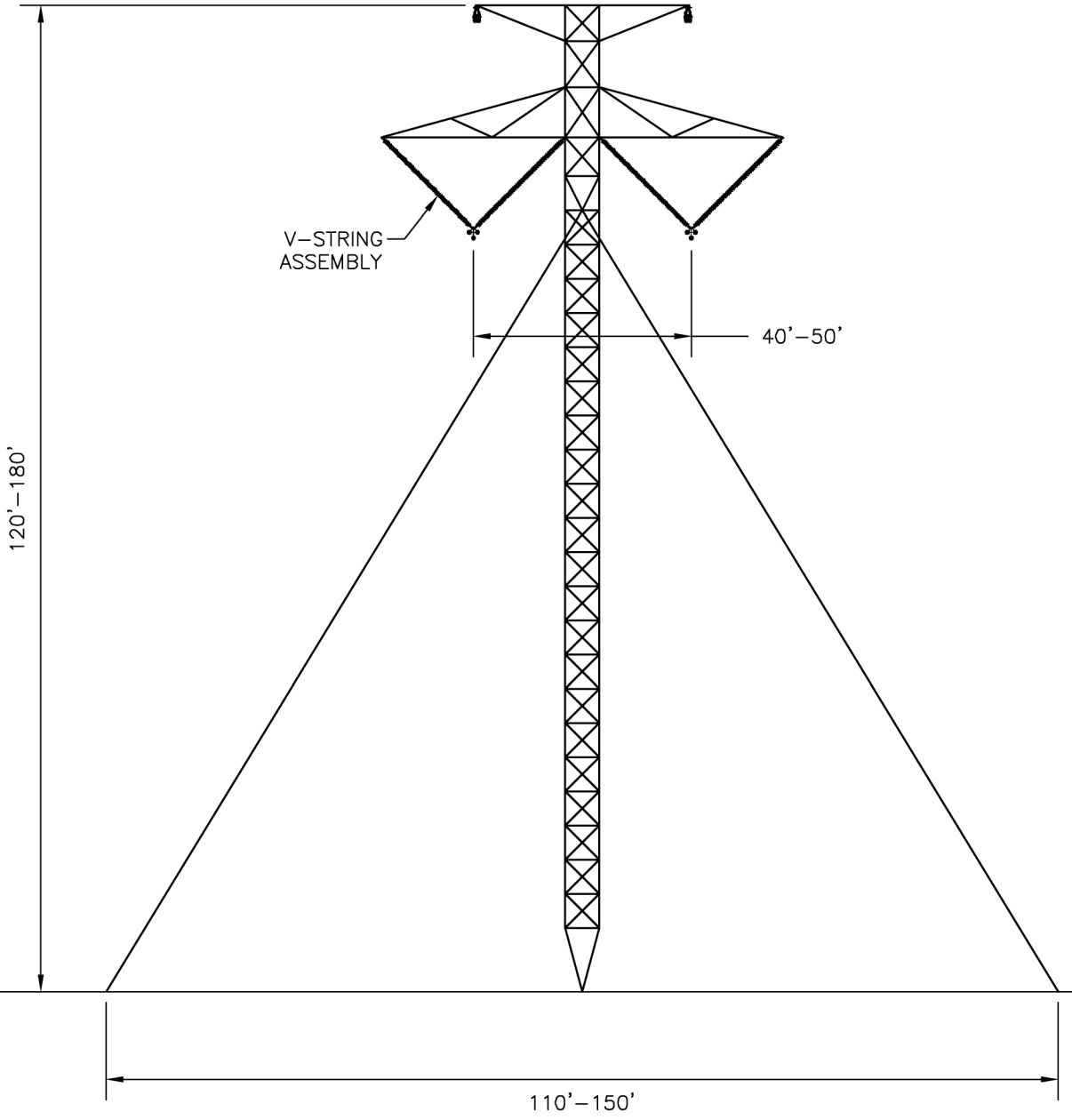
The guyed lattice structure shown on Figure 1 is the proposed tangent design for most locations due to its constructability and overall cost considerations. In addition to tangent structure configurations, specialized structures will be engineered wherever the line must change direction. Each angle structure will be individually designed, taking into consideration both the degree of the angle and site-specific geologic conditions, to withstand the increased lateral stress of conductors pulling in two different directions. Angle structures are stronger and have deeper foundations than tangent structures. The term 'dead-end' or 'strain' structure typically refers to a structure where the conductors are separated and connected together (electrically) by a jumper. These dead-end structures are typically placed at locations where the transmission line significantly changes direction.

The TWE Project will be designed in accordance with guidelines established by the Avian Powerline Interaction Committee (APLIC 1994, 2006).

TABLE 2 ±600 KV DC TRANSMISSION LINE DESIGN ALTERNATIVES POTENTIALLY USED IN CHARACTERISTIC SETTINGS

CHARACTERISTIC SETTING	GUYED STEEL LATTICE	SELF SUPPORTING STEEL LATTICE	TUBULAR STEEL POLE
Flat to Rolling Terrain	X		
Steep to Mountainous Terrain & Steep Side Slopes	*	X	X
Open Lands	X		
Agricultural Fields, Urban Areas		X	X
Highly constrained ROW			X
Line Angle 0-2°	X		
Heavier Line Angles and Dead-end Strain Structures		X	X

* Should helicopter erection of structures be preferred or required, guyed lattice steel structures may be utilized in steep to mountainous terrain as long as specific structure locations do not have excessively steep side slopes.



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. TOWER OUTLINE AND BRACINGS ARE INDICATIVE ONLY.

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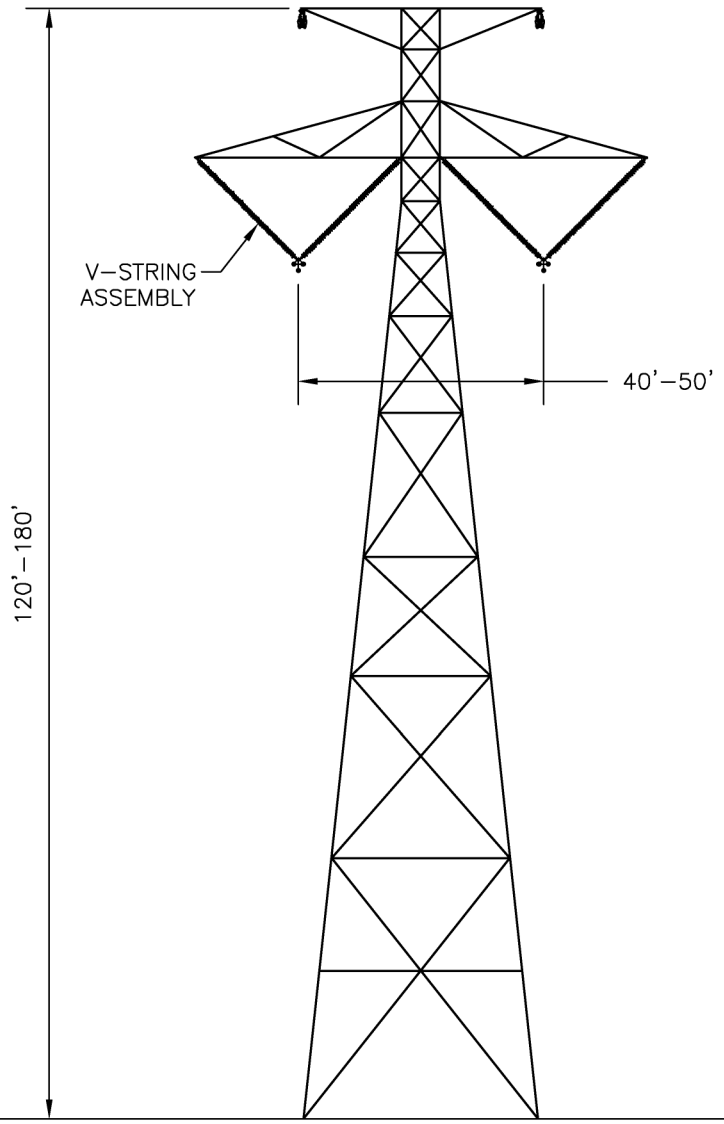
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 1

TYPICAL ±600kV DC
GUYED V–STRING
LATTICE STRUCTURE



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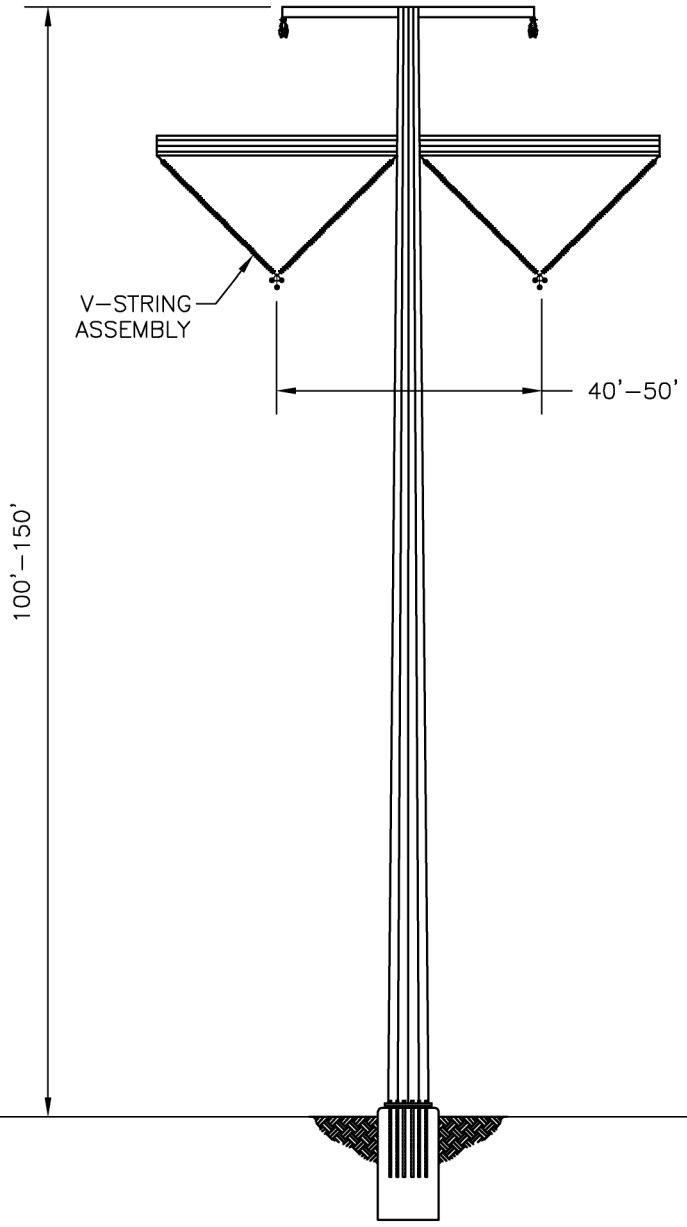
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 2

TYPICAL ±600kV DC
SELF SUPPORTING LATTICE
V–STRING STRUCTURE



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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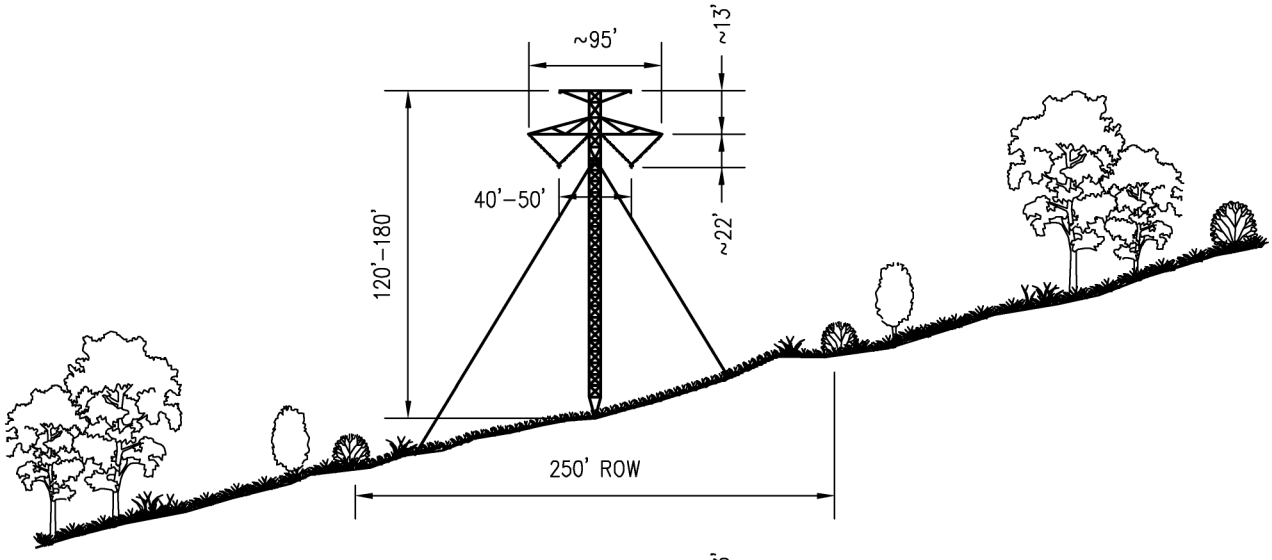
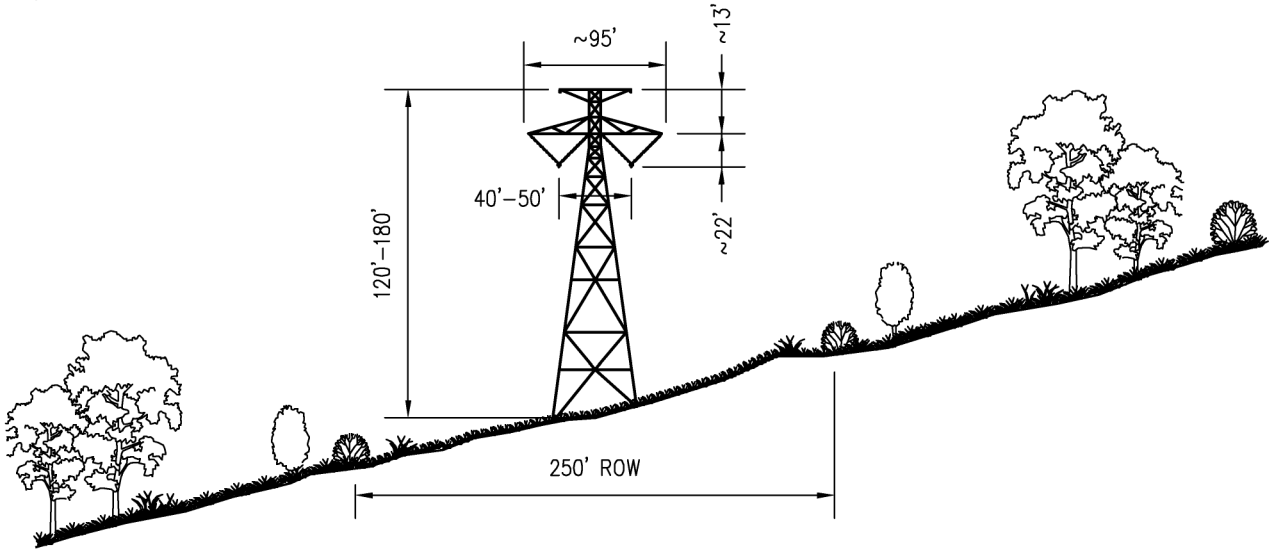
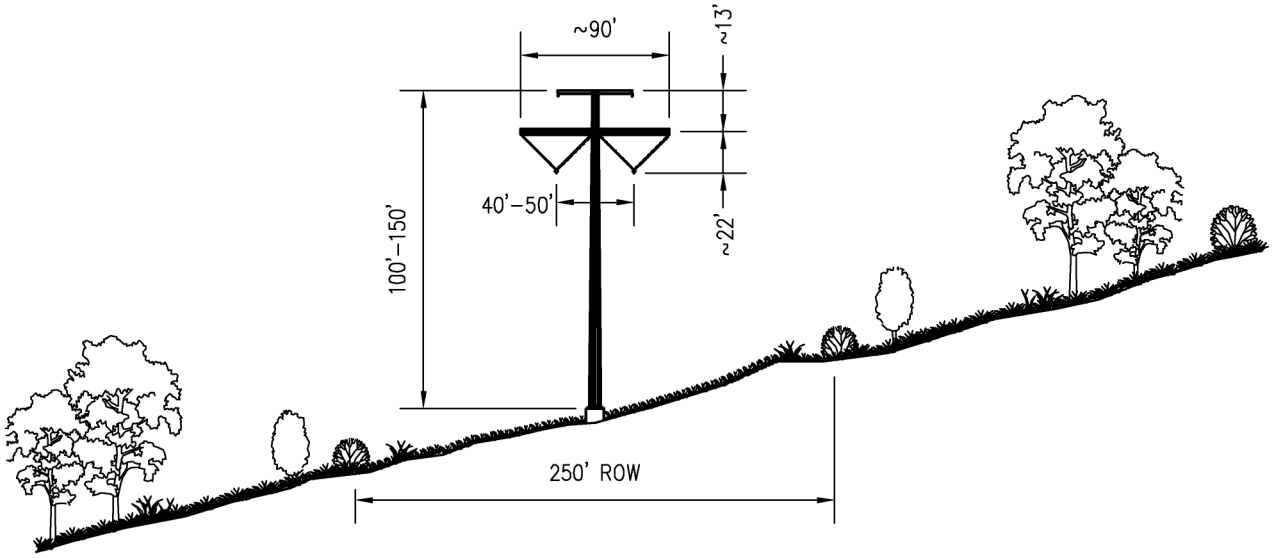
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 3

TYPICAL ±600kV DC
TUBULAR STEEL POLE
V–STRING STRUCTURE







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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 4

TYPICAL ROW CROSS SECTIONS
BY STRUCTURE TYPE

3.1.2 Structure Foundations

The guyed steel lattice towers will generally require one precast concrete support pedestal for the tower base and four anchors for guy cables. The typical precast concrete support pedestal will be three to six feet in diameter and four to six feet in depth. Due to site-specific characteristics, some foundations may require a cast-in-place reinforced concrete support pedestal. The anchors for attachment of the guy cables will be plate anchors or rock anchors depending on soil/rock conditions at each site.

Self supporting lattice towers will require four foundations with one foundation on each of the four corners (legs) of the lattice towers. The foundation diameter and depth will be determined during final design and are dependent on the type of soil or rock present at each specific site. Typically, the foundation for each leg of the structure will be a reinforced cast-in-place concrete drilled pier, with a typical diameter of three to four feet and a depth of approximately 12 to 25 feet. Foundations for dead-end and angles structures will be larger, typically ranging from five to eight feet in diameter and 20 to 50 feet in depth.

Tubular steel pole towers will require one cast-in-place foundation. These tubular steel towers will be installed on a single reinforced concrete pier with anchor-bolts connecting the tubular pole base plate to the foundation. The foundation diameter and depth will be determined during final design and are dependent on the type of soil or rock present at each specific site. Foundations for these structures will typically be six to ten feet in diameter and 20 to 60 feet in depth.

3.1.3 Conductors

Design Characteristics. The proposed conductor for the TWE Project ±600 kV DC transmission line is an ACSR (Aluminum Conductor Steel Reinforced) conductor approximately 1.5 inches in diameter. Each pole of the ±600 kV bipole[4] line will be composed of three or four subconductors in a triple-bundle or quad-bundle configuration. The individual conductors will be bundled in either a triangular configuration (triple-bundle) or a diamond configuration (quad-bundle) with spacing of approximately 18 inches between subconductors. The bundled configuration is proposed to provide adequate current carrying capacity and to provide a reduction in audible noise and radio interference as compared to a single large-diameter conductor. Each ±600 kV subconductor will have a non-specular finish[5].

Ground Clearance Requirements and Guidelines. Conductor phase-to-phase and phase-to-ground clearance parameters are determined in accordance with the NESC, ANSI C2, produced by the American National Standards Institute (ANSI). The NESC provides for minimum distances between the conductors and ground, crossing points of other lines and the transmission support structure and other conductors, and minimum working clearances for personnel during energized operation and maintenance activities. The clearance requirements for conductor heights above ground are based on the current and potential use of the land being crossed. The clearance requirements for vertical separation at crossings over existing transmission lines are governed by NESC 2007 Rule 233. In addition to the minimum NESC requirements, additional clearances or buffers are added to account

[4] A bipole HVDC transmission line consists of two poles – positive and negative. A pole may consist of one conductor or multiple conductors (i.e., subconductors) bundled together.
[5] Non-specular finish refers to a "dull" finish rather than a "shiny" finish.

for additional safety, construction tolerances, wire movements, wire temperatures, and landowner or land use specific requirements.

The minimum ground clearance for the TWE Project ±600 kV DC conductor is 37 feet at a conductor temperature of 176 degrees Fahrenheit. For a ±600 kV DC transmission line, the minimum conductor heights will typically range from 37 feet for range lands to 50 feet or more above railroad tracks. Clearances above highways would typically be 40 to 50 feet. Lands with center pivot irrigation or lands that are aerially sprayed would typically use a minimum ground clearance of 37 feet. The exact clearance criteria for each type of land use and each type of facility being crossed will be determined during detailed design.

The clearance requirements for vertical separation at crossings over existing transmission lines are also governed by NESC 2007 Rule 233. In addition to the minimum NESC requirements, additional clearances or buffers are added to account for additional safety, construction tolerances, wire movements, differential wire temperatures, and utility specific requirements. The vertical separation typically ranges from approximately 25 feet for distribution and lower voltage lines to approximately 50 feet or more for 500 kV extra high voltage (EHV) or HVDC lines. The exact clearance criteria for each voltage class being crossed will be determined during detailed design.

Standard industry practice suggests that the higher voltage line would cross over the lower voltage line. This standard would be followed at the line crossing locations in coordination with each facility owner or manager. To optimize the crossing structure heights, the line crossing locations are typically at mid-spans of the lines being crossed and at right angles to each other. Depending on the terrain and heights of the facility being crossed, taller structures for the TWE Project transmission line may be required at the line crossing locations. Guard structures will be installed, if required, to protect underlying wires and structures during wire stringing operations. These structures intercept the wire should it drop below a conventional stringing height, preventing damage to underlying wires and structures. In addition to guard structures, during construction, the Contractor for the TWE Project will be required to coordinate with the owner or operator of the line being crossed to comply with outage and other utility-specific requirements.

Due to the static nature of DC electrical and magnetic fields, the proposed DC transmission line will not induce any current in oil and gas well heads. The HVDC transmission line will be sited such that oil or gas wellheads, and associated above ground facilities at the wellhead, will not be located on the transmission ROW. Additionally, a 250-foot buffer from oil and gas wellheads will be used as a siting criteria for locating the final centerline of the ±600 kV HVDC transmission line.

3.1.4 Insulators and Associated Hardware

As shown in Figures 1, 2, and 3, insulator assemblies for ±600 kV DC tangent structures will consist of two strings of insulators normally in the form of a "V." These insulator strings are used to suspend each conductor bundle (pole) from the structure, maintaining the appropriate electrical clearance between the conductors, the ground, and the structure. The V-shaped configuration of the ±600 kV DC insulators also restrains the conductor so that it will not swing into contact with the structure in high winds. Dead-end insulator assemblies for ±600 kV DC transmission lines will use an I-shaped configuration, which consists of insulators connected horizontally from either a tower dead-end arm or a dead-end pole in the form of an "I." Individual insulators for both suspension and dead-end applications will be composed of a single unit polymer (non-ceramic insulators).

3.1.5 Overhead Shield (Ground) Wires

To protect the ±600 kV DC transmission line from direct lightning strikes, two lightning protection shield wires, also referred to as ground wires, will be installed on the peaks or top arms of each structure. Electrical current from lightning strikes will be transferred through the shield wires and structures into the ground.

One of the shield wires will be composed of extra high strength steel wire approximately 0.5 inch in diameter. In short sections of the transmission line, near the terminals, this shield wire will also serve as the overhead electrode line connecting the AC/DC converter station to the ground electrode facility. The second shield wire will be an optical ground wire (OPGW) constructed of aluminum and steel, which will carry 36 to 48 glass fibers within its core. The optical ground wire will have a diameter of approximately 0.65 inch. The glass fibers inside the OPGW will facilitate data transfer between the two AC/DC converter stations at the Northern and Southern Terminals. The data will be used for system control and monitoring.

3.1.6 Grounding Rods

A grounding system will be installed at the base of each transmission tower and will consist of copper ground rods embedded in the ground in immediate proximity to the tower foundation, and connected to the tower by a buried copper lead. After the ground rods have been installed, the grounding will be tested to determine the resistance to ground. If the resistance to ground for a transmission tower is excessive, then counterpoise will be installed to lower the resistance. Counterpoise consists of a bare copper-clad or galvanized-steel cable buried a minimum of 12 inches deep, extending from one or more legs of a tower for approximately 100 feet within the ROW.

3.1.7 Minor Additional Hardware

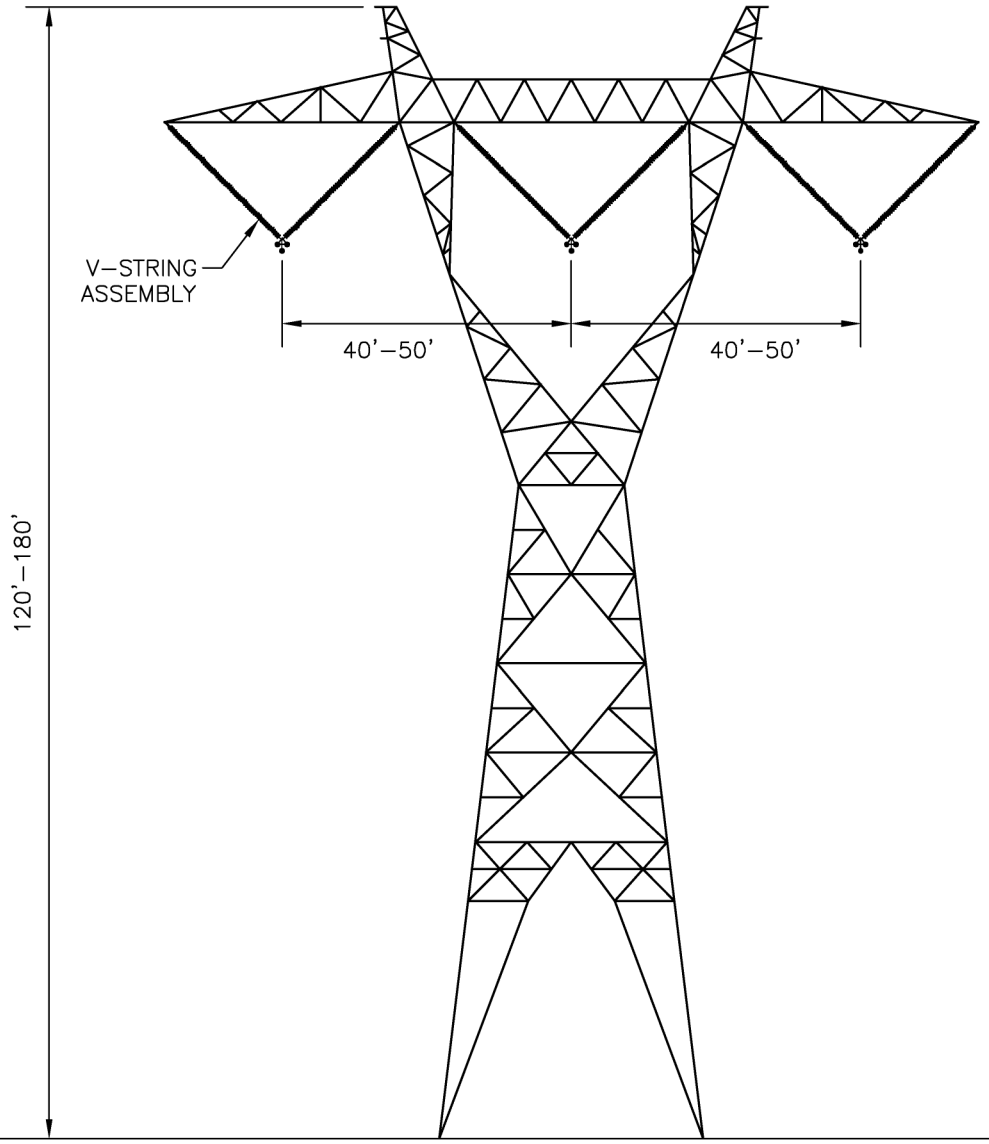
In addition to the conductors, insulators, and overhead shield wires, other associated hardware will be installed on the structures as part of the insulator assembly to support the conductors and shield wires. This hardware will include clamps, shackles, links, plates, and various other pieces composed of galvanized steel and aluminum.

Other hardware not associated with the transmission of electricity may be installed as part of the Project. This hardware may include aerial marker spheres or aircraft warning lighting as required for the conductors or structures per Federal Aviation Administration (FAA) regulations.[6] Tower proximity to airports and tower height are the determinants of whether FAA regulations would apply based on an assessment of wire/tower strike risk. The Applicant does not anticipate that tower lighting will be required because proposed towers will be less than 200 feet tall and will be located to the greatest extent to avoid airport impacts. However, if special circumstances (e.g., a tall crossing) require structures taller than 200 feet, FAA regulations regarding lighting and marking will be followed.

[6] U.S. Department of Transportation, Federal Aviation Administration, Advisory Circular AC 70/7460-1K Obstruction Marking and Lighting, August 1, 2000; and Advisory Circular AC 70/7460-2K Proposed Construction or Alteration of Objects that May Affect the Navigable Airspace, March 1, 2000.

3.1.8 Grid Interconnections

The TWE Project will need to connect to planned or existing 500 kV and 230 kV transmission grids in Wyoming and to existing 500 kV transmission grids in Nevada, near each terminal. Specific structure types are not known at this time and will be determined during final engineering and design. A typical self supporting lattice structure, used for a single circuit 500 kV AC line connection, is shown on Figure 5. Typical single circuit and double circuit 230 kV AC single pole structures are shown on Figure 6. The components for the 500 kV and 230 kV structures including foundations, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, are similar to those described for the ±600 kV DC transmission line.



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.
2. TOWER OUTLINE AND BRACINGS ARE INDICATIVE ONLY.

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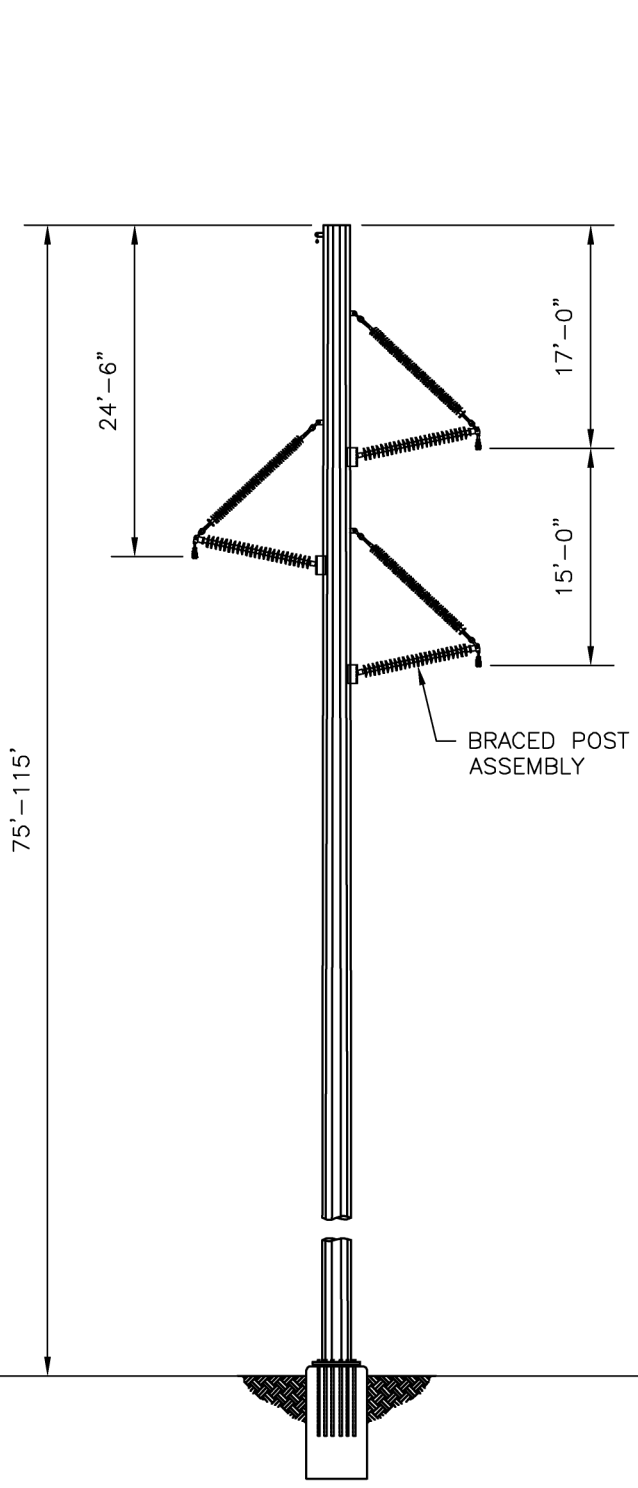
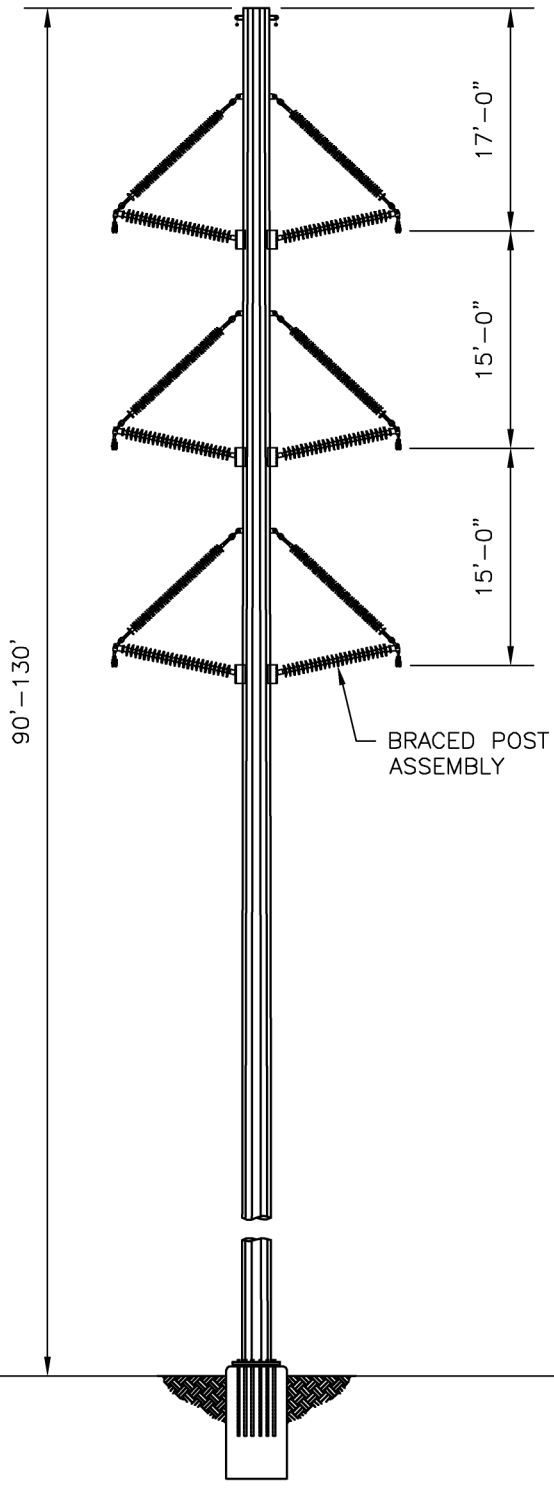
FIGURE 5

TYPICAL 500kV AC SINGLE CIRCUIT
SELF SUPPORTING
LATTICE STRUCTURE





NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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FIGURE 6

TYPICAL 230kV AC SINGLE & DOUBLE CIRCUIT POLE STRUCTURE

3.2 Northern and Southern Terminals

The terminal stations will be designed to include the AC/DC converter station and an adjacent AC substation. The AC/DC converter station will include a ±600 kV DC switchyard, AC/DC conversion equipment, transformers, and multiple equipment, control, maintenance and administrative buildings. There will be two buildings to house the AC/DC conversion equipment, each approximately 200 feet long by 80 feet wide by 60 to 80 feet high. Additionally, there will be smaller buildings to house the control room, control and protection equipment, auxiliary equipment, and cooling equipment. The AC substations will be either a 500/230 kV substation (Northern Terminal) or a 500 kV substation (Southern Terminal). The AC substations will include a switchyard, transformers, control equipment, and control buildings. Figure 7 is a photograph of a representative AC/DC terminal (converter station and adjacent AC Substation).

FIGURE 7 TYPICAL AC/DC CONVERTER STATION

Table 3 summarizes the general design characteristics of the terminals.

TABLE 3 TYPICAL DESIGN CHARACTERISTICS OF TERMINALS

FEATURE	DESCRIPTION
Northern Terminal	Six 500 kV AC line positions, two 500/230 kV transformer banks, twelve 230 kV line positions, two AC filter bank line positions, two reactive support device positions, two DC line positions with transformers, converter building(s), and AC and DC filter yards. The reactive support equipment will require other structures and building development within the proposed complex. Maintenance and storage facilities will be developed as required and as appropriate for this remote location. Certain assigned shift operators, maintenance staff, and site security staff may be on-site at all times, although no permanent residence(s) will be established. On-site fire protection and emergency/security staff will support operations and maintenance staff at the facility in accordance with state, county, and federal requirements.
Southern Terminal	Six 500 kV AC line positions, two 500 kV AC filter line positions, two DC line positions with transformers, converter building(s), and AC and DC filter yards. Maintenance and storage facilities will be developed as required and as appropriate for this remote location. Certain assigned shift operators, maintenance staff, and site security staff may be on site at all times, although no permanent residence(s) will be established. On site fire protection and emergency/security staff will support operations and maintenance staff at the facility in accordance with state, county, and federal requirements.

3.2.1 Northern Terminal

The Northern Terminal will consist of an AC/DC converter station (a ±600 kV DC switchyard and a converter building containing power electronics and control equipment), a 500/230 kV AC substation, and a 230 kV AC substation. The facilities will be located on private lands in Carbon County, Wyoming, approximately 2.5 miles southwest of the town of Sinclair, Wyoming. The Northern Terminal will connect to the existing Platte – Point of Rocks 230 kV line located within a mile of the terminal. The Northern Terminal will also connect to the planned Energy Gateway West and Gateway South 500 kV transmission lines being developed by PacifiCorp.

The Northern Terminal will require the following components:

- An AC/DC converter station approximately 30 acres in size.
- A 500/230 kV AC substation approximately 135 acres in size.
- A 230 kV AC substation approximately 40 acres in size.
- An electrical connection from the AC/DC converter station to the ±600 kV DC transmission line connecting to the Southern Terminal. All facilities for this connection are incorporated into the ±600 kV DC transmission line.
- Two electrical connections from the proposed single circuit Energy Gateway West 500 kV transmission line to the 500/230 kV substation. These connections will connect the Northern Terminal to both the Aeolus and Anticline substations via the Energy Gateway West 500 kV transmission line. These two connections may require 500 kV transmission facilities, assumed to be four miles total or less in length, to connect the 500/230 kV substation to the route of the Energy Gateway West 500 kV transmission line. Figure 5 shows a typical structure design for the 500 kV transmission line connections.

- Two electrical connections from the proposed single circuit Energy Gateway South 500 kV transmission line to the 500/230 kV Substation. These connections will connect the Northern AC/DC converter station to both the Aeolus and Mona Substations via the Energy Gateway South 500 kV transmission line. These two connections may require 500 kV transmission facilities, assumed to be four miles total or less in length, to connect the 500/230 kV substation to the route of the Energy Gateway West 500 kV transmission line. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Two electrical interconnections to the existing Platte – Point of Rocks 230 kV line, which will be rerouted into and out of the 230 kV substation. This 230 kV connection is assumed to require four miles or less of double circuit 230 kV transmission line. Figure 6 shows a typical structure design for the 230 kV transmission line connections.
- Up to six electrical interconnections from proposed and planned generation facilities by 230 kV transmission lines. Figure 6 shows a typical structure design for the 230 kV transmission line connections.

Construction of the Northern Terminal is estimated to require approximately 520 acres. Approximately 250 acres of this area will be permanently dedicated for the AC/DC converter station and substations, terminal access road, transmission line structures, and interconnection line access roads. Approximately 205 acres will be fenced for the Northern Terminal. Approximately 275 acres are estimated to be temporarily disturbed for construction work areas, including land for storage and a concrete batch plant, transmission line structure work areas, and pulling, tensioning and splicing sites.

The general planned locations for the Northern Terminal and grid interconnections are shown on Map Exhibit 3. The location for the Northern Terminal site is proposed to be within the siting area shown. The final site location will be determined during final engineering and design. The criteria used in selecting the siting area and the final site location are:

- Land Ownership - use of private lands over public lands is preferable.
- Land Use - other current and planned land uses in the area, in particular other infrastructure that is being planned and permitted.
- Environmental Constraints - avoidance of sensitive resources, including sensitive wildlife habitats, cultural resource sites, wetlands, and major drainages.
- Topography - use of level dry land over more rugged terrain is preferable.
- Access to the TWE Project transmission line corridors coordinated with other existing and planned infrastructure and which minimize line crossings.
- Interconnections with existing, planned, and potential transmission lines such that line crossings are minimized, and conflicts with other existing and planned infrastructure are avoided.

Map Exhibit 3 illustrates a conceptual layout of the Northern Terminal and associated 230 kV and 500 kV connections to existing and planned facilities. The location of the Northern Terminal and the

alignments of the 230 kV and 500 kV transmission line connections will be located within the proposed terminal siting area and will be determined during final design.[7]

Based on final ownership/operating agreements and interconnection contracts, it is possible that the 500/230 kV AC substation and/or the 230 kV AC substation could each be broken into two separate facilities. The total required acreage of the separate 500/230 kV AC substation(s) and the 230 kV AC substation(s) would not be greater than the 175 acres (135 plus 40) described above. The total fenced acreage for the Northern Terminal would be 205 acres in either one contiguous facility or 70 acres in one location and an additional 135 acres in a remote location. Land outside of this area would be used for access roads. Terminal access will require an estimated ten acres of permanent disturbance. With the exception of the associated interconnection lines, no other permanent development outside of the fenced area for this facility is anticipated.

[7] The three major components of the Northern Terminal (AC/DC converter station, 500/230 kV AC substation, and 230 kV AC substation) are planned to be co-located and contiguous. Although each of these three components are stand-alone facilities and could be located on separate parcels connected together by short "transmission" lines, it is common practice and preferable for the AC/DC converter station and 500/230 kV AC substation(s) to be located adjacent to each other. Although it is also preferable to locate the 230 kV AC substation next to the 500 kV AC substation, depending on the availability of space and other constraints in this area, these stand-alone facilities could be separated by a distance of up to two miles.

Legend

Project Features

- Proposed
- Corridor
- Terminal Siting Area
- Conceptual Terminal Site

Land Jurisdiction

- BLM
- Private
- State of Wyoming

Transportation

- Interstate Highway
- Railroad

Existing Transmission

- 230 kV Line

Administrative Boundaries

- Section Line

Note: Terminal site consists of an AC/DC Converter Station, 500 kV AC Substation & a 230 kV AC Substation

Platte-Point of Rocks 230 kV

W10

230 kV Connections

500 kV Connections

600 kV TWE Project Line

230 kV Connections

500 kV Connections

0 0.1 0.2 0.3 0.4 0.5

Miles

Map Exhibit 3

Conceptual Northern Terminal & Grid Interconnections

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3.2.2 Southern Terminal

The Southern Terminal will consist of an AC/DC converter station (a ±600 kV DC switchyard and a converter building containing power electronics and control equipment) and a 500 kV AC substation. The facilities will be located in the Eldorado Valley on private or BLM administered land, approximately 15 miles south of Boulder City, in Clark County, Nevada. The Southern Terminal will connect to all four of the existing 500 kV substations located at the Marketplace Hub. These four substations are the Eldorado, Marketplace, Merchant, and McCullough substations.

The Southern Terminal will require the following components:

- An AC/DC converter station approximately 30 acres in size.
- A 500 kV AC substation approximately 110 acres in size.
- An electrical connection from the AC/DC converter station to the ±600 kV DC transmission line connecting to the Southern Terminal. All facilities for this connection are incorporated into the ±600 kV DC transmission line.
- Two electrical connections from the existing Mead – Marketplace 500 kV transmission line to the new 500 kV AC Substation. These connections will connect the Southern Terminal to both the Mead and Marketplace substations via the existing Mead – Marketplace 500 kV transmission line. These two connections may require 500 kV transmission facilities, assumed to be five miles total or less in length, to connect the new 500 kV AC substation to the existing Mead – Marketplace 500 kV transmission line. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Construction of a 500 kV transmission line from the new 500 kV AC substation to the Eldorado substation. This single circuit 500 kV transmission line is estimated to be five miles in length or less. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Construction of a 500 kV transmission line from the new 500 kV AC substation to the McCullough substation. This single circuit 500 kV transmission line is estimated to be five miles in length or less. Figure 5 shows a typical structure design for the 500 kV transmission line connections.
- Although not anticipated at this time, one or more of the existing 138/230 kV lines within the Proposed Terminal Siting Area may need to be re-routed/re-configured to accommodate the Southern Terminal due to congestion within the area. If necessary, this reroute or reconfiguration of 138/230 kV transmission line facilities is not anticipated to impact more than a total of five miles of line. Figure 6 shows a typical structure design for the 230 kV transmission line connections.

Construction of the Southern Terminal on private land is estimated to require approximately 555 acres whereas the terminal construction on BLM land is estimated to require approximately 750 acres. Approximately 230 to 260 acres of this area will be permanently dedicated for the AC/DC converter station and switchyards, terminal access road, transmission line structures, and interconnection line access roads. Approximately 140 acres will be fenced for the Southern Terminal. Approximately 335

acres on the private land site and 500 acres of the BLM land site are estimated to be temporarily disturbed for construction work areas, including land for storage and a concrete batch plant, transmission line structure work areas, and pulling, tensioning and splicing sites.

The general planned location for the Southern Terminal and grid interconnections are shown on Map Exhibit 4, which illustrates a conceptual layout of the Southern Terminal and associated 500 kV connections to existing substations. The location of the Southern Terminal and the alignments of the 500 kV transmission line connections will be located within the terminal siting area and will be determined during engineering and design.[8]

Terminal access on the private land site and BLM land site will require an estimated 15 and 20 acres of permanent disturbance, respectively. With the exception of the associated interconnection lines, no other permanent development outside of the fenced area for this facility is anticipated.

3.3 Ground Electrode Systems

Two ground electrode facilities are proposed, one connecting to the Northern Terminal and one connecting to the Southern Terminal. The general proposed siting area for the northern ground electrode facility is termed 'Separation Flat' and shown on Map Exhibit 5. The proposed siting area for the southern ground electrode facility is termed 'Mormon Mesa-Carp Elgin Road' and shown on Map Exhibit 6.[9] The siting and site selection criteria are described in section 4.4.2. The location of the ground electrode systems within the siting areas and the layout of the wells and control facilities will be defined during final engineering and design. Once construction is completed, approximately 0.5 of an acre, or less, near the center of the electrode containing the control house will be fenced. Agricultural land uses outside the fenced area such as grazing and cultivated crops would be permissible.

These two ground electrode facilities will be built, each within approximately 100 miles of the Northern and Southern Terminals, to establish and maintain electrical current continuity during normal operations, and immediately following an unexpected outage of one of the two poles (or circuits) of the ±600 kV DC terminal or converter station equipment.

Each ground electrode facility will consist of a network of approximately 60 deep-earth electrode wells arranged along the perimeter of a circle expected to be about 3,000 feet in diameter. All wells at a site will be electrically interconnected and wired to a small control building via low voltage underground cables. A typical site plan for a ground electrode system is shown in Figure 8 and a photograph of a typical above ground facility is provided in Figure 9. A low voltage electrode line will be required to connect the ground electrode facilities to the AC/DC converter stations. To the

[8] The two major components of the Southern Terminal (AC/DC converter station and the 500 kV AC substation) are planned to be co-located and contiguous. Although these two components are stand-alone facilities and could be located on separate parcels connected together by short "transmission" lines, it is common practice and preferable for the AC/DC converter station and 500 kV AC substation to be located adjacent to each other.

[9] Map Exhibits 5 and 6 show both the proposed and alternative ground electrode sites and siting areas. See Section 4.2.2 for discussion of siting criteria and alternative siting areas.

extent practical, the overhead electrode line will be co-located on the ±600 kV DC structures in the overhead shield wire position. Where the electrode line diverges from the ±600 kV DC transmission line, it will be located on single pole structures, similar to those used for a modified 34.5 kV/69 kV distribution transmission line, built within a separate 50-foot-wide ROW. Figure 10 shows a typical single pole structure design that would be used for the overhead electrode line.

During a DC transmission disturbance where one pole becomes inoperable, the ground electrodes will carry a short-term large current that was previously flowing in the inoperable pole. The electrodes will be sized and designed to disperse this current into the ground at levels which are safe for people and animals in the vicinity. Such contingency conditions that result in high ground electrode currents are most often the result of an unexpected outage on the transmission line or equipment in the AC/DC converter station. The high current operation of the ground electrode facilities and the use of the earth as a return path is limited to unexpected emergency conditions and typically only operated for 10 minutes to less than an hour following the loss of a pole. For planning and preliminary engineering purposes, 12 to 16 unexpected disturbances resulting in the loss of a pole are anticipated on a yearly basis. Although the ground electrode facilities will be designed to operate at high current levels for up to 200 hours per year, typical yearly use at high currents is expected to be less than 30 hours per year.

The use of these ground electrode facilities allows system operators to maintain a portion of the TWE Project's power transmission capacity to support power network reliability. This feature will allow critical time for network operators to determine the extent of the electrical disturbance and reconfigure the transmission and generation systems into a more stable configuration that minimizes disruption of customer loads.

Legend

Project Features
- Proposed
- Corridor
- Terminal Siting Area
- Conceptual Terminal Site
- Alternative Conceptual Terminal Site

Land Jurisdiction
- BLM
- Private

Transportation
- Interstate Highway
- U.S. Highway

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- Substation

Administrative Boundaries
- Section Line

Note: Terminal site consists of an AC/DC Converter Station & a 500 kV AC Substation

N175

600 kV TWE Project Line

500 kV Connections

600 kV TWE Project Line

95

500 kV Connections

Marketplace

McCullough

Eldorado

Nevada Solar One

Merchant

0 0.25 0.5 0.75 1 1.25
Miles

Map Exhibit 4
Conceptual Southern Terminal & Grid Interconnections
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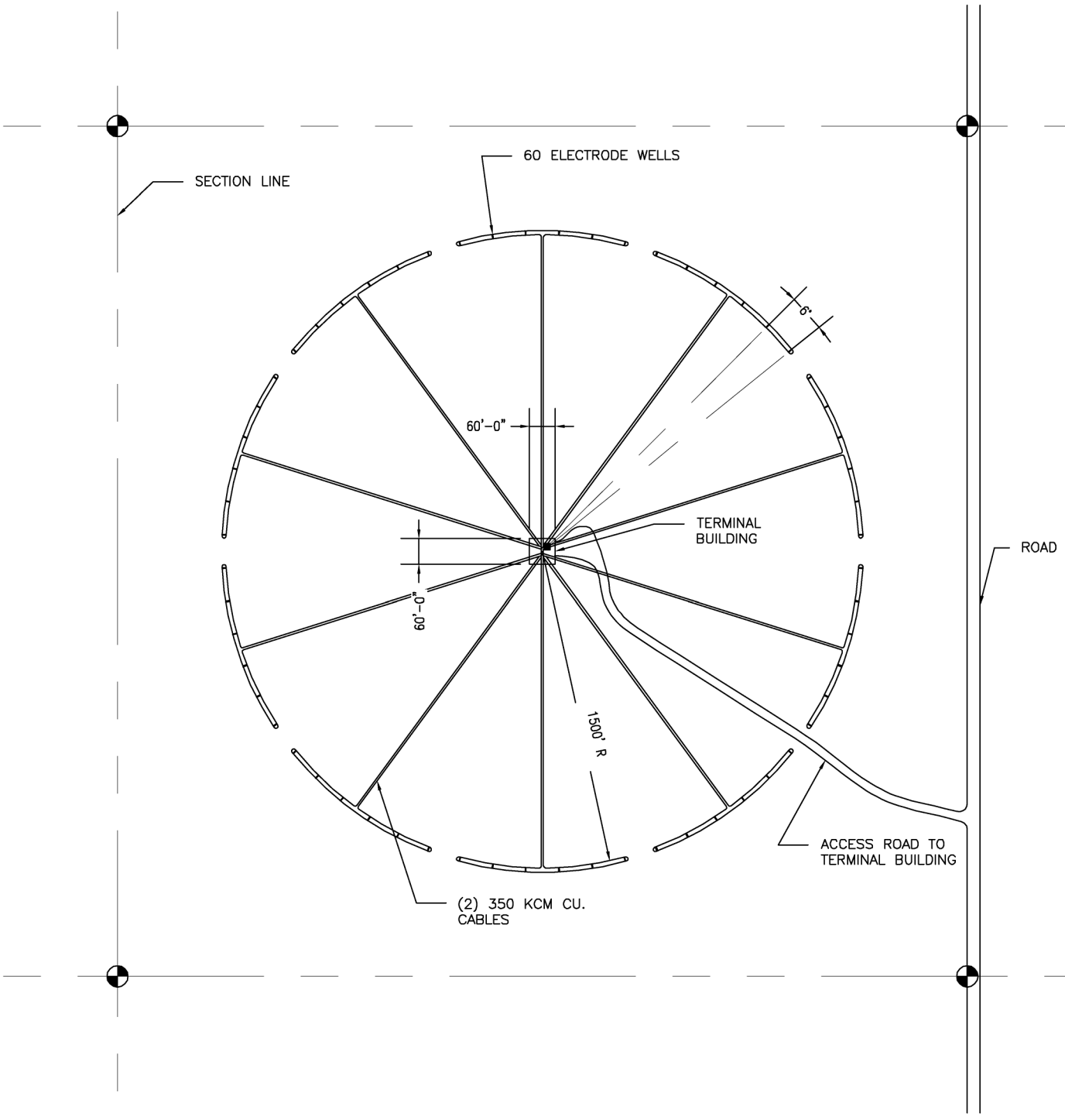

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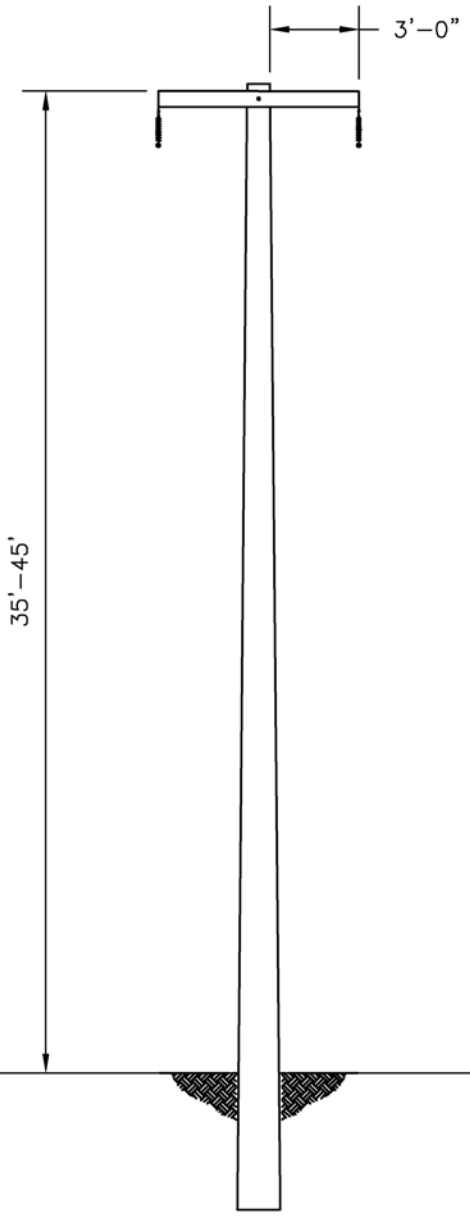
FIGURE 8

TYPICAL SITE PLAN FOR
GROUND ELECTRODE SYSTEM

FIGURE 9 TYPICAL ABOVE GROUND CONSTRUCTION AT THE GROUND ELECTRODE FACILITY



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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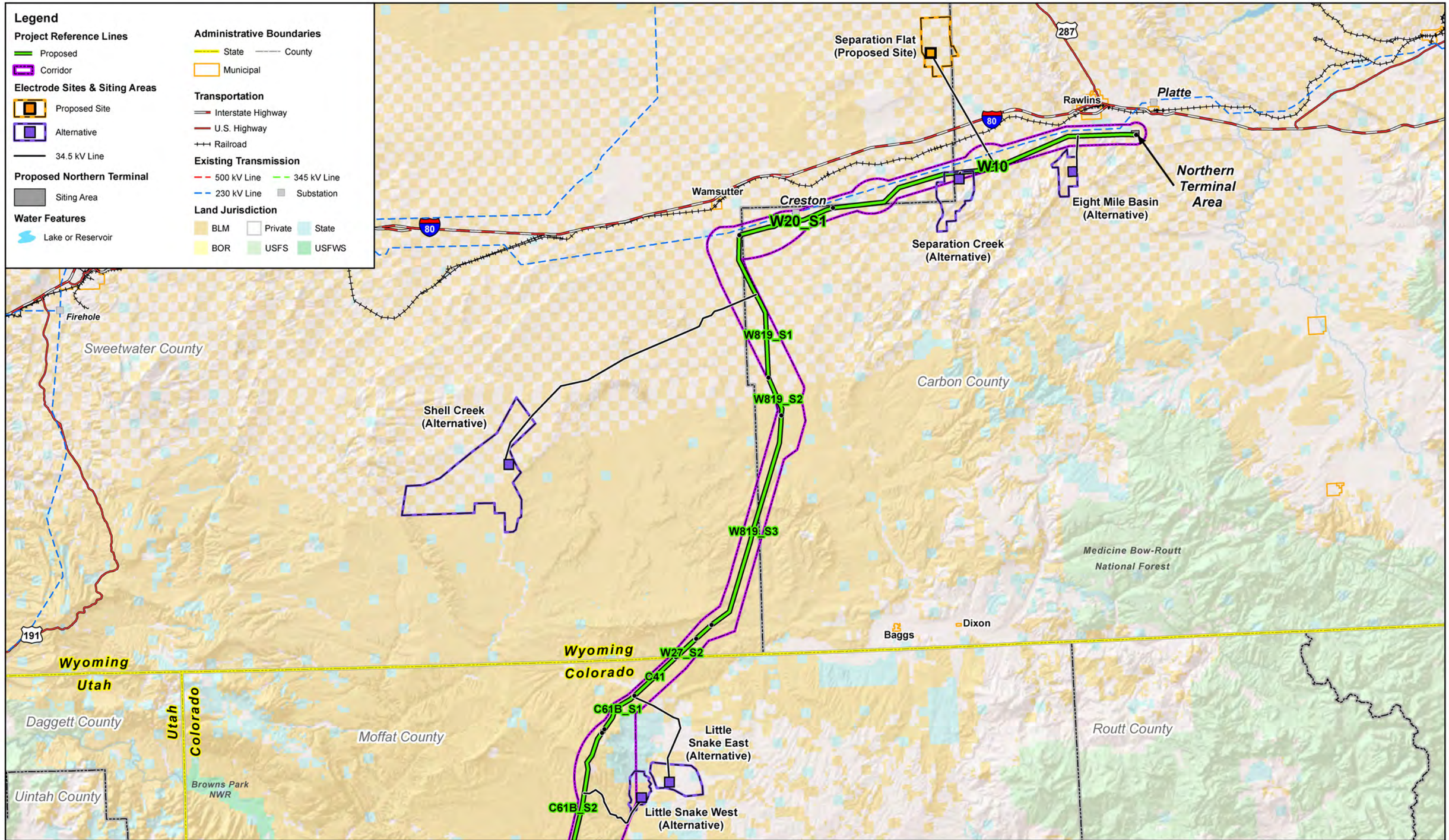
FIGURE 10

TYPICAL POLE STRUCTURE FOR OVERHEAD ELECTRODE LINE



Map Exhibit 5

Northern Terminal and Ground Electrode System- Proposed and Alternative Sites and Siting Areas

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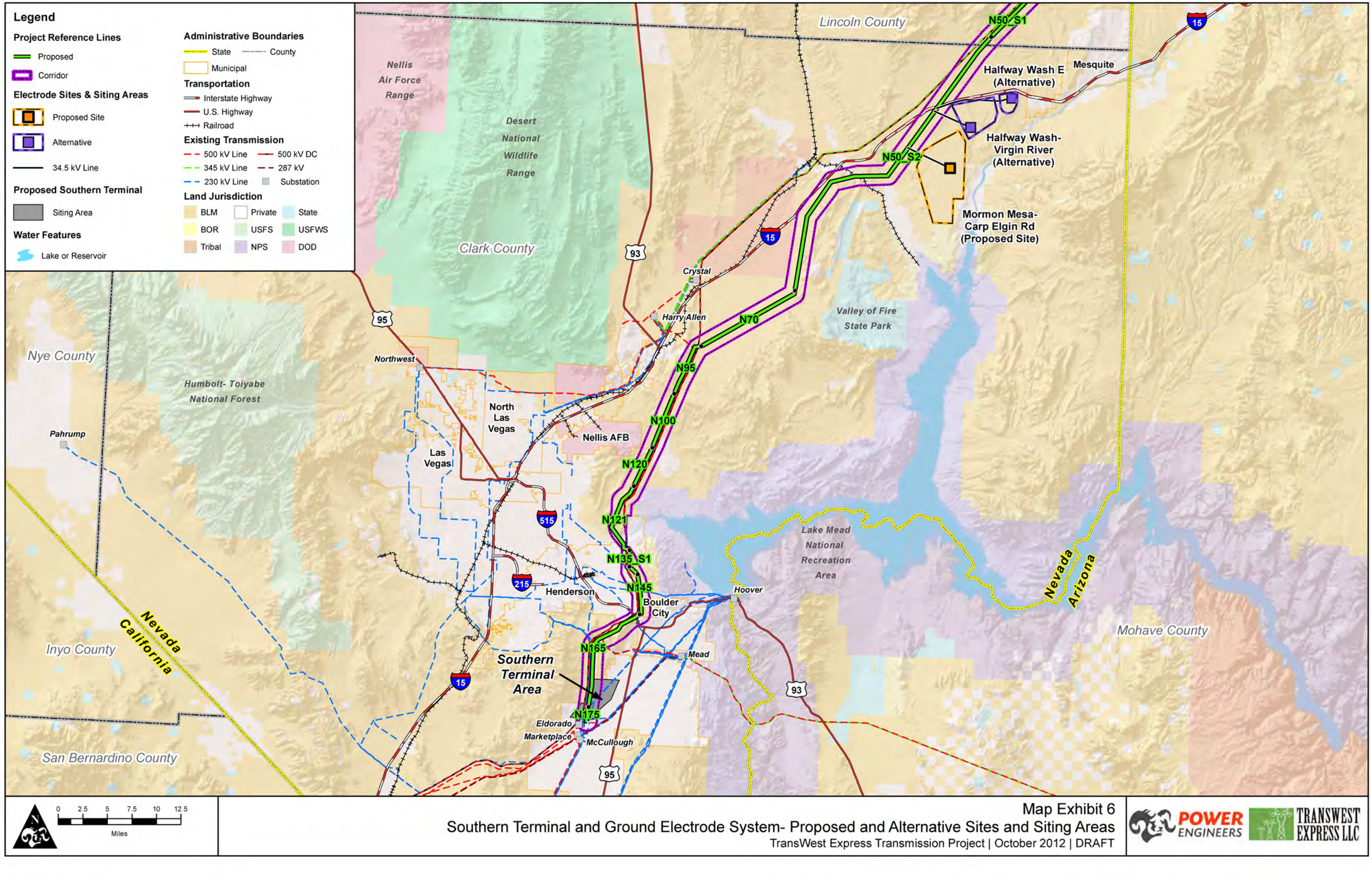

Map Exhibit 6

Southern Terminal and Ground Electrode System- Proposed and Alternative Sites and Siting Areas

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3.4 Communications System

The TWE Project will require a number of critical telecommunications support subsystems. These systems will be configured and designed to support the overall availability and reliability requirements for the operation of the HVDC terminal facilities and supporting substations. To provide secure and reliable communications for the control system real-time requirements, protection and day-to-day operations and maintenance needs, a mix of telecommunications systems will be used. The primary communications for protection and control will be provided via the one OPGW installed in the shield wire position on the transmission line. For redundancy purposes, a secondary communications path will be provided via existing or expanded/upgraded microwave systems or existing alternate buried fiber paths in the TWE Project region.

In addition to protection and control, the communications system will be used for Supervisory Control and Data Acquisition (SCADA). The SCADA system is a computer system for gathering and analyzing real time data which is used to monitor and control the substation (e.g., transformers and transmission lines), and auxiliary (e.g., pumps and cooling systems) equipment. A SCADA system gathers information, such as the status of a transmission line, transfers the information back to a central site, alerting the central site that the line has opened, carrying out necessary analysis and control, such as determining if outage of the line is critical, and displaying the information in a logical and organized fashion.

The primary communications will be an all-digital fiber system with repeater/regeneration facilities utilizing the OPGW located on the transmission line structures. The optical data signal degrades with distance as it travels through the optical fiber cable. Consequently, signal regeneration sites are required to amplify the signals if the distance between stations or regeneration sites exceeds approximately 50 miles. In total, approximately 15 to 20 regeneration sites will be required for the proposed TWE Project. In most cases, the regeneration communication sites will be located within the transmission line ROW and will typically be 100 feet by 100 feet in size. Figure 11 shows a typical communications regeneration site. The Applicant may also contract with third parties for the sale and use of excess fiber optic capacity. No additional facilities are anticipated for third party use of excess fiber optic capacity.

The secondary communications path for the TWE Project will be provided either by a private Project microwave system or purchasing/leasing capacity on existing utility dedicated communication networks within the TWE Project region.

If required, a private microwave system will be structured to utilize existing developed communications sites, access roads and utility held sites to the maximum extent possible. A small number of new microwave sites may be required for the TWE Project. As a microwave system requires line-of-site communications, the number and location of microwave sites will be determined as engineering progresses. A typical microwave communication site is less than 100 feet by 100 feet, and consists of a fenced enclosure that contains a small building for the communications equipment and a tower for mounting the microwave antenna(s). The microwave tower may be 50 feet to 150 feet high to meet the line-of-site communications requirement. In addition, multiple antennas may be mounted on the microwave tower depending upon the communications needs. In some cases, such as very remote locations with limited access to a reliable power supply, a small back-up generator may be required.

To facilitate mobile communications along the transmission line route for transmission line patrol, inspection, routine maintenance and emergency operations, a mobile ultra high frequency (UHF)/very high frequency (VHF) radio communications system will be implemented. For planning purposes, UHF/VHF radio equipment, towers, antennae and repeaters are assumed to be installed at each regeneration station.

FIGURE 11 COMMUNICATIONS REGENERATION SITE

3.5 Proposed TWE Project Construction Practices

This section describes the construction practices that will be used for the proposed TWE Project, including the ±600 kV DC transmission line; northern and southern terminals; ground electrode systems; and communications systems. Construction activities are described in the following sections:

- Section 3.5.1 – Pre-construction activities to be completed prior to construction commencing.
- Section 3.5.2 – Construction activities for the ± 600 kV DC transmission line and associated access roads.
- Section 3.5.3 – Construction activities for the northern and southern terminals.

- Section 3.5.4 – Construction activities for the northern and southern ground electrode systems.
- Section 3.5.5 – Construction activities for the communications system.
- Section 3.5.6 – Post construction clean-up and restoration.
- Section 3.5.7 – Special construction methods to be used in specific, sensitive locations, including blasting and helicopter construction techniques; roadless construction methods in IRAs; and construction techniques applicable to sensitive water resource areas.
- Section 3.5.8 – Water use during construction.
- Section 3.5.9 – TWE Project construction schedules, manpower, and equipment requirements.

3.5.1 Pre-Construction Activities

Prior to construction, the Applicant will obtain all applicable federal, state, and local permits; acquire easements and ROW grants for the TWE Project facilities; conduct geotechnical surveys and testing; and conduct pre-construction engineering and environmental surveys.

3.5.1.1 Permitting

The Applicant will acquire all federal, state, and local permits, licenses and agreements. A list of applicable permit requirements will be provided through the NEPA process and incorporated into the Construction, Operation, and Maintenance Plan (COM Plan) for the TWE Project. The TWE Project will necessitate crossings of existing electrical transmission lines, U.S. and State Highways, and railroads. The proposed line crossings will be coordinated with the appropriate entity and TransWest will obtain all required licenses, permits, or agreements.

3.5.1.2 ROW and Property Rights Acquisition

The Applicant will acquire ROWs or properties necessary to construct, operate, and maintain the TWE Project. New ROWs will be acquired for the transmission line(s) through a combination of ROW grants and easements with various federal, state, and local governments; other companies (e.g., utilities and railroads); and private landowners. Property owners affected by the TWE Project would initially be contacted by a realty agent who would explain the steps involved in site selection, property rights acquisition, and construction. A realty agent would request permission (for workers or Contractors) to enter the property to conduct engineering and environmental surveys and studies. Landowners will be contacted early in the process to obtain right-of-entry for surveys. Each landowner along the final centerline route will be contacted to explain the Project and to secure right-of-entry and access to the ROW.

Studies will be conducted to select structure sites, based on engineering design criteria, terrain, geologic investigations, and property owner input regarding land use and how to minimize potential impacts to properties. Geotechnical drilling will be required at some sites. Property owners will be compensated for damages to crops, fences, and other property caused by surveys and studies.

Property rights, in the form of perpetual easements or ROW, will be needed to construct, operate, and maintain the transmission line. Land for the Northern and Southern Terminals, substations, series compensation (as may be required for System Alternatives 2 and 3; see Section 4.3), and regeneration stations will be obtained in fee simple where located on private land. Easements and fee simple properties will be purchased through negotiations with landowners based on independent appraisals. Independent appraisals are used to determine the fair market value of the easement or property. Every effort will be made to acquire easements and properties through landowner negotiations to obtain an agreement, which is fair and reasonable to both parties. For transmission line easements, the landowner will retain title to the land and may continue to use the property in ways that are compatible with the transmission line. If in place of TransWest, Western were to acquire the private land property rights for the Project, it will do so in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970.

Federal and state laws enable public agencies, and in some cases private parties, to acquire property rights for facilities to be built in the public interest. If a negotiated agreement cannot be reached, easements can be acquired through eminent domain (condemnation) proceedings. Through the eminent domain process, a court determines the compensation to be paid to the property owner(s).

3.5.1.3 Geotechnical Surveys and Testing

Prior to construction of the TWE Project, ground-based land surveys will be required at soil boring locations required for geotechnical investigations.

Geologic evaluation and geotechnical investigations will be performed as a part of general construction activities to evaluate potential geologic and geotechnical hazards and to determine specific requirements (ground conditions, soil types, depth to rock, depth to water, soil strength properties, etc.) for foundation design and construction. The work will be completed in time to develop final engineering specifications necessary for construction.

Geological evaluation will occur at generally the same time as geotechnical investigations, and will be a part of the final geotechnical report. For this activity, an engineering geologist will evaluate fault lines, landslide prone areas, steep slopes, and unstable soils to identify potential hazards, primarily at structure sites. Geologic review and evaluation will also be performed in the immediate vicinity of structure sites, and for access roads crossing steep slopes and unstable soils. The primary purpose of the geologic evaluation is to identify potential hazards with sufficient lead time to evaluate options for avoiding or mitigating potential hazards. The Project geotechnical engineer and geologist will prepare a report including recommendations for any necessary relocation of structure sites or roads in potentially hazardous areas. In the event that a structure site cannot be relocated, the geotechnical report will also specify construction methods designed to stabilize the site as well as any adjacent areas that might pose a hazard to the main site. These recommendations will be incorporated into the COM Plan including construction details for grading, drainage, and specialized slope treatments. The Contractor will implement the plans. All geologic/geotechnical field studies required will be coordinated with the appropriate land management agencies or private landowner and the appropriate permits will be obtained by the Applicant.

To determine proper structure foundation requirements, geotechnical investigations will be performed in the field to evaluate the strength and bearing capacity of site soils. This study will entail a core drilling program at structure site locations along the Agency Preferred Alternative. At sampling sites, borings will be extracted from which soil and/or bedrock material samples will be taken for

laboratory testing and analysis. Soil borings are typically six to eight inches in diameter and as much as 70 feet deep. Soil borings are commonly taken at structure site locations at intervals of approximately one mile.

Soil borings will be performed with rubber tired or low impact drill rigs using approved access routes and methods in accordance with the appropriate land management agency or private landowner requirements, and applicable mitigation measures. Equipment typically used for geotechnical evaluations includes a drill rig, water truck, and 4-wheel drive support vehicles. The average estimated drilling time at each site is approximately one-half day. Work areas are typically 40 feet by 40 feet in size (1,600 square feet/0.37 acre).

Surface disturbances may occur at the structure site drill locations caused by parking, use of equipment, and associated field crew activities in the work area. Water may be used during the drilling process and a small amount of water may exit the drill holes. Following the completion of drilling at each site, soil boring holes will be backfilled with the drilled materials. Any remaining material would be spread at the site. The area of excess soil spreading will be small, and typically will not exceed 10 feet by 10 feet in size. No open holes will be left unattended and all holes will be backfilled prior to leaving the site.

Any geotechnical investigations involving ground disturbance on federal lands prior to the issuance of the TWE Project ROW grants may require additional authorizations. TransWest will apply for and obtain all necessary federal, state, and local authorizations.

3.5.1.4 Pre-Construction Surveys and Flagging

Pre-construction engineering surveys will be conducted to identify the transmission line ROW centerline and width, structure sites, vegetation clearance boundaries, property boundaries, ground profiles, access routes, temporary work areas, and stream crossings.

Pre-construction environmental surveys will be conducted, as required by permitting agencies, for the identification, flagging, and avoidance of sensitive resources. Requirements for environmental pre-construction surveys will be documented in the Final Environmental Impact Statement (FEIS) and the regulatory agencies' decision documents and stipulations. Investigations may include, but are not limited to: (1) desert tortoise and greater sage-grouse surveys; (2) rare and sensitive plant surveys; (3) noxious weed surveys; (4) cultural resource surveys; and (5) wetlands delineations in accordance with requirements for the Clean Water Act (CWA), Section 404 permit. Section 3.7 identifies the Applicant-committed environmental mitigation measures, including pre-construction surveys for sensitive resources.

3.5.2 Transmission Line Construction

The following sections detail the transmission line construction activities associated with the proposed ±600 kV DC transmission line and access roads. The general sequence of transmission line construction includes: construction of access roads; clearing of ROW and temporary work areas clearing; installation of foundations; assembly and erection of structures; installing shield wires and conductors; installing ground rods/counterpoise; and site cleanup and reclamation. Typical transmission line construction activities and sequencing are depicted in Figures 12 and 13. Various construction activities will occur during the construction process, with several construction crews

operating simultaneously at different locations. Section 3.5.9.3 summarizes the types and quantities of equipment to be used for the transmission line construction.

3.5.2.1 Access Road Construction

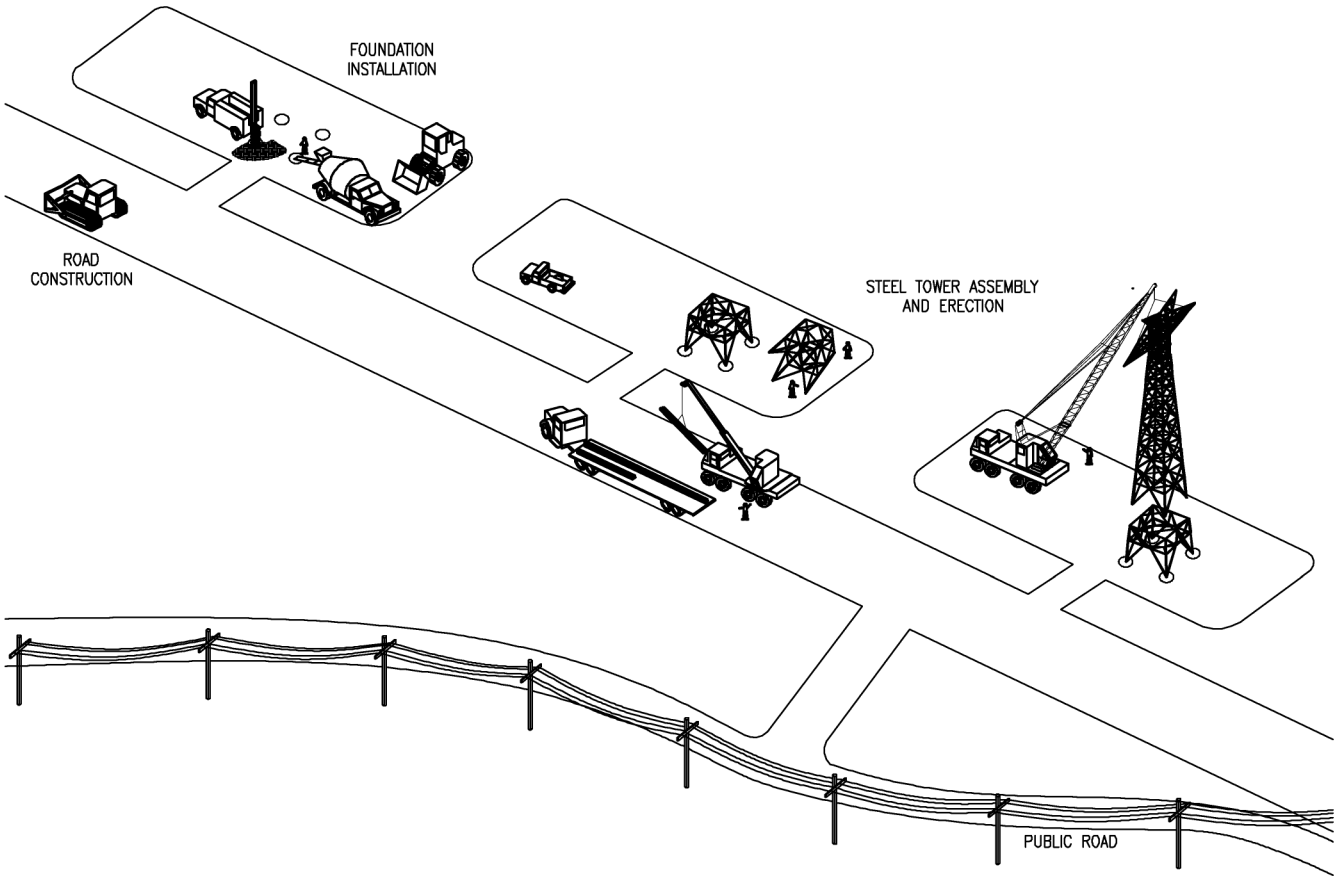
The TWE Project will require surface access to all structures and work areas during construction and operation to allow construction vehicles and equipment to access the location of each transmission structure. Access in IRAs is discussed in Section 3.5.7.3 Roadless Construction. The TWE Project has been designed to utilize existing access roads wherever practical in order to minimize environmental impacts associated with new road construction.

The construction of new access roads will be required only as necessary to access structure sites lacking direct access from existing roads, or where topographic conditions (e.g., steep terrain, rocky outcrops, and drainages) prohibit safe overland access to the site. Where terrain and soil conditions are suitable, non-graded overland access ("drive & crush") will be utilized. New access roads will be located within the ROW whenever practical and will be sited to minimize potential environmental impacts. The number of new access roads will be held to a minimum, consistent with their intended use (e.g., structure construction or conductor stringing and tensioning).

Where new roads are required, access roads will be designed in accordance with standards and guidelines set by the American Association of State Highway and Transportation Officials (AASHTO). On public lands, BLM and USFS road requirements will be followed, including standards set forth in "The Gold Book – Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development" (AASHTO 2006).

As part of the COM Plan, an Access Road Plan will be developed for the Agency Preferred Alternative during final engineering and design, which will define site-specific access to each structure and temporary work area. Appendix A documents the methods used to estimate indicative access roads by terrain type for the proposed TWE Project and Alternative Route Segments. Roadless construction methods are described under Special Construction Methods, in Section 3.5.7.3.

Table 4 summarizes the access road categories used to estimate access road requirements by route segment. Figure 14 illustrates typical access road cross-sections in the various terrain conditions.



TYPICAL TRANSMISSION LINE CONSTRUCTION ACTIVITIES

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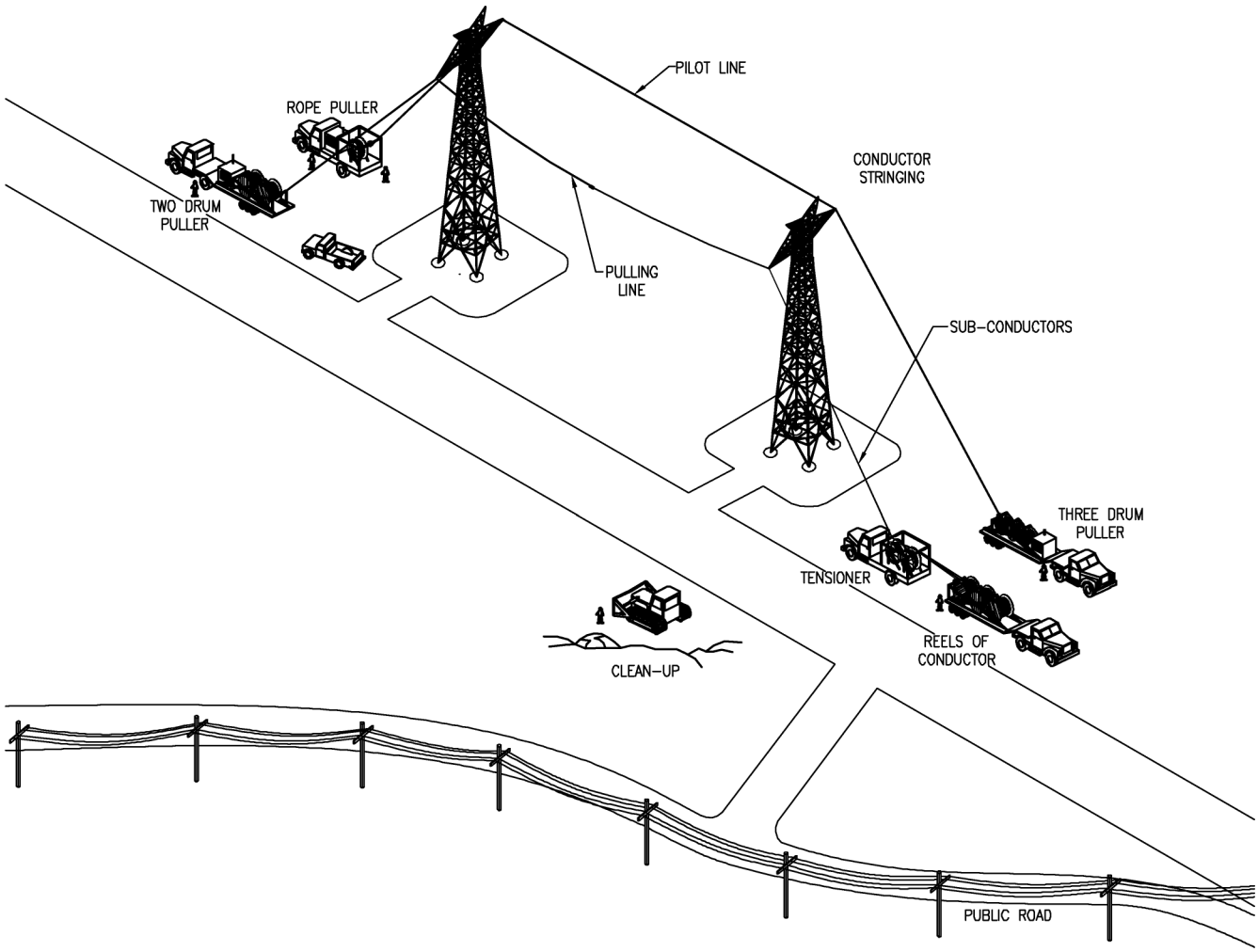
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 12

STRUCTURE FOUNDATION INSTALLATION,
TOWER ASSEMBLY, &
ERECTION ACTIVITIES



BASIC WIRE HANDLING EQUIPMENT
SINGLE CIRCUIT TOWER

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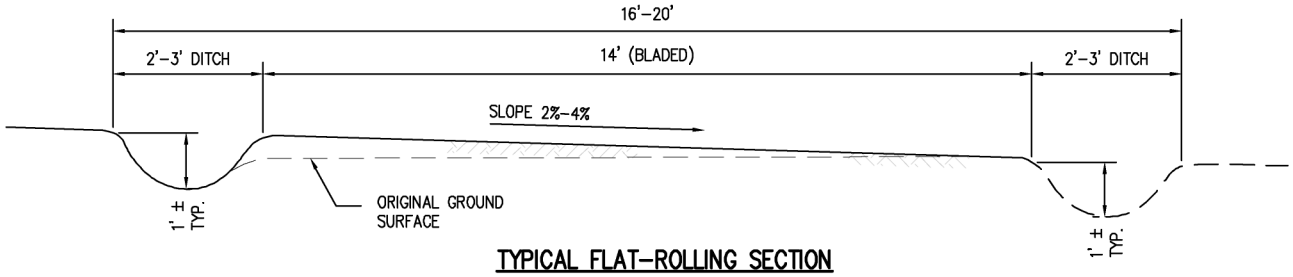
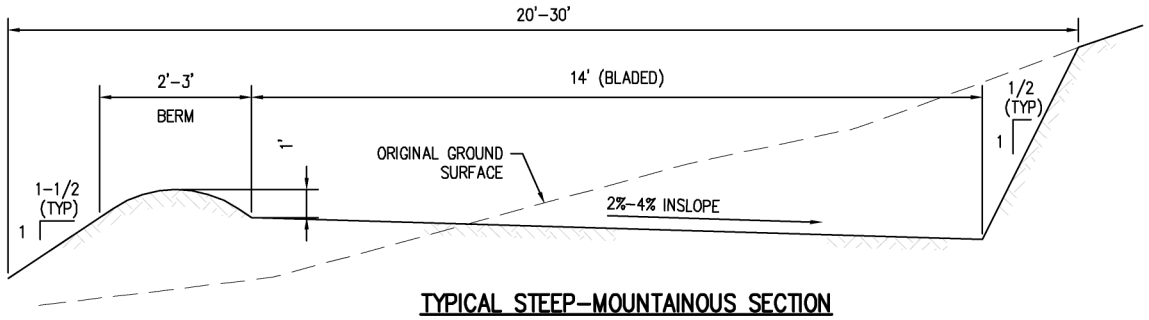
FIGURE 13
CONDUCTOR STRINGING ACTIVITIES

TABLE 4 ACCESS ROAD CATEGORIES AND DISTURBANCE ASSUMPTIONS FOR DEIS ANALYSIS		
ACCESS ROAD CATEGORY	TERRAIN TYPES	ASSUMPTION FOR ESTIMATING DISTURBANCES
Backbone Access Road Network Outside Corridors		
Category 1 – Existing Improved Roads	All terrain types	Geographic Information System (GIS) data provided. No ground disturbances would occur.
Category 2 (A) – Existing Roads Outside Corridor Requiring Improvements	All terrain types	GIS data provided. Access roads should conservatively be estimated as 24 feet wide.
Access Roads Inside Corridors		
Category 1 – Existing Improved Roads	All terrain types	GIS data provided. No ground disturbances would occur.
Category 2 (B) – Existing Roads Inside Corridor Requiring Improvements	All terrain types	For the DEIS analysis, Category 2B roads are estimated conservatively, as new roads, under Road Categories 3-6.
Category 3 – New Access Roads in Flat Terrain	Flat – 0-8% slopes	Ratio of access road miles to one mile of transmission line – 1.3 miles Access Road Width – 16 feet
Category 4 – New Access Roads in Rolling Terrain	Rolling – 8-15% slopes	Ratio of access road miles to one mile of transmission line – 1.4 miles Access Road Width – 18 feet
Category 5 – New Access Roads in Steep Terrain	Steep – 15-25% slopes	Ratio of access road miles to one mile of transmission line – 1.8 miles Access Road Width – 22 feet
Category 6 – New Access Roads in Mountainous Terrain	Mountainous – greater than 25% slopes	Ratio of access road miles to one mile of transmission line – 2.8 miles Access Road Width – 24 feet

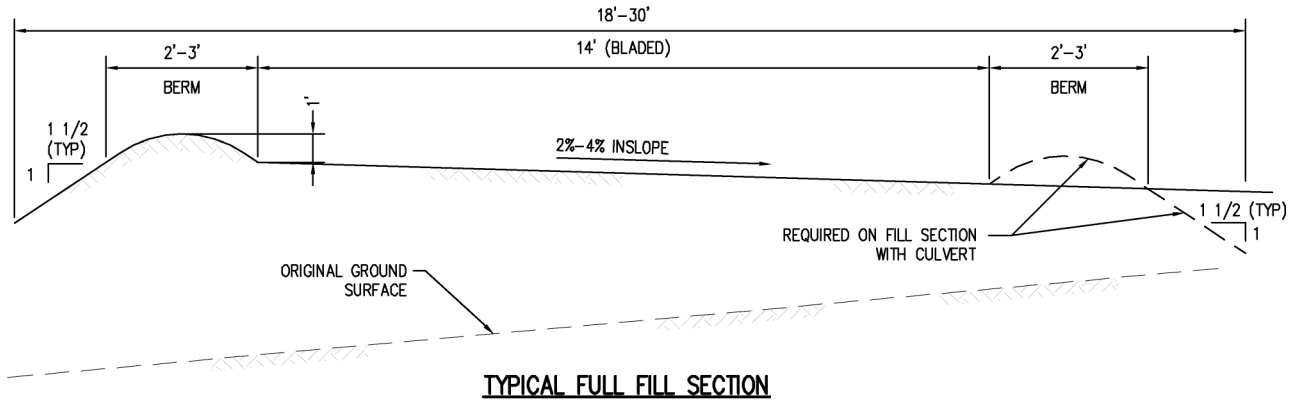
Construction of new access roads will begin with vegetation removal. Merchantable timber will be cut and stockpiled in locations where the logs can be loaded on to trucks and hauled to market. Non-merchantable logs will be stored along the edge of the ROW for later use in site restoration. Smaller vegetation will be lopped and scattered outside the road construction area. For bladed roads and where appropriate, topsoil will be removed and salvaged from the road construction area as required by the appropriate land management agency or private landowner. Topsoil will be stored adjacent to the road or in a nearby workspace. Appropriate erosion control devices will be installed to prevent erosion or loss of the topsoil, including measures to prevent wind erosion and fugitive dust, and silt fencing to prevent sediment runoff. As needed, the structure site construction pads and access roads will be bladed/graded to allow for safe access and construction. The blading/grading may include minor cut and fill as needed to achieve a safe, workable surface.



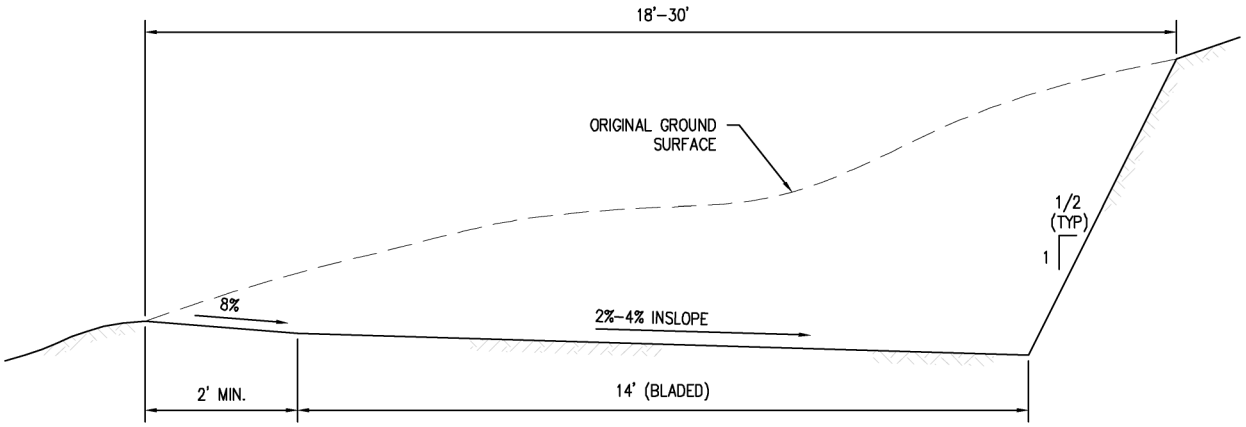
TYPICAL FLAT-ROLLING SECTION



TYPICAL STEEP-MOUNTAINOUS SECTION



TYPICAL FULL FILL SECTION



TYPICAL FULL CUT SECTION

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FIGURE 14

TYPICAL ACCESS ROAD CROSS-SECTIONS BY TERRAIN TYPE

Access road construction may employ heavy equipment including bulldozers, front-end loaders, dump trucks, backhoes, excavators - both tracked and rubber-tired, and graders. Other specialized equipment including boom trucks to install culverts in some areas will be used where needed.

3.5.2.2 Clearing of Transmission ROW and Temporary Work Areas

Vegetation within the ROW will be cleared in accordance with the TWE Project Vegetation Management Program, described in Section 3.6.2.1 and 3.6.2.2. The appropriate land management agencies and private landowners will be consulted before ROW clearing begins. Figure 15 provides a plan view of typical transmission ROW and temporary work areas.

Temporary work areas will be cleared of vegetation or flagged, as needed, prior to construction. Temporary work areas will include staging areas; material storage yards; fly yards; pulling, tensioning and spicing sites; work areas at each structure site; batch plant sites; and guard structures. Table 5 summarizes the temporary land disturbance that would be required for Project construction including the typical size and spacing required for the TWE Project facilities and activities.

TABLE 5 SUMMARY OF TEMPORARY LAND DISTURBANCE FOR WORK AREAS

TEMPORARY WORK AREA	DIMENSIONS/ SIZE	LOCATION AND NUMBER OF FREQUENCY NEEDED
TWE Project ±600 kV DC Transmission Line		
Staging Areas / Fly Yards	Average size: 7 acres	Approximately every 5 miles
Material Storage Yards	Average size: 20 acres	Approximately every 30 miles
Wire Pulling, Tensioning and Splicing Sites	ROW width x 500 feet for dead-end structure ROW width x 500 feet for mid-span conductor and shield wire 100 x 500 feet for fiber optic cable set-up sites	Two sites at every dead-end structure Approximately every 9,000 feet Approximately every 18,000 feet
Structure Work Areas	ROW width x 200 feet per structure	All structure sites, average 4 per mile
Batch Plants	Average size: 5 acres	Approximately every 15 miles
TWE Project Northern and Southern Terminals		
Storage and Concrete Batch Plant	7.5 acres	On-site
Interconnection Line structure work areas	200 feet x 200 feet (230 kV structures)* ROW width x 200 feet (500 kV structures)	All structure sites Approximately 6 per mile for 230 kV* Approximately 4 per mile for 500 kV

TABLE 5 SUMMARY OF TEMPORARY LAND DISTURBANCE FOR WORK AREAS		
TEMPORARY WORK AREA	DIMENSIONS/ SIZE	LOCATION AND NUMBER OF FREQUENCY NEEDED
Interconnection Line wire pulling, tensioning, splicing sites	ROW width x 500 feet (230 kV ROW width – 100 feet)* (500 kV ROW width – 250 feet)	Mid-span conductor and shield wire sites – every 9,000 feet Fiber optic cable set-up sites – every 18,000 feet Splicing sites typically at the same locations as the pulling/tensioning sites per common construction practices
TWE Project Northern and Southern Ground Electrode Systems		
Ground Electrode Site	65 acres	On-site
Overhead electrode line, structure work areas	ROW width x 100 feet (34.5 kV ROW width – 50 feet)	All structure sites, average 18 per mile
Overhead electrode line, pulling, tensioning, and splicing sites	75 feet x 100 feet 75 feet x 150 feet	Mid-span conductor sites – every 9,000 feet All dead-end structure sites – two sites each
Material Storage Yards	10 acres	One at each ground electrode site (total of two)
Notes: *Only applies to Northern Terminal		

The following is a summary of the purpose and use of structure work areas; wire-pulling, tensioning and splicing sites; construction staging areas/fly yards; concrete batch plants; and equipment staging and refueling sites.

Structure Work Areas

Individual structure sites will be cleared to install the transmission line structures and facilitate access for future transmission line and structure maintenance. At each structure location (±600 kV DC and 500 kV), an area up to approximately 250 by 200 feet, will be needed for construction laydown, structure assembly, and erection at each structure site. This temporary disturbance will occur within the ROW. To the extent necessary, the work area will be cleared of vegetation and bladed to create a safe working area for placing equipment, vehicles, and materials. After line construction, all areas not needed for normal transmission line maintenance, including fire and personnel safety clearance areas, will be graded to blend as near as possible with the natural contours, then revegetated as required.

Additional equipment may be required if solid rock is encountered at a structure location. Rock-hauling, hammering, or blasting may be required to remove the rock. Excess rock that is too large in size or volume to be spread at the individual structure sites will be hauled away and disposed of at approved landfills or at a location specified by the appropriate agency or landowner. See *Excavating and Installing Foundations* below for additional information on blasting activities.

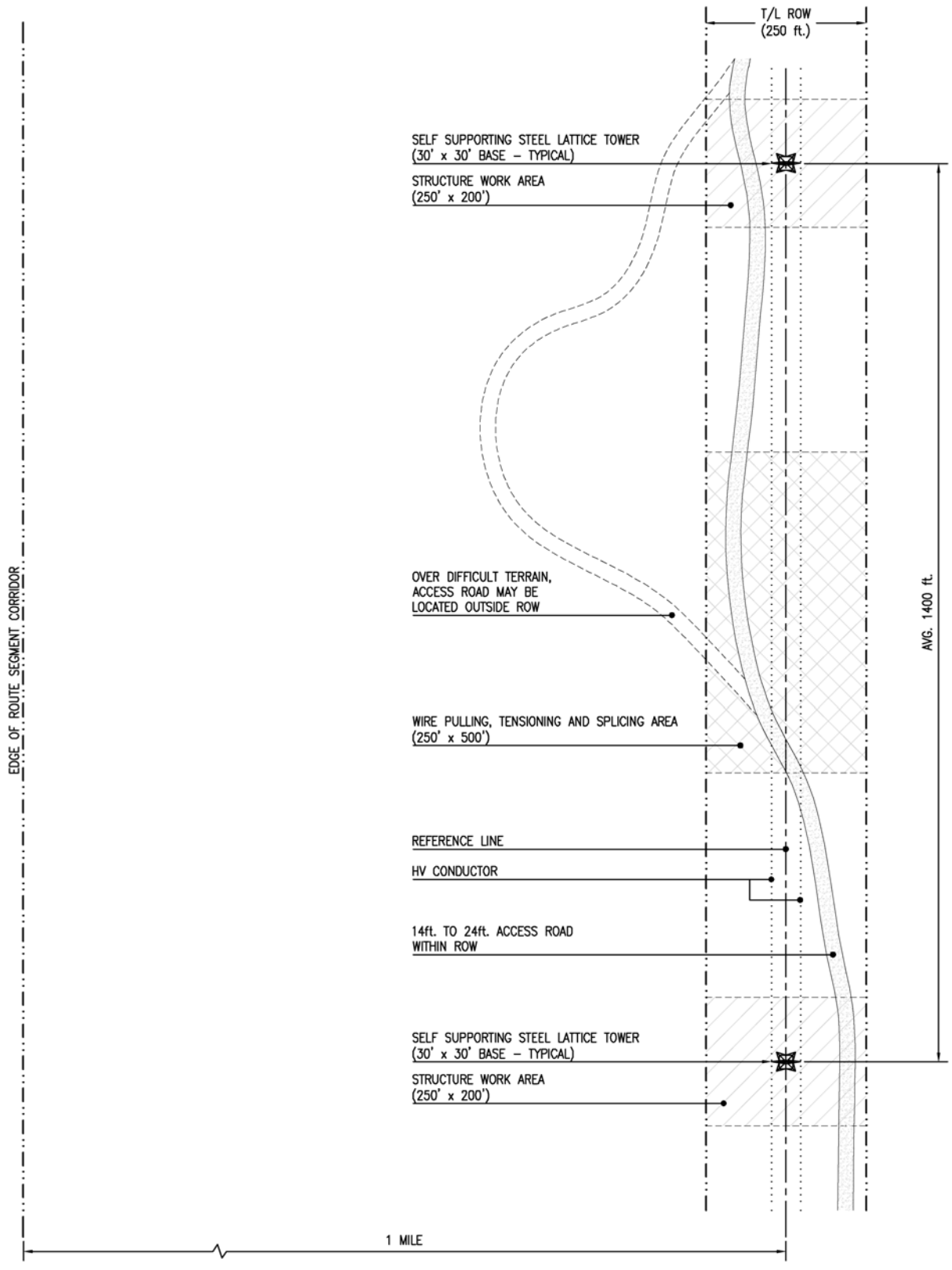

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FIGURE 15
PLAN VIEW OF TYPICAL TRANSMISSION ROW & CONSTRUCTION WORK AREAS

Wire Pulling, Tensioning, and Splicing Sites

Wire pulling, tensioning and splicing sites will be cleared and bladed only to the extent necessary to perform safe wire installation construction activities. During planning for wire installation activities wire pulling, tensioning and splicing sites will be selected to minimize clearing and blading to the extent practical such that actual disturbance areas will not exceed those described in Table 5. After line construction, all areas disturbed for wire pulling, tensioning and splicing sites will be restored as described in the COM Plan.

Construction Staging Areas/Fly Yards

The staging areas will be located in previously disturbed sites or in areas of minimal vegetative cover where possible. The staging areas will serve as field offices; reporting locations for workers; parking space for vehicles and equipment; and sites for material storage, fabrication assembly, concrete batch plants, and stations for equipment maintenance. Staging area dimensions and disturbance areas are summarized in Table 5. Additionally, fly yards for helicopter operations will be located approximately every five miles along the route where helicopter construction is planned, and will occupy approximately seven acres.

Concrete Batch Plant Sites

Concrete for use in the structure foundations will be dispensed from portable concrete batch plants located at approximately 15-mile intervals along the ROW, most located at staging areas. Sites will be identified in the COM Plan. Equipment typically required at a batch plant site includes generators, concrete trucks, front-end loaders, Bobcat loaders, dump trucks, transport trucks and trailers, water tanks, concrete storage tanks, scales, and job site trailers. Rubber-tired trucks and flatbed trailers will be used to assist in relocating the portable plant along the ROW. Commercial ready-mix concrete may be used when access to structure construction sites is economically feasible. Batch plant sites, although temporary in nature, will also be fenced.

Equipment Staging and Refueling Sites

Staging of equipment will be located at staging areas, pulling and tensioning sites, or other temporary work areas previously described. These areas will be used to temporarily lay out equipment to be used for work on specific TWE Project activities at nearby locations.

During construction, the Contractor will implement standard refueling procedures for heavy equipment that is left on the ROW for long periods of time such as cranes, blades, dozers, drill rigs, etc. This equipment will be refueled in place. As a rule, no personal or light-duty vehicles will be allowed to refuel on the ROW. Procedures and precautions similar to those used for helicopter refueling (discussed below) will be utilized.

Staging areas and helicopter fly yards will be fenced and their gates locked. Security guards will be stationed where needed. Staging area locations will be finalized following discussion with the land management agency or negotiations with landowners. In some areas, the staging area may need to be scraped by a bulldozer and a temporary layer of rock laid to provide an all-weather surface. Unless otherwise directed by the landowner, the rock will be removed from the staging area upon completion of construction and the area will be restored.

3.5.2.3 Excavation and Installation of Foundations and Anchors

The single shaft tubular steel poles and self supporting steel lattice towers will typically be supported by cast-in-place drilled concrete pier foundations. For these structure types, vertical excavations for foundations will be made with power drilling equipment. Where soils permit, truck-or track-mounted augers of various sizes, depending on the diameter and depth requirements of the hole to be drilled, will be used. Foundations for guyed steel lattice towers will typically be small precast or cast-in-place concrete pedestals. The precast pedestals will be hauled to the tower site on a flatbed truck and set in a small excavation dug by a backhoe or digger.

In rocky areas, the foundation holes may be excavated by drilling or blasting methods, or installing special rock anchor or micro-pile type foundations. The rock anchoring or micro-pile system will be used in areas where site access is limited, or adjacent structures could be damaged as a result of blasting or rock hauling activities. If hard rock is encountered within the planned drilling depth of tower foundations, blasting may be required to loosen or fracture rock. Potential areas requiring blasting will be identified based on geological setting of the proposed alignment. A Blasting Plan will be prepared as part of the COM Plan detailing the general concepts proposed to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, provisions for controlling fly rock, vibrations, and air blast damage. Blasting is described in detail in Section 3.5.7 Special Construction Practices.

In environmentally sensitive areas with very soft soils, a HydroVac, which uses water pressure and a vacuum, may be used to excavate material into a storage tank. Alternatively, a temporary casing may be used during drilling to hold the excavation open, and then the casing is withdrawn as the concrete is placed in the hole. In areas where it is not possible to operate large drilling equipment due to access or environmental constraints, hand-digging may be required.

In areas where single shaft tubular steel pole structures are used, increased volumes of excavated subsoil spoils, based on foundation size and depth may require spreading beyond the general disturbance area to maintain grades and runoff, and to facilitate restoration. In these areas, topsoil will be salvaged and set aside to be placed over the subsoil material during restoration. These locations will be mitigated on a case-by-case basis. Spoil material will be used for backfill where suitable, and the remainder will be spread at the tower site or along graded access roads or in locations previously agreed upon by the Applicant and the appropriate land management agency or private landowner.

Foundation or anchor holes left open or unguarded will be covered to protect the public and wildlife. If practical, fencing may be used. All safeguards associated with using explosives (e.g., blasting mats) will be employed. Blasting activities will be coordinated with the appropriate agencies, particularly for purposes of safety and protection of sensitive areas and biological resources. In extremely sandy areas, water or an appropriate land management agencies' approved gelling agent will be used to stabilize the soil before and during excavation.

Reinforced-steel anchor bolt cages will be installed after excavation and prior to structure installation. These cages are designed to increase the structural integrity of the foundations, will be assembled at the nearest laydown yard or staging area, and delivered to the tower site via flatbed truck. These cages will be inserted in the holes prior to pouring concrete. The excavated holes containing the reinforcing anchor bolt cages will be filled with concrete.

Typically, and because of the remote location of much of the transmission line route, concrete will be provided from portable batch plant areas as described above. Concrete will be delivered directly to the site in concrete trucks with a capacity of up to ten cubic yards. In the more developed areas along the route, the Contractor may use local concrete providers to deliver concrete to the site when economically feasible.

Guyed lattice structures require the installation of anchors and guy wires to support the structure. Depending upon the soil type and engineering strength requirements, anchors will be either excavated plate anchors, drilled and epoxy, or grouted anchors.

Drilled anchors will require a small truck or track mounted drilling equipment that will drill a hole four to eight inches in diameter, 20 to 40 feet or more in depth. The anchor rod is inserted into the open bore and secured to the soil or rock either with epoxy or grout.

Plate anchor are installed in a three to four foot diameter excavation, 10 to 20 feet in depth, drilled by a small truck or track mounted drilling rig. The anchor rod is attached to the plate anchor, placed in the hole and the excavation is backfilled and compacted.

3.5.2.4 Erection of Transmission Structures

Bundles of steel members and associated hardware (insulators, hardware, and stringing sheaves) will be transported to each structure site by truck. Wood blocking will be hauled to each location and laid out; the tower steel bundles will be opened and laid out for assembly by sections and assembled into subsections of convenient size and weight. Typically, the leg extensions for the towers will be assembled and erected by separate crews with smaller cranes to make ready for setting of the main tower assembly. The assembled subsections will then be hoisted into place by means of a large crane and fastened together to form a complete tower. A follow-up crew then will tighten all the bolts in the required joints. Refer to Figure 12 for a general illustration of this procedure. The use of helicopters for structure erection is described in Section 3.5.7 Special Construction Practices.

3.5.2.5 Stringing of Conductors, Shield Wire, and Fiber Optic Ground Wire

Insulators, hardware, and stringing sheaves will be delivered to each tower site. The towers will be rigged with insulator strings and stringing sheaves at each shield (ground) wire and conductor position.

Interruption of road traffic on all types of roads (county, state, federal, interstate) is not anticipated during conductor stringing and tensioning activities unless required under the terms and conditions of a specific road or highway crossing permit. As described below, pilot lines will be pulled from tower to tower by either a helicopter (most commonly) or land operated equipment. The use of a helicopter to pull the pilot lines is commonly used so that impacts to road traffic are minimized or avoided. For safety and efficiency reasons, wire stringing and tensioning activities are typically performed during daylight hours and are scheduled to coincide to the extent practical with periods of least road traffic in order to minimize traffic disruptions.

Railroad crossing operations and procedures are controlled by and permitted through the railroad company operating the affected rail line (see the Union Pacific Railroad website for Overhead Wire Crossings as an example). Terms and conditions to be followed are specified in the crossing permit. Typically, stoppage of railroad traffic is not required during construction or conductor stringing and

tensioning activities. Crossing activities are similar to those for road crossings and typically involve the use of guard structures as discussed below. Stringing and tensioning activities will be performed in coordination with the appropriate railroad authorities. For safety and efficiency, stringing and tensioning activities are performed during daylight periods and scheduled to coincide with times of least railroad traffic. The railroad will typically provide a switchman who is present at all times when work is being performed near or over any railroad line.

For protection of the public during stringing activities, temporary guard structures will be erected at road crossing locations where necessary. Guard structures will consist of H-frame wood poles placed on either side of the road to prevent ground wires, conductors, or equipment from falling on underlying facilities and disrupting road traffic. Typically, guard structures are installed just outside of the road ROW. Although the preference is for access to each of these guard structures to be located outside the road ROW, it may be necessary for access to be within the road ROW depending on topography and access restrictions imposed by the regulatory agency (i.e., State Department of Transportation (DOT), county road and bridge department, etc.). Access use within the road ROW will be performed in compliance with the stipulations of the crossing permit and regulatory agency requirements.

Site specific road crossing locations with excessive widths (generally greater than 200 to 300 feet) such as may occur on interstate highways would require installation of temporary guard structures in medians between opposite traffic flow lanes. Although TransWest does not currently anticipate needing guard structures in medians, as final engineering design progresses, locations requiring center median guard structures may be identified. The erection and dismantling of these temporary guard structures may require short-term traffic diversions. These short-term traffic diversions, which may last from a few hours to a day, are most commonly a short duration closure of the shoulder of the road or in more congested locations might consist of the closure of one lane of traffic. Complete closure of one direction of traffic is not anticipated. Temporary traffic diversion signs, signals, markers, barriers and traffic control personnel, if required by the State DOT, will be employed. These activities would be coordinated with the appropriate State DOTs. Traffic disruptions will be kept to a minimum and TransWest will comply with crossing permit requirements which typically limit durations of traffic interruptions.

In urban locations or for extremely high volume roadways (such as interstate highways), the State DOTs may require the installation of protective steel netting above the roadway for the duration of wire stringing and tensioning operations (generally ranging from a few days to two to three weeks). The installation of protective steel netting requires a brief closure of the roadway (generally 3 - 20 minutes) while the netting is pulled across the roadway and hoisted onto the temporary support structures. This process is repeated when the netting is removed. Because of the heavy traffic volume and the impact of stopping traffic, netting is typically installed during the lowest traffic period (normally 3am to 5am on a Sunday morning) per the requirements of the State DOT. Although not anticipated, any road stoppage will employ all appropriate State DOT traffic safety requirements (signage, flagmen, lighting, signals, temporary barriers, law enforcement, etc.).

The delivery of large pieces of equipment or material as part of the construction process may slow or interrupt traffic on state or county roads on a short-term basis. The duration of these types of traffic disruption are typically very short, a few minutes or less while the delivery truck passes down a roadway or turns a corner. The limited number of large pieces of equipment or material that are

delivered to any one portion of the project tends to make traffic disruptions infrequent and generally unnoticed by the motoring public.

Equipment for erecting guard structures will include augers, backhoes, line trucks, boom trucks, pole trailers, and cranes. Guard structures may not be required for small roads. In such cases, other safety measures such as barriers, flagmen, or other traffic controls will be used. Following stringing and tensioning of all ground wires and conductors, the guard structures will be removed and the area restored.

Pilot lines will be pulled (strung) from tower to tower by either a helicopter or land operated equipment, and threaded through the stringing sheaves at each tower. Following pilot lines, a stronger, larger diameter line will be attached to conductors to pull them onto towers. This process will be repeated until the shield wire, optical ground wire, or conductor is pulled through all sheaves.

Shield wires, fiber optic cable, and conductors will be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end of a conductor segment. Site dimensions for pulling and tensioning equipment are provided in Table 5. These sites may differ in size and dimensions, however, depending on the structure's purpose (e.g., mid-span or dead-end), site-specific topography, and whether anchoring of the shield wire or conductor will be located at these sites. The tensioner, in concert with the puller, will maintain tension on the ground wires or conductor while they are fastened to the towers. Once each type of wire has been pulled in, the tension and sag will be adjusted, stringing sheaves will be removed, and the conductors will be permanently attached to the insulators.

Tension will be maintained on all insulator assemblies to ensure positive contact between insulators, thereby avoiding sparking. Caution also will be exercised during construction to avoid scratching or nicking the conductor surface, which may provide points for corona to occur. Refer to Figure 13 for a general illustration of this procedure.

At tangent and small-angle towers, the conductors will be attached to the insulators using clamps while at the larger angle dead-end structures the conductors are cut and attached to the insulator assemblies by "dead-ending" the conductors, either with a compression fitting or an implosive type fitting. Both are industry-recognized methods. When utilizing the implosive type fitting, pertinent land management agencies, private landowners, and public safety organizations will be notified before proceeding with this method.

Part of standard construction practices prior to conductor installation will involve measuring the resistance of the ground to electrical current near the towers. If the measurements indicate a high resistance, counterpoise will be installed, which will consist of trenching in-ground wire to a depth of 12 inches in non-cultivated land and 18 inches in cultivated land, with a ground rod driven at the end. The counterpoise will be contained within the limits of the ROW and may be altered or doubled back and forth to meet the requirements of the TWE Project. Typical equipment used for installing ground rods includes line trucks, backhoes, and trenchers.

3.5.2.6 Clean-up and Site Reclamation

Construction sites, material storage yards, and access roads will be kept in an orderly condition throughout the construction period. Refuse and trash will be removed from the sites and disposed of

in an approved manner (e.g., in an approved landfill). In remote areas, trash and refuse will be removed to a construction staging area and contained temporarily until such time as it can be hauled to an approved site. No open burning of construction trash will occur. Contaminants such as oils, hydraulic fluids, antifreeze, and fuels will not be dumped on the ground, and all spills will be cleaned up. A Hazardous Materials Management Plan will be prepared with the COM Plan.

For permanent access roads, the primary road surface will remain and not be restored to original contours so that a stable road will be present if equipment is needed to access a tower during operation and maintenance. Construction roads and trails not required for maintenance will be restored to the original contour, seeded, and be left in a condition acceptable to the land management agency or private landowner. The surfaces of these construction roads and trails will be scarified as needed to provide conditions that will facilitate natural revegetation, provide for proper drainage, and prevent erosion (Western 2010).

Following construction, where reasonable, in the areas where it has been determined the access roads will be temporary, the topsoil may be bladed back across the disturbed road section and the access blocked as determined through mutual agreement by the Applicant and the appropriate land management agency or private landowner. In these areas, seeds and roots contained within the respread topsoil layer normally provide a natural source for new growth. A ROW Preparation, Rehabilitation, and Restoration Plan will be developed.

Disturbed areas not required for access roads and maintenance areas around structures will be restored and revegetated, as required by the appropriate land management agency or private landowner. Temporary access roads will be decompacted and the topsoil replaced. The land-management agency, private landowner or local National Resource Conservation Service (NRCS) office will be consulted regarding the appropriate seed mix and rate to revegetate the road surface. Vegetation on an eight-foot wide road surface may be periodically managed to allow equipment travel if necessary. Temporary culverts will be removed. Drivable at-grade waterbars will be installed where needed with frequency proportional to road slope to prevent erosion of the roadbed. Applicable agency Best Management Practices (BMPs) will be implemented. All practical means will be made to restore the land outside the minimum areas needed for safe operation and maintenance to its original contour and to restore natural drainage patterns along the ROW.

3.5.3 Terminal and Substation Construction

Terminal construction activities will occur at the Northern and Southern Terminals. Section 3.5.9.3 summarizes the types of construction equipment to be used at each terminal, substation or series compensation station.[10]

Construction of the AC/DC converter stations, substations or series compensation stations will initially consist of survey work, geotechnical sample drillings approximately 20 to 50 feet deep, and soil resistivity measurements that will be used in the final design phases of the station. Once the final design of the station has been completed, a Contractor will mobilize to perform site development

[10] Terminal construction for the proposed Project includes the adjacent substations. Separate substations and/or series compensation stations are required for System Alternatives 2 and 3. Descriptions of the construction for the substations and series compensation station for System Alternatives 2 and 3 are included within this section for convenience and completeness.

work, including grubbing and then reshaping the general grade to form a relatively (one percent slope) flat working surface. This effort also will include the construction of permanent all-weather access roads. An eight-foot-tall chain link fence will be erected around the perimeter of the terminal, substation or series compensation station to prevent unauthorized personnel from accessing the construction and staging areas. The perimeter fence will be a permanent feature to protect the public from accessing the facility. The excavated and fill areas will be compacted to the required densities to allow structural foundation installations. Oil containment structures required to prevent oil from transformers, reactors, circuit breakers, etc., from getting into the ground or water bodies in the event of rupture or leak, will be installed.

Following the foundation installation, underground electrical raceways and copper ground grid installation will take place, followed by steel structure erection and area lighting. The steel structure erection will overlap with the installation of the insulators and bus bar, as well as the installation of the various high-voltage apparatus typical of an electrical substation. The converter valve hall and ancillary buildings will be erected. The installation of the high-voltage transformers will require special high-capacity cranes and crews (as recommended by the manufacturer) to be mobilized for the unloading, setting into place, and final assembly of the transformers. While the above mentioned activities are taking place, the enclosures that contains the control and protection equipment for the terminal, substation and series compensation station will be constructed, equipped, and wired. A final crushed rock surface will be placed on the subgrade to make for a stable driving and access platform for the maintenance of the equipment. After the equipment has been installed, testing of the various systems will take place, followed by electrical energization of the facility. The energization of the facility generally is timed to take place with the completion of the transmission line work and other required facilities.

Soil Boring

Typically, soil borings will be made on a 600-foot grid spacing within the terminal, substation or series compensation station, particularly at the approximate location of large structures and equipment such as substation dead-ends and transformers, to determine the engineering properties of the soil for foundation design. Borings will be made with truck- or track-mounted equipment. The borings will be approximately four inches in diameter, range from 20 to 50 feet deep, and be backfilled with the excavated material upon completion of soil sampling.

Clearing and Grading

The Contractor will mobilize to perform site development work including grubbing, grading and construction of an all-weather access road (gravel). Clearing of all vegetation will be required for the entire terminal, substation or series compensation station area, including a distance of approximately eight to ten feet outside the fence.

Once the vegetation is cleared, the entire site will be graded essentially flat, with enough slope to provide for runoff of precipitation. The site will be graded to use existing drainage patterns to the extent possible. Depending upon the size of the site a more complex drainage design may be required to handle larger volumes of runoff. Drainage design for large sites may require drainage zones, retention basins, and drainage structures such as ditches or culverts. After grading, the entire site will be treated with a soil sterilizer to prevent vegetation growth to minimize future maintenance. Clearing and grading material will be disposed of in compliance with local ordinances. Material from

off-site will be obtained at existing borrow or commercial sites and will be trucked to the site using existing roads and the site access road.

Once installation of foundations, underground electrical raceways and copper ground grid are completed, a four to six inch layer of crushed rock will be applied to the finished surface of the station to provide a solid all-weather working surface and to protect personnel from high currents and voltages during electrical fault conditions.

Storage and Staging Yards

Construction material storage yards may be located outside the terminal, substation or series compensation station-fenced area near the facility being constructed. These storage yards may be part of the terminal, substation series compensation station property or leased by the Contractor. After construction is completed, all debris and unused materials will be removed and the staging/storage yards returned to preconstruction conditions by the Contractor.

Grounding

A grounding system will be required in each terminal, substation and series compensation station for detection of faults and for personnel safety. The grounding system typically consists of buried copper conductor arranged in a grid and driven ground rods, typically eight to ten feet long. The ground rods and any equipment and structures are connected to the grounding conductor. The amount of conductor and length and number of ground rods required will be calculated based on fault current and soil characteristics.

Fencing and Lighting

Security fencing will be installed around the entire perimeter of each terminal, substation and series compensation station to protect sensitive equipment and prevent accidental contact with energized conductors by third parties. This seven-foot-high fence would be constructed of chain link with steel posts. One foot of barbed wire or similar material will be installed on top of the chain link yielding a total fence height of eight feet. Locked gates will be installed at appropriate locations for authorized vehicle and personnel access.

Safety and security lighting at the terminals, substations and series compensation stations will be provided inside the fence for safety and security, and for uncommon emergency night repair work. Dusk to dawn safety and security lighting will be used at the terminals and 500 kV AC substations.

Foundation Installation

Foundations for supporting structures and large buildings are of two types: spread footings or drilled piers. Spread footings are placed by excavating the foundation area, placing forms and reinforced-steel and anchor bolts, and pouring concrete into the forms. After the foundation has been poured, the forms would be removed, and the surface of the foundation finished. Drilled pier foundations are placed in a hole generally made by a track or truck-mounted auger. Reinforced-steel and anchor bolts are placed into the hole using a track or truck-mounted crane. The portion of the foundation above ground would be formed. The portion below ground uses the undisturbed earth of the augured hole as the form. After the foundation has been poured, the forms would be removed, the excavation would be backfilled, and the surface of the foundation finished.

Equipment foundations for circuit breakers, transformers, and small prefabricated buildings will be slab-on-grade type. These foundations are placed by excavating the foundation area; placing forms, reinforced steel, and anchor bolts (if required); and placing concrete into the forms. After the foundations have been poured, the forms are removed, and the surface of the foundation finished. Where necessary, provisions will be made in the design of the foundations to mitigate potential problems due to frost. Reinforced steel and anchor bolts will be transported to each site by truck, either as a prefabricated cage or loose pieces, which will then be fabricated into cages on the site. Concrete will be hauled to the site in concrete trucks. Excavated material will be spread at the site or disposed of in accordance with agency requirements or local ordinances. Structures and equipment will be attached to the foundations by means of threaded anchor bolts embedded in the concrete. Some equipment such as transformers and reactors may not require anchor bolts.

Oil Containment

Some types of electrical equipment, such as transformers, and some types of reactors and circuit breakers, are filled with an insulating mineral oil. Containment structures are required to prevent equipment oil from getting into the ground or waterbodies in the event of a rupture or leak. These structures take many forms depending on site requirements, environmental conditions, and regulatory restrictions. The simplest type of oil containment is a pit, of a calculated capacity, under the oil-filled equipment that has an oil-impervious liner. The pit is filled with rock to grade level. In case of an oil leak or rupture, the oil captured in the containment pit is pumped into tanks or barrels and transported to a disposal facility. If required, more elaborate oil-containment systems can be installed. This may take the form of an on-site or off-site storage tank and/or oil-water separator equipment depending on site requirements.

Structure and Equipment Installation

Supporting steel structures are erected on concrete foundations. These are set with a track or truck-mounted crane and attached to the foundation anchor bolts by means of a steel base plate. These structures will be used to support the energized conductors and certain types of equipment. This equipment will be lifted onto the structure by means of a truck-mounted crane and bolted to the structures; electrical connections are then made. Some equipment, such as transformers, reactors, and circuit breakers, will be mounted directly to the foundations without supporting structures. These will be set in place by means of a truck-mounted crane. Some of this equipment requires assembly and testing on the pad. Electrical connections to the equipment will then be made.

Equipment Housing, Control, Storage and Ancillary Building Construction

The Project will require several buildings at each terminal, substation or series compensation site. Depending upon size and function, these buildings will be either prefabricated or constructed on site as concrete block or metal clad steel frame buildings.

The following provides a brief description and approximate dimension of the building types generally required for the terminals:

> The **HVDC Converter Valve Hall** is a large building that contains the high-voltage electronics involved in the conversion process (referred to as valves), the valve cooling circulation system (pipes required to circulate the cooling medium), clean air exchange, and other supporting environmental conditions required for operation of the converter system. The valves are typically suspended from the ceiling of the building which requires large

clearance distances to the ground and surrounding structures due to the high voltages that are generated within the building during the conversion process. The building will be approximately 60 to 80 feet in height and the footprint will be approximately 200 by 80 feet. There will be two buildings of this size; one housing the valve equipment for the positive DC pole and the other housing the equipment for the negative DC pole.

An **HVDC Auxiliary Support Building** is typically placed between the two valve halls or very near the valve halls. This building contains the pumps and heat exchange system for cooling of the valves. The building is typically 100 feet wide, 100 feet long and approximately 20 feet high.

A **Main Operations Building** housing operations, general office and support functions is approximately 150 by 150 feet square and is typically a two-story building with a complete basement. The HVDC control room and supporting control systems are housed in a main operations building. The telecommunications equipment, the HVDC controls equipment, and the operational control room are typically located in separated secure spaces to assure safety and to restrict access to all levels of automation and telecommunication. Operations, administrative staff, and maintenance dispatch supporting facilities are also located within this building. Control spaces will be equipped with full ranges of uninterrupted power supply power protection, fire safety operations, and dispatcher coordination centers. This facility will also include the SCADA control and monitoring systems for the Project's entire AC substation, and transmission systems as necessary up to the points of interconnection with the regional grid.

The **Security Control Office Building** will be an approximately 30 by 30 foot single story building with a full basement, to facilitate life safety and other equipment including domicile facilities for security personnel on extended shift work.

The **Diesel Generator Building** will be an approximately 100 by 30 foot single story building. This building contains diesel generators and support equipment necessary to operate the facility on loss of the primary power source.

The **DC Switchyard Building** is typically a single story building of approximately 30 feet by 60 feet. One or more control buildings may be required at each terminal to house control devices, battery banks for primary control power, and remote monitoring equipment. The size and construction of the building will depend on DC switchyard requirements. Typically, the control building will be constructed of concrete block, pre-engineered metal sheathed, or composite surfaced materials. Once the control house is erected, protection and control equipment will be mounted and wired inside.

A **Hazardous Chemical and Dry Storage Building** will be developed to place the various chemical bulk storage and other items outside and apart from the other buildings in the terminal complex. This building will be approximately 30 feet by 30 feet. This building will be supplied with the code required containment, life, and fire safety systems.

A **Dry Indoor Storage Building** will be developed based on the requirements of the HVDC Contractor and is estimated to be approximately 100 feet by 150 feet, single story, high bay building.

The following provides a brief description and approximate dimension of the buildings types generally required for the terminals, substations and series compensation stations:

> The **AC Switchyard Control House** is typically a single story structure of approximately 30 feet by 60 feet. One or more control buildings may be required at each switchyard, substation or series compensation station to house protective relays, control devices, battery banks for primary control power, and remote monitoring equipment. The size and construction of the building will depend on individual substation requirements. Typically, the control building will be constructed of concrete block, pre-engineered metal sheathed, or composite surfaced materials. Once the control house is erected, protection and control equipment will be mounted and wired inside.

Conductor Installation

The two main types of high-voltage conductors used in terminals and substations are tubular aluminum for rigid bus sections and/or stranded aluminum conductor for strain bus and connections to equipment. Rigid bus will be a minimum of four inches in diameter and will be supported on porcelain or polymer insulators on steel supports. The bus sections will be welded together and attached to special fittings for connection to equipment. Stranded aluminum conductors will be used as flexible connectors between the rigid bus and the station equipment.

Conduit and Control Cable Installation

Most terminal and substation equipment requires low-voltage connections to protect relaying and control circuits. These circuits allow metering, protective functions, and control (both remote and local) of the power system. Connections will be made from the control building to the equipment through multi-conductor control cables installed in conduits and/or a pre-cast concrete cable trench system.

3.5.4 Ground Electrode Construction

Construction of the two ground electrode facilities will be initiated with a survey and staking to layout the location of the access road, deep earth electrode wells, control building and low voltage underground electrical, control and monitoring cables connecting the wells to the control building. The Contractor will mobilize to perform site development work including grubbing and grading and construction of an all-weather access road (gravel). Grubbing, grading, and contouring of the entire site is not required. Removal of vegetation will be required for the access road, control building site, well sites, alignments of the underground electrical, control and monitoring cables and on-site material storage yard/staging area.

Once the vegetation is cleared, the control building site will be graded essentially flat, with enough slope to provide for runoff of precipitation. After grading, the control building site will be treated with a soil sterilizer to prevent vegetation growth to minimize future maintenance. Next, a thin layer of gravel or crushed rock will be applied to the finished surface of the control building site. With the exception of the permanent and temporary access roads, no additional grading will be required. Clearing and grading material will be disposed of in compliance with local ordinances. Material from off-site will be obtained at existing borrow or commercial sites, and will be trucked to the regeneration site using existing roads and the regeneration site access road.

Security fencing will be installed around the perimeter of the control building site. This seven-foot-high fence would be constructed of chain link with steel posts. One foot of barbed wire or similar material will be installed on top of the chain link yielding a total fence height of eight feet. A locked gate will be installed for authorized vehicle and personnel access.

Foundations for the prefabricated building will be slab-on-grade type. These foundations are placed by excavating the foundation area; placing forms, reinforced steel, and anchor bolts; and placing concrete into the forms. After the foundations have been poured, the forms are removed, and the surface of the foundation finished. Where necessary, provisions will be made in the design of the foundations to mitigate potential problems due to frost.

Reinforced steel and anchor bolts will be transported to each site by truck which will then be fabricated into cages on the site. Concrete will be hauled to the site in concrete trucks. Excavated material will be spread at the site or disposed of in accordance with agency requirements or local ordinances. The pre-fabricated building will be transported to the site by truck and attached to the foundations by means of threaded anchor bolts embedded in the concrete.

Each ground electrode site will require drilling approximately 60 deep earth wells. Each electrode well will be a 12 to 18 inch diameter bore drilled to a depth of 200 to 700 feet (depth based upon engineering and design). The well drilling will require small amounts of water which will be procured from commercial or municipal sources. Ground water will not be removed although small amounts of water, mud and spoil will be brought to the surface as part of the drilling process. All excess water, mud, drilling fluids, and spoils will be contained adjacent to the drill rig and when completed will be disposed of per landowner and agency requirements.

Once drilling is completed, a wire will be grouted into the well, the well capped, and a small area excavated around the well head for the installation of the utility access vault. A precast concrete utility access vault is installed. This utility access vault provides access to the well in addition to preventing public access to the well connections or electrode components.

Several underground cables are installed in trench connecting each well to the control building. These cables provide a low voltage electrical connection from the control building to each well, and perform control and monitoring functions. Cables will be direct buried with the trench backfilled and compacted with spoil. Once backfilling is complete, the trenched area will be contoured back to match existing slopes and grades.

A communication system used for monitoring and control of the ground electrode facility will be installed. This communication link will require installation of either a buried or overhead fiber optic cable, and equipment or fixed radio communication equipment and antenna.

Connection to a local electric distribution circuit will be required to provide power to the site. Additionally, an emergency generator with a liquid propane (LP) gas fuel tank will be installed adjacent to the control building inside the fenced area.

3.5.5 Communications System Construction

The fiber optic network will require regeneration sites at periodic distances along the transmission line, as determined in the detailed engineering studies. In general, these regeneration sites are planned

to be within the transmission line ROW. The communications system facilities will be constructed concurrently with the transmission line.

Construction will be initiated with a survey and staking to layout the location, and extent of the regeneration site. The Contractor will mobilize to perform site development work including grubbing, grading, and construction of an all-weather access road (gravel).

Clearing of all vegetation will be required for the entire regeneration site, including a distance of approximately eight to ten feet outside the fence. Once the vegetation is cleared, the entire regeneration site will be graded essentially flat, with enough slope to provide for runoff of precipitation. After grading, the entire site will be treated with a soil sterilizer to prevent vegetation growth to minimize future maintenance. Next, a thin layer of gravel or crushed rock will be applied to the finished surface of the regeneration site. Clearing and grading material will be disposed of in compliance with local ordinances. Material from off-site will be obtained at existing borrow or commercial sites, and will be trucked to the regeneration site using existing roads and the regeneration site access road.

Security fencing will be installed around the entire perimeter of each regeneration station. This seven-foot-high fence would be constructed of chain link with steel posts. One foot of barbed wire or similar material will be installed on top of the chain link yielding a total fence height of eight feet. A locked gate will be installed for authorized vehicle and personnel access.

Foundations for the prefabricated building(s) will be slab-on-grade type. These foundations are placed by excavating the foundation area; placing forms, reinforced steel, and anchor bolts; and placing concrete into the forms. After the foundations have been poured, the forms are removed, and the surface of the foundation finished. Where necessary, provision will be made in the design of the foundations to mitigate potential problems due to frost.

Reinforced steel and anchor bolts will be transported to each site by truck which will then be fabricated into cages on the site. Concrete will be hauled to the site in concrete trucks. Excavated material will be spread at the site or disposed of in accordance with agency requirements or local ordinances. Pre-fabricated building(s) will be transported to the site by truck and attached to the foundations by means of threaded anchor bolts embedded in the concrete.

The fiber optic cable will be connected from the splice box located near the bottom of the nearest transmission structure to the control building at the regeneration site via two diverse paths, either overhead or underground. The overhead path may require one, two or three short distribution type poles all located on the transmission ROW. An underground path will require trenching and burial of an underground fiber optic cable. All trenching is to occur on the transmission ROW.

Connection to a local electric distribution circuit will be required to provide power to the site. Additionally, an emergency generator with a LP gas fuel tank will be installed at the site inside the fenced area.

A short tower (generally less than 30 feet) with a UHF/VHF radio antenna will be installed to provide communication support for transmission line patrol and maintenance operations and allow emergency operations independent of commercial common carrier (i.e., cellular telephone).

3.5.6 Post Construction Clean-Up and Restoration

Terminal, ground electrode, series compensation station and transmission line construction will generate a variety of solid wastes including concrete, hardware, and wood debris. The solid wastes generated during construction will be recycled or hauled away for disposal. Excavation along the ROW and at terminals and substations will generate excavated subsoil spoil that could potentially be used as fill; however, some of the excavated material will be removed for disposal.

The majority of waste associated with terminal and substation construction results from spoils created during site grading. Very little of the soil excavated during foundation installation is waste product. Above-grade waste will be packing material such as crates, pallets, and paper wrapping to protect equipment during shipping. It is assumed a 12-yard dumpster will be filled once a week with waste material for the duration of each terminal or substation project.

Clean-up and restoration will consist of:

- Removing packing crate reels, shipping material and debris, and disposing of them at approved landfill sites;
- Backfilling holes and ruts in access roads, installing water bars, and doing final grading;
- Dressing work sites and structure sites to remove ruts;
- Mitigating soil compaction and leveling, disking, and preparing areas for seeding, as required;
- Maintaining permanent access roads as needed for future maintenance work;
- Leaving access roads in place, but not regularly maintaining them. Access roads will be graded, have water bars installed, and reseeded to encourage vegetation cover according to appropriate land management agency or private landowner requirements;
- Repairing fences and gates to their original condition or better;
- Grounding fences;
- Seeding and revegetating, as specified in the COM Plan and in accordance with appropriate land management agency or private landowner requirements; and
- Contacting property owners and processing claims for settlement.

3.5.7 Special Construction Practices

3.5.7.1 Blasting

As described earlier in this section, foundations for tubular steel poles and self supporting steel lattice towers will normally be installed using drilled shafts or piers. Foundations for guyed steel lattice towers will typically be small precast or cast-in-place concrete pedestals. If hard rock is encountered within the planned drilling depth, blasting may be required to loosen or fracture the rock to reach the required depth to install the tower foundations. Areas where blasting will likely occur will be identified during final design based on the geologic conditions of the Agency Preferred Alternative alignment as determined by the geotechnical investigation. The Contractor will be required to prepare a Blasting Plan for the Project, subject to the approval of the Applicant. The Blasting Plan

will detail the Contractor's proposals for compliance with the Applicant's blasting specifications and Blasting Plan framework from the COM Plan, and will detail the general concepts proposed to achieve the desired excavations. In addition, the Plan will address proposed methods for controlling fly rock, for blasting warnings, and for use of non-electrical blasting systems. The Contractor will be required to provide data to support the adequacy of the proposed efforts regarding the safety of structures and slopes and to ensure that an adequate foundation is obtained. When utilized, blasting will take place between sunrise and sunset.

The Blasting Plan will contain shot plans which will detail the drilling and blasting procedures; the number, location, diameter, and inclination of drill holes; the amount, type, and distribution of explosive per hole and delay; and pounds of explosive per square foot for pre-splitting and smooth blasting. The Contractor will be required to maintain explosives logs.

Blasting near buildings, structures, and other facilities susceptible to vibration or air blast damage will be carefully planned by the Contractor and the Applicant, and controlled to eliminate the possibility of damage to such facilities and structures. The Blasting Plan will include provisions for control to eliminate vibration, fly rock, and air blast damage.

Blasting will be very brief in duration (milliseconds), and the noise will dissipate with distance. Blasting produces less noise and vibration than comparable non-blasting methods to remove hard rock. Non-blasting methods include track rig drills, rock breakers, jack hammers, rotary percussion drills, core barrels, and rotary rock drills with rock bits, which all require much longer time duration to excavate the same amount of rock as blasting.

3.5.7.2 Helicopter Construction

Helicopter construction techniques may be used for the erection of structures, stringing of conductor and shield wire, and other Project construction activities. The use of helicopters for structure erection is evaluated based on site- and region-specific considerations including access to structure locations, sensitive resources, permitting restrictions, construction schedule, weight of structural components, time of year, elevation, availability of heavy lift helicopters, and/or construction economics.

Helicopter erection of structures is a viable option for all locations without restrictions prohibiting or restricting helicopter use. As such "fly yards", each seven acres in size have been incorporated into Project planning. In areas without restrictions on helicopter usage, the decision to employ helicopter construction techniques will be determined by the Contractor. However it is not anticipated that helicopter erection will be used except potentially in areas with extremely difficult access, in areas with some form of access restriction or in areas required by mitigation measures.

The use of helicopters for pulling shield wire and conductor lead lines is the normal and expected construction technique for wire stringing, as such, helicopters will be used for this purpose on the Project.

Other Project construction activities potentially facilitated by helicopters may include delivery of construction laborers, equipment, and materials to structure sites; structure placement and hardware installation. Helicopters may also be used to support the administration and management of the Project by the Applicant. Except in areas with restrictions on constructing or maintaining access roads, the use of helicopter construction methods would not change the length of the access road

system required for operating the Project, because vehicle access will be required to each structure site regardless of the construction method employed.

When helicopter construction methods are employed, the structure assembly activities will be based at a fly yard. The fly yards will be approximately seven acres and will be sited typically at about five mile intervals within the section of the line employing helicopter erection. Optimum helicopter methods of erection will be used. Bundles of steel members and associated hardware for up to 15 to 20 towers (generally to include insulators, hardware, blocking, stringing sheaves, etc.) are transported to the appropriate fly yard by truck and stored. The steel bundles are opened and laid out by component section and then assembled into assemblies of convenient size and weight according to the helicopter's lifting capabilities. The leg extensions are typically transported to the tower location, assembled, and erected in place (with smaller equipment) in preparation for flying the completed tower sections to each location. After a planned quantity of towers is completely assembled, the helicopter and support force are mobilized and, within a few days, will set all the planned towers within a given section. A follow-up crew will then tighten all the bolts in the joints.

Prior to installation, each tower would be assembled in multiple sections at the fly yard. Tower sections or components would be assembled by weight, based on the lifting capacity of the helicopter in use. The lift capacity of helicopters is dependent on the elevation of the fly yard, the tower site, and the intervening terrain. The heavy lift helicopters that could be used to erect the complete towers or sections of a tower would be able to lift a maximum of 15,000 to 20,000 pounds per flight, depending on elevation.

After assembly at the fly yard, the complete tower or tower section would be attached by cables from the helicopter to the top of the tower section and airlifted to the tower location. Upon arrival at the tower location, the section would be placed directly onto the foundation or atop the previous tower section. Guide brackets attached on top of each section would assist in aligning the stacked sections. Once aligned correctly, line crews would climb the towers to bolt the sections together permanently.

It should be noted that the fly yard locations provided are considered approximate and subject to change, additions, or deletions upon acquisition of a Contractor prior to the beginning of construction. Upon completion of field review, a final determination would be made on the necessity of certain fly yards and the respective locations that provide the most efficient, economic, safest, and least impactful use of the fly yards that are needed.

A helicopter may be used to move personnel and equipment (e.g., pulling lines and assembling towers). Helicopters will set down in areas previously identified to receive temporary disturbance such as fly yards and staging areas. Travelers may be dropped at pulling and tensioning sites or other work areas previously described. Spill protection measures will be in place and all FAA regulations will be followed. Notification will be made to coordinate the air space with other possible helicopters or aircraft in the area (i.e., seeding operations, fire support, and Military Operation Areas).

If needed, additional temporary work areas within close proximity to or on the ROW will be identified by the Contractor and approved by the appropriate land management agency or private landowner for landing and refueling the helicopter. Each fuel truck will be equipped with automatic shutoff valves and will carry spill kits. In addition to the required preventive spill measures, a water truck may be required to spray the site to reduce dust. The Contractor will be required to clean up

any materials released on the ROW. Any accidental spills will be handled according to the guidelines presented in the Hazardous Materials Management Plan.

3.5.7.3 Roadless Construction Methods

The proposed TWE Project corridor reference line crosses the edges of six IRAs in three national forests: Atchinson, Mogotsu, and Moody Wash IRAs in Dixie National Forest; 418008 and 418009 IRAs in Uinta-Wasatch-Cache National Forest; and Cedar Knoll IRA in Manti-La Sal National Forest. In total, the proposed TWE Project ROW crosses approximately 10 miles of IRAs of its total 725-mile length. In addition to the standard construction methods planned for the TWE Project, two specialized construction methods can be used where specific conditions are present that restrict the use of standard methods such as can be found in IRAs.

Within these IRAs, the TWE Project could be constructed by one of two specialized construction methods:

1. Construction zone method
2. Helicopter-only construction method

The standard construction methods described in this PDTR are the preferred methods for the TWE Project. Under specific conditions where access road construction is prohibited, the construction zone method eliminates the need for access roads and allows standard construction methods to take place with specialized vehicles. In extreme conditions where access road construction is prohibited and vegetation clearing is not needed along the entire ROW per Level 3 – Selective ROW Clearance-Based Vegetation Management described in Section 3.6.2.1, the helicopter-only construction method would be effective. These two specialized construction methods are described below.

Construction Zone Method

The Applicant is not proposing to build or maintain any temporary or permanent roads across IRAs. The proposed Project will entail establishing a construction zone for the sole purpose of accommodating motorized equipment needed to construct and bring in supplies necessary for the installation of the ±600 kV DC transmission line. There will be no addition of forest classified or temporary road miles for either construction or maintenance of the TWE Project. Existing forest system roads will be used to access the TWE Project transmission line construction ROW.

A 100-foot-wide construction ROW (construction zone) will be used for installing the transmission line. Helicopter construction methods may be used to the extent practical. Vegetation clearing, grading, and temporary work areas within the IRAs would occur within the construction zone. Topsoil will be salvaged and stockpiled. The extent of construction disturbances would be the same or similar, as previously described for the proposed TWE Project standard construction methods. Although construction of the entire Project is anticipated to occur over an approximately three-year period, construction within a particular IRA from initial ground disturbance to start of reclamation is expected to occur over a six to nine month timeframe.

Following the completion of construction activities, the construction zone will be reclaimed. Disturbed areas will be re-contoured, topsoil replaced, and disturbed lands revegetated with vegetation consistent with USFS requirements and the Vegetation Management Plan. Revegetation treatments would be monitored for three to five years, in accordance with USFS requirements. Once the construction zone is reclaimed, routine maintenance would be via aircraft or low-impact vehicles

such as vehicles with rubber treading, low pressure tires, or specialized mechanical movement to accommodate the terrain and landscape, and all-terrain vehicles (ATVs), or by non-motorized methods (e.g., foot, horseback, or other non-motorized methods). Unless otherwise approved, the transmission line ROW would only be accessed with motorized equipment for emergency repairs, or to maintain NESC electrical line clearances. Long-term disturbances would include maintenance of a limited ROW width, in which active vegetation management would occur. Authorization for continued vegetation management and emergency repairs would be the responsibility of the USFS and conducted in accordance with the COM Plan and USFS stipulations.

The Applicant will work with the USFS to control the use of the ROW and prevent unauthorized travel along the ROW by off-road vehicles. Measures would be determined in consultation with the USFS and may include the following: a) installing gates or other man-made physical barriers; b) creating natural barriers (e.g. large boulders or debris); and c) stockpiling trees cut for ROW clearing at barrier locations.

Helicopter-Only Construction Method

The Applicant is not proposing to build or maintain any temporary or permanent roads across IRAs. This method would construct the Project in IRAs using helicopter-only construction methods supported by minimal impact overland travel. A detailed description of helicopter construction techniques are provided in Section 3.5.7.2. Helicopters would transport personnel, drilling equipment, towers and other construction materials to and from the ROW and would be used for wire stringing. Access to the ROW also could be accomplished by overland travel using low-impact vehicles as described above for the Construction Zone Method. No blade work would be performed to assist overland travel within the IRAs.

Within an IRA, the structure foundations could be constructed by several methods depending on soil conditions, terrain conditions, and final engineering design. Examples of construction options for installing tower foundations include using precast concrete support pedestals for the guyed steel lattice structures and micro-piles for the self supporting lattice tower foundations transported into the IRA by helicopter or by overland travel using low-impact vehicles. Tower structure sections would be preassembled at approved construction fly yards located outside of the IRAs and airlifted to the tower site locations by helicopter for erection.

Following the completion of construction activities, any temporary disturbance, including any associated with overland travel to access the ROW within the IRA, would be reclaimed and maintained as described above for the Construction Zone Method.

3.5.7.4 Construction in Sensitive Water Resource Areas

Waterbody and Wetland Crossings

Access roads will be designed and constructed to minimize disruption of natural drainage patterns and waterbodies including rivers, streams, ephemeral streams, ponds, lakes, reservoirs, and playas. Structure sites, new access roads, and other disturbed areas will be located away from waterbodies, wherever practicable. Each waterbody crossing will be designed in a distinct segment of the associated access roads as advanced engineering is completed. On all federally-managed lands, the Applicant will consult with the managing agency regarding relevant standards and guidelines pertaining to waterbody road-crossing methods.

Consultation will include site assessment, design, installation, maintenance, and decommissioning of the crossings. Wherever needed, culverts, low-water crossings, and other devices of adequate accepted design will be used to accommodate estimated peak flows of waterways, including crossings of all affected perennial, intermittent, and ephemeral streams. Construction disturbances of banks and beds of waterbodies will be minimized. Performance of low water stream crossings (i.e. drive thru and ford) will be monitored for the life of the access road, and maintained as necessary to preserve water quality. Figure 16 shows typical road designs for low-water crossings and culvert stream crossings.

Potential types of water crossings that would be implemented include:

- **Drive Thru (Arizona Crossing):** Crossing of a channel with minimal vegetation removal where no cut or fill is needed. This is typical for low-precipitation sagebrush country characterized by rolling topography and streams that rarely flow with water.

- **Ford:** Crossing of a channel that includes grading and stabilization. Stream banks and approaches will be graded and stabilized with rock or other erosion control devices to allow vehicle passage. With approval of the land management agency, streambeds in select areas will be reinforced with coarse rock material to support vehicle loads, prevent erosion, and minimize sedimentation of the waterways. Coarse rock will be installed in the streambed in a manner such that it will not raise the level of the streambed, thus allowing continued movement of water, fish, and debris. A typical ford crossing results in a disturbance footprint 25 feet wide (along the waterbody) and 50 feet long (along the roadway) for 1,250 square feet or 0.03 acre of disturbed area at each crossing. The 0.03 acre is based on an estimated disturbance based on the requirement to operate equipment within the riparian area to construct a 14-foot-wide travelway and install armoring to protect it from erosion.

- **Culvert:** Crossing of a waterbody that includes installation of a culvert and construction of a stable road surface for vehicle passage over the culvert. Culverts will be designed and installed under the direction of a qualified engineer who, in collaboration with a hydrologist and an aquatic biologist where required by the land management agency, will specify placement locations; culvert gradient, height, and sizing; and proper construction methods. Culvert design will consider roadbed loading and debris size and volume. The disturbance footprint for a typical culvert installation is estimated to be 50 feet wide (along the waterbody) and 150 feet long (along the road) for 7,500 square feet or 0.17 acre of disturbed area at each crossing. This disturbed area includes approaches to the crossing and side slopes. The amount of area disturbed by excavation and fill material at each crossing will typically be much less and will be determined during final design and engineering. Ground-disturbing activities will comply with agency approved BMPs. Construction will occur during periods of low water or normal flow. The operation of construction equipment in riparian areas will be minimized. All culverts will be designed and installed to meet specified riparian conditions, as identified in applicable unit management plans. Culvert slope will not exceed stream gradient.

  Culverts will typically be partially buried in the streambed to maintain streambed material in the culvert. Sandbags or other non-erosive material will be placed around culverts to prevent scour or water flow outside the culvert. Adjacent sediment control structures such as silt

fences, check dams, rock armoring, or riprap may be necessary to prevent erosion or sedimentation. Stream banks and approaches may be stabilized with rock or other erosion control devices. Culverts will be inspected annually for proper operation and maintained to preserve water quality for the life of the Project (estimated at 50 years or longer).

Wetlands will be avoided to the extent possible and practical in siting transmission line structures, terminals, ground electrode systems, temporary work areas, and access roads. Wetlands can typically be spanned by transmission lines to avoid impacts. Temporary access roads requiring a wetland crossing can minimize impacts by implementing timber or other types of mats that can support construction equipment. The use of mats avoids having to fill the wetland causing permanent impacts. Impacts to wetlands and waters of the U.S. will require a CWA Section 404 permit from the U.S. Army Corps of Engineers (USACE), National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit (Section 402), and Section 401 water quality certification.

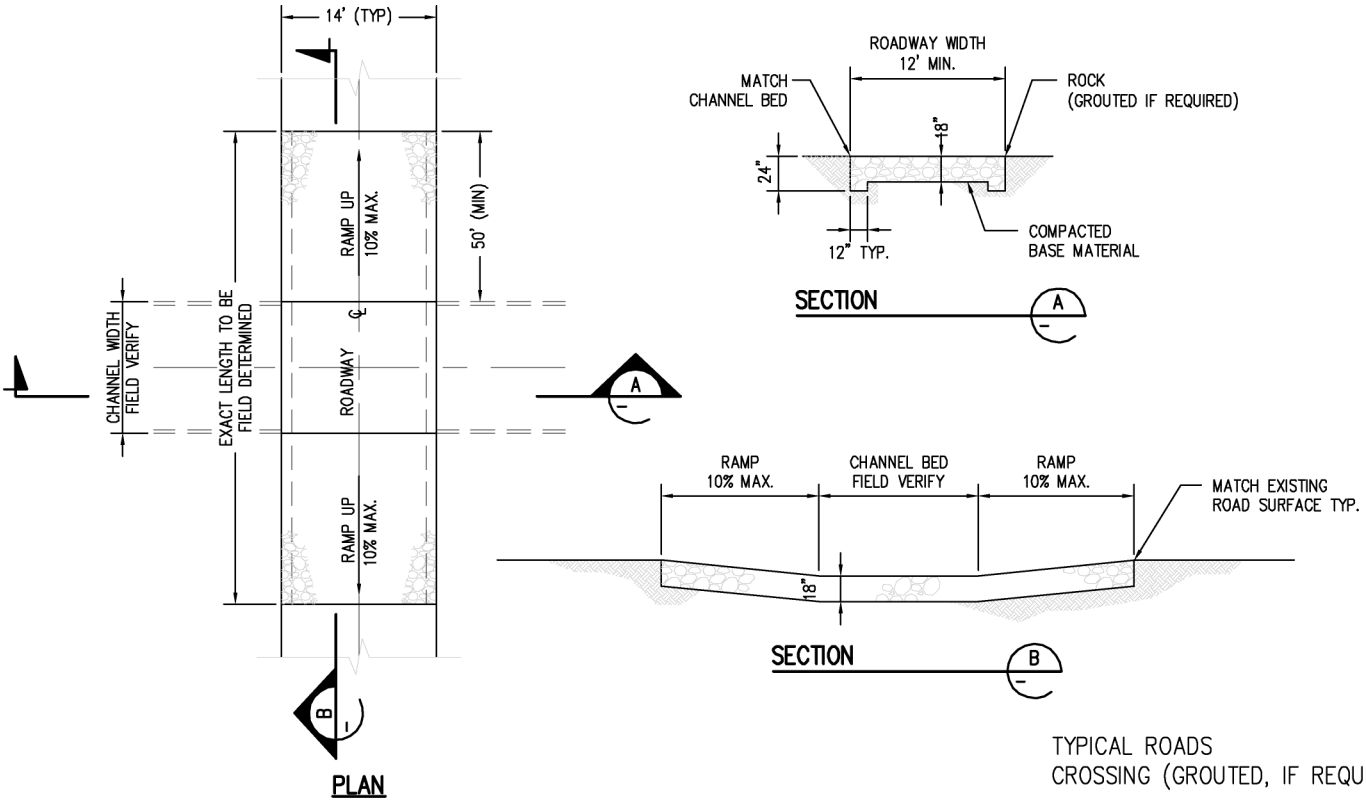
3.5.8 Water Use

Water Uses and Purpose. Construction of the transmission lines and substation/converter stations will require water. Major water uses are for transmission line structure and substation foundations, and dust control during ROW and substation grading and site work. A minor use of water during construction would include the establishment of substation landscaping where required.

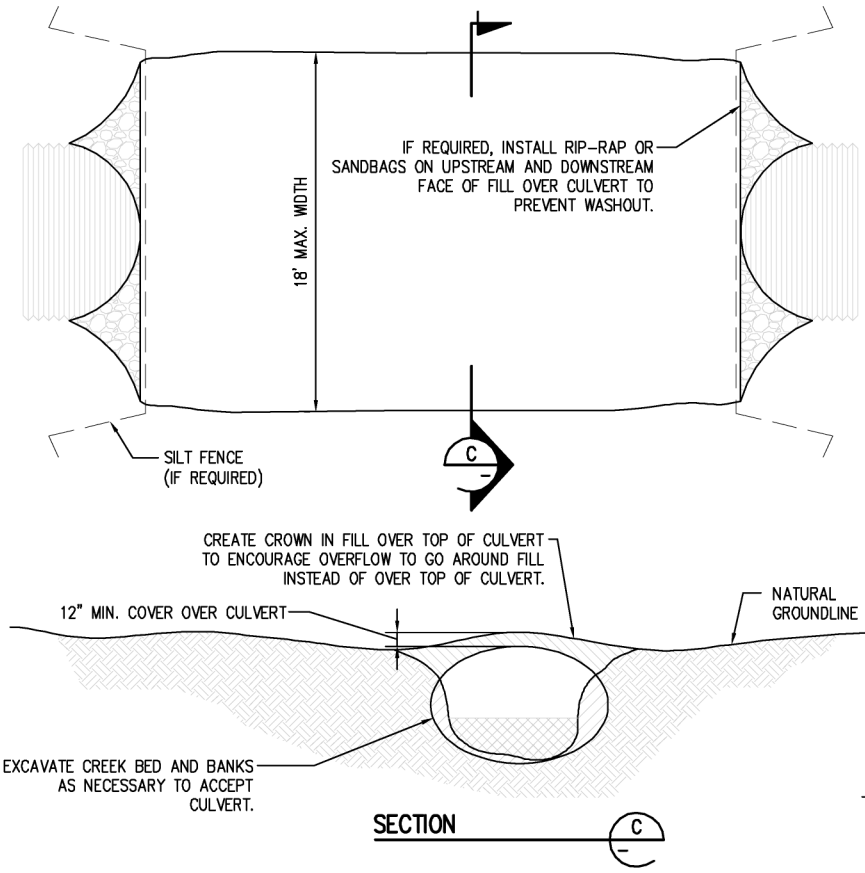
Water usage for transmission line construction is for two primary purposes: foundation construction and ROW dust control. In the construction of foundations, water is transported to the batch plant site where it will be used to produce concrete. From the batch plant, the wet concrete will be transported to the structure site in concrete trucks for use in foundation installation.

Construction of the transmission lines and related facilities will generate a temporary increase in fugitive dust. If the level of fugitive dust is too high in specific project areas, as determined in cooperation with the landowner or agency, water would be applied to disturbed areas to minimize dust.

Water usage for substation/converter station construction is primarily for dust control during site preparation work. During this period, construction equipment would be cutting, moving, and compacting the subgrade surface. As a result, water trucks patrolling the site to control dust would make as many as one pass per hour over the site. Once site preparation work is complete, concrete for the placement of foundations becomes the largest user of water and dust control becomes minimal.



TYPICAL ROADS
CROSSING (GROUTED, IF REQUIRED)



TYPICAL ROADS – CULVERT

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FIGURE 16

TYPICAL ROAD DESIGNS FOR
LOW WATER & CULVERT CROSSINGS

Once site grading is complete, the balance of the substation construction work would be performed on bare subgrade soil or subgrade with a thin layer of rock. Fire risk would be minimal due to the bare ground or rock surface and would be contained within the confines of station-fenced area.

Water Use Estimates. The estimated water required per mile of transmission line construction is approximately 3,400 gallons for foundation concrete and 240,000 gallons for dust control. Water required for construction of the Northern Terminal is estimated to be 600,000 gallons including dust control. Water required for construction of the Southern Terminal is estimated to be 400,000 gallons including dust control due to less disturbance and fewer foundations. Estimated water required for each ground electrode site is 150,000 gallons including dust control. The required water will be procured from municipal sources, from commercial sources, or under a temporary water use agreement with landowners holding existing water rights. No new water rights will be required.

3.5.9 Construction Schedule, Workforce and Equipment

The proposed construction schedule for the TWE Project will be developed for the Agency Preferred Alternative during engineering and design. The construction schedule for the TWE Project will incorporate timing restrictions for special status plant and animal species, as determined by the land management and regulatory agencies in their respective decision documents. For purposes of the DEIS analysis, conceptual schedules have been developed, which provide general estimates on the duration of activities for each of the proposed TWE Project facilities. Conceptual schedules are described in Section 3.5.9.1. Estimated workforce and equipment needs are described in Sections 3.5.9.2 and 3.5.9.3, respectively.

3.5.9.1 Construction Schedule

It is anticipated that total construction timeframe for the transmission line will be approximately three years, concurrent with terminals and ground electrode system construction.

Conceptual schedules for the proposed TWE Project are shown in Figures 17, 18, 19 and 20. Figure 17 provides a bar chart construction schedule for a typical 20-mile stretch of the ±600 kV DC transmission line. Figure 18 shows the entire conceptual schedule for constructing the 725 mile long ±600 kV DC transmission line, including access roads and communication facilities. Figure 19 is a schedule for the proposed Northern and Southern Terminals, and Figure 20 is a construction schedule for the ground electrode systems.

For planning purposes, the overall schedule for the transmission line has been separated into three construction spreads or operations by line segment. The transmission line schedules show a staggered start to allow time for setups, material and equipment logistics and coordination between spreads. The total elapsed time of the combined transmission line schedule is approximately 137 weeks. These construction schedules include consideration for the anticipated conditions; however, severe winter weather, delays in equipment manufacturing and/or delivery, seasonal restrictions required for permitting and/or unexpected mitigation could interrupt the schedule inserting delays of weeks to several months or more.

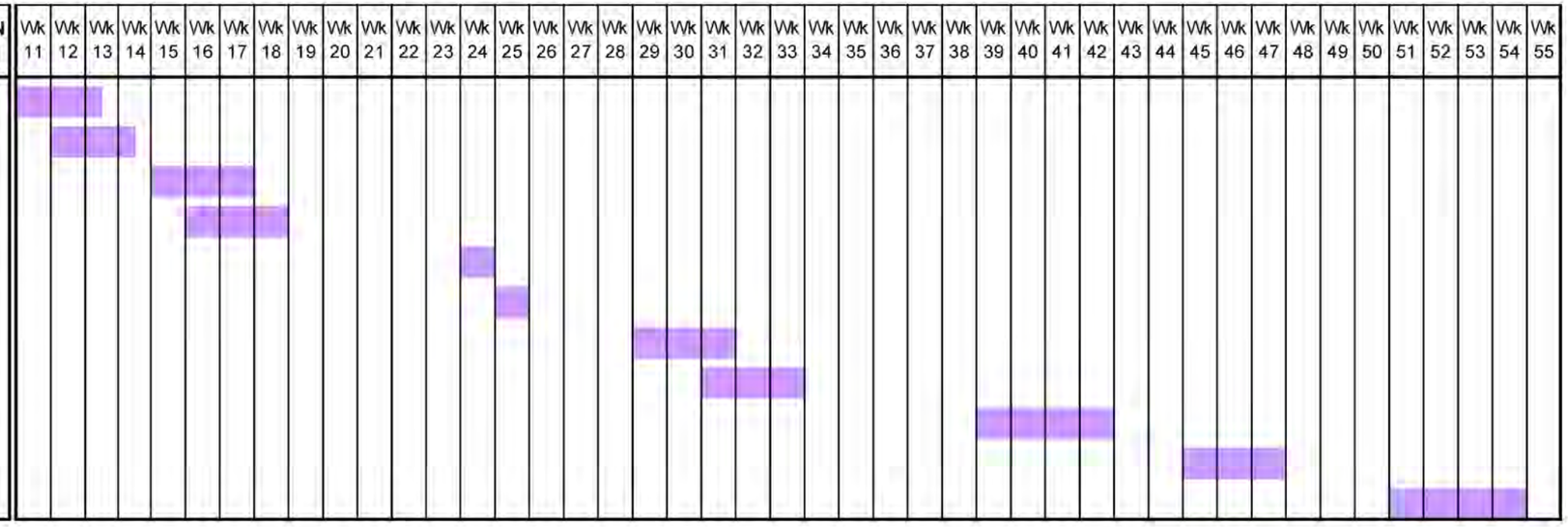
Construction spreads for the transmission line are anticipated at three different locations. The approximate geographic locations are: (1) Northern Terminal to North-East Utah (approximately 221 miles); (2) North-East Utah to West-Central Utah (approximately 235 miles); and (3) West-Central Utah to the Southern Terminal (approximately 269 miles). The line construction will progress

simultaneously at these locations. The construction spreads for the transmission line have been designed such that one or more Contractors may be employed to construct the complete line.

The duration of transmission line construction activities on any given parcel of land may extend up to a year, although the total amount of time of actual construction activity would be much shorter, in the range of a few months. Over any particular section of the route, transmission line construction would be characterized by short periods (ranging from a day to one to two weeks) of relatively intense activity interspersed with periods with no activity. Figure 17 illustrates the typical durations for the construction of a 20-mile section of the transmission line.

The construction of the Northern and Southern Terminals is planned to start approximately three to six months after the start of the construction of the transmission line and run concurrently. The total elapsed time is scheduled for approximately two years. These construction schedules include consideration for the anticipated conditions; however, severe winter weather at the Northern Terminal could interrupt the schedule inserting delays of weeks to several months or more.

TASK	DURATION (WEEKS)
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	2.5
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	2.5
GEOLOGICAL INVESTIGATIONS	3
SURVEY / STAKE STRUCTURE LOCATIONS	3
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	1
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	1
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	3
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	3
ERECT SELF SUPPORTING LATTICE STRUCTURE	4
WIRE INSTALLATION	3
FINAL CLEAN UP / RECLAMATION / RESTORATION	4



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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 17
CONSTRUCTION SCHEDULE FOR 20 MILE SECTION OF ±600kV DC TRANSMISSION LINE

SECTION 1 - APPROXIMATELY 221 MILES
NORTHERN TERMINAL - NORTHEASTERN UTAH
(NORTHERN TERMINAL - ROUTE SEGMENT U50)

TOTAL DURATION: 111 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	111
INSPECTION	109
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	109
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	56
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	67
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	67
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	60
ERECT SELF SUPPORTING LATTICE STRUCTURE	70
WIRE INSTALLATION	61
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2 - APPROXIMATELY 235 MILES
NORTHEASTERN UTAH - WEST CENTRAL UTAH
(ROUTE SEGMENT U55 - ROUTE SEGMENT U210)

TOTAL DURATION: 131 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	131
INSPECTION	129
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	129
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	60
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	60
GEOLOGICAL INVESTIGATIONS	69
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	83
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	83
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	75
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	75
ERECT SELF SUPPORTING LATTICE STRUCTURE	87
WIRE INSTALLATION	76
FINAL CLEAN UP / RECLAMATION / RESTORATION	87

SECTION 3 - APPROXIMATELY 269 MILES
WEST CENTRAL UTAH - SOUTHERN TERMINAL
(ROUTE SEGMENT U220 - SOUTHERN TERMINAL)

TOTAL DURATION: 120 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	120
INSPECTION	118
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	118
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	56
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	56
GEOLOGICAL INVESTIGATIONS	64
SURVEY / STAKE STRUCTURE LOCATIONS	64
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	75
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	75
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	70
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	70
ERECT SELF SUPPORTING LATTICE STRUCTURE	80
WIRE INSTALLATION	70
FINAL CLEAN UP / RECLAMATION / RESTORATION	80

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 18
CONSTRUCTION SCHEDULE FOR ±600kV DC TRANSMISSION LINE BY SEGMENT
SHEET 1

SECTION 1 - APPROXIMATELY 221 MILES
NORTHERN TERMINAL - NORTHEASTERN UTAH
(NORTHERN TERMINAL - ROUTE SEGMENT U50)

TOTAL DURATION: 111 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	111
INSPECTION	109
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	109
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	56
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	67
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	67
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	60
ERECT SELF SUPPORTING LATTICE STRUCTURE	70
WIRE INSTALLATION	61
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2 - APPROXIMATELY 235 MILES
NORTHEASTERN UTAH - WEST CENTRAL UTAH
(ROUTE SEGMENT U55 - ROUTE SEGMENT U210)

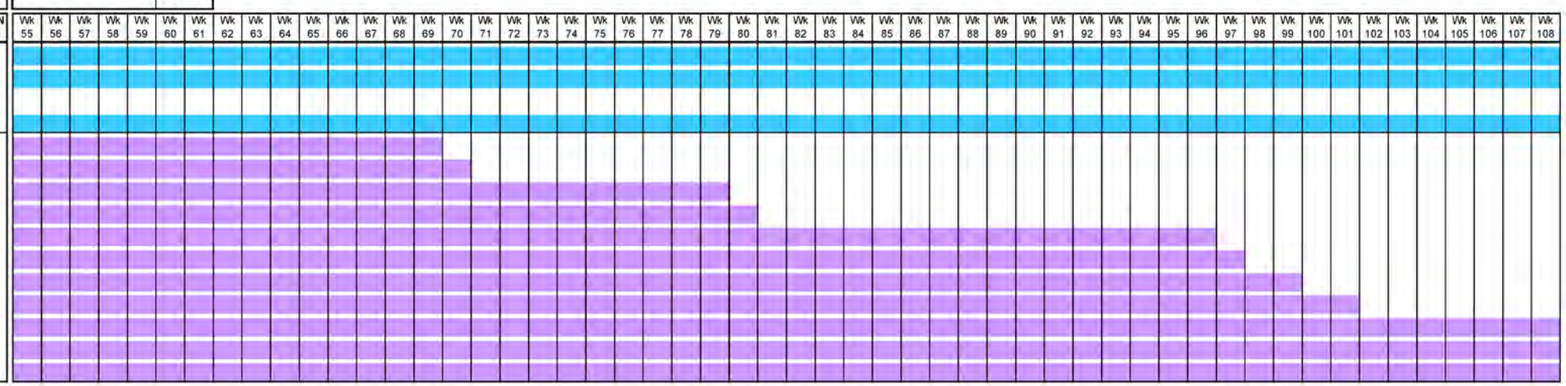
TOTAL DURATION: 131 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	131
INSPECTION	129
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	129
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	60
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	60
GEOLOGICAL INVESTIGATIONS	69
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	83
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	83
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	75
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	75
ERECT SELF SUPPORTING LATTICE STRUCTURE	87
WIRE INSTALLATION	76
FINAL CLEAN UP / RECLAMATION / RESTORATION	87

SECTION 3 - APPROXIMATELY 269 MILES
WEST CENTRAL UTAH - SOUTHERN TERMINAL
(ROUTE SEGMENT U220 - SOUTHERN TERMINAL)

TOTAL DURATION: 120 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	120
INSPECTION	118
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	118
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	56
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	56
GEOLOGICAL INVESTIGATIONS	64
SURVEY / STAKE STRUCTURE LOCATIONS	64
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	75
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	75
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	70
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	70
ERECT SELF SUPPORTING LATTICE STRUCTURE	80
WIRE INSTALLATION	70
FINAL CLEAN UP / RECLAMATION / RESTORATION	80



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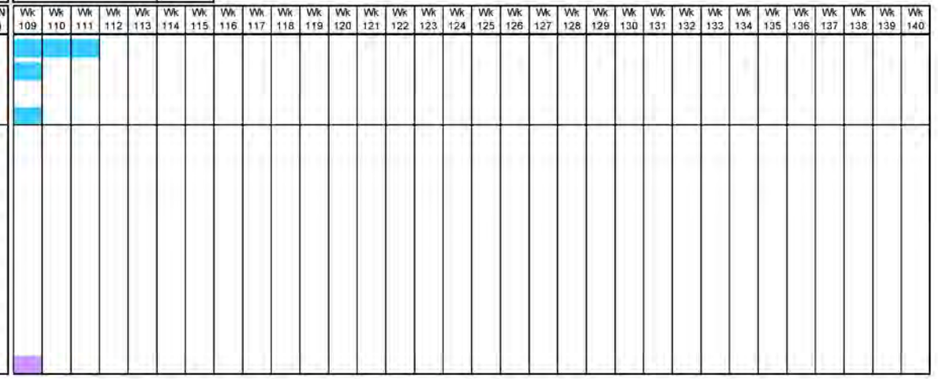
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 18

CONSTRUCTION SCHEDULE FOR
±600kV DC TRANSMISSION LINE BY SEGMENT
SHEET 2

SECTION 1 - APPROXIMATELY 221 MILES
NORTHERN TERMINAL - NORTHEASTERN UTAH
(NORTHERN TERMINAL - ROUTE SEGMENT U50)

TOTAL DURATION: 111 weeks

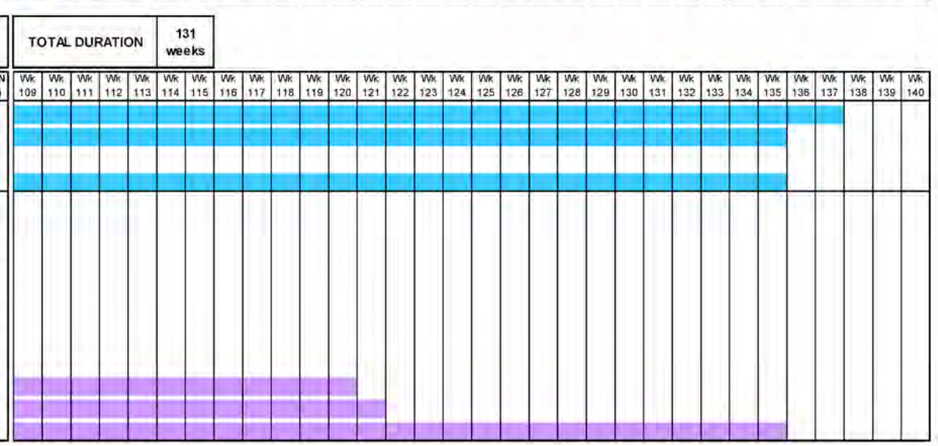
TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	111
INSPECTION	109
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	109
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	56
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	67
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	67
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	80
ERECT SELF SUPPORTING LATTICE STRUCTURE	70
WIRE INSTALLATION	61
FINAL CLEAN UP / RECLAMATION / RESTORATION	70



SECTION 2 - APPROXIMATELY 235 MILES
NORTHEASTERN UTAH - WEST CENTRAL UTAH
(ROUTE SEGMENT U55 - ROUTE SEGMENT U210)

TOTAL DURATION: 131 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	131
INSPECTION	129
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	129
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	60
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	60
GEOLOGICAL INVESTIGATIONS	69
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	83
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	83
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	75
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	75
ERECT SELF SUPPORTING LATTICE STRUCTURE	87
WIRE INSTALLATION	76
FINAL CLEAN UP / RECLAMATION / RESTORATION	87



SECTION 3 - APPROXIMATELY 269 MILES
WEST CENTRAL UTAH - SOUTHERN TERMINAL
(ROUTE SEGMENT U220 - SOUTHERN TERMINAL)

TOTAL DURATION: 120 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	120
INSPECTION	118
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	118
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	56
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	56
GEOLOGICAL INVESTIGATIONS	64
SURVEY / STAKE STRUCTURE LOCATIONS	64
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	75
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	75
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	70
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	70
ERECT SELF SUPPORTING LATTICE STRUCTURE	80
WIRE INSTALLATION	70
FINAL CLEAN UP / RECLAMATION / RESTORATION	80

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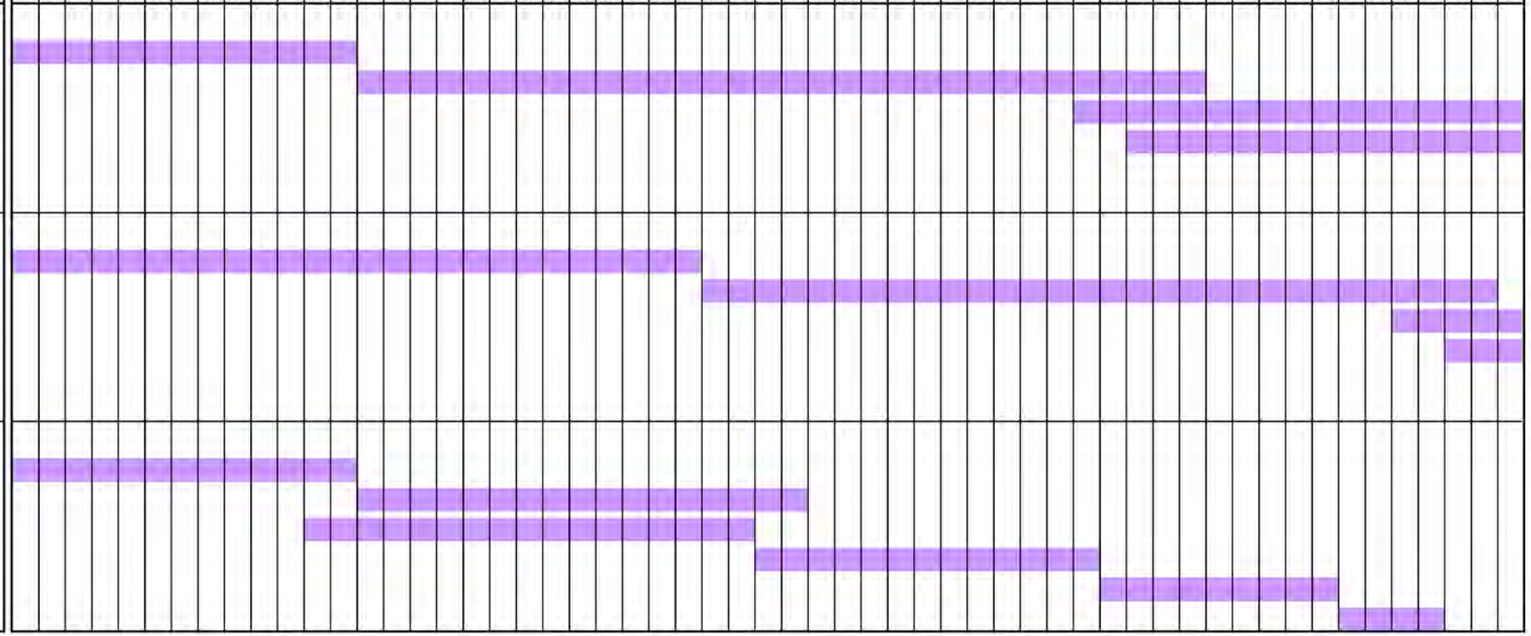
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 18
CONSTRUCTION SCHEDULE FOR
±600kV DC TRANSMISSION LINE BY SEGMENT
SHEET 3

NORTHERN TERMINAL

TOTAL DURATION: 111 week

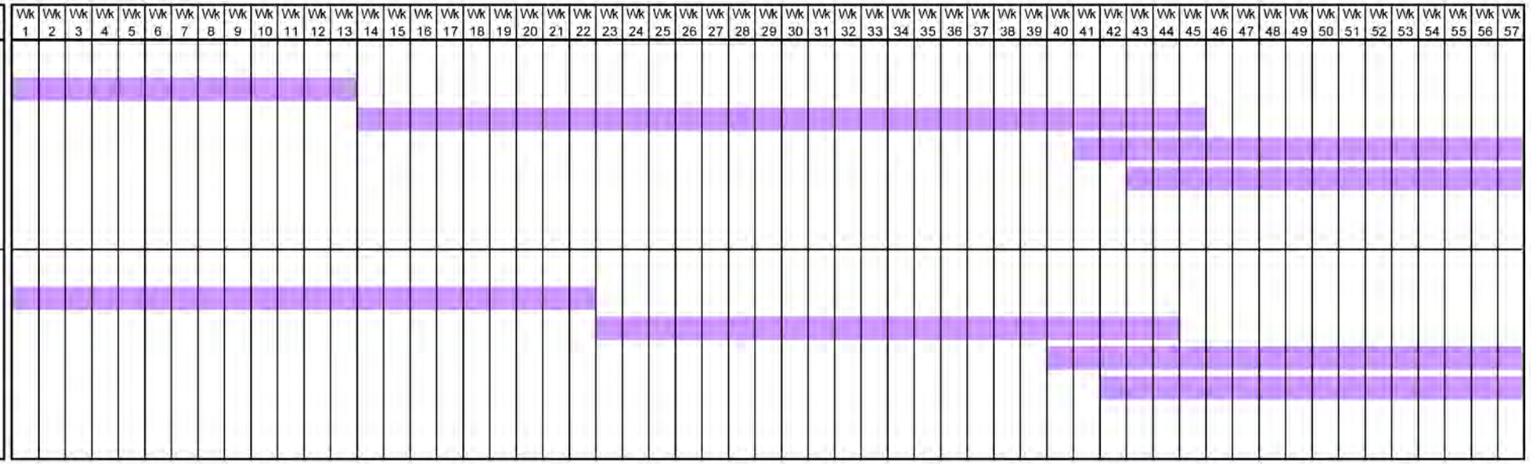
TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	26
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	30
BUILDING CONSTRUCTION	34
EQUIPMENT INSTALLATION	30
EQUIPMENT TESTING	17
OPERATIONAL	7
230 kV AC SUBSTATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	17
BUILDING CONSTRUCTION	17
EQUIPMENT INSTALLATION	13
EQUIPMENT TESTING	9
OPERATIONAL	4



SOUTHERN TERMINAL

TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
BUILDING CONSTRUCTION	26
EQUIPMENT INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	6



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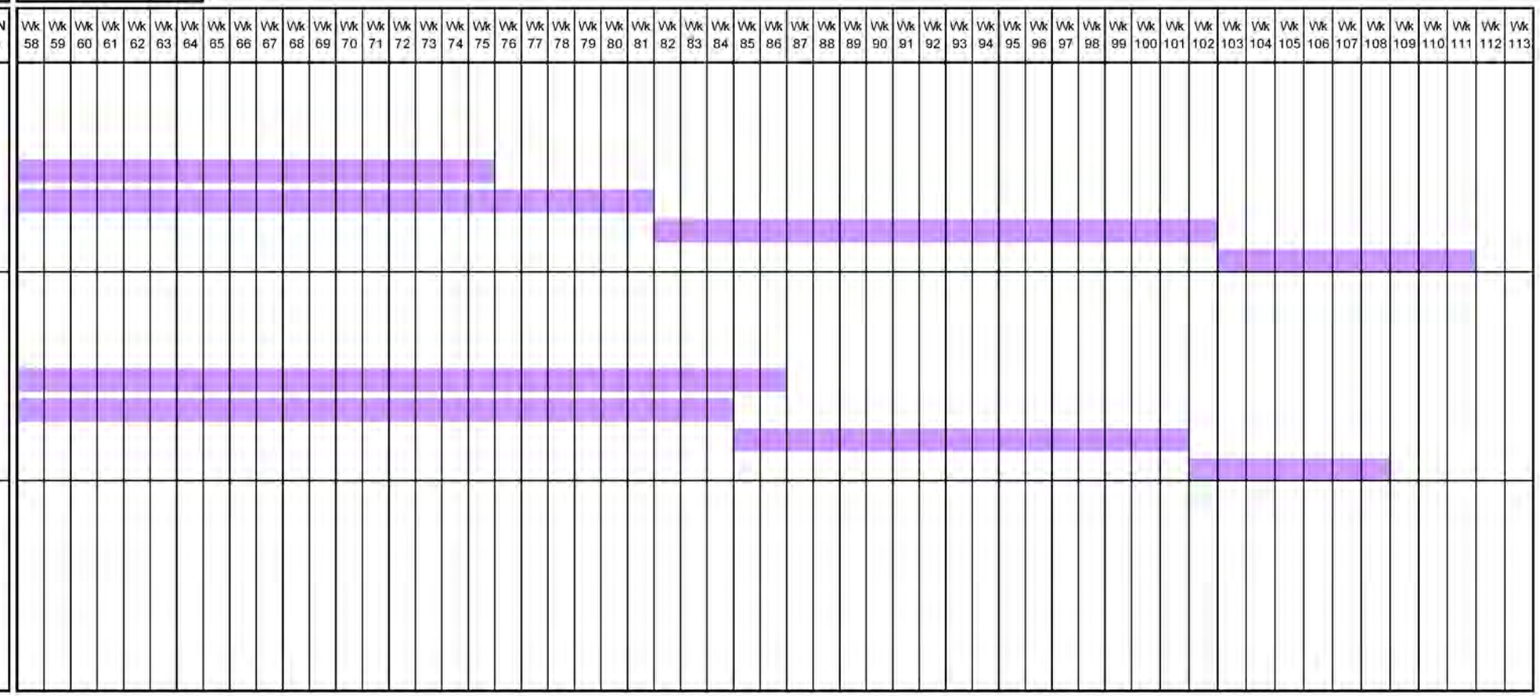
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 19

CONSTRUCTION SCHEDULE FOR
NORTHERN & SOUTHERN TERMINALS
SHEET 1

NORTHERN TERMINAL

TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	26
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	30
BUILDING CONSTRUCTION	34
EQUIPMENT INSTALLATION	30
EQUIPMENT TESTING	17
OPERATIONAL	7
230 kV AC SUBSTATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	17
BUILDING CONSTRUCTION	17
EQUIPMENT INSTALLATION	13
EQUIPMENT TESTING	9
OPERATIONAL	4



SOUTHERN TERMINAL

TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500 kV AC SUBSTATION	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
BUILDING CONSTRUCTION	26
EQUIPMENT INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	6

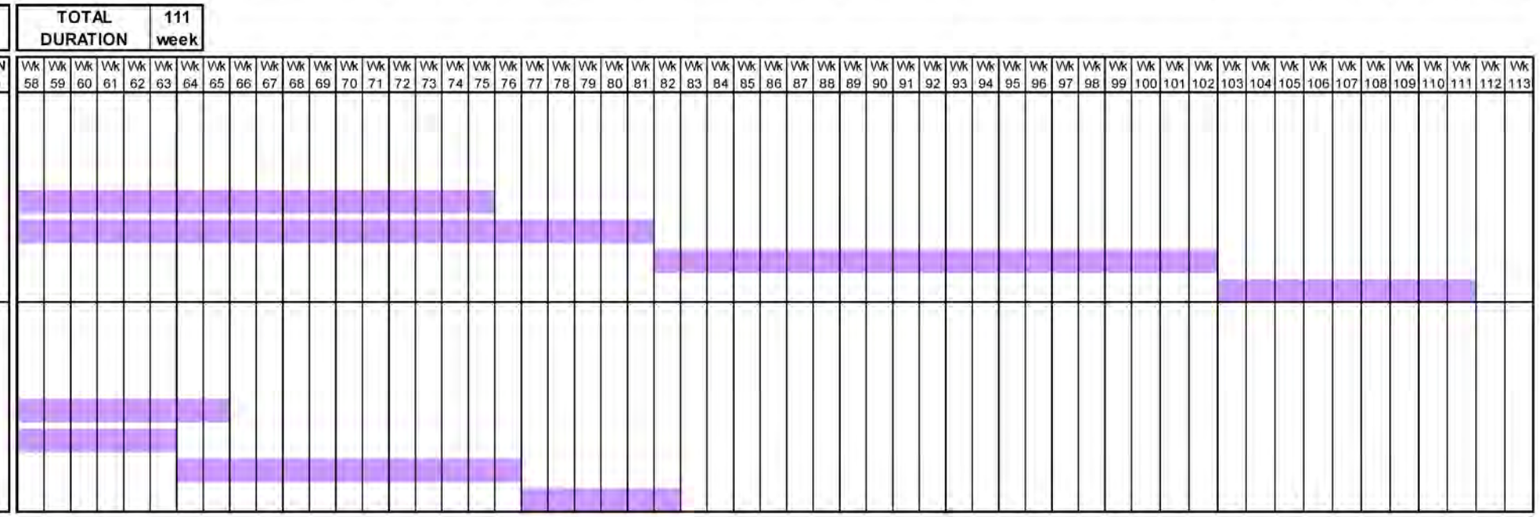


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FIGURE 19

CONSTRUCTION SCHEDULE FOR
NORTHERN & SOUTHERN TERMINALS
SHEET 2

CONSTRUCTION SCHEDULE FOR ONE GROUND ELECTRODE LOCATION

TASK	DURATION (WEEKS)	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38
SITE GRADING	3																																						
DRILLING 60 WELLS	8																																						
EXCAVATE CABLE TRENCHES	6																																						
BUILD CONCRETE CABLE TRENCHES	10																																						
INSTALL ELECTRODE ELEMENTS	8																																						
INSTALL LV CABLES, SWITCHES	4																																						
INSTALL TEMPERATURE & CURRENT TRANSDUCERS, WIRING	2																																						
BUILD CONTROL / COMMUNICATION BUILDING & FENCED AREA	8																																						
INSTALL SITE COMMUNICATIONS EQUIPMENT, SCADA	4																																						
ELECTRODE COMMISSIONING*	8																																						

*PERFORMED AFTER CONVERTER STATIONS ARE FUNCTIONAL

CONSTRUCTION SCHEDULE FOR LOW VOLTAGE TRANSMISSION LINE (10 MILES ASSUMED)

TASK	DURATION (WEEKS)	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11	Wk 12	Wk 13	Wk 14	Wk 15	Wk 16	Wk 17	Wk 18	Wk 19	Wk 20	Wk 21	Wk 22	Wk 23	Wk 24	Wk 25	Wk 26	Wk 27	Wk 28	Wk 29	Wk 30	Wk 31	Wk 32	Wk 33	Wk 34	Wk 35	Wk 36	Wk 37	Wk 38
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	3																																						
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	4																																						
FOUNDATION EXCAVATION	3																																						
HAUL STRUCTURES	3																																						
INSTALL STRUCTURES	4																																						
INSTALL WIRES	2																																						
FINAL CLEAN UP / RECLAMATION / RESTORATION	4																																						

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 20
CONSTRUCTION SCHEDULE FOR GROUND ELECTRODE SYSTEM

3.5.9.2 Construction Workforce

The proposed TWE Project will be constructed by contract personnel, with the Applicant responsible for project management, project administration and inspection. The construction workforce will consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel who will perform the construction tasks. Estimated construction workforce requirements by major activity are summarized in Tables 6 and 7.

Table 6 identifies the estimated personnel and equipment that is required for each of the three transmission line spreads. The total estimated number of construction personnel for construction of the entire transmission line is 630 people. Table 7 identifies the estimated personnel and equipment that is required for each of the two terminals and each of the two ground electrodes. The total estimated number of construction personnel for construction of both terminals and both ground electrodes is 360 people. The total estimated workforce for the complete proposed Project is approximately 1,000 people.

Construction will generally occur between 7 a.m. and 7 p.m., Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities.

Temporary work camps are not expected to be necessary for the construction of the TWE Project. Variables considered in determining if work camps would be required are:

- The total distance between living facilities for construction workers and designated work areas. A general one-way travel time of two hours may be considered as a limit in determining if temporary work camps are necessary.
- Workers' Union wage agreement regarding the driving time one-way (to worksite) or round trip (to/from worksite). If the agreement allows for driving time then the camp consideration may not be required.
- The ability of existing communities to provide housing for workers or to make improvements to meet the workers' accommodation demands.
- Socioeconomic impacts on communities along the route with or without the work camps.
- Economic feasibility of permitting a work camp.
- Service life of the work camps and the restoration requirements after tear down.

The TWE Project does not appear to have areas that are more than 50 miles (on paved roads) from the ROW to existing communities or towns. The average travel distance for the Project is approximately 15 miles. The populations of these towns indicate their capability to handle the housing and/or accommodation demands of the construction workers. It should be noted during typical transmission line construction, the entire work force and support personnel generally do not all work in one area at any given time. Generally one or more activities are completed and the associated crews move to a new location prior to all the other activities becoming fully operational in that area. Section 3.5 describes the construction process, including construction workforce levels and numbers of workers by activities.

3.5.9.3 Construction Equipment

Equipment required for construction of the TWE Project transmission lines, terminals and ground electrode systems will include, but is not limited to, that listed in Tables 6 and 7.

TABLE 6 ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINE CONSTRUCTION FOR EACH SPREAD			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
Survey Crew	6	2	Pickup trucks
		2	ATV
Geologic/Geotechnical Investigations	6	2	Pickup trucks, 4-wheel drive
		1	ATV
		2	Rubber tire drill trucks (2-ton)
Road Construction Crew	6	2	Dozer (D-8 Cat or equivalent)
		1	Motor grader
		1	Pickup truck
		2	Carry alls
		1	Water truck (for construction and maintenance)
		1	Dump truck
		1	Front end loader
		1	Diesel tractor w/lowboy
Foundation Installation Crew	26	4	Hole diggers
		2	Dozers
		2	Trucks (2-ton)
		2	Trucks, flatbed, w/boom (5-ton)
		4	Concrete trucks
		2	Dump trucks
		2	Diesel tractors (equipment hauling)
		3	Pickup trucks
		1	Mechanics truck
		1	Water truck
		1	Carry all
		2	Cranes, all terrain (35-ton)
		1	Front end loader
		1	Backhoe, w/bucket
		1	Wagon drill
		3	Equipment-tool trailers
Anchor Installation	20	2	Pickup trucks

TABLE 6 ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINE CONSTRUCTION FOR EACH SPREAD			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
		4	Carry alls
		1	Truck, flatbed (2-ton)
		2	Trucks, flatbed, w/boom (5-ton)
		1	Dump truck
		1	Water truck
		2	Concrete trucks
		1	Mechanics truck
		2	Diesel tractors, w/lowboy
		2	Dozers
		1	Loader, front end
		3	Backhoes, w/bucket
		3	Wagon drills
		3	Cranes, all terrain (35-ton)
Structure Steel Haul Crew	8	1	Equipment-tool trailer
		2	Diesel tractors (steel hauling)
		1	Pickup truck
		1	Truck, flatbed (2-ton)
		1	Carry all
		5	Cranes, all terrain (35-ton)
		3	Fork lifts
Structure Assembly Crews 8-9 Crews	72	2	Pickup trucks
		10	Carry alls
		5	Cranes, all terrain (35-ton)
		1	Water truck
		5	Air compressors
		2	Trucks (2-ton)
		1	Mechanics truck
		2	Tool-equipment trailers
Structure Erection Crews 1-2 Crews	20	2	Cranes (120 – 300-ton)
		2	Trucks (2-ton)

TABLE 6 ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINE CONSTRUCTION FOR EACH SPREAD			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
		2	Pickup trucks
		5	Carry alls
		1	Mechanics truck
		2	Air compressors
		1	Tool-equipment trailer
Wire Installation Crew	36	6	Wire reel trailers
		4	Haul trailers
		4	Diesel tractors
		4	Cranes (2) 20-ton, (2) 30-ton
		5	Trucks, flatbed, w/bucket (5 -ton)
		4	Pickup trucks
		2	Splicing trucks
		2	3-drum pullers (one medium, one heavy)
		2	Single drum pullers (large)
		1	Backhoe, w/bucket
		1	Water truck
		2	Trucks, flatbed (2-ton)
		4	Double bull-wheel tensioner (two light and two heavy)
		2	Sagging equipment (D-8 Cat)
		6	Carry alls
		2	Static wire reel trailers
		3	Tool-equipment trailers
		2	Mechanics trucks
Clean-up Crew	4	1	Truck, flatbed, w/bucket (5-ton)
		1	Pickup truck
		1	Carry all
Road Rehabilitation Crew (ROW Restoration)	6	1	Dozer (D-8 Cat or equivalent)
		1	Front end loader w/bucket
		1	Backhoe, w/bucket
		1	Diesel tractor, w/lowboy

TABLE 6 ESTIMATED PERSONNEL AND EQUIPMENT FOR TRANSMISSION LINE CONSTRUCTION FOR EACH SPREAD			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
		1	Seeding/harrowing equipment, w/tractor
		1	Motor grader
		1	Pickup truck
		1	Dump truck
		1	Carry all
Estimated maximum personnel required for all transmission line tasks including maintenance, management, and quality control personnel = 210 for each of the three spreads.			

TABLE 7 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH TERMINAL AND GROUND ELECTRODE SYSTEM			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
Survey Crew	4	2	Pickup trucks
Site Management Crew	10-12	4	Office trailers
		4	Pickups
		4	Generators
Site Development – Civil Work Crew	30-35	4	Scrapers
		2	Dozers (ripper)
		2	Motor graders
		2	Roller compactors
		2	Excavators
		4	Dump trucks
		3	Water trucks
		1	Mechanics truck
		1	Fuel truck
		2	Pickup trucks
		6	Carry alls
Fence Installation Crew	10-20	1	Pickup truck
		1	Boom truck
		2	Carry alls
		1	Backhoe
		1	Concrete truck
		1	Reel stand truck

TABLE 7 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH TERMINAL AND GROUND ELECTRODE SYSTEM			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
		2	Bobcats
Equipment Footings Installation Crew	24-30	2	Hole diggers
		2	Boom trucks
		1	Excavator
		3	Concrete trucks
		1	Dump truck
		1	Roller compactor
		2	Plate compactors
		1	Backhoe
		2	Bobcats
		1	Mechanics truck
		1	Fuel truck
		1	Water truck
		2	Pickup trucks
		4	Carry alls
Cable Trench, Conduits, and Station Grounding Crew	12-16	2	Trenchers
		2	Dozers (ripper)
		2	Roller compactors
		2	Plate compactors
		2	Excavators
		1	Boom truck
		3	Pickup trucks
		2	Flatbed trucks
		4	Carry alls
		1	Air compressor
		1	Backhoe
		1	Mechanics truck
		1	Fuel truck
		1	Dump truck
		1	Reel stand truck

TABLE 7 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH TERMINAL AND GROUND ELECTRODE SYSTEM			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
Steel Structure and Bus Installation Crew, Converter Valve Hall, Ancillary Buildings Construction Crew, Equipment Assembly and Erection Crew	16-24	2	Cranes, RT
		2	High capacity cranes
		4	Boom trucks
		6	Manlifts
		4	Welder trucks
		2	Carry alls
		3	Pickup trucks
		2	Flatbed trucks
		1	Mechanics truck
		4	Vans
		2	Flatbed trucks
Control Building and Wiring Crew	20-24	2	Boom trucks
		4	Manlifts
		3	Wire pullers-small
		2	Reel stand trucks/trailers
		4	Vans
		4	Pickup trucks
		2	Carry alls
		1	Splicing van
		2	Concrete trucks
		1	Bobcat
		1	Trencher
		2	Plate compactors
Ground Electrode Construction Crew	12-18	2	Pickup trucks
		1	Fuel truck
		1	Water truck
		2	Trenchers
		2	Drill rigs
		1	Boom truck
		2	Flatbed trucks

TABLE 7 ESTIMATED PERSONNEL AND EQUIPMENT FOR EACH TERMINAL AND GROUND ELECTRODE SYSTEM			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
		1	Bobcat
		1	Backhoe
		1	Mechanics truck
		1	Concrete trucks
		1	Air compressor
The above table reflects estimated personnel requirements, which may reach as high as 180 for each terminal, substation, and ground electrode construction, including maintenance, management, and quality control personnel.			

3.6 Proposed TWE Project Operation and Maintenance Practices

The TWE Project ±600 kV DC, 500 kV AC and 230 kV AC transmission lines will comprise critical infrastructure of the Desert Southwest transmission systems and of the western U.S. electrical grid. Limiting the duration of unplanned outages, and planning for the use of live-line maintenance techniques to minimize the requirement for any outages is an important part of the design, construction, and operation/maintenance requirements for this Project.

Regular inspection of transmission lines, terminals, substations, ground electrodes, and support systems is critical for safe, efficient, and economical operation of the Project. Regular ground and aerial inspections will be performed in accordance with the Applicant's established policies and procedures for transmission line inspection and maintenance (Western 2007). The TWE Project ±600 kV DC, 500 kV AC and 230 kV AC transmission lines, terminals, substations, ground electrode systems, communications system, and other ancillary facilities will be inspected regularly for corrosion, equipment misalignment, loose fittings, vandalism, and other mechanical problems. The need for vegetation management on transmission line ROWs will also be determined during inspection patrols.

3.6.1 Transmission Lines

Inspection of the entire transmission line system will be conducted semi-annually. Aerial inspection will be conducted by helicopter semi-annually and will require two or three crew members, including the pilot. Detailed ground inspections will take place on an annual basis using access roads to each structure. Ground inspection would use 4x4 trucks or 4x4 ATVs for all structures with access roads. For structures in areas without permanent access roads, ground inspection will be on foot or by other approved means. The inspector would assess the condition of the transmission line and hardware to determine if any components need to be repaired or replaced, or if other conditions exist that require maintenance or modification activities. The inspector would also note any unauthorized encroachments and trash dumping on the ROW that could constitute a safety hazard. The inspector would access each of the structure locations along each line and use binoculars and spotting scopes to perform this inspection.

Routine maintenance activities are ordinary maintenance tasks that have historically been performed and are regularly carried out on a routine basis. The work performed is typically repair or replacement of individual components (no new ground disturbance), performed by relatively small crews using a minimum of equipment, and usually is conducted within a period from a few hours up

to a few days. Work requires access to the damaged portion of the line to allow for a safe and efficient repair of the facility. Equipment required for this work may include four-wheel-drive trucks, material (flatbed) trucks, bucket trucks (low reach), boom trucks (high reach), or man lifts. This work is scheduled and is typically required due to issues found during inspections. Typical items that may require periodic replacement on structures include insulators, hardware, or structural members. It is expected that these replacements would be required infrequently.

If during transmission line maintenance and monitoring, it is determined that new or reconstruction activities should be implemented, the Applicant will notify the appropriate land management agency or private landowner, and obtain proper approvals, as necessary.

Dust control during maintenance of the transmission line will be managed the same as during construction.

3.6.2 Transmission Line ROW

The Applicant will maintain work areas adjacent to structures and along the ROW for vehicle and equipment access necessary for operations, maintenance, and repair. Where long-term access is required for maintenance of the line, the Applicant will maintain the approved access roads in a safe, useable condition, as directed by an authorized officer from the appropriate land management agency or private landowner.

When needed, ROW repairs may include grading or repair of existing maintenance access roads and work areas, and spot repair of sites subject to erosion, flooding or scouring. Access road maintenance entails activities to ensure that approved access roads are in appropriate condition for access to transmission lines by maintenance and inspection crews. These activities include re-grading, re-surfacing, and re-constructing water diversions such as culverts, ditches and water bars. Required equipment may include a grader, backhoe, four-wheel-drive pickup truck, and a cat-loader or bulldozer. The cat-loader has steel tracks whereas the grader, backhoe, and truck typically have rubber tires. Repairs to the ROW would be scheduled as a result of line inspections, or would occur in response to an emergency situation.

Snow removal, if necessary for terminal, substation, ground electrode and regeneration station access roads, will be performed with blades equipped with shoes to keep the blade off the road surface in order to avoid damage.

Vegetation within the ROWs will be managed in accordance with the TWE Project Vegetation Management Program described in detail below.

3.6.2.1 Vegetation Management Program

A Vegetation Management Program will be developed and implemented for the TWE Project. The Program will be designed to meet NERC reliability requirements in a cost-effective manner, and provide measures for minimizing potential conflicts with critical environmental resources or management issues. The vegetation management program for the TWE Project transmission line ROWs will be based on meeting reliability requirements of NERC through integrative vegetation management (IVM) practices (NERC 2009, ANSI 2006). The TWE Project program will comply with NERC reliability standards.

NERC has established reliability standard FAC-003-2 to prevent vegetation related outages from occurring on bulk transmission systems, which could lead to cascading outages. The standard was developed in response to serious outages and operational problems, which have resulted from interference between overgrown vegetation and transmission lines over the past 10 to 20 years. Compliance with this standard is mandatory. FAC-003-2 requires having and implementing a documented transmission vegetation management program, designed to control vegetation on transmission ROWs (NERC 2009).

IVM is a best management practice conveyed in the American National Standard for Tree Care Operations, Part 7 (ANSI 2006) and the International Society of Arboriculture's *Best Management Practices: Integrated Vegetation Management* (Miller 2007). IVM is consistent with the requirements of FAC-003-2 and is recognized as containing the most appropriate techniques for transmission ROWs to meet and exceed the NERC requirements (NERC 2009). IVM is a system of managing plant communities by setting objectives for desired conditions and identifying and managing ROWs for compatible and incompatible vegetation. Implementation of TWE Project's Vegetation Management Plan will comply with NERC standards through IVM practices. IVM principles will serve as guidance in establishing and maintaining a desired condition for TWE Project ROWs and associated facilities.

3.6.2.2 TWE Project Vegetation Management Plan Framework

The Applicant will develop the Vegetation Management Plan for the Agency Preferred Alternative. The Plan would be developed during Project engineering and design, and would be part of the COM Plan. For purposes of the DEIS analysis, the following provides a framework summary of the draft program, including desired conditions and implementation strategies.

The TWE Project Vegetation Management Program will establish and maintain several levels or types of desired conditions within the TWE Project transmission line ROWs. Potential desired conditions and implementation measures are described below for three levels:

- Level 1 – Standard ROW Vegetation Management
- Level 2 – Selective ROW Wire-Border Zone Vegetation Management
- Level 3 – Selective ROW Clearance Based Vegetation Management

In all settings, the Applicant must meet the NERC requirements and therefore, irrespective of the level of vegetation management applied, site-specific conditions may require a more conservative restrictive vegetation management approach such that the Applicant-defined minimum clearance to vegetation criteria, which complies with NERC, is met.

Level 1 - Standard ROW Vegetation Management

Application and Desired Condition. Level 1 is the Applicant's desired condition for the majority of the TWE Project ROW. Level 1 represents the most effective way to meet and exceed the NERC standards in a cost-effective manner. Level 1 would entail initially clearing the ROW of all undesirable vegetation and managing the ROW to maintain the desired condition.

The Level 1 desired condition is characterized by stable, low growth plant communities, free of noxious or invasive plants. These communities would typically be comprised of herbaceous plants and low growing shrubs, which ideally are native to the local area. Vegetation heights would average three feet in height, and may range between two feet and six feet. Accumulations of vegetation debris

from intensive or repetitive vegetation treatments may require mitigation to reduce risks from wildfire and enhance the fire survivability of the transmission facility. The density of remaining vegetation would be a consideration in assessing overall fire risk. Adequate access routes are required and must be maintained to provide for efficient, cost-effective vegetation treatment activities. Figures 21 and 22 illustrate the Level 1 desired conditions.

Implementation. As part of construction, the clearing of the ROW and access roads would be accomplished in accordance with a vegetation clearing specifications plan. As part of the ROW clearing, all danger trees would be identified and removed from the ROW. All trees would be cut off at ground level and the stumps left in place for erosion control. Low-growing trees, shrubs, and ground vegetation would be left in place to the extent possible. At ravine crossings, more woody vegetation would be retained to the extent practical with higher conductor clearances. Vegetation would be cleared at each tower. Clearance zones would extend out 50 feet around self supporting lattice towers and single shaft tubular steel poles. The clearance zone for the guyed lattice towers would extend out 20 feet from the outline of the guy pattern. Figure 23 shows the extents of vegetation clearing planned for the guyed lattice towers. Figure 24 provides comparable information for the tubular steel pole and self supporting lattice towers. Shrubs and ground cover outside these tower clearance zones would be left in place to the extent possible. Commercial timber generated from the ROW clearing would be purchased from the appropriate land management agency or private landowner. Slash would be removed from the Project site or chipped and spread according to approved USFS or BLM practices.

During the life of the TWE Project, the ROW would be managed to retain the Level 1 desired condition in designated areas. During operation, the Applicant would be responsible for routine inspections of vegetation. Annual plans for the inspection and treatment of vegetation would be implemented. The Plan would describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions.

Vegetation would be removed using mechanical equipment such as chain saws, weed trimmers, rakes, shovels, mowers, and brush hooks. Clearing efforts in heavy growth areas would use equipment such as a Hydro-Ax or similar. The duration of activities, and the size of crew and equipment required, would depend on the amount and size of the vegetation to be trimmed or removed. In selected areas, herbicides may be used to control noxious weeds and to meet vegetation management objectives. All herbicide applications would be performed in accordance with federal, state, and local regulations, and in compliance with appropriate land management agency or private landowner requirements.

Level 2 – Selective ROW Wire-Border Zone Vegetation Management

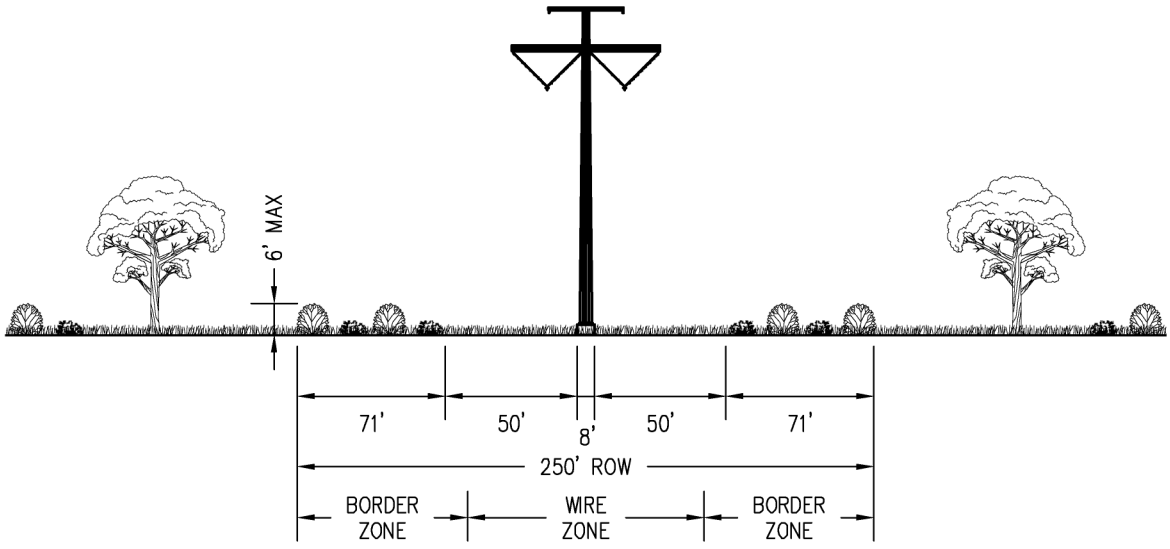
Application and Desired Condition. Level 2 is the desired condition for portions of the ROW where highly sensitive or constrained resource or agency management issues have been identified through the NEPA process that can be effectively mitigated with Level 2 vegetation treatment. Level 2 vegetation management would meet the NERC standards, but would be more costly in terms of on-going maintenance. Consequently, Level 2 would be applied selectively to only those portions of the ROW where the implementation of Level 2 would effectively mitigate potential impacts to highly sensitive resources. Examples of areas where Level 2 vegetation management may be appropriate are Visual Resource Management (VRM) Class III landscapes, or sensitive wildlife habitats susceptible to forest fragmentation impacts, where potential impacts can be effectively mitigated with this vegetation measure.

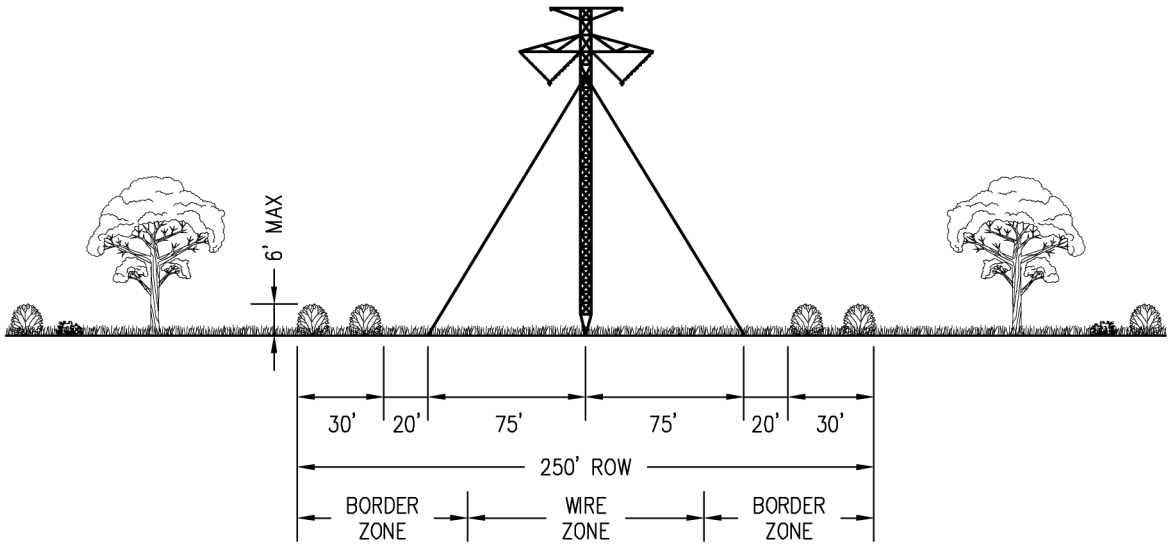
The desired condition of the ROW in Level 2 is based on the Wire Border Zone concept developed by Bramble and Brynes (Bramble, et al. 1985, 1986). The principle objective of the Wire Border Zone concept is to define a simple approach, based on maintaining a minimum clearance from an energized conductor to any type of vegetation, that can be applied to most situations on the transmission line This approach is consistent with the NERC FAC-003-2 regulatory requirements to maintain the required Minimum Vegetation Clearance Distance (MVCD).

NERC FAC-003-2 defines the Wire-Border Zone as a technique that can be applied to the ROW through cultural control. Under this technique, two zones are defined for vegetation management. Figure 25 shows a typical ROW cross-section for the TWE Project ±600 kV DC transmission line and Wire Zone and Border Zone areas. The definition of each and desired conditions are as follows:

Wire Zone. The Wire Zone is defined as the section of the utility ROW that is directly under the wires and extending outward a distance sufficient to accommodate anticipated wire movement. The Wire Zone for this Project is 90 feet in width centered on the centerline of the transmission line. The maximum vegetation height for the desired conditions for Level 2 within the Wire Zone is six feet.

The desired condition for the Wire Zone would be the same as Level 1 and characterized by stable, low-growth plant communities, free of noxious or invasive plants. These communities would typically be comprised of herbaceous plants and low-growing shrubs, which ideally are native to the local area. Vegetation heights would average three feet in height, and may range between two feet and six feet. Refer to Level 1 for full definition.





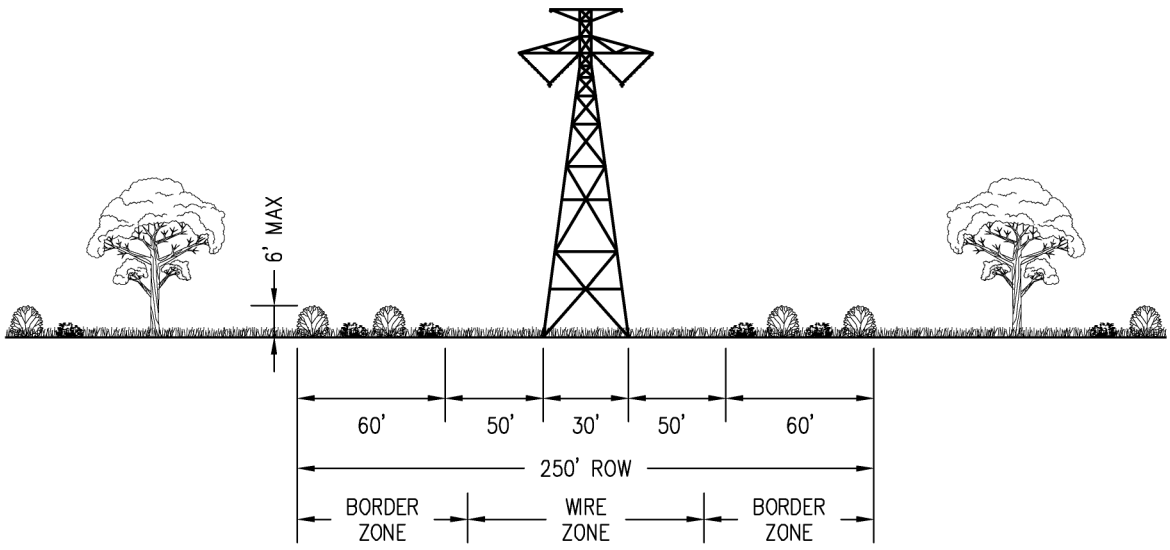


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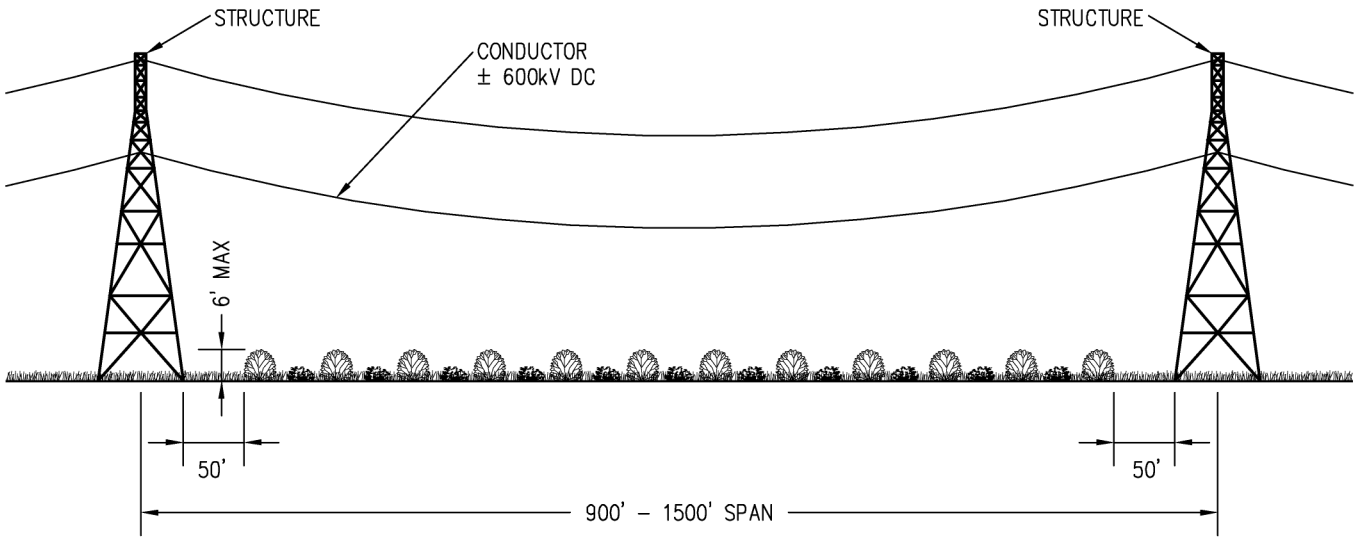
FIGURE 21

LEVEL 1 STANDARD ROW VEGETATION MANAGEMENT – CROSS SECTION VIEW



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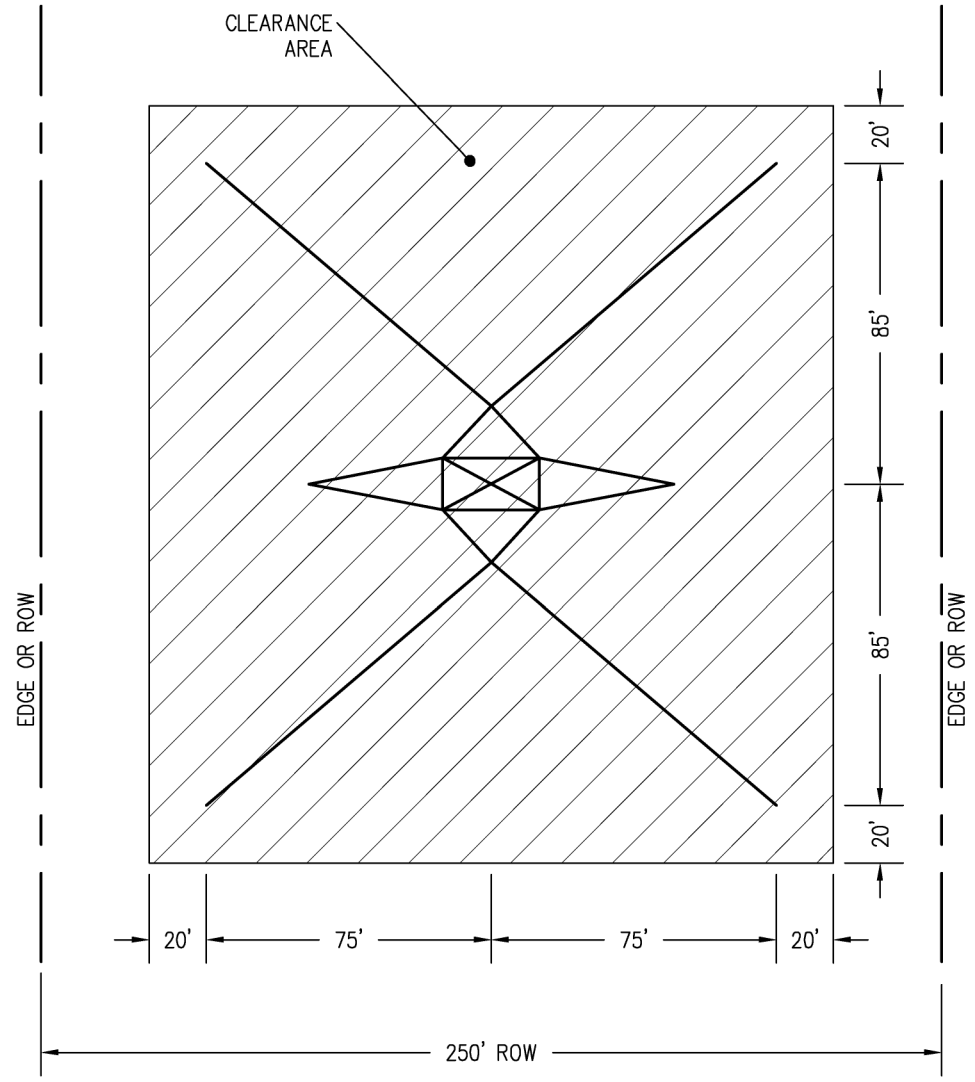
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 22

LEVEL 1 STANDARD ROW VEGETATION MANAGEMENT – PROFILE VIEW



CLEARANCE ZONE FOR GUYED LATTICE TOWER

(TYPICAL)

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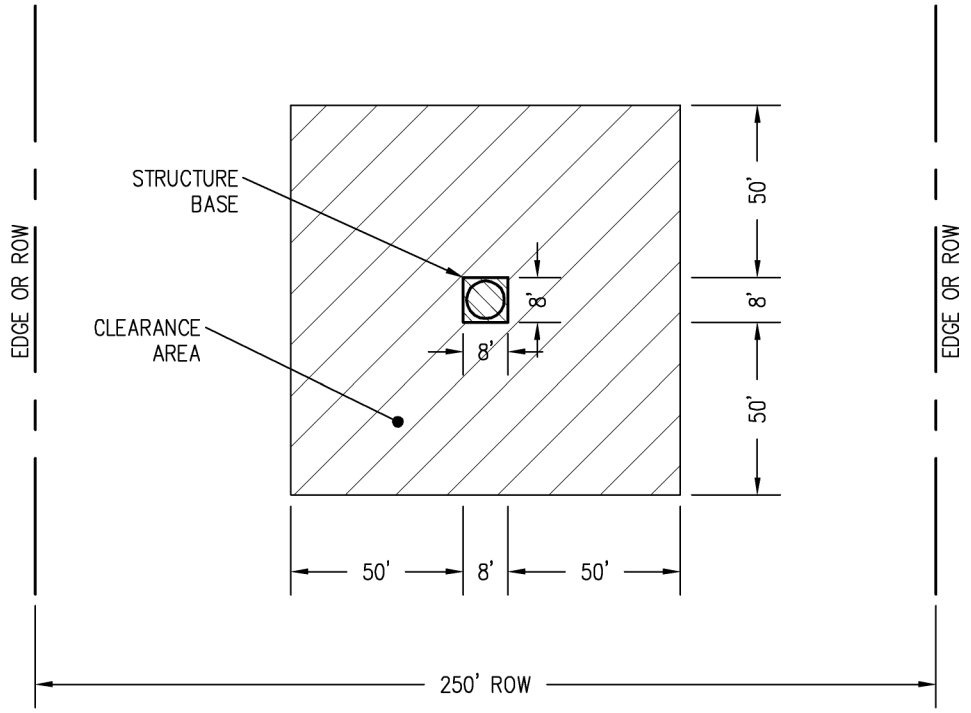
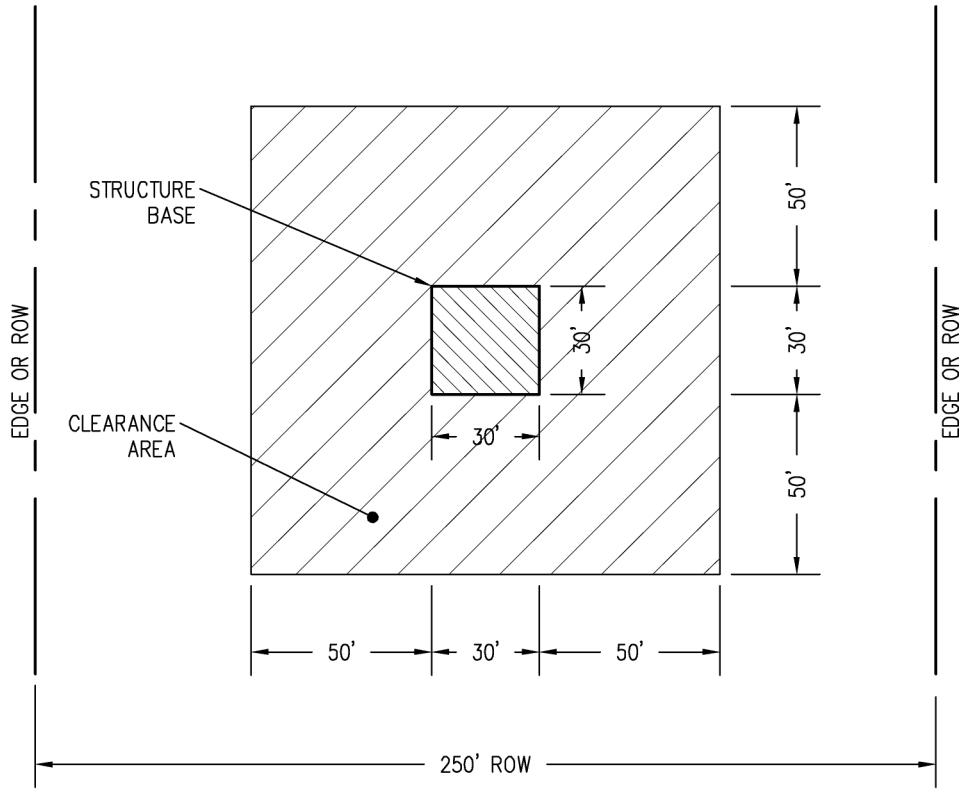
FIGURE 23

LEVELS 1, 2, & 3 VEGETATION CLEARANCE ZONE FOR GUYED STEEL LATTICE TOWER



CLEARANCE ZONE FOR TUBULAR STEEL POLE
(TYPICAL)



CLEARANCE ZONE FOR SELF-SUPPORTING LATTICE TOWER
(TYPICAL)

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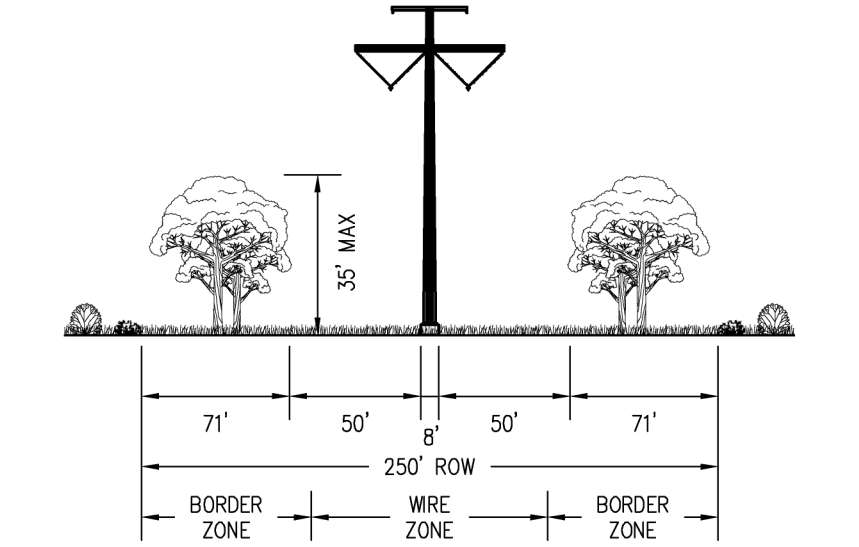
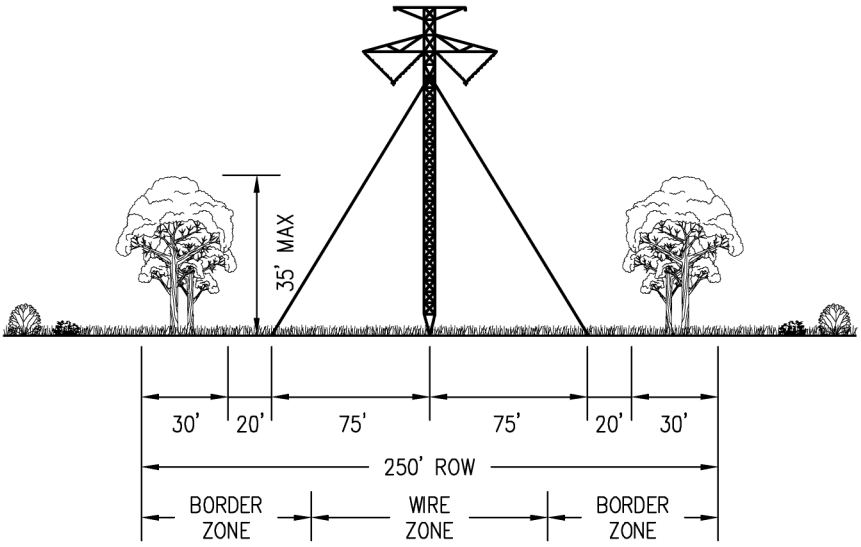
FIGURE 24
LEVELS 1, 2, & 3 VEGETATION CLEARANCE ZONE FOR TUBULAR STEEL POLE & SELF SUPPORTING STEEL LATTICE TOWER





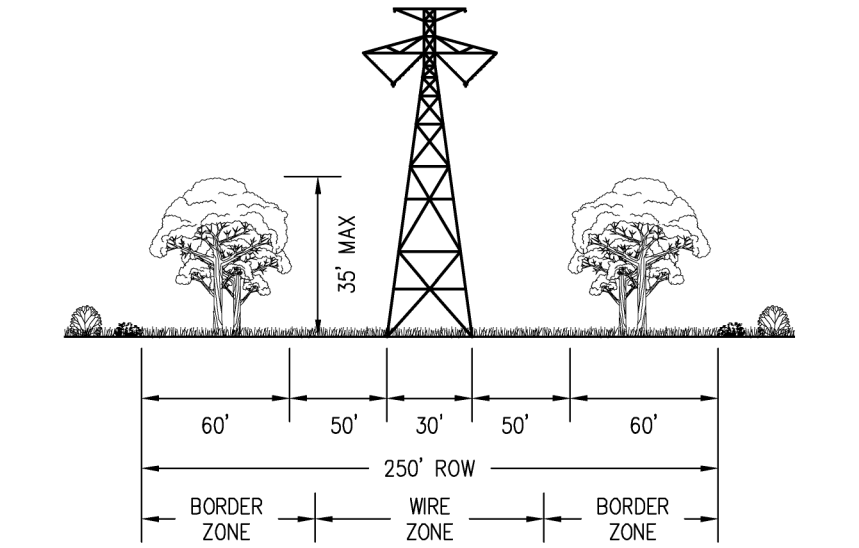


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FIGURE 25

LEVELS 2 & 3 SELECTIVE ROW VEGETATION MANAGEMENT – CROSS SECTION VIEW

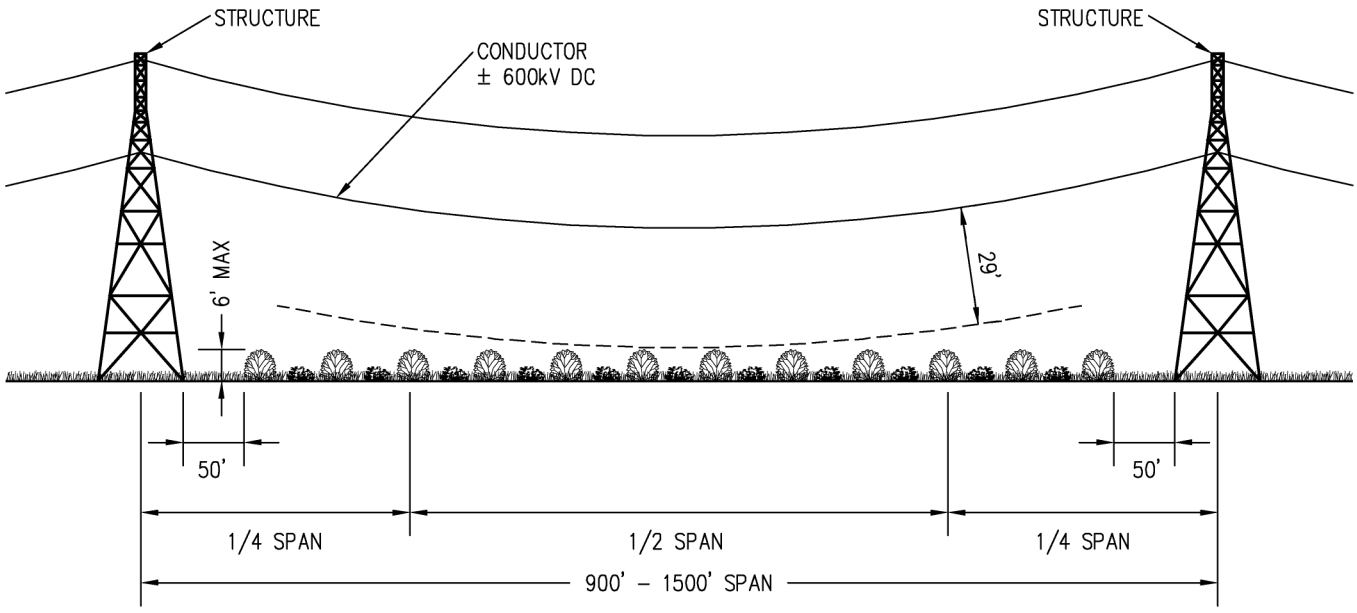
Border Zone. The Border Zone is defined as the section of the utility ROW that extends outward from Wire Zone boundary to the ROW boundary. For the TWE Project, the Border Zone would extend 80 feet on either side of the Wire Zone to the ROW boundary, depending on slope and other topographic conditions.

For Level 2, the desired condition within the Border Zone is to manage this section of the ROW for stable low-growth vegetation consisting of small trees and large shrubs, as well as lower grasses and herbs. The maximum vegetation height within the Border Zone, within the center half of the span is 25 feet. The maximum vegetation height within the Border Zone, within the quarter spans nearest the structures is 35 feet. Taller vegetation may also be suitable, depending on the growth and density characteristics of specific tree varieties, as well as increased height of the conductors across canyons or low-lying valleys. Figure 25 conceptually illustrates the differences in vegetation height that the Wire-Border Zone management technique would allow for each of the three structure types. Figures 26 and 27 illustrate a typical profile view of Level 2 vegetation heights.

Implementation. As part of construction, implementation standards for the clearing of the ROW and access roads would be the same in the Level 2 Wire Zone as described previously (refer to Level 1 discussion). Level 1 construction standards would also be applied to the Level 2 Border Zone in instances where undesirable vegetation needs to be removed and managed for the life of the Project (e.g., fast-growing or invasive species). Other techniques that may be used in the Level 2 Border Zone during construction are selective mechanical or manual tree removal, side pruning, and selective use of herbicides.

During operation, Level 2 vegetation would be managed the same as Level 1 in the Wire Zone. The Applicant would be responsible for routine inspections of vegetation. Annual plans for the inspection and treatment of vegetation would be implemented. The plan would describe the methods used, such as manual clearing, mechanical clearing, herbicide treatment, or other actions.

In the Border Zone, long-term operational practices would include additional techniques such as selective mechanical tree removal, selective manual control measures (e.g., use of hand-carried tools), and side pruning. Long-term operational management of ROW vegetation under Level 2 would be more costly and labor-intensive, over time, to ensure taller trees in the Border Zone do not violate NERC reliability standards for MVCD.



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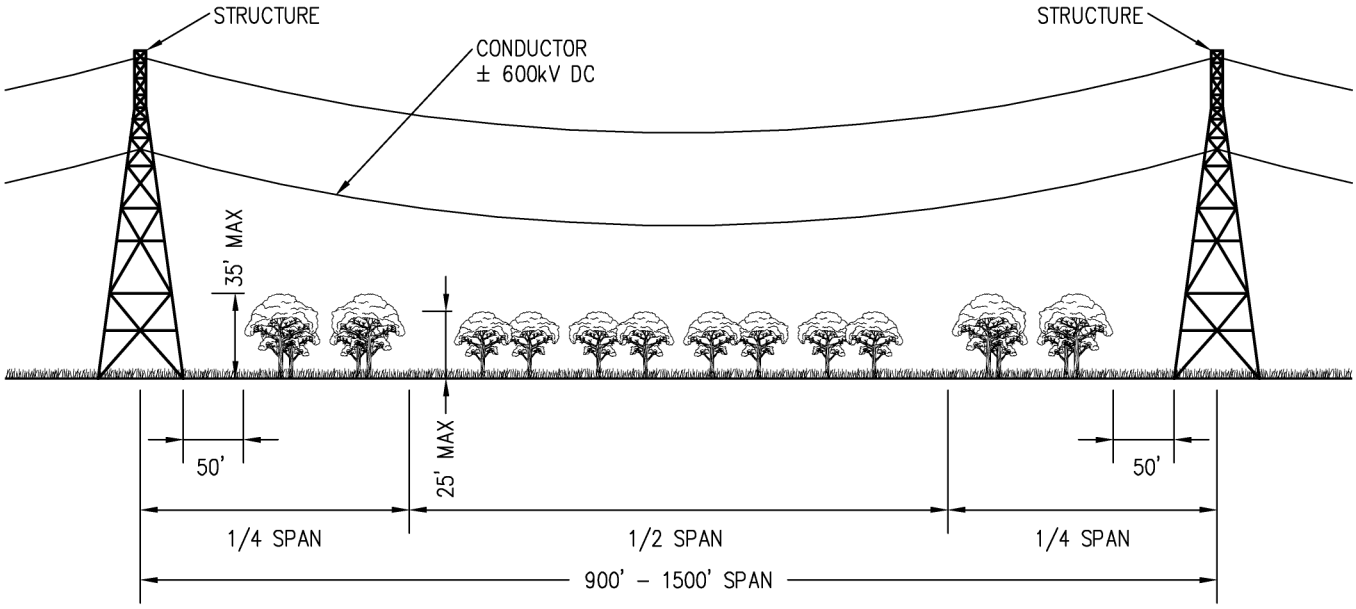
TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 26

LEVEL 2 SELECTIVE ROW VEGETATION MANAGEMENT – WIRE ZONE PROFILE VIEW



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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 27

LEVELS 2 & 3 SELECTIVE ROW VEGETATION MANAGEMENT – BORDER ZONE PROFILE VIEW

Level 3 – Selective ROW Clearance-Based Vegetation Management

Application and Desired Condition. Level 3 is the Applicant's desired condition for limited and selective portions of the ROW that have been determined to have critical resource or agency management issues associated with vegetation within the Wire Zone. Level 3 vegetation management would meet the NERC standards, but would be significantly more costly in terms of on-going maintenance of the ROW, would require more frequent access to the ROW, and more frequent vegetation treatments. Consequently, Level 3 is proposed by the Applicant only in limited and specific areas of the ROW where practices would effectively mitigate potential impacts to critical resources and related land management issues. Examples of critically sensitive areas where Level 3 vegetation management may be appropriate are at ROW crossings of riparian vegetation or VRM Class II areas where potential impacts can be effectively mitigated with this vegetation management practice.

Level 3 builds on the Level 2 desired conditions described above. The desired condition for Level 3 is based on maintaining the Applicant-defined minimum clearance from energized conductors to any type of vegetation. Within the Wire Zone and Border Zone, the Level 3 desired condition would allow for increased vegetation diversity and heights, where such vegetation would not pose potential conflicts with the Applicant-defined minimum clearances to vegetation.

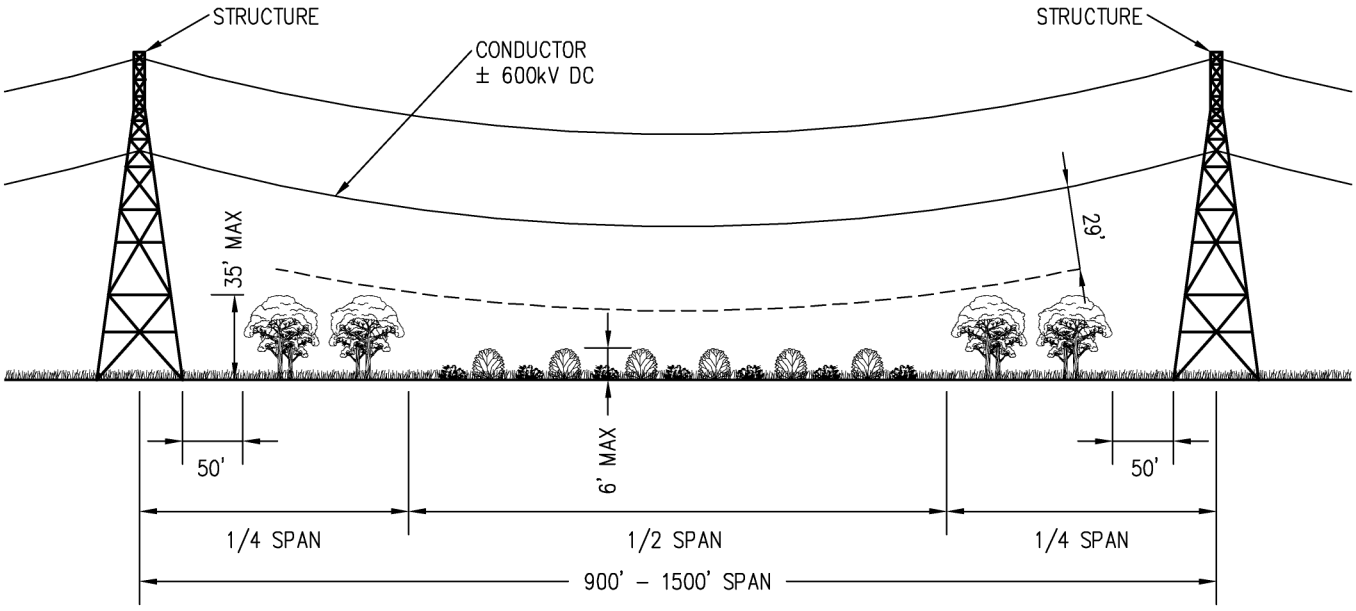
The Applicant-defined minimum clearances to vegetation have been established to incorporate NERC reliability standards, construction tolerances, conductor and tree movement due to wind and/or ice loading, increased sag as a result of thermal loading, and allowances for rapid vegetation growth. For the TWE Project, the minimum clearances from an energized conductor to vegetation would be:

- ±600 kV DC – 29 feet (at maximum elevation of 10,000 feet)
- 500 kV AC – 23 feet (at maximum elevation of 10,000 feet)

Under Level 3, increased vegetation heights anywhere within the ROW would be suitable where the vegetation does not encroach on the minimum clearance to vegetation established by the Applicant. Level 3 is also expected to be feasible at most ROW crossings of riparian vegetation due to increased structure heights at canyon crossings or low valley crossings. Level 3 vegetation management may also be achieved in some locations by increasing the height of structures at riparian crossings to allow a greater diversity and height of vegetation to remain.

For planning and determination of impacts purposes, the vegetation management for Level 3 should employ the Level 2 Border Zone definition described above. Figures 27 and 28 provide profiles for both the Wire and Border zones for Level 3.

Implementation. As part of construction, implementation standards for the clearing of the transmission structure sites and access roads within the ROW would be the same under Level 3 as previously described for Level 1 (refer to Level 1 discussion).



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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 28

LEVEL 3 SELECTIVE ROW VEGETATION MANAGEMENT – WIRE ZONE PROFILE VIEW

In practice, Level 3 selective clearing of the entire ROW would be defined on a span-by-span basis such that any vegetation that does not meet the minimum clearance to vegetation established by the Applicant would be cleared. Level 3 construction standards would be applied in instances where undesirable vegetation needs to be removed from the ROW and managed for the life of the Project (e.g., fast-growing or invasive species). Selective clearing techniques that may be used for Level 3 clearance criteria during construction are selective mechanical tree removal, side pruning, and selective use of herbicides. In general, trees and larger shrubs would be retained through selective clearing.

During operation, Level 3 vegetation would be managed within the ROW to maintain the desired conditions. Long-term operational practices for Level 3 ROW areas would be more labor-intensive and expensive than Level 1 or 2, to ensure that, over time, taller trees and shrubs do not violate the Applicant-defined minimum clearances to vegetation. Level 3 also requires more frequent visitation and access to the ROW for inspections and vegetation treatments.

During operation, the Applicant would be responsible for routine inspections of vegetation. Annual plans for the inspection and treatment of vegetation would be implemented. The Plan would describe the methods to be used in Level 3 areas, as well as techniques applicable to the Level 1 and 2 portions of the ROW.

Appendix C summarizes how the TWE Project vegetation management program improvement levels would apply to each of the vegetation communities identified in AECOM's Memorandum, dated February 22, 2011 (AECOM 2011). Appendix C shows photographs of existing Western ROWs that characterize the Level 3 management vegetation strategies.

3.6.3 Terminals, Substation, Ground Electrodes and Communication Systems

Maintenance activities include equipment testing, equipment monitoring and repair, and emergency and routine procedures for service continuity and preventive maintenance. Terminal, substation, ground electrode and regeneration station monitoring and control functions are performed wholly or in part remotely from the Applicant's central operations facilities. Unauthorized entry into the terminal, substations or regeneration stations is prevented with the provision of fencing and locked gates. Warning signs would be posted and entry to the operating facilities would be restricted to authorized personnel.

Several forms of security are planned for each of the locations, although the security arrangements at each of the terminals, substations, ground electrode facilities, or regeneration stations may differ somewhat. Security measures may include fire detection in the control building via a monitoring system; alarming for forced entry; and a perimeter security system coupled with remote sensing infrared camera equipment in the fenced area of the station to provide visual observation/confirmation to the system operator of disturbances at the fence line.

Safety and security lighting at the terminals, substations and series compensation stations would be provided inside the fence for safety and security and for uncommon emergency night repair work. Dusk to dawn safety and security lighting will be used at the terminals and 500 kV AC substations.

Each of the terminals will have a control room staffed 24 hours per day, 365 days per year by two to three system operators and supervisory personnel. In addition to control room staffing, 8 to 20 technicians, engineers, maintenance, security, and supervisory personnel may be staffed at each terminal. Total staffing at each terminal is expected to be 20 to 30 people.

Routine maintenance for the terminal and adjacent substations would be performed by the on-site staff. Major inspection or maintenance activities would require additional personnel and equipment estimated to be 15 to 20 craft, technician, engineering, manufacturer, consultant and supervisory personnel for a period of two to four weeks on an estimated once per year basis.

For AC substations and series compensation stations located remote from the terminals it is anticipated that maintenance at each of these remote facilities would require approximately six trips per year by a two to four person crew. Routine operations would require two workers in a light utility truck to visit the remote substation or series compensation station monthly. Typically, once per year a major inspection or maintenance effort may be required which would require up to 15 personnel for one to three weeks. If substation landscaping is required by the permitting agency, drought-tolerant plant materials would be used to minimize watering requirements after plant establishment.

Communication regeneration stations would be visited every two to three months by two individuals in a light truck to inspect the facilities. Annual maintenance would be performed by a two-man crew in a light truck over a two to five day period.

Ground electrode facilities would be visited every two to three months by two individuals in a light truck to inspect the facilities. Annual maintenance would be performed by a two man crew in a light truck over a two to five day period. The ground electrode connector line would be inspected by aerial and ground based inspection identical to the maintenance program described for the transmission lines.

3.6.3.1 Water Use

Operation and maintenance of the Northern and Southern Terminals is expected to require water use by personnel in the Operations and Maintenance office building and by the HVDC evaporative cooling and misting systems during summer months. Monthly and annual estimated water use is provided in Table 8.

TABLE 8 NORTHERN AND SOUTHERN TERMINAL ANNUAL ESTIMATED WATER USE (ALL VALUES IN ACRE-FEET)

MONTH	OFFICE USE	COOLING & MISTING SYSTEMS FOR N. TERMINAL	COOLING & MISTING SYSTEMS FOR S. TERMINAL	TOTAL USE N. TERMINAL	TOTAL USE S. TERMINAL
January	0.069	0	0	0.069	0.069
February	0.062	0	0	0.062	0.062
March	0.069	0	0	0.069	0.069
April	0.066	0	0	0.066	0.066
May	0.069	0	0.034	0.069	0.103
June	0.066	0.068	0.068	0.134	0.134
July	0.069	0.135	0.135	0.205	0.205
August	0.069	0.068	0.135	0.137	0.204
September	0.066	0	0.068	0.066	0.134
October	0.069	0	0	0.069	0.069

TABLE 8 NORTHERN AND SOUTHERN TERMINAL ANNUAL ESTIMATED WATER USE (ALL VALUES IN ACRE-FEET)					
MONTH	OFFICE USE	COOLING & MISTING SYSTEMS FOR N. TERMINAL	COOLING & MISTING SYSTEMS FOR S. TERMINAL	TOTAL USE N. TERMINAL	TOTAL USE S. TERMINAL
November	0.066	0	0	0.066	0.066
December	0.069	0	0	0.069	0.069
Annual	0.809	0.272	0.44	1.081	1.25
Source: BBA 2012					

Annual office use of water for each terminal is estimated at 0.809 acre-feet. The office building will consist of approximately 7,200 square feet of actively used space including offices, kitchen, and bathrooms with a shower. The annual office water use was conservatively estimated based upon this actively used square footage and a water use estimate of 0.75 acre-feet per year per 6,695 square feet of office space (Douglas County 1999).

Evaporative cooling will not likely be needed for ambient air temperatures up to 104° Fahrenheit (40° Celsius). If ambient air temperatures exceed 113° Fahrenheit (45° Celsius), then misting and evaporative cooling will be required for these short time periods.

Annual water use for HVDC evaporative cooling and misting systems at the Northern Terminal is estimated at 0.272 acre-feet. Use includes 400 gallons per year for maintenance and flushing of the cooling system and an estimated 88,000 gallons per year for the misting system. The misting system use was estimated to at 275 gallons per hour, running eight hours per day for 10 days in June, 20 days in July, and 10 days in August for a total of 40 days. Evaporative cooling of the filters is not anticipated.

Annual water use for HVDC evaporative cooling and misting systems at the Southern Terminal is estimated at 0.440 acre-feet. Use includes 400 gallons per year for maintenance and flushing of the cooling system and an estimated 143,000 gallons per year for the misting system. The misting system use was estimated to at 275 gallons per hour, running eight hours per day for 5 days in May, 10 days in June, 20 days in July, 20 days in August and 10 days in September for a total of 65 days. Evaporative cooling of the filters is not anticipated.

The water use for each of the terminals may vary from these estimates based on the cooling system technology employed for the terminals. Non-evaporative cooling technologies are available and will be considered during the detailed engineering for the terminal equipment.

3.6.4 Emergency Response

The operation of the system is managed and monitored from control rooms at each of the terminals and at Applicant's operation center. Electrical outages or variations from normal operating protocols would be sensed and reported at these operation centers. The remote substations and series compensation stations are equipped with remote monitoring, proximity alarms, and in some cases, video surveillance with monitoring and control functions performed at the control rooms at the terminals and/or at the Applicant's operation center.

The implementation of routine operation and maintenance activities on power lines minimize the need for most emergency repairs. Emergency maintenance activities are often those activities necessary to repair natural hazard, fire, or human-caused damages to a line. Such work is required to eliminate a

safety hazard, prevent imminent damage to the power line, or restore service if there is an outage. In an emergency, the Applicant must respond as quickly as possible to restore power.

In most cases, the equipment necessary to carry out emergency repairs is similar to that necessary to conduct routine maintenance. More extensive emergency repair may also require the same types of equipment used during construction, including hole drilling equipment, backhoes for excavation, and/or concrete trucks and cranes for structure erection. Other required equipment may include power tensioners, pullers, wire trailers, crawler tractors, and trucks and pickups for hauling materials, tools, and workers. Under certain conditions, a helicopter may be used to haul in material and erect towers or string conductor in those areas where access and/or terrain conditions preclude the use of conventional methods. Site and access road disturbances, such as ruts created during emergency operations, will be restored to satisfactory condition using restoration and rehabilitation procedures.

In the event of an emergency, crews will be dispatched quickly to repair or replace any damaged equipment. Every attempt will be made to contact the agency or landowners along the ROW. In the event notification cannot be made, repair operations will proceed only in the case of an emergency situation. Repair of the line will have priority under emergency conditions, and reasonable efforts will be made to protect plants, wildlife, and other resources. Restoration and rehabilitation procedures following completion of repair work will be similar to those prescribed during construction.

Emergency response procedures will be implemented for the following potential events:

- Downed transmission lines, structures, or equipment failure
- Fires
- Sudden loss of power
- Natural disasters
- Serious personal injury

3.6.5 Fire Protection

All federal, state, and county laws, ordinances, rules, and regulations pertaining to fire prevention and suppression would be strictly adhered to. All personnel would be advised of their responsibilities under the applicable fire laws and regulations.

When working on public or National Forest System lands, the Applicant's employees and Contractors would be equipped with approved suppression tools and equipment. The Applicant or its Contractor would notify local fire authorities and the BLM or USFS (as appropriate) if a Project-related fire occurs within or adjacent to a construction area.

If the Applicant becomes aware of an emergency situation that is caused by a fire on or threatening BLM-managed or USFS lands and that could damage the transmission lines or their operation, it would notify the appropriate agency contact. Specific construction-related activities and safety measures would be implemented during construction of the transmission line to prevent fires and to ensure quick response and suppression if a fire occurs. Typical practices to prevent fires during construction and maintenance/repair activities include brush-clearing prior to work, stationing a water truck at the job site to keep the ground and vegetation moist in extreme fire conditions, enforcing red flag warnings, providing "fire behavior" training to all pertinent personnel, keeping vehicles on or

within designated roads or work areas, and providing fire suppression equipment and emergency notification numbers at each construction site.

3.6.6 ROW Safety Requirements

The design, operation, and maintenance of the TWE Project will meet or exceed applicable criteria and requirements outlined by the FERC, WECC, NESC, and U.S. Department of Labor Occupational Safety and Health Standards for the safety and protection of landowners, their property, and the general public. The transmission line will be protected with power circuit breakers and line relay protection equipment. If a conductor or component failure occurs, power will be automatically removed from the line. Lightning protection will be provided by overhead shield wires on the top of the line. Where vegetation presents a potential hazard, trees will be trimmed or cut to prevent accidental grounding contact with conductors.

3.6.7 Building and Fence Grounding

As part of the proposed TWE Project, short distances (five miles or less) of AC transmission lines will be constructed between the TWE Project substations and the existing and planned regional AC transmission system. In order to mitigate possible electric shock caused by electrostatic and electromagnetic AC induction, all buildings, fences, and other structures with metal surfaces located within 300 feet of the centerline of the ROW will be grounded to the mutual satisfaction of the parties involved. Typically, residential buildings located 300 feet from the centerline will not require grounding. Other buildings or structures outside of the ROW will be reviewed in accordance with the NESC to determine grounding requirements. All metal irrigation systems and fences that parallel the transmission line for distances of 500 feet or more, within 300 feet of the centerline will be grounded. All fences that cross under the transmission line also will be grounded. This procedure will be included in the construction specifications, and if grounding is required outside the ROW, agency and landowner consent will be obtained as necessary.

3.6.8 Decommissioning Practices

The proposed transmission line would have a projected operational life of at least 50 years or longer. At the end of the useful life of the Project and if the facility were no longer required, the transmission line would be removed from service. At such time, conductors, insulators, and hardware would be dismantled and removed from the ROW. Structures would be removed and foundations removed to below-ground surface.

Following abandonment and removal of the transmission line structures and equipment from the ROW, any areas disturbed during line dismantling would be restored and rehabilitated. In the same way, if a terminal, substation, or regeneration station is no longer required, the buildings, structures and equipment would be dismantled and removed from the site. The station structures would be disassembled and either re-used at another station or sold for scrap. Major equipment such as breakers, transformers, and reactors would be removed, refurbished, and stored for use at another facility. Foundations would be either abandoned in-place or cut off below ground level and buried.

For access roads serving the transmission line, the Applicant is responsible for the decommissioning and reclamation of access roads following abandonment in accordance with the landowner's or land agency's direction.

3.7 TWE Project Environmental Mitigation Measures

Prior to construction, the Applicant will prepare a COM Plan, which will incorporate environmental measures, stipulated in the Lead Agencies' Records of Decision(s) (RODs). The COM Plan will provide information on the TWE Project design, construction, operation, and maintenance practices, and environmental mitigation measures that will be used and implemented by contractors and personnel.

The following is a preliminary list of specific plans, which will be incorporated into the COM Plan:

- Access Road Plan
- Biological Protection Plan
- Blasting Plan
- Clean-up Work Management Plan
- Cultural Resources Treatment Plan
- Erosion, Dust Control and Air Quality Plans
- Fire Protection Plan
- Flagging, Fencing and Signage Plan
- Hazardous Materials Management Plan
- Health and Safety Plan
- Mitigation Monitoring Plan
- Noxious Weed Management Plan
- Paleontological Resources Management and Mitigation Plan
- Pesticide Use Plan
- ROW Preparation, Rehabilitation, and Restoration Plan
- Spill Prevention Notification and Clean Up Plan
- Storm Water Pollution Prevention Plan
- Vegetation Management Plan
- Wetlands and Waters of the U.S. Mitigation Plan (CWA, Section 404 Permit)

The COM Plan will include the TWE Project-committed mitigation measures. Mitigation measures include general mitigation measures, which would apply to the TWE Project as a whole; and selective mitigation measures, which would be implemented on a case-by-case basis to address specific environmental impacts or localized conditions. The mitigation measures will be updated through the NEPA process to incorporate appropriate selective mitigation measures.

Table 9 identifies the general mitigation measures, which will be used to reduce impacts to environmental resources. Mitigation measures are organized by major resource topics. These measures are part of the proposed TWE Project, and would be common to all the DEIS alternatives. Table 9 identifies the phase(s) during which each measure would be implemented:

- P – planning and engineering design
- C – construction
- O – operation and maintenance

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
		GENERAL MEASURES	
1	P	General, compliance with agency stipulations and RODs	The TWE Project will be planned, constructed, operated, and decommissioned in accordance with the agencies' Records of Decision (RODs), the BLM's ROW Grant stipulations, USFS Special Use Permit stipulations, and requirements of other permitting agencies.
2	P	General, compliance with laws and regulations	The Applicant will comply with all applicable environmental laws and regulations. Applicable laws and regulations may include, but are not limited to, the Clean Water Act (CWA) Section 303(d) and Section 404; the Wild and Scenic Rivers Act, Section 3(a) or 2(a) ii; the Endangered Species Act (ESA), Section 7; the National Historic Preservation Act (NHPA), Section 106; and the Native American Graves Protection and Repatriation Act (NAGPRA). Compliance with all applicable laws and regulations will be documented in the Final POD/COM Plan.
3	P	General, mitigation monitoring plan	The COM Plan will include a mitigation monitoring plan that will address how each mitigation measure, required by permitting agencies in their respective decision documents and permits will be monitored for compliance.
4	P	General, environmental training	Prior to construction, all personnel will be instructed on the protection of cultural, paleontological, ecological resources, and other natural resources in accordance with the COM Plan provisions. To assist in this effort, the construction contract would address (a) federal, state, and tribal laws regarding cultural resources, fossils, plants, and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
		PROJECT DESIGN, ACCESS AND CONSTRUCTION	
5	P	General, compliance with laws and regulations	The COM Plan will display the location of Project infrastructure (i.e. towers, access roads, substations) and identify short-term and long-term land and resource impacts and the mitigation measures that will be implemented for site-specific and resource-specific environmental impacts.
6	P	General, Access Road Plan	The COM Plan will include an Access Road Plan that incorporates relevant agency standards regarding road design, construction, maintenance, and decommissioning. The Access Road Plan will incorporate best management practices, stipulated by the agencies in their respective decision documents and permits.
7	P	Access, visual	The alignment of any new access roads will follow the designated area's landform contours where practical, providing that such alignment does not additionally impact resource values. This will minimize ground disturbance and reduce scarring (visual contrast).
8	P, C	Access, tower placements, surface water, vegetation management, drainage, dust control	Crossings of streams and waterways will be done in compliance with federal, state, and local regulations. Roads will be built as near as possible at right angles to the streams and washes (Arizona crossing). Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. In addition, road construction will include dust-control measures during construction in sensitive areas. All existing roads will be left in a condition equal to, or better than, their condition prior to the construction of the transmission line. Structures will be sited with a minimum distance of 200 feet from streams,

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
			wherever possible.
9	C, O	Access	All construction vehicle movement outside the ROW normally will be restricted to pre-designated access or public roads.
10	P, C	General ROW, visual	The area limits of construction activities will normally be predetermined, with activity restricted to and confined within those limits. No paint or permanent discoloring agents will be applied to rocks or vegetation to indicate survey or construction activity limits.
11	P, C	Access, visual	In construction areas where re-contouring is not required, vegetation will be left in place, wherever possible, and original contour will be maintained to avoid excessive root damage and to allow for re-sprouting.
12	P, C, O	Access, soils, vegetation, water, cultural visual resources	Except for repairs necessary to make roads passable, no widening or upgrading of existing access roads will be undertaken in the area of construction and operation, where soils or vegetation are sensitive to disturbance. In designated areas, structures will be placed to avoid sensitive features such as, but not limited to, riparian areas, water courses and cultural sites, or to allow conductors to clearly span the features within limits of standard structure design. This will minimize the amount of disturbance to the sensitive feature or reduce visual contrast.
13	C	Vegetation management, restoration, erosion control	In construction areas (e.g., marshalling yards, structure sites, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration will normally consist of returning disturbed areas back to their natural contour, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, and filling ditches.
14	P, C	General, soils, erosion control, visual	The COM Plan will show the location of borrow sites, from which material will be obtained. Borrow pits will be stripped of topsoil to a depth of approximately six inches. Stripped topsoil will be stockpiled and, upon completion of borrow excavation, spread to a uniform depth of six inches over areas of borrow pits from which removed. Before replacing topsoil, excavated surfaces will be reasonably smooth and uniformly sloped. The sides of borrow pits will be brought to stable slopes with slope intersection shaped to carry the natural contour of adjacent undisturbed terrain into the pit to give a natural appearance. When necessary, borrow pits will be drained by open ditches to prevent accumulation of standing water.
15	C	Clean-up	The COM Plan will include a Clean-up Work Management Plan, and a Flagging, Fencing, and Signage Plan. Except for permanent survey markers, and material that locate proposed facilities, stakes, pins, rebar, spikes, and other material will be removed from the surface and within the top 15 inches of the topsoil as a part of final clean-up. Fences on ROW will be removed where necessary and replaced to the original condition or better when the work is finished. Where existing fences are removed to facilitate the work, temporary fence protection for lands adjacent to the ROW will be provided at all times during the continuation of the Contract. Such temporary fence protection will be adequate to prevent public access to restricted areas. Temporary fencing constructed on the ROW will be removed by the Contractor as part of the clean-up operations prior to final acceptance of the completed work.

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
16	C	Site restoration and clean-up, water resources, land use	Watering facilities (tanks, natural springs and/or developed springs, water lines, wells, etc.) will be repaired or replaced, if damaged or destroyed by construction activities, to their pre-disturbed condition as required by the landowner or land management agency.
17	C	Site restoration and clean-up	Existing vegetation such as landscape plants, gardens, and field crops, which are damaged by the application of the soil-applied herbicide, will be replaced by the Contractor at its expense.
18	C	Site clean-up	The Applicant will pay fair market value to the land management agency for any merchantable forest products that will be cut during ROW clearing. Merchantable forest products will either be removed or stacked at locations determined by the land management agency.
		GEOLOGY AND SOILS	
19	C	Drainage, soil erosion control	The COM Plan will include an Erosion Control Plan. Grading will be performed to provide adequate drainage around structure sites and sufficient clearance under conductors. Excavated material will be spread around the site from which excavated. Topsoil will be piled separately and replaced after work completion.
		GROUNDWATER, SURFACE WATER AND WETLANDS	
20	P	Water quality	As part of the CWA 404 Permit for the TWE Project, the COM Plan will include a Wetlands and Waters of the U.S. Plan, which will incorporate measures to avoid and minimize impacts to wetlands and waters of the U.S. to the extent practical. The COM Plan will include a Storm Water Pollution Prevention Plan. The Applicant will identify all streams in the vicinity of the proposed project sites that are listed as impaired under Section 303(d) of the CWA and develop a management plan to avoid, reduce, and/or minimize adverse impacts to those streams.
21	P	Water quality	The Applicant will obtain a National Pollutant Discharge Elimination System (NPDES) permit from the Environmental Protection Agency (EPA) prior to construction.
22	C	Water quality	Runoff from excavated areas, construction materials or wastes (including truck washing and concrete washes), and chemical products such as oil, grease, solvents, fuels, and pesticides will be controlled. Excavated material or other construction material will not be stockpiled or deposited near or on stream banks, lake shorelines, ditches, irrigation canals, or other areas where runoff could impact the environment.
23	C	Water quality	Washing of concrete trucks or disposal of excess concrete in any ditch, canal, stream, or other surface water will not be permitted. Concrete wastes will be disposed of in accordance with all federal, state and local regulations.
24	C, O	Surface water, wetlands	Vehicle refueling and servicing activities will be performed in designated construction zones located more than 100 feet from wetlands and streams. Spill prevention and containment measures or practices will be incorporated as needed.
25	P	Dewatering	A dewatering permit will be obtained from the appropriate agencies if required for construction dewatering activities.
		VEGETATION AND SOILS MANAGEMENT	
26	P, C	Vegetation management and noxious weeds	The COM Plan will include a Vegetation Management Plan and a Noxious Weed Management Plan. The Vegetation Management Plan will address plant removal and selective clearing. The Noxious Weed Management Plan

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
			will be developed in accordance with appropriate land management agencies' standards, consistent with applicable regulations and agency permitting stipulations for the control of noxious weeds and invasive species (Executive Order (E.O.) 13112). Included in the Noxious Weed Management Plan will be stipulations regarding construction, restoration, and operation (use of weed-free materials, washing of equipment, etc.).
27	C	Vegetation management	In construction areas where re-contouring is not required, vegetation will be left in place wherever possible and original contour will be maintained to avoid excessive root damage and allow for re-sprouting.
28	C	Vegetation management, visual	Clearing will be performed so as to minimize marring and scarring the countryside and preserve the natural beauty to the maximum extent possible. Except for danger trees, no clearing will be performed outside the limits of the ROW.
		ECOLOGICAL RESOURCES	
29	P, C	Ecological, special status species	The COM Plan will include a Biological Protection Plan, which will identify important, sensitive, or unique habitats and BLM sensitive, USFS sensitive, and state-listed species in the vicinity of the TWE Project. The COM Plan will identify measures to be taken to avoid, minimize, or mitigate impacts to these habitats and species.
30	P	Ecological, raptors	In applicable areas, the TWE Project will be designed to meet or exceed the raptor safe design standards described in the *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (Avian Power Line Interaction Committee (APLIC) 2006).
31	P, C, O	Ecological, special status species	Mitigation measures that will be developed during the consultation period with the BLM and under Section 7 of the ESA will be adhered to, along with mitigation developed in conjunction with state authorities.
32	P, C	Ecological, special status species	Seasonal restrictions may be implemented in certain areas to mitigate impacts on wildlife. With the exception of emergency repair situations, ROW construction, restoration, maintenance, and termination activities in designated areas will be modified or discontinued during sensitive periods (e.g., nesting and breeding periods) for candidate, proposed or listed threatened and endangered, or other sensitive animal species, as required by permitting agencies. Potential seasonal restrictions and avoidance buffers for nesting raptors will be identified in the DEIS. The Biological Protection Plan will incorporate the seasonal restrictions and stipulations contained in the federal agency RODs.
33	P, C	Ecological, special status species and habitats	Prior to the start of construction, the Applicant will provide training to all Contractor and Subcontractor personnel and others involved in construction activities where/if there is a known occurrence of protected species or habitat in the construction area. Sensitive areas will be considered avoidance areas. Prior to any construction activity, avoidance areas will be marked on the ground and maintained through the duration of the Contract. The Applicant will remove markings during or following final inspection of the Project.
34	C	Ecological, special status species and habitats	If evidence of a protected species not previously identified or known is found in the Project area, the Contractor will immediately notify the appropriate land management agencies and provide the location and nature of the findings.
		CULTURAL RESOURCES – HISTORIC, ARCHAEOLOGICAL, AND TRIBAL TRADITIONAL	

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
35	P, C	Cultural resources	In consultation with the appropriate land management agencies and state historic preservation officers (SHPOs), and in accordance with the Programmatic Agreement (PA), a Cultural Resources Treatment Plan will be prepared as part of the COM Plan to address the specific mitigation measures for cultural resources that will be developed and implemented to mitigate any identified adverse effects. These may include Project modifications to avoid adverse impacts, monitoring of construction activities, and data recovery studies.
36	P, C	Native American cultural resources	The Applicant will comply with all laws, policies, and regulations pertaining to consultations with federally recognized Tribes.
37	P	General, cultural	Prior to construction, all construction personnel will be instructed on the protection of cultural resources, including the provisions of federal, state, and tribal laws regarding cultural resources, including prohibition of collection and removal; and the importance of these resources and the purpose and necessity of protecting them.
		PALEONTOLOGICAL RESOURCES	
38	P, C, O	Paleontology	If paleontological resources are known to be present in the Project area, or if areas with a high potential to contain paleontological material has been identified through the NEPA process and DEIS, the Applicant will prepare a Paleontological Resources Management and Mitigation Plan as part of the COM Plan.
39	P	Paleontology	Paleontological mitigation may be required in areas of greatest disturbance and areas likely to have significant fossils. Preconstruction surveys of such areas may be conducted as agreed upon by the land-managing and lead federal agency.
		LAND USE AND VISUAL RESOURCES	
40	P, C, O	Land Use, agriculture	On agricultural land, the ROW will be aligned, in so far as practical, to reduce the impacts to farm operations and agricultural production.
41	C	Land Use, agriculture	In cultivated agricultural areas, soil compaction by construction activities will be disked to uncompacted soils. Construction activities will minimize impacts on agricultural operations.
42	C	Land Use, ranching	In grazing areas, excessive amounts of pine needles left by clearing of trees, will be removed from the ROW and disposed of in a location to prevent harm to grazing domestic animals.
43	C	Access, land use, gates	The COM Plan will include a Flagging, Fencing, and Signage Plan. Fences and gates will be repaired or replaced to their original pre-disturbed condition as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates will be installed only with the permission of the landowner or the land management agency, and will be restored to their original pre-disturbed condition following construction. Cattle guards will be installed where new permanent access roads cut through fences, at the request of the land management agency.
44	P, C, O	Visual	Non-specular conductors and shield/ground wires will be used to reduce potential visual impacts.
45	P, C, O	Structure design and public safety	Structures and/or shield/ground wire will be marked with high-visibility devices where required by governmental agencies (Federal Aviation Administration (FAA)). Structure heights will be less than 200 feet, where feasible, to minimize the need for aircraft obstruction lighting.

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
46	P, C, O	Visual resources	The Applicant will comply with federal permitting agency stipulations regarding visual resources.
		AIR QUALITY	
47	P, C	Air quality, dust control	The COM Plan will include a Dust Control and Air Quality Plan. Requirements of those entities having jurisdiction over air quality matters will be adhered to and dust control measures will be developed. Open burning of construction trash will not be allowed unless permitted by appropriate authorities.
48	P, C	Air quality, emissions	The Contractor and Subcontractor(s) will be required to have and use air emissions control devices on construction machinery, as required by federal, state or local regulations or ordinances.
		CORONA EFFECTS	
49	P, C, O	Corona	Transmission line materials will be designed to minimize corona. The proposed hardware and conductor will limit the audible noise, radio interference, and TV interference due to corona. Tension will be maintained on all insulator assemblies to assure positive contact between insulators, thereby avoiding sparking. Caution will be exercised during construction to avoid scratching or nicking the conductor surface that may provide points for corona to occur.
50	O	TV, radio interference	The Applicant will respond to complaints of line-generated radio or television interference by investigating the complaints and implementing appropriate mitigation measures. The transmission line will be patrolled on a regular basis so that damaged insulators or other line materials that could cause interference are repaired or replaced.
		PUBLIC HEALTH AND SAFETY	
51	P, C, O	Safety standards	The TWE Project will be designed, constructed, and operated to meet or exceed the requirements of the National Electrical Safety Code (NESC), U.S. Department of Labor, Occupational Safety and Health Administration standards, and the Applicant's requirements for safety and protection of landowners and their property.
52	O	Induced currents	The Applicant will apply necessary mitigation to eliminate problems of induced currents and voltages onto conductive objects sharing ROW, to the mutual satisfaction of the parties involved.
53	P, C	Blasting	The COM Plan will include a Blasting Plan, which will identify methods and mitigation measures to minimize the effects of blasting, where applicable. The Blasting Plan will document the proposed methods to achieve the desired excavations, proposed methods for blasting warning, use of non-electrical blasting systems, and provisions for controlling fly rock, vibrations, and air blast damage.
54	P, C, O	Noise, electrostatic, and EMF	Research studies performed to determine the effects of audible noise and electrostatic and electromagnetic fields (EMF) will be regularly monitored by the Applicant to ascertain whether these effects are significant.
55	P, C, O	FAA regulations	The TWE Project will be designed to comply with FAA regulations, including lighting regulations, to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips.
56	P	Worker health and safety	As part of the COM Plan, the Applicant will provide a Health and Safety Plan, which will outline measures to protect workers and the general public during construction, operation, and decommissioning of the TWE Project. The Plan will identify applicable federal and state occupational safety standards,

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
			establish safe work practices, and define safety performance standards.
		HAZARDOUS MATERIALS, WASTE, AND WASTEWATER MANAGEMENT	
57	P	Hazardous materials	As part of the COM Plan, the Applicant will provide a Spill Prevention Notification and Clean-up Plan. The Plan will address compliance with all applicable federal, state, and local regulations, and will include: spill prevention measures, notification procedures in the event of a spill, employee awareness training, and commitment of manpower, equipment, and materials to respond to spills, if they occur.
58	P	Hazardous materials	As part of the COM Plan, the Applicant will provide a Pesticide Use Plan. The Plan will address compliance with all applicable federal, state and local regulations.
59	P	Hazardous materials	As part of the COM Plan, the Applicant will provide a Clean-up Work Management Plan that has been approved by applicable federal, state or local environmental regulation agencies. The plan will address on-site excavation of contaminated soils and debris and will include: identification of contaminants, methods of excavation, personnel training, safety and health procedures, sampling requirements, management of excavated soils and debris, and disposal methods.
60	C	Waste management	No non-biodegradable debris will be deposited in the ROW. Slash and other biodegradable debris will be left in place or disposed of in accordance with agency requirements.
61	C, O	Hazardous materials, waste management	As part of the COM Plan, the Applicant will provide a Hazardous Materials Management Plan. Hazardous materials will not be drained onto the ground or drainage areas. Totally enclosed containment will be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials will be removed to a disposal facility authorized to accept such materials.
62	C, O	Hazardous materials	If a reportable release of hazardous substance occurs at the work site, the Contractor will immediately notify the Applicant and all environmental agencies, as required by law. The Contractor will be responsible for the clean-up.
		FIRE PROTECTION	
64	P, C	Fire, safety	The COM Plan will include a Fire Protection Plan. The Applicant or its Contractor(s) will notify the BLM of any fires and comply with all rules and regulations administered by the BLM and USFS concerning the use, prevention, and suppression of fires on federal lands, including any fire prevention orders that may be in effect at the time of the permitted activity. The Applicant or its Contractor(s) may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the Applicant or its Contractor(s). The Applicant or its Contractor(s) will: • Operate all internal and external combustion engines on federally-managed lands per 36 CFR 261.52(j), which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified; • Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC-10 pound on all equipment and vehicles. If a fire

TABLE 9 TWE PROJECT COMMITTED ENVIRONMENTAL MITIGATION MEASURES			
NO.	PHASE(S)	TOPIC	DESCRIPTION OF MITIGATION MEASURE
			spreads beyond the suppression capability of workers with these tools, all workers will cease fire suppression action and leave the area immediately via pre-identified escape routes; • Initiate fire suppression actions in the work area to prevent fire spread to or on federally-administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable that a fire would exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area; • Notify the appropriate fire center immediately of the location and status of any escaped fire; • Review weather forecasts and the potential fire danger prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration will be given to additional mitigation measures or temporary discontinuance of the operation during periods of extreme wind and dryness; • Operate all vehicles on designated roads, or park in areas free of vegetation; • Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter will be required to watch for ignitions; and • Use only diesel-powered vehicles in areas where excessive heat from vehicle exhaust systems could start brush or grass fires.

4.0 TWE PROJECT ALTERNATIVES

Section 4.0 describes the range of alternatives presented during the TWE Project Public Scoping process. In January 2011, the BLM and Western issued the Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the TWE Project. The NOI was published in the Federal Register on January 4, 2011 starting the 90-day public scoping process. The joint lead agencies held 23 scoping meetings in Wyoming, Colorado, Utah and Nevada.

Section 4.0 provides information on siting areas and alternative facility locations for the TWE Project terminals and ground electrode systems, which have been developed by TransWest for the lead agencies consideration. Section 4.0 also discusses the feasibility of undergrounding portions of the TWE Project, in response to the lead agencies' request for information on this technology alternative.

Section 4.0 describes alternatives to the proposed TWE Project as follows:

- Section 4.1 – Transmission Line Alternatives, describes the alternative line design characteristics, structure designs, and construction, operation and maintenance practices for the corridor routing alternatives.

- Section 4.2 – Project Facility Alternatives, describes the general siting areas, and proposed and alternative facility locations for the Northern and Southern Terminals and ground electrode systems. These alternatives are recommended by TransWest for inclusion in the DEIS.

- Section 4.3 – System Alternatives, describes system alternatives presented during public scoping. The system alternatives, termed System Alternative 1, 2 and 3, were initially suggested by TransWest in the *TransWest Express Transmission Project ROW Application SF 299 (Amended from December 2008) January 2010* (TWE 2010b). System Alternative 1 was removed from further consideration as described previously in Section 2.4.2. System Alternatives 2 and 3 are recommended by TransWest for inclusion in the DEIS.

- Section 4.4 – Undergrounding Alternative, describes technology and feasibility issues associated with undergrounding portions of the TWE Project. TransWest is not recommending this technology alternative be considered in detail in the DEIS. Technical issues associated with potential undergrounding alternatives are discussed.

4.1 Transmission Line Alternatives

4.1.1 Transmission Line Design Alternatives

The transmission line design characteristics and alternative structure designs would be the same for the corridor routing alternatives as previously described for the proposed TWE Project in Section 3.1.

4.1.2 Transmission Line Construction, Operation and Maintenance Practices

The construction, operation and maintenance practices for the corridor routing alternatives would be the same as previously described for the proposed TWE Project in Sections 3.5 and 3.6.

4.2 Project Facility Alternatives

4.2.1 Northern Terminal

The location for the Northern Terminal will be finalized during engineering and design. The general planned location for the Northern Terminal is proposed to be within a general siting area, shown on Map Exhibit 3. For purposes of the DEIS analysis, Map Exhibit 3 shows a preliminary location for the Northern Terminal and its relationship to the TWE Project proposed corridor and grid interconnections. Considerations in siting the location of the Northern Terminal within this general area include:

- Land Ownership - use of private lands over public lands is preferable.
- Land Use - other current and planned land uses in the area, in particular other infrastructure that is being planned and permitted.
- Environmental Constraints - avoidance of sensitive resources, including sensitive wildlife habitats, cultural resource sites, and wetlands.
- Topography - use of level terrain over more rugged terrain is preferable.
- Access to the TWE Project transmission line corridors coordinated with other existing and planned infrastructure and which minimize line crossings.
- Interconnections with existing, planned and potential transmission lines such that line crossings are minimized and conflicts with other existing and planned infrastructure are avoided.

4.2.2 Southern Terminal

The location for the Southern Terminal will be finalized during engineering and design. The location for the Southern Terminal is proposed to be within a general siting area, shown on Map Exhibit 4. For purposes of the DEIS analysis, Map Exhibit 4 shows preliminary locations for the Southern Terminal and its relationship to the TWE Project proposed corridor and grid interconnections. Siting criteria used in selecting this siting area, and the final site location are similar to those described for the Northern Terminal.[11]

4.2.3 Ground Electrode System Alternatives

The location of the ground electrode systems will be finalized during engineering and design. For purposes of the DEIS analysis, general siting areas and conceptual site locations have been identified for the proposed and alternative northern and southern ground electrode systems as shown on Map Exhibits 5 and 6. The ground electrode site could be located anywhere within the siting areas. Additionally, for the DEIS analysis, the lower voltage connector lines from the ±600 kV DC transmission line proposed route to each of the conceptual ground electrode sites are shown on Map Exhibits 5 and 6.

The proposed TWE Project and alternative siting areas were selected based on feasibility studies that considered surface and deep earth geology, proximity to the proposed and alternative routes,

[11] Criteria are the same, except interconnections with the planned Energy Gateway Projects do not apply to the Southern Terminal.

proximity to underground infrastructure (oil, gas and water wells, pipelines, etc.), and topography. Major factors in selecting the alternative sites were:

1. Geology and ground resistivity of the area. The primary need is for deep sedimentary basins with large volumes of sediments having a low resistivity. Locations with potentially high resistance geologic formations that could potentially interfere with the current path are generally avoided.

2. Distance from grounded metallic infrastructure that might be negatively impacted by DC ground currents. In general, this consideration results in the electrode site being a few miles or more from power plants, electrical substations, underground pipelines, and active oil or gas wells. The ground electrodes cannot be located within 2 miles of major pipelines due to the risk of having a corrosive impact on nearby metallic structures. Ground electrodes located within 2 – 10 miles of major pipelines may require additional or modified corrosion protection systems.

3. Land use constraints such as protected areas (National Parks, wilderness, etc.) and sensitive resource areas (e.g., sage-grouse leks and core areas). Secondary consideration is given to topography as it would be impractical to drill the ground wells in mountainous topography.

More detailed information will be required to make a final determination of the proposed ground electrode sites including: a) availability of public lands or private lands; b) detailed measurements of ground resistivity; c) chemical and thermal characteristics of the soil at the site; and d) a detailed analysis of grounded metallic infrastructures in the area. The location and layout of the selected ground electrode facility will also take into consideration existing and planned land uses, environmental constraints, routing of the ±600 kV DC transmission line, and the length and routing of the low voltage connector lines.

4.2.3.1 Northern Ground Electrode Alternative Sites

The 'Separation Flat' siting area contains the proposed northern ground electrode site. This proposed siting area would accommodate all routes into the Northern Terminal. The five alternative sites shown on Map Exhibit 5 would also connect to the Northern Terminal: Eight Mile Basin, Separation Creek, Shell Creek, Little Snake East, and Little Snake West.

4.2.3.2 Southern Ground Electrode Alternative Sites

The 'Mormon Mesa-Carp Elgin Road' siting area contains the proposed southern ground electrode site that would provide connection to the Southern Terminal. The two alternative sites shown on Map Exhibit 6 would also connect to the Southern Terminal: Halfway Wash E and Halfway Wash-Virgin River.

4.3 System Alternatives

TransWest amended the Preliminary ROW Application SF 299 to eliminate System Alternative 1 from further consideration in August 2012. Only two system alternatives remain, System Alternative 2 and System Alternative 3. Section 4.3 addresses two system alternatives considered for the TWE Project during the public scoping process as follows:

- Section 4.3.1 provides an overview of System Alternatives 2 and 3.

- Section 4.3.2 describes the system alternatives according to the conditions under which each system alternative would meet the TWE Project purpose and need and the alternative's specific components and design characteristics.

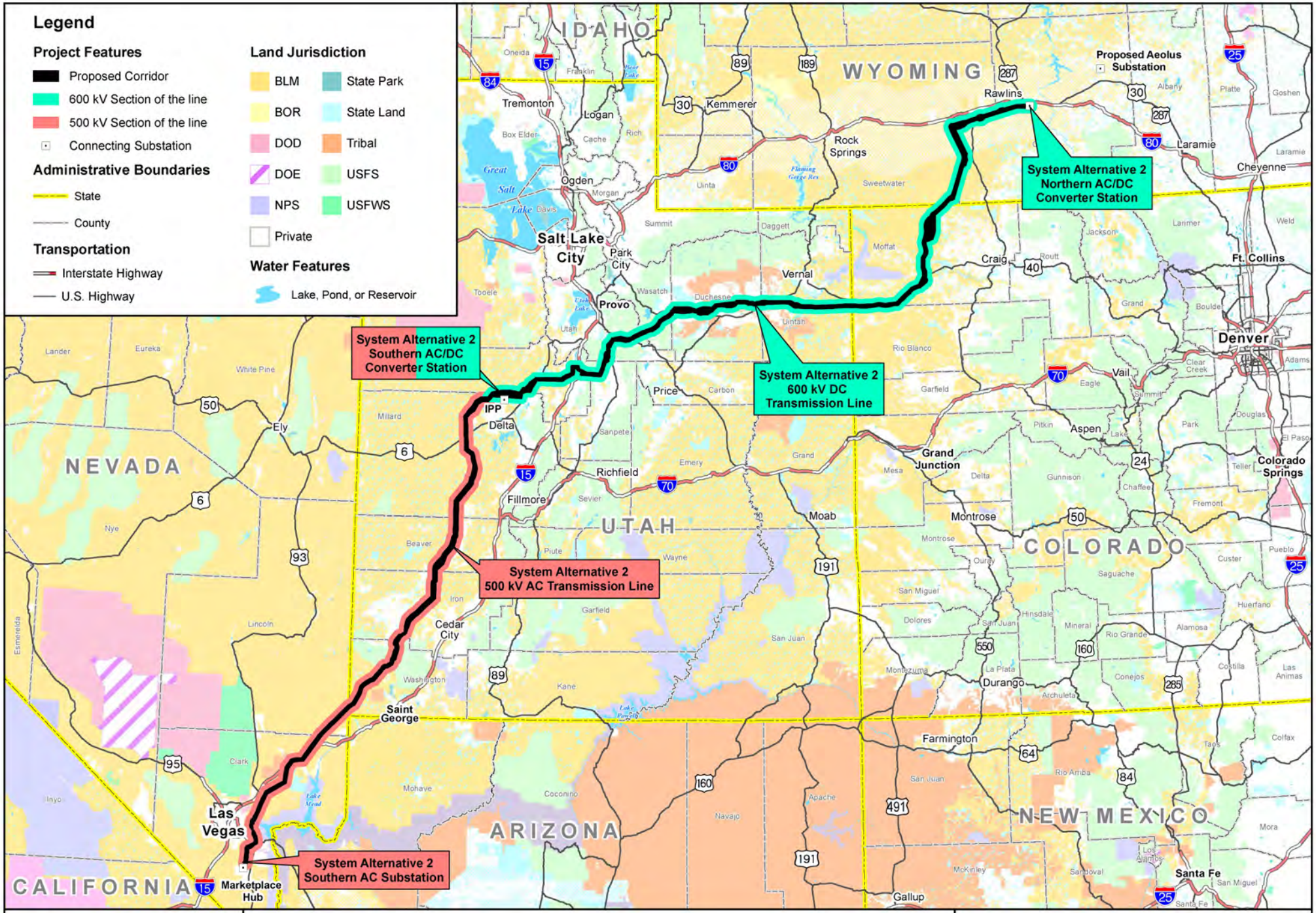
- Section 4.3.3 discusses how the system alternatives would differ from the proposed TWE Project with respect to construction, operation, and maintenance practices.

- Section 4.3.4 provides a comparison of the system alternatives to the proposed TWE Project.

4.3.1 Overview of Alternative Systems

System Alternative 2 - System Alternative 2 would be an alternative system configuration, which would replace the proposed TWE Project (Map Exhibit 7). This alternative would entail TransWest constructing and operating a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length, from the Northern Terminal to a new AC/DC converter station near the existing IPP Substation near Delta, Utah. From the new AC/DC converter station in Utah, a single circuit 1,500 MW, 500 kV AC transmission line, approximately 350 miles in length, would be constructed to one of the existing substations in the Eldorado Valley, south of Boulder City, Nevada (Marketplace Hub).

System Alternative 3 - System Alternative 3 would be a phased approach to building and operating the proposed TWE Project (Map Exhibit 8). This phased approach would entail construction of a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length between the location of the proposed Northern Terminal to the IPP substation near Delta, Utah and operated initially as a 1,500 MW, 500 kV AC transmission system. For AC operation, the initial phase of this system alternative would require 500/345 kV substation connections near the IPP line in Millard County, Utah and construction of a 500 kV Series Compensation Station near the halfway point of the northern segment. Full development of the TWE Project using this phased build out approach would involve constructing the remaining portion of the 3,000 MW, ±600 kV DC line from IPP to the Southern Terminal, south of Boulder City, Nevada and converting operations to a DC system.



Map Exhibit 7

System Alternative 2: DC from Wyoming to IPP, AC from IPP to Marketplace Hub

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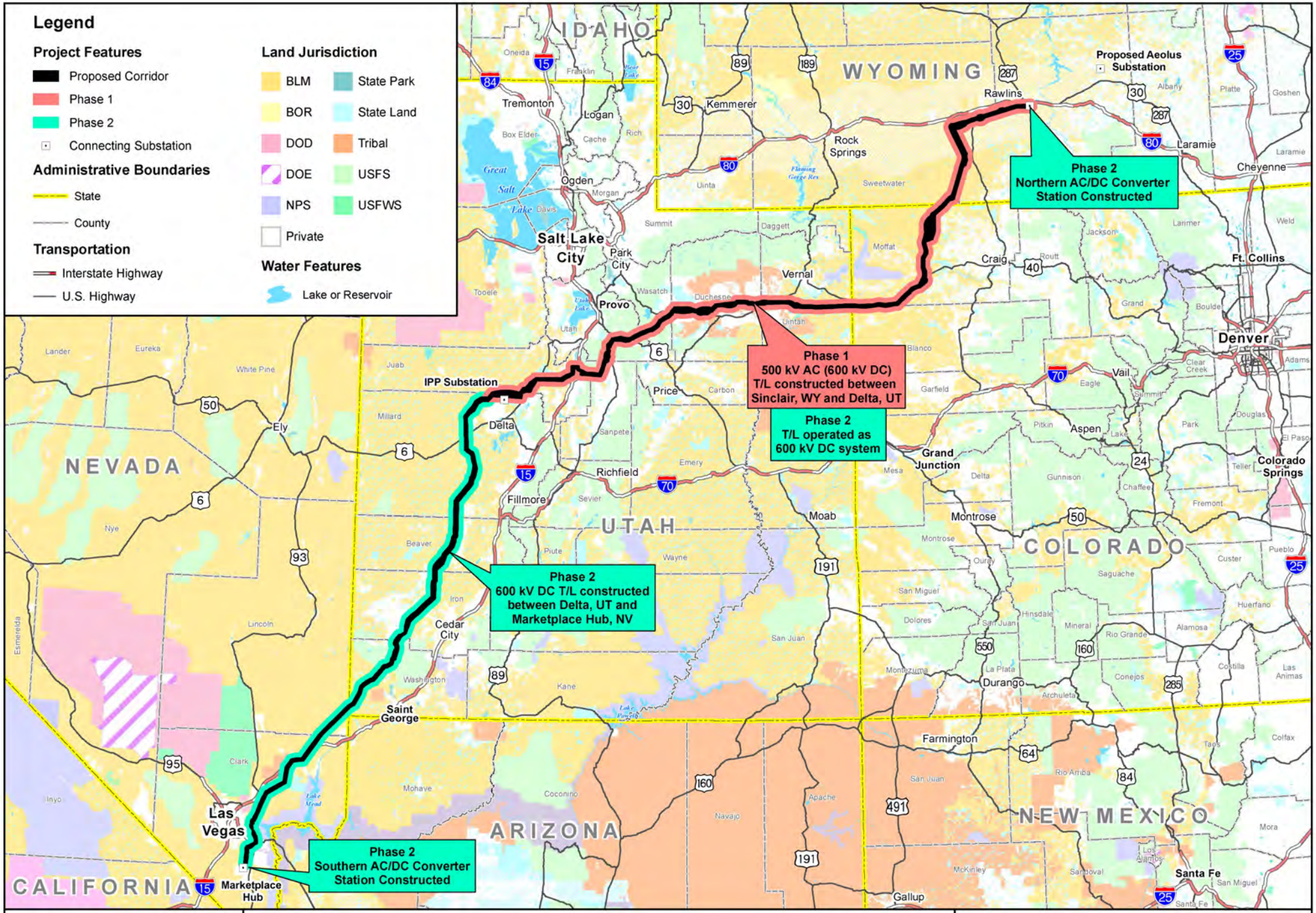
POWER ENGINEERS

TRANSWEST EXPRESS LLC



Map Exhibit 8
System Alternative 3: Phased Build-Out
TransWest Express Transmission Project | October 2012 | DRAFT

POWER ENGINEERS
TRANSWEST EXPRESS LLC

4.3.2 Alternative Systems' Purpose and Need and Design Characteristics

4.3.2.1 System Alternative 2 – DC from Wyoming to IPP, AC from IPP to Marketplace Hub

System Alternative 2 would meet the TWE Project's stated objectives only if transmission capacity becomes available and can be utilized to transmit energy delivered by the TWE Project from Delta, Utah to Southern California. Under this system alternative, the delivery of energy to markets in the Desert Southwest region would be through both the new 1,500 MW 500 kV transmission line and through the existing 2,400 MW 500 kV DC transmission system, IPP's 'Southern Transmission System' (STS), between Delta, Utah and Adelanto, California. Because capacity is not currently available on the STS, System Alternative 2 does not currently meet the TWE Project's purpose and need. Should capacity become available in the future, TransWest would only consider implementing this system alternative under the conditions that sufficient capacity, approximately 1,500 MW, was commercially available to transmit energy delivered by the TWE Project to California; and that TransWest is able to establish commercial interconnection agreements with the utility owning and operating the IPP transmission line (currently Los Angeles Department of Water and Power (LADWP)). TransWest will provide the lead agencies with notice if a decision is made to implement System Alternative 2.

System Alternative 2 would replace the proposed TWE Project. This alternative would entail a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length, from the Northern Terminal to a new AC/DC converter station near the existing IPP substation near Delta, Utah. From the new AC/DC converter station in Utah, a single circuit 1,500 MW, 500 kV AC transmission line, approximately 350 miles in length, would be constructed to one of the existing substations in the Eldorado Valley, south of Boulder City, Nevada (Marketplace Hub). See Map Exhibit 6.

System Alternative 2 would entail the following specific facilities and actions:

a. Construction of the Northern Terminal and ground electrode system (identical facilities to the proposed TWE Project);
b. Construction of a new AC/DC converter station and an adjacent 500/345 kV AC substation near the IPP in Millard County, Utah;
c. Construction of a ground electrode system within 50 miles of Delta, Utah;
d. Construction of a double circuit 345 kV AC line between the new 500/345 kV AC Substation near IPP to the existing IPP 345 kV AC substation adjacent to the existing IPP AC/DC converter station. The length of the double circuit 345 kV AC connection is estimated to be less than five miles;
e. Construction of a ±600 kV DC transmission line, approximately 375 miles long, from the Northern Terminal to the new AC/DC converter station and associated 500/345 kV substation near IPP (northern segment, similar to proposed TWE Project);
f. Construction of a single circuit, 1,500 MW, 500 kV AC line from the new 500/345 kV AC substation near IPP to one of the existing Marketplace Hub substations in the Eldorado Valley (southern segment); and
g. Construction of a series compensation station (similar to a small 500 kV substation) adjacent to the 500 kV AC transmission line, near the halfway point in the 500 kV AC line southern segment.

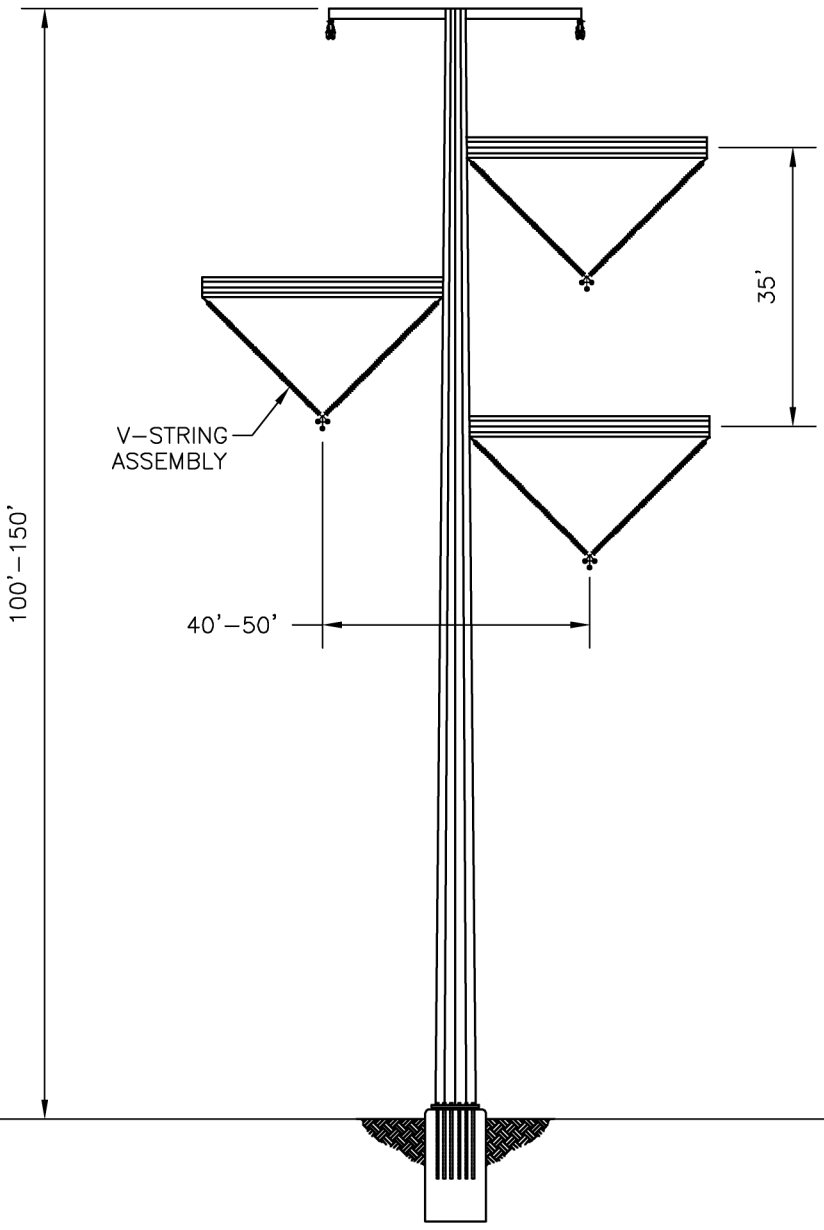
Compared to the proposed TWE Project, System Alternative 2 would: 1) replace the ±600 kV DC transmission line with a single circuit 500 kV AC line, from near IPP in Millard County, Utah to one of the existing Marketplace Hub substations in Clark County, Nevada[12]; 2) eliminate the Southern Terminal and ground electrode system in Clark County, Nevada and replace these facilities with similar facilities near IPP in Millard County, Utah; 3) construct additional new facilities, including a 500/345 kV AC substation, a double circuit 345 kV transmission line, less than five miles in length, and a 500 kV series compensation station, near the halfway point in the 500 kV AC line.

System Alternative 2 would require both a 500 kV single circuit AC configuration and a 345 kV double circuit AC configuration. System Alternative 2 would require a single circuit 500 kV configuration and structures, similar to the structure design shown in Figure 29. The 500 kV single circuit configuration would require three sets of conductor bundles, one steel shield wire, and one OPGW. The components for the 500 kV structures including foundations, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, would be similar to those described for the ±600 kV DC transmission line.

One double circuit 345 kV transmission line would be required for System Alternatives 2 and 3. The 345 kV double circuit structures would be either self supporting steel lattice towers or single shaft tubular steel poles. Figure 30 shows a typical steel pole design. The 345 kV double circuit configuration would require six sets of conductor bundles, one steel shield wire, and one OPGW. The components for the 345 kV structures including foundations, conductors, insulators, and associated hardware, overhead shield (ground) wires, and grounding rods, would be similar to those described for the ±600 kV DC transmission line.

Map Exhibit 9 depicts the siting areas for the System Alternative 2 AC/DC converter station, 500/345 kV AC substation, ground electrode system, double circuit 345 kV connector line and the 500 kV series compensation station.

[12] Level 1 and Level 2 of the co-location distances framework applies to the 1,500 MW, 500 kV AC transmission portion of System Alternative 2. The selective use of Level 2 co-location distances can be used between the 1,500 MW, 500 kV AC transmission line segment and transmission lines with a voltage level of 500 kV and lower.



NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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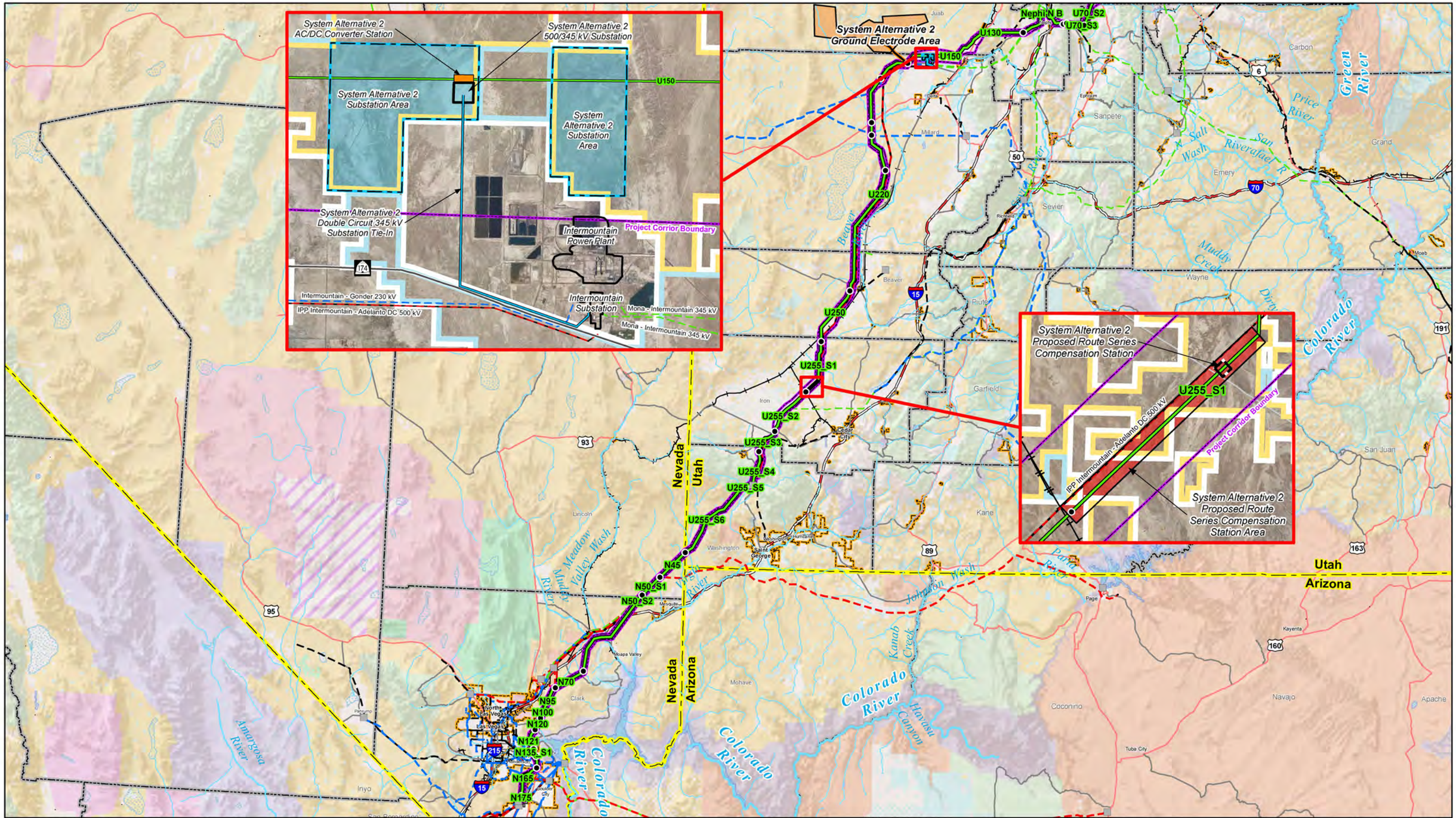
FIGURE 29

TYPICAL 500kV AC SINGLE CIRCUIT
TUBULAR POLE STRUCTURE



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Map Exhibit 9

System Alternative 2 Components

Project Features
- Proposed Reference Line
- Route Segment Node
- Route Corridor
- Terminal Siting Area
- Ground Electrode Area
- Ground Electrode Site
- 34.5 kV Electrode Line

Administrative Boundaries
- Municipal Boundary

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- 138 kV Line
- Substation

Land Jurisdiction
- Indian Reservation
- State Land
- USDA Forest Service
- State Park or Recreation Area
- U.S. Department of Energy
- U.S.Department of Defense
- National Park or National Monument
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service

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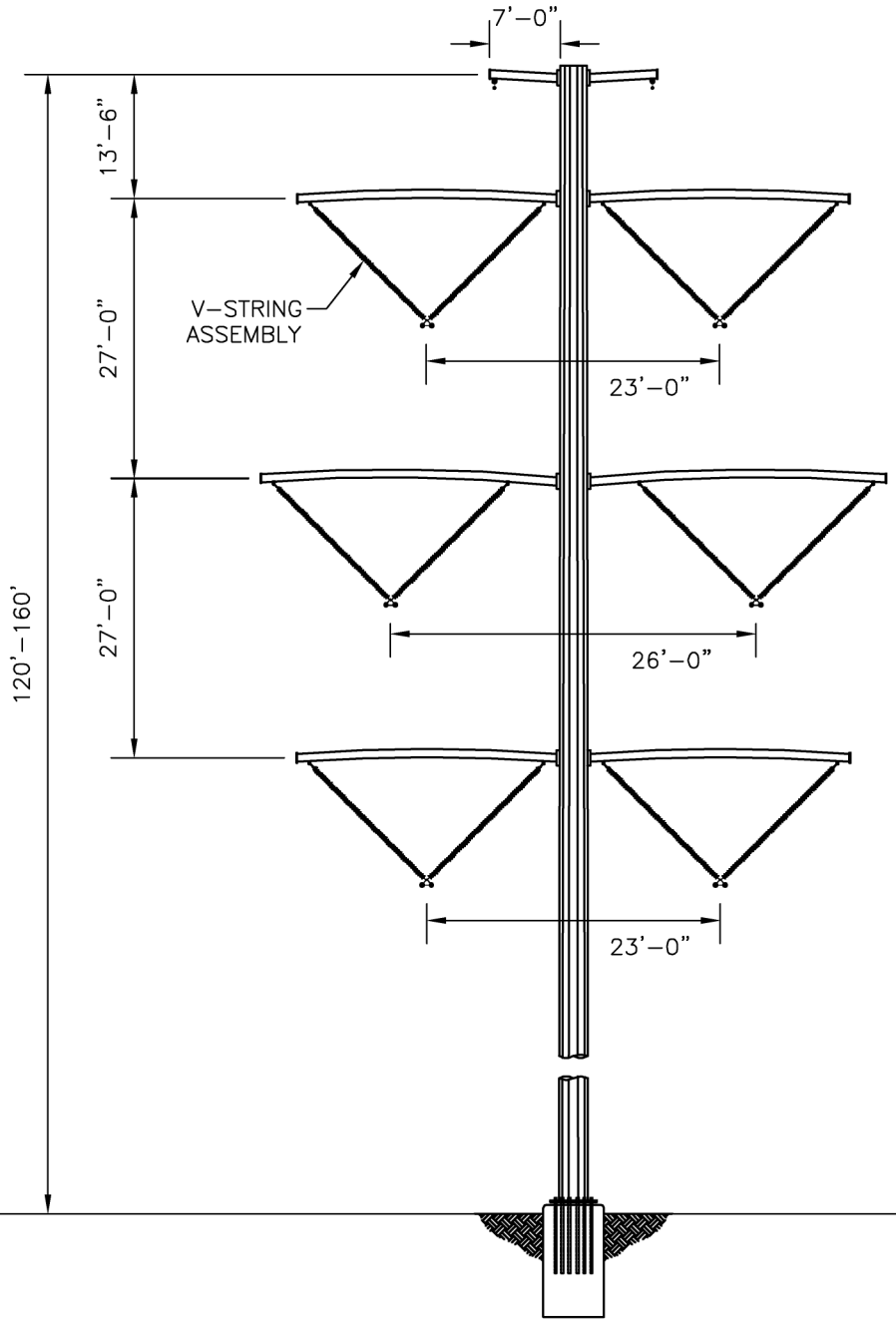

NOTES

1. DIMENSIONS SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY.

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FIGURE 30

TYPICAL 345kV AC DOUBLE CIRCUIT
SELF SUPPORTING STEEL POLE STRUCTURE

4.3.2.3 System Alternative 3 – Phased Build Out

Similar to System Alternative 2, this System Alternative would meet the TWE Project's stated objectives only if transmission capacity becomes available and can be utilized to transmit energy delivered by the TWE Project from Delta, Utah to Southern California. This initial delivery of energy to markets in the Desert Southwest region would be through the existing 2,400 MW, 500 kV DC transmission system, and IPP's STS. This system alternative would meet the TWE Project's objectives and is considered feasible, however, it is more costly than building out the full system as a single non-phased project and would only be required if the demand for Wyoming resources in the Desert Southwest proves to be slower in development than expected. Construction of the line between Utah and Nevada, the Southern Terminal and completion of the Northern Terminal would be phased, however, to occur at some point in the future when market demands warrant converting the line's operation from 1,500 MW to 3,000 MW.

Should capacity become available, TransWest would only consider implementing this system alternative under the condition that sufficient capacity, approximately 1,500 MW, was commercially available to transmit energy delivered by the TWE Project to California; and that TransWest is able to establish commercial interconnection agreements with the utility owning and operating the IPP transmission line (currently LADWP). A market analysis would also need to be completed with results showing a phased approach to be commercially beneficial. TransWest will provide the lead agencies with notice if a decision is made to implement System Alternative 3.

System Alternative 3 is similar to the proposed TWE Project, except the project would be built and operated in phases. This phased approach would entail construction of a 3,000 MW, ±600 kV DC transmission line approximately 375 miles in length between the location of the proposed Northern Terminal to the IPP substation near Delta, Utah and operated initially as a 1,500 MW, 500 kV AC transmission system. For AC operation, the initial phase of this system alternative would require 500/345 kV substation connections near the IPP in Millard County, Utah and construction of a 500 kV Series Compensation Station near the halfway point of the northern segment. Full development of the TWE Project using this phased build out approach would involve constructing the remaining portion of the 3,000 MW, ±600 kV DC line from IPP to the Southern Terminal, south of Boulder City, Nevada and converting operations to a DC system (see Map Exhibit 8).

The TWE Project would be energized in phases. Phase 1 would entail the following:

a. Construction of the 500 kV substation portion of the Northern Terminal. The adjacent AC/DC converter station in Wyoming would be built in Phase 2;
b. Construction of a 500/345 kV AC substation in the vicinity of the existing IPP 345 kV substation near Delta, Utah;
c. Construction of a single circuit 500 kV AC line from the Northern Terminal near Sinclair, Wyoming to the new 500/345 kV AC substation near IPP (northern line segment). The single circuit 500 kV AC line would be designed to operate at both 500 kV AC and ±600 kV DC for easy conversion to ±600 kV DC operation;
d. Construction of a 500 kV series compensation station near the halfway point of the 500 kV AC northern line segment;
e. Construction of a double circuit 345 kV transmission line connecting the new 500/345 kV AC substation to the existing IPP 345 kV substation. The length of the double circuit 345 kV AC connection is estimated to be less than five miles; and

f. Energization of Phase 1 of System Alternative 3 as a 1,500 MW, 500 kV AC system.

Phase 2 would entail the following:

a. Construction of the AC/DC converter station portion of the Northern Terminal in Wyoming and construction of the entire Southern Terminal in Nevada;
b. Construction of the ground electrodes for both the Northern and Southern Terminals (see Map Exhibits 5 and 6);
c. Construction of the ±600 kV DC transmission line between IPP and the Southern Terminal (southern line segment);
d. Removal of the connection to the IPP substation at Delta, Utah and connecting the Phase 1 500 kV AC line (constructed during Phase 1, designed for conversion to ±600 kV DC and operated at 500 kV AC during Phase 1) to the Phase 2 ±600 kV DC line between Delta, Utah and the Southern Terminal;
e. Convert the operation of the TWE Project to a 3,000 MW, ±600 kV DC system;
f. Decommission the 500/345 kV AC substation at IPP;
g. Decommission the double circuit 345 kV transmission line at IPP; and
h. Decommission the series compensation station on the 500 kV AC northern line segment.

System Alternative 3 would utilize the same transmission corridor as the proposed TWE Project. Construction of the Northern Terminal in Wyoming would occur in phases. Phase 1 would require the construction of the AC substation portion of the Northern Terminal complex. In Phase 2, the AC/DC converter station portion of the Northern Terminal complex would be constructed adjacent to the 500 kV AC substation constructed in Phase 1, completing the Northern Terminal. The AC operation of the northern line segment would require the construction of a 500/345 kV substation near IPP. Upon conversion of the line to DC operations, this 500/345 kV substation would be decommissioned along with the double circuit 345 kV line. The 500 kV AC line constructed in Phase 1 from Wyoming to Utah (northern line segment) would be designed and constructed as a DC line to a criteria that would enable it to be initially operated at 500 kV AC and then converted from 500 kV AC operation to ±600 kV DC operation. No further changes to the transmission line would be required to convert the line from AC to DC operation. AC operation of the northern line segment would require the construction of a 500 kV series compensation station near the halfway point of this segment. Upon conversion of the line to DC operations, this 500 kV series compensation station would be decommissioned.

Phase 1 of System Alternative 3 would require a single circuit 500 kV AC configuration designed and constructed to meet the ±600 kV DC criteria. The typical Phase 1 single circuit 500 kV AC structures would be similar in appearance to those shown in Figure 29. The single circuit 500 kV AC configuration would require three sets of conductor bundles, one steel shield wire, and one OPGW. The conversion from 500 kV AC to ±600 kV DC would not require physical changes to the structure or wire system constructed in Phase 1 as one of the three conductor bundle sets would be de-energized and left in place.

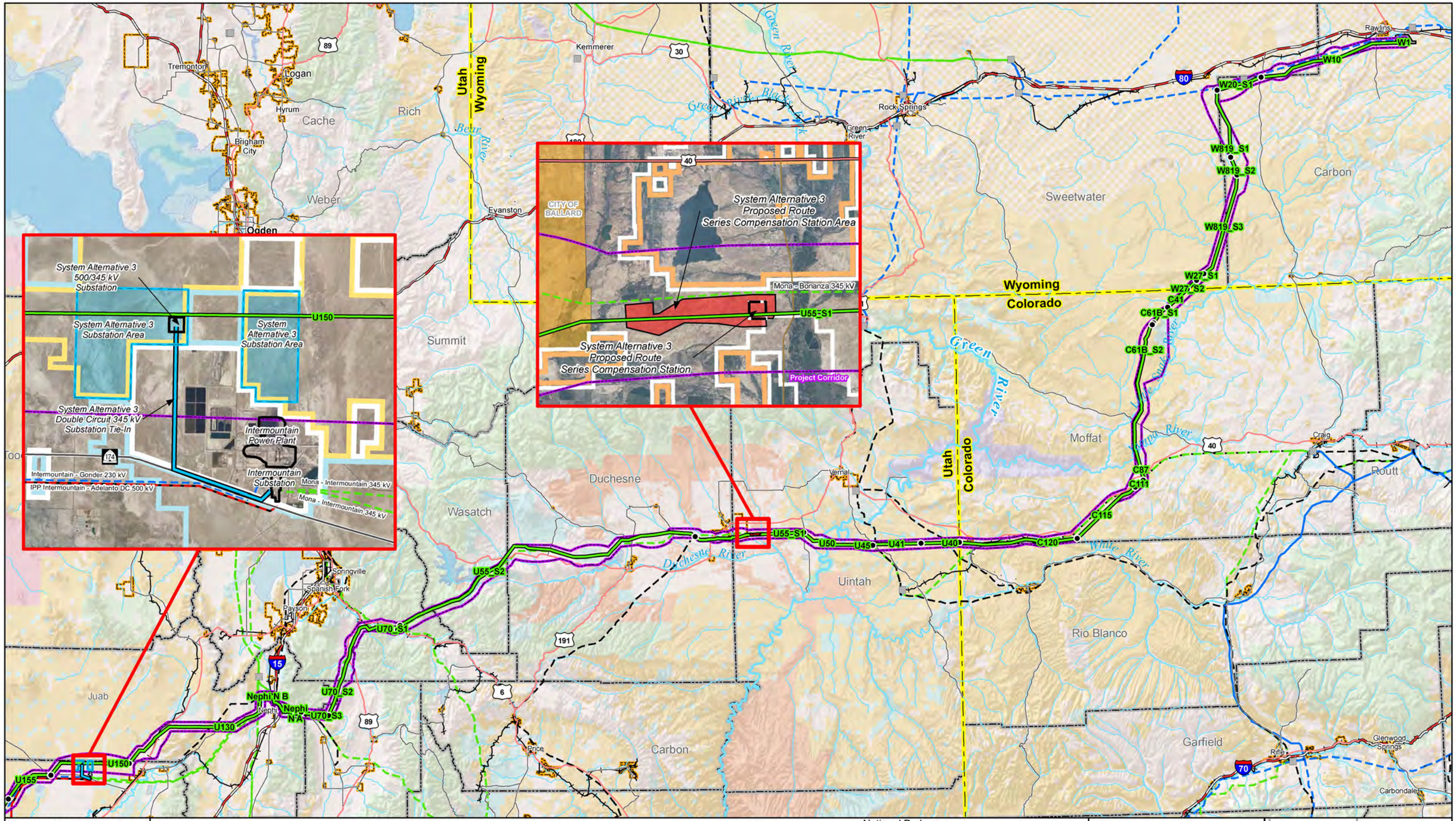
Phase 1 of System Alternative 3 would also require one 345 kV double circuit transmission line. The 345 kV double circuit structures would be either self supporting steel lattice towers or single shaft tubular steel poles. Figure 30 shows a typical steel pole design. The 345 kV double circuit configuration would require six sets of conductor bundles, one steel shield wire, and one OPGW. The components for the 345 kV structures including foundations, conductors, insulators, and associated

hardware, overhead shield (ground) wires, and grounding rods, would be similar to those described for the ±600 kV DC transmission line.

Map Exhibit 10 depicts the siting areas for the System Alternative 3 components, including the 500/345 kV AC substation, double circuit 345 kV connector lines and the 500 kV series compensation station.

4.3.3 Construction, Operation and Maintenance Activities of System Alternatives

The construction, operation, and maintenance activities described for the proposed TWE Project would be very similar for most aspects of the system alternatives. Applicant-committed mitigation measures would also apply to these alternatives. This section discusses key differences between the system alternatives and the proposed TWE Project.



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Map Exhibit 10

System Alternative 3 Components

Project Features
- Proposed Reference Line
- Route Segment Node
- Route Corridor
- Terminal Siting Area

Administrative Boundaries
- Municipal Boundary

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- 138 kV Line
- Substation

Land Jurisdiction
- Indian Reservation
- State Land
- USDA Forest Service
- State Park or Recreation Area
- U.S. Department of Energy
- U.S.Department of Defense
- National Park or National Monument
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service

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4.3.3.1 System Alternative Construction Activities, Workforce and Equipment Requirements

The construction activities, workforce and equipment requirements for the transmission line and terminals would be very similar or the same for the system alternatives as described for the proposed TWE Project in Section 3.5.9. Construction of each substation or series compensation station would require approximately 135 personnel. The construction activities, workforce and equipment requirements for the substations and series compensation stations for System Alternatives 2 and 3 would be approximately as shown in Table 10. Special construction methods and Applicant-committed mitigation measures would apply to these alternatives, as presented in Sections 3.5.7 and 3.7.

TABLE 10 ESTIMATED PERSONNEL AND EQUIPMENT FOR SYSTEM ALTERNATIVE SUBSTATIONS

ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
Survey Crew	4	2	Pickup trucks
Site Management Crew	8-10	2	Office trailers
		3	Pickups
		4	Generators
Site Development – Civil Work Crew	20-25	4	Scrapers
		2	Dozers (ripper)
		2	Motor graders
		2	Roller compactors
		2	Excavators
		4	Dump trucks
		3	Water trucks
		1	Mechanics truck
		1	Fuel truck
		2	Pickup trucks
		6	Carry alls
Fence Installation Crew	10-15	1	Pickup truck
		1	Boom truck
		2	Carry alls
		1	Backhoe
		1	Concrete truck
		1	Reel stand truck
		2	Bobcats
Equipment Footings Installation	20-25	2	Hole diggers

TABLE 10 ESTIMATED PERSONNEL AND EQUIPMENT FOR SYSTEM ALTERNATIVE SUBSTATIONS			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
Crew		2	Boom trucks
		1	Excavator
		3	Concrete trucks
		1	Dump truck
		1	Roller compactor
		2	Plate compactors
		1	Backhoe
		2	Bobcats
		1	Mechanics truck
		1	Fuel truck
		1	Water truck
		2	Pickup trucks
		4	Carry alls
Cable Trench, Conduits, and Station Grounding Crew	10-12	2	Trenchers
		2	Dozers (ripper)
		2	Roller compactors
		2	Plate compactors
		2	Excavators
		1	Boom truck
		3	Pickup trucks
		2	Flatbed trucks
		4	Carry alls
		1	Air compressor
		1	Backhoe
		1	Mechanics truck
		1	Fuel truck
		1	Dump truck
		1	Reel stand truck
Steel Structure and Bus Installation Crew, Control Buildings Construction Crew, Equipment Assembly and	16-24	2	Cranes, RT
		2	High capacity cranes
		4	Boom trucks

TABLE 10 ESTIMATED PERSONNEL AND EQUIPMENT FOR SYSTEM ALTERNATIVE SUBSTATIONS			
ACTIVITY	PEOPLE	QUANTITY AND TYPE OF EQUIPMENT	
Erection Crew		6	Manlifts
		4	Welder trucks
		2	Carry alls
		3	Pickup trucks
		2	Flatbed trucks
		1	Mechanics truck
		4	Vans
		2	Flatbed trucks
Control Building and Wiring Crew	16-20	2	Boom trucks
		4	Manlifts
		3	Wire pullers-small
		2	Reel stand trucks/trailers
		4	Vans
		4	Pickup trucks
		2	Carry alls
		1	Splicing van
		2	Concrete trucks
		1	Bobcat
		1	Trencher
		2	Plate compactors

The above table reflects estimated personnel requirements, which may reach as high as 135 for each substation or series compensation station construction, including maintenance, management, and quality control personnel.

4.3.3.2 System Alternative Construction Schedules

The conceptual construction schedule for the transmission line for System Alternative 2 would employ a three spread approach very similar to the schedule presented for the proposed TWE Project in Section 3.5.9.1 and shown on Figure 18. For System Alternative 2, the conceptual construction schedules shown in Figure 18 would need to be increased by approximately ten weeks to accommodate the additional work required for installing an AC transmission line in place of a DC transmission line.

The conceptual construction schedule for the transmission lines for System Alternative 3 follows a phased approach and is shown on Figure 33. The conceptual construction schedule shown on Figure 33 would be used for both Phase 1 and Phase 2 of System Alternative 3.

The construction schedules for the terminal, ground electrodes, substations and series compensation stations for System Alternatives 2 and 3 would differ from the proposed TWE Project, as illustrated on Figures 31 and 32.

4.3.3.3 Induced Currents on AC Transmission Systems

Unlike the proposed TWE Project ±600 kV DC transmission line, which presents no risk of inducing currents line due to the static nature of the DC electrical and magnetic fields, AC transmission systems can induce currents. Mitigation measures for AC inductive currents would be implemented as necessary for the AC portions of System Alternatives 2 and 3.[13] Mitigation measures would be incorporated into the siting of the AC transmission line ROWs, as well as through transmission line design and operation measures. Measures to mitigate induced current impacts on pipelines, railroads and other land uses are described in Appendix D.

[13] The proposed TWE Project includes short sections of AC transmission lines to connect between the terminals and existing and planned AC transmission systems. Potential impacts from AC induced currents on these system interconnection lines would be mitigated, if necessary, as described herein for the system alternatives.

SYSTEM ALTERNATIVE - 2

TOTAL DURATION: 111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION (NEAR IPP)	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500/345 kV AC SUBSTATION (NEAR IPP)	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
EQUIPMENT INSTALLATION	26
CONTROL BUILDING INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	7
IPP 345 kV AC SUBSTATION MODIFICATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
EQUIPMENT INSTALLATION	17
CONTROL BUILDING MODIFICATION	13
EQUIPMENT TESTING	7
OPERATIONAL	3
SERIES COMPENSATION STATION	
SITE GRADING	10
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
CONTROL HOUSE CONSTRUCTION	17
EQUIPMENT INSTALLATION	16
EQUIPMENT TESTING	10
OPERATIONAL	3

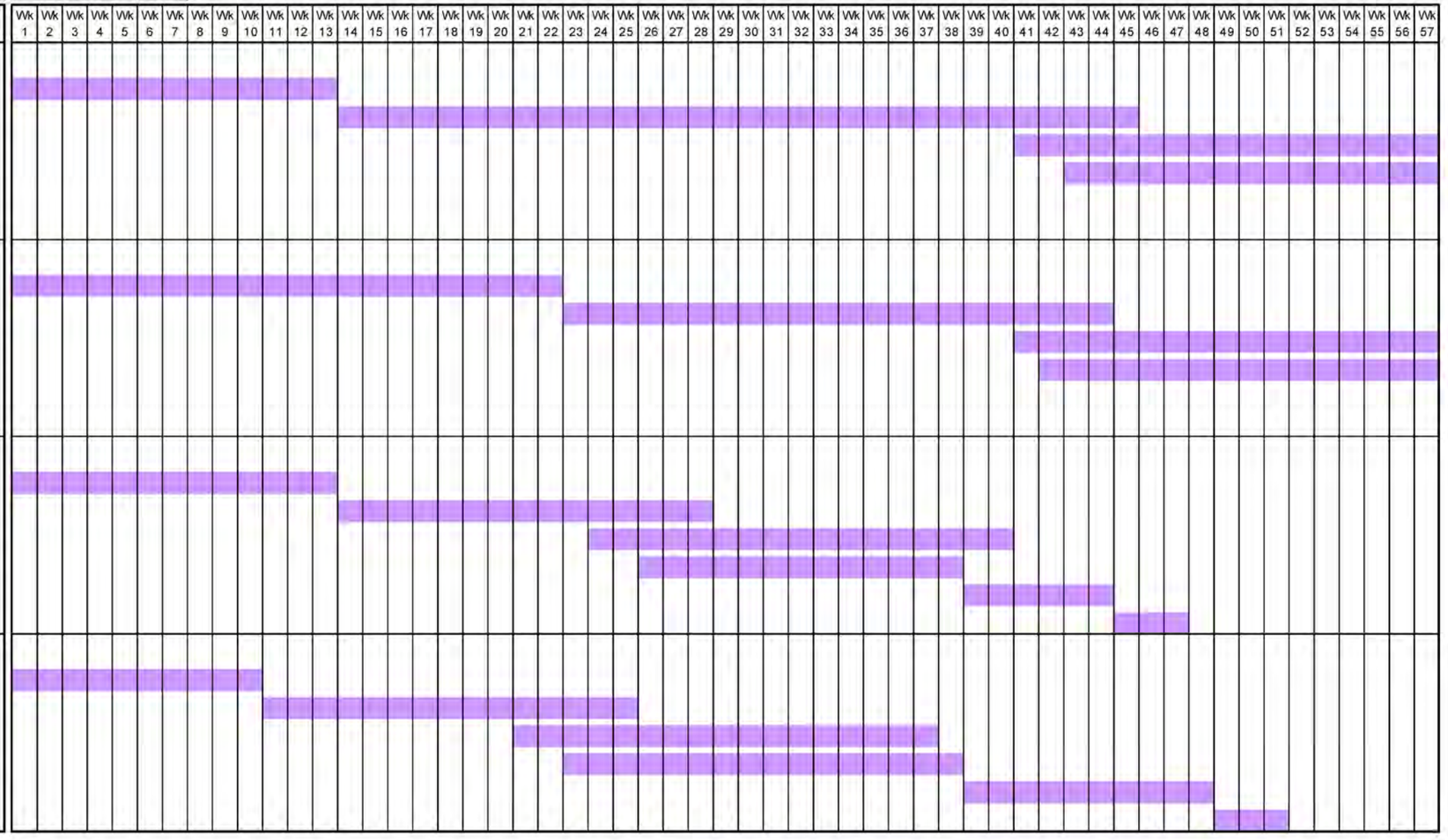

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FIGURE 31
CONSTRUCTION SCHEDULE FOR SYSTEM ALTERNATIVE 2 TERMINALS, SUBSTATIONS AND SERIES COMPENSATION STATION – SHEET 1

SYSTEM ALTERNATIVE - 2	TOTAL DURATION	111 week

TASK	DURATION (WEEKS)
AC/DC CONVERTER STATION (NEAR IPP)	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	32
BUILDING CONSTRUCTION	35
EQUIPMENT INSTALLATION	39
EQUIPMENT TESTING	21
OPERATIONAL	9
500/345 kV AC SUBSTATION (NEAR IPP)	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
EQUIPMENT INSTALLATION	26
CONTROL BUILDING INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	7
IPP 345 kV AC SUBSTATION MODIFICATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
EQUIPMENT INSTALLATION	17
CONTROL BUILDING MODIFICATION	13
EQUIPMENT TESTING	7
OPERATIONAL	3
SERIES COMPENSATION STATION	
SITE GRADING	10
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
CONTROL HOUSE CONSTRUCTION	17
EQUIPMENT INSTALLATION	16
EQUIPMENT TESTING	10
OPERATIONAL	3

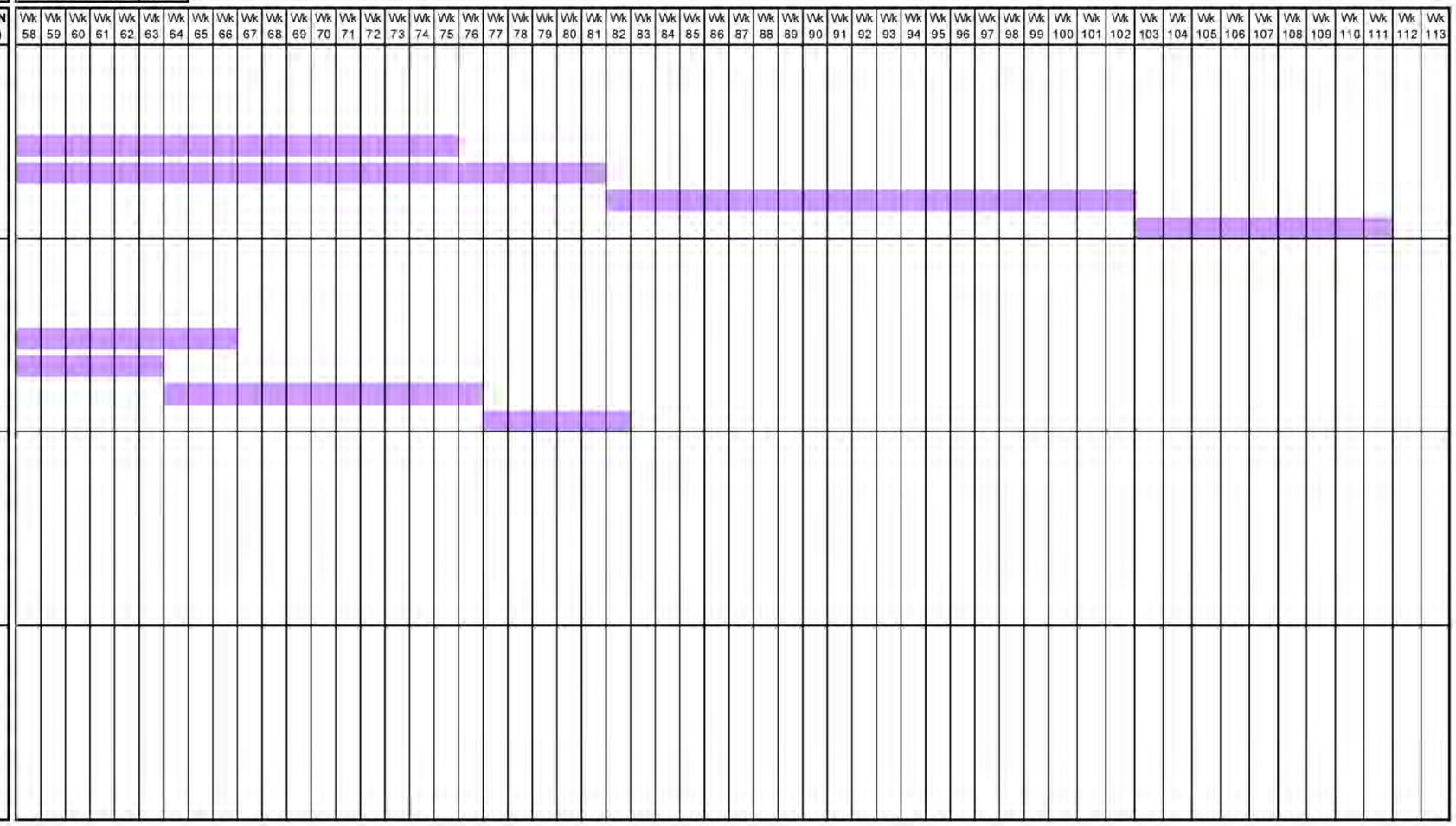

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FIGURE 31
CONSTRUCTION SCHEDULE FOR SYSTEM ALTERNATIVE 2 TERMINALS, SUBSTATIONS AND SERIES COMPENSATION STATION – SHEET 2

SYSTEM ALTERNATIVE - 3	TOTAL DURATION	82 week

TASK	DURATION (WEEKS)
500/345 kV AC SUBSTATION (NEAR IPP)	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
EQUIPMENT INSTALLATION	26
CONTROL BUILDING INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	7
IPP 345 kV AC SUBSTATION MODIFICATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
EQUIPMENT INSTALLATION	17
CONTROL BUILDING MODIFICATION	13
EQUIPMENT TESTING	7
OPERATIONAL	3
SERIES COMPENSATION STATION	
SITE GRADING	10
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
CONTROL HOUSE CONSTRUCTION	17
EQUIPMENT INSTALLATION	16
EQUIPMENT TESTING	10
OPERATIONAL	3

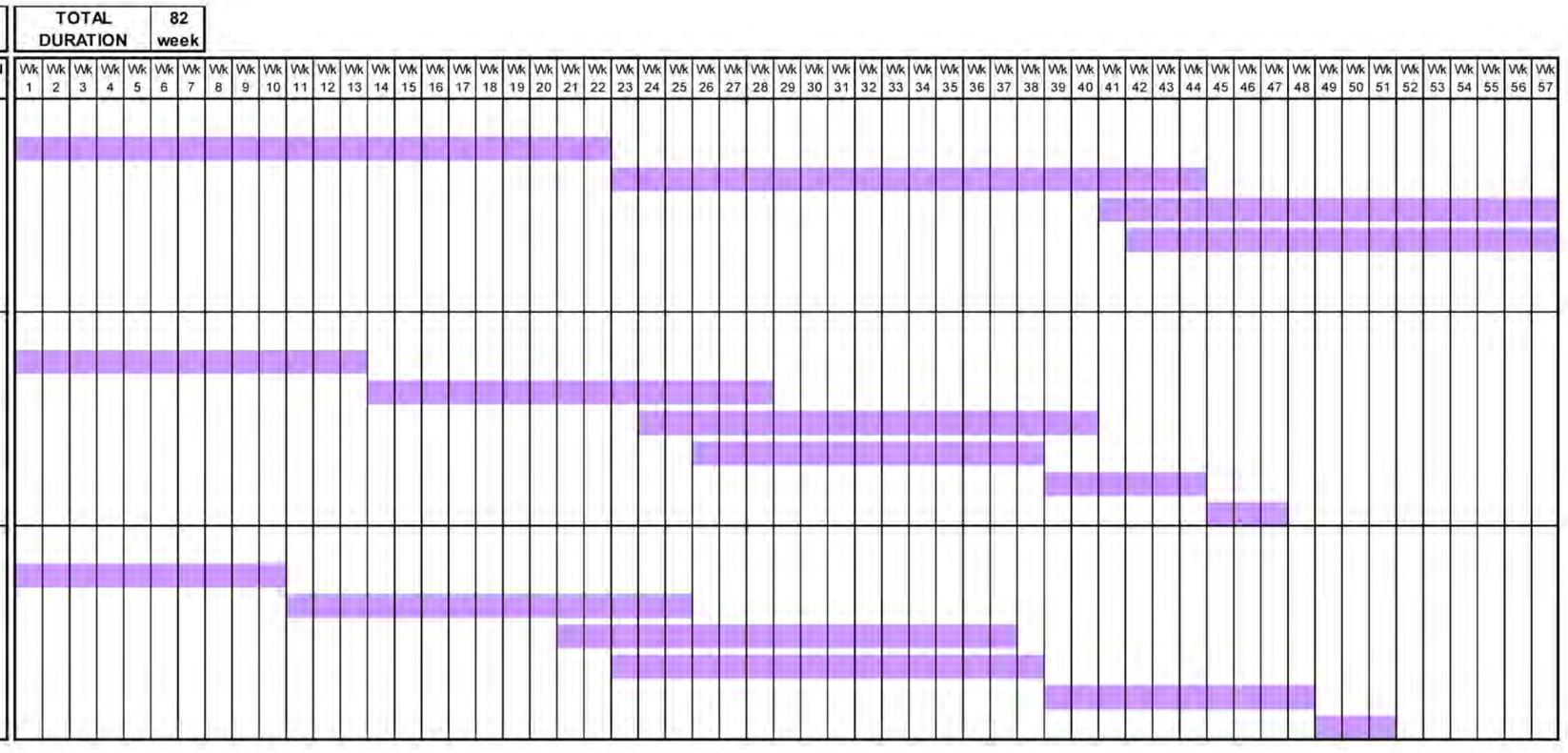

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FIGURE 32
CONSTRUCTION SCHEDULE FOR SYSTEM ALTERNATIVE 3 SUBSTATION AND SERIES COMPENSATION STATION – SHEET 1

SYSTEM ALTERNATIVE - 3		TOTAL DURATION	82 week

TASK	DURATION (WEEKS)
500/345 kV AC SUBSTATION (NEAR IPP)	
SITE GRADING	22
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	22
EQUIPMENT INSTALLATION	26
CONTROL BUILDING INSTALLATION	22
EQUIPMENT TESTING	13
OPERATIONAL	7
IPP 345 kV AC SUBSTATION MODIFICATION	
SITE GRADING	13
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
EQUIPMENT INSTALLATION	17
CONTROL BUILDING MODIFICATION	13
EQUIPMENT TESTING	7
OPERATIONAL	3
SERIES COMPENSATION STATION	
SITE GRADING	10
BELOW-GRADE WORK (FOUNDATIONS, CONDUIT, GROUNDING)	15
CONTROL HOUSE CONSTRUCTION	17
EQUIPMENT INSTALLATION	16
EQUIPMENT TESTING	10
OPERATIONAL	3

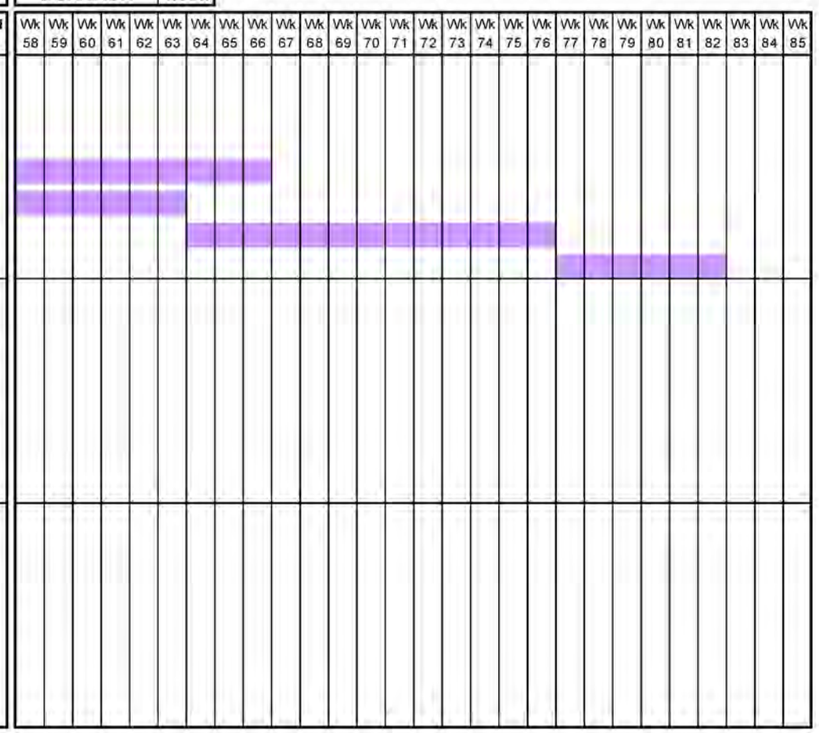

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FIGURE 32

CONSTRUCTION SCHEDULE FOR SYSTEM ALTERNATIVE 3 SUBSTATION AND SERIES COMPENSATION STATION – SHEET 2

SECTION 1 - APPROXIMATELY 221 MILES
NORTHERN TERMINAL - NORTHEASTERN UTAH
(NORTHERN TERMINAL - ROUTE SEGMENT U50)

TOTAL DURATION: 122 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	122
INSPECTION	120
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	120
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	67
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	70
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	70
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	66
ERECT SELF SUPPORTING LATTICE STRUCTURE	72
WIRE INSTALLATION	85
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2 - APPROXIMATELY 182 MILES
NORTHEASTERN UTAH - WEST CENTRAL UTAH
(ROUTE SEGMENT U55 - ROUTE SEGMENT U150)

TOTAL DURATION: 124 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	124
INSPECTION	122
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	122
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	50
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	50
GEOLOGICAL INVESTIGATIONS	58
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	72
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	72
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	63
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	68
ERECT SELF SUPPORTING LATTICE STRUCTURE	74
WIRE INSTALLATION	88
FINAL CLEAN UP / RECLAMATION / RESTORATION	72

SECTION 3 - APPROXIMATELY 322 MILES
WEST CENTRAL UTAH - SOUTHERN TERMINAL
(ROUTE SEGMENT U155 - SOUTHERN TERMINAL)

TOTAL DURATION: 140 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	140
INSPECTION	138
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	138
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	66
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	66
GEOLOGICAL INVESTIGATIONS	76
SURVEY / STAKE STRUCTURE LOCATIONS	76
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	90
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	90
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	83
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	83
ERECT SELF SUPPORTING LATTICE STRUCTURE	96
WIRE INSTALLATION	84
FINAL CLEAN UP / RECLAMATION / RESTORATION	96

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FIGURE 33

CONSTRUCTION SCHEDULE FOR
SYSTEM ALTERNATIVE 3 TRANSMISSION LINE
SHEET 1

SECTION 1 - APPROXIMATELY 221 MILES
NORTHERN TERMINAL - NORTHEASTERN UTAH
(NORTHERN TERMINAL - ROUTE SEGMENT U50)

TOTAL DURATION: 111 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	122
INSPECTION	120
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	120
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	67
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	70
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	70
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	60
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	66
ERECT SELF SUPPORTING LATTICE STRUCTURE	72
WIRE INSTALLATION	85
FINAL CLEAN UP / RECLAMATION / RESTORATION	70

SECTION 2 - APPROXIMATELY 182 MILES
NORTHEASTERN UTAH - WEST CENTRAL UTAH
(ROUTE SEGMENT U55 - ROUTE SEGMENT U150)

TOTAL DURATION: 124 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	124
INSPECTION	122
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	122
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	50
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	50
GEOLOGICAL INVESTIGATIONS	58
SURVEY / STAKE STRUCTURE LOCATIONS	69
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	72
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	72
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	63
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	68
ERECT SELF SUPPORTING LATTICE STRUCTURE	74
WIRE INSTALLATION	88
FINAL CLEAN UP / RECLAMATION / RESTORATION	72

SECTION 3 - APPROXIMATELY 322 MILES
WEST CENTRAL UTAH - SOUTHERN TERMINAL
(ROUTE SEGMENT U155 - SOUTHERN TERMINAL)

TOTAL DURATION: 140 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMINISTRATION	140
INSPECTION	138
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	138
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	66
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	66
GEOLOGICAL INVESTIGATIONS	76
SURVEY / STAKE STRUCTURE LOCATIONS	76
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	90
INSTALL FOUNDATIONS FOR SELF SUPPORTING LATTICE STRUCTURE	90
HAUL MATERIALS FOR SELF SUPPORTING LATTICE STRUCTURE	83
ASSEMBLE SELF SUPPORTING LATTICE STRUCTURE	83
ERECT SELF SUPPORTING LATTICE STRUCTURE	96
WIRE INSTALLATION	84
FINAL CLEAN UP / RECLAMATION / RESTORATION	96

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 33

CONSTRUCTION SCHEDULE FOR
SYSTEM ALTERNATIVE 3 TRANSMISSION LINE
SHEET 2

SECTION 1 - APPROXIMATELY 221 MILES
NORTHERN TERMINAL - NORTHEASTERN UTAH
(NORTHERN TERMINAL - ROUTE SEGMENT U50)

TOTAL DURATION: 122 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMNISTRATION	122
INSPECTION	120
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	120
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	49
CONSTRUCT ACCESS ROADS AND / OR STRUCTURE PADS	49
GEOLOGICAL INVESTIGATIONS	56
SURVEY / STAKE STRUCTURE LOCATIONS	67
EXCAVATE HOLES FOR SELF SUPPORTING LATTICE STRUCTURE	70
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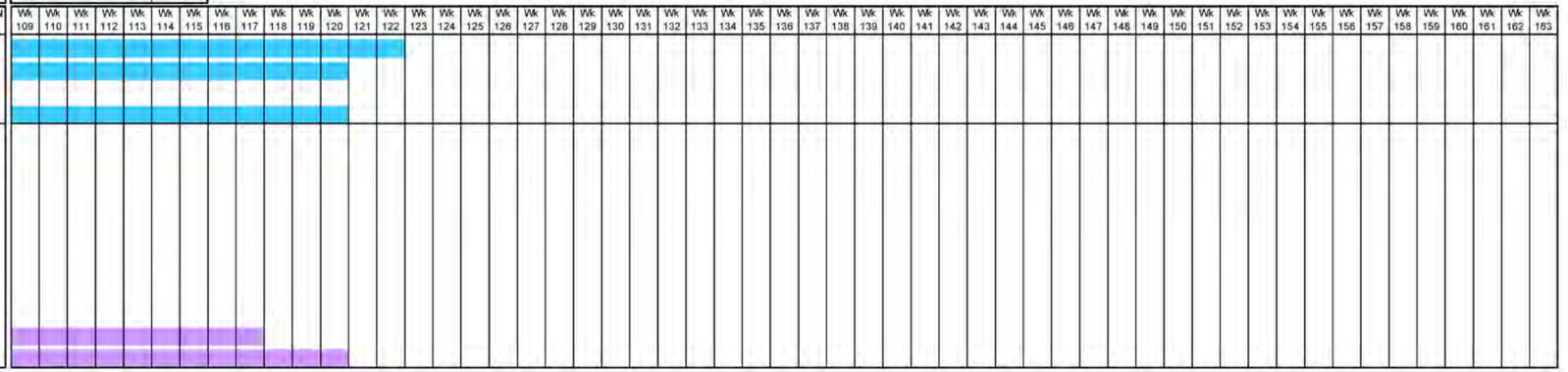
ERECT SELF SUPPORTING LATTICE STRUCTURE	72
WIRE INSTALLATION	85
FINAL CLEAN UP / RECLAMATION / RESTORATION	70



SECTION 2 - APPROXIMATELY 182 MILES
NORTHEASTERN UTAH - WEST CENTRAL UTAH
(ROUTE SEGMENT U55 - ROUTE SEGMENT U150)

TOTAL DURATION: 124 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMNISTRATION	124
INSPECTION	122
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	122
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	50
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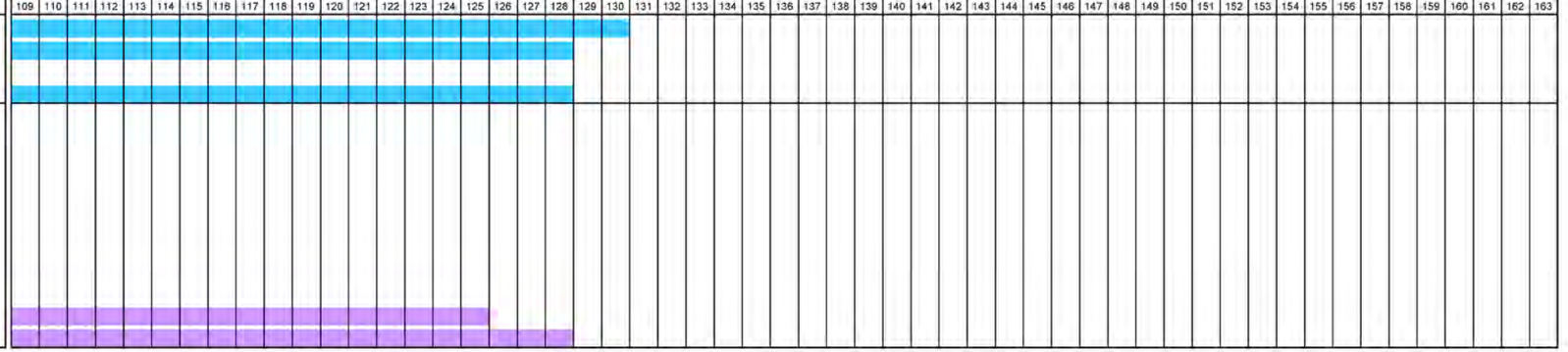
WIRE INSTALLATION	88
FINAL CLEAN UP / RECLAMATION / RESTORATION	72



SECTION 3 - APPROXIMATELY 322 MILES
WEST CENTRAL UTAH - SOUTHERN TERMINAL
(ROUTE SEGMENT U155 - SOUTHERN TERMINAL)

TOTAL DURATION: 140 weeks

TASK	DURATION (WEEKS)
CONSTRUCTION MANAGEMENT / ENGINEERING SUPPORT / ADMNISTRATION	140
INSPECTION	138
MOBILIZE CONTRACTOR	6
RECEIVE / HANDLE MATERIALS	138
SURVEY / STAKE ACCESS ROADS & STRUCTURE PADS	66
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ERECT SELF SUPPORTING LATTICE STRUCTURE	96
WIRE INSTALLATION	84
FINAL CLEAN UP / RECLAMATION / RESTORATION	96

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TRANSWEST EXPRESS TRANSMISSION PROJECT
FIGURE 33

CONSTRUCTION SCHEDULE FOR
SYSTEM ALTERNATIVE 3 TRANSMISSION LINE
SHEET 3

4.3.4 Comparison of Proposed TWE Project to System Alternatives

Table 11 provides a comparison summary of System Alternatives 2 and 3 to the proposed TWE Project.

TABLE 11 COMPARISON OF PROPOSED TWE PROJECT TO SYSTEM ALTERNATIVES

COMPARISON FACTORS	PROPOSED TWE PROJECT	SYSTEM ALTERNATIVE 2	SYSTEM ALTERNATIVE 3
TWE Project Configuration	Two-terminal ±600 kV DC transmission line between WY and NV with potential interconnection to IPP system near Delta, UT.	Two terminal ±600 kV DC transmission line between WY and IPP system near Delta, UT. Two terminal single circuit 500 kV AC transmission line between Delta, UT and NV.	Phased Approach Phase 1 – Two terminal 500 kV AC (±600 kV DC) line between WY and IPP near Delta, UT. Phase 2 – proposed TWE Project. Involves building DC line from IPP to Marketplace and two AC/DC converter stations.
Contingencies for System Alternatives	N/A .	Capacity available in the future on IPP STS to serve Desert Southwest.	Capacity available in the future on IPP STS to serve Desert Southwest. The need for transmission capacity requires a phased implementation.
Current Status of System Contingencies and System Alternatives	N/A .	Future available capacity on the IPP STS is uncertain. Therefore, the status of System Alternative 2 is uncertain.	Future available capacity on the IPP STS is uncertain. Currently, all of the TWE Project's 3,000 MW of capacity is needed by the projected in-service date. It is unlikely System Alternative 3 will be pursued.

TABLE 11 COMPARISON OF PROPOSED TWE PROJECT TO SYSTEM ALTERNATIVES

COMPARISON FACTORS	PROPOSED TWE PROJECT	SYSTEM ALTERNATIVE 2	SYSTEM ALTERNATIVE 3
Routing Alternatives	As part of the EIS preparation, the BLM and Western have established three regions for the TWE Project route. Each region has a distinct set of Route Alternatives.	The TWE Project route region and all Route Alternatives for each region all apply to System Alternative 2.	The TWE Project route region and all Route Alternatives for each region all apply to System Alternative 3.
System Capacity	3,000 MW between WY and NV	3,000 MW between WY and UT 1,500 MW between UT and NV	Phase 1 - 1,500 MW between WY and UT Phase 2 - 3,000 MW between WY and NV
Typical Transmission Line Towers Used	Guyed or self supporting lattice towers holding up two conductor bundles for entire Project.	Guyed or self supporting lattice towers holding up two conductor bundles between WY and Delta, UT. Guyed or self supporting lattice towers holding up three conductor bundles between Delta, UT and NV.	Guyed or self supporting lattice towers holding up three conductor bundles between WY and Delta, UT. Guyed or self supporting lattice towers holding up two conductor bundles between Delta, UT and NV.
Terminals - AC/DC Converter Stations	Northern Terminal near Sinclair, WY. Southern Terminal at Marketplace Hub near Boulder City, NV.	Northern Terminal same as proposed TWE Project. Southern Terminal near the IPP near Delta, UT.	Phase 1 – no AC/DC Converter Stations Phase 2 - Same as proposed TWE Project.

TABLE 11 COMPARISON OF PROPOSED TWE PROJECT TO SYSTEM ALTERNATIVES

COMPARISON FACTORS	PROPOSED TWE PROJECT	SYSTEM ALTERNATIVE 2	SYSTEM ALTERNATIVE 3
TWE Project Interconnections	Northern Terminal will interconnect with existing 230 kV line and one (two total) 500 kV circuit of the Energy Gateway West and Energy Gateway South projects. Southern Terminal will interconnect with the existing 500 kV AC substations (up to 4 total) at the Marketplace Hub near Boulder City, NV. Potential interconnection with IPP system near Delta, UT.	Same as proposed TWE Project for Northern Terminal. Southern Terminal would be located near Delta, UT and would be interconnected to the IPP transmission system, and the TWE Project 500 kV AC line. The TWE Project 500 kV AC line would interconnect with one of the existing 500 kV AC substations at the Marketplace Hub near Boulder City, NV.	Phase 1 – The TWE Project 500 kV AC line would interconnect with the existing 230 kV line and the 500 kV Energy Gateway West and Energy Gateway South lines in WY and with the IPP Substation near Delta, UT. Phase 2 – same as the proposed TWE Project.
Related Structures and Facilities	Fiber optic network communications system. Two ground electrode facilities near terminals.	Same as the proposed TWE Project, however, ground electrode facility would be within 50 miles of the Southern Terminal near IPP Substation, Delta, UT.	Phase 1 – Fiber optic network communications system between WY and NV. No ground electrode. Phase 2 - Same as proposed TWE Project.

4.4 Underground Alternatives

Underground cable systems have been considered and evaluated for the TWE Project. To date, underground cable technology is not commercially available at the very high voltage and capacity levels (i.e., 600 kV and 3,000 MW) required to meet the TWE Project's purpose and need. The technology is not presently available, nor is it likely that it will become available within the time frame for the construction of the Project. The Applicant is committed to using the latest and most applicable commercially available technology. While there are theoretical and laboratory experiments in place that could conceivably be applied to the voltage and capacity levels of the TWE Project, there are no AC or DC underground installations worldwide above 500 kV or 2,000 MW either in-service or planned to be in-service in the next decade.

Advancements have been made in underground technology, however, sufficient testing or installation data for a ±600 kV, 3,000 MW underground application is not currently available. The Applicant will continue to consider and evaluate the technical and commercial feasibility of underground technologies for the TWE Project, however advancements in the technology to make undergrounding any portion of the Project feasible is not likely.

Below is a brief description of the various technologies, including information on the voltage levels that have been achieved for underground and submarine systems in service and advancements under development.

4.4.1 Underground Cable System Technologies

Self Contained Fluid Filled Cable - Self-contained fluid filled (SCFF) cable systems are typically constructed around a hollow tube, used for fluid circulation, and use Kraft paper insulation or a laminated polypropylene paper (LPP) insulation that is impregnated with dielectric fluid to minimize the insulation breakdown under electrical stress. To maintain pressure within the system, pumping plants are required every seven to ten miles along the route, assuming a relatively flat topography. The pumping plants are responsible for maintaining a constant pressure on the system, but must have large reserve tanks to facilitate the expansion and contraction of the dielectric fluid as the system undergoes thermal cycling.

While SCFF cable systems have the longest running history at the EHV levels, their use is typically restrained to long submarine cable installations. However, this technology has been implemented on inland applications with high reliability at voltages up to ±450 kV DC. Installations above this level do not exist worldwide.

Mass Impregnated – Mass impregnated (MI) cable systems account for nearly 80% of the worldwide long distance DC submarine installations. Constructed with ether Kraft paper or LPP insulation that is impregnated with a dielectric fluid, MI cables are similar to SCFF systems except fluid pumping facilities are not required. By reducing the number of system components, it can be argued that MI cable systems are more reliable than their SCFF counterparts and this conclusion if generally supported by a long running reliability track record. To date, ±500 kV DC is the highest voltage system in operation worldwide.

Cross Linked Polyethylene - Cross linked polyethylene (XLPE) cable systems are the most advanced solid dielectric cables found within the industry. Currently ±150 kV DC is the highest rated cable system in the world, however design and installation of a ±320 kV DC system is presently

underway. The use of HVDC solid dielectric cable has been delayed due primarily to complications with the XLPE insulation. The main concern with XLPE insulation is the buildup of space charges in the insulation and their subsequent distortion of the electrical stress distribution. Recent progress in the development of a modified XLPE insulation has apparently been successful in solving the space-charge problem, and the Japanese have prepared an International Council on Large Electric Systems paper documenting testing of a XLPE cable up to ±500 kV with satisfactory results.

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APPENDICES

APPENDIX A

TWE PROJECT COMPONENTS DISTURBANCE AND ACCESS ROAD METHODOLOGY

TWE Project Components Disturbance Methodology

The typical design characteristics of the TWE Project components shown in Table 1 were used to develop Excel spreadsheets that calculated the temporary and permanent land disturbance resulting from the TWE Project + 600 kV transmission line, terminals, ground electrodes, and system alternatives. For the transmission line component, disturbances were calculated for each alternative route segment so that any combination of these segments could be used to analyze impacts of alternative routes. The transmission line and terminal disturbance spreadsheets were modified as appropriate for each system alternative.

TABLE A-1 TWE PROJECT COMPONENTS DESIGN CHARACTERISTICS USED IN DISTURBANCE ESTIMATES	
± 600 KV DC TRANSMISSION LINE	
Physical Properties	
Line Length	Miles per route segment
Structure Type[14]	Self supporting steel lattice
Span Length	900 to 1,500 feet
Number of Structures per Mile	Approximately four
ROW Width	250 feet
Land Temporarily Disturbed	
Structure Work Area	ROW width (250 ft) x 200 feet per structure
Wire-Pulling, Tensioning and Splicing Sites	ROW width (250 ft) x 500 feet for dead-end structure (two sites at every dead-end structures) ROW width (250 ft) x 500 feet for mid-span conductor and shield wire (approximately every 9,000 feet) 100 x 500 feet for fiber optic cable set-up sites (approximately every 18,000 feet)
Material Storage Yards	20 acres every 30 miles of line
Staging Areas / Fly Yards	7 acres every 5 miles of line
Batch Plant Sites	5 acres every 15 miles of line
Land Permanently Disturbed	
Structure Base	Self Supporting Lattice (tangent) - 900 square feet (30 x 30 feet tower base) Self Supporting Lattice (angle) - 1,225 square feet (35 x 35 feet tower base) Self Supporting Lattice (dead-end) - 1,600 square feet (40 x 40 feet tower base)
Regeneration Sites	10,000 square feet (100 x 100 feet) every 50 miles of line
New Access Roads	See Section 3.5.2.1 Access Road Construction and Appendix A Access Road Methodology
NORTHERN AND SOUTHERN TERMINALS	
Physical Properties of Interconnection Lines	

[14] Tangent self supporting lattice structures were used to calculate disturbance since this structure type would result in greater disturbances per structure than the proposed guyed lattice structure. Structure types to be used in site-specific settings will be determined during engineering and design of the Agency Preferred Alternative.

TABLE A-1 TWE PROJECT COMPONENTS DESIGN CHARACTERISTICS USED IN DISTURBANCE ESTIMATES	
Line Length	Miles per interconnection line
Structure Type	Self supporting steel lattice for 500 kV line Single pole tubular steel for 230 kV line
Number of Structures per Mile	Approximately six (230 kV structure) and four (500 kV structure)
ROW Width	100 feet for 230 kV line 250 feet for 500 kV line
	Land Temporarily Disturbed
Storage and Concrete Batch Plant	7.5 acres
Structure Work Areas for Interconnection Lines	200 x 200 feet per 230 kV structure; approximately 6 per mile of line (N. Terminal only) 250 x 200 feet per 500 kV structure; approximately 4 per mile of line
Wire-Pulling, Tensioning and Splicing Sites for Interconnection Lines	ROW width x 500 feet – mid-span conductor and shield wire sites every 9,000 feet and fiber optic set-up sites every 18,000 feet
	Land Permanently Disturbed
Converter Station and Switchyards	205 acres (N. Terminal), 140 acres (S. Terminal)
Structure Base 500 kV Interconnection Line	Self Supporting Lattice (tangent) – 1,225 square feet (35 x 35 feet tower base) Self Supporting Lattice (angle) - 1,600 square feet (40 x 40 feet tower base) Self Supporting Lattice (dead-end) – 2,025 square feet (45 x 45 feet tower base)
Structure Base 230 kV Interconnection Line	Single Pole Tubular (tangent) - 40 square feet Single Pole Tubular (angle) - 45 square feet Single Pole Tubular (dead-end) – 50 square feet
New Access Roads	See Section 3.5.2.1 Access Road Construction and Appendix A Access Road Methodology
	GROUND ELECTRODES
	Physical Properties of Overhead Electrode Lines
Line Length	Miles per electrode line
Structure Type	Wood poles for low voltage 34.5 kV line
Number of Structures per Mile	18
ROW Width	50 feet
	Land Temporarily Disturbed
Ground Electrode Site	65 acres
Material Storage Yards	10 acres (one at each electrode site)
Structure Work Areas for 34.5 kV Line	ROW (50 ft) x 100 feet
Wire-Pulling, Tensioning and Splicing Sites for Interconnection Lines	75 x 150 feet – two at every dead-end 75 x 100 feet – mid-span conductor site every 9,000 feet
	Land Permanently Disturbed
Ground Electrode Site	0.5 acres
Well Access	5 acres

TABLE A-1 TWE PROJECT COMPONENTS DESIGN CHARACTERISTICS USED IN DISTURBANCE ESTIMATES	
Structure Base 34.5 kV Line	Wood pole (tangent) - 16 square feet Wood pole (angle) - 25 square feet plus 25 square feet per anchor (2 per structure location) Wood pole (dead-end) – 36 square feet plus 25 square feet per anchor (4 per structure location)
New Access Roads	See Section 3.5.2.1 Access Road Construction and Appendix A Access Road Methodology

MEMORANDUM

DATE:	March 1, 2011	
TO:	David Smith Garry Miller Chris Keller	
C:	Ron Carrington Sarah Doering Pushkar Gokhale Dan Cacioppo DMS 115841/ PER 01	
FROM:	Linda Erdmann	
SUBJECT:	115841	Trans West Express Transmission Project – Access Road Methodology

MESSAGE

This memo provides a description of the base data and methodology that will be used to estimate miles of access roads and percentages of these access roads inside and outside the transmission line right-of-way (ROW) by route segment for the Proposed and Alternative Routes. This data will ultimately be used to approximate the area of ground disturbance associated with new access roads within the Proposed and Alternative Route corridors by route segment in four different types of terrain:

- Terrain Type 1 - Flat
- Terrain Type 2 - Rolling
- Terrain Type 3 - Steep
- Terrain Type 4 - Mountainous

Backbone Access Road Network Methodology

The first step in this process is to identify existing roads in the project area that can be used to access the Proposed and Alternative Route corridors for transmission line construction and maintenance. These public and private roads make up the backbone access road network that includes paved, gravel, and dirt roads.

Google Earth was used to determine the location of existing access roads for the Proposed and Alternative Routes. Existing paved roads are assumed to require no improvements and therefore no ground disturbance. These roads are categorized as Category 1 Existing Improved Roads. Existing gravel and dirt roads that appear to have wide, well graded or graveled surfaces are assumed to require no improvements and therefore no ground disturbance. These roads are also categorized as Category 1 Existing Improved Roads.

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Existing dirt roads that appear to have narrow, poorly graded surfaces or that appear as two-track paths are assumed to require improvement and therefore ground disturbance. These roads are categorized as either Category 2A Existing Roads Outside the Corridor that Require Improvement or Category 2B Existing Roads Inside the Corridor that Require Improvement.

Category 1 Existing Improved Roads and Category 2A Existing Roads Outside the Corridor that Require Improvement make up the backbone access road network. Category 2B Existing Roads Inside the Corridor that Require Improvement are considered new access roads and are included in the indicative access road summary by terrain type described in the next section.

A GIS shapefile was created for the backbone access road network for the Proposed and Alternative Routes. The purpose of the backbone access road GIS shapefile is twofold:

1. Identify lengths of Category 1 and Category 2A roads that can be used to access the Proposed and Alternative Route corridors for transmission line construction and maintenance.
2. Identify the starting point for the layout and location of new access roads (Categories 2B, 3, 4, 5, & 6).

New Access Road Methodology

New access roads were identified and mapped along sample segments of the Proposed Route (June 2010) in order to determine the indicative length of new access roads required for the Proposed and Alternative Routes. This approach will provide the information necessary to analyze and compare impacts from construction of the access roads for the Proposed and Alternative Routes in the EIS. The new access roads and backbone access roads described previously will provide the complete road network necessary to construct the TWE transmission line.

POWER's construction managers reviewed hard copy USGS 7.5-minute quadrangle topographic maps with the entire length of the Proposed Route shown. Segments along the Proposed Route that represented the different terrain types that would require new access road construction were identified. A total of 18 sample segments were identified which represented flat, rolling, steep and mountainous terrain. Six of the 18 sample segments, 1, 7, 13, 15, 17 and 18 have more than one type of terrain as shown in Table 1.

Once these sample segments were selected, indicative structure spotting based on topographic constraints and spans ranging from 1200 to 1400 feet were completed and access roads were hand drawn on the hard copy USGS quad maps using the contours. These maps were then scanned, geo-referenced and the roads digitized into the GIS.

Once in the GIS, the location of the digitized access roads were re-examined by the construction managers to identify any potential digitizing scale errors. For example, if a new

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access road was located just outside the 250 foot ROW in flat terrain, the location of the road was corrected to be within the ROW as intended. The corrected access roads were labeled by terrain category (Categories 3, 4, 5 & 6) and sample segment number.

The 18 sample segments were analyzed for slope in tenth mile increments, using 6 meter DEMs derived from the TWE Towill elevation data. Tenth mile increments were used to obtain 10 data points or values per one mile of sample segment length. This provides a more accurate terrain measurement compared to one data point or value per one mile increment over the total length of the sample segment. This slope analysis provided the minimum, maximum, and average slope and cumulative change in slope for each tenth mile increment, which was then compared to topographic maps for accuracy. In steeper terrain areas, the average slopes were often less than the actual terrain where the flatter sample segments in the mountainous areas had distorted the greater slope values. For example, in Sample Segment 10, all of the average slope values ranked as "steep" or "rolling", although both the topographic map and Google Earth show the areas to be clearly mountainous. In addition, the minimum and maximum slopes did not always represent actual terrain. Therefore, it was determined that the cumulative change in slope best represented all terrain types and was used for each tenth mile increment.

The cumulative change in slope for each tenth mile increment over a length of a mile (10 tenth mile increments) is then averaged to calculate the slope value and terrain type per mile of sample segment. This data is then entered into an Excel spreadsheet to compare the percentage change in slope value and terrain type for successive one mile sections of the sample segment. These sections are then grouped by average slope value and dominant terrain type. Therefore, each sample segment can have more than one dominant terrain type.

Miles of sample segments with dominant slopes between 0 to 8 percent are categorized as Flat Terrain; 8 to 15 percent as Rolling Terrain; 15 to 25 percent as Steep Terrain; and over 25 percent as Mountainous Terrain. Roads within these four terrain types are categorized as follows:

- Category 3 Construct Road in Flat Terrain (0 to 8 percent slope)
- Category 4 Construct Road in Rolling Terrain (8 to 15 percent slope)
- Category 5 Construct Road in Steep Terrain (15 to 25 percent slope)
- Category 6 Construct Road in Mountainous Terrain (greater than 25 percent slope)

The miles of transmission line, new access roads, new road within the ROW, and new road outside the ROW were calculated for each sample segment and totaled by terrain type (Table 1). The ratio of line miles to road miles by terrain type will be applied to the Proposed and Alternative Routes to estimate the miles of new access roads required by route segment. For example, if Alternative Route segment X from mile 10 to mile 20 is predominantly flat, then using the ratio shown in Table 1 for Category 3 Flat Terrain, which is 1.3, the 10 miles of transmission line for Alternative Route segment X would require approximately 13 miles of new access roads.

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Determination of the dominant terrain type along Proposed and Alternative Route segments will require the same GIS slope analysis in tenth mile increments as described above for the sample segments. The cumulative change in slope percentages for each tenth mile increment will be mapped according to terrain type: Flat (0 to 8 percent slope), Rolling (8 to 15 percent slope), Steep (15 to 25 percent slope), and Mountainous (greater than 25 percent slope). Demarcation of the dominant terrain along the extent of the route segment will require analysis of the slope data as described above. Terrain Sample Maps for Sample Segments 1 to 18 are provided which show the cumulative change in slope percentages for each tenth mile increment, miles of terrain type, backbone access network, and indicative structures and access roads. GIS shapefiles of this data is also provided.

The ROW data by terrain category will also be applied to the Proposed and Alternative Routes to estimate the percentage of new roads that would be within the ROW and outside the ROW. In general, roads in flat terrain are most likely to be located within the ROW than those in steep terrain due to topography constraints. So for the example given above, approximately 9.23 miles or 71 percent of the new access roads required would be within the ROW and approximately 3.77 miles or 29 percent would be outside the ROW (Table 1).

This approach substantially reduces the time and effort needed to conduct the impact analysis from access road construction in the EIS since the process of indicative spotting, locating, and mapping new access roads as done for the sample segments along the Proposed Route will not be required for the entire length of the Proposed and Alternative Routes.

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TABLE 1 INDICATIVE ACCESS ROAD SUMMARY BY TERRAIN TYPE

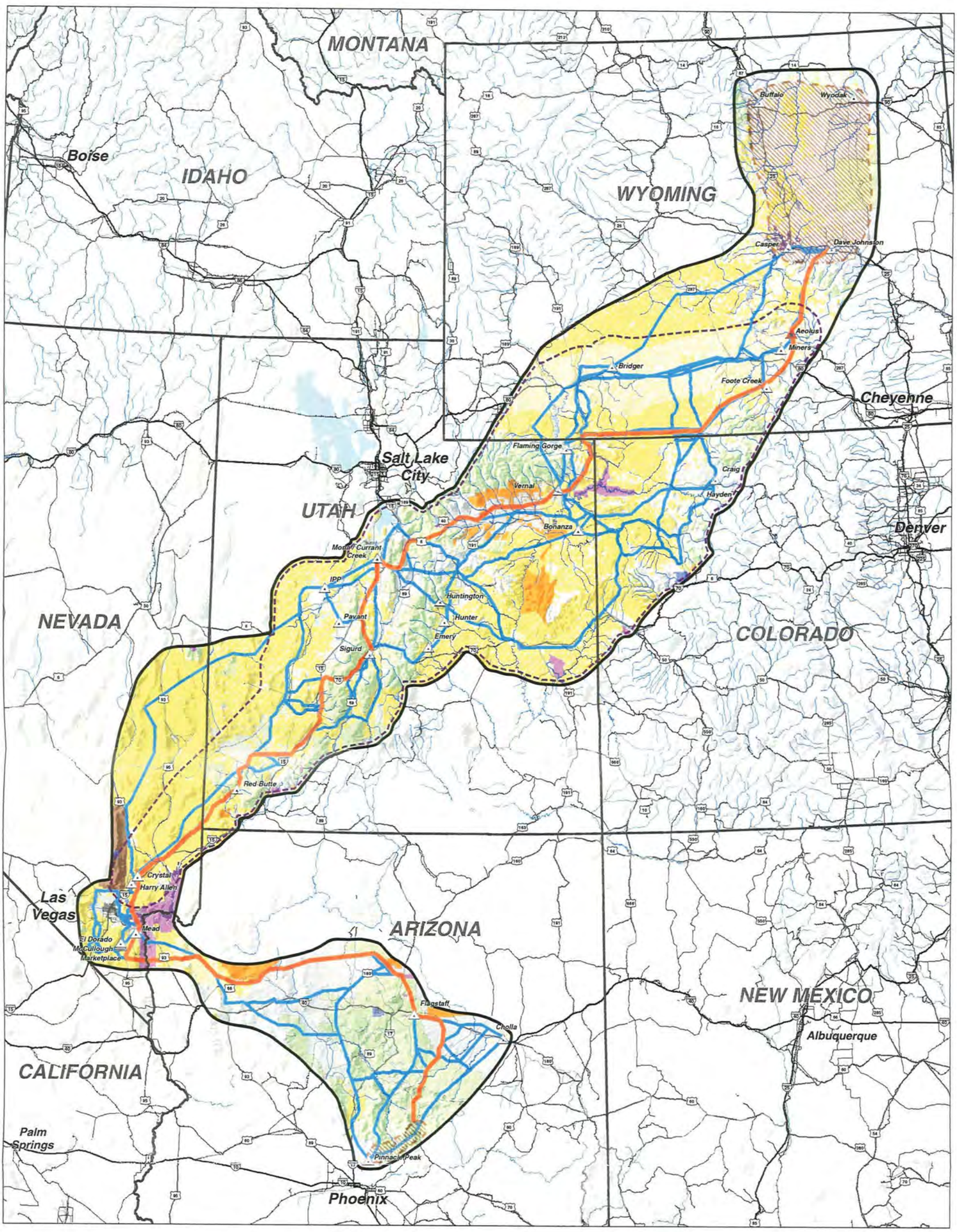
SAMPLE SEGMENT	PROPOSED ROUTE SEGMENT	MILEPOST		LINE LENGTH (MILES)	NEW ACCESS ROAD LENGTH (MILES)**	ROAD IN ROW (MILES)	ROAD OUTSIDE ROW (MILES)	AVERAGE CUMULATIVE CHANGE IN SLOPE (%)	TERRAIN TYPE	RATIOS BY TERRAIN TYPE			ROW BY TERRAIN TYPE	
		BEGIN	END							TOTAL LINE LENGTH (MILES)	TOTAL ACCESS ROAD LENGTH (MILES)	RATIO	TOTAL ACCESS ROADS IN ROW (MILES / %)	TOTAL ACCESS ROADS OUTSIDE ROW (MILES / %)
11	U165	10	20	10	10.54	10.0	0.5	2%	Terrain Type 1 Flat	84.5	108.7	1.3	77.4 / 71%	31.3 / 29%
12	U255	15	25	10	13.75	9.4	4.4	1%						
14	N45	0	11	11	13.56	9.7	3.9	3.2%						
15	N70	3	11	8	12.03	7.7	4.3	2.7%						
1	W10	9	15	6	8.19	6.2	2.0	5.5%						
18	N165	4.5	6	1.5	1.58	1.1	0.5	6.5%						
2	W10	20	31	11	18.44	10.3	8.1	5%						
3	W25	0	10	10	8.91	8.6	0.3	2%						
4	W25	20	30	10	10.97	9.2	1.8	7%						
7	U55	53	60	7	10.72	5.3	5.4	6%						
17	N135	0	1	1	0.36	0.24	0.1	11.1	Terrain Type 2 Rolling	29.5	39.8	1.4	23.5 / 59%	16.2 / 41%
5	C60	5	15	10	15.51	9.3	6.1	9%						
6	C85	15	25.2	10.2	14.52	5.8	8.7	10.5%						
16	N100	0	7.3	7.3	8.63	7.7	0.8	9.5%						
18	N165	0	1	1	0.75	0.6	0.2	13.2%						
1	W10	5	9	4	8.45	3.1	5.4	18%	Terrain Type 3 Steep	21.2	39.2	1.8	14.4 / 36%	24.8 / 64%
7	U55	50	53	3	7.65	2.3	5.4	16.3%						
15	N50_S2	30	34.2	4.2	6.61	3.23	3.4	22.5%						
15	N70	0	3	3	5.02	2.24	2.8	18.2%						
13	U255	49	56	7	11.44	3.5	7.9	21.1%						
8	U55	80	90	10	29.03	4.4	24.6	38%	Terrain Type 4 Mountainous	42.3	120.4	2.8	19.4 / 16%	101 / 84%
9	U70	0	10	10	28.63	3.8	24.8	40.5%						
10	U70	25	37	12	28.87	6.2	22.7	28%						
13	U255	45	49	4	16.23	1.5	14.7	28%						
17	N135	1	3.8	2.8	4.73	1.5	3.2	28.1%						
18	N165	1	4.5	3.5	12.86	2.1	10.8	27.2%						

Notes: **Miles of New Access Road Length includes Category 2B Existing Roads Inside Corridor that Require Improvement
Terrain Type 1 Flat (0 to 8 percent slope)
Terrain Type 2 Rolling (8 to 15 percent slope)
Terrain Type 3 Steep (15 to 25 percent slope)
Terrain Type 4 Mountainous (greater than 25 percent slope)

APPENDIX B

Supplemental Map Exhibits B-1 to B-6

- B-1 Preliminary Right-of-Way Application Corridors, November 2007.
- B-2 Proposed and Alternative Routes, Amended SF-299 Application, December 2008.
- B-3 Proposed and Alternative Routes, Las Vegas Area, Amended SF-299 Application, December 2008.
- B-4 Proposed and Alternative Routes, Amended SF-299 Application, January 2010.
- B-5 Proposed and Alternative Routes, Las Vegas Area, Amended SF-299 Application, January 2010.
- B-6 Proposed and Alternative Corridors, Amended POD, July 2010.



Legend

- Terminal Siting Area
- Preliminary Proposed Corridor
- Preliminary Alternative Corridor
- Bureau of Land Management
- Bureau of Indian Affairs
- U.S. Forest Service
- National Park Service
- Department of Defense
- U.S. Fish & Wildlife Service
- Bureau Of Reclamation
- State/Private

Reference Features

- Interstate
- Highway
- Major Road
- Railroads
- Major River
- Major Lake
- State Boundary
- TransWest Express Study Area
- Gateway South Study Area
- Substation
- New Substation

Data Sources

Land Ownership:
BLM Denver Service Center, 2006
BLM - National Atlas, 2006, EPG Inc, 2007

NOTE: Substation locations are schematics and do not necessarily represent precise locations. Preliminary transmission line corridors generally follow existing or planned transmission lines; however, the existing transmission lines are not depicted on the map for graphical clarity.

0 15 30 60 90 120
Miles

Working Draft: November 30, 2007

N:\projects\nationalgrid\gateway\corridor_analysis\mxds\basemap.mxd

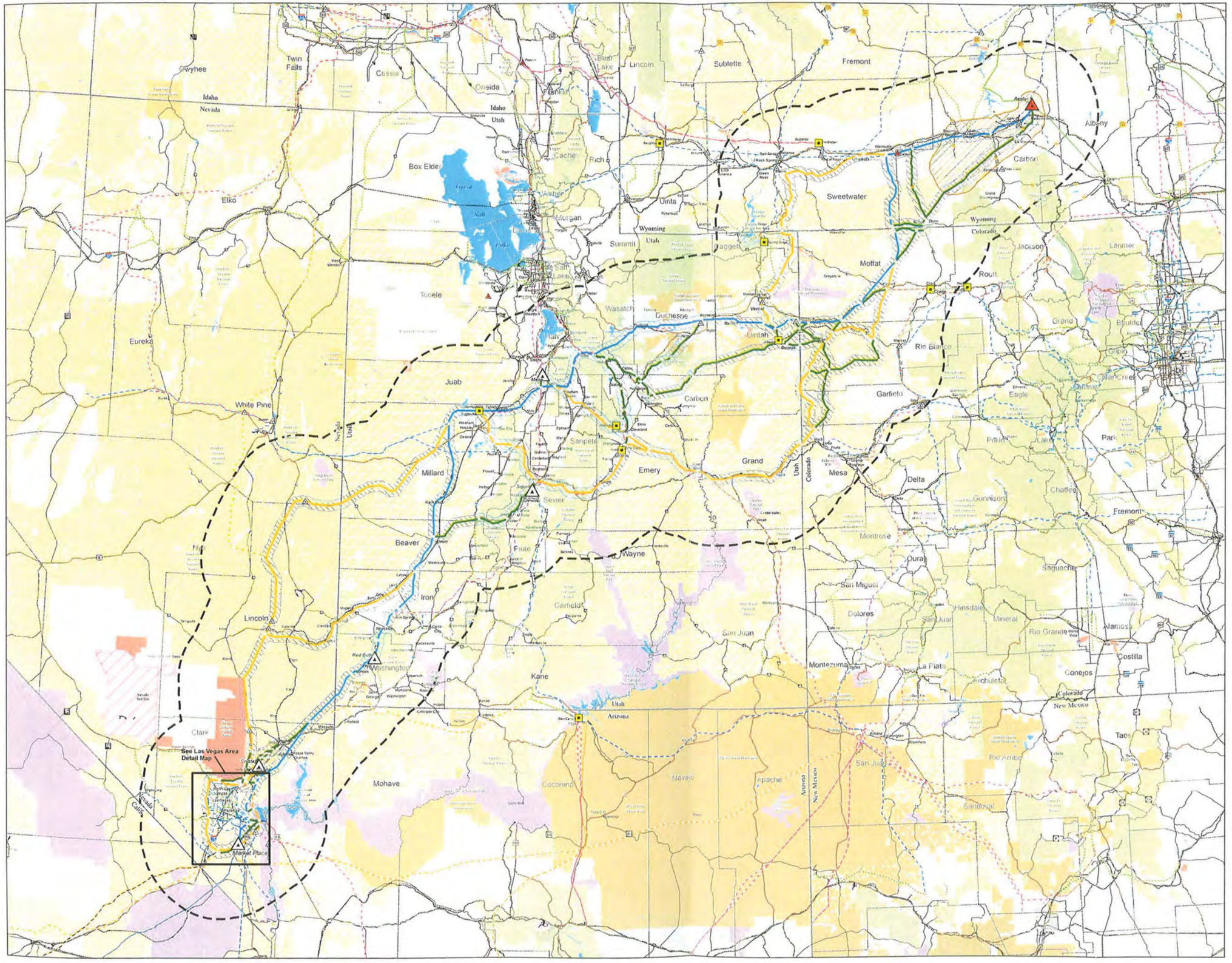
Figure 5

Preliminary Right-Of-Way Application Corridors

TransWest Express Transmission Project

nationalgrid APS ROCKY MOUNTAIN POWER

FIGURE 1
PROPOSED AND ALTERNATIVE ROUTES



Legend

Land Jurisdiction

- Bureau of Land Management
- Indian Reservation
- U.S. Forest Service
- National Park Service
- U.S. Fish & Wildlife Service
- Department of Defense
- Bureau of Reclamation
- Department of Energy
- State Land
- Private Land

Project Features

- Proposed Substation (Permitting in Progress)
- Study Area Boundary
- Proposed Route
- Proposed Alternative Route
- Alternatives Under Further Consideration
- 6 Mile Wide Corridor Buffer
- Link Node
- Terminal Siting Area

Utility Facilities

- Existing Power Plant
- Existing Substation
- 500kV+/- DC Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 115/138kV Transmission Line

Transportation Features

- Interstate Highway
- US Highway
- State Highway
- Railroad

Water Features

- River or Stream
- Lake, Pond, or Reservoir

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
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NOTE: Substation locations are schematic and do not necessarily represent precise locations.

Print Date December 12, 2008

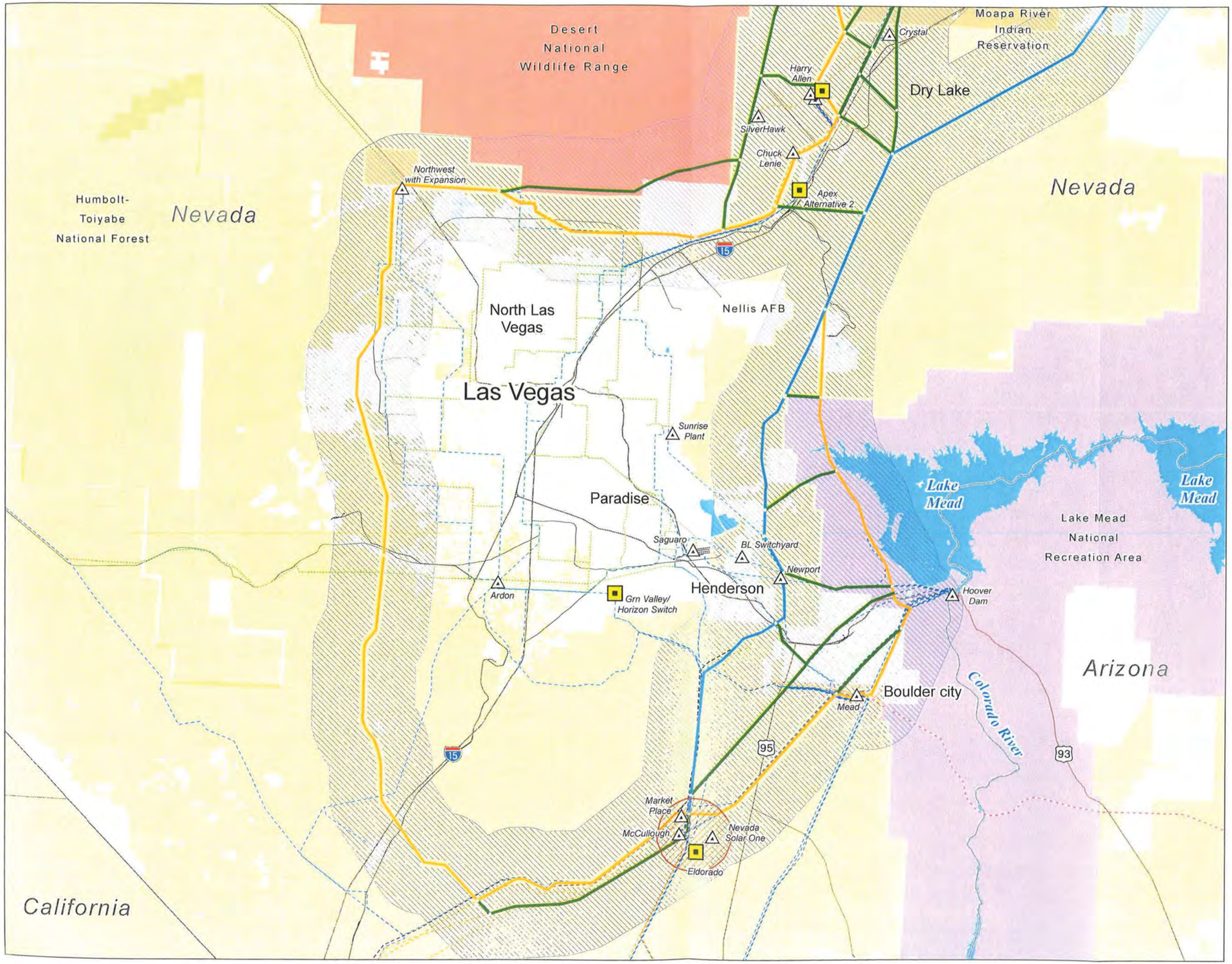
DRAFT

0 12.5 25 50 75 100 Miles

TRANSWEST EXPRESS
TRANSMISSION LINE PROJECT

TRANSWEST EXPRESS LLC

FIGURE 2
PROPOSED AND ALTERNATIVE ROUTES
LAS VEGAS AREA



Legend

Land Jurisdiction
- Bureau of Land Management
- Indian Reservation
- U.S. Forest Service
- National Park Service
- U.S. Fish & Wildlife Service
- Department of Defense
- Bureau of Reclamation
- Department of Energy
- State Land
- Private Land

Project Features
- Proposed Route
- Proposed Alternative Route
- Alternatives Under Further Consideration
- 6 Mile Wide Corridor Buffer
- Link Node
- Terminal Siting Area

Utility Facilities
- Existing Power Plant
- Existing Substation
- 500kV+/- DC Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230kV Transmission Line
- 115/138kV Transmission Line

Transportation Features
- Interstate Highway
- US Highway
- State Highway
- Railroad

Water Features
- River or Stream
- Lake, Pond, or Reservoir

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
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NOTE: Substation locations are schematic and do not necessarily represent precise locations.

Print Date December 12, 2008 DRAFT

0 1.25 2.5 5 7.5 10 Miles

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TRANSMISSION LINE PROJECT

TRANSWEST EXPRESS LLC

X:\GIS\projects\12907_003_Transwest_Express\Figures\DocumentFigures\SF299_20091013\TME_FIG_2_SF299_11X17.mxd

MAP EXHIBIT B-4
PROPOSED AND ALTERNATIVE ROUTES

Legend

Project Features
- Proposed Route
- Proposed Alternatives
- Link Node
- 6-Mile-Wide Corridor
- Study Area
- Terminal Siting Area

Utility Facilities
- 500kV +/- Direct Current Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- 115kV Transmission Line
- Below 100kV Transmission Line
- Unknown Voltage Transmission Line

Transportation Features
- Interstate Highway
- U.S. Highway
- State Highway

Water Features
- Perennial Water Bodies

Land Jurisdiction
- Department of Defense
- Department of Energy
- Indian Reservation
- State Land
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- USDI National Park Service

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
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Print Date : January 22, 2010

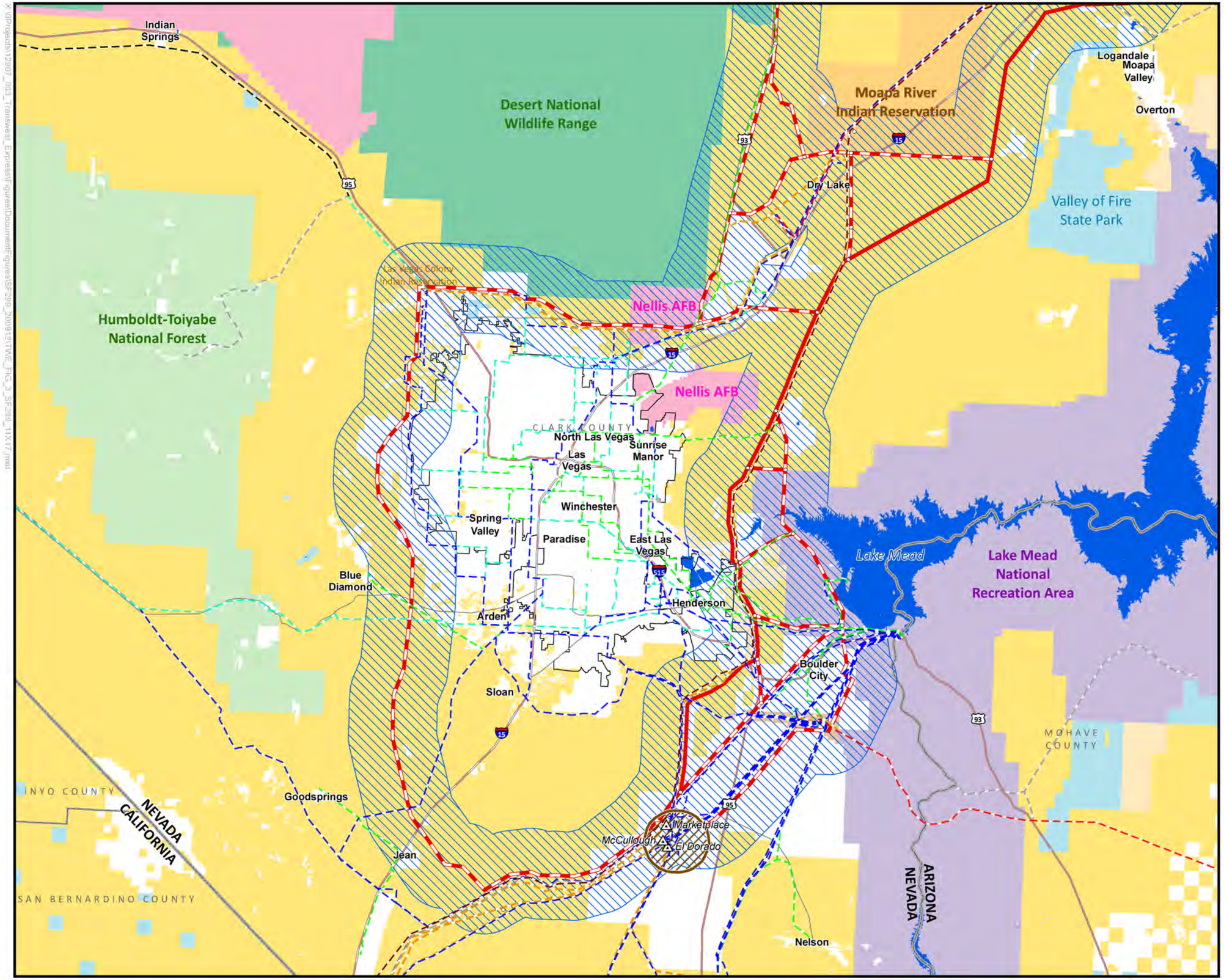
0 20 40 80 120
Miles

TRANSWEST EXPRESS
TRANSMISSION PROJECT

NATIONAL SYSTEM OF PUBLIC LANDS

TRANSWEST EXPRESS LLC

MAP EXHIBIT B-5
PROPOSED AND ALTERNATIVE ROUTES LAS VEGAS AREA



Legend

Project Features
- Proposed Route
- Proposed Alternatives
- Link Node
- 6-Mile-Wide Corridor
- Study Area
- Terminal Siting Area

Utility Facilities
- Project Substation
- 500kV +/- Direct Current Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- 115kV Transmission Line
- Below 100kV Transmission Line
- Unknown Voltage Transmission Line

Transportation Features
- Interstate Highway
- U.S. Highway
- State Highway

Water Features
- Perennial Water Bodies

Land Jurisdiction
- Department of Defense
- Department of Energy
- Indian Reservation
- State Land
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- USDI National Park Service

Data Sources

Transportation:
NTAD2008, US Depaitment of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
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Print Date : January 22, 2010

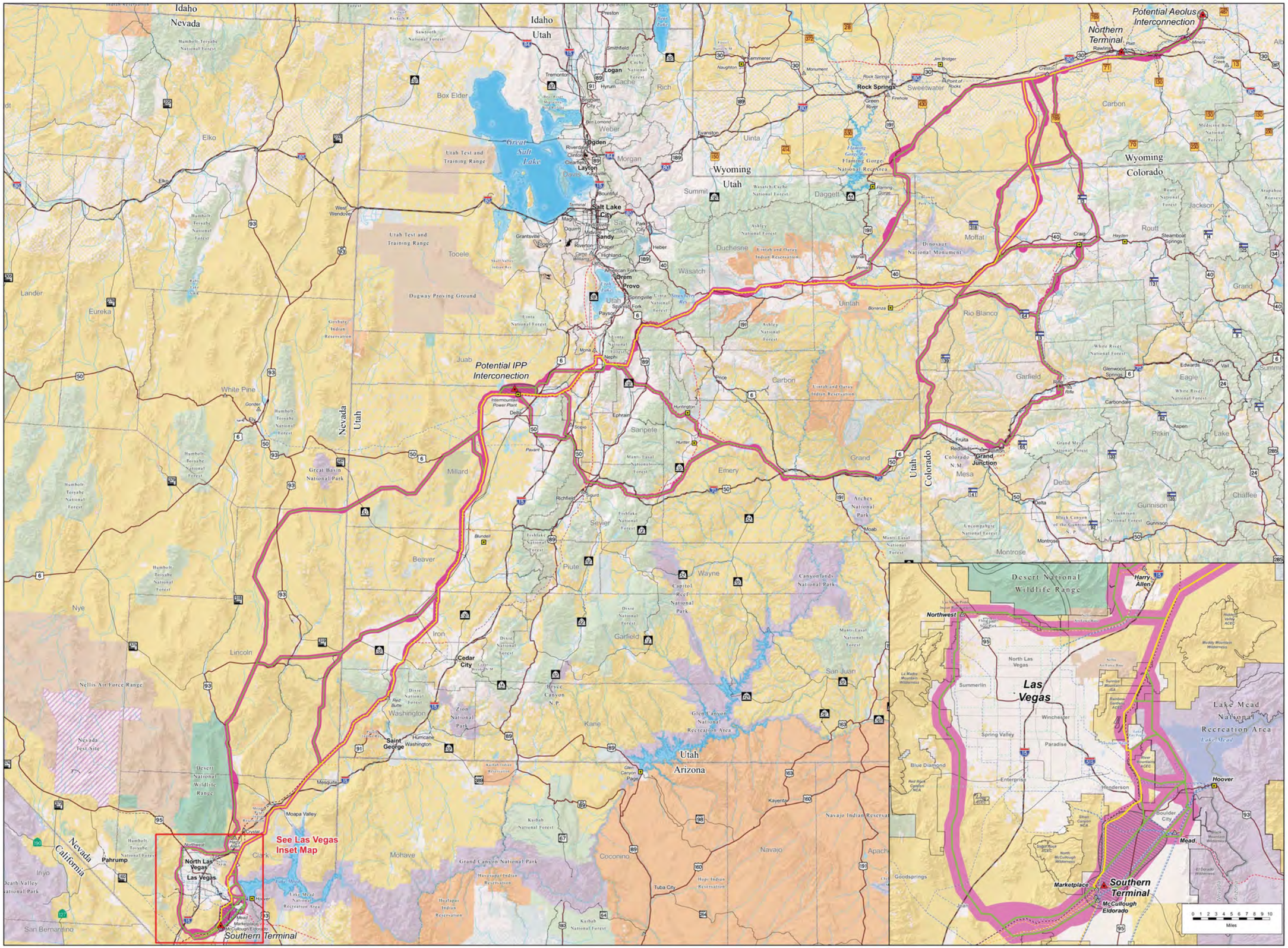
0 2.5 5 10 15
Miles

TRANSWEST EXPRESS TRANSMISSION PROJECT

NATIONAL SYSTEM OF PUBLIC LANDS

TRANSWEST EXPRESS LLC

MAP EXHIBIT B-6
PROPOSED AND ALTERNATIVE CORRIDORS



Legend

Project Features

- Proposed Segment
- Alternative Segment
- Proposed & Alternative Corridors (Typical two miles wide)
- Proposed Substation/ Terminal
- Terminal Siting Area

Land Jurisdiction

- Department of Defense
- Department of Energy
- Indian Reservation
- USDA Forest Service
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service
- USDI National Park Service
- State Land
- State or Local Park
- Private Land

Existing Utilities

- Existing Power Plant
- Existing Substation
- 500kV+/- DC Transmission Line
- 500kV Transmission Line
- 345kV Transmission Line
- 230 to 287kV Transmission Line
- 138 to 161kV Transmission Line
- 115kV Transmission Line

Transportation Features

- Interstate Highway
- US Highway
- State Highway
- Railroad

Water Features

- River or Stream
- Lake, Pond, or Reservoir

Data Sources

Transportation:
NTAD2008, US Department of Transportation
Land Jurisdiction:
BLM State Office California, Colorado, Idaho, New Mexico, Oregon, Utah, Wyoming 2008
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NOTE: Substation locations are schematic and do not necessarily represent precise locations.

Date updated: June 29, 2010
Routes Current as of June 23, 2010

The routes shown on this map are preliminary and may be revised and/or refined throughout the development of the project.

0 10 20 30 40 50 60 70 80
Miles

1:800,000

TRANSWEST EXPRESS TRANSMISSION PROJECT

POWER ENGINEERS
June 29, 2010

TRANSWEST EXPRESS LLC

APPENDIX C

Supplemental Information – TWE Project Vegetation Management Program

- Table C-1 TWE Project DEIS Vegetation Management Guidelines by Vegetation-Land Cover Type - Response to AECOM December 10, 2010 Data Request Number 1.5

- Figure C-1 Figure C-1 Photographs of Level 3 Vegetation Management

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15					
VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
Montane Forest SO28, SO32 - Douglas fir - Subalpine fir - Engelmann spruce - Aspen	60 to 80 feet	50 to 150 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – managed for compatible vegetation types, heights and densities, including trees, shrubs and herbs, based on allowed types, heights and densities.	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed vegetation types, heights and densities. *ROW Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone* - Managed for compatible vegetation, including trees, shrubs and herbs, based on allowed types, heights and densities. *ROW Border Zone* – Managed for compatible vegetation, including trees, shrubs and herbs, based on allowed types, heights and densities.
Aspen SO 23	30 to 70 feet	30 to 60 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* – Same	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities.

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15					
VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
				as Level 1. Cleared from ROW. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – managed for allowed tree heights and densities.	*ROW Border Zone* - Selectively cleared based on allowed heights and densities. Operation Phase: *ROW Wire Zone* - Managed for allowed vegetation, including shrub and types, heights and densities. *ROW Border Zone* – Managed for allowed vegetation, including shrub and tree types, heights and densities.
Ponderosa Pine SO36	40 to 90 feet	30 to 100 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities. *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Operation Phase:

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15					
VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
				growing shrubs and herbs. *ROW Border Zone* – managed for allowed tree heights and densities.	*ROW Wire Zone* - Managed for allowed vegetation, including shrub and types, heights and densities. *ROW Border Zone* – Managed for allowed vegetation, including shrub and tree types, heights and densities.
Pinyon Juniper SO39, SO40, SO52 - Pinyon pine Utah Juniper	15 to 40 feet	100 to 300 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most pinyon juniper would be allowed in the border zone. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – managed for allowed tree heights and densities.	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities. Most pinyon juniper would be allowed in the wire zone. *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most pinyon juniper would be allowed in the border zone. Operation Phase: *ROW Wire Zone* - Managed for allowed vegetation, including shrub and tree types, heights and densities.

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15					
VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
					ROW Border Zone – Managed for allowed vegetation, including shrub and tree types, heights and densities.
Mountain Shrubland SO46 - Gambel oak - Serviceberry - Mountain-mahogany - Chokecherry	8 to 15 feet	20 to 50 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	Construction Phase: *ROW Wire Zone* – Same as Level 1. Cleared from ROW *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most shrubs would be allowed in the border zone. Operation Phase: *ROW Wire Zone* - Same as Level 1. Managed for low growing shrubs and herbs. *ROW Border Zone* – managed for allowed shrub heights and densities.	Construction Phase: *ROW Wire Zone* - Selectively cleared based on allowed heights and densities. Most shrubs would be allowed in the wire zone, except along access roads and structure clearance sites. *ROW Border Zone* - Selectively cleared based on allowed heights and densities. Most shrubs would be allowed in the border zone, except along access roads and structure clearance sites. Operation Phase: *ROW Wire Zone* - Managed for allowed vegetation, including shrub types, heights and densities.

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15					
VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
					ROW Border Zone – Managed for allowed vegetation, including shrub types, heights and densities.
Sagebrush Shrubland SO54, SO55, SO56 - Big sagebrush - Silver sagebrush - Black sagebrush	2 to 6 feet tall	20 to 50 years	Construction Phase: Retained in ROW except where fuel load is too great; and along access roads and construction sites. Operation Phase: ROW managed for low growing shrubs and herbs.	NOT APPLICABLE	NOT APPLICABLE
Desert Shrubland SO45, SO60, SO65, SO69 Cold Desert: - Greasewood - Rabbitbrush - Saltbush species Warm Desert: - Creosote bush - Burro bush - Josha trees	1 to 6 feet tall Josha trees – 20 feet; Salt bush – less than 1 foot; Average – 3 feet	Cold desert: 30 to 50 years Warm desert: 50 to 200 years	Construction Phase: Retained in ROW except where fuel load is too great; and along access roads and construction sites. Joshua trees would be retained, except for center span of wire zone. Operation Phase: ROW managed for low growing shrubs and herbs. Joshua trees would be retained, except for center span of wire zone.	NOT APPLICABLE	NOT APPLICABLE

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE
RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
Riparian SO96, S118 - Cottonwoods - Willows - River birch - Boxelder - Willow	Trees – 30 to 60 feet (if present) Shrubs – 5 to 15 feet	Trees – 50 to 80 years Shrubs – 5 to 20 years	NOT APPLICABLE	NOT APPLICABLE	Construction Phase: Retained in ROW except where fuel load is too great; or where conductor clearances cannot be maintained. Riparian areas would be avoided by access roads and construction sites to the extent feasible. Trees would be retained, except for center span of wire zone. *ROW Wire Zone and Border Zone -* Selectively cleared based on allowed vegetation types, heights and densities. Operation Phase: *ROW Wire Zone and Border Zone -* Managed for compatible vegetation, including trees, shrubs and herbs, based on allowed types, heights and densities.
Wetland SO96 - Greasewood - Saltbush	2 to 5 feet	20 to 40 years	NOT APPLICABLE	NOT APPLICABLE	Construction Phase: Retained in ROW except where impacts are unavoidable (e.g. limited

TABLE C-1 TWE PROJECT DEIS VEGETATION MANGEMENT GUIDELINES BY VEGETATION LAND COVER TYPE
RESPONSE TO AECOM DECEMBER 10, 2010 DATA REQUEST NUMBER 15

VEGETATION LAND COVER TYPE/ AND DOMINANT SPECIES*	HEIGHT RANGE	REGENERATION TIME TO FORMER HEIGHT (YEARS)	LEVEL 1 – STANDARD ROW VEGETATION MANAGEMENT	LEVEL 2 – SELECTIVE ROW VEGETATION MANAGEMENT – WIRE-BORDER ZONE	LEVEL 3 – SELECTIVE ROW – CLEARANCE BASED VEGETATION MANAGEMENT
- Inland salt grass - Alkali sacaton					access roads). Operation Phase: Managed for retention of compatible vegetation.
Grassland/Steppe SO71, SO79, SO90 - Herbs and Shrubs	Herbs – 1 to 2 feet Shrubs – 1 to 5 feet	5 to 20 years	Construction Phase: Retained in ROW. Operation Phase: ROW managed for low growing shrubs and herbs.	NOT APPLICABLE	NOT APPLICABLE
Grassland – Invasive D08 - Cheatgrass - Red brome	Herbs – 1 to 2 feet	1 to 2 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for non-invasive low growing shrubs and herbs.	NOT APPLICABLE	NOT APPLICABLE
Riparian – Invasive D04 - Tamarisk	5 to 20 feet	5 to 20 years	Construction Phase: Cleared from ROW. Operation Phase: ROW managed for non-invasive low growing shrub species.	NOT APPLICABLE	NOT APPLICABLE

* Land cover types and dominant species listing is based on AECOM's Memorandum: Characteristics of Land Cover Crossed by TransWest Transmission Project Alternative Corridors, Draft, February 22, 2011.

Level 3 - Typical ROW Setting

Level 3 – ROW with Elevated Line Setting

FIGURE C-1 PHOTOGRAPHS OF LEVEL 3 VEGETATION MANAGEMENT

APPENDIX D

Supplemental Information - Technical Information of Applicability of Induced Current Risks for AC and DC Transmission Lines

APPLICABILITY OF INDUCED CURRENT RISKS FOR AC AND DC TRANSMISSION LINES

The proposed TWE Project ±600 kV DC transmission line presents no risk of inducing line currents due to the static nature of the DC electrical and magnetic fields. In comparison, AC transmission systems can induce currents. Mitigation measures for AC inductive currents would be implemented for the AC transmission lines associated with the Proposed TWE Project or for System Alternatives 2 and 3.

In order to mitigate possible electric shock caused by electrostatic and electromagnetic AC induction, all buildings, fences, and other structures with metal surfaces located within 300 feet of the centerline of the ROW will be grounded to the mutual satisfaction of the parties involved. Typically, residential buildings located 300 feet from the centerline will not require grounding. Other buildings or structures outside of the ROW will be reviewed in accordance with NESC to determine grounding requirements. All metal irrigation systems and fences that parallel the transmission line for distances of 500 feet or more, within 300 feet of the centerline will be grounded. All fences that cross under the transmission line also will need to be grounded. This procedure will be included in the construction specifications, and if grounding is required outside the ROW, agency and landowner consent will be obtained as necessary.

AC Inductive Mitigation for Railroads

When a high voltage transmission line is located adjacent to a railroad, the tracks and signals may be subjected to electrical interference from electric and magnetic induction, conductive interference, and capacitive effects. Capacitive coupling results from the electric field from the transmission lines' conductors coupling with above ground conductive objects that are insulated from the earth, such as railroad tracks that are typically installed on high impedance ballast (the rock bed used to support the tracks). Electric and magnetic induction results from the magnetic field produced by the alternating current (AC) flowing in the conductors of the transmission line coupling with the above ground and below ground metallic objects, such as railroad tracks and buried communications cables, if present. If a transmission line is located in proximity and parallel to a railroad for long distances, all these interference mechanisms can cause high currents and voltages to develop on the tracks and communication cables. If the AC interference is above certain thresholds, it can result in personal safety hazards, damage to signal and communication equipment, and false signaling of equipment.

These AC interference effects can be predicted with computer modeling. With proper planning and mitigation management, railroads and high voltage AC transmission lines can be safely collocated. The American Railway Engineering and Maintenance-of-Way Association has specifications for steady state rail-to-ground and equipment-to-ground voltage levels to ensure safety of railway operating personnel and the public. During fault conditions the safety criteria established by the ANSI/IEEE Standard 80 (Guide for Safety in AC Substation Grounding) is used. In addition, railroad signal and equipment manufacturers provide AC interference voltage tolerances for proper signal operation so that nearby transmission facilities can be designed to ensure that AC interference levels do not exceed the acceptable safety criteria or equipment voltage tolerance.

Depending on AC interference levels, several mitigation methods may be used. These include increasing the distance between the transmission line and the railroad tracks, reducing the distance between insulated joints in track sections, grounding the railroad's tracks, and burying gradient control wires or matting.

For locations where the final alignment of an AC section of transmission line is in close proximity to a railroad for long distances, the Applicant, during detailed design, would perform computer modeling of potential AC interference effects to design and implement required mitigation to be installed prior to energizing the transmission line.

AC Inductive Mitigation for Pipelines

When a high voltage transmission line is located adjacent to a pipeline ROW, the pipeline may be subjected to electrical interference from electric and magnetic induction, conductive interference, and capacitive effects. Electric and magnetic induction is the primary effect of the high voltage AC transmission line on a buried pipeline during normal (steady-state) operation. This form of interference is due to the magnetic field produced by the AC current flowing in the conductors of the transmission line coupling with the metallic pipeline, inducing a voltage and associated current on the pipeline.

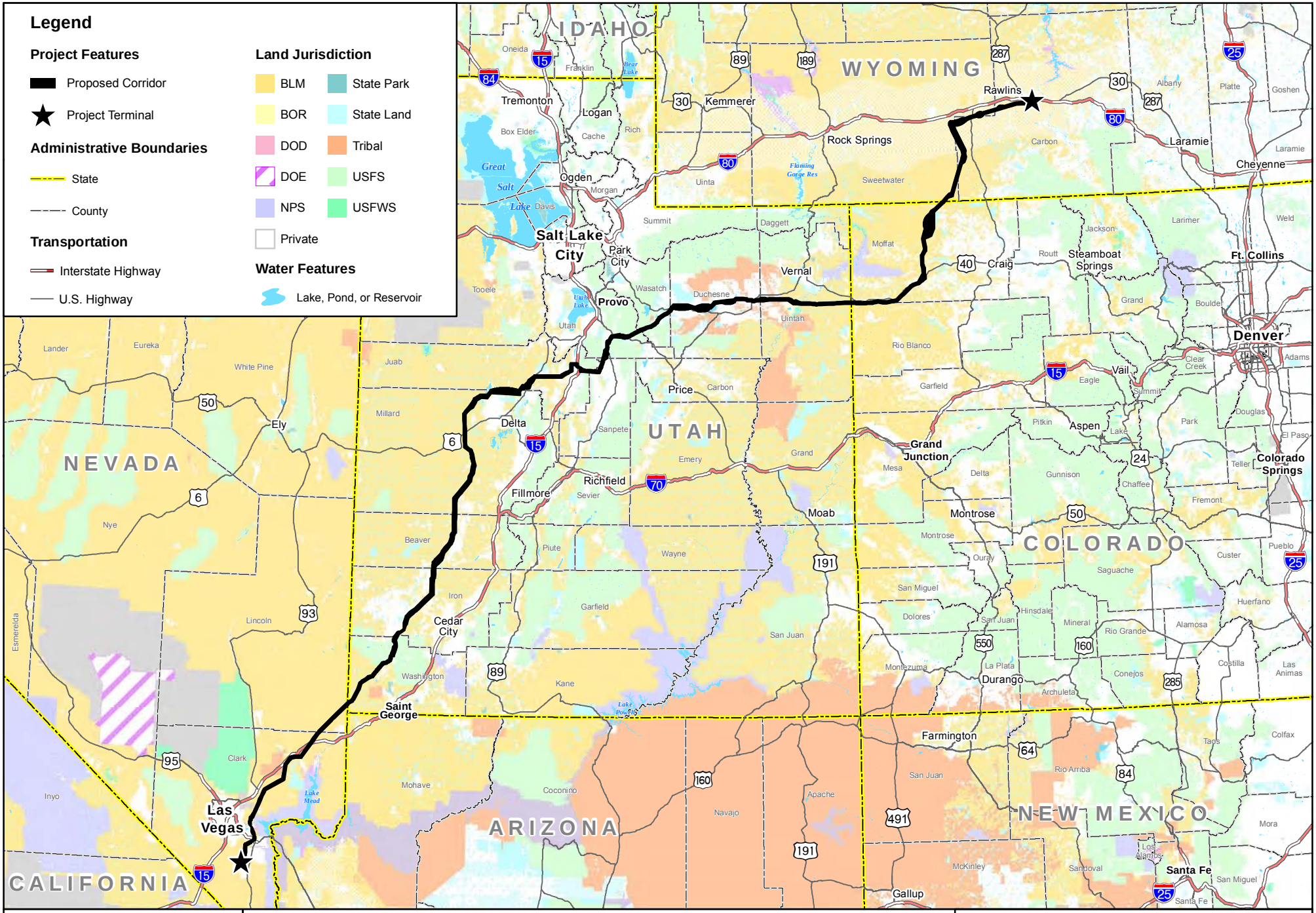
Conductive interference is a concern when a transmission line fault occurs in proximity to the pipeline, because it can cause AC currents to enter the pipeline at coating holidays (flaws in the coating) and produce a voltage gradient across the pipeline coating. Electric and magnetic effects are also a concern during a fault because the phase current in at least one phase (conductor) of the high voltage AC transmission line is elevated.

If these electrical interference effects are great enough during normal operation, then a potential shock hazard exists for anyone that touches an above ground part of the pipeline, such as a valve or cathodic protection test station. In addition, during normal operation, if the induced AC current density at a flaw in the pipeline coating is great enough, AC pipeline corrosion may occur. Lastly, damage to the pipeline coating can occur if the voltage between the pipeline and surrounding soil becomes excessive during a fault condition.

With proper planning and mitigation, pipelines and high voltage AC transmission lines can be safely collocated. The AC interference effects can be easily predicted with computer modeling. The National Association of Corrosion Engineers has standards that ensure that pipeline integrity would not be degraded nor personnel safety compromised because of AC interference from a transmission line constructed and operated adjacent to a pipeline.

Mitigation techniques for AC interference on pipelines include reducing the impedance of the transmission structure grounds, grounding the pipeline in conjunction with de-couplers, burying gradient control wires along the pipeline or burying ground mats under aboveground facilities (such as valves) and using dead fronts at test stations.

The TWE Project configured as an overhead AC transmission line can be located in its 250 foot ROW adjacent to the ROW for buried underground high pressure natural gas and other petroleum pipelines as long as proper grounding and cathodic protection systems are utilized for the pipeline. The TWE Project; however, may not be sited in the same ROW as an underground pipeline regardless of whether the TWE Project is a DC or AC line. For locations where the final alignment of an AC section of transmission line is in close proximity to a pipeline, the Applicant, during detailed design, would ensure that computer modeling of AC interference effects is completed and that any required mitigation is designed and installed prior to energizing the transmission line.


Legend
Project Features
Proposed Corridor
Project Terminal
Administrative Boundaries
State
County
Transportation
Interstate Highway
U.S. Highway
Land Jurisdiction
BLM
BOR
DOD
DOE
NPS
Private
State Park
State Land
Tribal
USFS
USFWS
Water Features
Lake, Pond, or Reservoir
IDAHO
WYOMING
NEVADA
UTAH
COLORADO
ARIZONA
NEW MEXICO
CALIFORNIA
Rawlins
Kemmerer
Rock Springs
Laramie
Cheyenne
Ft. Collins
Denver
Colorado Springs
Salt Lake City
Park City
Provo
Vernal
Craig
Steamboat Springs
Grand Junction
Aspen
Vail
Price
Delta
Fillmore
Richfield
Moab
Montrose
Durango
Farmington
Gallup
Santa Fe
Ely
Cedar City
Saint George
Las Vegas
Tremonton
Logan
Ogden
Tooele
Wasatch
Duchesne
Uintah
Rio Blanco
Garfield
Eagle
Pitkin
Gunnison
Chaffee
Fremont
Custer
Pueblo
Huerfano
Alamosa
Conejos
Costilla
Las Animas
Mora
Colfax
Taos
Rio Arriba
Sandoval
McKinley
San Miguel
Montezuma
La Plata
Archuleta
Hinsdale
Mineral
Rio Grande
Saguache
Ouray
Dolores
San Juan
Grand
Emery
Sanpete
Sevier
Piute
Wayne
Beaver
Millard
Juab
Iron
Washington
Kane
Garfield
Lincoln
Clark
Nye
White Pine
Lander
Eureka
Esmeralda
Inyo
Mohave
Coconino
Navajo
Apache
Uinta
Summit
Morgan
Davis
Box Elder
Cache
Rich
Franklin
Oneida
Bear Lake
Great Salt Lake
Utah Lake
Flaming Gorge Res
Sweetwater
Carbon
Albany
Platte
Goshen
Larimer
Weld
Boulder
Adams
Douglas
Park
Teller
El Paso
Clear Creek
Summit
Jackson
Routt
Moffat
Daggett
Lake Powell
Lake Mead
Los Alamos
Santa Fe
San Miguel
Miles
0
25
50
Map Exhibit 1
Proposed Corridor, Regional Vicinity
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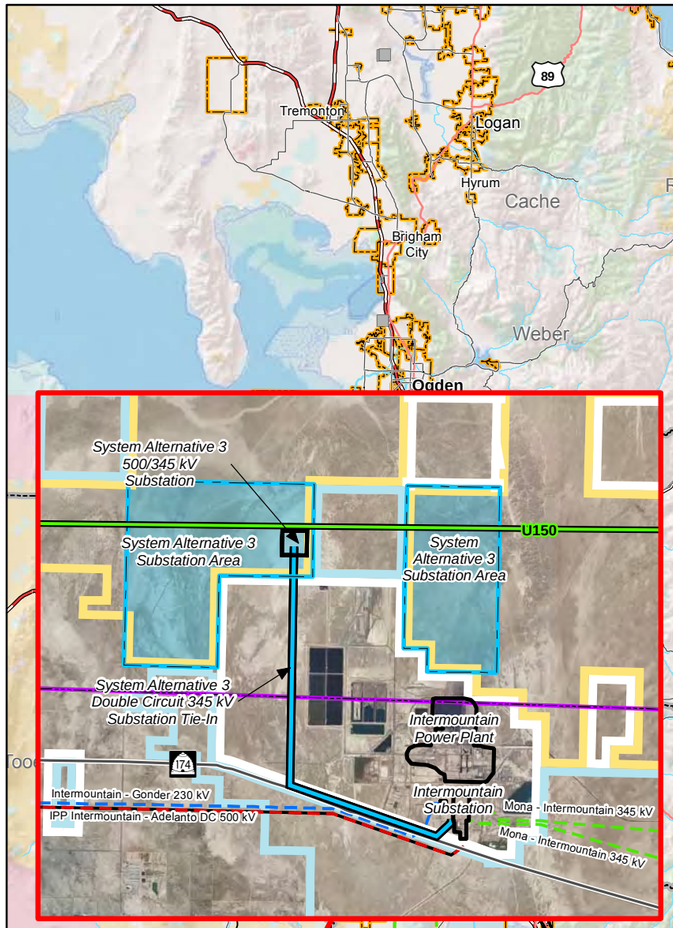
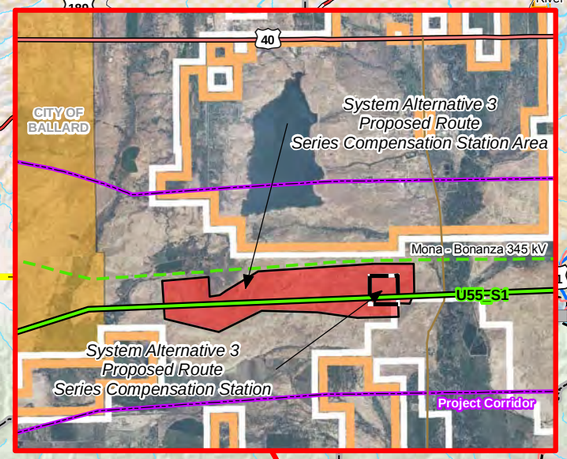
TRANSWEST EXPRESS LLC





TransWest Express Transmission Project
October 2012 Draft

Map Exhibit 10

System Alternative 3 Components

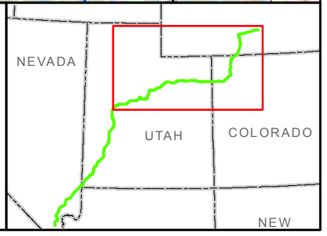
Project Features
- Proposed Reference Line
- Route Segment Node
- Route Corridor
- Terminal Siting Area

Administrative Boundaries
- Municipal Boundary

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- 138 kV Line
- Substation

Land Jurisdiction
- Indian Reservation
- State Land
- USDA Forest Service
- State Park or Recreation Area
- U.S. Department of Energy
- U.S.Department of Defense
- National Park or National Monument
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service

0 10 20 30
Miles



Map Exhibit 2

Proposed Route Utility Corridor Utilization

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Legend

Project Features

- Proposed
- Corridor
- Terminal Siting Area
- Conceptual Terminal Site

Land Jurisdiction

- BLM
- Private
- State of Wyoming

Transportation

- Interstate Highway
- Railroad

Existing Transmission

- 230 kV Line

Administrative Boundaries

- Section Line

Note: Terminal site consists of an AC/DC Converter Station, 500 kV AC Substation & a 230 kV AC Substation

Platte-Point of Rocks 230 kV

230 kV Connections

500 kV Connections

600 kV TWE Project Line

230 kV Connections

500 kV Connections

W10

0 0.1 0.2 0.3 0.4 0.5

Miles

Map Exhibit 3
Conceptual Northern Terminal & Grid Interconnections
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POWER ENGINEERS

TRANSWEST EXPRESS LLC

Legend

Project Features

- Proposed
- Corridor
- Terminal Siting Area
- Conceptual Terminal Site
- Alternative Conceptual Terminal Site

Land Jurisdiction

- BLM
- Private

Transportation

- Interstate Highway
- U.S. Highway

Existing Transmission

- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- Substation

Administrative Boundaries

- Section Line

Note: Terminal site consists of an AC/DC Converter Station & a 500 kV AC Substation

N175

600 kV TWE Project Line

500 kV Connections

600 kV TWE Project Line

95

500 kV Connections

Marketplace

McCullough

Eldorado

Nevada Solar One

Merchant

0 0.25 0.5 0.75 1 1.25

Miles

Map Exhibit 4

Conceptual Southern Terminal & Grid Interconnections

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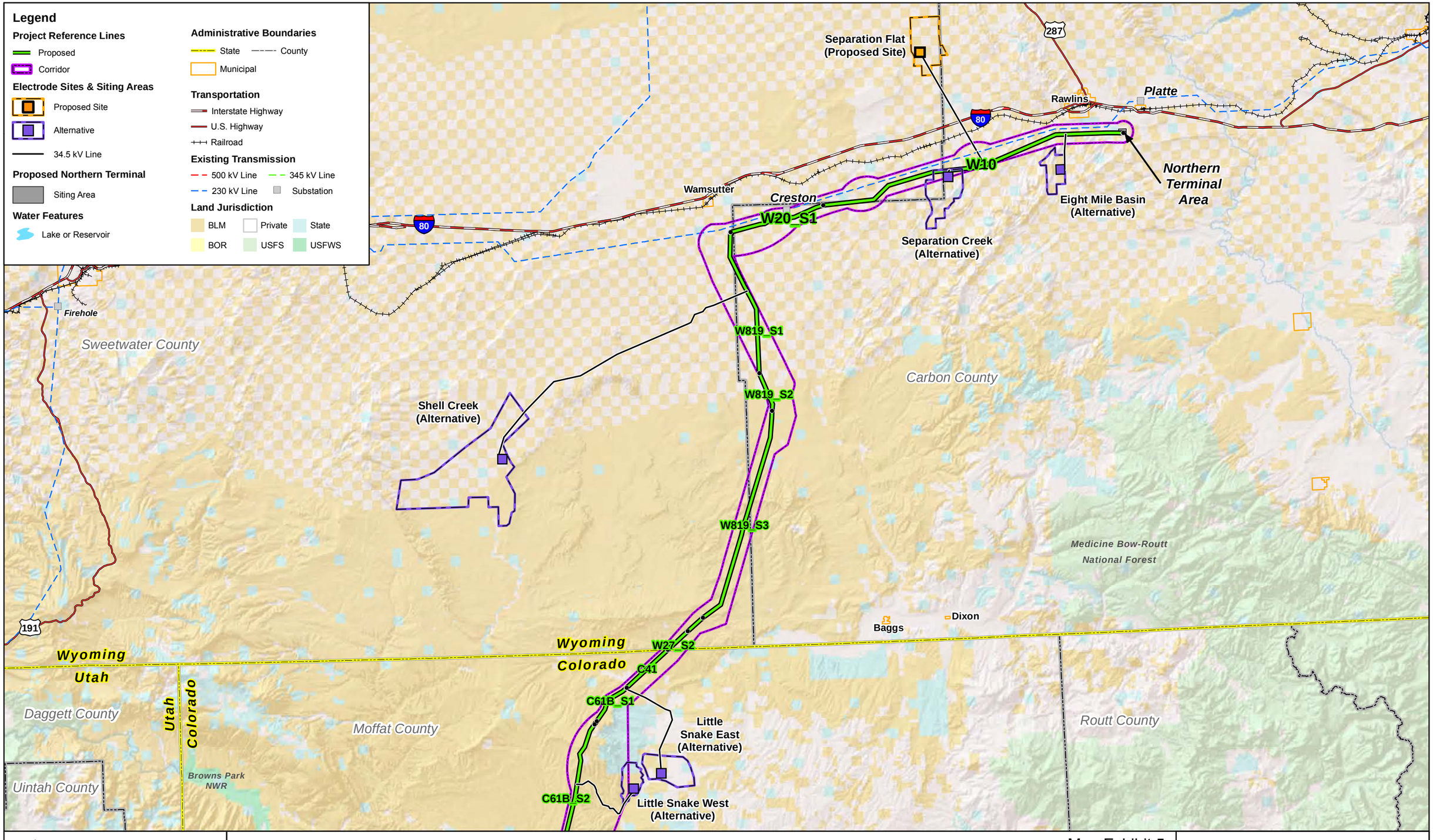

Map Exhibit 5

Northern Terminal and Ground Electrode System- Proposed and Alternative Sites and Siting Areas

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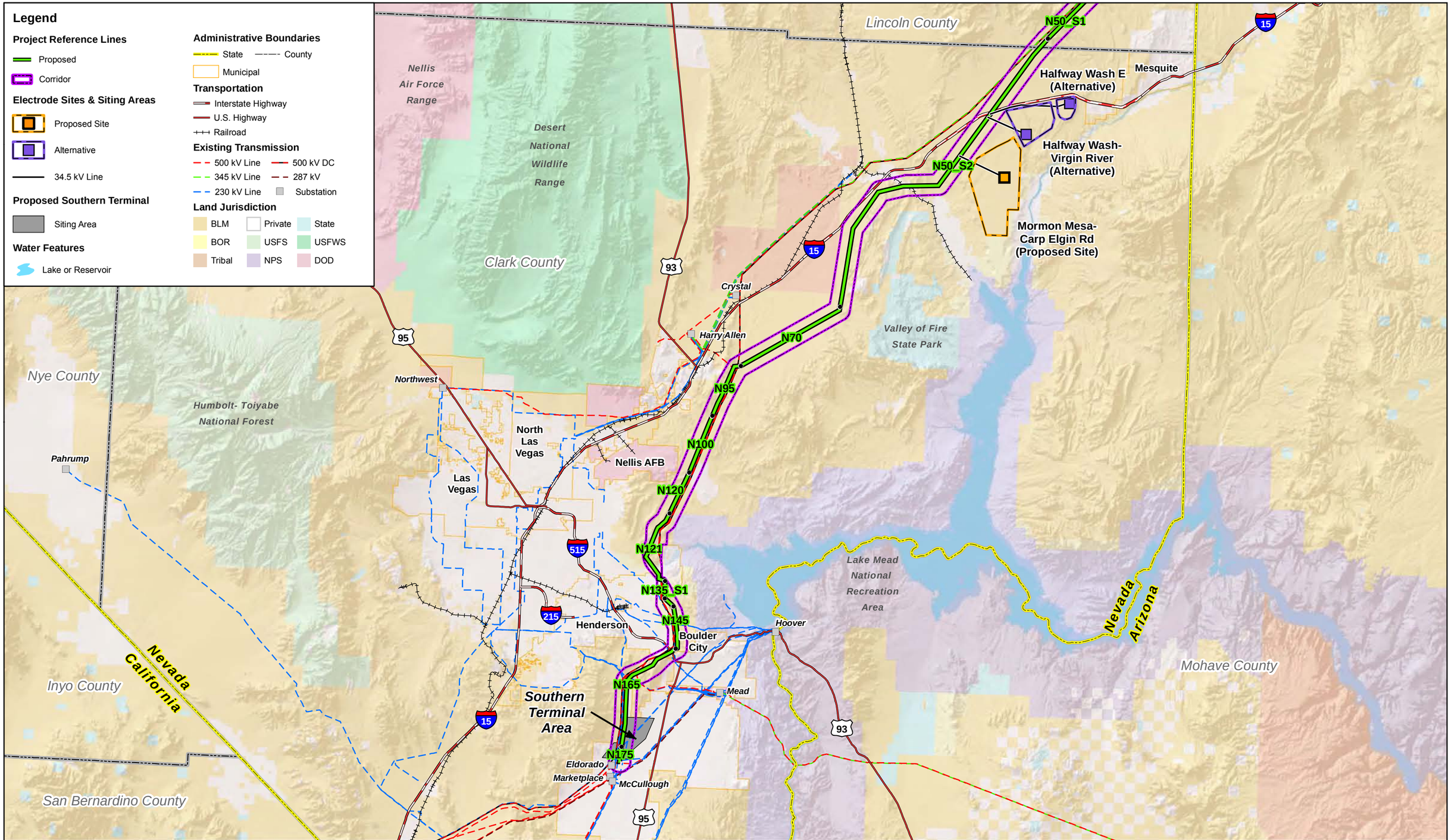

Map Exhibit 6

Southern Terminal and Ground Electrode System- Proposed and Alternative Sites and Siting Areas

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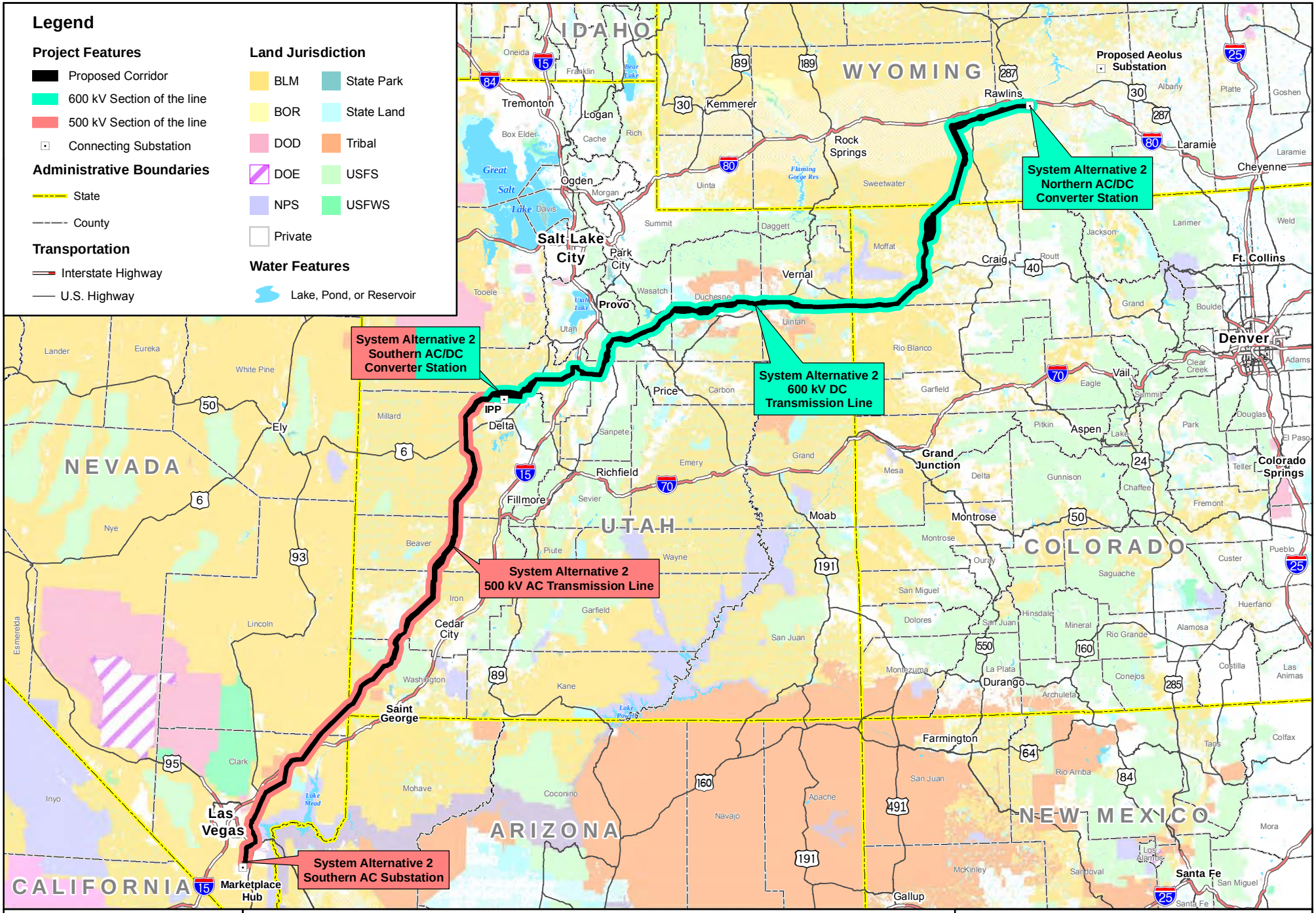
POWER ENGINEERS

TRANSWEST EXPRESS LLC



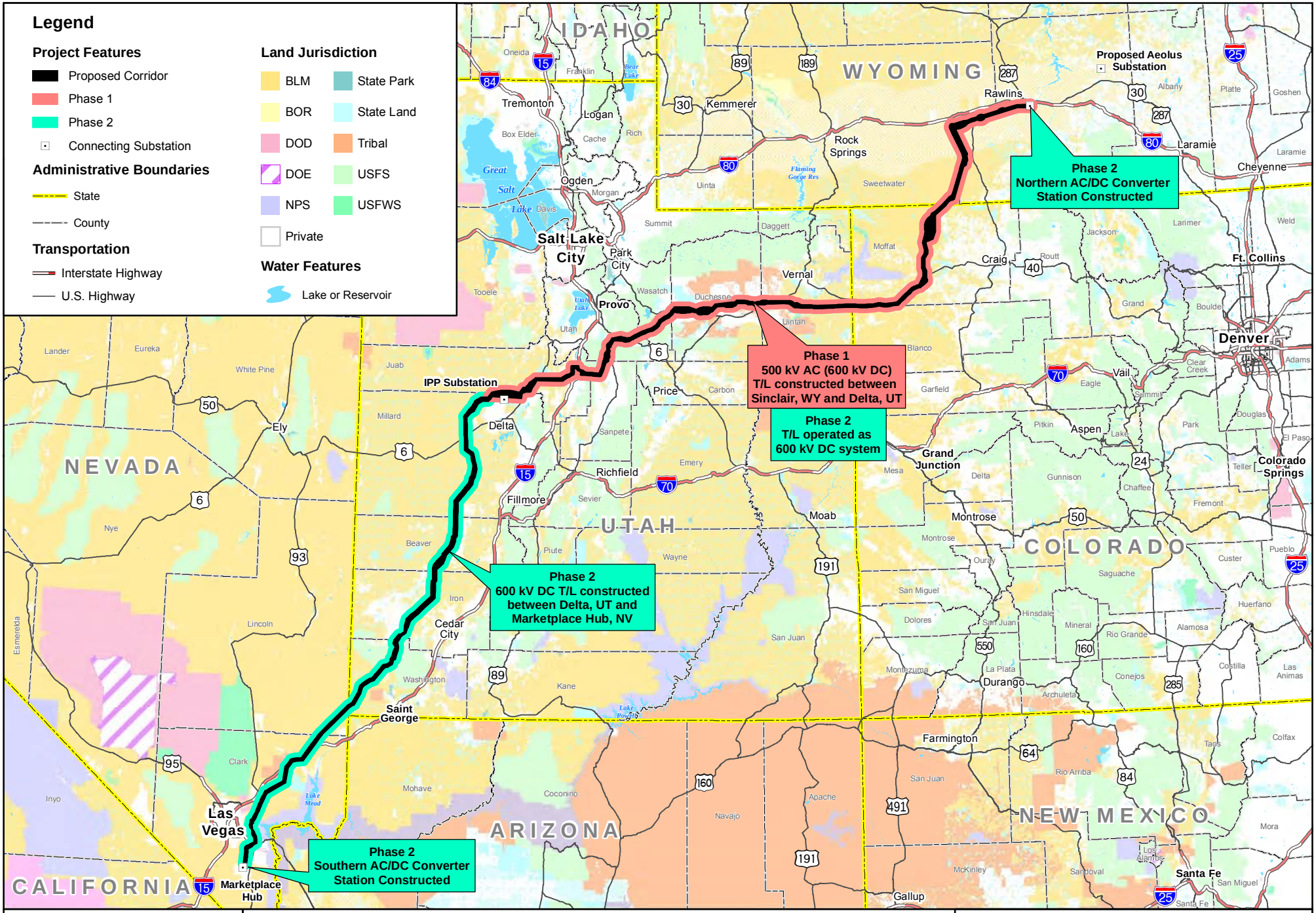
Map Exhibit 7

System Alternative 2: DC from Wyoming to IPP, AC from IPP to Marketplace Hub

TransWest Express Transmission Project | October 2012 | DRAFT

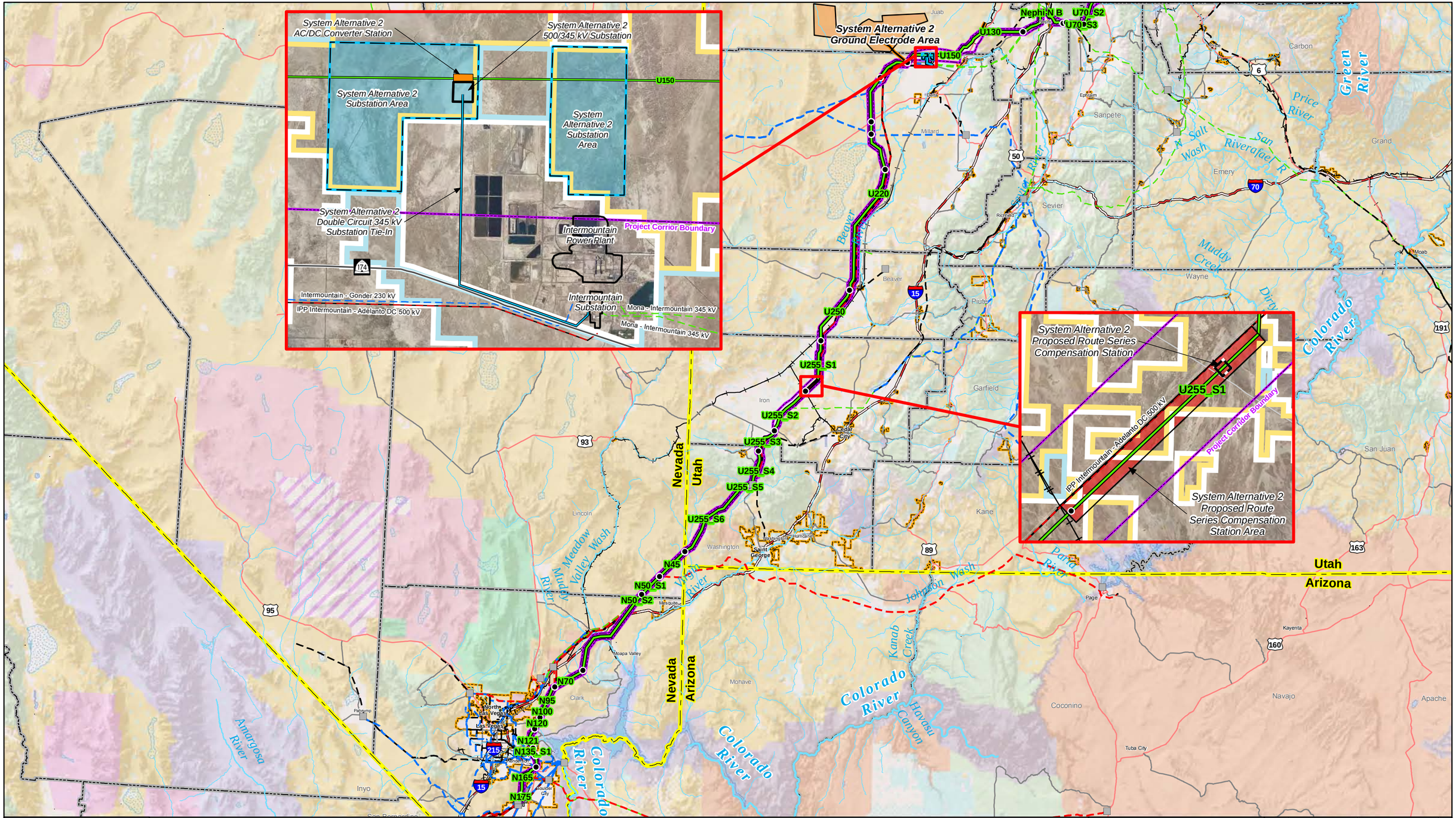
POWER ENGINEERS

TRANSWEST EXPRESS LLC



Map Exhibit 8
System Alternative 3: Phased Build-Out
TransWest Express Transmission Project | October 2012 | DRAFT

POWER ENGINEERS
TRANSWEST EXPRESS LLC



TransWest Express Transmission Project
October 2012 Draft

Map Exhibit 9

System Alternative 2 Components

Project Features
- Proposed Reference Line
- Route Segment Node
- Route Corridor
- Terminal Siting Area
- Ground Electrode Area
- Ground Electrode Site
- 34.5 kV Electrode Line

Administrative Boundaries
- Municipal Boundary

Existing Transmission
- 500 kV Line
- 500 kV DC Line
- 345 kV Line
- 287 kV Line
- 230 kV Line
- 138 kV Line
- Substation

Land Jurisdiction
- Indian Reservation
- State Land
- USDA Forest Service
- State Park or Recreation Area
- U.S. Department of Energy
- U.S.Department of Defense
- National Park or National Monument
- USDI Bureau of Land Management
- USDI Bureau of Reclamation
- USDI Fish and Wildlife Service

0 10 20 30 40
Miles

TRANSWEST EXPRESS LLC
POWER ENGINEERS

IDAHO
WYOMING
NEVADA
UTAH
COLORADO
NEW MEXICO
ARIZONA

Appendix E
Air Quality Calculations

Table E-1 Calculation Factors and Conversions

				Duration				
PM_{10} fraction	$PM_{2.5}$ fraction	tons/ acre/ month	Percent Control	Weeks	Work Days	acres/ day	tons/ acre/ day	tons/ day
0.75	0.1	1.2	0.5	26	156	3.2	0.04	0.128

Formula used in PM_x Calculations: PM_x = acres * (tons/ acre/ day) * (percent control) * (days) * (PM_x fraction)

Table E-2 Construction Disturbance of Project Terminals and Associated Facilities

	Construction Disturbance (acres)	PM10 from Construction Disturbance (tons)	PM2.5 from Construction Disturbance (tons)
Northern Terminal	**503.0**	15.1	1.5
Southern Terminal	**409.0**	12.3	1.2
Ground Electrode	**160.0**	4.8	0.5
Corridor	**90.0**	2.7	0.3

Table E-4 Calculation of Construtions Impacts on Air Quality

Alternatives Summary

Regional Alternative	I-A	I-B	I-C	I-D
600kV T-Line (mi)	155	159	186	171
Access Roads (mi)	227	223	269	242

Regional Alternative	II-A	II-B	II-C	II-D	II-E	II -F
600kV T-Line (mi)	257	345	364	262	266	270
Access Roads (mi)	463	580	556	480	478	515

Regional Alternative	III-A	III-B	III-C	III-D
600kV T-Line (mi)	275	282	308	311
Access Roads (mi)	423	401	433	433

Regional Alternative	IV-A	IV-B	IV-C
600kV T-Line (mi)	37	39	44
Access Roads (mi)	60	71	74

Regional Summary of PM Emissions

	Region I	Region II	Region III	Region IV
Miles	155	257	275	37
Tower Count	545	905	969	130
Tower foundations/wk	10	11	12	11
Tower foundations/mo	41	47	51	47
acres/tower	3	3	3	3
acres/month	112	128	137	127
tons/month	134	153	164	152
tons (total)	1765	2931	3139	422
Tons (annual)	1610	1836	1967	422

Project Duration

	(wks)	Months
Region I	57	13.2
Region II	83	19.2
Region III	83	19.2
Region IV	12	2.8

Assumptions:

1.2	tons per acre per month of disturbed area (EPA Emissions factor)
5%	active construction acres per day of the total disturbance area in a region
50%	controls from watering or other dust abatement procedure
30	days per month
0.75	PM10 fraction of TSP per acre per month of disturbed area
0.1	PM2.5 fraction of PM10 per acre per month of disturbed area
5280	feet per mile
1500	feet between towers (span)

Formula used in PM_x Calculations: PM_x = acres * (tons/ acre/ day) * (percent control) * (days) * (PM_x fraction)

Project Phase	Construction Disturbance (acres)				Construction Disturbance Emissions (tons/mo)				Construction Disturbance Emissions PM10 (tons)				Construction Disturbance Emissions PM2.5 (tons)			
Regional Alternative	I-A	I-B	I-C	I-D	I-A	I-B	I-C	I-D	I-A	I-B	I-C	I-D	I-A	I-B	I-C	I-D
Access Roads	512	481	601	515	1	1	1	1	12	11	14	12	1	1	1	1
Structures & Communication Sites-	718	735	864	794	2	2	2	2	16	17	19	18	2	2	2	2
Stringing & Tensioning Sites	456	487	600	587	1	1	1	1	10	11	14	13	1	1	1	1
ETWA	371	381	447	411	1	1	1	1	8	9	10	9	1	1	1	1
Facilities Total	**2057**	**2084**	**2512**	**2307**	**5**	**5**	**6**	**5**	**46**	**47**	**57**	**52**	**5**	**5**	**6**	**5**
Additional ROW-veg clearing	3241	3303	3847	3499	7	8	9	8	73	74	87	79	7	7	9	8
Emission Total					12	12	15	13	119	121	143	131	12	12	14	13

Project Phase	Construction Disturbance (acres)						Construction Disturbance (tons/mo)						Construction Disturbance Emissions PM10 (tons)						Construction Disturbance Emissions PM2.5 (tons)					
Regional Alternative	II-A	II-B	II-C	II-D	II-E	II-F	II-A	II-B	II-C	II-D	II-E	II-F	II-A	II-B	II-C	II-D	II-E	II-F	II-A	II-B	II-C	II-D	II-E	II-F
Access Roads	1154	1404	1274	1218	1196	1213	3	3	3	3	3	3	26	32	29	27	27	27	3	3	3	3	3	3
Structures & Communication Sites- Construction	1190	1597	1688	1209	1232	1249	3	4	4	3	3	3	27	36	38	27	28	28	3	4	4	3	3	3
Stringing & Tensioning Sites	783	1174	1230	1022	894	906	2	3	3	2	2	2	18	26	28	23	20	20	2	3	3	2	2	2
ETWA	617	828	874	628	639	648	1	2	2	1	1	1	14	19	20	14	14	15	1	2	2	1	1	1
Facilities Total	**3745**	**5003**	**5066**	**4077**	**3960**	**4016**	**9**	**11**	**12**	**9**	**9**	**9**	**84**	**113**	**114**	**92**	**89**	**90**	**8**	**11**	**11**	**9**	**9**	**9**
Additional ROW-veg clearing	5391	7101	7485	5267	5502	5579	12	16	17	12	13	13	121	160	168	119	124	126	12	16	17	12	12	13
Emission Total							21	28	29	21	22	22	206	272	282	210	213	216	21	27	28	21	21	22

Project Phase	Construction Disturbance (acres)			Construction Disturbance (ton/mo)			Construction Disturbance Emissions PM10 (tons)			Construction Disturbance Emissions PM2.5 (tons)		
Regional Alternative	III-A	III-B	III-C	III-A	III-B	III-C	III-A	III-B	III-C	III-A	III-B	III-C
Access Roads	971	860	926	2	2	2	32	28	30	3	3	3
Structures & Communication Sites- Construction	1271	1304	1426	3	3	3	42	43	47	4	4	5
Stringing & Tensioning Sites	740	731	836	2	2	2	24	24	27	2	2	3
ETWA	661	677	740	2	2	2	22	22	24	2	2	2
Facilities Total	**3642**	**3572**	**3928**	**8**	**8**	**9**	**119**	**117**	**129**	**12**	**12**	**13**
Additional ROW-veg clearing	5851	6015	6538	0	0	0	0	0	0	0	0	0
Emission Total				8	8	9	119	117	129	12	12	13

Project Phase	Construction Disturbance (acres)			Construction Disturbance (ton/mo)			Construction Disturbance Emissions PM10 (tons)			Construction Disturbance Emissions PM2.5 (tons)		
Regional Alternative	IV-A	IV-B	IV-C	IV-A	IV-B	IV-C	IV-A	IV-B	IV-C	IV-A	IV-B	IV-C
Access Roads	145	176	177	0	0	0	5	6	6	0	1	1
Structures & Communication Sites- Construction	176	184	209	0	0	0	6	6	7	1	1	1
Stringing & Tensioning Sites	156	119	170	0	0	0	5	4	6	1	0	1
ETWA	90	94	107	0	0	0	3	3	4	0	0	0
Facilities Total	**567**	**573**	**663**	**1**	**1**	**2**	**19**	**19**	**22**	**2**	**2**	**2**
Additional ROW-veg clearing	566	573	663	1	1	2	19	19	22	2	2	2
Emission Total				3	3	3	37	38	43	4	4	4

Table E-4 Calculation of Construtions Impacts on Air Quality

Project Phase	Construction Disturbance (acres)						Construction Disturbance Emissions (ton/mo)						Construction Disturbance Emissions PM10 (tons)						Construction Disturbance Emissions PM2.5 (tons)					
Alternative Name	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing
Emma Park Alternative Variation	218	163	180	85	**646**	669	0	0	0	0	**1**	2	5	4	4	2	15	15	0	0	0	0	**1**	2
Emma Park Alternative Variation Comparison	*236*	*149*	*203*	*77*	***665***	*577*	*1*	*0*	*0*	*0*	***2***	*1*	5	3	5	2	15	13	*1*	*0*	*0*	*0*	***1***	*1*
Ox Valley East Alternative Variation	99	74	66	38	**276**	315	0	0	0	0	**1**	1	2	2	1	1	6	7	0	0	0	0	**1**	1
Ox Valley East Alternative Variation Comparison	*94*	*67*	*57*	*34*	***252***	*285*	*0*	*0*	*0*	*0*	***1***	*1*	2	1	1	1	6	6	*0*	*0*	*0*	*0*	***1***	*1*
Ox Valley West Alternative Variation	98	76	56	39	**268**	333	0	0	0	0	**1**	1	2	2	1	1	6	7	0	0	0	0	**1**	1
Ox Valley West Alternative Variation Comparison	*94*	*67*	*57*	*34*	***252***	*285*	*0*	*0*	*0*	*0*	***1***	*1*	2	1	1	1	6	6	*0*	*0*	*0*	*0*	***1***	*1*
Pinto Alternative Variation	108	136	134	71	**449**	571	0	0	0	0	**1**	1	2	3	3	2	10	13	0	0	0	0	**1**	1
Pinto Alternative Variation Comparison	*122*	*109*	*93*	*56*	***381***	*469*	*0*	*0*	*0*	*0*	***1***	*1*	3	2	2	1	9	11	*0*	*0*	*0*	*0*	***1***	*1*
Marketplace Alternative Variation	20	37	33	19	**109**	155	0	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	**0**	0
Marketplace Alternative Variation Comparison	*18*	*33*	*14*	*17*	***82***	*154*	*0*	*0*	*0*	*0*	***0***	*0*	0	0	0	0	0	0	*0*	*0*	*0*	*0*	***0***	*0*

Project Phase	Construction Disturbance (acres)						Construction Disturbance Emissions (ton/mo)						Construction Disturbance Emissions PM10 (tons)						Construction Disturbance Emissions PM2.5 (tons)					
Alternative Name	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing	Access Roads	Structures & Communication Sites-Construction	Stringing & Tensioning Sites	ETWA	Facilities Total	Additional ROW-veg clearing
Mexican Flats Alternative Connector	25	48	32	24	**129**	206	0	0	0	0	0	0	1	1	1	1	3	5	0	0	0	0	**0**	0
Baggs Alternative Connector	68	105	68	54	**294**	464	0	0	0	0	1	1	2	2	2	1	7	10	0	0	0	0	**1**	1
Fivemile Point North Alternative Connector	8	15	52	7	**82**	20	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	**0**	0
Fivemile Point South Alternative Connector	6	10	10	5	**31**	42	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	**0**	0
Castle Dale Alternative Connector	48	51	44	25	**168**	209	0	0	0	0	0	0	1	1	1	1	4	5	0	0	0	0	**0**	0
Price Alternative Connector	79	85	72	44	**280**	369	0	0	0	0	1	1	2	2	2	1	6	8	0	0	0	0	**1**	1
Lynndyl Alternative Connector	70	111	66	58	**306**	511	0	0	0	0	1	1	2	3	1	1	7	11	0	0	0	0	**1**	1
IPP East Alternative Connector	7	13	11	6	**36**	50	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	**0**	0
Highway 191 Alternative Connector	37	22	49	11	**119**	61	0	0	0	0	0	0	1	0	1	0	3	1	0	0	0	0	**0**	0
Avon Alternative Connector	20	37	28	19	**104**	164	0	0	0	0	0	0	0	1	1	0	2	4	0	0	0	0	**0**	0
Moapa Alternative Connector	33	60	43	31	**166**	262	0	0	0	0	0	1	1	1	1	1	4	6	0	0	0	0	**0**	1
Sunrise Mountain Alternative Connector	8	13	11	6	**38**	50	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	**0**	0
Lake Las Vegas Alternative Connector	19	18	8	9	**54**	86	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0	**0**	0
Three Kids Mine Alternative Connector	33	25	22	13	**93**	106	0	0	0	0	0	0	1	1	1	0	2	2	0	0	0	0	**0**	0
River Mountain Alternative Connector	56	32	37	17	**142**	132	0	0	0	0	0	0	1	1	1	0	3	3	0	0	0	0	**0**	0
Railroad Pass Alternative Connector	14	14	23	7	**58**	48	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	**0**	0

Site Alternatives	Length (miles)		Construction Disturbance (acres)				Construction Disturbance Emissions (ton/mo)				Construction Disturbance Emissions PM10 (tons)				Construction Disturbance Emissions PM2.5 (tons)			
	34.5 kV AC Overhead Line	Access Road	Ground Electrode Sites	Overhead Lines	Access Roads	Total	Ground Electrode Sites	Overhead Lines	Access Roads	Total	Ground Electrode Sites	Overhead Lines	Access Roads	Total	Ground Electrode Sites	Overhead Lines	Access Roads	Total
Northern System Alternatives																		
Separation Flat (All Alts)	13	17	65	30	34	128	0	0	0	0	1	4	1	1	1	3	11	41
Shell Creek (Alts I-A & I-D)	33	43	65	75	83	223	0	0	0	1	3	7	1	2	2	5	27	72
Little Snake East (Alts I-A, I-B, & I-D)	9	12	65	20	24	108	0	0	0	0	1	4	1	0	1	2	8	35
Little Snake West (Alt I-A)	10	14	65	25	31	121	0	0	0	0	1	4	1	1	1	3	10	39
Shell Creek (Alt I-B)	26	37	130	79	72	281	0	0	0	1	2	9	3	2	2	6	23	91
Little Snake West (Alts I-B & I-D)	12	15	65	26	29	121	0	0	0	0	1	4	1	1	1	3	9	39
Cottonwood Creek (Alt I-C)	5	6	65	10	14	89	0	0	0	0	0	3	1	0	0	2	4	29
Pio Springs 1 (Western Wyoming Alt Variation)	6	7	65	12	14	92	0	0	0	0	0	3	1	0	0	2	5	30
Southern System Alternatives																		
Mormon Mesa-Carp Elgin Rd (Alt. A)	6	7	65	12	14	91	0	0	0	0	0	3	1	0	0	2	4	30
Halfway Wash - Virgin River (Alt. A)	4	5	65	9	10	84	0	0	0	0	0	3	1	0	0	2	3	27
Halfway Wash East (Alt. A)	8	10	65	18	20	104	0	0	0	0	1	3	1	0	0	2	7	33
Mormon Mesa-Carp Elgin Rd (Alt. B)	8	10	65	18	20	103	0	0	0	0	1	3	1	0	0	2	7	33
Halfway Wash - Virgin River (Alt. B)	6	7	65	13	14	93	0	0	0	0	0	3	1	0	0	2	5	30
Halfway Wash East (Alt. B)	8	10	65	18	19	102	0	0	0	0	1	3	1	0	0	2	6	33
Meadow Valley 2 (Alt. C)	22	29	65	49	60	174	0	0	0	0	2	6	1	1	1	4	19	56

Table E-4 Calculation of Operation Impacts on Air Quality

Alternatives Summary

Regional Alternative	I-A	I-B	I-C	I-D
600kV T-Line (mi)	155	159	186	171
Access Roads (mi)	227	223	269	242

Regional Alternative	II-A	II-B	II-C	II-D	II-E	II -F
600kV T-Line (mi)	257	345	364	262	266	270
Access Roads (mi)	463	580	556	480	478	515

Regional Alternative	III-A	III-B	III-C	III-D
600kV T-Line (mi)	275	282	308	311
Access Roads (mi)	423	401	433	433

Regional Alternative	IV-A	IV-B	IV-C
600kV T-Line (mi)	37	39	44
Access Roads (mi)	60	71	74

Project Duration

	(wks)	Months
Region I	57	13.2
Region II	83	19.2
Region III	83	19.2
Region IV	12	2.8

Assumptions:

1.2	tons per acre per month of disturbed area Emissions factor
5%	active construction acres per day of the total disturbance area in a region
50%	controls from watering or other dust abatement procedure
30	days per month
0.75	PM10 fraction of TSP per acre per month of disturbed area
0.1	PM2.5 fraction of PM10 per acre per month of disturbed area
5280	feet per mile
1500	feet between towers (span)

Formula used in PM_x Calculations: PM_x = acres * (tons/ acre/ day) * (percent control) * (days) * (PM_x fraction)

Project Phase	Operation Disturbance (acres)				Operation Disturbance Emissions (tons/mo)				Operation Disturbance Emissions PM10 (tons)				Operation Disturbance Emissions PM2.5 (tons)			
Regional Alternative	I-A	I-B	I-C	I-D	I-A	I-B	I-C	I-D	I-A	I-B	I-C	I-D	I-A	I-B	I-C	I-D
Access Roads	512	481	601	515	1	1	1	1	12	11	14	12	1	1	1	1
Structures & Communication Sites-	14	15	17	16	0	0	0	0	0	0	0	0	0	0	0	0
Stringing & Tensioning Sites	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ETWA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Facilities Total	**526**	**495**	**618**	**531**	**1**	**1**	**1**	**1**	**12**	**11**	**14**	**12**	**1**	**1**	**1**	**1**
Additional ROW-veg clearing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emission Total					1	1	1	1	12	11	14	12	1	1	1	1

Project Phase	Operation Disturbance (acres)						Operation Disturbance (tons/mo)						Operation Disturbance Emissions PM10 (tons)						Operation Disturbance Emissions PM2.5 (tons)					
Regional Alternative	II-A	II-B	II-C	II-D	II-E	II-F	II-A	II-B	II-C	II-D	II-E	II-F	II-A	II-B	II-C	II-D	II-E	II-F	II-A	II-B	II-C	II-D	II-E	II-F
Access Roads	1154	1404	1274	1218	1196	1213	3	3	3	3	3	3	26	32	29	27	27	27	3	3	3	3	3	3
Structures & Communication Sites-	24	32	34	25	25	25	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Stringing & Tensioning Sites	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ETWA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Facilities Total	**1178**	**1436**	**1308**	**1243**	**1221**	**1238**	**3**	**3**	**3**	**3**	**3**	**3**	**27**	**32**	**29**	**28**	**27**	**28**	**3**	**3**	**3**	**3**	**3**	**3**
Additional ROW-veg clearing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Emission Total							3	3	3	3	3	3	27	32	29	28	27	28	3	3	3	3	3	3

Project Phase	Operation Disturbance (acres)			Operation Disturbance (ton/mo)			Operation Disturbance Emissions PM10 (tons)			Operation Disturbance PM2.5 (tons)		
Regional Alternative	III-A	III-B	III-C	III-A	III-B	III-C	III-A	III-B	III-C	III-A	III-B	III-C
Access Roads	971	860	926	2	2	2	32	28	30	3	3	3
Structures & Communication Sites-	25	25	28	0	0	0	1	1	1	0	0	0
Stringing & Tensioning Sites	0	0	0	0	0	0	0	0	0	0	0	0
ETWA	0	0	0	0	0	0	0	0	0	0	0	0
Facilities Total	**996**	**885**	**953**	**2**	**2**	**2**	**33**	**29**	**31**	**3**	**3**	**3**
Additional ROW-veg clearing	0	0	0	0	0	0	0	0	0	0	0	0
Emission Total				2	2	2	33	29	31	3	3	3

Project Phase	Operation Disturbance (acres)			Operation Disturbance (ton/mo)			Operation Disturbance Emissions PM10 (tons)			Operation Disturbance Emissions PM2.5 (tons)		
Regional Alternative	IV-A	IV-B	IV-C	III-A	III-B	III-C	III-A	III-B	III-C	III-A	III-B	III-C
Access Roads	149	180	174	0	0	0	5	6	6	0	1	1
Structures & Communication Sites-Construction	4	4	4	0	0	0	0	0	0	0	0	0
Stringing & Tensioning Sites	0	0	0	0	0	0	0	0	0	0	0	0
ETWA	0	0	0	0	0	0	0	0	0	0	0	0
Facilities Total	**152**	**184**	**178**	**0**	**0**	**0**	**5**	**6**	**6**	**0**	**1**	**1**
Additional ROW-veg clearing	0	0	0	0	0	0	0	0	0	0	0	0
Emission Total				0	0	0	5	6	6	0	1	1

Table E-4 Calculation of Operation Impacts on Air Quality

Project Phase	Operation Disturbance (acres)			Operation Disturbance (ton/mo)			Operation Disturbance Emissions PM10 (tons)			Operation Disturbance Emissions PM2.5 (tons)		
Alternative Name	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**
Emma Park Alternative Variation	218	3	**221**	0	0	**1**	5	0	5	0	0	**0**
Emma Park Alternative Variation Comparison	*236*	*3*	***239***	*1*	*0*	***1***	5	0	5	*1*	*0*	***1***
Ox Valley East Alternative Variation	99	2	**100**	0	0	**0**	2	0	2	0	0	**0**
Ox Valley East Alternative Variation Comparison	*94*	*1*	***95***	*0*	*0*	***0***	2	0	2	*0*	*0*	***0***
Ox Valley West Alternative Variation	98	2	**100**	0	0	**0**	2	0	2	0	0	**0**
Ox Valley West Alternative Variation Comparison	*94*	*1*	***95***	*0*	*0*	***0***	2	0	2	*0*	*0*	***0***
Pinto Alternative Variation	108	3	**111**	0	0	**0**	2	0	3	0	0	**0**
Pinto Alternative Variation Comparison	*122*	*2*	***125***	*0*	*0*	***0***	3	0	3	*0*	*0*	***0***
Marketplace Alternative Variation	20	1	**21**	0	0	**0**	0	0	0	0	0	**0**
Marketplace Alternative Variation Comparison	*18*	*1*	***19***	*0*	*0*	***0***	0	0	0	*0*	*0*	***0***

Project Phase	Operation Disturbance (acres)			Operation Disturbance (ton/mo)			Operation Disturbance Emissions PM10 (tons)			Operation Disturbance Emissions PM2.5 (tons)		
Alternative Name	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**	**Access Roads**	**Structures & Comm. Sites**	**Facilities Total**
Mexican Flats Alternative Connector	25	1	**26**	0	0	**0**	1	0	1	0	0	**0**
Baggs Alternative Connector	68	2	**70**	0	0	**0**	2	0	2	0	0	**0**
Fivemile Point North Alternative Connector	8	0	**8**	0	0	**0**	0	0	0	0	0	**0**
Fivemile Point South Alternative Connector	6	0	**6**	0	0	**0**	0	0	0	0	0	**0**
Castle Dale Alternative Connector	48	1	**49**	0	0	**0**	2	0	2	0	0	**0**
Price Alternative Connector	79	2	**81**	0	0	**0**	3	0	3	0	0	**0**
Lynndyl Alternative Connector	70	2	**72**	0	0	**0**	2	0	2	0	0	**0**
IPP East Alternative Connector	7	0	**7**	0	0	**0**	0	0	0	0	0	**0**
Highway 191 Alternative Connector	37	1	**38**	0	0	**0**	1	0	1	0	0	**0**
Avon Alternative Connector	20	1	**21**	0	0	**0**	1	0	1	0	0	**0**
Moapa Alternative Connector	33	1	**34**	0	0	**0**	1	0	1	0	0	**0**
Sunrise Mountain Alternative Connector	8	0	**8**	0	0	**0**	0	0	0	0	0	**0**
Lake Las Vegas Alternative Connector	19	0	**19**	0	0	**0**	1	0	1	0	0	**0**
Three Kids Mine Alternative Connector	33	1	**34**	0	0	**0**	1	0	1	0	0	**0**
River Mountain Alternative Connector	56	1	**57**	0	0	**0**	2	0	2	0	0	**0**
Railroad Pass Alternative Connector	14	0	**14**	0	0	**0**	0	0	0	0	0	**0**

Site Alternatives	Length (miles)		Operation Disturbance (acres)				Operation Disturbance Emissions PM10 (tons)				Operation Disturbance PM10 (tons)				Operation Disturbance Emissions PM2.5 (tons)			
	34.5 kV AC Overhead Line	**Access Road**	**Ground Electrode Sites**	**Overhead Lines**	**Access Roads**	**Total**	**Ground Electrode Sites**	**Overhead Lines**	**Access Roads**	**Total**	**Ground Electrode Sites**	**Overhead Lines**	**Access Roads**	**Total**	**Ground Electrode Sites**	**Overhead Lines**	**Access Roads**	**Total**
Northern System Alternatives																		
Separation Flat (All Alts)	13	17	6	0	34	39	0	0	0	0	0	0	1	1	0	0	0	0
Shell Creek (Alts I-A & I-D)	33	43	6	0	83	89	0	0	0	0	0	0	3	3	0	0	0	0
Little Snake East (Alts I-A, I-B, & I-D)	9	12	6	0	24	29	0	0	0	0	0	0	1	1	0	0	0	0
Little Snake West (Alt I-A)	10	14	6	0	31	37	0	0	0	0	0	0	1	1	0	0	0	0
Shell Creek (Alt I-B)	26	37	11	0	72	83	0	0	0	0	0	0	2	3	0	0	0	0
Little Snake West (Alts I-B & I-D)	12	15	6	0	29	35	0	0	0	0	0	0	1	1	0	0	0	0
Cottonwood Creek (Alt I-C)	5	6	6	0	14	19	0	0	0	0	0	0	0	1	0	0	0	0
Pio Springs 1 (Western Wyoming Alt Variation)	6	7	6	0	14	20	0	0	0	0	0	0	0	1	0	0	0	0
Southern System Alternatives																		
Mormon Mesa-Carp Elgin Rd (Alt. A)	6	7	6	0	14	19	0	0	0	0	0	0	0	1	0	0	0	0
Halfway Wash - Virgin River (Alt. A)	4	5	6	0	10	16	0	0	0	0	0	0	0	1	0	0	0	0
Halfway Wash East (Alt. A)	8	10	6	0	20	26	0	0	0	0	0	0	1	1	0	0	0	0
Mormon Mesa-Carp Elgin Rd (Alt. B)	8	10	6	0	20	26	0	0	0	0	0	0	1	1	0	0	0	0
Halfway Wash - Virgin River (Alt. B)	6	7	6	0	14	20	0	0	0	0	0	0	0	1	0	0	0	0
Halfway Wash East (Alt. B)	8	10	6	0	19	25	0	0	0	0	0	0	1	1	0	0	0	0
Meadow Valley 2 (Alt. C)	22	29	6	0	60	66	0	0	0	0	0	0	2	2	0	0	0	0

Appendix F
Physical Resources

Region I

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Alternative I-A						
Total	**2**	**203**	**1**	**4**	**2**	**2**
Coal Creek		1				
East Fork Cherokee Creek		1				
East Fork Wolf Creek		1				
Eightmile Lake				1		
Fillmore Creek		1				
Fivemile Lake				1		
Little Snake River (CO)	1				Sediment	1
Middle Fork Wolf Creek		1				
Powder Wash		1				
Red Wash		1				
Sand Creek		1				
Separation Creek		1				
Sugar Creek		1				
West Fork Cherokee Creek		1				
Wolf Creek		1				
Yampa River	1				Sediment, Iron	1
Unnamed		191	1	2		

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Alternative I-B						
Total	**2**	**250**	**1**	**1**	**2**	**2**
Coal Creek		1				
East Fork Cherokee Creek		1				
East Fork Wolf Creek		1				
Fillmore Creek		1				
Little Snake River (CO)	1				Sediment	1
Middle Fork Wolf Creek		1				
Powder Wash		1				
Sand Creek		1				
Separation Creek		1				
Sugar Creek		1				
West Branch Willow Creek		1				
West Fork Cherokee Creek		1				
Wolf Creek		1				
Yampa River	1				Sediment, Iron	1
Unnamed		238	1	1		

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Alternative I-C						
Total	**19**	**270**	**6**	**8**	**7**	**5**
Antelope Creek	1					
Bogenschutz Creek		1				
Cherokee Creek		1				
Coal Creek		1				
Culverwell Reservoir				1		
Deception Creek		1				
Deep Creek		1				
Dry Cottonwood Creek		1				
East Fork Wolf Creek	1	1				
Elkhead Creek						1
Elkhorn Ditch		1				
Fillmore Creek		1				
First Mesa Ditch	1		1			
Fortification Creek	1				Selenium	1
Fourmile Creek	1					
Little Bear Creek						
Little Bear Ditch	1		1			
Little Cottonwood Creek	1					
Little Snake River (WY)	1					
Maybell Ditch			1			
Middle Fork Wolf Creek		1				
Muddy Creek	3				TMDL: Physical Alterations	1
Separation Creek		1				
Smith Ditch			1			
Sugar Creek		1				
West Side Canal			1			
Wolf Creek		1				
Yampa River	3				Sediment, Iron	2
Unnamed	5	257	1	7		

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Alternative I-D (Agency Preferred)						
Total	**4**	**235**	**1**	**4**	**2**	**3**
Coal Creek		1				
Cottonwood Creek		1				
East Fork Cherokee Creek		1				
East Fork Wolf Creek		1				
Eightmile Lake				1		
Fillmore Creek		1				
Fivemile Lake				1		
Little Snake River (CO)	1				Sediment	1
Middle Fork Wolf Creek		1				
North Fork Cottonwood Creek		1				
North Prong Red Creek	1					
Powder Wash		1				
Red Creek	1					
Red Wash		1				
Sand Creek		1				1
Separation Creek		1				
Sugar Creek		1				
West Fork Cherokee Creek		1				
Wolf Creek		1				
Yampa River	1				Sediment, Iron	1
Unnamed		221	1	2		

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide	Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide	Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region II																				
Alternative II-A							**Alternative II-B**							**Alternative II-C**						
Total	**19**	**298**	**40**	**3**	**4**	**2**	**Total**	**26**	**522**	**19**	**5**	**39**	**4**	**Total**	**24**	**468**	**37**	**12**	**41**	**4**
Currant Creek	1						Bitter Creek		1					Bitter Creek		1				
Dripping Rock Creek		1					Carbon Canal			1				Blackham Creek	1					
Dry Gulch Creek	1						Cedar Creek	1						Central Utah Canal			1			
Duchesne River	1				Total Dissolved Solids, Temperature, Benthic-Macroinvertebrate Bioassessments	1	Central Utah Canal			1				Cottonwood Creek (tributary Huntington Creek)	1				TMDL: Total Dissolved Solids	
East Twin Wash		1					Coal Fork	1						Divide Creek		1				
Furner Creek		1					Cottonwood Creek (tributary Huntington Creek)		1					D M A D Reservior				1		
Gardner Creek			1				Deer Creek	1						Douglas Creek	1				Sedimentation/ Siltation	
Green River	1					1	Divide Creek		1					Duggins Creek		1				
Hop Creek	1						Douglas Creek	1				Sedimentation/ Siltation		East Fork Eightmile Creek		1				
Knight Ditch			1				Evacuation Creek		1					Evacuation Creek		1				
Lake Fork (Soldier Creek)	1				Total Dissolved Solids, Sedimentation/ Siltation		Grassy Trail Creek	1						Ferron Creek	1					
Lake Fork River	1				TMDL: Total Dissolved Solids		Green River	1					1	Gooseberry Creek	1					
Montes Creek	1						Horse Creek		1					Green River	1					1
North Lateral C Canal		2					Huntington Creek	1				TMDL: Total Dissolved Solids		Huntington Creek	1				Selenium	
Red Creek	1						Icelander Creek		1					Ivie Creek			1			
Red Wash		1					Indian Creek	1						Link Canyon Wash		1				

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region II						
Alternative II-D						
Total	**17**	**315**	**14**	**2**	**1**	**1**
Argyle Creek	1					
Blind Fork		1				
Burnt Fork		1				
Cottonwood Creek (tributary San Pitch River)	1					
Dripping Rock Creek		1				
Dry Creek		1				
Dry Fork		1				
East Twin Wash		1				
Furner Creek		1				
Gooseberry Creek	1					
Green River	1					1
Hop Creek	1					
Maple Fork	1					
Minnie Maud Creek	1					
Mud Creek	1					
North Fork Gordon Creek	1					

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Alternative II-E						
Total	**40**	**345**	**26**	**4**	**23**	**2**
Argyle Creek	3					
Beaver Creek	1					
Dripping Rock Creek		1				
Dry Gulch Creek	1					
Duchesne River	1				Total Dissolved Solids, Temperature, Benthic	1
East Twin Wash		1				
Furner Creek		1				
Gray Mountain Canal			1			
Green River	1					1
Hop Creek	1					
Horse Creek	1					
Indian Creek	1					
Lake Fork (Soldier Creek)	1				Total Dissolved Solids, Sedimentation/ Siltation	
Lake Fork River	1				TMDL: Total Dissolved Solids	
Lateral Number 5		1				
Midview Ditch		1				

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Alternative II-F (Agency-Preferred)						
Total	**27**	**302**	**6**	**1**	**7**	**2**
Argyle Creek	1					
Bear Creek	1					
Central Utah Canal			1			
Dripping Rock Creek		1				
East Twin Wash		1				
Green River	1					1
Hop Creek	1					
Indian Creek	1					
Lake Fork (Soldier Creek)	1				Total Dissolved Solids, Sedimentation/ Siltation	
Red Wash		1				
Sevier River	2					1
Sheep Creek	1					
Soldier Creek	5				Phosphorus, Sediment/Siltation	
Stinking Water Creek	1					
Tabbyune Creek	1					
Thistle Creek	1					

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region II						
Alternative II-A (Continued)						
Salt Creek[1]	1					
Sheep Creek	2	1				
Soldier Creek	1				Phosphorus, Sedimentation/ Siltation	
Stinking Water Creek	1					
Strawberry River	1					
Tanner Creek		1				
Thistle Creek	1					
Tie Fork	1					
Uinta River	1					
West Creek	1	2				
West Twin Wash		1				
Unnamed		287	38	3		
Alternative II-B (Continued)						
Little North Creek		2				
McDonald Creek		1				
Missouri Creek		1				
North Creek	1					
Pleasant Creek	3					
Price River	2					1
Red Wash		1				
San Pitch River	1					
Sevier River	2					1
Straight Fork	2	1				
Texas Creek		1				
Thompson Wash	1					
West Creek		1				
West Salt Creek	5	32			Sediment, Iron	
Westwater Creek		1				
Whetstone Creek		1				
Whiskey Creek		1				
White River (tributary Green River)	1					1
Unnamed		473	17	5		
Alternative II-C (Continued)						
Lost Creek	1					
McDonald Creek		1				
Meadow Creek	1					
Missouri Creek		1				
Muddy Creek	1					
Niotche Creek	1					
Piute Canal			1			
Quitchupah Creek	1				Benthic-Macroinvertebrate Bioassessments	
Red Wash		1				
Rock Canyon Creek		1				
Rocky Ford Canal			1			
Round Valley Creek		1	1			
Saleratus Creek	1					
Sevier River	2					2
Texas Creek		1				
Thompson Wash	1					
Vermillion Canal			1			
West Fork Eightmile Creek		1				
West Salt Creek	5	32			Sediment, Iron	
Westwater Creek		1				
Whiskey Creek		1				
Whisky Creek			1			
White River (tributary Green River)	1					1
Willow Creek (tributary Price River)	1					
Yogo Creek	1					
Unnamed		421	30	11		

[1] Salt Creek is classified as intermittent at this crossing by the NHD; however UDWR comments indicated it is perennial.

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region II						
Alternative II-D (Continued)						
Oak Creek		1				
Price River	1					
Red Wash		1				
San Pitch River	1					
Stinking Water Creek	1					
Summit Creek	1					
Tanner Creek		1				
Upper Huntington Creek	1					
West Creek		1				
West Twin Wash		1				
White Pine Fork	1					
White River (tributary Price River)	1					
Willow Creek (tributary Green River)	1				Benthic-Macroinvertebrate Bioassessments	
Unnamed		303	14	2		
Alternative II-E (Continued)						
Montes Creek	1					
Moon Lake Canal		1				
North Lateral C Canal		2				
Price River	2					
Red Wash		1				
Sheep Creek	1					
Soldier Creek	5				Phosphorus, Sediment/Siltation	
Sowers Creek	14	1			Total Dissolved Solids, Boron	
Stinking Water Creek	1					
Tanner Creek		1				
Thistle Creek	1					
Tie Fork	1					
Uinta River	1					
West Creek		1				
West Twin Wash		1				
Willow Creek (tributary Price River)	1					
Unnamed		332	25	4		
Alternative II-F (Agency-Preferred) (Continued)						
Tie Fork	1					
West Creek		1				
West Twin Wash		1				
White River (tributary Green River)	1					
White River (tributary Price River)	1					
Willow Creek (tributary Gree	1				Benthic-Macroinvertebrate Bioassessments	
Unnamed	6	297	5	1		

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region III						
Alternative III-A						
Total	**3**	**511**	**17**	**4**	**2**	**2**
Beaver Dam Wash	1					
Dan Sill Creek		1				
Gypsum Wash		2				
Halfway Wash		1				
Iron Springs Creek		1				
Lower Big Wash Reservoir				1		
Magotsu Creek	1					
Moscow Reservoir				1		
Moody Wash		1				
Muddy River	1				Iron, Temperature, Boron	1
Old River Bed			1			
Pinto Creek		1			Benthic-Macroivertebrate Bioassessments	
Sand Hollow Wash		2				
Sevier River		1				1
Spring Creek		1				
Toquop Wash		1				
Weiser Wash		1				
Unnamed		498	16	2		
Alternative III-B						
Total	**5**	**421**	**20**	**3**	**1**	**2**
Clover Creek[2]	1	2				
East Pass Wash		1				
East Pine Wash		1				
Gold Springs Wash		1				
Gypsum Wash		2				
Halfway Wash		1				
Lower Big Wash Reservoir				1		
Meadow Valley Wash	1					
Moscow Reservoir				1		
Mud Springs Wash	1					
Muddy River	1				Iron, Dissolved Oxygen, Temperature, Phosphorous,	1
Old Channel Sevier River		2				
Old River Bed			1			
Sams Camp Wash	1	1				
Sevier River		1				1
Toquop Wash		1				
Weiser Wash		1				
Unnamed		407	19	1		
Alternative III-C (Agency Preferred)						
Total	**0**	**491**	**21**	**3**	**0**	**2**
Buckboard Wash		1				
Cedar Wash		1				
Cottonwood Wash		1				
Delamar Wash		1				
Gold Springs Wash		1				
Gypsum Wash		1				
Helene Wash		1				
Jumbo Wash		1				
Kane Springs Wash		2				
Lower Big Wash Reservoir				1		
Meadow Valley Wash		1				
Miller Spring Wash		3				
Monkey Wrench Wash		1				
Moscow Reservoir				1		
Old River Bed			1			
Pahranagat Wash		4				1
Red Rock Wash		1				
Sevier River		1				1
Unnamed		470	20	1		

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region IV						
Alternative IV-A (Agency-Preferred)						
Total	**1**	**65**	**1**	**0**	**1**	**0**
Gypsum Wash		1				
Las Vegas Wash	1				Iron, Molybdemum; TMDL: Phosphorous, Ammonia, Chlorophyll-a	
Unnamed		64	1			
Alternative IV-B						
Total	**3**	**48**	**5**	**0**	**1**	**0**
Boulder City Lateral			2			
Gypsum Wash		3				
Hemenway Wash	2					
Las Vegas Wash[3]	1				Iron, Molybdemum; TMDL: Phosphorous, Ammonia, Chlorophyll-a	
Lava Butte Wash		1				
Unnamed		44	3			
Alternative IV-C						
Total	**2**	**49**	**4**	**0**	**1**	**0**
Boulder City Lateral			1			
Gypsum Wash		3				
Hemenway Wash	1					
Las Vegas Wash[3]	1				Iron, Molybdemum; TMDL: Phosphorous, Ammonia, Chlorophyll-a	
Lava Butte Wash		1				
North Fork Quail Wash		1				
Quail Wash		1				
Unnamed		43	3			

[2] Clover Creek is classified as intermittent at all crossings by the NHD; however NDOW comments indicated the downstream-most crossing is perennial.

[3] Las Vegas Wash ends upstream of this crossing according to the NHD; however the attributes of the upstream segments of the drainage have been adoped at this crossing also.

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide	Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region II													
Emma Park Alternative Variation							**Comparable Portion of Alternative II-F**						
Total	**10**	**16**	**0**	**0**	**0**	**0**	**Total**	**2**	**15**	**0**	**0**	**0**	**0**
Dry Fork		1					Argyle Creek		1				
Horse Creek	1						Bear Creek	1					
Kyune Creek	1						Tabbyune Creek	1					
Minnie Maud Creek	1						Unnamed		14				
Right Fork Kyune Creek	1												
Tabbyune Creek	1												
West Fork Willow Creek	2												
Willow Creek	1												
Unnamed	2	15											
Region III													
Ox Valley East Alternative Variation							**Comparable Portion of Alternative III-A**						
Total	**1**	**29**	**0**	**0**	**0**	**0**	**Total**	**2**	**30**	**0**	**1**	**0**	**0**
Bullrush Creek		2					Dan Sill Creek		1				
Spring Creek	1						Magotsu Creek	1					
Twin Spring Creek		1					Spring Creek		1				
Unnamed		26					Unnamed	1	28		1		
Ox Valley West Alternative Variation							**Comparable Portion of Alternative III-A**						
Total	**1**	**33**	**0**	**0**	**0**	**0**	**Total**	**2**	**30**	**0**	**1**	**0**	**0**
Bullrush Creek		2					Dan Sill Creek		1				
Spring Creek	1						Magotsu Creek	1					
Twin Spring Creek		1					Spring Creek		1				
Unnamed		30					Unnamed	1	28		1		
Pinto Alternative Variation							**Comparable Portion of Alternative III-A**						
Total	**7**	**57**	**0**	**0**	**1**	**0**	**Total**	**2**	**57**	**2**	**1**	**0**	**0**
Little Pinto Creek		1					Dan Sill Creek		1				
Magotsu Creek	1						Magotsu Creek	1					
Mahogany Creek		1					Pinto Creek		1		1		
Pinto Creek	4				Benthic-Macroivertebrate Bioassessments		Spring Creek		1				
Santa Clara River	2						Unnamed	1	54	2			
Unnamed		55											
Region IV													
Marketplace Alternative Variation							**Comparable Portion of Alternative IV-A**						
Unnamed		6					Unnamed		3				

Waterbody Name	Perennial	Intermittent	Canal/ Ditch	Reservoir/ Lake	Cause of Impairment (if applicable)	Floodplain over 1000-feet-wide
Region I						
Mexican Flats Alt Connector						
Total	**1**	**18**	**0**	**0**	**1**	**0**
Muddy Creek		1			TMDL: Physical Alternations	
Unnamed	1	17				
Fivemile Point South Alt Connector						
Total	**0**	**4**	**0**	**0**	**0**	**0**
Unnamed		4				
Baggs Alt Connector						
Total	**1**	**24**	**0**	**0**	**0**	**1**
East Fork Cherokee Creek		1				
Muddy Creek	1					1
Sand Creek		1				
Unnamed		22				
Fivemile Point North Alt Connector						
Total	**1**	**5**	**0**	**0**	**0**	**0**
Cottonwood Creek		1				
Muddy Creek	1					
Unnamed		4				
Region II						
Highway 191 Alt Connector						
Total	**3**	**6**	**0**	**0**	**0**	**0**
Willow Creek	3					
Unnamed		6				
Lynndyl Alt Connector						
Total	**0**	**33**	**12**	**0**	**0**	**0**
Unnamed		33	12			
Castle Dale Alt Connector						
Total	**0**	**14**	**2**	**0**	**0**	**0**
Cottonwood Creek Huntington Canal			1			
Unnamed		14	1			
IPP East Connector						
NONE						
Price Alt Connector						
Total	**4**	**29**	**0**	**0**	**0**	**0**
Miller Creek	1					
Serviceberry Creek		1				
Unnamed	3	28				
Region III						
Avon Alt Connector						
NONE						
Moapa Alt Connector						
Unnamed		27				
Region IV						
Sunrise Mountain Alt Connector						
Total	**0**	**4**	**0**	**0**	**0**	**0**
Gypsum Wash		1				
Unnamed		3				
River Mountain Alt Connector						
Total	**1**	**8**	**1**	**0**	**0**	**0**
Boulder City Lateral			1			
Hemenway Wash	1					
Unnamed		8				
Lake Las Vegas Alt Connector						
Total	**0**	**8**	**1**	**0**	**0**	**0**
Unnamed		8	1			
Railroad Pass Alt Connector						
Total	**0**	**4**	**0**	**0**	**0**	**0**
Unnamed		4				
Three Kids Mine Alt Connector						
Total	**0**	**8**	**0**	**0**	**0**	**0**
Unnamed		8				

Appendix G
Biological Resources

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
PLANTS						
Mussentuchit gilia	*Aliciella tenuis (Gilia tenuis)*	BLM-UT	Range: Endemic to Emery, Sevier, and Wayne Counties, Utah, along the western slope of the San Rafael Swell. Total population estimated at approx. 15,400 individuals. Habitat: Typically associated with communities composed of shadscale, *Ephedra, Wyethia,* Indian ricegrass, pinyon-juniper and mountain mahogany on fine-textured, pale, poorly cemented limestone. Often on the Curtis Formation, as well as the Dakota and Navajo Sandstone. Elevation range 5,200 to 7,100 feet amsl. Flowering May to June.	Region II: Moderate. Populations have been documented approx. 9 miles south of the 2-mile transmission line corridor in Sevier County; and approx. 11 miles southeast of the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present within the 2-mile transmission line corridors in Sevier and Emery counties, Utah.	No.	NatureServe 2012; UNPS 2006.
Chatterley onion	*Allium geyeri* var. *chatterleyi*	USFS-Manti-LaSal NF	Range: Endemic to San Juan County, Utah. Habitat: Pinyon-juniper, mountain mahogany, and ponderosa pine-manzanita communities. Elevation range 6,600 to 8,200 feet amsl. Flowering late June to early August.	None.	Yes. The species is endemic to San Juan County, Utah, which is not crossed by the 2-mile transmission line corridor.	UNPS 2006.
Jones' blue star	*Amsonia jonesii*	BLM-CO	Range: Known from the Four Corners states: Utah, New Mexico, Arizona, and Colorado (Mesa and Montezuma counties). No population estimates available. Habitat: Dry, open areas with clay, sandy, or gravelly soils in desert steppe, rocky gorges, and canyons. Elevation range 4,500 to 5,000 feet amsl. Flowering April.	Region II: High. The species has been documented within the 2-mile transmission line corridor and approx. 2 miles southeast of the 2-mile transmission line corridor in Mesa County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Mesa County, Colorado.	No.	CNHP 2002; NatureServe 2012.
Sweet-flowered rock jasmine	*Androsace chamaejasme* ssp. *carinata*	USFS-Manti-LaSal NF	Range: This species is known in Alaska and western Canada south to New Mexico in Utah, Wyoming, and Colorado. In Utah, the species is found in the LaSal Mountains in Grand and San Juan counties, Utah. Habitat: Alpine tundra, montane rock crevices, rocky soils derived from limestone dolomite. The species may occur in clearings or beneath shrub cover in leaf litter. Elevation range 10,000 to 12,600 feet amsl. Flowering May to July.	None.	Yes. Although known populations are present approx. 28 miles south of the 2-mile transmission line corridor, the species occurs at a higher elevation than that crossed by the 2-mile transmission line corridor within Grand County, Utah. The project does not cross San Juan County, Utah. As such, it is unlikely the species would be present within the 2-mile transmission line corridors.	UNPS 2006; Fertig et al. 1994; Graham and Ackerfield 2008.
Rough angelica	*Angelica scabrida*	BLM-NV	Range: Endemic to the Spring Mountains within Clark County, Nevada. Habitat: An aquatic or wetland-dependent species occupying moist rocky calcareous drainages, canyon bottoms, or seepy or north-facing slopes over carbonate or sandstone rock in the interior chaparral, mountain brush, and montane coniferous forest zones. Elevation range 4,040 to 9,350 feet amsl. Flowering July to September.	None.	Yes. The species is endemic to the Spring Mountains which are not crossed by the 2-mile transmission line corridors.	NNHP 2001; NatureServe 2012.
Meadow pussytoes	*Antennaria arcuata*	BLM-WY	Range: Regional endemic found in three disjunct areas in south-central Idaho, northeastern Idaho, and central Wyoming. In Wyoming, the species is known only from the Sweetwater River Valley and the South Pass area of the southern Wind River Range in the vicinity of Atlantic City and Jeffrey City (Fremont County) and from the northern Green River Basin (Sublette County). Total population estimated at approx. 99,000 to 130,000 individuals among 15 populations. Habitat: Primarily found in subirrigated meadows within broad stream channels. Typically associated species include *Deschampsia cespitosa, Juncus balticus, Poa pratensis, P. nevadensis* on hummocks, and level ground or shallow depressions on alkaline, clayey soils high in organic matter. Elevation range 4,950 to 7,900 feet amsl. Flowering July to September.	Region I: Low. Although species presence has not been documented within the 2-mile transmission line corridors, a WYNDD model-detailed analysis indicates the potential for occurrence within Sweetwater and Carbon counties, Wyoming.	No.	BLM 2012a; NatureServe 2012; WYNDD 2009.
Sticky ringstem	*Anulocaulis leiosolenus* var. *leiosolenus*	NPS-Lake Mead NRA; BLM-NV	Range: Known within Nevada, Arizona, northern Texas, and Mexico. Habitat: Found on calcareous clays and shales, sometimes on gypsum substrates. Elevation range 1,300 to 3,940 feet amsl. Flowering late spring-early fall.	Regions III and IV: The species has been documented within the 2-mile transmission line corridor in Clark County, Utah. Potential habitat may be present both within the 2-mile transmission line corridors and the analysis area in Clark County, Nevada. Based on agency consultation, this species is not likely to occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA.	No.	NPS 2012; NatureServe 2012; Southwest Environmental Information Network 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Atwood's columbine	*Aquilegia atwoodii*	BLM-UT	Range: Restricted in distribution to a couple of tributaries of the Green River in the Uintah County portion of Desolation Canyon including Rattlesnake Canyon within the Desolation Canyon Wilderness Study Area. Habitat: Habitat parameters are unknown.	None.	Yes. The species is restricted to the Desolation Canyon Wilderness Study Area which is not crossed by the 2-mile transmission line corridors.	BLM 2011.
Desolation Canyon columbine	*Aquilegia descolaticola*	BLM-UT	Range: Known within Desolation Canyon in Grand and Uintah counties, Utah. Habitat: Seeps and adjacent moist sandy soil in the Price River Formation along the Green River in canyons tributary to Desolation Canyon. Elevation range 4,265 to 4,430 feet amsl. Flowering period unknown.	None.	Yes. Based on the species limited elevation range and geological substrate, potential habitat is not present within the 2-mile transmission line corridors.	BLM 2011; NatureServe 2012.
Link Trail columbine	*Aquilegia flavescens* var. *rubicunda*	USFS-Manti-LaSal NF	Range: Endemic to the mountains of Emery, Garfield, and Sevier counties, Utah. Most of the documented occurrences are located within the Manti-La Sal National Forest; a few occurrences are located within the Fishlake National Forest. Habitat: Ponderosa pine, aspen, and spruce-fir communities, generally associated with seeps in Mesa Verde Group sandstones near coal measures. Associated species include river birch, Douglas fir, rose, serviceberry, willow, squawbush, and rock spirea. Elevation range 6,900 to 8,500 feet amsl. Flowering period unknown.	Region II: Moderate. The species has been documented approx. 4 miles northeast and approx. 6 miles southwest of the 2-mile transmission line corridor in Emery County; and approx. 4.5 miles north of the 2-mile transmission line corridor in Sevier County, Utah.Potential habitat for the species (including the presence of the Mesa Verde Group sandstone) may be present within the 2-mile transmission line corridor in Emery County, Utah within the USFS-Manti-LaSal NF.	No.	UNPS 2006; NatureServe 2012;
Graham columbine	*Aquilegia grahamii*	USFS-Ashley NF	Range: Endemic to the eastern Uinta Mountains, Uintah County, Utah. Habitat: Sandy drip lines in hanging gardens of shaded canyons of the Weber Sandstone Formation. Elevation range 7,600 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to the Uinta Mountains, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Laramie columbine	*Aquilegia laramiensis*	BLM-WY	Range: Endemic to the Laramie Range of southeast Wyoming within Albany and Converse counties. Habitat: Relatively poor soils on sparsely vegetated outcrops of igneous and metamorphic rock and small, shaded ledges, large crevices, soil pockets among boulders, and the bases of outcrops. Elevation range 5,400-10,100 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to Albany and Converse counties, which are not crossed by the 2-mile transmission line corridors.	WYNDD 2010-2012.
Utah columbine	*Aquilegia scopulorum* var. *goodrichii*	BLM-UT	Range: Resticted to shale ridges of the West Tavaputs Plateau. Known from Avintaquin drainage east to Argyle drainage in southern Duchesne County, Utah. Habitat: Shale ridges within the Green River Formation. Species inhabits high elevation ranges. Flowering period unknown.	Region II: High. The species has been documented within the 2-mile transmission line corridor within Duchesne County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area within Duchesne County, Utah.	No.	BLM 2011.
Park rockcress	*Arabis fernaldiana* var. *fernaldiana (Arabis vivariensis)*	BLM-UT, BLM-CO	Range: Endemic to Uintah County, Utah and Moffat County, Colorado. In Utah, it is found in Dinosaur National Monument, on Diamond Mountain, and on Cliff Ridge and Blue Mountain. Habitat: Mixed desert shrub and pinyon-juniper communities in limestone and sandstone outcrops within the Weber Formation often found in pine duff in shaded areas. Elevation range 5,000 to 6,000 feet amsl. Flowering April/May to early June.	Low.	Yes. Although the species has been documented approx. 1.5 miles west of the 2-mile transmission line corridor in Uintah County, Utah, it is unlikely the species would occur within the2-mile transmission line corridors based on the species limited distribution geographic range and associated geological formation.	BLM 2010, 2008; CNHP 2002; NatureServe 2012; UGS 2010; UNPS 2006.
UNK	*Arabis goodrichii*	BLM-UT	Range: Known within Millard County, Utah. Habitat: Mountain mahogany vegetation communities on talus slopes.	Region II: Low. No known populations have been identified for the species; limited data is available regarding habitat requirements. Although unlikely, potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area throughout Millard County, Utah.	No.	BLM 2011.
Small rockcress	*Arabis pusilla*	BLM-WY	Range: Endemic to the southern South Pass area of the Wind River Range in Fremont County, Wyoming. Habitat: Sparsely vegetated granite-pegmatite outcrops where coarse soil has accumulated in cracks and crevices. Elevation approx. 7,709 feet amsl. Flowering May to June.	None.	Yes. The species is endemic to Fremont County, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Las Vegas bearpoppy	*Arctomecon californica*	NPS-Lake Mead NRA; NV State CE, BLM-NV	Range: Known within Clark County, Nevada and also in Arizona and Utah. Habitat: Open, dry, spongy or powdery, often dissected, "badland", or hummocked soils with high gypsum content, often with well-developed soil crust, in areas of generally low relief on all aspects and slopes, with a sparse cover of other gypsum-tolerant species surrounded by *Larrea tridentata, Atriplex*, and *Coleogyne ramosissima*. Elevation range 1,060 to 3,642 feet amsl. Flowering April to May.	Regions III and IV: High. The species has been documented within, and adjacent to, the NPS-Lake Mead NRA and 2-mile transmission line corridors in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area throughout Clark County, Nevada.	No.	NNHP 2001; NPS 2012; USFWS 2010a.
Dwarf bearpoppy	*Arctomecon humilis*	FE (UT)	Range: Endemic to the eastern edge of the Mojave Desert near St. George, Utah in Washington County. This species occurs within the "Dixie Corridor", where the Mohave Desert floristic province meets the Colorado Plateau physiographic province. Habitat: Low, rolling hills and ridgetops composed of gypsiferous clay soils of the Triassic Moenkopi Formation in warm, open desert shrub communities. It is found predominantly on the Shnabkaib, and Middle and Upper Red members of the Moenkopi Formation. Elevation range 2,700 to 3,300 feet amsl. Flowering March to May.	Low.	Yes. Although the species has been documented approx. 11 miles southeast of the 2-mile transmission line corridor in Washington County, suitable habitat parameters (specifically elevation range and geological formation) are not present within the 2-mile transmission line corridor.	UNPS 2006; USFWS 2012a, 2010, 1985a.
White bearpoppy	*Arctomecon merriamii*	BLM-NV	Range: Known within Clark, Lincoln, and Nye counties, Nevada and also in California. Habitat: On a wide variety of dry to sometimes moist basic soils, including alkaline clay and sand, gypsum, calcareous alluvial gravels, and carbonate rock outcrops. Elevation range 2,000 to 6,280 feet amsl. Flowering spring.	Regions III: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Lincoln County, Nevada. Region IV: Moderate. The species has been documented approx. 20 miles west of the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark County, Nevada.	No.	NNHP 2001; NatureServe 2012.
Petiolate wormwood	*Artemisia campestris ssp. borealis var. petiolata*	USFS-Ashley NF	Range: Known only from the Uinta Mountains in Daggett and Duchesne counties, Utah. Habitat: Ponderosa pine-lodgepole pine-*Arcotostaphylos* community. Elevation range: 8,900 feet amsl. Flowering July to August.	None.	Yes. The species is endemic to the Uinta Mountains, which are not crossed by the 2-mile transmission line corridors.	UNPS 2006; NatureServe 2012.
Eastwood milkweed	*Asclepias eastwoodiana*	BLM-NV	Range: Known within Esmeralda, Lander, Lincoln, and Nye counties, Nevada. Habitat: In open areas on a wide variety of basic (pH usually 8 or higher) soils, including calcareous clay knolls, sand, carbonate or basaltic gravels, or shale outcrops, generally barren and lacking competition, frequently in small washes or other moisture-accumulating microsites, in the shadscale, mixed-shrub, sagebrush, and lower pinyon-juniper zones. Elevation range 4,680 to 7,080 feet amsl. Flowering May to June.	Region III: Moderate. The species has been documented approx. 10 miles north of the 2-mile transmission line corridor in Clark County, Nevada. Based on elevation range and soil substrate, potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area within Clark County, Nevada.	No.	NNHP 2001.
Barneby woody aster	*Aster kingii* var. *barnebyana*	USFS – Fishlake NF; USFS-Uinta-Wasatch-Cache NF	Range: Endemic to the Canyon Mountains in Juab and Millard counties, Utah. Habitat: Mountain mahogany-oak communities on shaded, low outcrops of Precambrian quartzite. Known within precipitous, somewhat protected locations. Elevation range 6,000 to 9,460 feet amsl. Flowering August to September.	Low.	Yes. Although the species has been documented approx. 2 miles west of the 2-mile transmission line corridor in Millard County, Utah; and approx. 4.5 miles north of the 2-mile transmission line corridor in Juab County, Utah, habitat model results indicate lack of potential habitat within the 2-mile transmission line corridors in Millard and Juab counties, Utah.	UNPS 2006; NatureServe 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Shivwitz milkvetch	*Astragalus ampullarioides*	FE (UT)	Range: Endemic to the Mojave Desert and the vicinity of St. George, Utah within Washington County. Six populations are located in the vicinity of St. George, Utah. Habitat: Warm desert shrub, creosote bush, and juniper communities on purple-hued patches of soft clay typically associated with Petrified Forest member of the Chinle Formation. Elevation range 3,018 and 4,363 feet amsl. Flowering May to June.	Region III: Moderate. The species has been documented approx. 4 miles southeast of the 2-mile transmission line corridor in Washington County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area within Washington County, Utah.	No.	UNPS 2006; USFWS 2012a, 2006.
Gumbo milkvetch	*Astragalus ampullarius*	BLM-UT	Range: Restricted to Kane and Washington counties, Utah, and Mohave and Coconino counties, Arizona. Habitat: Restricted habitat of clay, saline, seleniferous soils of the Chinle and Moenkopi formations. Typically found in mixed desert shrub and juniper communities. Elevation range 3,200 to 5,400 feet amsl. Flowering April to May.	Low.	Yes. Based on the presence of suitable geological formations and elevation range, potential habitat may be present within Washington County, Utah; however, it is unlikely the species would be found within the 2-mile transmission line corridors.	UNPS 2006.
Cushion milkvetch	*Astragalus aretoides*	BLM-CO	Range: Known within Moffat County, Colorado, and also in Utah and Wyoming. Habitat: Habitat information is not available for this species.	Regions I and II: Low. No known populations have been identified within the 2-mile transmission line corridors or analysis area. Since habitat characteristics are unavailable for this species, it is unknown if potential habitat may be present within the 2-mile transmission line corridor or analysis area. A conservative estimate was applied, assuming the presence of potential habitat within Moffat County, Colorado.	No.	NatureServe 2012.
Dana milkvetch	*Astragalus argophyllus* var. *stocksii (Astragalus henrimontanensis)*	USFS-Dixie NF	Range: Endemic to the Henry Mountains and Aquarious Plateau in Garfield and San Juan counties, Utah. Habitat: Mixed conifer, aspen, ponderosa pine, pinyon-juniper, and sagebrush communities on gravelly loam soil. Elevation range 7,200 to 9,200 feet amsl. Flowering April to May.	None.	Yes. The species is endemic to Garfield and San Juan counties, Utah, which are not crossed by the 2-mile transmission line corridors.	UNPS 2006; NatureServe 2012.
Torrey milkvetch	*Astragalus calycosus* var. *monophyllidius*	BLM-NV	Range: Known within Clark, Elko, Eureka, Lincoln, and Nye counties, Nevada; and also in Utah in the following watersheds: White, Muddy, Meadow Valley Wash, Pilot-Thousand Springs, Diamond-Monitor Valleys, Ralston-Stone Cabin Valleys, and Hot Creek Railroad Valleys. Habitat: Elevation range 5,350 to 7,465 feet amsl.	Region III: Moderate. The species has been documented approx. 4 miles west and south of the 2-mile transmission line corridor in Lincoln County, Nevada. Potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Lincoln County, Nevada.	No.	NNHP 2001; NatureServe 2012.
Bicknell milkvetch	*Astragalus consobrinus*	USFS-Fishlake NF	Range: Restricted to central and south-central Utah in Emery, Garfield, Piute, Sevier, and Wayne counties. Habitat: Sagebrush-grassland, desert shrub, and pinyon-juniper communities on the Mancos Shale Formation, volcanic gravel, open gravelly, or sandy knolls, and barren stony hillsides. Elevation range 6,000 and 8,500 feet amsl. Flowering May to July.	Region II: Moderate. The species has been documented approx. 2 miles south of the 2-mile transmission line corridor in Emery County, Utah, and 9.5 miles south of the 2-mile transmission line corridor within the USFS-Fishlake NF in Sevier County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area within the USFS-Fishlake NF in Sevier County, Utah.	No.	NatureServe 2012; UNPS 2006.
Debeque milkvetch	Astragalus debequaeus	BLM-CO	Range: Endemic to the Colorado River Valley near Debeque within Garfield and Mesa counties, Colorado. Total estimated population is 61,256 individuals from 17 documented occurrences. Habitat: Barren outcrops of dark clay interspersed with layers of sandstone on varicolored, fine textured, seleniferous, saline soils of the Wasatch Formation-Atwell Gulch Member. Elevation range 5,100 to 6,400 feet amsl. Flowering late April to May.	Region II: Low. The species has been documented approx. 35 miles east of the 2-mile transmission line corridor in Garfield and Mesa counties, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Mesa County, Colorado.	No.	CNHP 2002; NatureServe 2012.
Deseret milkvetch	*Astragalus desereticus*	FT (UT)	Range: Endemic to central Utah. Known from one population of 5,000 to 10,000 individuals found near the town of Birdseye, Utah. Habitat: Open to sparse juniper-sagebrush community on open, steep, naturally disturbed south and west (rarely north) facing slopes of sandy-gravelly soils of the Moroni Formation dominated by pinyon pine and Utah juniper. Elevation range 5,400 to 5,700 feet amsl. Flowering May and June.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Utah County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Utah County, Utah.	No.	USFWS 2012a, 2011a; UDWR 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Horseshoe milkvetch	*Astragalus desperatus* var. *neeseae (Astragalus equisolensis*)	BLM-UT	Range: Restricted to Uintah County, Utah and Mesa County, Colorado. In Uintah County, the species is found in scatter locations in the vicinity of Horseshoe Bend along the Green River. Habitat: Sagebrush, shadscale, horsebrush, and other mixed desert and salt desert shrub communities on sand-silty soils, river terrace sands and gravels, and ground level crevices of rock outcrops within the Duchesne River Formation. Elevation range 4,800 to 5,200 feet amsl. Flowering May to early June.	Regions I and II: High. The species has been documented within and approx. 1.5 miles north of the 2-mile transmission line corridors in Uintah County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Uintah County, Utah.	No.	BLM 2010; USFWS No Date; UNPS 2006; UNPS 2005.
Debris milkvetch	*Astragalus detritalis*	BLM-CO	Range: Endemic to the Uinta Basin in Duchesne and Uintah counties, Utah, and Rio Blanco and Moffat counties, Colorado. Habitat: Found in pinyon-juniper and mixed desert shrub communities associated with *Artemisia, Stipa, Phlox, Trifolium*, and cactus species. Often in rocky soils ranging from sandy clays to sandy loams, and on alluvial terraces with cobbles. Elevation range 5,400 to 7,200 feet amsl. Flowering late April to early June.	Regions I and II: High. The species has been documented within the2-mile transmission line corridors in Moffat and Rio Blanco counties, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Rio Blanco and Moffat counties, Colorado.	No.	CNHP 2002; NatureServe 2012.
Meadow milkvetch	*Astragalus diversifolius*	BLM-WY	Range: Known from central Idaho to northern Utah. In Wyoming, this species is known within the Great Divide Basin. Habitat: Moist, often alkaline meadows and swales in sagebrush valleys. Elevation range 4,400 to 6,300 feet amsl.	Region I: Moderate. The species has been documented approx. 10 miles northwest of the northern Separation Flat Ground Electrode Site and approx. 19 miles north of the 2-mile transmission line corridor in Sweetwater County, Wyoming. Potential habitat for the species may be present within the 2-mile transmission line corridor within Sweetwater County, Wyoming and at the northern Separation Flat Ground Electrode Site.	No.	WYNDD 2009.
Duchesne milkvetch	*Astragalus duchesnensis*	BLM-CO	Range: Endemic to the Uinta Basin, this species occurs in Daggett, Duchesne, and Uintah counties, Utah and in Moffat and Rio Blanco counties, Colorado. Habitat: Found in salt desert shrub and pinyon-juniper communities on sandy and gravelly pediments such as sandy mesas or around sandstone or shale outcrops. Elevation range 4,690 to 6,400 feet amsl. Flowering late July to June.	Regions I: Moderate. The species has been documented approx. 6 miles south of the 2-mile transmission line corridor in Rio Blanco County. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Moffat County, Colorado. Region II: High. The species has been documented within the 2-mile transmission line corridor in Rio Blanco County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Rio Blanco and Moffat counties, Colorado.	No.	BLM 2010; CNHP 2002; NatureServe 2012.
Veyo milkvetch	*Astragalus ensiformis* var. *gracilior*	BLM-NV	Range: Known within Lincoln County, Nevada; and also in Washington County, Utah. Habitat: Open washes, valley floors, and hillsides in clay soils within pinyon-juniper and sagebrush communities. Elevation range 4,200 to 5,000 feet amsl. Flowering period unknown.	Region III: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. Potential habitat may be present both within the 2-mile transmission line corridors and the analysis area in Lincoln County, Nevada.	No.	NatureServe 2012.
Needle Mountains milkvetch	*Astragalus eurylobus*	BLM-NV	Range: Known within Lincoln and Nye counties, Nevada and also in Arizona and Utah. Habitat: Generally deep, barren, sandy, gravelly, or clay soils derived from sandstone or siliceous volcanics, frequently in or along drainages. Elevation range 4,600 to 5,750 feet amsl. Flowering late spring.	Region III: High. The species has been documented within the 2-mile transmission line corridor` in Lincoln County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Black woollypod	*Astragalus funereus*	BLM-NV	Range: Known within Clark, Lincoln, and Nye counties, Nevada. Habitat: Dry, open scree, talus, or gravelly alluvium derived from light-colored volcanic tuff, on east, south, less commonly west, and rarely north aspects. Elevation range 3,200 to 7,680 feet amsl. Flowering period unknown.	Regions III and IV: Low. Based on elevation range and soil substrate, potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark and Lincoln counties, Nevada.	No.	NatureServe 2012; NNHP 2001.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Threecorner milkvetch	*Astragalus geyeri* var. *triquetrus*	NPS-Lake Mead NRA; NV State CE, BLM-NV	Range: Known within Clark and Lincoln counties, Nevada and also in Arizona. Habitat: Dependent on sand dunes or deep sand in Nevada, this species occupies open, deep sandy soil, generally stabilized by vegetation and/or a gravel veneer. Elevation range 1,100 to 2,400 feet amsl. Flowering late winter to early spring.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark County, Nevada. Based on agency consultation and habitat parameters, this species is not likely to occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA.	No.	NNHP 2001; NPS 2012: USFWS 2010a.
Gilman milkvetch	*Astragalus gilmanii*	BLM-NV	Range: Known within Lincoln County, Nevada and also in California. Habitat: On light-colored volcanic tuff slopes in pinyon-juniper woodland communities. Elevation range 5,380 to 6,000 feet amsl. Flowering May.	Region III: Low. Based on elevation range and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Hamilton milkvetch	*Astragalus hamiltonii*	FE (UT); BLM-UT	Range: Largely confined to the Duchesne River Formation between the towns of Tridell, Lapoint, and Vernal, in Uintah County, Utah. Habitat: Found on benches and steep slopes of red, erosive, sandy clay loam soils of the Duchesne River Formation in juniper and desert shrub communities. Elevation range 4,900 to 6,200 feet amsl. Flowering period May to June.	Region II: Moderate. The species has been documented approx. 7 miles north of the 2-mile transmission line corridor in Uintah County, Utah. Potential habitat for the species may be present both within the 2-mile wide corridors and outside analysis are in Uintah County, Utah.	No.	BLM 2011, 2010, 2008; USFWS 2012a, 2011b; UNPS 2006.
Holmgren milkvetch	*Astragalus holmgreniorum*	FE (UT)	Range: Typically found in areas that drain to the Santa Clara and Virgin rivers. Six documented populations are located within ten miles of St. George, Utah in Washington County, Utah. Habitat: Skirt edges of small and large hill and plateau formations worn by water erosion, slightly above or at the edge of intermittent drainages. Most often the species is found on Virgin River limestone cobble and Upper Red members of the Moenkopi Formation in warm desert shrub communities on gravelly clay hills. Elevation range 2,700 to 3,000 feet amsl. Flowering April to May.	None.	Yes. The species occurs at a lower elevation than that crossed by the 2-mile transmission line corridors within the species-specific geologic formations in Washington County, Utah.	NatureServe 2012; UNPS 2006; USFWS 2012a, 2006.
Iselyi's milkvetch	*Astragalus iselyi*	BLM-UT	Range: Extremely narrow endemic to Grand and San Juan counties, Utah known from three general areas astride the Grand-San Juan county line and a single disjunct location in Grand County. Habitat: Seleniferous and gypsiferous soils derived from the Morrison and Paradox formations in pinyon-juniper communities. Elevation range 5,000 to 6,595 feet amsl. Flowering late-March to May.	None.	Yes. The species is found on specific geologic formations that are not crossed by the 2-mile transmission line corridora within Grand County, Utah.	NatureServe 2012.
Starvling milkvetch	Astragalus jejunus var. jejunus (Astragalus jejunus)	BLM-CO	Range: Known within Moffat County, Colorada; and also in, Idaho, Nevada, Utah, and Wyoming. No population estimates available. Habitat: Sagebrush and sagebrush-juniper communities often on dry hilltops, gullied bluffs, barren ridges, river terraces, and windswept ridgetops. Substrate is typically tuff, shale, sandstone, or clays. Elevation range 5,500 to 7,500 feet amsl. Flowering May to July.	Regions I and II: Low. Although populations were not identified, potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Moffat County, Colorado.	No.	NatureServe 2012.
Straw milkvetch	*Astragalus lentiginosus* var. *stramineus*	BLM-NV	Range: Locally restricted within the Upper Virgin and Lower Virgin watersheds in Clark and Lincoln counties, Nevada; and Washington County, Utah. Habitat: Sandy and gravelly flats and dunes. Elevation range 2,000 to 3,000 feet amsl. Flowering period unknown.	Region III: Moderate. The species has been documented approx. 1.5 miles east of the 2-mile transmission line corridor `in Lincoln County, Nevada. Potential habitat may be present both within the 2-mile transmission line corridors and the analysis area in Lincoln and Clark counties, Nevada.	No.	NatureServe 2012; NNHP 2001.
Navajo Lake milkvetch	*Astragalus limnocharis var. limnocharis*	USFS-Dixie NF	Range: Endemic to southwestern Utah in Iron and Kane counties. Habitat: Lake shores and limestone breaks on Pink and White Limestone members of the Claron Formation, on shore of Navajo Lake or with western bristlecone pine communities. Elevation range 8,800 and 10,000 feet amsl. Flowering July to September.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors in Iron and Kane counties, Utah.	UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Heliotrope milkvetch/ Table Cliff milkvetch	*Astragalus limnocharis var. montii (Astragalus montii/ Astragalus limnocharis var. tabulaeus)*	FT (UT), USFS-Dixie NF	Range: Endemic to the southern Wasatch Plateau on Ferron, Heliotrope, and White mountains in Sanpete and Sevier counties, Utah. Habitat: High elevation, subalpine mixed grass-forb plant communities at timberline with shallow and poorly developed soils found in shallow, very rocky soils derived from the Flagstaff Geological Formation (limestone). Elevation range 10,500 to 11,000 feet amsl. Flowering mid June to August.	Low.	Yes. Although potential habitat may be present based on the limited presence of suitable elevation range, it is unlikely this species would occur within the 2-mile transmission line corridors given the species narrow and limited geographic range.	CPC 2010; NatureServe 2012; USFWS 2012a, 1995a; UNPS 2006.
Grand Junction milkvetch	*Astragalus linifolius*	BLM-CO	Range: Endemic to the eastern base of the Uncompahgre Plateau in Delta, Mesa, and Montrose, counties Colorado. Total population estimated at approx. 10,000 individuals between 21 known occurrences; however, population estimates have not been provided for all occurrences. Habitat: Pinyon-juniper and sagebrush communities on dry adobe hills and sandstone areas on the Chinle and Morrison formations. Elevation range 4,800 to 6,200 feet amsl. Flowering late May to June.	None.	Yes. The species is endemic to the Chinle and Morrison formations, which are not crossed by the 2-mile transmission line corridors in Mesa County, Colorado.	CNHP 2002; NatureServe 2012.
Loa milkvetch	*Astragalus loanus*	BLM-UT	Range: Endemic to central Sevier County, Utah. Habitat: Sagebrush and juniper communities on igneous gravels. Elevation range 6,300 to 6,800 feet amsl. Flowering May to early June.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Sevier County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Sevier County, Utah.	No.	NatureServe 2012; UNPS 2006.
Halfring milkvetch	*Astragalus mohavensis* var. *hemygyrus*	BLM-NV	Range: Known within Clark, Lincoln, and Nye counties, Nevada and also in California. Habitat: Carbonate gravels and derivative soils on terraced hills and ledges, open slopes, and along washes in the creosote-bursage, blackbrush, and mixed-shrub zones. Elevation range 3,000-5,600 feet amsl. Flowering April to June.	Regions III and IV: Moderate. Although known populations are present approx. 30 miles west of the 2-mile transmission line corridors in Clark County, Nevada; potential habitat is only present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Mokiak milkvetch	*Astragalus mokiacensis*	NPS-Lake Mead NRA; BLM-NV	Range: Known with Clark County, Nevada and also in Arizona and Utah. Habitat: Bluffs, cliff terraces, gullied badlands, disturbed areas along streams on sandy soils. Elevation range 2,460 to 5,020 feet amsl. Flowering April to June	Regions III and IV: Low. Based on elevation range, suitable vegetation cover types, and soil substrate, potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark County, Nevada. Based on agency consultation and habitat parameters, this species is not likely to occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA.	No.	NatureServe 2012; NPS 2012; NNHP 2001.
Ferron milkvetch	*Astragalus musiniensis*	BLM-CO	Range: Known within Mesa and Garfield counties, Colorado; and also in Utah. Habitat: Gullied bluffs, knolls, benches, and open hillsides in pinyon-juniper woodlands, sagebrush, or desert shrub communities, mostly on shale, sandstone, or alluvium derived from them. Elevation range 4,700 to 7,000 feet amsl. Flowering late April through early June.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Garfield and Mesa counties, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Garfield and Mesa counties, Colorado.	No.	CNHP 2002; NatureServe 2012.
Naturita milkvetch	*Astragalus naturitensis*	BLM-CO	Range: Known within Garfield, Mesa, Montezuma, Montrose and San Miguel counties, Colorado; and also in New Mexico, Utah, and the Navajo Nation. Habitat: Cracks and ledges of sandstone cliffs and flat bedrock area with some shallow soil development, within pinyon-juniper woodland communities. Elevation range 4,310 to 6,725 feet amsl. Flowering April to May.	Region II: Low. The species has been documented approx. 37 miles east of the 2-mile transmission line corridor in Mesa County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Mesa and Garfield counties, Colorado.	No.	CNHP 2002; NatureServe 2012.
Nelson's milkvetch	*Astragalus nelsonianus*	BLM-CO	Range: Regional endemic of southwest and central Wyoming, northeast Utah, and northwest Colorado. One, possibly extirpated population has been documented in Moffat County, Colorado. Habitat: Barren, alkaline flats, gullied bluffs, and bottomlands. Elevation range 6,400 to 7,000 feet amsl. Flowering period late May to August.	Region I: Moderate. The species has been documented approx. 2 miles northwest of the 2-mile transmission line corridor in Moffat County, Colorado. Potential habitat for the species may be present within the 2-mile transmission line corridor in Moffat County, Colorado.	No.	CNHP 2002; NatureServe 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Pink egg milkvetch (Long-calyx eggvetch)	*Astragalus oophorus* var. *lonchocalyx*	BLM-UT, BLM-NV	Range: Endemic to the Great Basin within Beaver, Iron, and Washington counties, Utah; and in Lincoln County, Nevada. Habitat: Pinyon-juniper, sagebrush, and mixed desert shrub communities. Elevation range 5,800 to 7,500 feet amsl. Flowering May.	Region III: High. The species has been documented within the 2-mile transmission line corridor in Iron County, Utah; adjacent to the 2-mile transmission line corridors in Iron, Washington, and Beaver counties, Utah; and within the 2-mile transmission line corridor on the Lincoln Co., Nevada-Iron Co., Utah border. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Iron County, Utah and Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001; UNPS 2006.
Ash Meadow milkvetch	*Astragalus phoenix*	BLM-NV	Range: Endemic to the Ash Meadows area in Nye County, Nevada. Habitat: Dry, hard, seasonally moist, white barren flats, washes, and knolls of calcareous alkaline soils with saltgrass, shadscale saltbush, Ash Meadows blazingstar, alkali goldenbush, and nakedstem sunray. Elevation range 2,200 to 2,350 feet amsl. Flowering period: spring.	None.	Yes. The species is endemic to the Ash Meadows, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Fisher Tower's milkvetch	*Astragalus piscator*	BLM-CO	Range: Known only from locations in close proximity to the Colorado River in Grand, San Juan, and Wayne counties, Utah and from the canyon of the Dolores River in Mesa County, Colorado. Habitat: Alluvial terraces (benches) along the Dolores River, in open areas with sandy, sometimes gypsiferous soils of valley benches and gullied foothills; also in disturbed sandy habitats along the road. Elevation range 4,300 to 5,600 feet amsl. Flowering late April to early June.	Low.	Yes. Although potential habitat may be present based on the presence of suitable elevation range, vegetation cover types, and soil substrate, it is unlikely this species would occur within the 2-mile transmission line corridors given the species-specific association to the Dolores River, which is outside of the 2-mile transmission line corridors.	CNHP 2002; NatureServe 2012.
Precocious milkvetch	*Astragalus proimanthus*	BLM-WY	Range: Narrow endemic within the southern Green River Basin, in southwestern Sweetwater County. It is restricted to 320 acres in the vicinity of McKinnon, Wyoming. Habitat: Typically found in cushion plant-bunchgrass communities in sparsely vegetated rims, and gullied upper slopes of benches, bluffs, and mesa-like ridges. Found on substrates derived from the Bridger Formation, and the Laney member of the Green River Formation. Elevation range 6,400 to 7,200 feet amsl. Flowering late April to mid June.	Low.	Yes. Although the species has been documented approx. 30 miles west of the2-mile transmission line corridor in Sweetwater County, Wyoming, it is unlikely the species would occur within the 2-mile transmission line corridors based on the lack of suitable habitat parameters.	Fertig & Welp 2001; WYNDD 2009.
Peabody milkvetch	*Astragalus pubentissimus (Astragalus pubentissimus* var. *peabodianus)*	BLM-UT	Range: Endemic to Emery and Grand counties, Utah. Habitat: Entrenched channels on the south and west flanks of the Tavaputs Plateau in pinyon-juniper and mixed desert shrub communities. Elevation range 4,300 to 5,800 feet amsl. Flowering May to early July.	Low.	Yes. Given the location of the Tavaputs Plateau in relation to the 2-mile transmission line corridors within Emery and Grand counties, Utah, it is unlikely that the species would be present within the 2-mile transmission line corridors in Emery and Grand counties, Utah.	BLM 2010; NatureServe 2012; UNPS 2006.
Trelease's milkvetch	*Astragalus racemosus* var. *treleasei*	BLM-WY	Range: Endemic to southwestern Wyoming; and Duchesne and Uintah counties in northeastern Utah. Found in the Green River Basin, the foothills of the Wyoming Range, and the Uinta Basin. Habitat: Eocene-Oligocene outcrops in the basins of Cenozoic lakes, Lake Gosiute, and Lake Uinta. In Wyoming, the species occurs on the Wasatch and Bridger Formations, on localized habitats of sparsely vegetated outwash flats and fluted Badland slopes. Elevation range unknown. Flowering June to July.	Region I: Low. Although species presence has not been documented within the 2-mile transmission line corridors, a WYNDD model-detailed analysis indicates the potential for occurrence within the 2-mile transmission line corridors in Sweetwater and Carbon counties, Wyoming.	No.	Heidel 2003; NatureServe 2012.
San Rafeal milkvetch	Astragalus rafaelensis	BLM-CO	Range: Endemic to the Navajo Basin within Emery, and less commonly, Grand counties, Utah; the Dolores River Valley in Montrose County, Colorado; and less commonly Mesa, and La Plata counties, Colorado. Habitat: Banks of sandy clay gulches, gullied hills, washes, talus under cliffs, in pockets at the foot of sandstone outcrops, or among boulders along dry watercourses. Substrates typically seleniferous clayey, silty or sandy. Elevation range 4,400 to 6,500 feet amsl. Flowering period late April to early June.	Region II: Low. No populations have been documented within or adjacent to the 2-mile transmission line corridors; however, although unlikely, potential habitat may be present within the 2-mile transmission line corridor in Mesa County, Colorado.	No.	CNHP 2002; NatureServe 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Spring Mountains milkvetch	*Astragalus remotus*	BLM-NV	Range: Endemic to the southeastern slopes of the Spring Mountains within Clark County, Nevada. Habitat: Rocky, gravelly, and/or sandy calcareous soils derived from carbonate or sandstone, in washes and drainages, or on hillsides or rocky ledges, within the zonal desert shrub or desert wash communities. Elevation range 3,400 to 7,050 feet amsl. Flowering April to early June.	None.	Yes. The species is endemic to the Spring Mountains, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Cisco milkvetch	*Astragalus sabulosus var. sabulosus*	BLM-UT	Range: Endemic to the Grand River Valley within Grand County, Utah. Habitat: Salt desert shrub communities on the Mancos Shale Formation. Elevation range 4,250 to 5,250 feet amsl. Flowering late March to May.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Grand County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Grand County, Utah.	No.	NatureServe 2012; UNPS 2006.
Stage Station milkvetch	*Astragalus sabulosus var. vehiculus*	BLM-UT	Range: Narrow endemic, known near head of Courthouse Wash within Grand County, Utah. Habitat: Shadscale, woody-aster, and galleta community on the Morrison Formation. Elevation range 4,500 to 4,800 feet amsl. Flowering April to May.	None.	Yes. The species is endemic to Courthouse Wash, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Escarpment milkvetch	*Astragalus striatiflorus*	BLM-UT	Range: Endemic to the Colorado Plateau within Kane and eastern Washington counties, Utah; and Coconino County, Arizona. Habitat: Interdune valleys, sandy depressions on ledges, and bars, and terraces in stream channels, in pinyon-juniper, ponderosa pine, and sandy desert shrub communities. Elevation range 4,900 to 6,600 feet amsl. Flowering May to June.	None.	Yes. The species is endemic to the Colorado Plateau within Kane and eastern Washington counties, Utah, which are not crossed by the 2-mile transmission line corridors.	UNPS 2006.
Currant milkvetch	*Astragalus uncialis*	BLM-NV	Range: Endemic to the Great Basin within Millard County, Utah; and Nye County, Nevada. Habitat: Found in shadscale and budsage communities in Utah, and sagebrush communities in Nevada. Substrate is dry alkaline soils derived from limestone on dry knolls and in gullies, often associated with ancient terraces of Pleistocene lakes. Elevation range 4,600 to 6,000 feet amsl. Flowering April to mid June.	None.	Yes. The species is endemic to Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001; UNPS 2006.
Welsh's milkvetch	*Astragalus welshii*	BLM-UT	Range: Endemic to Garfield, eastern Iron, Kane, Piute, and Wayne counties, Utah. Habitat: Restricted to igneous gravels, in sagebrush, pinyon-juniper, and sagebrush-aspen communities. Elevation range 6,560 to 9,220 feet amsl. Flowering May to early June.	None.	Yes. Although the associated vegetation cover types and geological substrate are present, the species occurs at a higher elevation that that crossed by the 2-mile transmission line corridors within Iron County, Utah.	NatureServe 2012; UNPS 2006.
Guard milkvetch	*Astragalus zionis* var. *vigulus*	USFS-Dixie NF	Range: Endemic to the east slope of the Pine Valley Mountains in Washington County, Utah. Habitat: Pinyon-juniper, mountain mahogany, and oak-manzanita communities. Elevation range 5,900 to 8,200 feet amsl. Flowering late April to late June.	None.	Yes. The species is endemic to the east slope of the Pine Valley Mountains, which are not crossed by the 2-mile transmission line corridor.	NatureServe 2012; UNPS 2006.
Pahrump silverscale	*Atriplex argentea* var. *longitrichoma*	BLM-NV	Range: Known only from the Pharump and Stewart valleys in southern Nye County, Nevada; and adjacent southeastern Inyo County, California. Habitat: Saline valley bottoms, open desert communities, roadways, and in agricultural fields with shrubby saltbush, creosote bush, mesquite, and annual weed species. Elevation range unknown. Flowering summer through fall.	None.	Yes. The species is endemic to Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	FNA 2001; NatureServe 2012.
Giant fourwing saltbush	*Atriplex canescens* var. *gigantea*	BLM-UT	Range: Found within Juab, Millard, and Tooele counties, Utah. Habitat: Sand dunes in interdune valleys or on the active, leeward dune margins with scurfpea, anomalous sunflower, and other sand-loving plant species. Elevation range 4,750 to 5,250 feet amsl. Flowering late June.	Region II: High. The species has been documented within the2-mile transmission line corridors in Juab and Millard counties, Utah. The only known population located in Jericho Dunes (i.e., Lynndyl Sand Dunes) is crossed by the 2-mile transmission line corridors. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Juab and Millard counties, Utah.	No.	CPC 2010; UNPS 2010.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Dainty moonwort	*Botrychium crenulatum*	USFS-Ashley NF, USFS-Uinta-Wasatch-Cache NF; BLM-NV	Range: Found within Cache, Juab, Summit, and Wasatch counties, Utah; and also known throughout western U.S. and Canada. Habitat: Wet, marshy and springy areas, such as marshy meadows, marsh edges, saturated soils of seeps, bottom and stabilized margins of small streams, and occasionally along roads and ditches where moist. Prefers areas with shade, and dense cover within the montane zone. Elevation at approx. 8,000 feet amsl. Fronds mature June to July.	Region II: Moderate. The species has been documented approx. 24 miles north of the2-mile transmission line corridor in Wasatch County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Utah, Juab, and Wasatch counties, Utah within the USFS-Uinta-Wasatch-Cache NF. Based on detailed habitat modeling, suitable habitat was not identified within the 2-mile transmission line corridors within the USFS-Uinta NF.	No.	NatureServe 2012; NNHP 2001; UNPS 2006.
Slender moonwort	*Botrychium lineare*	USFS-Ashley NF, USFS-Uinta-Wasatch-Cache NF	Range: Found within Duchesne and Salt Lake counties, Utah; and also in Alaska, California, Colorado, Idaho, Minnesota, Montana, Nevada, Oregon, and Washington, and Canada. Habitat: Typical habitat varies for the species. In Utah, it is normally found in grass-forb meadows, under trees in woods, and on shelves on limestone cliffs. Elevation range 4,900 to 6,600 feet amsl. Spores mature in late June or July.	Region II: Moderate. The species has been documented approx. 1 mile southeast of the 2-mile transmission line corridor in Duchesne County, Utah. Potential habitat for the species may be present within the 2-mile transmission line corridors within the USFS-Ashley NF in Duchesne County, Utah; and within the USFS-Uinta-Wasatch-Cache NF in Utah and Wasatch counties, Utah.	No.	NatureServe 2012; UNPS 2006.
Paradox moonwort	*Botrychium paradoxum*	USFS-Dixie NF	Range: Widely disjunct in Duchesne and Garfield counties in Utah; and in Montana, British Columbia, Alberta, and Saskatchewan. Total population estimates are unknown; however, the species is known from 21 to 80 occurrences. Habitat: In Utah, the species occur in open, moist, high elevation meadows. Elevation at approximately 10,800 feet amsl. Flowering July to August.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Duchesne and Garfield counties, Utah.	NatureServe 2012; UNPS 2006.
Alkali mariposa lily	*Calochortus striatus*	BLM-NV	Range: Known only within Nye and Clark counties, Nevada. Habitat: Moist, alkaline meadows around springs, creosote bush zone with *Distichlis spicata*, *Cleomella brevipes*, *Iva acerosa*, *Anemopsis californica*, and *Dodecatheon pulchellum*. Elevation range 2,100 to 3,700 feet amsl. Flowering April to June.	Regions III and IV: Moderate. The species has been documented approx. 14 miles west of the 2-mile transmission line corridors in Clark County, Nevada. Potential habitat for the species may be present within the 2-mile transmission line corridors in Clark County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Baird camissonia	*Camissonia bairdii*	BLM-UT	Range: Endemic to Washington County, Utah. Habitat: Blackbrush and pinyon-juniper communities. Elevation range 3,900 to 4,300 feet amsl. Flowering period unknown.	Region III: Moderate. The species has been documented approx. 0.25 mile southeast of the 2-mile transmission line corridor in Washington County, Utah. Potential habitat for the species may be present within the 2-mile transmission line corridor in Washington County, Utah.	No.	UNPS 2006.
Bolander's camissonia	*Camissonia bolanderi*	BLM-UT	Range: Narrowly restricted edaphic endemic to Emery County, Utah; known only from the upper Tidewell Draw in the San Rafael Desert. Habitat: Known only on the gypsiferous Triassic Moenkopi Formation, associated with *Atriplex* and *Ephedra*. Elevation of approximately 4,780 feet amsl.	None.	Yes. The species is endemic to the Triassic Moenkopi Formation which is not crossed by the 2-mile transmission line corridors in Emery County, Utah.	NatureServe 2012.
Gould camissonia	*Camissonia gouldii*	BLM-UT	Range: Known only from the volcanic cones north of St. George in Washington County, Utah, and from Mohave and Coconino counties, Arizona. Habitat: Volcanic ash cones in pinyon-juniper and big sagebrush communities. Elevation range 3,500 to 4,600 feet amsl. Flowering mid May to early July.	Region III: Moderate. The species has been documented approx. 9 miles southeast of the 2-mile transmission line corridor in Washington County, Utah. Potential habitat may be present within the 2-mile transmission line corridor in Washington County, Utah.	No.	UNPS 2006.
Aquarius paintbrush	*Castilleja aquariensis*	USFS-Dixie NF	Range: Endemic to south-central Utah on the Aquarius Plataea in Garfield and Wayne counties, Utah. Habitat: Sagebrush/mixed-forb meadow openings with *Ribes*, columbine, silver sagebrush, groundsel, yarrow, fescue, penstemon, and cinquefoil, in open spruce-fir stands. Elevation range 9,800 to 11,300 feet amsl. Flowering July to August.	None.	Yes. The species is endemic to Garfield and Wayne counties, Utah, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Tushar paintbrush	*Castilleja parvula* var. *parvula*	USFS-Dixie NF, USFS-Fishlake NF	Range: Endemic to Beaver, Garfield, and Piute counties, Utah. Habitat: Alpine ridgetops and talus slopes above timberline on tertiary igneous sandy gravel with Engelmann spruce, *Cymopterus*, *Happlopappus*, *Monardella*, and *Ribes*. Elevation range 10,000 to 12,000 feet amsl. Flowering July.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Beaver, Garfield, and Piute counties, Utah.	NatureServe 2012; UNPS 2006.
Reveal paintbrush	*Castilleja revealii (Castilleja parvula* var. *revealii*)	USFS-Dixie NF	Range: Endemic to southern Utah in Garfield, Kane, and Iron counties. Habitat: Ponderosa and bristlecone pine communities on gravelly soils of the Wasatch Limestone Formation. Elevation range 7,500 to 10,000 feet amsl. Flowering late June to August.	None.	Yes. The species occurs at a higher elevation and on different geologic formations than that crossed by the 2-mile transmission line corridors within Garfield, Kane, and Iron counties, Utah.	NatureServe 2012; UNPS 2006.
Monte Neva paintbrush	*Castilleja salsuginosa*	BLM-NV; NV State CE	Range: Endemic to Nevada; known within Eureka and White Pine counties. Habitat: An aquatic or wetland-dependent species occupying damp, open, alkaline to saline clay soils of hummocks and drainages on travertine hot spring mounds with *Sarcobatus vermiculatus, Chrysothamnus nauseosus,* and *Sporobolus airoides*. Elevation range 5,965 to 6,130 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to Eureka and White Pine counties, Nevada, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Spring-loving centaury	*Centaurium namophilum*	BLM-NV	Range: Endemic to the Ash Meadows area in Nye County, Nevada. Habitat: An aquatic or wetland-dependent species found in open, moist to wet, alkali-crusted clay soil of seeps, springs, outflow drainages, meadows, and hummocks with saltbush, goldenweed, mountain rush, yerba mansa, and boraxweed. Elevation range 2,100 to 2,350 feet amsl. Flowering in summer.	None.	Yes. The species is endemic to Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Foothills Palo verde	*Cercidium microphyllum*	NPS-Lake Mead NRA	Range: Mojave and Sonoran deserts of Arizona, California, and Baja Mexico. Habitat: Habitat parameters unknown.	None.	Yes. Based on agency consultation, it is unlikely this species would occur within the 2-mile transmission line corridors.	NPS 2012.
Virgin River thistle	*Cirsium mohavense*	BLM-NV	Range: Resticted to the Mohave Desert region in Nevada; and also in California and Arizona. Habitat: Moist, low canyons, streambanks, and poorly drained alkaline flats, seeps, and springs in the desert, associated with saltbush. Elevation range 1,394 to 5,988 feet amsl. Flowering in summer.	None.	Yes. The species is endemic to the Mohave Desert region of Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Ownbey's thistle	*Cirsium ownbeyi*	BLM-WY	Range: Endemic to the eastern flank of the Uinta Mountains in Daggett County and northern Uintah County, Utah; the Green River Basin on the east side of Flaming Gorge Reservoir in Sweetwater County, Wyoming; and Moffat County, Colorado. Habitat: Semi-barren rims or steep slopes of broken gray slate below shaley cliffs. Elevation range 6,440 to 8,200 feet amsl. Flowering June to August.	Region I: Low. Although the species has been documented approx. 54 miles west of the 2-mile transmission line corridors, potential habitat may be present both within the 2-mile transmission line corridors and the analysis area in Sweetwater and Carbon counties, Wyoming.	No.	CNHP 2002; BLM 2010; NatureServe 2012; UNPS 2006; WYNDD 2009.
Cedar Rim thistle	*Cirsium pulcherrimum* var. *aridum (Cirsium aridum)*	BLM-WY	Range: Endemic to the Green River Basin in Sublette County; Beaver Rim area in Fremont County; Sweetwater River Valley in Carbon County; and the east side of Flaming Gorge in Sweetwater County, Wyoming. Total population estimated at approx. 40,000 to 50,000 individuals. Habitat: Sparsely vegetated openings in Wyoming big sagebrush grasslands on barren chalky hills, gravelly slopes, fans and fine-textured sandy-shaley draws. Typically found on whitish-gray sandstone, chalk, tufaceous colluvium or clay substrates derived from the Split Rock, White River, Wagon Bed, Wind River, Green River, and Wasatch formations. Elevation range 5,800 to 7,500 feet amsl. Flowering June to July.	Region I: Low. Although the species has been documented approx. 54 miles west of the 2-mile transmission line corridors, potential habitat may be present both within the 2-mile transmission line corridors and the analysis area in Sweetwater and Carbon counties, Wyoming.	No.	NatureServe 2012; WYNDD 2009.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Virgin thistle	*Cirsium virginensis*	NPS-Lake Mead NRA; BLM-UT	Range: Endemic to the Mojave Desert within Washington County, Utah; Clark County, Nevada; and Mohave County, Arizona. Habitat: Hanging gardens, saline seeps, washes, and stream terraces. Elevation range 2,800 to 3,100 feet amsl. Flowering May to September.	Low.	NPS-Lake Mead NRA: Yes. Based on agency consultation, this species is not likely to occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA. BLM-UT: Yes. Although potential habitat may be present based on the presence of suitable topography and elevation range, it is unlikely that this species would occur within the 2-mile transmission line corridors.	NatureServe 2012; NPS 2012; NNHP 2001; UNPS 2006.
Goodrich cleomella	*Cleomella palmeriana* var. *goodrichii*	BLM-UT	Range: Endemic to Uintah County, Utah. Habitat: Eroded slopes of heavy clay in the Mancos, Tropic, and Morrison formations associated with *Machaeranthera venusta, Phacelia demissa, Astragalus flavus,* and *Atriplex corrugata*. Elevation range 4,000 to 6,000 feet amsl. Flowering May.	None.	Yes. Although the species has been documented approx. 7 miles south of the 2-mile transmission line corridor in Uintah County, Utah, it is unlikely this species would occur given the lack of species-specific geological formations within the 2-mile transmission line corridor.	BLM 2010; UNPS 2006.
Tecopa birdbeak	*Cordylanthus tecopensis*	BLM-NV	Range: In Nevada, known only from the Ash Meadows area and Fishlake Valley within Esmeralda and Nye counties, Nevada; and also in California. Habitat: Dependent on wetland margin areas in Nevada, this species occupies open, moist to saturated, alkali-crusted clay soils of seeps, springs, outflow drainages, and meadows, with *Distichlis spicata, Juncus balticus, Eleocharis, Spiranthes infernalis, Centaurium namophilum, Typha, Cirsium, Ivesia kingii* var. *eremica,* and *Ericameria albida*. Elevation range 2,100 to 4,900 feet amsl. Flowering summer to early fall.	None.	Yes. The species is known only from Esmeralda and Nye counties, Nevada, which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Barneby's catseye	*Cryptantha barnebyi*	BLM-UT	Range: Endemic to the Uinta Basin in Uintah County, Utah. Habitat: Locally abundant on domed or gently-sloping white shale knolls of the Green River Formation, mostly in shadscale and pinyon-juniper communities. Elevation range 6,060 to 7,875 feet amsl. Flowering May to June.	Region II: High. The species has been documented within the 2-mile-wide corridor in Uintah County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Uintah County, Utah.	No.	BLM 2010; NatureServe 2012.
Tufted cryptantha	*Cryptantha caespitosa*	BLM-CO	Range: Regional endemic to central and southern Wyoming and adjacent Utah, Idaho, and Moffat and Rio Blanco counties, Colorado. Habitat: Rocky or chalky ridgetops in cushion plant communities, forb-grass, pinyon-juniper, mountain brush, limber pine, and spruce-fir forests of adobe soils. Elevation range 6,400 to 10,240 feet amsl. Flowering late April/May to June/early July.	Region I: High. The species has been documented within the 2-mile transmission line corridor in Moffat County, Colorado. Potential habitat for the species may be present within the 2-mile transmission line corridor and the analysis area, and associated with the Little Snake West and Little Snake East Ground Electrode Sites in Moffat County, Colorado. Region II: Moderate. The species has been documented approx. 11 miles south and west of the 2-mile transmission line corridor in Rio Blanco County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Rio Blanco County, Colorado	No.	CNHP 2002; NatureServe 2012.
Mound cryptantha	*Cryptantha compacta*	BLM-UT	Range: Endemic to southwestern Millard County, Utah. Total population estimated at approx. 100,000 individuals. Habitat: Salt desert shrub and mixed desert shrub communities on Sevey Dolomite and gravelly loam on open slopes and ridges. Elevation range 6,200 to 7,400 feet amsl. Flowering May to July.	Low.	Yes. Although the species has been documented approx. 28 miles northwest of the 2-mile transmission line corridor in Millard County, Utah, it is unlikely the species would occur within the 2-mile transmission line corridors based on the lack of suitable elevation range within Millard County, Utah.	NatureServe 2012; UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Creutzfeldt-flower	*Cryptantha creutzfeldtii*	USFS-Manti-LaSal NF; BLM-UT	Range: Endemic to central Utah in Carbon, Emery and Sevier counties. Habitat: Shadscale and mat *Atriplex* communities on the Mancos Shale Formation. Elevation range 5,250 to 6,500 feet amsl. Flowering late April to June.	Region II: Moderate. The species has been documented immediately adjacent (300 feet) northwest of the 2-mile transmission line corridor in Sevier County, Utah; and one mile north of the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present within the 2-mile transmission line corridors in Emery and Sevier, counties, Utah. Based on detailed habitat modeling, suitable habitat was not identified within the 2-mile transmission line corridors within the USFS-Manti-LaSal NF.	No.	BLM 2010; NatureServe 2012; UNPS 2006.
Graham's catseye	*Cryptantha grahamii*	BLM-UT	Range: Endemic to the Uinta Basin in Duchesne and Uintah counties, Utah. Habitat: Mixed desert shrub, sagebrush, pinyon-juniper and mountain shrub communities on Green River shale. Elevation range 5,000 to 7,400 feet amsl. Flowering May to June.	Region II: Moderate. The species has been documented approx. 0.5 mile southof the 2-mile transmission line corridor in Duchesne County, Utah; and 4 miles south of the 2-mile transmission line corridor in Uintah County, Utah. Potential habitat for the species may be present within the 2-mile transmission line corridors in Duchesne and Uintah counties, Utah.	No.	NatureServe 2012; UNPS 2006.
Las Vegas catseye	*Cryptantha insolita*	NV State CE	Range: Known only from the Las Vegas Valley and adjacent lower slopes of the Spring Mountains within Clark County, Nevada. Habitat: Light-colored, alkaline clay flats and low hills in the creosote bush zone. Elevation range 1,900 to 2,000 feet amsl. Flowering April to June.	Region IV: Moderate. The species has been documented approx. 6 miles west of the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present within the Las Vegas Valley within the 2-mile transmission line corridors in Clark County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Yellow-white catseye	*Cryptantha ochroleuca*	USFS-Dixie NF	Range: Endemic to Garfield and Iron counties in south-central Utah. Habitat: Pinyon-juniper, ponderosa pine, and bristlecone pine communities on the Pink limestone member of the Wasatch Formation, on unconsolidated alluvium. Elevation range 7,500 to 9,350 feet amsl. Flowering May to June.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Garfield and Iron counties, Utah.	NatureServe 2012; UNPS 2006.
Osterhout cryptantha	*Cryptantha osterhoutii*	BLM-CO	Range: Endemic to the Navajo Basin and found on the Colorado Plateau, this species is known within Mesa County, Colorado; Grand, Wayne, Garfield and San Juan counties , Utah; and perhaps Arizona. Habitat: Dry barren sites in reddish purple decomposed sandstone or in dry sandy soil in the desert, in blackbrush, mixed desert shrub, oak brush, salt bush, and pinyon-juniper communities. Elevation range 4,500 to 6,560 feet amsl. Flowering April to early June/July.	Low.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types and elevation range, it is unlikely this species would occur within the 2-mile transmission line corridor in Mesa County, Colorado.	CNHP 2002; NatureServe 2012.
Rollins cryptantha	*Cryptantha rollinii*	BLM-CO	Range: Known from southwestern Wyoming; Emery, Uintah, Duchesne, and Carbon counties, Utah; and Moffat and Rio Blanco counties, Colorado. Habitat: Known from white shale slopes of the Green River Formation within pinyon-juniper woodlands and cold desert shrubland communities. Elevation range 5,300 to 5,800 feet amsl. Flowering May to June.	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Rio Blanco County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Rio Blanco and Moffat counties, Colorado.	No.	CNHP 2002; NatureServe 2012.
Virgin River cryptantha	*Cryptantha virginensis*	NPS-Lake Mead NRA	Range: Endemic to California. Habitat: Sagebrush scrub, bristlecone pine forests, and pinyon-juniper woodland communities. Elevation range 6,234 to 10,171 feet amsl. Flowering period April to June.	None.	Yes. Based on agency consultation and lack of suitable habitat parameters, it is unlikely this species would occur within the 2-mile transmission line corridors.	Calflora 2012; NPS 2012.
Jones cycladenia	*Cycladenia humilis* var. *jonesii (Cycladenia jonesii)*	FT (UT)	Range: Endemic to Emery, Garfield, Grand, and Kane counties, Utah; and Coconino County, Arizona. Habitat: Gypsiferous saline soils on the Chinle, Cutler, and Summerville formations in *Eriogonum/Ephedra*, cool desert shrub, and juniper communities. Elevation range 4,400 to 6,000 feet amsl. Flowering mid May to June.	Region II: Moderate. The species has been documented approx. 8.5 miles southwest of the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Emery County, Utah.	No.	BLM 2010; USFWS 2012a; UDWR 2012; UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Intermountain wavewing	*Cymopterus basalticus*	BLM-NV	Range: A Great Basin endemic, known within White Pine County, Nevada; and also in Utah. Habitat: Bare, basaltic rocks, barren clays, and gravelly hills and alluvial fans, mostly on dolomite (in Utah). Elevation range 5,800 to 6,900 (in Nevada). Flowering in spring.	Low.	Yes. Although suitable parameters may be present within Lincoln County, Nevada, it is unlikely the species would occur with the 2-mile transmission line corridors.	NNHP 2001.
Pinnate springparsley	*Cymopterus beckii*	USFS-Dixie NF, USFS-Manti-LaSal NF	Range: Endemic to San Juan and Wayne counties in Utah; and Navajo Nation Tribal Lands in Arizona. Habitat: Pinyon-juniper, mountain brush, ponderosa pine/Manzanita, conifer/oak, and Douglas-fir communities in sandy or stony places, often in rock crevices and near cliff bases on north and east exposures. Elevation range 5,600 to 7,500 feet amsl. Flowering April to July.	None.	Yes. The species is endemic to San Juan and Wayne counties, Utah, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Uinta Basin springparsley	*Cymopterus duchesnesis*	BLM-CO	Range: Known only from Duchesne and Uintah counties, Utah; and in adjacent Rio Blanco, Moffat, and Mesa counties, Colorado. Habitat: Found in cold desert shrub, sagebrush, and juniper communities on sandy clay and clay semi-barrens of the Mancos and Morrison shales (i.e., Morrison, Uintah, Wasatch and Green River formations). Elevation range 4,700 to 6,800 feet amsl. Flowering April and May.	Region I: Moderate. The species has been documented approx. 25 miles southwest of the 2-mile transmission line corridor in Rio Blanco County, Colorado. Potential habitat for the species may be present within the 2-mile transmission line corridors in Moffat County, Colorado. Region II: High. The species has been documented within the 2-mile transmission line corridor in Mesa County, Colorado. Potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Mesa and Rio Blanco counties, Colorado.	No.	BLM 2010; CNHP 2002; NatureServe 2012.
Cedar Breaks biscuitroot	*Cymopterus minimus*	USFS-Dixie NF	Range: Endemic to Garfield, Iron, and Kane counties, Utah. Habitat: Bristlecone pine, ponderosa pine, and spruce-fir communities on Claron Limestone. Elevation range 8,000 to 10,400 feet amsl. Flowering July to August.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Iron County, Utah.	NatureServe 2012; UNPS 2006.
Brownie ladyslipper	*Cypripedium fasciculatum*	USFS-Ashley NF	Range: Known from Cache, Daggett, Salt Lake, Uintah, and Summit counties, Utah; and also Montana, Idaho, Wyoming, Colorado, Wahsington, Oregon, and California. Habitat: Duff in spruce-fir or lodgepole pine forests and along shaded streams. Elevation range 8,000 to 9,000 feet amsl. Flowering June to July.	None.	Yes. The species is not known to occur within the southern extent of the Ashley NF within Wasatch and Duchesne counties, Utah and is, therefore, unlikely to occur within the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Stream stippleback lichen	*Dermatocarpon luridum*	BLM-NV	Range: Known distribution includes Washington, Oregon and California. Although the species is broadly distributed globally, the species is not known to occur within Nevada, Habitat: Grows on rocks, small boulders, and bedrock, submerged or seasonally emergent, adjacent to or in clear mountain streams, on seepy terraces, and in streams and rivers with red alder, Douglas-fir, western hemlock and riparian vegetation ranging from young stands to old-growth, and in streams in alpine meadows. Elevation range 1,000 to 6,500 feet amsl.	None.	Yes. The 2-mile transmission line corridors do not cross the geographic range of the species.	NatureServe 2012.
Wyoming tansymustard	*Descurainia torulosa*	BLM-WY	Range: Endemic to the southern Absaroka Range in Fremont, Park, and Teton counties, Wyoming; and the Rock Springs Uplift in Sweetwater County, Wyoming. Total population estimated at approx. 1,500 individuals. Habitat: Found at the base of volcanic breccias or sandstone cliffs, in sandy soil under slight overhangs, in cavities, in volcanic rock or on ledges. Elevation range 7,700 to 10,500 feet amsl. Flowering period unknown.	Region I: Moderate: The species has been documented approx. 7 miles northwest of the Pio-Springs and approx. 6 miles west of the Shell Creek ground electrode sites in Sweetwater County, Wyoming. Potential habitat for the species may be present within the aforementioned ground electrode sites in Sweetwater County, Wyoming.	No.	WYNDD 2009.
Gold Butte moss	*Didymodon nevadensis*	BLM-NV	Range: Known within Clark County, Nevada. Habitat: On or near gypsiferous deposits and outcrops or limestone boulders, especially on east to north facing slopes of loose uncompacted soil often associated with other mosses and lichens. Elevation range 1,310 to 2,315 feet amsl. Flowering late-winter to spring (i.e., October-April).	Regions III and IV: Low. Potential habitat for the species may be present within the 2-mile transmission line corridors near Las Vegas and Lake Mead, Nevada.	No.	NNHP 2001.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Rockcress draba	*Draba globosa (Draba densifolia* var. *apiculata*)	USFS-Ashley NF, USFS-Uinta-Wasatch-Cache NF	Range: Known within Duchesne, Juab, Salt Lake, and Summit counties, Utah; Gunnison and Lake counties, Colorado; and also Wyoming, Idaho, and Montana. Total population estimated at approx. 40 individuals. Habitat: Alpine meadows, granitic talus slopes, and rock crevices. Elevation range 11,500 to 12,500 feet amsl. Flowering June to August.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Duchesne counties, Utah.	CNHP 2002; NatureServe 2012.
Maguire draba	*Draba maguirei*	USFS-Uinta-Wasatch-Cache NF	Range: Endemic to Cache County, Utah. Habitat: Open areas in spruce and fir forests with substrates typically comprised of dolomite. Elevation range 5,500 to 9,500 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to Cache County, Utah which is not crossed by the 2-mile transmission line corridors.	CPC 2010; UNPS 2006.
Creeping draba	*Draba sobolifera*	USFS-Dixie NF, USFS-Fishlake NF	Range: Endemic to the Tushar Mountains of Beaver and Piute counties, Utah. Habitat: Alpine tundra and spruce-fir communities in igneous gravels and talus. Elevation range 10,000 to 12,100 feet amsl. Flowering July to August.	None.	Yes. The species occurs at a higher elevation and in very limited geographic range than that crossed by the2-mile transmission line corridors within Beaver County, Utah.	NatureServe 2012; UNPS 2006.
Chalk liveforever	*Dudleya pulverulenta*	NPS-Lake Mead NRA	Range: Known with Clark and Nye counties, Nevada; and also within Arizona, California, and possibly Utah. Habitat: Habitat parameters unknown. Elevation range 2,100 to 5,512 feet amsl. Flowering period February to June.	None.	Yes. Based on agency consultation and lack of suitable habitat parameters, it is unlikely this species would occur within the 2-mile transmission line corridors.	NNHP 2001; NPS 2012.
Dune wildrye	*Elymus simplex* var. *luxurians*	BLM-WY	Range: Known only from the upper Green River Basin in Sweetwater County, Wyoming. No population estimates available. Habitat: Drifting sand dunes. Elevation at approx. 7,130 feet amsl.	Low.	Yes. Although the species has been documented approx. 37 miles northwest of the 2-mile transmission line corridor; it is unlikely the species would be present within the 2-mile transmission line corridor in Sweetwater County, Wyoming based on the species narrow and limited geographic range and lack of suitable habitat.	WYNDD 2009.
Silverleaf sunray	*Enceliopsis argophylla*	NPS-Lake Mead NRA; BLM-NV	Range: Restricted to the Lake Mead area within Clark County, Nevada; and also known in Arizona and Utah. Habitat: Dry, open, relatively barren areas on gypsum badlands, volcanic gravels, loose sands in the creosote-bursage zone. Elevation range 1,165 to 2,380 feet amsl. Flowering continually.	Regions III and IV: High. The species has been documented within, and adjacent to, the NPS-Lake Mead NRA and within the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark County, Nevada.	No.	NNHP 2001; NPS 2012.
Ash Meadows sunray	*Enceliopsis nudicaulis* var. *corrugata*	BLM-NV	Range: Occurs within the Ash Meadows area within Nye County, Nevada; and also possibly in California. Habitat: Dry to somewhat moist, open, hard, whitish, strongly alkaline silty to clay soils, often on or near low calcareous outcrops, in spring and seep areas in the creosote-bursage and shadscale zones with shadscale saltbush, alkali goldenbush, saltgrass, and broom snakeweed. Elevation range 2,200 to 2,360 feet amsl. Flowering early spring.	None.	Yes. The species is endemic to Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Nevada willowherb	*Epilobium nevadense*	USFS-Fishlake NF, BLM-UT, BLM-NV	Range: Known within Iron, Millard, and Washington counties; and within the Charleston Mountains in Clark, Lincoln, and Eureka counties, Nevada. Habitat: Slopes with limestone outcrops or talus associated with singleleaf pinyon and ponderosa pine. Elevation range 6,000 to 8,930 feet amsl. Flowering July to September.	Regions II and III: Moderate. The species has been documented adjacent to the 2-mile transmission line corridors in Millard and Washington counties, Utah. Based on the presence of suitable elevation range, vegetation cover types, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Washington, Iron, Juab, and Millard counties, Utah; and Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001; UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Antelope Canyon goldenbush	*Ericameria cervina*	BLM-NV	Range: Known within Clark and Lincoln counties, Nevada; and also in Utah and Arizona. Habitat: Rock crevices and talus in shadsacale and Douglas-fir-bristlecone pine communities. Often on calcareous substrates and less commonly on ash flow tuff. Elevation range 3,120 to 6,230 feet amsl. Flowering summer to early-fall.	Region III: Low. Although no known populations have been documented within or adjacent to the 2-mile transmission line corridors, suitable habitat parameters may be present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Greenwood goldenbush	*Ericameria lignumviridis (Haplopappus lignumviridis)*	BLM-UT	Range: Endemic to Sevier County, Utah. Habitat: According to UNPS, this species occupies crevices in igneous rock outcrops and cliffs above streams. According to FNA and NatureServe, this species occupies riparian areas with willow, nettle, conyza, and other bottomland plant species. Elevation range 6,150 to 6,250 feet amsl. Flowering August to September.	Low.	Yes. Although sparse patches of appropriate elevation range are present, it is unlikely the species would be present within the 2-mile transmission line corridors in Sevier County, Utah.	UNPS 2006; FNA 1995; NatureServe 2012.
Abajo daisy	*Erigeron abajoensis*	USFS-Manti-LaSal NF	Range: Endemic to Garfield, Piute, San Juan, and Sevier counties, Utah. Habitat: Rocky or gravelly open slopes in evergreen communities typically composed of sagebrush, pinyon-juniper, ponderosa pine, or spruce-fir on limestone and igneous substrates. Elevation range 6,562 to 11,483 feet amsl. Flowering July to August.	Low.	Yes. Although potential habitat may be present based on the presence of suitable elevation range, vegetation cover types, and soil substrate, it is unlikely this species would occur within the 2-mile transmission line corridors within the Manti-LaSal NF.	FNA 1994; NatureServe 2012.
Carrington daisy	*Erigeron carringtonae*	USFS-Manti-LaSal NF	Range: Endemic to Emery, Sanpete, and Sevier counties, Utah. Habitat: Meadows and escarpment margins on Flagstaff Limestone. Elevation range 10,000 to 11,000 feet amsl. Flowering July to early August.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present both within and outside of the 2-mile transmission line corridor within the USFS Manti-LaSal NF in Emery County, Utah.	No.	UNPS 2006.
Cronquist daisy	*Erigeron cronquistii*	USFS-Uinta-Wasatch-Cache NF	Range: Endemic to the Bear River Range in Cache County, Utah. Habitat: Crevices in limestone cliffs and talus. Elevation range 5,750 to 8,500 feet amsl. Flowering May to August.	None.	Yes. The species is endemic to Cache County, Utah which is not crossed by the 2-mile transmission line corridors.	UNPS 2006.
Kachina daisy	*Erigeron kachinensis*	USFS-Manti-LaSal NF; BLM-CO	Range: Endemic to the Colorado Plateau within White and Dark Canyons and Elk Ridge within San Juan County, Utah; and the Dolores River drainage within Montrose County, Colorado. Habitat: Habitats range from low elevation seeps and hanging gardens to high elevation mesic sandstone outcrops in aspen and ponderosa pine communities on saline soil. Elevation range 4,800 to 8,200 feet amsl. Flowering late April to August.	None.	Yes. The species is endemic to San Juan County, Utah and Montrose County, Colorado which are not crossed by the 2-mile transmission line corridors.	CNHP 2002; NatureServe 2012; UNPS 2006.
Maguire daisy	*Erigeron maguirei*	USFS-Fishlake NF; BLM-UT	Range: Endemic to Emery, Garfield, and Wayne counties, Utah. Habitat: Cool, mesic wash bottoms and dry, partially shaded slopes of eroded sandstone cliffs within mountain shrub, Douglas-fir, ponderosa pine, and the lower limits of the juniper woodland communities on the Wingate, Chinle, and Navajo Sandstone formations. Elevation range 5,400 to 7,100 feet amsl. Flowering June to July.	Region II: High. The species has been documented within and immediately adjacent to the 2-mile transmission line corridor in Emery County, Utah. Based on the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridor in Emery County, Utah. Based on detailed habitat modeling, suitable habitat was not identified within the 2-mile transmission line corridors within the USFS-Fishlake NF.	No.	BLM 2010; NatureServe 2012; UNPS 2006.
LaSal daisy	*Erigeron mancus*	USFS-Manti-LaSal NF	Range: Endemic to the LaSal Mountains of Grand and San Juan counties, Utah. Habitat: Subalpine fir, alpine grass/sedge and forb communities and found frequently in rockstripes. Elevation range 10,000 to 12,200 feet amsl. Flowering July to August.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Grand County, Utah.	UNPS 2006.
Sheep fleabane	*Erigeron ovinus*	BLM-NV	Range: Known only from the Sheep and Groom ranges and Mount Irish within Clark and Lincoln counties, Nevada. Habitat: Crevices in carbonate cliffs and ridgeline outcrops in the pinyon-juniper and montane conifer zones. Elevation range 3,600 to 8,400 feet amsl. Flowering late June.	Low.	Yes. The species is only known within the Sheep and Groom Ranges and Mount Irish, which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Untermann daisy	*Erigeron untermanii*	USFS-Ashley NF, BLM-UT	Range: Endemic to Duchesne County, Utah. Habitat: Pinyon-juniper, mountain mahogany, limber and bristlecone pine, and sagebrush communities on calcareous shale, sandstone, and siltstone of the Uinta and Green River formations. Elevation range 7,000 to 9,400 feet amsl. Flowering May to June.	Region II: High. The species has been documented both within and outside of the USFS Ashley NF within the 2-mile transmission line corridor in Duchesne County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridors within the USFS-Ashley NF and on BLM lands in Duchesne County, Utah.	No.	BLM 2008; NatureServe 2012; UNPS 2006.
Single-stemmed wild buckwheat	*Eriogonum acaule*	BLM-CO	Range: Known within Moffat County, Colorado; and also in eight counties in Wyoming. Habitat: Ridge tops, chalky or ashy barrens, and clay flats. Elevation range 5,680 to 6,820 feet amsl. Flowering June to July.	Regions I and II: Low. Based on the limited data available for the species it is possible that potential habitat may be present within the 2-mile transmission line corridors in Moffat County, Colorado.	No.	NatureServe 2012.
Widtsoe buckwheat	*Eriogonum aretioides*	USFS-Dixie NF	Range: Endemic to Garfield County, Utah. Habitat: Bristlecone pine, ponderosa pine, Douglas-fir, and Rocky Mountain juniper communities on the Pink Limestone member of the Claron Formation. Elevation range 7,400 to 8,700 feet amsl. Flowering late May/June to August.	None.	Yes. The species is endemic to Garfield County, Utah which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Kaye's wild buckwheat	*Eriogonum artificis*	BLM-UT	Range: Known from one location in Beaver County, Utah. Habitat: Sandy to somewhat gravelly, volcanic slopes in mixed grassland and sagebrush communities, and juniper woodlands. Elevation range 6,000 to 6,040 feet amsl. Flowering August to September.	Low.	Yes. Although suitable vegetation cover types and soil substrate are present, it is unlikely this species would occur within the 2-mile transmission line corridors given the species-specific elevational range.	University of Maryland 2003.
Elsinore buckwheat	*Eriogonum batemanii* var. *ostlundii*	USFS-Fishlake NF	Range: Endemic to Piute and Sevier counties, Utah. Habitat: Shadscale, mixed desert shrub, sagebrush, juniper and ponderosa pine communities on igneous gravels. Elevation range 5,500 to 6,500 feet amsl. Flowering July to September.	Region II: Moderate. Based on the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridor in Sevier County, Utah within the USFS-Fishlake NF.	Yes.	UNPS 2006.
Pahrump Valley buckwheat	*Eriogonum bifurcatum*	BLM-NV	Range: Known within Clark and Nye counties, Nevada; and also in California. The distribution, as currently understood, straddles the Nevada/California state line, from Stewart Valley southeastward to Mesquite Valley. Habitat: Barren, saline, heavy clay or silty hardpan soils on and near dry playa margins, and on adjacent shore terraces and stabilized sand dunes, with *Atriplex confertifolia*, *A. hymenelytra*, *Prosopis glandulosa* var. *torreyana*, *Suaeda torreyana*, and *Grayia spinosa*. Elevation range 2,300 to 2,800 feet amsl. Flowering mid May to mid June.	Low.	Yes. Based on the species limited distribution, it is unlikely the species would be found within the 2-mile transmission line corridors.	NNHP 2001.
Logan buckwheat	*Eriogonum brevicaule* var. *loganum*	USFS-Uinta-Wasatch-Cache NF	Range: Known within northern Utah in Box Elder, Cache, and Morgan counties. Habitat: Sagebrush-bunchgrass communities to sagebrush-subalpine conifer woodlands on rocky outcrops on sandy, gravelly, or limestone slopes. Elevation range 4,400 to 10,175 feet amsl. Flowering May to August.	None.	Yes. The species is known only within Box Elder, Cache, and Morgan counties, Utah, which are not crossed by the 2-mile transmission line corridors.	UNPS 2006.
UNK	*Eriogonum brevicaule* var. *mitophyllum*	BLM-UT	Range: Known along Lost Creek near Sigurd, Utah in Sevier County, Utah. Habitat: Saltbush and juniper communities on Arapien Shale.	Region II: Low. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Sevier County, Utah.	No.	BLM 2011.
Darin buckwheat	*Eriogonum concinnum*	BLM-NV	Range: A Nevada endemic, known within Nye County, Nevada. Habitat: Deep loose sand derived from, or in crevices of light-colored tuff or other volcanic rocks, often at bases of cliffs or outcrops, in pinyon-juniper, sagebrush, mixed-shrub, Blackbrush, and shadscale zones. Possibly dependent on sand dunes and deep sand. Elevation range 2,525 to 6,640 feet amsl. Flowering late-spring to early-fall.	None.	Yes. The species is endemic to Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NNHP 2001.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Grand buckwheat	*Eriogonum contortum*	BLM-CO	Range: Known within Mesa and Garfield counties, Colorado; and Grand County, Utah. Habitat: Shadscale and saltbrush communities on Mancos shale. Elevation range 4,200 to 5,100 feet amsl. Flowering May to August.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Garfield and Mesa counties, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridor and analysis area in Garfield and Mesa counties, Colorado.	No.	CNHP 2002; NatureServe 2012.
Las Vegas buckwheat	*Eriogonum corymbosum var. nilesii*	FC (NV), BLM-NV, NV State CE#	Range: Known within Clark County and Lincoln County (near Toquop Wash), Nevada; and also in Washington County, Utah. Habitat: On and near gypsum soils, often forming low mounds or outcrops in washes and drainages, or in areas of generally low relief, often with *Arctomecon californica* and other gypsum-tolerant species, surrounded by *Ambrosia dumosa, Stanleya pinnata, Atriplex canescens, Ephedra torreyana, Larrea tridentata, Acacia greggii, Suaeda torreyana,* and *Psorothamnus* fremontii. Elevation range 1,900 to 3,839 feet amsl. Flowering August to November.	Region III (Nevada): High. The species has been documented within the 2-mile transmission line corridors in Clark and Lincoln counties, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Lincoln County, Nevada. Region III (Utah): Moderate. The species has been documented approximately 26 miles east of the 2-mile transmission line corridor in Wasthington County, Utah. Although unlikely, potential habitat may be present within the 2-mile transmission line corridors in Washington County, Utah. Region IV: Moderate. The species has been documented approx. 9 miles west of the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present within the 2-mile transmission line corridors in Clark County, Nevada.	No.	Logan Simpson Design 2013; NatureServe 2012; NNHP 2001; Styles 2010; USFWS 2012a, 2010a.
Flat Top buckwheat	*Eriogonum corymbosum* var. *smithii*	BLM-UT	Range: Endemic to the Colorado Plateau within Emery and Wayne counties, Utah. Habitat: Found on the Entrada Formation and seleniferous stabilized dunes associated with purple-sage, matchweed, Ephreda/Indian ricegrass, desert shrub, and rabbitbrush communities. Elevation range 4,500 to 5,600 feet amsl. Flowering August to September.	Low.	Yes. Although potential habitat may be present within Emery County, Utah based on the presence of suitable elevation and soil substrate, it is unlikely the species would occur within the 2-mile transmission line corridors.	BLM 2010; UNPS 2006.
Ephedra buckwheat	*Eriogonum ephredoides*	BLM-CO	Range: Known within Rio Blanco and Moffat counties, Colorado; and adjacent Uintah County, Utah. Habitat: Found in juniper and sagebrush-grass communities on white shale of the Green River Shale Formation. Elevation range 5,600 to 6,030 feet amsl. Flowering June through late July/September.	Regions I and II: Moderate. The species has been documented approx. 5 mles south of the 2-mile transmission line corridor in Rio Blanco County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Moffat and Rio Blanco counties, Colorado.	No.	BLM 2010; NatureServe 2012.
Clokey buckwheat	*Eriogonum heermannii* var. *clokeyi*	BLM-NV	Range: Known within Clark and Nye counties, Nevada. Habitat: Carbonate outcrops, talus, scree, and gravelly washes and banks in the creosote-bursage, shadscale, and blackbrush zones. Elevation range 4,000 to 6,000 feet amsl. Flowering late spring to summer.	Low.	Yes. Although known populations have been documented approx. 25 miles west of the 2-mile transmission line corridor in Clark County, Nevada, it is unlikely that potential habitat is present within the 2-mile transmission line corridors based on the lack of suitable habitat parameters.	NNHP 2001.
Ibex buckwheat	*Eriogonum nummulare* var. *ammophilum*	BLM-UT	Range: Endemic to Juab and Millard counties, Utah. Habitat: Shadscale, horsebrush, winterfat, rabbitbrush, ephedra, and pinyon-juniper communities on alluvium and sandy soil. Elevation range 4,800 to 6,000 feet amsl. Flowering late June to mid August.	Regions II and III: Moderate. The species has been documented approx. 25 miles west of the 2-mile transmission line corridor in Millard County, Utah; and approx. 32 miles northwest of the 2-mile transmission line corridor in Juab County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Millard County, Utah.	No.	UNPS 2006.
Wirestem buckwheat	*Eriogonum pharnaceoides* var. *cervinum*	BLM-UT	Range: Endemic to Iron and Washington counties, Utah. Habitat: Pinyon-juniper, oakbrush, and ponderosa pine communities. Elevation range 6,000 to 8,700 feet amsl.	Region III: High. The species has been documented within and immediately adjacent to the 2-mile transmission line corridor in Washington County, Utah. Potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Washington County, Utah.	No.	UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Scarlet buckwheat	*Eriogonum phoenicium* (*Eriogonum microthecum* var. *phoeniceum*)	BLM-UT, BLM-NV	Range: Endemic to the Wah Wah Mountains within Millard County, Utah; and the Mahogany Mountains of Lincoln County, Nevada. Habitat: Found in pinyon-juniper woodlands and mountain mahogany communities on gray-white tuffaceous soils associated with sagebrush and *Eriogonum microthecum*. Elevation range 5,700 to 6,800 feet amsl. Flowering June to September.	Utah – None. Nevada - Low.	Utah – Yes. The species is endemic to the Wah Wah Mountains, which are not crossed by the 2-mile transmission line corridors. Nevada - Yes. Based on the species limited geographic range, elevation range, and substrate, potential habitat may be present in Lincoln County, Nevada; however, it is unlikely the species would be found within the 2-mile transmission line corridors in Lincoln, Nevada.	NNHP 2001; UNPS 2006.
Kaye H. Thorne's buckwheat	*Eriogonum spathulatum* var. *kayeae*	BLM-UT	Range: Known within the Squaw Peak area located south of the San Francisco Mountains in Beaver County, Utah. Habitat: Species-specific habitat parameters are unknown based on limited knowledge of the species.	None.	Yes. Based on the geographic range of the species, it is unlikely that this species would occur within the 2-mile transmission line corridors.	BLM 2011.
Frisco buckwheat	*Eriogonum soredium*	FC (UT), BLM-UT	Range: Endemic to the San Francisco Mountains within the Great Basin in Beaver County, Utah. Habitat: Restricted to soils derived from Ordovician limestone outcrops in the San Francisco Mountains, the species is typically found on sparsely vegetated exposed slopes in pinion juniper and sagebrush communities. Elevation range 6,200 and 7,228 feet amsl. Flowering June to September.	None.	Yes. The species is endemic to the San Francisco Mountains, Utah which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006; USFWS 2012a, 2011b.
Woodside buckwheat	Eriogonum tumulosum	BLM-CO	Range: Known within Moffat County, Colorado; and also in Duchesne, Emery, and Uintah counties, Utah. Habitat: Mixed desert shrub and pinyon-juniper woodlands on rocky outcrops and sedimentary gravels or clays. Elevation range 5,800 to 6,300 feet amsl. Flowering late April to early July.	Regions I and II: Low. Based on the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Moffat County, Colorado.	No.	CNHP 2002; NatureServe 2012.
Duchesne buckwheat	*Eriogonum viridulum*	BLM-CO	Range: Currently known only from Duchesne and Uintah counties, Utah. Known from potentially extirpated populations within Moffat County, Colorado. Habitat: Sandy or silty flats or clay slopes and hills, saltbush or sagebrush communities, pinyon-juniper woodlands. Elevation range 4,590 to 7,217. Flowering July to October.	Low.	Yes. Although potential habitat may be present, it is unlikely the species would occur within the 2-mile transmission line corridors based on the range of known occurrences.	NatureServe 2012.
Sticky buckwheat	*Eriogonum viscidulum*	NPS-Lake Mead NRA; NV State CE, BLM-NV	Range: Known within Clark and Lincoln counties, Nevada; and also in Arizona. Habitat: Dependent on sand dunes or deep sands, this species occupies deep loose sandy soils in washes, flats, roadsides, steep aeolian slopes, and stabilized dune areas associated with *Ambrosia dumosa, Larrea tridentata, Pleuraphis rigida, Krameria parvifolia, Achnatherum hymenoides, Tamarix ramosissima, Tessaria sericea, Astragalus geyeri* var. *triquetrus, A. sabulonum, Eriogonum trichopes, Ephedra torreyana, Dicoria canescens, Pediomelum, Croton californicus, Sporobolus cryptandrus, Psorothamnus fremontii, Abronia,* and *Tiquilia*. Elevation range 1,200 to 2,200 feet amsl. Flowering April to May.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark and Lincoln Counties, Nevada. Based on agency consultation and suitable habitat parameters, this species is not likely to occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA.	No.	NatureServe 2012; NNHP 2001; NPS 2012: USFWS 2010a.
Utah spurge	*Euphorbia nephradenia*	BLM-UT	Range: Endemic to the Colorado Plateau within Emery, Garfield, Kane, and Wayne counties, Utah; and also in Colorado. Habitat: Mat saltbush, blackbrush, ephedra, mixed sandy desert shrub, and grassland communities on dark clay hills, blow sand and stabilized dunes mainly from the Tropic Shale and Entrada formations. Elevation range 3,800 to 4,800 feet amsl. Flowering June to August.	Region II: Moderate. The species has been documented approx. 2.2 miles south of the 2-mile transmission line corridor in Emery County, Utah. Based on agency consultation and the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery County, Utah.	No.	BLM 2011; UNPS 2006.
Mojave barrel cactus	*Ferocactus cylindraceus var. lecontei*	NPS-Lake Mead NRA	Range: Known in Clark County, Nevada, and also in Calfiornia, Arizona, Utah, and Mexico. Habitat: Gravelly or rocky hillsides, canyon walls, alluvial fans, and wash margins or sandy flats in desert. Elevation range 2,460 to 4,921. Flowering period unknown.	None.	Yes. Based on agency consultation and lack of suitable habitat parameters within the 2-mile transmission line corridors, it is unlikely this species would occur within the 2-mile transmission line corridors.	EOL 2012; NPS 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Ackerman's green gentian	*Frasera ackermaniae*	BLM-UT	Range: Restricted endemic known only from Uintah County, Utah. Habitat: Clay semi-barrens of the Chinle Formation with scattered *Juniperus osteosperma*. Elevation range 5,830 to 6,000 feet amsl. Flowering June.	None.	Yes. Although the spcies has been documented approx. 7 miles northwest of the 2-mile transmission line corridor, it is unlikely this species would occur within the 2-mile transmission line corridors given the absence of the species-specific geological formation and elevational range.	BLM 2010; UNPS 2006.
Sunnyside green gentian	*Frasera gypsicola*	BLM-NV; NV State CE	Range: Known within Nye and the White River Valley east of the Egan Range in White Pine counties, Nevada; and also in Utah. Habitat: Open, dry, whitish, alkaline, often salt-crusted and spongy silty-clay soils on calcareous flats and barrens, with little if any gypsum content, in cushion-plant associations surrounded by sagebrush, greasewood, and occasionally barberry and swamp cedar communities with *Artemisia pygmaea, A. tridentata, Eriogonum shockleyi, Physaria chambersii, Cryptantha welshii, Hymenopappus filifolius, Phlox tumulosa,* and *Lepidium nanum*. Elevation range 5,180 to 5,510 feet amsl. Flowering June to July.	None.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types and soil substrate, it is unlikely this species would occur within the 2-mile transmission line corridors given the species narrow and limited geographic range	NatureServe 2012; NNHP 2001.
Tufted green gentian	Frasera paniculata	BLM-CO	Range: Known within Mesa County, Colorado; and also in southeast Utah, northeast Arizona, and northwest New Mexico. Habitat: Dry, deep, sandy soils in desert shrub and pinyon-juniper communities. Elevation range 3,700 to 6,500 feet amsl. Flowering June to early July.	Region II: Low. Based on the presence of suitable vegetation cover types and elevation range, potential habitat for the species may be present within the 2-mile transmission line corridor in Mesa County, Colorado.	No.	NatureServe 2012.
Utah gentian	Gentianella tortuosa	BLM-CO	Range: Known from Rio Blanco County, Colorado, central and southwest Utah, and southern Nevada. Habitat: Sagebrush through spruce-fir forests on shale outcrops of the Green River Formation. Elevation range 8,500 to 10,800 feet amsl. Flowering July to August.	Low.	Yes. Although the species has been documented approx. 20 miles east of the 2-mile transmission line corridor in Rio Blanco County, Colorado, it is unlikely the species would be present within the 2-mile transmission line corridors based on the lack of suitable vegetation cover types and elevation range parameters.	CNHP 2002; NatureServe 2012.
Wonderland Alice flower	*Gilia caespitosa*	USFS-Dixie NF, USFS-Fishlake NF	Range: Endemic to Wayne County, Utah. Habitat: On Navajo and Wingate sandstone in crevices, Carmel Limestone formations, detrital slopes, and (infrequently) in sandy wash bottoms within open pinyon-juniper communities, often mixed with mountain brush, sagebrush, or ponderosa pine. Elevation range 5,100 to 9,000 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to Wayne County, Utah which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012.
Narrowstem gilia	Gilia stenothysra	BLM-CO	Range: Known from Mesa and Rio Blanco counties, Colorado; and Carbon, Duchesne, Emery and Uintah counties, Utah. Habitat: Found in open places often in hills of pinyon-juniper, salt desert shrub, sagebrush, and mountain-mahogany communities in silty to gravelly loams and sandy or clay alkaline soils, sandstone and siltstone shale or clay barrens all of the Green River and Uinta formations. Elevation range 5,000 to 9,320 feet amsl. Flowering late May to June thru early July.	Region II: High. The species has been documented within the 2-mile transmission line corridors in Moffat and Rio Blanco counties, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Moffat and Rio Blanco counties, Colorado.	No.	CNHP 2002; NatureServe 2012.
Smooth dwarf greasebush	*Glossopetalon pungens* var. *glabrum*	BLM-NV	Range: Restricted to the Spring and Sheep ranges within Clark County, Nevada; and also in California. Habitat: Crevices of carbonate cliffs and outcrops, generally avoiding southerly exposures, in the pinyon-juniper, mountain mahogany, and montane conifer zones. Elevation range 6,000 to 7,800 feet amsl. Flowering mid April to early July.	None.	Yes. The species is restricted to the Spring and Sheep ranges, which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Ash Meadows gumplant	*Grindelia fraxinopratensis*	BLM-NV	Range: Endemic to the Ash Meadows area in Nye County, Nevada. Habitat: Open, flat, whitish, strongly alkaline, clay soils in or bordering meadows and shallow drainages near springs and seeps, sometimes in disturbed areas within the creosote-bursage and shadscale zones in ash-mesquite woodlands, shadscale scrub, or saltgrass meadows. Aquatic or wetland-dependent species. Elevation range 2,070 to 2,320 feet amsl. Flowering in summer.	None.	Yes. The species is endemic to the Ash Meadows of Nye County, Nevada, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Sand cholla	*Opuntia pulcella (Grusonia pulchella)*	BLM-NV; NV State CY	Range: Known within Churchill, Douglas, Esmeralda, Lander, Lincoln, Mineral, Nye, Pershing, and Washoe counties, Nevada; and also in Arizona, California, and Utah. Habitat: Dependent on sand dunes or deep sands in Nevada, this species occupies sand of dunes, dry-lake borders, river bottoms, washes, valleys, and plains. Elevation range 3,950 to 6,300 feet amsl. Flowering May to June.	Region III: Low. Based on the elevation range and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NNHP 2001.
Pine Valley goldenweed (Pine Valley goldenbush)	*Ericameria crispus* (*Haplopappus crispus*)	USFS-Dixie NF, BLM-UT	Range: Endemic to the Pine Valley Mountains in Washington County, Utah. Habitat: Ponderosa pine, manzanita, spruce-fir, mountain mahogany, and aspen communities. Elevation range 8,100 to 10,000 feet amsl. Flowering August to October.	Low.	Yes. Although the species has been documented approx. 5 miles southeast of the 2-mile transmission line corridor, potential habitat parameters (specifically elevation range) are not present within the 2-mile transmission line corridor. It is unlikely the species would occur within the 2-mile transmission line corridors.	UNPS 2006.
Cedar Breaks goldenbush	*Haplopappus zionis*	BLM-UT	Range: Endemic to Kane, Garfield, and Iron counties, Utah. Habitat: Spruce-fir and ponderosa pine communities, mostly on limestone members of the Cedar Breaks (Claron limestone) Formation. Elevation range 8,000 to 10,000 feet amsl. Flowering mid-July to August.	None.	Yes. Based on the species elevation range and geological formation requirements, it is unlikely the species would occur within the 2-mile transmission line corridors.	UNPS 2006.
Canyon sweetvetch	*Hedysarum occidentale* var. *canone*	USFS-Manti-LaSal NF	Range: Endemic to Carbon, Duchesne, and Emery counties, Utah. Habitat: Pinyon-juniper, serviceberry, maple, mountain mahogany, and sagebrush communities. Elevation range 6,400 to 8,300 feet amsl. Flowering late June to mid August.	Region II: Low. The species has been documented within the 2-mile transmission line corridor in Emery County, Utah; however, no populations were documented within the USFS-MantiLaSal NF. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area within the USFS Manti-LaSal NF in Emery County, Utah.	No.	NatureServe 2012; UNPS 2006.
Jones goldenaster	*Heterotheca jonesii*	USFS-Dixie NF	Range: Endemic to southern Utah in Washington, Kane, and Garfield counties, Utah. Habitat: Ponderosa pine, manzanita, Douglas-fir communities on sandstone or in sand. Elevation range 5,200 to 9,000 feet amsl. Flowering May to September.	Low.	Yes. Based on the species vegetation cover type association requirements, it is unlikely the species would occur within the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Rock hymenoxys	*Hymenoxys lapidicola*	BLM-UT	Range: Endemic to Uintah County, Utah. Habitat: Rock crevices in ponderosa pine-manzanita and pinyon-juniper communities. Elevation range 6,000 and 8,100 feet amsl. Flowering period unknown.	None.	Yes. Although the species has been documented approx. 3.5 miles north of the 2-mile transmission line corridor in Uintah County, Utah, it is unlikely this species would occur given the lack of species-specific geological formations within the 2-mile transmission line corridor.	BLM 2010; UNPS 2006.
Red Rock Canyon aster	*Ionactis caelestis*	BLM-NV	Range: Endemic to the type locality in the Sandstone Bluffs -Red Rock Canyon area of the Spring Mountains, Clark County, Nevada. Habitat: Crevices in exposed, sparsely vegetated outcrops of Aztec sandstone in the pinyon-juniper and lower montane-conifer zones, with *Fendlerella utahensis, Poa secunda, Amelanchier utahensis, Hymenopappus filifolius, Arctostaphylos pungens, Arenaria congesta* var. *charlestonensis, Glossopetalon pungens, Pinus ponderosa,* and *P. monophylla*. Elevation at approx. 6,810 feet amsl. Flowering June.	None.	Yes. The species is endemic to the Spring Mountains, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Rock purpusia	*Ivesia arizonica* var. *saxosa*	BLM-NV	Range: Endemic to Lincoln and Nye counties, Nevada. Habitat: Crevices of cliffs and boulders on volcanic and possibly carbonate rocks in the upper mixed-shrub, sagebrush, and pinyon-juniper zones. Elevation range 4,925 to 6,800 feet amsl. Flowering late spring to summer.	Low.	Yes. Although potential habitat may be present based on the presence of suitable elevation range, it is unlikely this species would occur within the 2-mile transmission line corridors based on the lack of species-specific substrate and vegetation community type habitat requirements.	NNHP 2001.
Jaeger ivesia	*Ivesia jaegeri*	BLM-NV	Range: Restricted to the Spring Mountains within Clark County, Nevada; and also in California. Habitat: Rock crevices of limestone cliffs and lower-angle bedrock outcrops. Elevation range 5,200 to 11,060 feet amsl. Flowering June to August.	None.	Yes. The species is endemic to the Spring Mountains, which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Ash Meadows mousetails	*Ivesia kingii* var. *eremica*	BLM-NV	Range: Endemic to the Ash Meadows area in Nye County, Nevada. Habitat: Open, moist to saturated, whitish, heavy to chalky alkaline clay soils in meadows on flats, drainages, and bluffs near springs and seeps, in saltgrass meadow, shadscale, and ash-mesquite vegetation. Aquatic or wetland-dependent species. Elevation range 2,150 to 2,350. Flowering late-spring to early-fall.	None.	Yes. The species is endemic to the Ash Meadows of Nye County, Nevada, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Ostler's ivesia	*Ivesia shockleyi* var. *osterli*	BLM-UT	Range: Endemic to the Wah Wah Mountains and Needle Range of western Beaver County, Utah. Habitat: Pinyon-juniper and adjacent ponderosa pine communities in crevices of quartzite and whitish outcrops. Elevation range 6,400 to 7,900 feet amsl. Flowering May to August.	None.	Yes. Although the species has been documented approx. 14 miles northwest of the 2-mile transmission line corridor in Beaver County, Utah, the species is endemic to the Wah Wah Mountains and Needle Range, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Wasatch jamesia	*Jamesia americana* var. *macrocalyx*	USFS-Uinta-Wasatch-Cache NF	Range: Endemic to the Wasatch Mountains and the Deep Creek Mountains in Salt Lake, Wasatch, Juab, and Tooele counties, Utah. Habitat: Mountain brush and spruce/fir communities, including cracks and crevices of rocky slopes, in granite or limestone cliffs. Elevation range 5,700 to 12,000 feet amsl within the Wasatch Mountains; 5,500 to 6,700 feet amsl within the Deep Creek Mountains. Flowering June to mid August.	Region II: Moderate. The species has beed documented approx. 14 miles northwest of the 2-mile transmission line corridor in Utah County, Utah. Based on the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Utah, Juab, and Wasatch counties, Utah.	No.	NatureServe 2012; UNPS 2006.
Zion jamesia	*Jamesia americana* var. *zionis*	USFS-Dixie NF	Range: Endemic to Zion Canyon, and adjacent areas near Kanab, Utah within Iron, Kane, and Washington counties, Utah. Habitat: Pinyon-juniper, oak, and ponderosa pine communities in hanging gardens, sandstone crevices, and cliff sides and bases. Elevation range 3,900 to 8,200 feet amsl. Flowering June to July, sometimes into early August.	Low.	Yes. Based on the species limited distribution and geographic range, it is unlikely the species would be found within the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Four-petal jamesia (waxflower)	*Jamesia tetrapetala*	BLM-UT, BLM-NV	Range: Endemic to the Great Basin within Millard County, Utah; and Nye, Lincoln, and White Pine counties, Nevada. Habitat: Found in crevices on Paleozoic limestone outcrops and talus at cliff bases associated with chokecherry, mountain mahogany, ephedra, and sagebrush. Elevation at approx. 7,600 feet amsl. Flowering June.	Low.	Yes. Although the species has been documented approx. 19 miles west of the 2-mile transmission line corridor in Millard County, Utah, it is unlikely that this species would be present within the 2-mile transmission line corridors based on the species geologic substrate and limited elevation range.	NNHP 2001; UNPS 2006.
Bullfrog Hills sweetpea	*Lathyrus hitchcockianus*	BLM-NV	Range: Possible or probable Nevada endemic, known within Nye County, Nevada. Habitat: Open, dry to slightly moist gravels of rocky drainage bottoms in canyons and on upper alluvial slopes, often at bases of boulders or canyon walls and climbing up through shrubs, in volcanic tuff or carbonate rocks in the mixed-shrub, sagebrush, and pinyon-juniper zones. Elevation range 4,000 to 6,900 feet amsl. Flowering in spring.	Region III: Low. Although no known populations have been documented within or adjacent to the Project corridors, suitable habitat parameters may be present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NNHP 2001.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Neeses' peppergrass	*Lepidium montanum* var. *neeseae*	USFS-Dixie NF	Range: Endemic to the Table Cliff Plateau in Garfield County, Utah. Habitat: Ponderosa pine and spruce-fir communities, mainly on the Pink and White members of the Wasatch Formation and Navajo Sandstone. Elevation range 7,700 to 8,800 feet amsl. Flowering May to June.	None.	Yes. The species is endemic to Garfield County, Utah which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Barneby ridgecress	*Lepidium barnebyanum*	FE (UT)	Range: Known only from three ridges near Indian Canyon on the Uintah and Ouray Reservations of the Ute Indian Tribe within the Uinta Basin, Duchesne County, Utah. Total population estimated at approx. 5,000 individuals. Habitat: Poorly developed soils derived from marly shale outcrops in a zone of interbedding geologic strata from the Uinta and Green River formations within pinyon-juniper communities dominated by other similar pulvinate plants. Elevation range 6,200 to 6,500 feet amsl. Flowering early May.	Region II: Moderate. Known popoulations have been documented approx. 2.5 miles northwest and 4 miles south of the 2-mile transmission line corridors in Duchesne County, Utah. Based on the presence of suitable elevation range, vegetation cover types and geologic formations, potential habitat for the species may be present within the 2-mile transmission line corridors in Duchesne County, Utah.	No.	BLM 20101; USFWS 2012a, 1993a.
Huber pepperplant	*Lepidium huberi*	BLM-UT	Range: Endemic to Uintah County, Utah. Habitat: Black sagebrush, mountain brush, ponderosa pine, lodgepole pine, and spruce-fir communities in sand or silty sands derived from the Shinarump Member of the Chinle, Park City, and Weber Sandstones. Elevation range 5,000 to 9,700 feet amsl. Flowering June to August.	None.	Yes. Based on the species geographic range and habitat parameters, it is unlikely the species would occur within the 2-mile transmission line corridors in Uintah County, Utah.	BLM 2010; UNPS 2006.
Ostler's peppergrass	*Lepidium ostleri*	FC (UT); BLM-UT	Range: Endemic to the San Francisco Mountains within the Great Basin in Beaver County, Utah. Habitat: Crevices in limestone outcrops typically in pinyon-juniper communities. Elevation range 5,800 to 6,800 feet amsl. Flowering June to early July.	None.	Yes. The species is endemic to the San Francisco Mountains, Utah which are not crossed by the 2-mile transmission line corridors.	UNPS 2006; USFWS 2012a, 2011.
Dudley Bluffs bladderpod	*Lesquerella congesta* (Physaria congesta)	FT (CO)	Range: Known within the northern Piceance Basin in Rio Blanco County, Colorado. Total population estimated at approx. 550,000 to 600,000 individuals. Habitat: Barren, white shale outcrops along downcutting drainages associated with the Piceance and Yellow creeks on the Thirteenmile Creek Tongue of the Green River; and Uintah formations surrounded by mesas with pinyon-juniper woodlands. Elevation range 6,140 to 6,644 feet amsl. Flowering period unknown.	None.	Yes. The species is endemic to the Piceance Basin which is not crossed by the 2-mile transmission line corridors.	CNHP 2002; NatureServe 2012; USFWS 2012a, 1990b.
Garrett bladderpod	*Lesquerella garrettii*	USFS-Uinta-Wasatch-Cache NF	Range: Endemic to the central Wasatch Mountains, known from Big Cottonwood Canyon to Provo Peak, within Salt Lake County, Utah. Habitat: Sparsely vegetated subalpine and alpine communities on semi-stable talus slopes and basin floors with rocky-gravelly soils and also in crevices along rocky ridges, and infrequently in pockets of exposed, coarse soil on slopes with large rocks and boulders. Elevation range 8,890 to 12,010 feet amsl. Flowering June to August.	Low.	Yes. Based on the species limited distribution and geographic range, it is unlikely the species would be found within the 2-mile transmission line corridors.	NatureServe 2012.
Large-fruited bladderpod	*Lesquerella macrocarpa*	BLM-WY	Range: Endemic to the Great Divide Basin in Fremont and Sweetwater counties; the Green River Basin in Lincoln County; and the Ross Butte in Sublette County, Wyoming. Total population estimated at approx. 52,000 individuals. Habitat: Sparsely vegetated areas on flat to gentle slopes on low hills, knolls, and colluvial fans on barren, fine-textured clays and shales often with gypsum and bentonite associated with *Atriplex gardneri-Elymus elymoides* communities. Elevation range 6,800 to 7,700 feet amsl. Flowering mid May to late June.	Low.	Yes. Although the species has been documented approx. 34 miles northwest of the 2-mile transmission line corridor, it is unlikely the species would be present within the 2-mile transmission line corridors in Sweetwater County, Wyoming based on the species narrow and limited geographic range and lack of suitable habitat.	WYNDD 2009.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Piceance bladderpod	Lesquerella parviflora	BLM-CO	Range: Endemic to the Piceance Basin within Rio Blanco, Garfield, and Mesa counties, Colorado. Habitat: Outcrops of the Green River Shale Formation on ledges and slopes of canyons in open areas of pinyon-juniper communities with soils of the Torriorthent Rock outcrop complex. Frequently associated species include *Pinus edulis, Juniperus osteosperma, Eriogonum* sp.*, Cirsium* sp.*, Astragalus lutosus, Cercocarpus* sp.*, Galium coloradense, Oryzopsis hymenoides, Penstemon* sp.*, and Machaeranthera* sp. Elevation range 6,200-8,600 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to the Piceance Basin which is not crossed by the 2-mile transmission line corridors.	CNHP 2002; NatureServe 2012.
Maquire's bitterroot	*Lewisia maguirei*	BLM-NV	Range: Endemic to the Quinn Canyon and Grant ranges in Nye County, Nevada. Habitat: Dry, sparsely vegetated carbonate scree or shallow gravelly-clay soils on steep slopes and ridgelines of all aspects in the pinyon-juniper zone with desert frasera, Torrey's milkvetch, and stemless fournerve daisy. Elevation range 7,360 to 8,280 feet amsl. Flowering late-spring.	None.	Yes. The species is endemic to Nye County, Nevada, which which is not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Canyonlands lomatium (Wideleaf bisquitroot)	*Lomatium latilobum*	BLM-UT, BLM-CO, USFS-Manti-LaSal NF	Range: Endemic to Grand and San Juan counties, Utah; and Mesa County, Colorado. Habitat: Rock crevices and sandy deposits of the Entrada and Navajo Sandstone Formations or the contact point of the Wingate and Chinle formations, often found in slot canyons and between fins within pinyon-juniper and desert shrub communities. General elevation range 4,050 to 7,250 feet amsl. In Utah, 5,000 to 6,000 feet amsl. In Colorado, 5,000 to 7,000 feet amsl. Flowering April to June.	None.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types and elevation range, it is unlikely this species would occur within the 2-mile transmission line corridors based on the lack of species-specific geologic formation associations.	NatureServe 2012; UNPS 2006.
Scrub lotus	*Lotus argyraeus* var. *multicaulis*	BLM-NV	Range: Known within the Piute Wash and Ivanpah-Pahrump Valley watersheds within Clark County, Nevada. Habitat: Pinyon-juniper woodlands. Elevation range 3,900 to 4,925 feet amsl. Flowering period unknown.	None.	Yes. The species is only known within the Piute Wash and Ivanpah-Pahrump Valley watersheds, which are not crossed by the 2-mile transmission line corridors.	Jepson Flora Project 1993; NatureServe 2012.
Dolores rushpink (Dolores River skeletonplant)	*Lygodesmia grandiflora* var. *doloresensis* (*Lygodesmia doloresensis*)	BLM-UT	Range: Known within Grand County, Utah; and Mesa County, Colorado. Habitat: Juniper, sagebrush, rabbitbrush, and blackbrush communities in reddish alluvial soil. Elevation range 4,600 to 4,700 feet amsl. Flowering June.	Low.	Yes. Although potential habitat may be present based on the presence of suitable soil substrates and elevation range, it is unlikely this species would occur within the 2-mile transmission line corridors given the lack of species-specific vegetation cover type associations.	UNPS 2006.
Entrada rushpink (Entrada skeletonplant)	*Lygodesmia grandiflora* var. *entrada* (*Lygodesmia entrada*)	BLM-UT	Range: Endemic to Emery, Grand, and San Juan counties, Utah. Habitat: Mixed desert shrub and juniper communities. Elevation range 4,400 to 4,800 feet amsl. Flowering June.	Region II: Low. Based on agency consultation and the presence of suitable vegetation cover types and elevation range, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery and Grand counties, Utah.	No.	BLM 2010; UNPS 2006.
Pioche blazingstar	*Mentzelia argillicola*	BLM-NV, BLM-UT	Range: Known only from a relatively small area in Lincoln County, Nevada, ranging from the northern end of Meadow Valley in the vicinity of Panaca to the southern end of Lake Valley on both sides of Patterson Wash north of Pioche; and an oil shale endemic from Sanpete and Sevier counties, Utah. Habitat: In Nevada, dry soft, silty clay soils on knolls and slopes with sparse vegetation consisting most notably of *Artemisia pygmaea*, *Eriogonum nummulare*, *Gutierrezia sarothrae*, and *Salvia dorrii* var. *dorrii.* In Utah, talus or scree slopes of the Arapien Shale Formation, with little to no vegetation. Elevation range 4,890 to 5,645 feet amsl. Flowering late May to August.	Region II (Utah): High. The species has been documented both within the 2-mile transmission line corridor and the analysis area in Sevier County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Sevier County, Utah. Region III (Nevada): Low.	Utah – No. NV - Yes. The 2-mile transmission line corridors do not cross the Meadow Valley Wash Watershed in Lincoln County, Nevada; therefore, it is unlikely that the species would be present within the 2-mile transmission line corridors.	BLM 2011; Holmgren and Holmgren 2002; NatureServe 2012.
Goodrich blazingstar (Goodrich stickleaf)	*Mentzelia goodrichii*	USFS-Ashley NF, BLM-UT	Range: Endemic to the escarpments of the Willow and Argyle canyons within southern Duchesne County, Utah. Found along Bad Land Cliffs above Argyle Canyon, and west in to Avintaquin Canyon. Habitat: Steep, white, marly calciferous shale of the Green River Formation in scattered limber and pinyon pine, Douglas-fir, mountain mahogany, and rabbitbrush communities. Elevation range 8,100 to 8,800 feet amsl. Flowering July to August.	Region II: High. The species has been documented both within and outside of the USFS Ashley NF within the 2-mile transmission line corridor in Duchesne County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and analysis area within the USFS Ashley NF in Duchesne County, Utah.	No.	BLM 2010; NatureServe 2012; UNPS 2006.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Ash Meadows blazingstar	*Mentzelia leucophylla*	BLM-NV	Range: Endemic to the Ash Meadows area in Nye County, Nevada. Habitat: Open, generally dry, hard, salt-crusted alkaline clay or sandy-clay soils on low bluffs, swales, flats, and drainages in shadscale vegetation surrounding spring and seep areas. Elevation range 2,200 to 2,350 feet amsl. Flowering in summer.	None.	Yes. The species is endemic to Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Horse Canyon stickleaf	*Mentzelia multicaulis var. librina*	BLM-UT	Range: Endemic to the Colorado Plateau within Carbon and Emery counties, Utah. Habitat: Sagebrush, rabbitbrush, and pinyon-juniper communities on the Mancos Shale and Price River formations. Elevation at approx. 6,200 feet amsl. Flowering July to September.	Region II: Moderate. The species has been documented approx. 3 miles east of the 2-mile transmission line corridor in Emery County, Utah. Based on the presence of suitable elevation range, vegetation cover types and geologic formations, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery and Carbon counties, Utah.	No.	BLM 2010; UNPS 2006.
Polished blazingstar	*Mentzelia polita*	BLM-NV	Range: Known within Esmeralda, Clark, and Lincoln counties, Nevada; and California. Habitat: Open areas in mixed desert shrub communities. Elevation range 1,475 to 4,495 feet amsl. Flowering April to May.	Region III: Low. Although no known populations have been documented within or adjacent to the 2-mile transmission line corridor, suitable habitat parameters may be present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NatureServe 2012.
Roan Cliffs stickleaf	*Mentzelia rhizomata*	BLM-CO	Range: An endemic oil shale species known within Garfield County, Colorado Habitat: Steeply sloping and constantly moving talus or scree slopes of the Green River Formation shale in Colorado associated with *Astragalus lutosus, Thalictrum heliophilum, Penstemon debilis*, and *Festuca dasyclada*. Elevation range 5,800 to 9,000 feet amsl. Flowering May to August.	Low.	Yes. Although the species has been documented approx. 42 miles east of the 2-mile transmission line corridor, it is unlikely that the species would occur within the 2-mile transmission line corridors in Garfield County, Colorado based on the lack of suitable habitat.	NatureServe 2012.
Shultz stickleaf	*Mentzelia shultziorum*	BLM-UT	Range: Endemic to Emery and Grand counties, Utah. Habitat: Shadscale, *Eriogonum,* and ephedra communities on the Cutler Formation. Elevation range at 4,100 to 5,200 feet amsl. Flowering July to August.	Region II: Moderate. The species has been documented approx. 1.5 miles south of the 2-mile transmission line corridor in Emery County, Utah; and approx. 17 miles south of the 2-mile transmission line corridor in Grand County, Utah. Based on agency consultation and the presence of suitable elevation range and vegetation cover types, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery and Grand counties, Utah.	No.	BLM 2010; UNPS 2006.
Tiehm blazingstar	*Mentzelia tiehmii*	BLM-NV	Range: Endemic to the White River Valley within northeastern Nye County and adjacent Lincoln County, Nevada. Habitat: Sparsely vegetated, white calcareous knolls and bluffs with scattered perennials (*Artemisia nova*, *Atriplex confertifolia*, *Chrysothamnus parryi* var. *asper*, *Enceliopsis nudicaulis* var. *nudicaulis*, *Frasera gypsicola*, *Hymenopappus filifolius* var. *nanus*, *Lepidium nanum*, and *Phlox tumulosa*) and annuals (*Cordylanthus kingii* var. *kingii* and *Eriogonum howellianum*). Elevation range 4,925 to 5,200 feet amsl. Flowering late June to early September.	None.	Yes. The species is endemic to the White River Valley, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; Holmgren and Holmgren 2001.
Eastwood monkey-flower	*Mimulus eastwoodiae*	BLM-CO	Range: Endemic to the Canyonlands of southeastern Utah and adjacent Colorado, Arizona, and New Mexico. In Colorado, approximately 8 occurrences are known from Montrose, Mesa, San Miguel, and Delta counties. Habitat: Moist seeps and hanging garden communities in sandstone cliffs in the Canyonlands associated with *Primula specuicola*, *Adiantum capillus-veneris*, *Aquilegia micrantha*, and *Epipactis gigantea*. Elevation range 4,700 to 5,800 feet amsl. Flowering late July to early September.	Low.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types and soil substrate, it is unlikely this species would occur within the 2-mile transmission line corridors given the species narrow and limited geographic range.	CNHP 2002; NatureServe 2012.
Nuttall sandwort	*Minuartia nuttallii*	BLM-CO	Range: Common throughout Nevada, occurs throughout much of northern California, somewhat common in nine Utah counties, and extends north into southern British Columbia, Alberta, Idaho, Montana, Oregon, Utah, Washington, Wyoming, and Colorado. Habitat: Sandy and rocky slopes and ridges, barren rock, chaparral, open pine woodland, often on serpentine. Elevation range 2,000 to 12,500 feet amsl. Flowering spring to summer.	Regions I and II: Low. Based on the presence of suitable vegetation community types and substrates, potential habitat may be present within the 2-mile transmission line corridors in Moffat County, Colorado.	No.	FNA 1911; NatureServe 2012.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Fish Lake naiad	*Najas caespitosa*	USFS-Fishlake NF	Range: Endemic to Pelican Point, Fish Lake in Sevier County, Utah. Habitat: Shallow water to a depth of 12 inches. Elevation at approx. 8,600 feet amsl. Flowering late July to August.	None.	Yes. Based on the species limited distribution geographic range, it is unlikely the species would be found within the 2-mile transmission line corridors.	UNPS 2006.
Matted fiddleleaf	*Nama densum* var. *parviflorum*	BLM-CO	Range: In Colorado, occurs in Moffat County. Also found in Utah, California, and Nevada. Habitat: Sandy soil weathered from outcrops of calcareous sandstone and dominated by big sagebrush, and needle and thread grass. Elevation range 3,930 to 5900 feet amsl. Flowers early June.	Regions I and II: Low. Based on the presence of suitable vegetation community types and elevation range, potential habitat may be present within the 2-mile transmission line corridors in Moffat County, Colorado.	No.	Montana Natural Heritage Program 2010; Rosatti and Wetherwax 2001.
Amargosa niterwort	*Nitrophila mohavensis*	BLM-NV	Range: Known only from the Carson Slough-Ash Meadows area in Nye County, Nevada. Habitat: Open, moist, heavily alkaline and salt-crusted, otherwise nearly barren clay flats in low drainage and seepage areas surrounded by shadscale and saltgrass vegetation. Aquatic or wetland-dependant species. Elevation range 2,100 to 2,160 feet amsl. Flowering late-spring.	None.	Yes. The species is known only from Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Narrowleaf evening primrose	*Oenothera acutissima*	BLM-CO	Range: Restricted to Moffat County, Colorado and Daggett, Uintah, and Duchesne counties, Utah; known in the vicinity of the Flaming Gorge National Recreation Area and around Diamond Mountain, Cold Spring Mountain, and Douglas Mountain at the eastern end of the Uinta Mountains. The species has been documented as far west as Burnt Mill Spring, northwest of Roosevelt, and as far east as Boone Draw, below Sand Wash Basin in Moffat County, Colorado. Habitat: Grows along arroyos, in drainage channels, in depressions or shallow basins, in meadows or gravelly open areas, and in rock crevices within middle elevation coniferous forests (ponderosa and lodgepole pine), rocky mountain juniper-sagebrush communities, and sagebrush scrub communities. Typically restricted to sandy/gravelly soils, often growing among rocks; appears to be associated with a red quartzite of the Uinta Mountain Group. Elevation range 3,900 to 8,530 feet amsl. Flowering late May to June.	Low.	Yes. Based on the species limited distribution geographic range, it is unlikely the species would be found within the 2-mile transmission line corridors.	BLM 2010; CNHP 2002; NatureServe 2012.
Blue Diamond cholla	*Opuntia whipplei* var. *multigeniculata* (*Cylindropuntia multigeniculata)*	BLM-NV; NV State CE; NV State CY	Range: Endemic to the Blue Diamond Hills of the Spring Mountains within Clark County, Nevada. Habitat: Dry, open carbonate ledges, crevices, and rocky colluvium on gentle to steep slopes of all aspects, but predominantly on northerly exposures, canyon walls, or other cooler or more protected exposures, in close proximity to overlying gypsum beds up-slope, and associated with numerous other succulent and shrub species of the creosote bush and blackbrush vegetation zones. Elevation range 3,585 to 4,250 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to the Blue Diamond Hills of the Spring Mountains, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Trotter oreoxis	*Oreoxis trotteri*	BLM-UT	Range: Endemic to Emery and Grand counties, Utah. Habitat: Warm desert shrub and mixed juniper communities. Elevation range 4,800 to 6,000 feet amsl. Flowering late April to mid June.	Region II: Moderate. Known populations are present approx. 17 miles south of the 2-mile transmission line corridor in Grand and Emery counties. Utah. Based on agency consultation and the presence of suitable elevation range and vegetation cover types, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery and Grand counties, Utah.	No.	BLM 2010; UNPS 2006.
Arctic poppy	*Papaver radicatum* var. *pygmaeum*	USFS-Ashley NF	Range: Known from the Uinta Mountains in Duchesne and Summit counties, Utah; and also Montana and Alberta, Canada. Habitat: Rock stripes in alpine tundra communities with *Polemonium*, *Smelowskia*, *Erigeron*, sedges, and saxifrages. Elevation range 11,100 to 12,800 feet amsl. Flowering July to August.	None.	Yes. The species is endemic to the Uinta Mountains, which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Ligulate feverfew	*Parthenium ligulatum*	BLM-CO	Range: Known from Rio Blanco and Moffat counties, Colorado; and also in Utah and Nevada. Habitat: Barren or semi-barren calciferous or gypsiferous outcrops of the Green River, Uinta, Ferron, Summerville, and Carmel formations in salt desert shrub, serviceberry, rabbitbrush, Indian rice-grass, greasebush, galleta, black sagebrush, pygmy sagebrush, and pinyon-juniper communities. Elevation range 5,590 to 7,000 feet amsl. Flowering May/June.	Region II: Low. Based on the presence of suitable elevation range, geologic formations, and vegetation cover types, potential habitat for the species may be present within the 2-mile transmission line corridor in Mesa and Rio Blanco counties, Colorado.	No.	CNHP 2002; NatureServe 2012.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
San Rafael cactus (Despain pincushion cactus)	*Pediocactus despainii*	FE (UT)	Range: Endemic to Emery and Wayne counties, Utah. Habitat: Open pinyon-juniper communities on limestone gravels. Elevation at approx. 6,000 feet amsl. Flowering late April to early May.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present both within and outside of the 2-mile transmission line corridors in Emery County, Utah.	No.	BLM 2010; CPC 2010; NatureServe 2012; USFWS 2012a, 2007, 1995b; UDWR 2012; UNPS 2006.
Siler pincushion cactus	*Pediocactus sileri*	FT (UT)	Range: Known within Kane and Washington counties, Utah; and Mohave and Coconino counties, Arizona. Habitat: Salt desert shrub communities in red and gray gypsiferous, seleniferous, and calciferous shales of the Moenkopi Formation often found growing with or in thick biological soil crusts. Elevation range 3,000 to 5,200 feet amsl. Flowering March to April/May.	Region III: Moderate. The species has been documented approx. 23 miles southeast of the 2-mile transmission line corridor in Washington County, Utah. Based on the presence of suitable elevation range, soil substrates, and vegetation cover types, potential habitat for the species may be present within the 2-mile transmission line corridors in Washington County, Utah.	No.	USFWS 2012a, 1986; UNPS 2006.
Winkler cactus	*Pediocactus winkleri*	FT (UT)	Range: Endemic to Emery and Wayne counties, Utah. Habitat: Salt desert shrub communities on small gravel barrens or clay on the Dakota Formation. Elevation range 4,800 and 5,200 feet amsl. Flowering late March to mid May.	Region II: Moderate. The species have been documented approx. 1. 5 miles east and 6 miles northwest of the 2-mile transmission line corridor in Emery County, Utah. Based on agency consultation and the presence of suitable elevation range, soil substrates, and vegetation cover types, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery County, Utah.	No.	BLM 2010; CPC 2010; USFWS 2012a, 2007, 1995b; UDWR 2012; UNPS 2006.
Barneby breadroot	*Pediomelum aromaticum* var. *barnebyi*	BLM-UT	Range: Restricted to southeast Washington County, Utah; and adjacent Mohave County, Arizona. Habitat: Pinyon-juniper and silver buffaloberry communities on fine-textured substrates of the Chinle Formation. Elevation at approx. 4,400 feet amsl. Flowering July to August.	Low.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types and geologic formation, it is unlikely this species would occur within the 2-mile transmission line corridors given the species limited geographic range.	UNPS 2006.
Beaver Dam breadroot	*Pediomelum castoreum*	NPS-Lake Mead NRA; BLM-NV	Range: Known within Lincoln and Clark counties, Nevada; and also in Arizona and California. Habitat: Limited information available; possibly dry, sandy deserts. Elevation range 1,280 to 5,000 feet amsl. Flowering period unknown; most common survey period: April to May.	Region III: High. The species has been documented within the 2-mile transmission line corridors in Clark County, Nevada. Potential habitat may be present both within the 2-mile transmission line corridors and the analysis area in Lincoln and Clark counties, Nevada. Region IV: Low. Potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Clark County, Nevada. Based on agency consulation and lack of suitable habitat parameters, it is unlikely that this species would occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA.	No.	NNHP 2001; NatureServe 2012; NPS 2012.
Paria breadroot	*Pediomelum pariense*	USFS-Dixie NF	Range: Endemic to Kane and Garfield counties, Utah. Habitat: Ponderosa pine and pinyon-juniper communities on calcareous or sandy soils on Wasatch Limestone. Elevation range 5,600 to 8,000 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to Kane and Garfield counties, Utah which are not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Stemless beardtongue	*Penstemon acaulis* var. *acaulis*	USFS-Ashley NF, BLM-WY, BLM-UT	Range: Endemic to Daggett County, Utah; and Sweetwater County, Wyoming. Habitat: Pinyon-juniper and sagebrush-grass communities on semi-barren substrates. Elevation range 5,840 to 7,285 feet amsl. Flowering June to July.	None.	Yes. Although the species has been documented approx. 3.5 miles north of the 2-mile transmission line corridor in Uintah County, Utah, it is unlikely this species would occur given the lack of species-specific geological formations within the 2-mile transmission line corridor.	BLM 2010; NatureServe 2012; UNPS 2006; WYNDD 2001.
White-margined beardtongue	*Penstemon albomarginatus*	BLM-NV	Range: Clark and Nye counties, Nevada; and also in Arizona and California. Habitat: Dependent on sand dunes or deep sand, this species occupies stabilized desert dunes and Mojavean desert scrub habitats. Elevation range 2,750 to 5,890 feet amsl. Flowering March to May.	Regions III and IV: Moderate. The species has been documented approx. 7 miles west of the 2-mile transmission line corridor in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Clark County, Nevada.	No.	NNHP 2001.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Broadbeard beardtongue	*Penstemon angustifolius* var. *dulcis*	BLM-UT	Range: Endemic to the Great Basin within Juab and Millard counties, Utah. Habitat: Fourwing saltbush, sagebrush/*Eriogonum* and juniper communities in dune sands. Elevation range 4,600 to 5,400 feet amsl. Flowering May to June.	Regions II and III: High. The species has been documented within the 2-mile transmission line corridor in Millard and Juab counties, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Millard and Juab counties, Utah.	No.	UNPS 2006.
Yellow twotone beardtongue	*Penstemon bicolor* ssp. *bicolor*	BLM-NV	Range: Possibly an endemic to Clark County, Nevada; and also in California. Habitat: Calcareous or carbonate soils in washes, roadsides, rock crevices, outcrops, or similar places receiving enhanced runoff, in the creosote-bursage, blackbrush, mixed-shrub, and lower juniper zones. Elevation range 2,500 to 5,480 feet amsl. Flowering spring.	Regions III and IV: Moderate. The species has been documented adjacent to the 2-mile transmission line corridors in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark County, Nevada.	No.	NNHP 2001.
Rosy twotone beardtongue	*Penstemon bicolor* ssp. *roseus*	NPS-Lake Mead NRA; BLM-NV	Range: Known within Clark and Nye counties, Nevada; and also in Arizona and California. Habitat: Rocky calcareous, granitic, or volcanic soils in washes, roadsides, scree at outcrop bases, rock crevices, or similar places receiving enhanced runoff, in the creosote-bursage, blackbrush, and mixed-shrub zones. Elevation range 1,800 to 4,840 feet amsl. Flowering mid March to mid May.	Regions III and IV: High. The species has been documented in numerous locations within the 2-mile transmission line corridors in Clark County, Nevada. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Clark County, Nevada. Based on agency consultation and lack of suitable habitat parameters, it is unlikely that this species would occur within the 2-mile transmission line corridors within the NPS-Lake Mead NRA.	No.	NNHP 2001; NPS 2012.
USF Red Canyon beardtongue	*Penstemon bracteatus*	USFS-Dixie NF	Range: Endemic to Garfield, Iron, Kane counties, Utah. Habitat: Ponderosa pine, limber pine, bristlecone pine/manzanita communities in stone slides and calcareous gravels of the Pink and White limestone members of the Claron Formation. Elevation range 6,900 to 8,500 feet amsl. Flowering May to July.	Low.	Yes. Based on the lack of suitable elevation range and vegetation cover type requirements, it is unlikely that potential habitat would be present within the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Cache beardtongue	*Penstemon compactus*	USFS-Uinta-Wasatch-Cache NF	Range: Known within Cache County, Utah; and also Franklin County, Idaho. Habitat: Openings in coniferous communities, associated with *Monardella*, clematis, columbine, and other penstemon species, on limestone and dolomite parent material. Elevation range 7,000 to 9,800 feet amsl. Flowering June to August.	None.	Yes The species has been documented within Cache County, Utah, which is not crossed by the 2-mile transmission line corridors.	UNPS 2006.
Tunnel Springs beardtongue	*Penstemon concinnus*	BLM-NV	Range: Endemic to the Great Basin within Beaver, Iron and Millard counties, Utah. Barely entering Nevada, the species is known from a few extant occurrences within White Pine and Lincoln counties. Habitat: Alluvial slopes within pinyon, juniper, or sagebrush communities. Elevation range between 6,200 to 6,600 feet amsl. Flowering May to June.	Region III: Low. Based on the presence of suitable vegetation cover types, soil substrates, and elevation range, potential habitat for the species may be present within the 2-mile transmission line corridors in Lincoln County, Nevada.	No.	NNHP 2001; Protect Snake Valley 2010.
Parachute beardtongue	*Penstemon debilis*	FP (CO)	Range: Endemic to Garfield County, Colorado. Habitat: Sparsely vegetated, south-facing, steep, white shale talus of the Parachute Creek Member of the Green River Formation. Soils are a mixture of thin shale fragments and clay. Elevation range 8,000 to 9,000 feet amsl. Flowering mid June to mid July.	Low.	Yes. The species has been documented approx. 40 miles east of the 2-mile transmission line corridor in Garfield County, Colorado; however, based on suitable habitat and agency consultation, it is unlikely that this species would occur within the 2-mile transmission line corridors given the species-specific associated vegetation communities.	CNHP 2002; USFWS 2012a,b, 2011c.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Franklin penstemon	*Penstemon franklinii*	BLM-UT	Range: Endemic to Cedar Valley within Iron County, Utah. Habitat: Associated with three-awn, needlegrass, matchweed, and black sagebrush communities. Elevation range 5,400 to 5,900 feet amsl. Flowering May to June.	Region III: Low. Based on agency consultation, known populations have been documented adjacent to the 2-mile transmission line corridor in Iron County, Utah. Although unlikely, potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Iron County, Utah.	No.	BLM 2012b; UNPS 2006.
Death Valley beardtongue	*Penstemon fruticiformis* ssp. *amargosae*	BLM-NV	Range: Clark and Nye counties, Nevada; and also in California. Habitat: Gravely washes, canyon floors and juniper-pine woodlands. Elevation 3,100 to 6,330 feet amsl. Flowering April to June.	Low.	Yes. Although potential habitat may be present based on the presence of suitable soil substrates and elevation range, it is unlikely the species would occur within the 2-mile transmission line corridors given the species-species vegetation cover type requirements.	CPC 2010; NNHP 2001.
Gibbens penstemon (Gibbens beardtongue)	*Penstemon gibbensii*	BLM-WY, BLM-CO, BLM-UT	Range: Known within Daggett County, Utah; Moffat and Rio Blanco counties, Colorado; and Carbon and Sweetwater counties, Wyoming. Habitat: Sandy or shaly (often Green River Shale) bluffs and slopes with juniper, thistle, *Eriogonnum, Elymus*, serviceberry, rabbitbrush, and *Thermopsis*. Elevation range 5,500 to 7,700 feet amsl. Flowering June to September.	Region I: Wyoming - High. The species has been documented within the 2-mile transmission line corridor in Sweetwater and Carbon counties, Wyoming. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Sweetwater and Carbon counties, Wyoming. Region I: Colorado – Moderate. The species has been documented on the Sweetwater County, Wyoming/Moffat County, Colorado, border. Potential habitat for the species may be present within the 2-mile transmission line corridor in Moffat County, Colorado.	No.	BLM 2010; NatureServe 2012; UNPS 2006; WYNDD 2009.
Goodrich penstemon	*Penstemon goodrichii*	BLM-UT	Range: Endemic to the Uinta Basin at the Lapoint-Tridell-Whiterocks area, Utah. Habitat: Blue gray to reddish clay badlands of the Duchesne River Formation in shadscale and juniper-mountain mahogany communities. Elevation range 5,600 to 6,200 feet amsl. Flowering late May to June.	Region II: Moderate. The species has been documented approx. 3 miles north of the 2-mile transmission line corridor in Duchesne County, Utah; and 9 miles north of the 2-mile transmission line corridor in Uintah County, Utah. Based on agency consultation and the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Duchesne and Uintah counties, Utah.	No.	BLM 2010; UNPS 2006.
Graham's penstemon	*Penstemon grahamii*	FP, BLM-CO, BLM-UT	Range: Restricted to the Uinta Basin in Uintah, Carbon, and Duchesne counties, Utah; and adjacent Rio Blanco County, Colorado. Habitat: Sparsely vegetated shadscale, *Eriogonum*, horsebrush, ryegrass, and pinyon-juniper communities on shale ledges and talus on the Green River Formation. Elevation range 4,600 to 7,600 feet amsl. Flowering late May to mid-June.	Region II: High. The species has been documented within, and adjacent to, the 2-mile transmission line corridor in Rio Blanco County, Colorado; and Uintah and Duchesne counties, Utah. Potential habitat may be present within the 2-mile transmission line corridors in Uintah and Duchesne counties, Utah; and Rio Blanco County, Colorado.	No.	BLM 2010; NatureServe 2012: USFWS 2012a; UNPS 2006.
Blowout penstemon	*Penstemon haydenii*	FE (WY)	Range: Known within the Sandhills region of Nebraska and the northeastern Great Divide Basin in Carbon County, Wyoming. Habitat: Substrate of eroding and shifting sand with low vegetation cover, typically found in "blowouts" (i.e., depressions in the topography caused by wind erosion) with less than 10 percent basal ground cover. Elevation range unknown. Flowering mid May to late June.	None.	Yes. Although populations are present approx. 29 miles north of the 2-mile transmission line corridor; it is unlikely the species would be present within the 2-mile transmission line corridors in Carbon County, Wyoming based on the lack of potential habitat.	Heidel 2012; Stubbendieck, et al. 1989; USFWS 2012a, 2011d, 1992a.
Pennell beardtongue	*Penstemon leiophyllus* var. *francisci-pennellii*	BLM-NV	Range: Known from the Snake, Wilson Creek, southern Schell Creek, Egan, and Grant ranges in Lincoln, Nye, and White Pine counties, Nevada; also in Utah. Habitat: Rocky calcareous slopes on shaded banks. Elevation range 7,000 to 11,500 feet amsl. Flowering period unknown; most common survey months: July to August.	None.	Yes. The 2-mile transmission line corridors do not intersect Nye or White Pine counties, Nevada. The species-specific elevation range parameters are not crossed by the 2-mile transmission line corridors in Lincoln County, Nevada.	NatureServe 2012; NNHP 2001.
Pahute Mesa beardtongue	*Penstemon pahutensis*	BLM-NV	Range: Known within Esmeralda and Nye counties, Nevada; and also in California. Habitat: In loose soil and rock crevices among boulders in pinyon-juniper woodlands and sagebrush shrublands. Elevation range 5,360 to 8,240 feet amsl. Flowering June to mid July.	None.	Yes. The species is known only within Nye and Esmeralda counties, Nevada, which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Little penstemon	*Penstemon parvus*	USFS-Dixie NF, USFS-Fishlake NF	Range: Endemic to Garfield, Piute, and Sevier counties, Utah. Habitat: Black sagebrush, silver sagebrush, and grass/forb communities on sandy gravelly loam and Tertiary volcanic gravels. Elevation range 8,500 to 10,500 feet amsl. Flowering late June to August.	Low.	Yes. Although populations are present approx. 6 miles south of the 2-mile transmission line corridor, it is unlikely the species would be present within the 2-mile transmission line corridors in Sevier County, Utah based on the lack of potential habitat.	NatureServe 2012; UNPS 2006.
Pinyon penstemon	*Penstemon pinorum*	USFS-Dixie NF, BLM-UT	Range: Endemic to the Pine Valley Mountains within Iron and Washington counties, Utah. Habitat: Pinyon-juniper, mountain mahogany, ephedra, oak, sagebrush, and less commonly greasewood communities, often on Claron Limestone or gravels. Elevation range 5,600 to 6,700 feet amsl. Flowering May to June.	Region III: High. The species has been documented within the 2-mile transmission line corridor in Iron and Washington counties, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Iron and Washington counties, Utah.	No.	NatureServe 2012; UNPS 2006.
White River beardtongue (White River penstemon)	*Penstemon scariosus (Penstemon scariosus* var. *albifluvis)*	BLM-UT, FC (CO, UT)	Range: Known within Uintah County, Utah; and Rio Blanco County, Colorado. Habitat: Mixed desert shrub and pinyon-juniper communities dominated by shadscale, rabbitbrush, ricegrass, ryegrass, sagebrush, and Barneby's thistle on sparsely vegetated tan shale slopes of the Green River Formation. Elevation range 5,000 to 6,880 feet amsl. Flowering late May to June.	Region II: Moderate. The species has been documented approx. 6 miles west of the 2-mile transmission line corridor in Rio Blanco County, Colorado; and approx. 8 miles southeast of the 2-mile transmission line corridor in Uintah County, Utah. Based on agency consultation and the presence of suitable habitat requirements, the species may be present within the 2-mile transmission line corridors in Uintah County, Utah and Rio Blanco County, Colorado.	No.	BLM 2010; CNHP 2002; USFWS 2012a, 2011e,f; UNPS 2006.
Jaeger beardtongue	*Penstemon thompsoniae* ssp. *jaegeri*	BLM-NV	Range: Known within the Spring Mountains, east to the Sheep Range, in Clark County, Nevada. Habitat: Gravelly limestone soils on knolls and sloes, in drainages, and under conifers, from the pinyon-juniper to the subalpine conifer zones. Elevation range 5,577 to 11,060 feet amsl. Flowering late-spring to summer.	None.	Yes. The species is endemic to the Spring Mountains, which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Ward beardtongue	*Penstemon wardii*	BLM-UT, USFS-Fishlake NF	Range: Endemic to Millard, Sanpete, and Sevier counties, Utah. Habitat: Arapien Shale Formation associated with ephedra, rabbitbrush, shadscale, mountain mahogany, sagebrush, and pinyon-juniper communities on semi-barren, white to gray, fine-textured, often calcareous or gypsiferous substrates. Elevation range 5,500 to 6,800 feet amsl. Flowering period unknown.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Sevier County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Sevier, Sanpete, and Millard counties, Utah.	No.	NatureServe 2012; UNPS 2006.
Alcove rock-daisy	*Perityle specuicola*	BLM-UT	Range: Regional endemic to canyons along the Colorado and San Juan Rivers in southeast Utah; also along the Colorado River Canyon near Moab, within the Glen Canyon National Recreation Area; and along the main canyon of the San Juan River within Garfield, Grand, and San Juan counties, Utah. Total population estimated at approx. 660 individuals. Habitat: Desert shrub and hanging garden communities in narrow, protected canyons, alcoves, and at cliff bases where it receives minimal to no direct sunlight on the Navajo Sandstone and the Cedar Mesa Formation. Elevation range 3,700 to 4,200 feet amsl. Flowering mid July to late September.	None.	Yes. Potential habitat for the species is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Parry petalonyx	*Petalonyx parryii*	BLM-UT	Range: Known within Washington County, Utah; western Coconino and northern Mohave counties, Arizona; and Clark County, Nevada. Habitat: Dry, desert washes, and canyons, often on gypsum and micaceoius shales with *Phacelia, Psorothamnus,* and *Atriplex* species on Chinle and Moenkopi outcrops. Elevation range and flowering period unknown.	Region III: Low. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area within Washington County, Utah.	No.	NatureServe 2012; UNPS 2006.
Clay phacelia	*Phacelia argillacea*	FE (UT)	Range: Known only within the Spanish Fork Canyon of Utah County, Utah. Total population estimated at approx. 200 individuals. Habitat: Steep slopes in sparsely populated juniper-pinyon and mountain brush communities on shaley clay colluviums of the Green River Formation. Elevation range 6,000 to 7,000 feet amsl. Flowering late May to early June.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Utah County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Utah County, Utah.	No.	Atwood 1975; Tilley et al. 2010; USFWS 2012a, 1982; UDWR 2012.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Argyle Canyon phacelia	*Phacelia argylensis*	BLM-UT	Range: Endemic to Argyle Canyon, adjacent to West Tavaputs Plateau in Duchesne County, Utah. Habitat: Pinyon-juniper, serviceberry, and Douglas Fir communities. Elevation range and flowering period unknown.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Utah County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Utah County, Utah.	No.	BLM 2011.
Beatley scorpion plant	*Phacelia beatleyae*	BLM-NV	Range: Endemic to Lincoln and Nye counties, Nevada. Habitat: Dry, open, nearly barren scree and loose gravelly soils on slopes and bases of white to brownish volcanic tuff outcrops on all slopes and aspects, and in adjacent drainages, in the mixed-shrub, blackbrush, shadscale, and upper creosote-bursage zones. Elevation range 3,540 to 5,500 feet amsl. Flowering April to May.	Low.	Yes. Although potential habitat may be present, it is unlikely the species would occur within the 2-mile transmission line corridors based on the location of the associated geologic formations and known occurrence populations.	NNHP 2001.
Parish phacelia	*Phacelia parishii*	BLM-NV	Range: Known within Clark, Lincoln, Nye, and White Pine counties, Nevada. Habitat: An aquatic or wetland-dependent species in Nevada occupying moist to superficially dry, open, flat to hummocky, mostly barren, often salt-crusted silty-clay soils on valley bottom flats, lake deposits, and playa edges, often near seepage areas, sometimes on gypsum deposits, surrounded by saltbush scrub vegetation but with few immediate associates such as *Atriplex confertifolia, A. canescens, A. argentea, Poa secunda, Monolepis nuttalliana, Phacelia fremontii, Lepidium flavum,* and *Sarcobatus vermiculatus*. Elevation range 2,190 to 5,920 feet amsl. Flowering late spring.	Regions III and IV: Low. Potential habitat for the species may be present both within the 2-mile transmission line corridors and the analysis area in Clark and Lincoln counties, Nevada.	No.	NNHP 2001.
Debeque phacelia	*Phacelia submutica*	FT (CO)	Range: Endemic to the Piceance Basin within Mesa and Garfield counties, Colorado. Total population estimated at approx. 3,594 to 34,504 individuals within 28 populations. Habitat: Exposures of dark gray and brown clay soils derived from the Atwell Gulch and Shire members of the Wasatch Formation on moderately steep slopes, barren or semi-barren hillsides, benches, and ridge tops adjacent to valley floors. Flowering late April to late June.	None.	Yes. The species is endemic to the Piceance Basin which is not crossed by the 2-mile transmission line corridors.	CNHP 2002; Lyon et al. 2001; USFWS 2012a,b, 2011c.
Utah phacelia	*Phacelia utahensis*	BLM-UT	Range: Known within Sanpete and Sevier counties, Utah; possibly also found in Carbon County, Utah. Habitat: Salt desert shrub communities on clay hills and banks in the Arapien Shale Formation (and possibly the Mancos Shale Formation). Elevation range 5,500 to 6,200 feet amsl. Flowering April to June.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Sevier County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Sevier County, Utah.	No.	BLM 2010; UNPS 2006.
Beaver Rim phlox	*Phlox pungens*	BLM-WY	Range: Endemic to the Wind River and Green River basins and southeastern foothills of the Wind River Range in Fremont, Lincoln, and Sublette counties, Wyoming. Habitat: Sparsely vegetated slopes on sandstone, siltstone, or limestone (in the Wind River Basin) and on clays and shales (in the Green River Basin). Elevation range 6,000 to 7,400 feet amsl.	Region I: Low. Although species presence has not been documented within the 2-mile transmission line corridors, a WYNDD model-detailed analysis indicates the potential for occurrence within Sweetwater and Carbon counties, Wyoming.	No.	BLM 2012a; NatureServe 2012; WYNDD 2000.
Tufted twinpod	*Physaria condensata*	BLM-WY	Range: Endemic to southwestern Wyoming within Lincoln, Sublette, and Uinta counties. Habitat: Sparsely vegetated shale slopes and ridges. Elevation range 6,500 to 7,000 feet amsl. Flowering May/June to June/July.	Region I: Low. Although species presence has not been documented within the 2-mile transmission line corridors, a WYNDD model-detailed analysis indicates the potential for occurrence within Sweetwater and Carbon counties, Wyoming.	No.	BLM 2012a; NatureServe 2012; WYNDD No Date.
Dudley Bluffs twinpod	*Physaria obcordata*	FT (CO)	Range: Endemic to the Piceance Basin in Rio Blanco County, Colorado. Habitat: Barren white outcrops and steep slopes exposed by creek downcutting associated with the Green River Formation. Elevation range 5,900 to 7,500 feet amsl. Flowering May/June to June/August.	None.	Yes. The species is endemic to the Piceance Basin which is not crossed by the 2-mile transmission line corridors.	CNHP 2002; USFWS 2012a.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Limber pine	*Pinus flexilis*	BLM-WY	Range: Widespread across the northern and central Rocky Mountains, and the Great Basin regions in Canada. It is patchily distributed across Oregon, Idaho, Montana, Wyoming, Nevada, Utah, Colorado, and New Mexico. In the Dakotas, Nebraska, Arizona, and California, isolated populations occur. Habitat: Dry, rocky sites in forested regions on mesic sites in low density, open area. In Wyoming, it is typically found with Rocky Mountain lodgepole pine, Engelmann spruce, whitebark pine, Rocky Mountain Douglas-fir, subalpine fire, Rocky Mountain juniper, and common juniper. General elevation range 4,000 to 12,500 feet amsl; specific elevation ranges for Wyoming are not available. Buds burst late April to late June, while pine cones ripen from August to September, and seeds are dispersed from September to October	None.	Yes. Based on the deletion of Segment 10 (former Aelous Design Option), potentially suitable habitat for this species is no longer present within the 2-mile transmission line corridor in Carbon County, Wyoming.	BLM 2012a; Johnson 2001; NatureServe 2012; USGS 1999.
Angell cinquefoil	*Potentilla angelliae*	USFS-Dixie NF	Range: Endemic to the Aquarius Plateau in Garfield and Wayne counties, Utah. Habitat: Rocky, subalpine meadows. Elevation at approx. 11,000 feet amsl. Flowering July.	None.	Yes. The species is endemic to the Aquarius Plateau in Garfield and Wayne counties, Utah, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006.
Cottam cinquefoil	*Potentilla cottamii*	USFS-Uinta-Wasatch-Cache NF, BLM-UT	Range: Known only from the Pilot Range within Elko County, Nevada; and Box Elder, Juab, and Tooele counties, Utah. Habitat: Crevices or narrow ledges on outcrops of quartzite or other siliceous metamorphic or granitoid rocks on all aspects in the upper subalpine conifer zone with *Pinus flexilis*, *Abies lasiocarpa*, *Ribes montigenum*, and *Achillea millefolium*. In Nevada, elevation range 9,400 to 10,600 feet amsl; in Utah, 7,500 to 10,400 feet amsl. Flowering late July to early August.	None.	Yes. Based on the species limited distribution geographic range, it is unlikely the species would be found within the 2-mile transmission line corridors.	NNHP 2001; UNPS 2006.
House Range primrose	*Primula cusickiana* var. *domensis*	BLM-UT	Range: Endemic to the House Ridge within the Notch Peak area in Millard County, Utah. Habitat: Limestone crevices. Elevation range and flowering period unknown.	None.	Yes. The species is endemic to the Notch Peak area which is not crossed by the 2-mile transmission line corridors.	BLM 2011; UNPS 2006.
Jones indigo-bush	*Psorothamnus polydenius* var. *jonesii (Psorothamnus nummularious)*	BLM-UT	Range: Endemic to Emery and Grand counties, Utah. Habitat: Shadscale, mat-saltbush, ephedra, and galleta communities on the Blue Gate and Tununk members of the Mancos Shale Formation on sandy terrace gravels. Elevation range 4,200 to 4,900 feet amsl. Flowering late May to mid July.	Region II: High. The species has a documented within the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Emery and Grand counties, Utah.	No.	BLM 2010; UNPS 2006.
Smokethorn	*Psorothamnus spinosus*	NPS-Lake Mead NRA	Range: Known within the Sonoran Desert, within the southern part of California, Arizona, and Baja California. Habitat: Desert washes. Elevation range less than 1,300 feet amsl. Flowering June to July.	None.	Yes. Based on agency consultation and lack of suitable habitat parameters, it is unlikely this species would occur within the 2-mile transmission line corridors.	Jepson Flora Project 2012; NPS 2012.
Persistent sepal yellowcress	*Rorippa calycina*	BLM-WY	Range: Restricted to the North Platte River drainage, and the Bighorn, Great Divide, Green River, and Wind River basins within Albany, Big Horn, Carbon, Fremont, Park, Sweetwater, and Washakie counties. Total population estimated at approx. 15,000 to 25,000 individuals. Habitat: Moist sandy to muddy banks of streams, stock ponds, and man-made reservoirs near the high water line, high plain swales that evaporate, and along creeks. Elevation range 3,660 to 6,800 feet amsl. Flowering late May to August (extending into October).	None.	Yes. Based on the deletion of Segment 10 (former Aelous Design Option), potentially suitable habitat for this species is no longer present within the 2-mile transmission line corridor in Carbon County, Wyoming.	WYNDD 2009.
Arizona willow	*Salix arizonica*	USFS-Dixie NF, USFS-Fishlake NF, USFS-Manti-LaSal NF	Range: Known within Iron, Kane, Sanpete, and Sevier counties, Utah; and also in Arizona, New Mexico, and possibly Colorado. Habitat: Riparian areas and wet meadows. Elevation at approx. 8,200 feet amsl. Flowering period unknown.	Region II: Moderate. The species has been documented approx. 15 miles north and south of the 2-mile transmission line corridor in Sanpete and Sevier counties, Utah. Based on the presence of suitable vegetation cover types, elevation range, and presence of riparian areas, potential habitat for the species may be present within the 2-mile transmission line corridors within USFS Fishlake NF in Sevier County, Utah.	No.	NatureServe 2012; UNPS 2006.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Death Valley sage	*Salvia funerea*	BLM-NV	Range: Known within Nye County, Nevada; and also in California. Habitat: Dry limestone cliffs, crevices, and adjacent wash gravels in deep sheltered canyons or on north-facing exposures, surrounded by zonal shadscale and creosote bush vegetation. Elevation range 2,600 to 3,500 feet amsl. Flowering in spring.	None.	Yes. The species is known within Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Clay reed-mustard	*Schoenocrambe argillacea*	FT (UT)	Range: Endemic to the Bookcliffs in Uintah County, Utah. Known populations are present from the west side of the Green River to the east side of Willow Creek. Habitat: Mixed desert shrub communities on generally north-facing slopes composed of clay soils rich with gypsum overlain with sandstone talus on shale substrates at the contact zone between the lower Uinta and upper Green River formations. Typically found in mixed desert shrub communities of shadscale, Indian ricegrass, and pygmy sagebrush. Elevation range 4,800 to 5,600 feet amsl. Flowering April to May.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Uintah County, Utah. Potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Uintah County, Utah.	No.	BLM 2010; USFWS 2012a, 1994a, 1992b; UDWR 2012; UNPS 2006.
Barneby reed-mustard	*Schoenocrambe barnebyi*	FE (UT)	Range: Endemic to Keesle Country of the San Rafael Swell and Capitol Reef National Park within Emery and Wayne counties, Utah. Total population estimated at approx. 2,000 individuals among 2 populations. Habitat: Sparsely vegetated mixed desert shrub communities, generally on north-facing slopes composed of red clay soils rich in selenium and gypsum, overlain with sandstone talus, which is derived primarily from the Moenkopi and sometimes from the Chinle and Carmel formations. Elevation range 5,400 to 6,889 feet amsl. Flowering April to May.	None.	Yes. The species is endemic to the Capitol Reef National Park and the San Rafael Swell which are not crossed by the 2-mile transmission line corridors.	BLM 2010; CPC 2010; USFWS 2012a, 2004, 1994a, 1992b; UDWR 2012; UNPS 2006.
Shrubby reed-mustard	*Schoenocrambe suffrutescens*	FE (UT)	Range: Endemic within the Hill Creek drainage, Willow Creek drainage, and Badland Cliffs within Duchesne and Uintah counties, Utah. Habitat: Shadscale, pygmy sagebrush, mountain mahogany, juniper, and other mixed desert shrub communities in calcareous shale of the Evacuation Creek member of the Green River Shale Formation. Elevation range 5,400 to 6,000 feet amsl. Flowering late May to June or July.	Region II: Moderate. The species has been documented approx. 1 mile south of the 2-mile transmission line corridor in Duchesne County, Utah, and approx. 5 miles south of the 2-mile transmission line corridor in Uintah County, Utah. Based on the proximity to endemic habitat and presence of potential habitat parameters, the species may be present within the 2-mile transmission line corridors in Duchesne and Uintah counties, Utah.	No.	BLM 2010; USFWS 2012a, 1994; UNPS 2006.
Blaine pincushion	*Sclerocactus blainei*	BLM-NV	Range: Possible or probably Nevada endemic known within Nye County, Nevada. Habitat: Alkaline calcareous and volcanic gravelly-clay soils in open valley bottom areas in the shadscale and lower sagebrush zones. Elevation range 5,100 to 5,300 feet amsl. Flowering in late-spring.	Region III: Low. The species has been documented approx. 10 miles noth of the 2-mile transmission line corridor in Lincoln County, Nevada. Potential habitat may be present both within the 2-mile transmission line corridor and the analysis area in Lincoln County, Nevada.	No.	NatureServe 2012; NNHP 2001.
Pariette cactus	*Sclerocactus brevispinus*	FT (UT)	Range: Known only from the Pariette Draw region along the Duchesne/Uintah County border, Utah. Habitat: Saline and alkaline soils in clay badlands. Elevation range 4,590 to 4,920 feet amsl. Flowering late April to May.	Low.	Yes. The species has been documented approx. 5 miles south of the 2-mile transmission line corridor on the Duchesne-Uintah counties, Utah border. However, based on the species limited distribution geographic range, it is unlikely the species would be found within the 2-mile transmission line corridors.	BLM 2010; FNA 1994; NatureServe 2012; USFWS 2012a, 2010c; UNPS 2006.
Colorado hookless cactus	*Sclerocactus glaucus*	FT (CO)	Range: Known within Delta, Garfield, Mesa, and Montrose counties, Colorado. Habitat: Rocky hills, mesa slopes, and alluvial benches in desert shrub communities. Elevation range 4,500 to 6,000 feet amsl. Flowering April to May.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Mesa County, Colorado. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Mesa and Garfield counties, Colorado.	No.	CNHP 2002; USFWS 2012a, 2010d.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Great Basin fishhook cactus	*Sclerocactus pubispinus*	BLM-NV; NV State CY	Range: Known within Nevada along the easternmost edges of Elko and White Pine counties; Lincoln County (northeast of Panaca, Nevada); and also in northwest Utah between Box Elder and Beaver counties. Habitat: Rocky hillsides of woodland and upper desert mountains. Elevation range and flowering period unknown.	Low.	Yes. Based on the species limited geographic distribution, it is unlikely that the species would be present within the 2-mile transmission line corridors.	NatureServe 2012; Styles 2010.
Schlesser pincushion	*Sclerocactus schlesseri*	BLM-NV	Range: Possibly endemic within Lincoln County, Nevada (specifically known within Dry Lake Valley); and also in Utah. Habitat: Open, stable or stabilized, gravelly, sandy silt or silty clay soils derived from somewhat ashy and/or gypsiferous lacustrine sediments, on mesic microsites created and/or maintained by gentle north to east aspects, dense shrub and/or grass canopies, high clay and silt content of the soil, and/or cryptobiotic soil crusts, usually associated with such soil crusts in the shadscale zone with *Atriplex confertifolia, Gutierrezia sarothrae, Ericameria viscidiflora* var. *puberula, Krascheninnikovia lanata, Pleuraphis jamesii, Mentzelia albicaulis,* and *Mimulus parryi*. Elevation range 4,760 to 5,145 feet amsl. Flowering late spring.	Region III: Moderate. Although element record occurrences were not provided for this species, it is likely that this species and/or its associated habitat would be present within the 2-mile transmission line corridor or the analysis area in Clark County, Nevada based on the proximity to Dry Lake Valley.	No.	NNHP 2010; Styles 2010.
Uinta Basin hookless cactus	*Sclerocactus wetlandicus*	FT (UT)	Range: Known within Carbon, Duchesne, and Uintah counties, Utah. Habitat: Rocky hills, mesa slopes, and alluvial benches in desert shrub and pinyon-juniper communities on river benches, valley slopes, and rolling hills, of the Duchesne River, Green River, and Uintah formations in dry, fine-textures soils overlain with cobbles and pebbles. Elevation range 4,500 to 6,600 feet amsl. Flowering April to late May.	Region II: High. The species has been documented within and adjacent to the 2-mile transmission line corridors in Duchesne and Uintah counties, Utah. Based on the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Duchesne and Uintah counties, Utah.	No.	BLM 2010; USFWS 2012a, 2010e; UNPS 2006.
Wright fishhook cactus	*Sclerocactus wrightiae*	FE (UT)	Range: Endemic to Emery, Sevier, and Wayne counties, Utah. Habitat: Salt desert shrub and shrub/grass to juniper communities on the Mancos Shale, Curtis, Dakota, Morrison, Summerville, and Entrada formations, often associated with well-developed biological soil crusts. On the Mancos Shale associated with the Bluegate, Tununk, Emery, and Ferron members. Substrate typically gypsiferous or saline soil that range in texture from clays to sandy silts to fine sands. Elevation range 4,260 to 5,900 feet amsl. Flowering April to May.	Region II: Moderate. The species has been documented approx. 3.5 miles southeast of the 2-mile transmission line corridor in Emery County; and approx 4 miles south of the 2-mile transmission line corridor in Sevier County, Utah. Based on the presence of suitable vegetation cover types, elevation range, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Sevier and Emery counties, Utah.	No.	BLM 2010; USFWS 2012a, 1985b; UDWR 2012; UNPS 2006.
Beaver Mountain groundsel	*Senecio castoreus*	USFS-Fishlake NF	Range: Endemic to the Tushar Mountains in Beaver and Piute counties, Utah. Habitat: Associated with *Polemonium, Trisetum, Festuca,* and *Arenaria* communities, often on windswept ridges or less commonly downward to the spruce-fir community on Tertiary igneous outcrops and gravel. Elevation range 11,000 to 12,700 feet amsl. Flowering July to September.	None.	Yes. The species occurs at a higher elevation and in very limited geographic range than that crossed by the 2-mile transmission line corridors within Beaver County, Utah.	UNPS 2006.
Podunk groundsel	*Senecio malmstenii*	USFS-Dixie NF	Range: Endemic to the Sevier-Markagunt and Paunsaugunt plateaus in Garfield, Iron, and Kane counties, Utah. Habitat: Western bristlecone pine, spruce-fir, and mixed conifer woodlands on steep talus slopes of the Claron Limestone Formation. Elevation range 9,500 to 10,500 feet amsl. Flowering June to August.	None.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors within Iron County, Utah.	UNPS 2006.
Musinea groundsel	*Senecio musiniensis*	USFS-Manti LaSal NF	Range: Endemic to the Wasatch Plateau in Sanpete County, Utah. Habitat: Ridgetops on white Flagstaff Limestone barrens and talus slopes on Musinea Peak, and margins of the Wasatch Plateau. Elevation range 9,400 to 10,800 feet amsl. Flowering July to September.	Low.	Yes. The species has been documented approx. 23 miles southwest of the 2-mile transmission line corridor in Sanpete County, Utah; however, habitat model results indicate lack of potential habitat within the 2-mile transmission line corridors in Sanpete County, Utah.	NatureServe 2012; UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Nachlinger catchfly	*Silene nachlingerae*	BLM-NV	Range: Known within Elko, Nye, and White Pine counties, Nevada. Habitat: Generally dry, exposed or somewhat sheltered carbonate (rarely quartzite) crevices in ridgeline outcrops, talus, or very rocky soils on or at the bases of steep slopes or cliffs, on all aspects but predominantly on northwesterly to northeasterly exposures, mainly in the subalpine conifer zone with sparse *Petrophytum aespitosum*, *Erigeron simplex*, *Pinus flexilis*, *P. longaeva*, *Artemisia arbuscula*, *Cercocarpus betuloides*, *Ericameria watsonii*, *Symphoricarpos oreophila*, *Leucopoa nevadensis*, *Jamesia tetrapetala*, and *Primula nevadensis*. Elevation range 7,160 to 11,250 feet amsl. Flowering August to September.	Low.	Yes. The species occurs at a higher elevation than that crossed by the 2-mile transmission line corridors on the border of Lincoln and White Pine counties, Nevada.	NNHP 2001.
Maguire campion	*Silene petersonii*	USFS-Dixie NF, USFS-Fishlake NF, USFS-Manti-LaSal NF	Range: Endemic to Iron, Kane, Garfield, Sanpete, and Sevier counties, Utah. Habitat: Ponderosa pine, aspen, and spruce-fir communities on Flagstaff Limestone and the Claron Formation. Elevation 7,000 to 11,300 feet amsl. Flowering July to August.	Region II: Moderate. The species has been documented approx. 9 miles south of the 2-mile transmission line corridor in Sanpete County, Utah. Based on the presence of suitable vegetation cover types, elevation range, and geologic formation, potential habitat for the species may be present within the 2-mile transmission line corridors in Sanpete and Sevier counties, Utah.	No.	NatureServe 2012; UNPS 2006.
St. George blue-eyed grass	*Sisyrinchium radicatum*	BLM-NV	Range: Known from southern Nevada; and southwestern Utah, apparently restricted to the St. George-Las Vegas region. Habitat: Moist meadows or on streambanks associated with bluegrass, rush, and sea milkwort. Elevation range 1,970 to 4,265 feet amsl. Flowering late-spring to mid-summer.	Regions III and IV: Low. Although the species has not been documented within the study area, potential habitat may be present within the 2-mile transmission line corridors in Clark County, NV.	No.	NatureServe 2012; FNA 1901.
Jones' globemallow	*Sphaeralcea caespitosa* var. *caespitosa*	BLM-UT	Range: Known within Beaver and Millard counties, Utah. Habitat: Mixed desert shrub and grass communities including shadscale, matchweed, rabbitbrush, winterfat, Indian ricegrass and galleta communities on the Sevy Dolomite Formation and on calcareous gravels. Elevation range 4,500 to 6,400 feet amsl. Flowering May to June and again in September.	Region III: High. The species has been documented within the 2-mile transmission line corridor in Millard County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Beaver County, Utah.	No.	UNPS 2006.
Railroad Valley globemallow	*Sphaeralcea caespitosa* var. *williamsiae*	BLM-NV	Range: Known within the Hot Creek-Railroad valleys watershed in Nye County, Nevada. Habitat: Mixed shrub, pinyon-juniper, and grass community on Sevy Dolomite rock calcareous soil. Elevation range 5,000-6,505 feet amsl. Flowering May.	None.	Yes. The species is only known within Nye County, Nevada, which is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; NNHP 2001.
Gierisch mallow	*Sphaeralcea gierischii*	FE (UT), BLM-UT	Range: Endemic to Washington County, Utah; and also in Mohave County, Arizona. Habitat: Warm desert shrub communities, mainly on gypsiferous outcrops of the Harrisburg Member of the Kaibab Formation. Elevation range 2,475 to 2,760 feet amsl. Flowering mid April to early May.	Low.	Yes. Although the species has been documented approx. 20 miles southeast of the 2-mile transmission line corridor, it is unlikely this species would occur within the 2-mile transmission line corridor based on the lack of species-specific associated geologic formations and elevation range within Washington County, Utah.	Federal Register 2012; USFWS 2012a; UNPS 2006.
Jane globemallow	*Sphaeralcea janeae*	BLM-UT	Range: Endemic to the Canyonlands section of Utah along the Colorado and Green rivers in Grand, Wayne, and San Juan counties, Utah. Habitat: Warm and salt desert shrub communities on the Shinarump and Moenkopi formations and the White Rim and Organ Rock members of the Cutler Formation. Elevation range 4,000 to 4,600 feet amsl. Flowering May to June.	None.	Yes. The species is only known to occur in association with the Shinarump, Moenkopi, and Cutler formations which are not crossed by the 2-mile transmission line corridors in Grand County, Utah.	NatureServe 2012; UNPS 2006.
Psoralea globemallow	*Sphaeralcea psoraloides*	BLM-UT	Range: Endemic to the Colorado Plateau within Emery and Wayne counties, Utah. Habitat: Zuckia-ephedra, shadscale, *Eriogonum*, *Lepidium*, and pinyon-juniper communities on saline and gypsiferous Mancos Shale, Buckhorn conglomerate, Curtis sandstone, Entrada siltstone, Carmel, and Kaibab Limestone. Elevation range 4,000 to 6,300 feet amsl. Flowering mid May to June.	Region II: Moderate. The species has been documented approx. 4 miles west of the 2-mile transmission line corridor in Emery County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Emery County, Utah.	No.	BLM 2010; UNPS 2006.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Rocktansy	*Sphaeromeria capitata*	BLM-CO, USFS-Dixie NF	Range: Known within Moffat County, Colorado; disjunct onto the Utah Plateaus in Garfield County, Utah; and also in Wyoming and Montana. Habitat: Western bristlecone pine, ponderosa pine, and pinyon-juniper communities on Cedar Breaks Limestone. General elevation range 4,920 to 7,875 feet amsl; Utah elevation range 7,700 to 7,800 feet amsl; and Colorado elevation range 7,500 to 7,900 feet amsl. Flowering May thru July (depending on state).	Low.	Yes. The species has been documented approx. 3.5 miles west of the 2-mile transmission line corridor in Moffat County, Colorado; however, it is unlikely this speices would occur within the 2-mile transmission line corridors based on the lack of suitable elevation range and soil substrates within Moffat County, Colorado.	NatureServe 2012; UNPS 2006.
Laramie false sagebrush	*Sphaeromeria simplex*	BLM-WY	Range: Regional endemic to the western foothills of the Laramie Range, Shirley Basin, and Shirley Mountains in Albany, Carbon, Converse, and Natrona counties, Wyoming. Total population estimated at approx. 860,000 individuals. Habitat: In cushion plant communities on rocky limestone soils on gentle slopes or rims of dry, rocky limestone-sandstone "pebble plains" in wind scoured openings. Surrounding vegetation communities typically are densely vegetated forest or shrubland communities. Elevation range 7,200 to 8,760 feet amsl. Flowering May to August.	None.	Yes. Based on the deletion of Segment 10 (former Aelous Design Option), potentially suitable habitat for this species is no longer present within the 2-mile transmission line corridor in Carbon County, Wyoming.	Handley and Heidel 2010; NatureServe 2012; WYNDD 2009.
Ute ladies'-tresses orchid[6]	*Spiranthes diluvialis*	FT (CO, UT, WY), BLM-NV; NV State CE	Range: Known within Lincoln and possibly White Pine counties, Nevada; and also in Colorado, Idaho, Montana, Nebraska, Utah, and Wyoming. Habitat: An aquatic or wetland-dependent occupying moist to very wet, somewhat alkaline or calcareous native meadows near streams, springs, seeps, lake shores, or in abandoned stream meanders that still retain ample ground water. Elevation range 4,200 to 6,100 feet amsl. Flowering July to August.	Regions I, II, III: High. The species has been documented within the 2-mile transmission line corridor in Wasatch, Duchesne, and Uintah counties, Utah. Based on the results of the modeled habitat assessment, potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Moffat County, Colorado; Duchesne, Juab, Uintah, Utah, and Wasatch counties, Utah; and Carbon County, Wyoming.	No.	BLM 2010; NatureServe 2012; NNHP 2001; USFWS 2012a, 1992c; WYNDD 2009.
White River swertia	*Swertia gypsicola*	BLM-UT	Range: Endemic to the Great Basin in western Millard County, Utah; and also in Nevada. Habitat: Greasewood and shadscale dominated valley bottoms. Elevation at approx. 5,000 feet amsl. Flowering mid June to July.	Low.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types, elevation range, and soil substrate, it is unlikely this species would occur within the 2-mile transmission line corridors.	UNPS 2006.
Thompson talinum	*Talinum thompsonii*	BLM-UT	Range: Endemic to the Colorado Plateau in Emery County, Utah. Habitat: Pinyon-juniper and ponderosa pine communities in siliceous conglomeratic gravels. Elevation range at approx. 7,500 feet. Flowering mid July to August.	Region II: Moderate. The species has been documented approx. 0.25 mile north of the 2-mile transmission line corridor in Emery County, Utah. Based on the presence of suitable elevation range, vegetation cover types, and soil substrate, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery County, Utah.	No.	BLM 2010; UNPS 2006.
Cathedral Bluff meadow-rue	*Thalictrum heliophilum*	BLM-CO	Range: Limited to the Colorado River drainage in Garfield, Rio Blanco, and Mesa counties, Colorado. Habitat: Sparsely vegetated steep talus slopes and ridges of the Parachute Creek Member of the Green River Formation. Elevation range approx. 6,300-8,800 feet amsl. Flowering June to August.	Low.	Yes. Although the species has been documented approx. 21 miles east of the 2-mile transmission line corridor in Rio Blanco County, Colorado; and approx. 44 miles east of the 2-mile transmission line corridor in Garfield County, Colorado, it is unlikely that this species would occur within the 2-mile transmission line corridors based on agency consultation and the lack of suitable habitat parameters.	FNA 1983; NatureServe 2012.
Duchesne greenthread (Caespitose greenthread)	*Thelesperma caespitosum (Thelesperma caespitosa)*	USFS-Ashley NF, BLM-UT, BLM-WY	Range: Endemic to Duchesne County, Utah; and Sweetwater County, Wyoming. Habitat: White shale slopes and ridges of the Green River Formation or in mountain shrub/pinyon-juniper communities of the Uinta Formation. Elevation range 5,900 to 8,860 feet amsl. Flowering May to June.	Region II: Utah – High. The speces has been documented within and adjacent to the USFS Ashley NF within the 2-mile transmission line corridor in Duchesne County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Duchesne County, Utah. Wyoming – Low.	Utah - No. Wyoming – Yes. Potential habitat for the species is not crossed by the 2-mile transmission line corridors in Sweetwater County, Wyoming.	BLM 2010; NatureServe 2012; UNPS 2006.

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Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Uinta greenthread	*Thelesperma pubescens*	BLM-WY, USFS-Uinta-Wasatch-Cache NF	Range: Endemic to the foothills of the southern Green River Basin and northern Uinta Range in Uinta and Sweetwater counties, Wyoming; and also in northeast Utah. Habitat: Sparsely vegetated cushion plant and sagebrush grasslands communities on cobbly soils along the summit edges of relict surfaces that are now isolated mountains forming mesa-like mountains capped with Bishop Conglomerate. Elevation range 8,100 to 8,900 feet amsl. Flowering July to August.	None.	Yes. Potential habitat for the species is not crossed by the 2-mile transmission line corridors.	NatureServe 2012; UNPS 2006; WYNDD 2009.
Bicknell thelesperma	*Thelesperma subnudum* var. *alpinum (Thelesperma pubescens)*	USFS-Dixie NF, USFS-Fishlake	Range: Endemic to Wayne County, Utah. Total population estimated at approx. 8,300 to 21,200 individuals. Habitat: Pinyon-juniper, bristlecone pine, mountain brush communities in the Navajo Sandstone and Carmel limestone formations. Elevation range 7,300 to 9,000 feet amsl. Flowering June to July.	None.	Yes. The species is endemic to Wayne County, Utah, which is not crossed by the 2-mile transmission line corridors.	USFS 1999.
Last Chance townsendia	*Townsendia aprica*	FT (UT)	Range: Endemic to Emery, Sevier, and Wayne counties, Utah. Habitat: Salt desert shrub and pinyon-juniper communities on clay or clay silt soils of the Blue Gate member of the Mancos Shale. Elevation range 6,100 to 8,000 feet amsl. Flowering April to May.	Region II: Moderate. The species has been documented approx. 0.25 mile north of the 2-mile transmission line corridor in Sevier County, Utah; and approx. 4 miles south of the 2-mile transmission line corridor in Emery County, Utah. Based on the presence of suitable vegetation cover types, elevation range, and geographic formations, potential habitat for the species may be present within the 2-mile transmission line corridors in Emery and Sevier counties, Utah.	No.	BLM 2010; USFWS 2012a, 1993b; UNPS 2006.
Sigurd townsendia (Sevier townsendia)	*Townsendia jonesii* var. *lutea*	BLM-UT, USFS-Fishlake NF	Range: Known within Juab, Piute, Sanpete, and Sevier counties, Utah. Habitat: Salt desert and mixed desert shrub and juniper sagebrush communities on Arapien shale and clays in volcanic rubble. Elevation range 5,500 to 6,300 feet amsl. Flowering May to June.	Region II: High. The species has been documented within the 2-mile transmission line corridor in Sevier County, Utah; and adjacent to the 2-mile transmission line corridor in Juab County, Utah. Potential habitat for the species may be present both within the 2-mile transmission line corridor and the analysis area in Juab and Sevier counties, Utah. Based on detailed species-specific habitat modeling, potential may also be present within the USFS-Fishlake NF with Juab and Sevier counties, Utah.	No.	NatureServe 2012; UNPS 2010.
Cedar Mountain easter daisy	*Townsendia microcephala*	BLM-WY	Range: Endemic to the northern foothills of the Uinta Range within Sweetwater and Uinta counties, Wyoming. Habitat: Restricted to the Bishop Conglomerate on exposed, west facing upper slopes and ridges on shallow, sandy soils. Elevation range 8,200 to 8,500 feet amsl. Flowering May to July.	None.	Yes. The species is endemic to the northern foothills of the Uinta Range, which is not crossed by the 2-mile transmission line corridors.	WYNDD 2009.
Strigose easter daisy	*Townsendia strigosa*	BLM-CO	Range: Known within Moffat County, Colorado; Daggett, Duchesne, and Uintah counties, Utah; and central western, southwestern, and south-central portions of Wyoming. Habitat: Habitat information is not available for this species.	Region I and II: Low. No known populations have been identified within or adjacent to the 2-mile transmission line corridors. Since habitat characteristics are unavailable for this species, it is unknown if potential habitat may be present within the 2-mile transmission line corridor or the analysis area. A conservative estimate was applied, assuming the presence of potential habitat within Moffat County, Colorado.	No.	NatureServe 2012.
Strigose townsendia	*Townsendia strigosa* var. *prolixa*	BLM-UT	Range: Known within the Chipeta Wells and Duchesne Valley area (also Evacuation Creek) in Uintah County, Utah. May also occur in Grand County, Utah and Sweetwater County, Wyoming. Habitat: Barren, rocky clay knolls. Elevation range and flowering period unknown.	Region II: Low. No known populations have been identified within or adjacent to the 2-mile transmission line corridor. Since habitat characteristics are unavailable for this species, it is unknown if potential habitat may be present within 2-mile transmission line corridor or the analysis area. A conservative estimate was applied, assuming the presence of potential habitat within Uintah County, Utah.	No.	BLM 2010.
Mountain clover	*Trifolium andinum*	BLM-CO	Range: Known from Wyoming and Utah to northern Arizona; Moffat County, Colorado; and Nye and Lincoln counties, Nevada. Habitat: Dry, sandy loam washes and exposed ridges in ponderosa pine or mixed shrub communities Elevation range 5,700 to 7,300 feet amsl. Flowering mid May to July.	Low.	Yes. Although potential habitat may be present based on the presence of suitable vegetation cover types, elevation range, and soil substrate, it is unlikely this species would occur within the 2-mile transmission line corridors.	CNHP 2002; NatureServe 2012.

Table G-1 Special Status Plant Species Identified for the TransWest Express Transmission Project[1]

Common Name	Scientific Name	Status[2]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area[3]	Eliminated from Detailed Analysis	References
Currant Summit clover	*Trifolium andinum* var. *podocephalum*	BLM-NV	Range: Endemic to the White Pine and Egan ranges within Lincoln and Nye counties, Nevada. Habitat: Crevices of volcanic or carbonate rock in the pinyon-juniper zone. Elevation range 6,900 to 7,400 feet amsl. Flowering late May through early July.	None.	Yes. The species is endemic to the White Pine and Egan ranges which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Frisco clover	*Trifolium friscanum*	FC (UT); BLM-UT	Range: Known within the San Francisco and Beaver Lake mountains in Beaver County; and within the Tunnel Springs Range in Millard County, Utah. Habitat: Calcareous and volcanic gravels and limestone on relatively steep slopes in pinyon-juniper woods often associated with mountain mahogany. Elevation range 6,900 to 7,300 feet amsl. Flowering June.	Low.	Yes. The species has been documented approx. 5 miles west of the 2-mile transmission line corridors in Beaver County, Utah; however, habitat model results indicate lack of potential habitat within the 2-mile transmission line corridors in Beaver County, Utah.	NatureServe 2012; USFWS 2012a, 2011b; UNPS 2006.
Smith violet	*Viola franksmithii*	USFS-UNK	Range: Endemic to Logan Canyon in Cache County, Utah. Habitat: Cracks, crevices, and holes in outcrops of limestone and dolomite, in humid, shady places. Elevation range 5,300 to 5,900 feet amsl. Flowering mid May to August.	None.	Yes. The species has been documented within Cache County, Utah, which is not crossed by the 2-mile transmission line corridors.	UNPS 2006.
Rock violet	*Viola lithion*	BLM-NV	Range: In Nevada, known only from the White Pine and Pilot Ranges within Elko, Nye, and White Pine counties. Habitat: Seasonally wet crevices in steep carbonate or quartzite outcrops in shaded northeast-facing avalanche chutes and cirque headwalls in the subalpine conifer zone with *Symphoricarpos oreophilus, Ribes montigenum, Heuchera rubescens, Aquilegia scopulorum, Thalictrum fendleri, Pinus flexilis,* and *Populus tremuloides*. Elevation range 7,840 to 10,480 feet amsl. Flowering June to August.	None.	Yes. The species is endemic to the White Pine and Pilot ranges which are not crossed by the 2-mile transmission line corridors.	NNHP 2001.
Sterile yucca	*Yucca sterilis* (*Yucca harrimaniae* var. *sterilis*)	BLM-UT	Range: Endemic of the Uinta Basin restricted to Uintah and Duchesne counties, Utah. Habitat: Salt desert shrub, juniper, sagebrush, shadscale communities in sandy soils. Elevation range 4,790 to 5,800 feet amsl. Flowering period unknown.	Region II: Moderate. The species has been documented approx. 3 miles north of the 2-mile transmission line corridor in Uintah County, Utah; and approx. 7.5 miles north of the 2-mile transmission line corridor in Duchesne County, Utah. Based on the presence of associated vegetation cover types, soil substrate, and elevational range, potential habitat may be present within the 2-mile transmission line corridors in Uintah and Duchesne counties, Utah.	No.	BLM 2010; UNPS 2006.

[1] Based on county level range and distribution, only those Nevada BLM Sensitive Species with potential for occurrence within the counties crossed by the proposed project were included as part of this analysis table.

[2] Status: FE-Federally Endangered Species; FT-Federally Threatened Species; FC-Federal Candidate Species; FP-Federal Proposed Species; BLM-BLM Sensitive Species; USFS-USFS Sensitive Species; NV State CE-NV State Critically Endangered; NV State CE#-NV State Recommended for Listing a Critically Endangered; NV State CY – NV State Protected as a Cacti, Yucca, or Christmas Tree

[3] Potential for Occurrence Within the Project Area: High-Documented occurrences and suitable habitat within the 2-mile-wide corridors; Moderate-Documented occurrences adjacent to the 2-mile-wide corridors and potential habitat parameters identified within the 2-mile-wide corridors; Low-No documented occurrences; however, one or more potential habitat parameters identified within the 2-mile-wide corridors; None-No documented occurrences, nor potential habitat parameters identified within the 2-mile-wide corridors.

Table G-2 Special Status Wildlife Species Identified for the TransWest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
INVERTEBRATES						
Aegialian scarab beetle	*Aegialia knighti*	BLM	Range: The Aegialian scarab beetle occurs only near the Big Dune in Clark County, Nevada. Habitat: The species occurs in typical Mojave desert habitat in low, red sand hills and sand blow-out areas.	None. The geographic range for this species is outside the 2-mile transmission line corridor.	Yes.	NatureServe Explorer 2010.
Eureka mountainsnail	*Oreohelix eurekensis*	BLM; UT-SS	Range: The Eureka mountainsnail is endemic to Utah and occurs in six isolated localities, representing four widely separated populations in Juab, Utah, Duchesne, Tooele and Grand counties, Utah. Habitat: The species inhabits relatively open, 45-degree, south/southwest-facing slopes on broken limestone and loam substrate.	Region II: Low. The species is known to occur in Duchesne, Juab, Grand, and Utah counties, Utah. It has been documented on the Juab/Utah county line, and in eastern Duchesne County, Utah.	No.	NatureServe Explorer 2010; UDWR 2010-2012.
Great Basin silverspot (Nokomis fritillary) butterfly	*Speyeria nokomis nokomis*	BLM	Range: The Great Basin silverspot butterfly is extirpated from most of its former range in Colorado, Arizona, New Mexico, and Utah. It is currently known to occur in Duchesne County, Utah and Moffat County, Colorado. Habitat: The subspecies inhabits streamside meadows and open seepage areas with an abundance of violets in desert landscapes. Colonies of this butterfly are often isolated.	Regions I and II: Low. The subspecies is known to occur in Duchesne County, Utah. In Moffat County, Colorado, it has been documented along the Green River in Dinosaur National Monument.	No.	NatureServe Explorer 2010; Opler et al. 2009; Selby 2007.
Great Basin small blue (Small blue) butterfly	*Philotiella speciosa septentrionalis*	BLM	Range: The Great Basin small blue butterfly is endemic to Nevada. Habitat: The species inhabits deserts, edges of dry desert lakes, and stream edges in foothills.	Regions III and IV: Low. The subspecies is known to occur in southern Nevada.	No.	NatureServe 2012; Opler et al. 2009.
Grey's silverspot (Grey's fritillary) butterfly	*Speyeria hesperis greyi*	BLM	Range: The Grey's silverspot butterfly is endemic to Nevada. Habitat: The species inhabits forest openings, meadows, and open hillsides.	Region III: Low. The subspecies is known to occur in southern Nevada.	No.	NatureServe 2012; Opler et al. 2009.
Honey Lake blue butterfly	*Euphilotes pallescens calneva*	BLM	Range: The Honey Lake blue butterfly is endemic to Nevada and California. Habitat: The species inhabits arid areas such as desert flats and edges of sand dunes.	Regions III and IV: Low. The subspecies is known to occur in southern Nevada.	No.	NatureServe 2012; Opler et al. 2009.
MacNeill sooty wing skipper (MacNeill saltbush sootywing) butterfly	*Hesperopsis gracielae*	BLM	Range: The MacNeill sooty wing skipper occurs in California, Nevada, Arizona, Utah, and Mexico. The species is endemic to a section of the Colorado River from the Arizona-Nevada-Utah border, south into adjacent Baja California, and Mexico. It also occurs east along the Salt River in Arizona. Habitat: The species inhabits saltbush flats adjacent to rivers.	Region III: High. The species is known to occur within the 2-mile transmission line corridor in isolated colonies along the Muddy River in Clark County, Nevada.	No.	Hiatt and Boone 2003; NatureServe Explorer 2010.
Mojave gypsum bee	*Andrena balsamorhizae*	BLM	Range: The Mojave gypsum bee occurs in Clark County, Nevada. Habitat: The species occurs in the Mojave desert and is a silverleaf sunray obligate.	Regions III and IV: High. The species is known to occur within the 2-mile transmission line corridor in gypsum soil areas of the Las Vegas Basin in Clark County, Nevada. Its obligate, silverleaf sunray, has also been documented within the 2-mile transmission line corridor in Clark County, Nevada.	No.	Hiatt and Boone 2003; NatureServe Explorer 2010.
Mojave poppy bee	*Perdita meconis*	BLM	Range: The Mojave poppy bee occurs in southeastern California, southern Nevada, southwestern Utah, and northwestern Arizona. Habitat: The species occurs in the Mojave desert and is a poppy plant obligate.	Regions III and IV: High. The species is known to occur within the 2-mile transmission line corridor in Clark County, Nevada. One of the obligate poppy species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. Another obligate poppy species has been documented within 5 miles of the reference line in Clark County, Nevada.	No.	Hiatt and Boone 2003; NatureServe Explorer 2010.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Mono Basin Skipper (Railroad Valley skipper) butterfly	*Hesperia uncas giulianii*	BLM	Range: The Mono Basin (Railroad Valley) skipper subspecies is endemic to Nevada. Habitat: The species inhabits grasslands, sagebrush, and open woodlands.	Regions III and IV: Low. The subspecies is known to occur in southern Nevada.	No.	NatureServe Explorer 2010; Opler et al. 2009.
Northern Mojave blue (Mojave blue) butterfly	*Euphilotes mojave virginensis*	BLM	Range: The northern Mojave blue butterfly occurs in Arizona, Nevada, and Utah. Habitat: The species inhabits Mojave desert habitat in washes and sandy areas.	Regions III and IV: Low. The subspecies is known to occur in southern Nevada.	No.	NatureServe Explorer 2010; Opler et al. 2009.
Rice's blue butterfly	*Euphilotes pallescens ricei*	BLM	Range: The Rice's blue butterfly is endemic to Nevada. Habitat: The species inhabits arid areas such as desert flats and the edges of sand dunes.	Regions III and IV: Low. The subspecies is known to occur in southern Nevada.	No.	NatureServe Explorer 2010; Opler et al. 2009.
White River wood nymph butterfly	*Cercyonis pegala pluvialis*	BLM	Range: The White River wood nymph butterfly occurs in Lincoln, Nye, and White Pine counties, Nevada. Habitat: The species inhabits large, sunny, grassy areas including open meadows, bogs, and fallow fields.	Region III: Moderate. The subspecies is known to occur within 5 miles of the reference line in Lincoln County, Nevada.	No.	NatureServe Explorer 2010; NNHP 2001; Opler et al. 2009.
REPTILES						
Banded Gila monster	*Heloderma suspectum cinctum*	NV-P	Range: The banded Gila monster occurs in Clark, Nye, and Lincoln counties, Nevada. Habitat: The subspecies occurs in rocky desert habitats. Primary vegetation types include desert grassland, Mojave and Sonoran desert scrub, and thorn scrub. It is sometimes found in oak or pine-oak woodlands.	Regions III and IV: High. The subspecies has been documented within the 2-mile transmission line corridor in Clark and Lincoln Counties, Nevada. It is also known to occur in Clark and Lincoln counties, Nevada.	No.	NatureServe Explorer 2010; Nevada Diversity Database 2007; NDOW 2012.
Chuckwalla	*Sauromalus ater*	BLM; UT-SS Tier II	Range: The chuckwalla occurs throughout the Mojave Desert region of Nevada, in southern Washington County, east Kane and Garfield counties, and southeast San Juan County, Utah. Habitat: The species occurs in rocky desert habitats.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. It has been documented within 5 miles of the reference line in Washington County, Utah. It is also known to occur in Lincoln County, Nevada.	No.	Nevada Diversity Database 2007; NDOW 2012; UDWR 2005; UNHP 2003.
Corn snake	*Elaphe guttata*	BLM; UT-SS Tier II	Range: The corn snake is primarily found east of the continental divide in North America. Isolated populations occur in Utah. Habitat: The species occurs in riparian habitat and mixed woodlands, with a permanent source of water.	Regions I, II and III: Moderate. The species has been documented within 5 miles of the reference line in Grand County, Utah. It is also known to occur along the Colorado and Green rivers, from Moab, in Grand County, Utah, north to Dinosaur National Monument in Uintah County, Utah.	No.	Stebbins 2003; UDWR 2005; UNHP 2003.
Desert glossy snake	*Arizona elegans eburnata*	BLM	Range: The desert glossy snake occurs from southern Nevada, northwest Arizona and extreme southwest Utah south through eastern California into northeastern Baja California. Habitat: The subspecies inhabits barren sandy desert, arid scrub, and rocky washes.	Region IV: Moderate. Suitable habitat occurs within the 2-mile transmission line corridor in Nevada.	No.	California Herps 2012.
Mojave shovel-nosed snake	*Chionactis occipitalis occipitallis*	BLM; NV-P	Range: The Mojave shovel-nosed snake is found within the Mojave Desert of southern Nevada. Habitat: The subspecies occurs within sparsely vegetated desert habitat consisting of mesquite-creosote bush, desert grasses, and cactus. Habitat components also include rocky slopes, dunes, washes, and sandy flats; but preferred habitat is flat areas with sandy soils.	Region IV: Moderate. Suitable habitat occurs within the 2-mile transmission line corridor in Nevada.	No.	NDOW 2012.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Desert iguana	*Dipsosaurus dorsalis*	BLM; UT-SS Tier II	Range: The desert iguana occurs in the Mojave desert of California and Nevada, and the Great Basin desert in Utah and Arizona, south to the deserts of Baja California and Mexico. Habitat: The species inhabits creosote desert with loose sands interspersed with firm ground and scattered rocks.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It has been documented within 5 miles of the reference line in Washington County, Utah.	No.	NDOW 2012; Nevada Diversity Database 2007; SDNHM 2009; UDWR 2005.
Desert night lizard	*Xantusia vigilis*	BLM; UT-SS Tier II	Range: The desert night lizard occurs in the Mojave desert. Habitat: The species inhabits arid and semiarid granite outcrops and rocky areas. Habitat typically consists of yucca, agave, Joshua trees, pinyon-juniper, and desert shrub.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Washington County, Utah, and Clark and Lincoln counties, Nevada.	No.	NDOW 2012; UNHP 2003; UDWR 2005.
Desert tortoise	*Gopherus agassizii*	FT; BLM; UT-SS Tier I; NV-P	Range: The desert tortoise occurs in the Mojave and Sonoran deserts of North America. Habitat: The species occurs in a variety of habitats, from sandy flats to rocky foothills, including alluvial fans, washes and canyons with suitable soils for burrows. Habitat typically consists of creosote bush and white bursage.	Regions III and IV: High. The species is known to occur within the 2-mile transmission line corridor in Washington County, Utah and Lincoln and Clark counties, Nevada. The project crosses USFWS critical habitat in Washington County, Utah and Clark and Lincoln counties, Nevada.	No.	59 FR 5820 5866; Germano 1994; NatureServe Explorer 2010; UDWR 2005; USFWS 2008a.
Long-nosed leopard lizard	*Gambelia wislizenii*	BLM	Range: The long-nosed leopard lizard occurs in the western United States from Oregon and Idaho south to northern Mexico. Habitat: This species inhabits a variety of sparsely distributed vegetation in desert flats and lower foothills.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It is also known to occur in western Colorado and western Utah.	No.	Colorado Herpetological Society No Date; NDOW 2012; SDNHM 2009.
Midget faded rattlesnake	*Crotalus viridis concolor*	BLM	Range: The midget faded rattlesnake occurs in southwest Wyoming, northeastern Utah, and northwestern Colorado. Habitat: This subspecies inhabits rock outcrops in sagebrush desert, pinyon-juniper, greasewood, saltbush, and desert shrub communities.	Regions I and II: Moderate. The subspecies has been documented within 5 miles of the reference line in Sweetwater County, Wyoming. It is also known to occur in the lower Green River valley from Green River and Rock Springs, Wyoming, to the Utah-Wyoming border. It is also known to occur in northeastern Utah and northwestern Colorado.	No.	WGFD 2005.
Utah milk snake	*Lampropeltis triangulum taylori*	BLM	Range: The Utah milk snake occurs in Utah, from the southwestern part of the state, north to the southern part of the Wasatch Mountains and east through the Uinta Mountains and the Uinta Basin. Habitat: The subspecies occurs in a variety of habitats including open forests, shrubland, and sagebrush, with a grass understory.	Region II: High. The subspecies is known to occur within the 2-mile transmission line corridor in Duchesne, Grand, Sanpete, and Sevier counties, Utah.	No.	UNHP 2003.
Mojave rattlesnake	*Crotalus scutulatus*	BLM; UT-SS Tier II	Range: The Mojave rattlesnake occurs in Clark, southern Nye, and southern Lincoln counties, Nevada. In Utah, the species occurs only in the Mojave desert region of southwestern Washington County. Habitat: The species inhabits areas with Joshua trees, creosote bush, burrow brush, and cholla cactus, with a rocky substrate.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. It has been documented within 5 miles of the reference line in Washington County, Utah.	No.	Heindl No Date; NDOW 2012; UDWR 2005; UNHP 2003.
Sidewinder	*Crotalus cerastes*	BLM; UT-SS Tier II	Range: The sidewinder occurs in the Mojave and Sonoran deserts of North America. Habitat: The species occurs in open sandy desert terrain with fine windblown sand, desert flats with sandy washes, or sand dunes sparsely vegetated with creosote bush or mesquite.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln and Clark counties, Nevada. It has been documented within 5 miles of the reference line in Washington County, Utah.	No.	AGFD 2006; NatureServe Explorer 2010; NDOW 2012; SDNHM 2009; UDWR 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Smooth greensnake	*Opheodrys vernalis*	BLM; UT-SS Tier II	Range: The smooth greensnake occurs in southwest and south-central Wyoming, and into Utah, Idaho, and New Mexico. Habitat: The species inhabits the foothills and montane zones, in riparian communities in coniferous, deciduous, and subalpine forests. Meadows, grasslands, and wetlands may also be utilized.	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Utah County, Utah. It has been documented in isolated locations in the mountains of central and eastern Utah, including the Wasatch, Uintah, Abajo, and La Sal mountains, and the East Tavaputs Plateau. It is also known to occur in Carbon County, Wyoming.	No.	Colorado Herpetological Society No Date; UDWR 2005; UNHP 2003; WGFD 2005.
Speckled rattlesnake	*Crotalus mitchellii*	BLM; UT-SS Tier II	Range: The speckled rattlesnake occurs in the Mojave and Sonoran deserts of North America. Habitat: The species inhabits rocky desert terrain and desert scrub communities, including creosote bush and bursage.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. It has been documented within 5 miles of the reference line in Washington County, Utah. It is also known to occur in extreme southern Lincoln County, Nevada.	No.	NatureServe Explorer 2010; NDOW 2012; SDNHM 2009; UDWR 2005; UNHP 2003.
Western banded gecko	*Coleonyx variegates*	BLM; UT-SS Tier II	Range: The western banded gecko occurs in the Mojave and Sonoran deserts of North America. Habitat: The species inhabits open areas, often near rocks, in creosote scrub and desert scrub communities.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. It has also been documented within 5 miles of the reference line in Washington County, Utah.	No.	NatureServe Explorer 2010; NDOW 2012; Nevada Diversity Database 2007; SDNHM 2009; UDWR 2005; UNHP 2003.
Western red-tailed skink	*Eumeces gilberti rubricaudatus*	BLM	Range: The western red-tailed skink occurs in Clark County, and parts of Lincoln and Nye counties, Nevada. Habitat: The subspecies is found in rocky, riparian habitat.	Regions III and IV: Low. The subspecies is known to occur in Clark and Lincoln counties, Nevada.	No.	BLM 2007; NatureServe Explorer 2010.
Western threadsnake (blindsnake)	*Leptotyphlops humilis*	BLM; UT-SS Tier II	Range: The western threadsnake occurs from southwestern Utah and southern Nevada through southern California, Arizona, New Mexico, Texas, and parts of Mexico. Habitat: The species occurs in a variety of habitats, including deserts, desert-grasslands, shrub covered mountain slopes including rocky terrain, washes near stream channels, riparian, and spring areas.	Regions III and IV: Low. The species is known to occur in southwestern Washington County, Utah, and in Clark and Lincoln counties, Nevada.	No.	BLM 2007; NatureServe Explorer 2010; UDWR 2005; UNHP 2003.
Zebra-tailed lizard	*Callisaurus draconoides*	BLM; UT-SS Tier II	Range: The zebra-tailed lizard occurs throughout the desert southwest of North America in Arizona, California, Nevada, New Mexico, and Utah. Habitat: The species inhabits open desert areas on firm soil, with sparse creosote bush and blackrush vegetation. It sometimes occurs on rocky, shady, leaf-litter substrates.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. It has been documented within 1 mile of the reference line in Washington County, Utah. It is also known to occur in Lincoln County, Nevada.	No.	BLM 2007; NatureServe Explorer 2010; Nevada Diversity Database 2007; UDWR 2005; UNHP 2003.
BIRDS						
American white pelican	*Pelecanus erythrorhynchos*	BLM; UT-SS Tier II	Range: The American white pelican breeds in widely distributed island colonies from Canada to northeastern California, Utah, Nevada, Wyoming, and Colorado. Habitat: The species breeds on islands in large bodies of water. It forages in marshes, lakes, and rivers. It constructs a scrape nest on flat, open ground, near water. It is a colonial nester.	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Millard County, Utah. It has also been documented within 5 miles of the reference line in Iron, Juab, Millard, Sevier, Uintah, and Washington counties, Utah. No suitable habitat for the American white pelican is crossed by the project alternatives in Region III. A breeding colony has been documented within 5 miles of the reference line in Carbon County, Wyoming.	No.	Floyd et al. 2007; Kingery 1998; NDOW 2012; UDWR 2005; UNHP 2003; WGFD 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Least bittern	*Ixobrychus exilis*	BLM; NV-P	Range: The least bittern nests throughout the eastern United States and in select areas of Oregon, California, Colorado, Arizona, New Mexico, Texas, Utah, Nebraska, Nevada, Mexico, and South America. Habitat: The species breeds and forages in freshwater marshes. It nests on a platform of marsh vegetation with a canopy.	Regions I, III, and IV: Moderate. The species has been documented within 5 miles of the reference line in Clark County, Nevada. Probable breeding records exist for the Pahranagat National Wildlife Refuge in Lincoln County, Nevada.	No.	Floyd et al. 2007; Gibbs et al. 1992.
White-faced ibis	*Plegadis chihi*	BLM	Range: The white-faced ibis nests from central Mexico to coastal Texas and Louisiana and through the Great Basin. Isolated colonies exist in Alberta, New Mexico, California, Montana, North Dakota, Iowa, Kansas, and South America. Habitat: The species breeds in tall emergent vegetation growing as “islands”, surrounded by water (at least 18 inches deep). It forages in wet hay meadows and flooded agricultural croplands, marshes, shallow ponds, lakes, and reservoirs. It constructs a nest of emergent vegetation in bulrushes, cattails, or reeds; on floating mats; or in low trees.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon County, Wyoming. It has also been documented within 5 miles of the reference line in Sweetwater County, Wyoming. Possible breeding colonies exist in northwestern Colorado and in Clark County, Nevada.	No.	Floyd et al. 2007; Kingery 1998; NDOW 2012; Ryder and Manry 1994; WGFD 2005.
Barrow’s goldeneye	*Bucephala islandica*	BLM	Range: The Barrow’s goldeneye breeds in the western mountains of North America, from Alaska to central California. Habitat: The species breeds near densely vegetated water bodies with abundant aquatic vegetation. It forages in water bodies. It nests in cavities, usually in dead trees close to cold-water lakes, pools, or rivers. The species exhibits high nest fidelity.	Region I: Low. The species is a confirmed breeder in Sweetwater and Carbon counties, Wyoming.	No.	Ehrlich et al. 1988; Kingery 1998; WGFD 2005.
Trumpeter swan	*Cygnus buccinator*	BLM	Range: The trumpeter swan was once distributed across most of North America and currently occurs locally from Alaska south to Oregon and east to Michigan. Habitat: The species breeds in areas with stable, quiet, and shallow waters where small islands, muskrat houses, or dense emergent vegetation provide nesting and loafing habitat. It forages in shallow marshes, ponds, lakes, and river oxbows with nutrient-rich waters, and dense aquatic plants and invertebrates. It constructs a nest of aquatic and emergent vegetation, often on a muskrat house surrounded by water.	Region I: High. The species has been documented within the 2-mile transmission line corridor in Sweetwater County, Wyoming.	No.	Ehrlich et al. 1988; Floyd et al. 2005; WGFD 2005.
Bald eagle	*Haliaeetus leucocephalus*	BLM USFS; CO-ST; UT-SS Tier I; NV-P	Range: The bald eagle occurs throughout the United States and Canada, south into central Mexico. Habitat: The species breeds near large lakes and rivers, in forested habitat where adequate prey and large, old cottonwood or conifer trees are available for nesting. It constructs a large stick nest, and exhibits high nest fidelity.	Regions I, II, III, and IV: High. This species has been documented throughout Wyoming, Colorado, Utah, and Nevada. Bald eagles nest and winter along major waterbodies in mature riparian woodlands.	No.	Floyd et al. 2007; Kingery 1998; NDOW 2012; UDWR 2005; UNHP 2003; WGFD 2005.
California condor	*Gymnogyps californianus*	FE; BLM; EXP/NE-UT; UT-SS Tier I	Range: The California condor is found in California, Arizona, and southern Utah. Habitat: The species breeds and forages in rugged mountains, with brushy or rocky outcrops for nesting. It nests on cliffs, in caves, or in cavities in giant sequoias. It constructs a nest of coarse gravel, with a small amount of leaves and twigs.	Region III: High. The species has been documented within the 2-mile transmission line corridor in Iron County, Utah. The re-introduced population in northern Arizona occurs outside the 2-mile transmission line corridor. However, condors regularly forage, roost, and may nest in southern Utah, therefore may occur within the 2-mile transmission line corridor.	No.	AGFD 2008; Ehrlich et al. 1988; Snyder and Rea 1998; UDWR 2005; UNHP 2003.
Ferruginous hawk	*Buteo regalis*	BLM; UT-SS Tier II; NV-P	Range: The ferruginous hawk occurs in Canada, eighteen western and central states, and Mexico. Habitat: The species breeds in semiarid open country, primarily grasslands, basin prairie shrublands, and badlands, typically near prairie dog colonies. It requires large tracts of relatively undisturbed rangeland for foraging habitat. It constructs a large stick nest on rock outcrops, knolls, cutbanks, cliff ledges, or trees, and exhibits high nest fidelity.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming; in Beaver, Duchesne, Emery, Grand, Iron, Juab, Millard, Uintah, and Washington counties, Utah; and in Lincoln County, Nevada. Suitable habitat also occurs within the study area in Clark County, Nevada.	No.	Floyd et al. 2007; Kingery 1998; NatureServe Explorer 2010; NDOW 2012; UDWR 2005; UNHP 2003; WGFD 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Golden eagle	*Aquila chrysaetos*	BLM	Range: The golden eagle occurs throughout North America, from Alaska to central Mexico. Habitat: The species breeds and forages in a variety of habitats, including large expanses of grasslands, sagebrush, agricultural lands, and tundra. It constructs a large stick nest on cliffs and in large trees, and exhibits high nest fidelity.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and in White Pine and Lincoln counties, Nevada. Suitable habitat also occurs within the 2-mile transmission line corridor in Colorado, Utah, and Nevada.	No.	Floyd et al. 2007; Kingery 1998; Kochert 2002.
Northern goshawk	*Accipiter gentilis*	BLM; USFS; UT-SS Tier I; NV-P	Range: The northern goshawk occurs in Alaska, Canada, and south through the southern Rocky Mountains and Mexico. Habitat: The species breeds and forages in mixed coniferous forest and mature aspen stands with tall trees, intermediate canopy coverage for nesting, and small open areas for foraging. It constructs a stick and twig nest on a large horizontal limb, usually against or near the truck.	Regions I and II: High. The species is known to occur within the 2-mile transmission line corridor in Sweetwater County, Wyoming and in Emery and Millard counties, Utah. It has also been documented within 5 miles of the reference line in Carbon County, Wyoming; Garfield and Rio Blanco counties, Colorado; in Daggett, Duchesne, Emery, Millard, Sanpete, Sevier, Uintah, Utah, and Wasatch counties, Utah; and in Lincoln County, Nevada. No suitable habitat for the northern goshawk is crossed by the project alternatives in Region III.	No.	Floyd et al. 2007; Johnsgard 1990; Kingery 1998; NDOW 2012; UDWR 2005; WGFD 2005.
Peregrine falcon	*Falco peregrinus*	BLM; USFS; NV-P	Range: The peregrine falcon occurs throughout most of North America. Habitat: The species breeds and forages in a variety of open habitats, including woodlands, forests, shrub-steppe, grasslands, marshes, and riparian habitats. It nests on cliffs and rarely on tall buildings near habitats with abundant prey. It constructs a well-rounded scrape nest of accumulated debris on a ledge.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Sweetwater County, Wyoming, Uintah County, Utah, and Clark County, Nevada. It has also been documented within 5 miles of the reference line in Carbon County, Wyoming, and in Utah (Daggett, Duchesne, Emery, Sevier, and Washington counties).	No.	Ehrlich et al. 1988; Floyd et al. 2007; Johnsgard 1990; Kingery 1998; Nevada Diversity Database 2007; UNHP 2003; WGFD 2005.
Prairie falcon	*Falco mexicanus*	BLM	Range: The prairie falcon occurs throughout western North America from Canada to Mexico. Habitat: The species breeds and forages in open terrain, including sagebrush, grasslands, and other arid habitats. It nests on cliff ledges facing open habitat.	Regions I, II, III, and IV: High. Potential habitat for this species occurs in the 2-mile transmission line corridor. It has been documented within 5 miles of the 2-mile transmission line corridor in Lincoln County, Nevada, and in Colorado.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Johnsgard 1990; Kingery 1998; NDOW 2012; WGFD 2009.
Swainson's hawk	*Buteo swainsoni*	BLM	Range: The Swainson's hawk breeds in western North America, from Alaska south into northern Mexico, and east to Oklahoma and Iowa. The species range includes Wyoming, Colorado, Utah, and Nevada. Habitat: The species breeds and forages in arid grasslands, desert, and agricultural areas with scattered trees and shrubs. It constructs a modest nest in trees and exhibits moderate nest fidelity.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Utah. Suitable habitat is present along the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Johnsgard 1990; Kingery 1998; UNHP 2003; WGFD 2005.
Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	BLM; USFS; UT-SS Tier II	Range: The Columbian sharp-tailed grouse occurs locally from Canada, south to Nevada and east to Colorado. It has been extirpated from Oregon, California, and Nevada. Habitat: The subspecies inhabits mountain-foothill shrub communities, sagebrush, grassland, and riparian habitats. Leks are located in flat areas with low, sparse vegetation. Nests occur within 0.6 mile of the lek area.	Regions I and II: Low. The subspecies occurs in suitable habitat in isolated locations in south-central Wyoming, and northwestern Colorado.	No.	Kingery 1998; UDWR 2005; WGFD 2005.
Greater sage-grouse	*Centrocercus urophasianus*	FC; BLM; USFS; UT-SS Tier II;	Range: The greater sage-grouse is found throughout the western United States. Habitat: The species breeds and forages in sagebrush grasslands. Leks are located in open areas (e.g., ridges, knolls, dry lake beds, burned areas) in close proximity to taller sagebrush which is used as escape cover. Most nests are located under sagebrush plants, typically within 4 miles of the lek. Brooding habitat consists of grassy areas near sagebrush. Winter habitat consists of south and east facing slopes with minimal snow cover.	Regions I, II, and III: High. Active leks occur within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah. Suitable nesting, brooding, and wintering habitat also occurs within the 2-mile transmission line corridor in these states. The 2-mile transmission line corridor includes greater sage-grouse core habitat areas in Wyoming.	No.	Connelly et al. 2004, 2000; Floyd et al. 2007; Kingery 1998; UDWR 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Gunnison sage-grouse	*Centrocercus minimus*	FC; BLM; UT-SS	Range: Gunnison sage-grouse occurs in isolated locations in southwestern Colorado and southeastern Utah. Habitat: The subspecies breeds and forages in sagebrush grasslands. Leks are located in open areas (e.g., ridges, knolls, dry lake beds, burned areas) in close proximity to tall sagebrush. Nests are generally located under sagebrush plants within 4 miles of the lek. Brooding habitat consists of grassy areas near sagebrush. Winter habitat consists of south and east facing slopes with minimal snow cover.	None.	Yes. The study area occurs outside the known geographic range of this species.	Connelly et al. 2004, 2000; Floyd et al. 2007; UNHP 2003.
Whooping crane	*Grus americana*	FE; CO-SE; UT-SS Tier I	Range: Wild populations of whooping cranes migrate from their wintering habitat in southern Texas, north through Oklahoma, Nebraska, South Dakota, North Dakota and Montana to their nesting habitat in Canada. A non-migratory population also occurs in Florida. Habitat: The species does not breed in the project region. Migrants forage in mudflats around reservoirs and in agricultural areas. Migrating whooping cranes roost on submerged river sandbars.	None. The occurrence of this species within the 2-mile transmission line corridor would be limited to accidental migrants from the Aransas-Wood Buffalo population. The Rocky Mountain experimental population is extinct.	No. The species is included in analyses because of the water depletion evaluation requirement in the Platte River Basin.	CDOW 2009a; Ehrlich et al. 1988; UDWR 2005; USDOS 2008; USFWS 2004b.
Yuma clapper rail	*Rallus longirostris yumanensis*	FE; NV-P	Range: The Yuma clapper rail was formerly restricted to an area near Yuma, Arizona, but has since expanded its range. Over 70 percent of the breeding population winters along the lower Colorado River. Habitat: The subspecies breeds and forages in freshwater marshes with dense vegetation exceeding 16 inches in height, and water depth of 12 inches or less. Important habitat components include pond openings, flowing channels, and emergent soils. It constructs a nest of reeds, aquatic vegetation, and grass in a tussock or clumped vegetation.	Regions III and IV: High. The subspecies has been documented within the 2-mile transmission line corridor in Clark County, Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; NatureServe Explorer 2010; Rosenberg et al. 1991; Todd 1986.
Black tern	*Chlidonias niger*	BLM	Range: The black tern occurs locally in Canada and the northern two-thirds of the United States. Habitat: The species breeds in large marshes, usually greater than 50 acres and forages in marshes and aquatic areas. It nests in small, loose colonies, in still water. It constructs a floating nest of dead rushes in marshes, or on grass tufts in wetlands	Regions I and II: High. Breeding colonies of this species have been documented within the 2-mile transmission line corridor in Carbon County, Wyoming and within 5 miles of the 2-mile transmission line corridor in Sweetwater County, Wyoming. The species has been documented within 5 miles of the reference line in Uintah County, Utah. Suitable habitat occurs at Pelican Lake, and on sandbars in the Green River, Utah.	No.	Kingery 1998; UNHP 2003.
Interior least tern	*Sternula antillarum*	FE; CO-SE	Range: The interior least tern occurs along rivers and lake shores throughout the interior U.S. from Montana to Texas and New Mexico to Louisiana. Habitat: The species breeds and forages on barren or sparsely vegetated sandbars adjacent to waterbodies. It nests in variable size colonies on sandy or pebbly, sparsely vegetated islands or shorelines.	None. It is unlikely that nesting interior least terns will be present within the 2-mile transmission line corridor.	No. The species is included in analyses because of the water depletion evaluation requirement in the Platte River Basin.	CDOW 2009b; USDOS 2008; USFWS 2009.
Long-billed curlew	*Numenius americanus*	BLM; UT-SS Tier II	Range: The long-billed curlew occurs from southern Canada into most of the western United States. Habitat: The species breeds and forages in a variety of grassland habitats, including moist meadow grasslands, agricultural areas, and dry prairie uplands, usually near water. It nests in grass less than 12 inches tall, with bare ground, shade, abundant invertebrate prey.	Regions I, II, and III: High. This species has been documented within the 2-mile transmission line corridor in Carbon County, Wyoming and Juab, Millard, and Uintah counties, Utah. It has also been documented within 5 miles of the reference line in Beaver, Grand, and Iron counties, Utah.	No.	Floyd et al. 2007; Kingery 1998; NatureServe Explorer 2010; UDWR 2005; UNHP 2003; WGFD 2005.

Table G-2 Special Status Wildlife Species Identified for the TransWest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Western snowy plover	*Charadrius alexandrinus nivosus*	BLM; NV-LD	Range: The western snowy plover occurs primarily along the western coast of the U.S. The subspecies breeds in Churchill, Elko, Eureka, Humboldt, Lyon, Mineral, Nye, Pershing, Washoe, and White Pine Counties, Nevada.It is considered a migrant throughout the state. Habitat: The subspecies breeds and forages on alkali playas near large standing pools of shallow water. Artesian wells and springs that spill water onto the dry playas are also used in times of drought. Nests are located on recently exposed alkaline flats.	Region IV: Moderate. Suitable playa habitat is crossed by the project.	No.	NDOW 2012.
Mountain plover	*Chardrius montanus*	BLM; USFS; UT-SS;	Range: The mountain plover occurs in dry short-grass prairies from south-central Canada to Texas. Habitat: The species breeds and forages in flat, short-grass prairie habitat and fallow agricultural fields with sparse vegetation. It constructs a ground nest of cow manure chips, grass, and roots.	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming. It has been documented within 5 miles of the reference line in Grand County, Utah. Historic records also exist for mountain plovers in Duchesne and Uintah counties, Utah.	No.	Ehrlich et al. 1988; NatureServe Explorer 2010; UNHP 2003; WGFD 2005; WYNDD 2010.
Piping plover	*Charadrius melodus*	FT; CO-ST	Range: The Northern Great Plains population of the piping plover occurs from Canada, south along major prairie rivers, including the Platte River system, and on lake shores to Colorado. Habitat: The species breeds and forages on (sparsely vegetated) sandy lakeshore beaches, and sandbars within riverbeds, and on lake shores. It constructs a scrape nest in sand or gravel.	None. It is unlikely that nesting piping plovers will be present along the 2-mile transmission line corridor.	No. The species is included because of the water depletion evaluation requirement in the Platte River Basin.	CDOW 2010a; USDOS 2008; USFWS 2004a.
Yellow-billed cuckoo (western)	*Coccyzus americanus*	FC; BLM; UT-SS Tier I; NV-P	Range: The western yellow-billed cuckoo occurs west of the continental divide in North America. Habitat: The species breeds and forages in dense woodlands along riparian corridors in otherwise arid areas. It requires a multi-storied canopy, and dense, shrubby vegetation, adequate invertebrate prey, cover, and water. It constructs twig nests, in shrubs.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Utah county, Utah. It has also been documented within 5 miles of the reference line in Emery, Grand, Uintah, and Washington counties, Utah. The species is documented in Meadow Valley Wash in Lincoln County, Nevada. It is also a confirmed breeder along the Muddy River in Nevada.	No.	47 CFR 51; Floyd et al. 2007; Hughes 1999; NDOW 2012; UDWR 2005; UNHP 2003.
Boreal owl	*Aegolius funereus*	USFS	Range: The boreal owl occurs from Alaska, south through the Rocky Mountains to northern New Mexico. Habitat: The species breeds and forages in mature, high elevation (above 9,000 feet amsl) coniferous forests, interspersed with mature aspen stands for nesting cavities. It requires large areas of forested habitat. It nests in large woodpecker holes or natural cavities in trees.	Regions I and II: Moderate. The species is documented within 5 miles of the reference line in Carbon County, Wyoming.	No.	Johnsgard 1988; Kingery 1998; WGFD 2005.
Burrowing owl	*Athene cunicularia*	BLM; CO-ST; UT-SS Tier II	Range: The burrowing owl occurs from Canada, south through most of the western United States to central Mexico. Habitat: The species breeds and forages in a wide variety of arid and semiarid environments, including grassland, desert, and shrub-steppe habitats, and agricultural areas. It generally nests in burrows excavated by small mammals, particularly prairie dogs and ground squirrels.	Regions I, II, III, and IV: High. The species is documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, Moffat County, Colorado, throughout Utah, and in Clark and Lincoln counties, Nevada.	No.	Floyd et al. 2007; Johnsgard 1988; Kingery 1998; NDOW 2012; Nevada Diversity Database 2007; NatureServe Explorer 2010; UDWR 2005; UNHP 2003; WGFD 2005.
Flammulated owl	*Otus flammeoulus*	BLM; USFS	Range: The flammulated owl breeds from Canada, south through Washington, Oregon, California, Nevada, Utah, Wyoming, Colorado, Arizona, New Mexico, western Texas, and Mexico. Habitat: The species breeds and forages in montane forests, especially ponderosa pine where it feeds on moths. It nests in cavities, especially abandoned woodpecker holes.	Regions I and II: Moderate. The species is known to occur in Colorado, Utah, and Nevada. Suitable habitat occurs in Rio Blanco County, Colorado, Daggett, Sevier, and Uintah counties, Utah, and Carbon County, Wyoming. It has been documented within 1 mile of the reference line. No suitable habitat for the flammulated owl is crossed by the project alternatives in Region III.	No.	Floyd et al. 2007; Johnsgard 1988; Kingery 1998; NDOW 2012; WGFD 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Long-eared owl	*Asio otus*	BLM	Range: The long-eared owl occurs from southern Canada through most of the United States, except in the southeast. Habitat: The species breeds and forages in dense, woody vegetation for roosting, and open country for hunting. It nests in abandoned corvid nests in trees or brush.	Regions I, II, III, and IV: Low. The species is known to occur in Wyoming, Colorado, Utah, and Nevada. Suitable habitat occurs along the 2-mile transmission line corridor.	No.	Floyd et al. 2007; Johnsgard 1988; Kingery 1998; WGFD 2005.
Mexican spotted owl	*Strix occidentalis lucida*	FT; BLM; CO-ST; UT-SS	Range: The Mexican spotted owl occurs in the interior mountain ranges of western North America, including portions of Utah, Colorado, Arizona, New Mexico, Texas, and Mexico. Habitat: The subspecies breeds and forages in mixed coniferous forests and hardwood forests in rocky steep-walled canyons. It uses a simple depression as a nest in a cave, pothole, or rock fissure in narrow, steep-wall canyons. It exhibits high nest fidelity.	Regions II and III: Moderate. The species is known to occur in several counties in eastern Utah. Suitable habitat exists along the Utah/Colorado border in eastern Uintah County and southern Duchesne County, Utah.	No.	50 CFR 17; CDOW 2008; Johnson 1997; UCDC 2008; UDWR 2005.
Short-eared owl	*Asio flammeus*	BLM; UT-SS Tier II	Range: The short-eared owl occurs from Alaska and Canada, south to central California and east to Maryland. Habitat: The species breeds and forages in broad expanses of open habitat, with dense, low vegetation, including grasslands, meadows, marshes, and open sagebrush shrublands. It is strongly associated with ungrazed and undisturbed native grasslands and wetlands that support dense small mammal populations. It constructs a grass nest in low vegetation.	Regions I, II, and III: High. The species is documented within the 2-mile transmission line corridor in Millard County, Utah and Carbon and Sweetwater counties, Wyoming. It has also been documented within 5 miles of the reference line in Beaver, Juab, and Uintah counties, Utah.	No.	Floyd et al. 2007; Johnsgard 1988; Kingery 1998; UDWR 2005; UNHP 2003; WGFD 2005.
Black swift	*Cypseloides niger*	BLM; UT-SS Tier II	Range: The black swift occurs in scattered colonies throughout western North America, from southeast Alaska to central Mexico. Habitat: The species breeds and forages in a variety of habitats, foraging far from nesting areas. It nests on vertical rock faces, near waterfalls, or in dripping caves. Nests are constructed of ferns and algae in small colonies.	Regions I and II: High. Nesting colonies are known to occur in Utah County, Utah. The species has been documented within the 2-mile transmission line corridor in Duchesne County, Utah. It has also been documented within 5 miles of the reference line in Uintah County, Utah.	No.	Ehrlich et al. 1988; Kingery 1998; UDWR 2005; UNHP 2003.
Lewis's woodpecker	*Melanerpes lewis*	BLM; UT-SS Tier II	Range: The Lewis's woodpecker occurs from southern Canada, to south-central California and New Mexico. Habitat: The species breeds and forages in open country with scattered trees, usually below 9,000 feet amsl. Habitat includes open ponderosa pine forests, burned-out coniferous stands, riparian and oak woodlands, and deciduous forests. It excavates cavities for nests in trees.	Regions I, II and III: High. The species has been documented within the 2-mile transmission line corridor area in Juab and Utah counties, Utah. It has also been documented within the 2-mile transmission line corridor in Millard and Uintah counties, Utah.	No.	Floyd et al. 2007; Kingery 1998; UDWR 2005; UNHP 2003; WGFD 2005.
Red-naped sapsucker	*Sphyrapicus nuchalis*	BLM	Range: The red-naped sapsucker occurs from the Rocky Mountains, west to eastern California and Oregon, and from southern Canada to Arizona and New Mexico. Habitat: The species breeds and forages in aspen, cottonwood riparian stands, and mixed aspen/coniferous forests from 5,000 to 9,000 feet amsl. It nests in tree cavities and exhibits some nest fidelity.	Regions I, II, III, and IV: Low. The species is known to occur in Wyoming, Colorado, Utah, and Nevada.	No.	Floyd et al. 2007; Kingery 1998; NatureServe Explorer 2010; NDOW 2012; WGFD 2009.
American three-toed woodpecker	*Picoides dorsalis*	BLM; USFS; UT-SS Tier II	Range: The American three-toed woodpecker occurs from Canada and Alaska, south through the Rocky Mountains to New Mexico. Habitat: The species is a high elevation spruce-fir forest obligate. It breeds and forages in coniferous forests, particularly in burned and beetle killed areas where it scales off bark in search of prey. It nests in tree cavities.	Regions I and II: Moderate. The species has been documented within 5 miles of the reference line in Emery and Sevier counties, Utah. Suitable habitat is present within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah. No suitable habitat for the American three-toed woodpecker is crossed by the project alternatives in Region III.	No.	Floyd et al. 2007; Kingery 1998; NatureServe Explorer 2010; UDWR 2005; UNHP 2003.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Bendire's thrasher	*Toxostoma bendirei*	NV-P	Range: The Bendire's thrasher occurs in the deserts of the southwestern United States and northwestern Mexico. Habitat: The species breeds and forages in desert habitat, especially areas of tall vegetation, cholla, creosote bush, yucca, and in juniper woodlands. It constructs a stick cup nest in shrubs, cacti, or trees.	Regions II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It is known to occur in Utah County, Utah, and Clark and Lincoln counties, Nevada. Nesting is suspected to occur in Washington, Iron, and Grand counties, Utah.	No.	England 1993; Floyd et al. 2007; UNHP 2003.
Bobolink	*Dolichonyx oryzivorus*	BLM; UT-SS Tier II	Range: The bobolink occurs from Canada, south to eastern Oregon, central Colorado, central Illinois, and western North Carolina. Habitat: The species breeds and forages in large grassland expanses. It constructs a grass nest in a depression in wet meadows, flooded pastures, and fields.	Regions I, II, and III: Moderate. The species has been documented within 5 miles of the reference line in Carbon County, Wyoming; Uintah County, Utah; and Moffat County, Colorado. Suitable habitat occurs within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; UDWR 2005; UNHP 2003; WGFD 2005.
Baird's sparrow	*Ammodramus bairdii*	BLM	Range: Baird's sparrow occurs from Canada south through the northern Great Plains. Habitat: The species breeds and forages in shortgrass prairie. It constructs a ground nest in a depression.	Region I: Low. This species may be found in grasslands and weedy fields in the Rawlins Field Office, but likely outside of the Special Status Bird Analysis Area.	Yes.	NatureServe Explorer 2010; WGFD 2005.
Brewer's sparrow	*Spizella breweri*	BLM	Range: The Brewer's sparrow occurs from southeastern Alaska south to southern California and southwestern Kansas. Habitat: The species is a sagebrush obligate. It breeds and forages in sagebrush shrublands with abundant, scattered shrubs and short grasses. It constructs a nest of grass, forbs, and roots in a shrub or low tree.	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It has been documented within 5 miles of the reference line in Carbon and Sweetwater counties, Wyoming. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada. No suitable habitat for the Brewer's sparrow is crossed by the project alternatives in Region IV.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; NatureServe Explorer 2010; WGFD 2005.
Crissal thrasher	*Toxostoma crissale*	BLM	Range: The Crissal thrasher occurs from the desert southwest of the United States and central Mexico. Habitat: The species breeds and forages in desert washes and riparian thickets. It constructs a grass nest in dense willows, mesquite, or sagebrush.	Regions III and IV: Moderate. The species has been documented within 5 miles of the reference line in Washington County, Utah. Suitable habitat occurs within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada and Washington County, Utah.	No.	Cody 1999; Ehrlich et al. 1988; Floyd et al. 2007; UNHP 2003.
Grasshopper sparrow	*Ammodramus savannarum*	BLM; UT-SS Tier II	Range: The grasshopper sparrow occurs from Canada east to southern Maine, and south to southern California and central Georgia. The main population occurs in the Great Plains. Habitat: The species breeds and forages in mid- and long-grass prairie, mixed grasslands, meadows, and open sagebrush-grasslands. It constructs a grass nest in a depression.	Region I: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; UDWR 2005; UNHP 2003; WGFD 2005.
Gray vireo	*Vireo vicinior*	BLM	Range: The gray vireo occurs in Arizona, New Mexico, Colorado, Utah, Nevada, and southern California. Habitat: The species breeds and forages in hot, arid mountains, in desert scrub, pinyon-juniper, pine-oak scrub, and high plains scrubland. It constructs a deep, rounded grass nest, suspended in a forked twig in a shrub.	Regions I, II, III, and IV: High. This species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It has been documented within 5 miles of the reference line in Moffat, and Rio Blanco counties, Colorado. Suitable habitat occurs throughout the 2-mile transmission line corridor in Utah and Nevada.	No.	Barlow, 1999; Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998.
Juniper titmouse	*Baeolophus griseus*	BLM	Range: The juniper titmouse occurs in western North America, from southern Oregon west to Wyoming, and south to Arizona, western Texas, and Mexico. Habitat: The species breeds and forages in juniper woodlands interspersed with sagebrush and other shrubs. It nests in a natural cavity or in an abandoned woodpecker hole.	Region I and II: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Lincoln County, Nevada. Suitable habitat occurs throughout the 2-mile transmission line corridor in Colorado, Utah, and Nevada. No suitable habitat for the juniper titmouse is crossed by the project alternatives in Regions III and IV.	No.	Floyd et al. 2007; Kingery 1998; WGFD 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Le Conte's thrasher	*Toxostoma lecontei*	BLM; NV-P;	Range: The Le Conte's thrasher occurs in the desert southwest of Nevada, California, Arizona, and northwestern Mexico. Habitat: The species breeds and forages in desert shrub, mesquite, and tall riparian shrub. It constructs a deep, bulky nest of thorny twigs and sticks in cholla, palo verde, or creosote bush.	Regions III and IV: Low. The species is known to occur in Clark and Lincoln counties, Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Sheppard 1996.
Loggerhead shrike	*Lanius ludovicianus*	BLM	Range: The loggerhead shrike occurs from south-central Canada, throughout the United States, and Mexico. Habitat: In the western U.S., the species breeds and forages in arid, open country with scattered small trees and shrubs or hedgerows. It constructs a twig nest in a thorny tree or shrub.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Lincoln County, Nevada. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; Yosef 1996.
Lucy's warbler	*Vermivora luciae*	BLM	Range: The Lucy's warbler occurs in the Sonoran desert of the southwestern United States and west coastal Mexico. Habitat: The species breeds and forages in riparian mesquite woodlands. It constructs a nest of weeds, bark, and mesquite in an abandoned verdin or woodpecker hole, or under loose bark.	Regions III and IV: Low. The species is known to occur in Lincoln and Clark counties, Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007.
Phainopepla	*Phainopepla nitens*	BLM; NV-P	Range: The phainopepla occurs in the southwestern United States and Mexico. Habitat: The species breeds and forages in desert, riparian woodlands, and desert shrub. It constructs a shallow, twig nest, often in mistletoe.	Regions III and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada.	No.	Chu 1999; Ehrlich et al. 1988; Floyd et al. 2007; Nevada Diversity Database 2007.
Pinyon jay	*Gymnorhinus cyanocephalus*	BLM	Range: The pinyon jay occurs from central Oregon, Montana, and South Dakota, south to Baja California, Arizona, and New Mexico. Habitat: The species breeds and forages in ponderosa pine savannah, pinyon-juniper, and montane shrublands. It constructs a bulky twig nest in a juniper or pine tree.	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It is known to occur in Wyoming, Colorado, Utah, and Nevada. No suitable habitat for the pinyon jay is crossed by the project alternatives in Region IV.	No.	Balda 2002; Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; WGFD 2005.
Sage sparrow	*Amphispiza belii*	BLM	Range: The sage sparrow occurs from central Washington, east to northwestern Colorado and south to Baja California and northwestern New Mexico. Habitat: The species is a sagebrush obligate. It breeds and forages in habitat with tall shrubs (3 to 6 feet tall) and low grass cover, and requires large blocks of unfragmented habitat. It constructs a twig nest in sagebrush.	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, Moffat County, Colorado, and Lincoln County, Nevada. It has also been recorded within 5 miles of the reference line in Rio Blanco County, Colorado. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and in Lincoln County, Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; WGFD 2005.
Sage thrasher	*Oreoscoptes montanus*	BLM	Range: The sage thrasher occurs from Canada, south through the Great Basin, to Arizona and New Mexico. Habitat: The species is a sagebrush obligate. It breeds and forages in habitat with tall shrubs (3 to 6 feet tall) and low grass cover. It constructs a bulky, twig nest in sagebrush.	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Lincoln County, Nevada. Suitable habitat occurs in Wyoming, Colorado, Utah, and in Lincoln County, Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; NDOW 2012; WGFD 2005.
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE; BLM; CO-SE; UT-SS Tier I; NV-P	Range: The southwestern willow flycatcher occurs throughout the southwestern United States. Habitat: The subspecies breeds and forages in dense riparian habitats with saturated soils, standing water, or nearby streams, or pools. It constructs a grass nest in a deciduous shrub.	Regions III and IV: High. The species has been documented within 5 miles of the reference line in Washington County, Utah. Suitable habitat occurs in Emery, Grand, Iron, and Uintah counties, Utah, and in Clark and Lincoln counties, Nevada. Designated Critical Habitat exists in Clark County, Nevada and in Washington County, Utah. Additional Critical Habitat is proposed in Clark and Lincoln counties, Nevada, and Washington County, Utah.	No.	Ehrlich et al. 1988; USFWS 2003; WGFD 2009; UDWR 2005; USFWS 2009; USFWS 2010b.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Vesper sparrow	*Pooecetes gramineus*	BLM	Range: The vesper sparrow occurs from southern Canada to the Appalachian Mountains, along the Ohio River, and in much of the western United States. Habitat: The species breeds and forages in a variety of open, grass habitats, including sagebrush steppe, meadows, pastures, and roadsides. It constructs a grass nest in a depression.	Regions I, II, and III: Low. The species is known to occur in Wyoming, Colorado, Utah, and in Lincoln County, Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Jones and Cornely 2002; Kingery 1998; WGFD 2005.
Yellow-breasted chat	*Icteria virens*	BLM	Range: The yellow-breasted chat occurs throughout the United States and northern Mexico. Habitat: The species breeds and forages in riparian shrub and marshes below 7,000 feet amsl. It constructs a large leaf and weed nest in a deciduous shrub.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It is known to occur in Wyoming, Colorado, Utah, and Nevada.	No.	Ehrlich et al. 1988; Floyd et al. 2007; Kingery 1998; WGFD 2005.
MAMMALS						
Allen's big-eared bat	*Idionycteris phyllotis*	BLM; UT-SS Tier II; NV-P	Range: The Allen's big-eared bat occurs in the southwestern United States and Mexico. Habitat: The species breeds and forages in lowland riparian, desert shrub, mountain shrub, and mixed forest habitats, between 1,675 to 6,000 feet amsl. It roosts in trees (large dead snags), mines, and caves, and forages over open water.	Regions III and IV: Moderate. The species has been documented within 5 miles of the reference line in Washington County, Utah, and Clark County, Nevada, primarily in the Spring Mountains. It may also be present in Lincoln County, Nevada.	No.	Bradley et al. 2006; Fitzgerald et al. 1994; Oliver 2000; UDWR 2005.
Big brown bat	*Eptesicus fuscus*	BLM	Range: The big brown bat occurs from Alaska and northern Canada to northern South America. Habitat: The species breeds and forages in a variety of habitats, including deciduous forests, shrublands, agricultural, and urban areas between 725 to over 9.850 feet amsl. It roosts in a variety of structures including mines, caves, buildings, and trees, and forages over open water or in tree foliage.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It has a widespread distribution in Wyoming and Colorado.	No.	Bradley et al. 2006; Fitzgerald et al.1994; Hester and Grenier 2005; NDOW 2012; Nevada Diversity Database 2007.
Big free-tailed bat	*Nyctinomops macrotis*	BLM; UT-SS Tier II	Range: The big free-tailed bat occurs from South America north to Mexico, Arizona, New Mexico, parts of Texas, California, Nevada, Utah, and Colorado. Habitat: The species breeds and forages at lower elevations (2,700 ft to 9,200 feet amsl) in a variety of habitats, including rugged, rocky areas in arid landscapes, lowland riparian, canyons, desert scrub, floodplains, montane forest, and woodlands. It roosts in crevices in cliff faces and occasionally in buildings and caves, and forages over open water.	Region II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln county, Nevada. It has been documented within 5 miles of the reference line in Sevier County, Utah, and Clark County, Nevada, in the Las Vegas area and the Muddy River drainage. Suitable habitat also occurs in the southern half of Utah.	No.	Bradley et al. 2006; Ellison et al. 2003; Hester and Grenier 2005; NDOW 2012; Oliver 2000; UDWR 2005.
Brazilian free-tailed bat	*Tadarida braziliensis*	BLM	Range: The Brazilian free-tailed bat occurs from central North America, south through Mexico and Cuba, to northern South America. Habitat: The species breeds and forages in a wide variety of habitats, from desert scrub to coniferous forests, between 725 to over 11,500 feet amsl. It roosts in caves, mines, trees, bridges, and buildings. Colonies often number in the thousands.	Regions II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It has also been recorded within 5 miles of the reference line in Duchesne, Juab, Sevier, Utah, and Washington counties, Utah.	No.	Bradley et al. 2006; Hester and Grenier 2005; NDOW 2012; Oliver 2000.
California leaf-nosed bat	*Macrotus californicus*	NV-P	Range: The California leaf-nosed bat occurs from southern California and Nevada, south to Mexico. Habitat: The species breeds and forages in low elevation (690 to 2,265 feet amsl) creosote, Mojave scrub, and riparian habitat. It roosts in caves, mines, buildings, bridges, and rock shelters.	Regions III and IV: High. The species is known to occur in the extreme southern portion of Nevada. It also may forage along the Virgin River in Clark County, Nevada. Maternity roosts are believed to exist in the Muddy River drainage in Clark County, Nevada.	No.	AGFD 1993; Bradley et al. 2006. .

Table G-2 Special Status Wildlife Species Identified for the TransWest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
California myotis	*Myotis californicus*	BLM	Range: The California myotis occurs throughout much of western North America. Habitat: The species breeds and forages in a variety of habitats from desert scrub to forests, including grassland and riparian areas between 690 and 8,960 feet amsl. It roosts in a variety of structures including mines, caves, buildings, and trees, and forages over open water.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It is known to occur throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al.1994; Hester and Grenier 2005; NDOW 2012; Nevada Diversity Database 2007; Oliver 2000.
Cave myotis	*Myotis velifer*	BLM	Range: The cave myotis occurs from Kansas, Oklahoma, and western Texas, to southern Nevada, southeastern California, south through Mexico and Honduras. Habitat: The species breeds and forages in lower elevations in desert shrub, grassland, mixed forest, cactus, and desert riparian habitats. It roosts in caves, mines, buildings, and bridges.	Regions III and IV: Low. The species is known to occur in Clark County, Nevada. It has also been documented in a mine in the southern portion of the Lake Mead National Recreation Area, in Nevada.	No.	Bradley et al. 2006
Fringed myotis	*Myotis thysanodes*	BLM; UT-SS; NV-P	Range: The fringed myotis occurs in most of western North America, from Canada to Mexico, and east to the front range of the Rocky Mountains. Habitat: The species breeds and forages in a wide variety of habitats, including lowland riparian, grassland, desert shrub, pinyon-juniper forests, and meadows, between 1,380 and 7,080 feet amsl. It roosts in mines, caves, trees, and buildings.	Regions II, III, and IV: High. The species been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It has also been recorded within 5 miles of the 2-mile transmission line corridor in Grand County, Utah.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; NDOW 2012; Oliver 2000.
Greater western mastiff bat	*Eumops perotis californicus*	BLM; NV-P	Range: The greater western mastiff bat occurs in California, Nevada, Arizona, Texas, and Mexico. Habitat: The species breeds and forages in a variety of habitats, including desert shrub, cliff/canyon, and montane coniferous forest, in a broad elevation range. It is known to roost on large rock formations.	Region IV: Low. The species is known to occur in Clark County, Nevada, in the Spring Mountains, the Las Vegas Valley Wash, and along the Colorado River near Laughlin, Nevada.	No.	AGFD 1993; Bradley et al. 2006.
Hoary bat	*Lasiurus cinereus*	BLM	Range: The hoary bat occurs from Canada throughout the United States, south to Argentina and Chile. Habitat: The species breeds and forages in forested upland habitats, forest riparian zones, and agricultural habitats, between 1,870 and 8,270 feet amsl. It may occur in park and garden settings in urban areas. It roosts in trees, within foliage 10 to 40 feet above the ground.	Regions I, II, III, and IV: Moderate. The species has been documented within 5 miles of the reference line in Carbon County, Wyoming. Suitable habitat also occurs within the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; Oliver 2000.
Long-eared myotis	*Myotis evotis*	BLM	Range: The long-eared myotis occurs across western North America, from southwestern Canada to Baja California, and east to the Great Plains. Habitat: The species breeds and forages in a wide variety of habitats, including lowland riparian, sagebrush, shrubland, rock outcroppings, cliffs, and forests, between 2,265 and 10,140 feet amsl. It roosts in hollow trees, under bark, in crevices in rock outcrops, in mines, caves, and buildings, and forages over open water.	Regions I, II, III, and IV: Moderate. The species has been documented within 5 miles of the 2-mile transmission line corridor in Lincoln County, Nevada. It is known to occur in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; NDOW 2012; Oliver 2000.
Long-legged myotis	*Myotis volans*	BLM	Range: The long-legged myotis occurs across western North America, from southeastern Alaska to Baja California, east to the western Great Plains and central Texas. Habitat: The species breeds and forages in pinyon-juniper and other higher elevation forests between 3,050 to 11,220 feet amsl. It occasionally utilizes riparian, and Mojave and salt desert scrub habitats. It roosts in hollow trees, rock crevices, caves, mines, and buildings, and forages over open water.	Regions I, II, III, and IV: Moderate. The species has been documented within 5 miles of the reference line in Clark and Lincoln counties, Nevada. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; Oliver 2000.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Pallid bat	*Antrozous pallidus*	BLM	Range: The pallid bat occurs from southern Canada to Mexico, and east to Texas, Oklahoma, and Kansas. Habitat: The species breeds and forages in a variety of habitats including desert scrub, grasslands, forests, cottonwood riparian areas, cliff/canyon, and urban areas, at low and middle elevations (5,900 feet amsl). It roosts in mines, caves, hollow trees, buildings, bridges, and on rock outcrops. The species forages on the ground.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. Suitable habitat occurs within the 2-mile transmission line corridor throughout Wyoming, Utah, and Nevada. In Colorado the species is known to occur along the Colorado/Utah border.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; Nevada Diversity Database 2007; Oliver 2000.
Silver-haired bat	*Lasionycteris noctivagans*	BLM	Range: The silver-haired bat occurs from southern Alaska through most of the United States to northeastern Mexico. Habitat: The species breeds and forages in forests, but can also occur in lowland riparian areas, desert shrub, and towns, between 1,575 and 8,270 feet amsl. It roosts exclusively in trees in the summer. In the winter it utilizes trees, rock crevices, mines, caves, and buildings, and forages over open water.	Regions I, II, III, and IV: Moderate. The species has been documented within 5 miles of the reference line in Carbon County, Wyoming, and Clark County, Nevada. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; Oliver 2000.
Spotted bat	*Euderma maculatum*	BLM; USFS; UT-SS Tier II; NV-P	Range: The spotted bat occurs from southern Canada, through the western United States (except Washington), to Mexico. Habitat: The species breeds and forages in a variety of habitats, including lowland riparian, desert shrub, forest, grassland, and towns, from 1,770 to 6,980 feet amsl. It is closely associated with rocky cliffs in Nevada. It roosts primarily in crevices on cliff faces.	Regions I, II, III, and IV: Moderate. The spotted bat has been documented within 5 miles of the reference line in Clark County, Nevada, and in Utah. It has also been documented in the Muddy River drainage and in Lincoln County, Nevada. In Colorado, it has only been reported in the extreme northwestern corner of the state, but could occur in western and south-central Colorado.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al.1994; Hester and Grenier 2005; Oliver 2000; UDWR 2005.
Townsend's (Western) big-eared bat	*Corynorhinus townsendi*	BLM; USFS; UT-SS Tier II; NV-P	Range: The Townsend's (western) big-eared bat occurs from Canada, south across the western United States, and most of Mexico. Habitat: The species breeds and forages in semi-desert shrublands, pinyon-juniper woodlands, cliff/canyon habitat, and open montane forests, from 690 to 11,480 feet amsl. It is highly associated with caves and mines. It roosts in mines, caves, trees, and buildings.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. It has been documented within 5 miles of the reference line in Beaver, Emery, Grand, Juab, Uintah, and Washington counties, Utah. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al.1994; Hester and Grenier 2005; Nevada Diversity Database 2007; Oliver 2000; UDWR 2005.
Western pipistrelle	*Pipistrellus hesperus*	BLM	Range: The western pipistrelle occurs from southern Washington, through the desert southwest, into Mexico. Habitat: The species breeds and forages in low and middle elevation (5,900 feet amsl) Sonoran desert habitats, ponderosa pine, and pinyon-juniper forests, usually in association with rock features. It roosts in rock crevices, mines, caves, buildings, and vegetation.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark and Lincoln counties, Nevada. It is also known to occur throughout Nevada, most of Utah, and in the western half of Colorado.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; NDOW 2005; Nevada Diversity Database 2007; Oliver 2000.
Western red bat	*Lasiurus blossevillii*	BLM; UT-SS Tier II; NV-P	Range: The western red bat occurs from southern Canada, through the western United States, south to Panama and South America. Habitat: The species breeds and forages in towns and lowland riparian cottonwood/willow groves in Utah. In Nevada, the species inhabits mesquite bosque. It is distributed from 1,375 to 6,595 feet amsl. It roosts in trees and leaf litter.	Regions I, II, III, and IV: Low. The species is known to occur in Lincoln and Clark counties, Nevada, and throughout the 2-mile transmission line corridor in Utah.	No.	AGFD 1993; Bradley et al. 2006; Oliver 2000; UDWR 2005.
Western small-footed myotis	*Myotis ciliolabrum*	BLM	Range: This western small-footed myotis occurs in the western half of North America, from Canada to central Mexico. Habitat: The species breeds and forages in arid, rocky terrain in a variety of habitats, including desert scrub, lowland riparian, pine-fir forests, and short-grass prairie. It occurs primarily at middle and higher elevations (above 5,900 feet amsl), although occasionally occurs in valley bottoms (3,450 to 5,900 feet amsl). It roosts in caves, mines, and trees.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It has been documented within 5 miles of the reference line in Carbon County, Wyoming. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; NDOW 2012; Oliver 2000.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Yuma myotis	*Myotis yumanensis*	BLM	Range: The Yuma myotis occurs in the western third of North America, from southwestern Canada, to Mexico. Habitat: The species breeds and forages in a wide variety of habitats, including sagebrush, salt desert scrub, agricultural, playa, forests, and riparian communities, between 1,475 and 7,675 feet amsl. It roosts in buildings, trees, mines, caves, bridges, and rock crevices, and forages over open water.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Clark County, Nevada. The species is known to occur throughout the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	Bradley et al. 2006; Ellison et al. 2003; Fitzgerald et al. 1994; Hester and Grenier 2005; Nevada Diversity Database 2007; Oliver 2000.
Black-footed ferret	*Mustela nigripes*	EXP/NE BLM; CO-SE; UT-SS	Range: The black-footed ferret formerly occurred throughout the Great Plains and Intermountain West of North America. Reintroduced populations occur in Wyoming, South Dakota, Arizona, Kansas, Montana, New Mexico, Utah, Colorado, and Mexico. Habitat: The species is a prairie dog-obligate. It inhabits prairie dog colonies within grasslands and semi-desert shrublands.	Regions I and II: High. A non-essential Experimental Population Area (EXPA) is located in northwestern Colorado, southwestern Wyoming, and northeastern Utah. The EXPA is crossed by the 2-mile transmission line corridor in Moffat and Rio Blanco counties, Colorado, and Duchesne and Uintah counties, Utah. The only non-experimental ferret populations that may occur in the 2-mile transmission line corridor are in Grand, Emery, or Carbon counties, UT, and portions of Sweetwater and Carbon counties, Wyoming.	No.	50 CFR 17; BLM 2005; Clark 1989; UNHP 2009; USFWS 2008b; WYNDD 2009.
Canada lynx	*Lynx canadensis*	FT; BLM; CO-SE; UT-SS Tier I	Range: The Canada lynx occurs in Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Wyoming, Vermont, Washington, and Wisconsin. Habitat: The species occurs in boreal forests. It utilizes early succession habitats with high tree densities for foraging. It utilizes mature forests with large, woody debris for denning.	Regions I and II: Moderate. The species has been documented within 1 mile of the reference line in Uintah County, Utah, and Carbon County, Wyoming.	No.	65 FR 16051; Ruediger et al. 2000; UDWR 2005; USFWS 2005; UNHP 2009.
Fisher	*Martes pennanti*	USFS	Range: The fisher occurs across much of northern North America, south along the western half of Washington, Oregon, and northern California. The range also extends south along the Rocky Mountains into western Wyoming. Habitat: The species inhabits dense mixed deciduous-coniferous forests.	Regions I and II: Low. The species is known to occur in the extreme southwestern corner of Wyoming, and the northeastern corner of Utah. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming, Colorado, and Utah. No suitable habitat for the fisher is crossed by the project alternatives in Region III.	No.	Fitzgerald et.al. 1994
Gray wolf	*Canis lupus*	FT-UT, CO; BLM; UT-SS Tier I	Range: The gray wolf formerly occupied most of North America. Remnant populations exist in Minnesota, Wisconsin, Michigan, Idaho, Montana, Wyoming, and Washington. Habitat: The species formerly occupied a variety of habitats such as temperate forests, mountains, tundra, taiga, and grasslands, with plentiful large prey. It and requires a large (25 to 1,500 square miles) home range. Current wolf populations are typically found in remote montane forests.	Region I and II: Low. The species has been documented within 5 miles of the reference line in Carbon and Sweetwater counties, Wyoming. Suitable habitat occurs within the 2-mile transmission line corridor in Wyoming, Colorado, and Utah.	No.	Fitzgerald et al. 1994; UDWR 2005; UNHP 2003; USFWS 2012b.
Kit fox	*Vulpes macrotis*	BLM; CO-SE; UT-SS Tier II	Range: The kit fox occurs in the southwestern United States and northern Mexico. Habitat: The species inhabits desert and semi-desert shrubland and grasslands.	Regions II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Beaver, Emery, Grand, Millard, and Washington counties, Utah, and Clark County, Nevada. It has also been documented within 5 miles of the reference line in Iron, Juab, and Sevier counties, Utah.	No.	Fitzgerald et al. 1994; Nevada Diversity Database 2007.
River otter	*Lontra canadensis*	BLM; CO-ST	Range: The river otter occurs throughout most of North America, north of Mexico, except in the extreme southwestern United States. It is extirpated or rare in large areas of the interior United States. Habitat: The species occurs in a variety of permanent riverine, aquatic, and riparian habitats, with slow-moving water, deep pools, abundant riparian vegetation, and plentiful fish. It utilizes dens in hollow logs, beaver lodges, burrows dug by other animals, log or rock piles, or dense thickets near water.	Regions I and II: Moderate. The species has been documented within 5 miles of the reference line in Carbon County, Wyoming and Daggett, Duchesne, Grand, and Uintah counties, Utah. In Colorado, it has been re-introduced in several river drainages and is known to occur throughout the western half of the state.	No.	Fitzgerald et al. 2006; UDWR 2005; WGFD 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Swift fox	*Vulpes velox*	BLM	Range: The swift fox occurs over most of the Great Plains of North America, from southern Canada to northern Texas. Habitat: The species inhabits short grass and mixed-grass prairies. It is closely associated with prairie dog colonies.	Region I: Moderate. The species has been documented within 5 miles of the reference line in Carbon County, Wyoming. Suitable habitat occurs throughout the 2-mile transmission line corridor in Wyoming.	No.	Fitzgerald et al. 1994; WGFD 2005.
Wolverine	*Gulo gulo*	USFS; CO-SE	Range: The wolverine occurs in northern North America. Historically, it was present in suitable habitat at high elevations, south into the United States along the Rocky Mountains. Habitat: The species inhabits boreal forests and tundra, and utilizes riparian habitat.	Regions I and II: Moderate. The status of the wolverine in Colorado, Utah, and Wyoming is uncertain. It has been documented within 5 miles of the reference line in Uintah County, Utah. The species has been documented in Daggett and Sanpete counties, Utah.	No.	Fitzgerald et al. 1994; UNHP 2003; WGFD 2012.
Desert bighorn sheep	*Ovis canadensis nelsoni*	BLM; USFS	Range: The desert bighorn sheep occurs in mountain ranges throughout the southwestern United States. Habitat: The subspecies inhabits steep desert mountains with abundant grass and low shrubs.	Regions II, III, and IV: Low. The subspecies is known to occur in western Colorado near the Colorado/Utah border, the extreme southwestern corner of Utah, Grand and Emery counties, Utah, and in southern Nevada.	No.	Armstrong 2010; NDOW 2010; UDWR 2008.
Rocky Mountain bighorn sheep	*Ovis canadensis*	USFS	Range: Bighorn sheep occur throughout the Rocky Mountains, from Canada to Mexico. Rocky Mountain bighorn sheep occur in the northern portion of this range in Wyoming, northern Utah and western Colorado. Habitat: The species inhabits steep, high mountain terrain. Summer habitat is primarily alpine tundra. Winter habitat is lower elevation open, grass areas and slopes, with low shrubs.	Regions I, II, and III: Moderate. The species is known to occur in isolated areas in northwestern Colorado and northeastern and east-central Utah.	No.	Armstrong 2010; UDWR 2008; WGFD 2005.
Dark kangaroo mouse	*Microdipodops megacephalus*	BLM; UT-SS Tier II	Range: The dark kangaroo mouse occurs from southeastern Oregon, through eastern California, southwestern Idaho, and west-central Utah. Habitat: The species inhabits desert shrub and sagebrush communities with fine, gravel soils.	Regions I, II, III, and IV: High. The species has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada. It has been documented within 5 miles of the reference line in Beaver, Iron, and Millard counties, Utah. Suitable habitat occurs through the 2-mile transmission line corridor in Wyoming, Colorado, Utah, and Nevada.	No.	NDOW 2012; UDWR 2005; UNHP 2003.
Pale kangaroo mouse	*Microdipodops pallidus*	BLM; NV-P	Range: The pale kangaroo mouse occurs in western and west-central Nevada and in extreme eastern California. Habitat: The species is considered a sand obligate and is restricted to fine, loose, sandy soils (with little or no gravel overlay) in valley bottoms dominated by saltbush and greasewood. It may also be found near sagebrush at its higher elevation range. The elevational range for this species is from between 3,900 and 6,000 feet amsl.	Region IV: Moderate. Suitable habitat occurs throughout the 2-mile transmission line corridor in Nevada.	No.	NDOW 2012.
Desert Valley kangaroo mouse	*Microdipodops megacephalus albiventer*	BLM; NV-P	Range: The Desert Valley kangaroo mouse occurs in the Desert Valley, in central Lincoln County, Nevada. Habitat: The subspecies inhabits loose sands and gravel. It is found in shadscale scrub, sagebrush scrub, and alkali sink plant communities. It may also occur in sand dunes near the margins its range.	Region III: High. The subspecies has been documented within the 2-mile transmission line corridor in Lincoln County, Nevada.	No.	NDOW 2012.
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	FT; BLM	Range: The Preble's meadow jumping mouse occurs in the foothills of southeastern Wyoming south to Colorado Springs along the eastern edge of the Front Range of Colorado. Habitat: The subspecies inhabits marshy areas and moist meadow grasslands near streams in grasslands, coniferous and deciduous forests, mixed shrublands, and riparian shrub, above 8,000 feet.	None. The subspecies is known to occur within the BLM Rawlins Field Office boundaries in Wyoming, outside of the 2-mile transmission line corridor.	Yes.	NatureServe Explorer 2010; USFWS 2010b; WGFD 2009.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Preble's shrew	*Sorex preblei*	UT-SS Tier II	Range: The Preble's shrew occurs over much of western North America. Habitat: The species inhabits wetland areas.	None. The species is only known to occur from two localities in Tooele County, Utah at the southern shore of the Great Salt Lake.	Yes.	UDWR 2010, 2005.
Silky pocket mouse	*Perognathus flavus*	UT-SS Tier II	Range: The silky pocket mouse occurs in the Southwestern and west-central Great Plains and intermountain plateaus from South Dakota to central Mexico. Habitat: The species inhabits sandy, sometimes rocky, soils in arid grasslands, shrublands, and pinyon-juniper woodland, in valley bottoms, hillsides, and mesas.	None. The species is known to occur in San Juan County, Utah, outside the 2-mile transmission line corridor.	Yes.	NatureServe Explorer 2010; UDWR 2005.
Mexican vole	*Microtus mexicanus*	UT-SS Tier II	Range: The race of Mexican vole that occurs in Utah is nearly endemic to the state. Habitat: The species inhabits mixed aspen/ponderosa pine forests.	None. The species is known to occur only on one mountain in extreme southwestern San Juan county, outside of the 2-mile transmission line corridor.	Yes.	UDWR 2005.
Idaho pocket gopher	*Thomomys idahoensis*	BLM	Range: The Idaho pocket gopher occurs in eastern Idaho, southwestern Montana, western Wyoming, and northeastern Utah. Habitat: The species inhabits areas of shallow rocky soils at medium to high elevations in open sagebrush, grassland plains, and subalpine mountain meadows.	Region I: Low. The species is known to occur in Daggett County, Utah. In Wyoming, it is known to occur within the Rock Springs Field Office boundaries, outside the 2-mile transmission line corridor.	No.	NatureServe Explorer 2010; UDWR 2005.
Gunnison's prairie dog	*Cynomys gunnisoni*	BLM; UT-SS Tier II	Range: The Gunnison's prairie dog occurs in the southwestern quarter of Colorado, the southeastern corner of Utah, the northeastern quarter of Arizona and the northwestern quarter of New Mexico. Habitat: The species inhabits grasslands, semi-desert, and montane shrublands.	None.	Yes. The geographic range for this species is outside the 2-mile transmission line corridor.	Fitzgerald et al. 1994; UDWR 2005; UNHP 2003.
Utah prairie dog	*Cynomys parvidens*	FT; BLM; UT-SS Tier I	Range: The Utah prairie dog occurs in the southwestern quarter of Utah. Habitat: The species inhabits prairies, including swale formations with moist vegetation even in drought, and well-drained soils that allow deep (3 feet) burrows. Vegetation must be low enough to permit a standing Utah prairie dog to scan their environment for predators.	Regions II and III: High. The species has been documented within the 2-mile transmission line corridor in Iron, Millard, and Sevier counties, Utah. The greatest concentrations occur in eastern Iron and southern Sevier counties**.**	No.	Hoogland 2006; UDWR 2005; UNHP 2003; USFWS 1991.
White-tailed prairie dog	*Cynomys leucurus*	BLM; UT-SS Tier II	Range: The white-tailed prairie dog occurs in western and southern Wyoming, northwestern Colorado, and east-central Utah. Habitat: The species inhabits open shrublands, semi-desert grasslands, and mountain valleys.	Regions I and II: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming, and Daggett, Duchesne, Emery, Grand, and Uintah counties, Utah. It is also known to occur in northwestern Colorado.	No.	Fitzgerald et al. 1994; UDWR 2005; UNHP 2003; WGFD 2009. .
Black-tailed prairie dog	*Cynomys ludovicianus*	BLM	Range: The black-tailed prairie dog occurs throughout the Great Plains of North America, from Canada to Mexico. Habitat: The species inhabits grasslands.	None. The species is known to occur in eastern Colorado and eastern Wyoming, outside of the 2-mile transmission line corridor.	Yes.	CDOW 2010a; NatureServe Explorer 2010.
Wyoming pocket gopher	*Thomomys clusius*	BLM	Range: The Wyoming pocket gopher occurs in southeastern Sweetwater County and southwestern Carbon County, Wyoming. Habitat: The species inhabits greasewood communities on dry, gravelly, shallow-soil ridge tops, on the edges of eroding washes.	Region I: High. The species has been documented within the 2-mile transmission line corridor in Sweetwater County, Wyoming. It has also been documented within 5 miles of the reference line in Carbon County, Wyoming.	No.	Keinath and Beauvais 2006; WGFD 2005.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence[2]	Eliminated from Detailed Analysis	References
Pygmy rabbit	*Brachylagus idahoensis*	BLM; USFS; UT-SS Tier II	Range: The pygmy rabbit occurs throughout the Great Basin, from Washington, south to east-central California and east to Utah and Wyoming. Habitat: The species is a sagebrush obligate and inhabits dense, tall stands of big sagebrush, usually along intermittent streams or riparian areas in sagebrush-grasslands. It excavates its own burrows in soft, deep soil.	Regions I, II, and III: High. The species has been documented within the 2-mile transmission line corridor in Carbon and Sweetwater counties, Wyoming. It has also been documented within 5 miles of the reference line in Iron, Millard, and Washington counties, Utah, and Lincoln County, Nevada. In Utah, the species occurs primarily in the Bonneville Basin. Suitable habitat also occurs in Lincoln and northeastern Clark counties, Nevada.	No.	Fitzgerald et al. 1994; NDOW 2012; UDWR 2005; UNHP 2003; WGFD 2005.

[1] Status:

FE = Federally Endangered

FT = Federally Threatened

FC = Federal Candidate

FP = Federal Proposed

EXP/NE = Experimental Non-essential population

BLM = BLM Sensitive

USFS = USFS Sensitive

CO-E = Colorado State Endangered

CO-T = Colorado State Threatened

NV-P = Nevada State Protected

UT-SS = Utah Sensitive Species (Tier I and Tier II species are defined in Utah's Comprehensive Wildlife Strategy)

[2] Potential for Occurrence

High = The species is known to occur within suitable habitat within the 2-mile transmission line corridor.

Moderate = The species is known to occur within 5 miles of the study area and suitable habitat for the species occurs within the 2-mile transmission line corridor.

Low = The known geographic range of the species is within the 2-mile transmission line corridor.

None = The geographic range of the species is outside the 2-mile transmission line corridor.

Table G-3 Special Status Aquatic Species Identified for the Transwest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area	Eliminated from Detailed Analysis	References
AMPHIBIANS						
Arizona toad	*Bufo microscaphus*	BLM; UTSC	Range: Historically, this species was widespread in Las Vegas Valley, but it is no longer present. Habitat: Species uses spring, washes, and ephemeral waterbodies.	Low. Historic records exist in Duck, Stevens Springs, Vegas Wash, Flamingo Wash, and Tropicana Wash, with the closest location being 270 feet to the west of a project corridor. Records also exist near corridor in Clover Creek and Meadow Valley Wash in Nevada.	No.	Bradford 2002.
Boreal toad	*Bufo boreas boreas*	CO-E; USFS; UT-CAS	Range: Present distribution includes southeastern Alaska south to northern California, and east to Montana, Wyoming, and Colorado. Habitat: Species non-breeding habitat consists of forested areas and upland vegetation. Breeding habitat includes low-gradient streams, marshes, beaver ponds, small lakes and reservoirs, stock ponds, wet meadows, and seeps.	High. Project corridor crosses habitat near Birch Creek in Juab County, Utah.	No.	Hogrete et al. 2005; Orabona et al. 2009; UDWR 2010e.
Columbia spotted frog	*Rana luteiventris*	FS; NV-P; UTSC; UT-CAS	Range: Distribution includes Alaska, British Columbia, south through Washington and Oregon to Nevada and north to Montana, Wyoming, and Utah. Habitat: Species occurs in streams, wet meadows, springs and springbrooks, marshes, lakes, and reservoirs. It is highly aquatic, since it is rarely found far from permanent waterbodies. It may traverse upland areas during wet periods or to reach wintering sites.	High. Project corridors cross the following waterbodies inhabited by this species: San Pitch River, Orson's Pond, Mt. Pleasant Canal, and Currant Creek and wetland complex in Utah.	No.	Orabona et al. 2009; eNature 2010.
Great Basin spadefoot toad	*Spea intermontana*	WY-N	Range: This species distribution extends throughout all of Nevada and into most of Utah; they are also present in small areas in California, Arizona, Colorado, and Wyoming. Habitat: Species occurs in sagebrush habitats below 6,000 feet amsl, west of the Continental Divide.	Moderate. Potential habitat exists in Region I analysis area, although there are no occurrences within the 2-mile transmission line corridor.	No.	Orabona et al. 2009.
Northern leopard frog	*Rana pipiens*	BLM; NV-P	Range: Distribution of species includes portions of Nevada, Utah, Colorado, and Wyoming. Habitat: Species occurs in marshes, beaver ponds, streams, rivers, and lakes up to an elevation of 9,000 feet amsl.	High. Project corridors cross the following waterbodies inhabited by this species: Muddy and Antelope creeks, and possibly Soap Wash in Wyoming; the White and Yampa rivers in Colorado; and Soldier Creek in Utah County, Utah..	No.	Orabona et al. 2009.
Relict leopard frog	*Rana onca*	NV-SP; FC	Range: A 2.3-mile linear stretch of the Overton Arm of Lake Mead and a 3.2 mile stretch of Black Canyon below Lake Mead. Species has been reintroduced in Red Spring, Quali Spring, and Perkins Pond in Clark County, Nevada. Habitat: Spring systems with largely unadulterated hydrology, devoid of introduced bullfrogs (*R. catesbiana*) or game fishes.	Low. The entire population is within the Lake Mead National Recreation Area.	Yes. This species does not occur within waterbodies within the Lake Mead National Recreation Area.	Bradford et al. 2004.
FISH						
Big Spring spinedace	*Lepidomeda mollispinis pratensis*	FT; NV-P	Range: Species is restricted to a 4-mile section of Upper Meadow Valley Wash (Condor Canyon) in Panaca and Dry valleys, Nevada. Habitat: Characteristics of stream habitat includes depths of 1 to 3 feet with moderate flow and silt, sand or gravel substrates.	None.	Yes. Condor Canyon section is located 10 miles north of the closest project corridor.	USFWS 1985c.
Bluehead sucker	*Catostomus discobolus*	BLM; UT-CAS	Range: This species is found in the rivers and tributary streams within the Colorado River Basin. Current distribution includes the Colorado, Dolores, Duchesne, Escalente, Fremont, Green, Gunnison, Price, San Juan, San Rafael, White, and Yampa rivers and numerous smaller tributaries. It also occurs in the Lower Colorado River Basin. Habitat: The species inhabits various stream habitats ranging from small tributaries to large mainstem rivers. Habitat typically consists of runs or riffles with rock or gravel substrates. Juveniles also utilize riffles, eddies, and backwaters.	High. Project corridors cross the following streams inhabited by this species in Utah: Duchesne County (Cottonwood, Currant, Dry Gulch, and Lake Fork creeks); Uintah County (Dry Gulch and Montes creeks and the Uinta River); Wasatch County (Currant Creek and Strawberry River).	No.	Ptacek et al. 2005.
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	BLM; FS; UT-SC; UT-CAS	Range: This species occurs in a variety of habitats within the Bonneville Basin. Habitat: Species prefers small headwater streams with pool and riffle habitat and slow, deep water with vegetated streambanks.	High. Project corridors cross streams inhabited by this species In the following Utah counties: Carbon, Duchesne, Sanpete, Utah, and Wasatch.	No.	Lentsch et al. 2000; Sigler and Sigler 1996

Table G-3 Special Status Aquatic Species Identified for the Transwest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area	Eliminated from Detailed Analysis	References
Bonytail	*Gila elegans*	FE; BLM	Range: Captures of wild adult bonytail have occurred in Lakes Powell, Mohave, and Havusu, and rivers (Colorado, Green, and Yampa) in the Upper Colorado River Basin. Habitat: This species is considered to be adapted to mainstem rivers in pools and eddies and reservoirs. Bonytail probably spawn in the spring over rocky substrates.	High. Project corridors cross the following streams inhabited by this species: Green River in Utah.	No.	USFWS 2002a.
Colorado pikeminnow	*Ptychocheilus lucius*	FE; BLM	Range: Species occurs within three subbasins and includes the following rivers: Green River Subbasin (Green, Yampa, Little Snake, White, Price, and Duchesne), Upper Colorado Subbasin (Upper Colorado, Gunnison, and Dolores), and San Juan (San Juan). Habitat: Adults require pools, deep runs, and eddy habitats maintained by high spring flows. Side-channels are considered to be spawning sites in the spring. Young fish use backwater areas for development.	High. Project corridors cross the following streams inhabited by this species: White and Yampa rivers in Colorado; Little Snake River in Wyoming; and Green River in Utah.	No.	USFWS 2002b.
Colorado River cutthroat trout	*Oncorhynchus clarkii pleuriticus*	BLM; FS; UT-CAS	Range: The species is native to the upper Colorado Basin in parts of Wyoming, Colorado, and Utah. Habitat: This species is typically associated with isolated headwater streams with cool temperatures and clear conditions.	High. Project corridors cross streams inhabited by this species in the following counties: Wyoming (Carbon and Sweetwater); Colorado (Moffatt, Rio Blanco, and Routt); and Utah (Daggett, Emery, Grand, Uintah, Utah, and Wasatch).	No.	Behnke 1981.
Devil's Hole pupfish	*Cyprinodon diabolis*	NV-P	Range: Species occurs in Devil's Hole located in Ash Meadows National Wildlife Refuge in Nevada. Habitat: A deep cavern in Devil's Hole.	None.	Yes. This species occurs at the Hoover Dam refugium located below Hoover Dam. This site is located approximately 2.3 miles to the east of the closest project corridor.	USFWS 2010c.
Flannelmouth sucker	*Catostomus latipinnis*	BLM; UT-CAS	Range: This species is widely distributed in medium and large–sized streams in the Upper Colorado Basin including Colorado and Wyoming. It is less abundant or absent from its historical range in Nevada, Utah, Arizona, and California. Habitat: Species is typically found in slower, warmer rivers in plateau regions. They prefer pools and deep runs but also occur in the mouths of tributaries, riffles, and backwaters. Juveniles utilize backwaters and shoreline areas.	High. Project corridors cross the following streams inhabited by this species: Muddy Creek and Little Snake River in Wyoming and Cottonwood, Currant, Dry Gulch, Montes, and Strawberry creeks and Lake Fork and Strawberry rivers in Utah.	No.	Rees et al. 2005a.
Greenback cutthroat trout	*Oncorhynchus clarkii stomias*	FT	Range: This species currently occurs in upper tributaries of the South Platte and Arkansas river drainages in eastern Colorado and portions of the Colorado River tributaries in western Colorado. Habitat: Species occurs in single stream segments or small lake habitats.	None.	Yes. Lakes and streams inhabited by this species are not crossed by project corridors.	USFWS 1998a; Williams 2006.
Hiko White River springfish	*Crenichthys baileyi grandis*	FE; NV-P	Range: This species occupies Hiko and Crystal springs in Paharanagat Valley, Nevada. Habitat: Species occurs in pool areas of two springs.	None.	Yes. Hiko and Crystal springs are located 20 to 21 miles west of the closest project corridor.	USFWS 1998b.
Humpback chub	*Gila cypha*	FE; BLM	Range: Species occurs in deep canyon portions of the Colorado River system such as Desolution-Gray, Black Rocks and Westwater canyons and Yampa Canyon inside Dinosaur National Monument in the Upper Colorado Basin. Populations also exist in the Lower Colorado Basin in the Grand Canyon and Little Colorado River. Habitat: Species prefers deep, fast-moving, turbid waters with large boulder substrates and steep cliffs.	Low to moderate. Species occurs in areas located downstream of stream crossings in Wyoming, Colorado, and Utah	No.	CDOW 2010b; UDWR 2010a.
June sucker	*Chasmistes liorus*	FE; BLM; UTSC	Range: Distribution is limited to Utah Lake and the Provo River in Utah. Habitat: Adults and juveniles occur in lake habitat. Adults use the Provo River for spawning and early development of young June sucker.	None.	No. This species is not known to occur in streams crossed by project corridors. However, it was included in the analysis to evaluate potential effects of water use.	USFWS 1999.
Lahontan cutthroat trout	*Oncorhynchus clarkii henshawi*	FT	Range: Distribution of this species includes isolated drainages of the Lahontan Basin in Nevada. Habitat: Species occurs in terminal lakes and isolated headwater streams in the Lahontan basin.	None.	Yes. Lakes and streams inhabited by this species are not crossed by project corridors.	Neville 2010.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area	Eliminated from Detailed Analysis	References
Least chub	*Iotichthys phlegethontis*	C; BLM; UT-SC; UT-CAS	Range: This species is native to the Bonneville Basin in Utah. Habitat: Species occurs in slow-moving rivers, creeks, ponds, and marshes. Typically, this species is assocated with moderate to dense vegetation.	Low to moderate. Species occurs in areas located downstream of stream and wetland areas in Utah. The closest location to a project corridor is 1.5 miles.	No.	USFWS 2012c.
Meadow Valley Wash desert sucker	*Catostomus clarkii spp.*	BLM; NV-P	Range: Species inhabits the Meadow Valley Wash drainage in Nevada. Habitat: Typically they occur in small to moderately large streams with pools and riffles with gravel, rubble, and sandy substrates.	High. Species known to occur in Meadow Valley Wash and the Muddy River in Nevada.	No.	NDOW 2009.
Meadow Valley Wash speckled dace	*Rhinicthys osculus subspecies*	BLM	Range: Species inhabits the Meadow Valley Wash drainage in Nevada. Habitat: Species occurs in a variety of habitats including riffles, runs, and pools in streams and rivers; ponds and lakes; and spring outflows.	High. Species occurs in Meadow Valley Wash and the Muddy River in Nevada.	No.	NDOW 2009.
Moapa dace	*Moapa coriacea*	FE	Range: Species is endemic to the Upper Muddy River and tributary thermal spring systems within the Warm Springs area in Nevada. Habitat: Species utilizes spring pools, spring outflows, and the mainstem portion of the Muddy River.	None	Yes. This species occurs in the Muddy River, which is located approximately 0.5 mile northeast of the closest project corridor.	USFWS 1996.
Moapa speckled dace	*Rhinichthys osculus moapae*	NV-P	Range: This subspecies is endemic to the Muddy River Basin in Nevada. Habitat: Species utilizes a variety of habitats in streams and spring sources.	High. Species known to occur in the Muddy River, Nevada just north of a project corridor. Species likely occurs in portion of river crossed by a corridor.	No.	Wildlife Action Plan Team 2006; USFWS 1996.
Moapa White River springfish	*Crenichthys baileyi moapae*	NV-P	Range: Species occurs in the Muddy River Basin in Nevada. Habitat: Species occurs in vegetated warm springs and their outflows.	High. Species known to occur in the Muddy River, Nevada just north of a project corridor. Species likely occurs in portion of river crossed by a corridor.	No.	Wildlife Action Plan Team 2006; USFWS 1996.
Mountain sucker	*Catostomus platyrhynchus*	BLM	Range: Species is widely distributed in the western U.S. including Wyoming and Colorado streams. Habitat: Species occurs in smaller streams and rivers in areas with eddies, small pools, and undercut banks and moderate current.	High. Species has been collected in Colorado River tributaries crossed by project corridors, including Utah streams such as Currant Creek, San Pitch River, and Thistle Creek.	No.	Woodling 1985.
Northern leatherside chub	*Lepidomeda copei*	FS; UT-CAS	Range: Species is native to the southeastern portion of the Bonneville Basin in Utah. Habitat: Species occurs in streams and rivers with relatively low water velocity, intermediate depths (9 to 26 inches), fine substrates.	None.	Yes. This species is not known to occur in streams crossed by project corridors.	UDWR 2010a; Idaho Fish and Game 2005.
Pahrump poolfish	*Empetrichthys latos*	FE; NV-P	Range: This species occurs in Shoshone Ponds in White Pine County and Corn Creek in Clark County, Nevada. Habitat: Species occurs in shallow springs and their outflow areas.	None.	Yes. Distances of occupied habitat from the closest project corridor include 17 miles for Shoshone Ponds and 6 miles for Corn Creek Refugium.	USFWS 1980.
Pahranagat roundtail chub	*Gila robusta jordani*	FE; NV-P	Range: This species presently occurs in a small section of Pahranagat Creek in Paharanagat Valley, Nevada. Habitat: Adults and juveniles typically inhabit pools below riffle areas.	None.	Yes. The closest occupied habitat is located approximately 5 miles west of the closest project corridor.	USFWS 1998b.
Pallid sturgeon	*Scaphirhynchus antillarum*	FE	Range: Species occurs in the Lower Platte River (downstream of Elk River confluence) in Nebraska. Habitat: Species in areas with strong current and firm sandy bottoms in the main channel of large turbid rivers.	None. However, the potential use of water for dust control in the North Platte subbasin would require impact analysis for this species.	No.	National Research Council 2004.
Plains topminnow	*Fundulus sciadicus*	BLM	Range: This species has a disjunct distribution in several plains states including Colorado. Habitat: Colorado populations are typically associated with quiet portions of streams with abundant filamentous algae.	None.	Yes.	Woodling 1985.

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Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area	Eliminated from Detailed Analysis	References
Razorback sucker	*Xyrauchen texanus*	FE; BLM	Range: Species occurs within five subbasins and includes the following rivers or lakes: Green River Subbasin (Green, Yampa, White, and Duchesne); Upper Colorado Subbasin (Upper Colorado and Gunnison); San Juan (San Juan); Lower Colorado River Subbasin (Lake Mohave, Lake Mead, and Lower Colorado River); and Gila River Subbasin (Verde and Salt). Habitat: Adults prefer deep runs, eddies, backwaters, and flooded off-channel habitats in the spring, runs and pools in the summer, low-velocity runs, pools, and eddies in the winter. Spawning occurs in the spring over cobble, gravel. And sand substrates. Young develop in backwaters, tributary mouths, and floodplain areas.	High. Project corridors cross the following streams inhabited by this species: Plateau Creek, Colorado River, and White River in Colorado; Green River in Utah; and Las Vegas Wash near Lake Mead in Nevada.	No.	USFWS 2002c.
Relict dace	*Relictus solitarius*	BLM; NV-P	Range: Species is endemic to eastern Nevada. Refugia and introduced populations occur in Spring Valley. Habitat: Species occurs spring, spring-fed streams, ponds, intermittent lakes and marshes with mud or gravel substrates. Preferred habitat is well-vegetated pools.	None.	Yes. This species is not known to occur in streams crossed by project corridors in Nevada where this species is protected.	NDOW 2009.
Roundtail chub	*Gila robusta robusta*	BLM; UT-CAS	Range: This chub is an endemic species to the Colorado River Basin in Colorado and Wyoming. Habitat: This species usually is found in stream reaches with a mixture of pool and riffle habitats. Adults and juveniles are typically found in relatively deep, low-velocity habitats that contain woody debris or other types of cover.	High. Project corridors cross the following streams inhabited by this species: Colorado, White, and Yampa rivers in Colorado; Little Snake River and Muddy Creek in Wyoming; and San Rafael River in Utah.	No.	Rees et al. 2005b.
Southern leatherside chub	*Lepidomeda aliciae*	BLM; FS; UT-CAS	Range: Species is present in the Utah Lake and Sevier River drainages. Habitat: Species is associated with a variety of habitat conditions involving stream flow, gradient, elevation, and pH, bit is usually found near coarse substrates.	High. Project corridors cross the following streams inhabited by this species: Lost Creek, Sevier River, San Pitch River, Thistle Creek, Soldier Creek, and Seely Pond in Utah.	No.	UDWR 2010b.
Utah chub	*Gila atraria*	NV–LD	Range: Species is native in the upper Snake River and throughout the Lake Bonneville Basin in Wyoming, Utah, Idaho, and Nevada. Habitat: It utilizes a variety of habitats including irrigation ditches, ponds, streams, and lakes.	None.	Yes. Species occurs in Big Springs Creek in Nevada, with the closest location being 0.7 mile north of the closest project corridor.	Sigler and Sigler 1996.
Virgin River chub	*Gila robusta seminuda*	FE; BLM	Range: This species occurs within the Muddy River in Nevada and the mainstem portion of the Virgin River from La Verkin Springs, Utah downstream to the confluence with Lake Mead. Habitat: Species uses spring pools, spring outflows, and the mainstem portion of the Muddy River.	Moderate. This species occurs in the Muddy River, with the closest known downstream location to a project corridor being 2 miles. The species likely occurs in the corridor based on general distribution information.	No.	USFWS 1996.
Virgin River spinedace	*Lepidomeda mollispinis mollispinis*	BLM, NV-P	Range: This species currently exists in the mainstem Virgin River and 11 tributaries in Utah, Arizona, and Nevada. Habitat: Species prefers clear, slow-moving small streams with abundant cover.	High. Project corridors cross the following streams inhabited by this species: Moody Wash in Utah.	No.	Lentsch et al. 1995; Sigler and Sigler 1996; UDWR 2010d.
White River desert sucker	*Catostomus clarkii intermedius*	NV-P	Range: Species occurs in White River Valley in Nevada. Habitat: Species occupies isolated stream, spring, and spring outflow systems.	None.	Yes. This species is not known to occur in streams crossed by project corridors.	NDOW 2009.
White River speckled dace	*Rhinicthys osculus subspecies*	BLM	Range: Species occurs in White River Valley in Nevada. Habitat: The types of habitats are expected to be similar to Meadow Valley Wash speckled dace.	None.	Yes. This species is not known to occur in streams crossed by project corridors.	NDOW 2009.
White River spinedace	*Lepidomeda albivallis*	FE	Range: The present distribution is limited to Flag Springs and the upper portion of Sunnyside Creek in White River Valley, Nevada. The species also has been introduced into Indian Spring. Habitat: Characteristics of springs inhabited by this species clear, cool temperatures, and open pools with aquatic vegetation.	None.	Yes. This species is not known to occur in waterbodies crossed by project corridors.	USFWS 1994b.

Table G-3 Special Status Aquatic Species Identified for the Transwest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area	Eliminated from Detailed Analysis	References
White River springfish	*Crenichthys baileyi baileyi*	FE	Range: The present distribution of this species is Ash Springs in Pahranagat Valley, Nevada. Habitat: This species utilizes pool and spring outflow habitats.	None.	Yes. This species is not known to occur in waterbodies crossed by project corridors.	Tuttle et al. 1990.
Woundfin	*Plagopterus argentissimus*	FE; BLM	Range: Species is currently found in the Virgin River system in Utah. Habitat: Species prefers swift flows and sandy substrates in the Virgin River.	None.	Yes. This species occurs in the Muddy River, with the closest location being 0.5 mile north of the closest project corridor in Nevada.	UDWR 2010c.
INVERTEBRATES						
Bifid duct pyrg	*Pyrgulopsis peculiaris*	FP; BLM; UT-SC	Range: This species occurs in a spring near Big Springs in Snake Valley and Rock, Turnley, and Woodsman springs in Spring Valley, Nevada. Habitat: Occupied waterbodies are springbrooks at elevations from 6,000 to 7,400 feet with moderate to high conductivity and aquatic vegetation.	None.	Yes. This species occurs in a spring near Big Springs, which is located approximately 1.8 miles north of the closest project corridor.	Center for Biological Diversity 2009; Hershler 1998.
California floater	*Anodonta californiensis*	BLM	Range: Historic records exist for Utah County. Current populations exist in Juab County, Utah. Habitat: Species has been collected in pond and stream habitats in Utah.	Currant Creek and Mona Springs in Juab County, Utah.	No.	Oliver and Bosworth 1999.
Devil's Hole Warm Spring riffle beetle	*Stenelmis calida calida*	BLM	Range: Species occurs in Devil's Hole located in Ash Meadows National Wildlife Refuge in Nevada. Habitat: A deep cavern in Devil's Hole.	None.	Yes. Devil's Hole is located greater than 5 miles from a project corridor.	USFWS 2012d.
Grated tryonia	*Tryonia clathrata*	FP; BLM; NV-P	Range: Species occurs in the Muddy River system in Nevada. Habitat: Species occurs in springs.	None.	Yes. Species occurs in Cardy Lamb and Oasis springs and the Moapa NWR, which are located at least 1 mile from a project corridor.	USFWS 1996.
Lake Valley pyrg	*Pyrgulopsis sublata*	FP	Range: This species is endemic to Wambolt Spring in Lake Valley. Habitat: This species occurs in a shallow spring with vegetation.	None.	Yes. This species occurs in Wambolt Spring, which is located approximately 2.1 miles northwest of the closest project corridor.	Center for Biological Diversity 2009; Hershler 1998.
Longitudinal gland pyrg	*Pyrgulopsis anguina*	FP	Range: Species is known from Big Springs and an unnamed spring near Big Springs in Snake Valley, Nevada and from Clay Spring in Snake Valley, Utah. Habitat: Occupied waterbodies include warm, flowing springs with aquatic vegetation.	None.	Yes. This species occurs in Big Springs, which is located approximately 0.4 mile north of the closest project corridor.	Center for Biological Diversity 2009; Hershler 1998.
Moapa pebblesnail	*Pyrgulopsis avernalis*	FP	Range: Species occurs in the Muddy River system in Nevada. Habitat: Species occurs in springs.	None.	Yes. Species occurs in Cardy Lamb Spring and the Moapa NWR, which are located at least 1 mile from a project corridor.	USFWS 1996.
Moapa Warm Spring riffle beetle	*Stenelmis moapa*	BLM	Range: Species occurs in the Muddy River system in Nevada. Habitat: Species typically is found in outflow streams immediately downstream of spring sources in swift, shallow water.	High. Species known to occur in the Muddy River, Nevada just north of a project corridor. Species likely occurs in portion of river crossed by a corridor.	No.	USFWS 1996.
Nearctic riffle beetle	*Stenelmis occidentalis*	BLM	Range: This beetle occurs in the Muddy River corridor, Moapa NWR/Warm Springs, and Ash Spring, and the Pahranagat River in Nevada. Habitat: Species occurs in wetland, spring, and river habitat. In Ash Springs, riffle beetles were present only in the spring source areas and not in the outflow.	None.	Yes. This species occurs in the Muddy River, with the closest known collection site being 0.5 mile northeast of a project corridor.	Nevada Natural Heritage Program Scorecard 2006; USFWS 1996.
Spring Mountains pyrg	*Pyrgulopsis deaconi*	FP; BLM; NV-P	Range: This species is endemic to the drainages of Las Vegas and Pahrump valleys in Nevada. It is present in Red, Willow, and Kiup springs. Habitat: The species occurs in permanent, artesian springbrooks that have high mineral content, unpolluted, and highly oxygenated.	None.	Yes. This species occurs in Red Spring in the Red Rock Canyon Recreation Area, which is located approximately 1.2 miles west of the closest project corridor.	Center for Biological Diversity 2009; Hershler 1998.

Table G-3 Special Status Aquatic Species Identified for the Transwest Express Transmission Project

Common Name	Scientific Name	Status[1]	Range and Habitat Requirements	Potential for Occurrence Within the Project Area	Eliminated from Detailed Analysis	References
Southern Bonneville pyrg	*Pyrgulopsis transversa*	UT-SC	Range: Species historically was present in Utah Lake. Fossil records exist for Bear Lake in Utah. The species is now extirpated in Utah. Habitat: Species occurs in relatively small, mineralized springs at elevations between approximately 5,830 and 6,740 feet elevation.	High. This species occurs in Thistle Creek, which is crossed by a project corridor.	No.	Oliver and Bosworth 1999.
Utah or desert valvata snail	*Valvata utahensis*	FE	Range: Species historically was present in Utah Lake. Fossil records exist for Bear Lake in Utah. The species is now extirpated in Utah. Habitat: Species occurred in large, shallow, slightly alkaline waters such as Utah Lake.	None.	Yes. This species is extinct.	Oliver and Bosworth 1999.

[1] Status:
FE = Federally Endangered.
FT = Federally Threatened.
FC = Federal Candidate.
FP = Federal Petitioned.
BLM = BLM Sensitive.
FS = USFS Sensitive.
CO-E = Colorado State Endangered.
CO-T = Colorado State Threatened.
NV-P = Nevada State Protected.
NV-LD = Species is not protected but it considered unique in Nevada (category to be discussed with NDOW).
WY N = Wyoming Native (category to be discussed with WGFD).
UT-CAS = Utah Conservation Agreement Species.
UT-SC = Utah special concern (category to be discussed with UDWR).

[2] Potential for Occurrence Within Project Area
High = The species is known to occur within suitable habitat within Project corridors.
Low to moderate = The species is known to occur within 2 miles of the Project corridors in a downstream direction from the boundary of a corridor.
None = Project corridors do not occur within the geographic range of the species.

Table G-4 Game Fish and Special Status Aquatic Species Occurrence in Streams, Region I Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives				ROW Crossings	Variation or Connector
					A	B	C	D		
Muddy Creek	Carbon, Wyoming	Brook trout	Bluehead sucker, flannelmouth sucker, mountain sucker, northern leopard frog, roundtail chub	116					1	Fivemile Point North Alternative Connector
Muddy Creek	Carbon, Wyoming	Brook trout	Bluehead sucker, flannelmouth sucker, mountain sucker, northern leopard frog, roundtail chub	130			X		1	
Muddy Creek	Carbon, Wyoming	Brook trout	Bluehead sucker, flannelmouth sucker, mountain sucker, northern leopard frog, roundtail chub	140			X		2	
Wild Cow Creek	Carbon, Wyoming	None	None	140			X			
Muddy Creek	Carbon, Wyoming	Brook trout	Bluehead sucker, flannelmouth sucker, mountain sucker, northern leopard frog, roundtail chub	140.05			X			
Muddy Creek	Carbon, Wyoming	Brook trout	Bluehead sucker, flannelmouth sucker, mountain sucker, northern leopard frog, roundtail chub	150.05					1	Mexican Flats Alternative Connector
Muddy Creek	Carbon, Wyoming	Brook trout	Bluehead sucker, flannelmouth sucker, mountain sucker, northern leopard frog, roundtail chub	170					1	Baggs Alternative Connector
Little Snake River	Carbon, Wyoming	Mountain whitefish, rainbow trout	Bluehead sucker, flannelmouth sucker, razorback sucker[1], roundtail chub	170.05						Baggs Alternative Connector
Yampa River	Moffat, Colorado	Black bullhead, brook trout, black crappie, brown trout, channel catfish, Colorado River cutthroat trout, mountain whitefish, northern pike, rainbow trout, walleye	Bluehead sucker, Colorado pikeminnow, Colorado River cutthroat trout, flannelmouth sucker, roundtail chub	180.2	X				1	
Little Snake River	Moffat, Colorado	Bluegill, black crappie, channel catfish, northern pike, rainbow trout, smallmouth bass	Bluehead sucker, Colorado pikeminnow, Colorado River cutthroat trout, flannelmouth sucker, northern leopard frog, roundtail chub	180.2	X				1	

Table G-4 Game Fish and Special Status Aquatic Species Occurrence in Streams, Region I Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives				ROW Crossings	Variation or Connector
					A	B	C	D		
Yampa River	Moffat, Colorado	Black bullhead, brook trout, black crappie, brown trout, channel catfish, Colorado River cutthroat trout, mountain whitefish, northern pike, rainbow trout, walleye	Bluehead sucker, Colorado pikeminnow, Colorado River cutthroat trout, flannelmouth sucker, roundtail chub	186		X		X	1	
Little Snake River	Moffat, Colorado	Bluegill, black crappie, channel catfish, northern pike, rainbow trout, smallmouth bass	Bluehead sucker, Colorado pikeminnow, Colorado River cutthroat trout, flannelmouth sucker, northern leopard frog, roundtail chub	186		X		X	1	
Yampa River	Moffat, Colorado	Black bullhead, brook trout, black crappie, brown trout, channel catfish, Colorado River cutthroat trout, mountain whitefish, northern pike, rainbow trout, walleye	Bluehead sucker, Colorado pikeminnow, Colorado River cutthroat trout, flannelmouth sucker, roundtail chub	190			X		3	
Yampa River	Routt, Colorado	Black bullhead, brook trout, black crappie, brown trout, channel catfish, Colorado River cutthroat trout, mountain whitefish, northern pike, rainbow trout, walleye	Bluehead sucker, Colorado pikeminnow, Colorado River cutthroat trout, flannelmouth sucker, roundtail chub	190			X		3	
Willow Creek	Carbon, Wyoming	Brook trout, Colorado River cutthroat trout	Colorado River cutthroat trout, mountain sucker	190			X			
Willow Creek	Moffat, Colorado	Brook trout, Colorado River cutthroat trout	Colorado River cutthroat trout, mountain sucker	190			X			
Little Bear Creek	Moffat, Colorado	Brook trout	None	190			X		1	
Dry Fork Little Bear Creek	Moffat, Colorado	None	None	190			X			
Little Cottonwood Creek	Moffat, Colorado	Colorado River cutthroat trout	Colorado River cutthroat trout	190			X		1	
Fortification Creek	Moffat, Colorado	Rainbow trout	Bluehead sucker, flannelmouth sucker, mountain sucker, roundtail chub	190			X		1	

Table G-4 Game Fish and Special Status Aquatic Species Occurrence in Streams, Region I Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives				ROW Crossings	Variation or Connector
					A	B	C	D		
Elkhead Creek	Moffat, Colorado	Black crappie, bluegill, smallmouth bass	Flannelmouth sucker	190			X		1	
Elkhead Creek	Routt, Colorado	Black crappie, bluegill, smallmouth bass	Flannelmouth sucker	190			X		1	
Little Snake River	Carbon, Wyoming	Mountain whitefish, rainbow trout	Bluehead sucker, flannelmouth sucker, razorback sucker[1], roundtail chub	190			X		1	
Fourmile Creek	Moffat, Colorado	Colorado River cutthroat trout	Colorado River cutthroat trout, mountain sucker	190			X		1	
Muddy Creek	Carbon, Wyoming	None	Bluehead sucker, flannelmouth sucker, northern leopard frog, roundtail chub	190			X			
O-Wi-Yu-Kuts Creek	Daggett, Utah	None	None	200						Western Wyoming Alternative Variation
Brush Creek	Uintah, Utah	Brown trout, rainbow trout	None	200					1	Western Wyoming Alternative Variation
Crouse Creek	Daggett, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout trout	200						Western Wyoming Alternative Variation
Jones Hole Creek	Uintah, Utah	Brown trout, rainbow trout	None	200					1	Western Wyoming Alternative Variation
Willow Creek	Daggett, Utah	None	None	200						Western Wyoming Alternative Variation
Clay Basin Creek	Daggett, Utah	None	None	200					1	Western Wyoming Alternative Variation
Ashley Creek	Uintah, Utah	None	None	200					2	Western Wyoming Alternative Variation
Red Creek	Daggett, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	200					1	Western Wyoming Alternative Variation
Red Creek	Sweetwater, Wyoming	Colorado River cutthroat trout	Colorado River cutthroat trout	200					1	Western Wyoming Alternative Variation

Table G-4 Game Fish and Special Status Aquatic Species Occurrence in Streams, Region I Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives				ROW Crossings	Variation or Connector
					A	B	C	D		
Beans Spring Creek	Sweetwater, Wyoming	None	Flannelmouth sucker, mountain sucker	200						Western Wyoming Alternative Variation
Bitter Creek	Sweetwater, Wyoming	None	Flannelmouth sucker, mountain sucker	200					3	Western Wyoming Alternative Variation
Camp Creek	Sweetwater, Wyoming	Brook trout, brown trout	None	200						Western Wyoming Alternative Variation
Castello Creek	Sweetwater, Wyoming	None	None	200					1	Western Wyoming Alternative Variation
Ely Creek	Sweetwater, Wyoming	None	None	200					1	Western Wyoming Alternative Variation
Gap Creek	Sweetwater, Wyoming	Brown trout	None	200						Western Wyoming Alternative Variation
Little Basin Creek	Sweetwater, Wyoming	None	None	200					1	Western Wyoming Alternative Variation
Greenhough Creek	Sweetwater, Wyoming	None	None	200					1	Western Wyoming Alternative Variation
Sage Creek	Sweetwater, Wyoming	None	Flannelmouth sucker, mountain sucker	200					1	Western Wyoming Alternative Variation
Green River	Daggett, Utah	Brown trout, Colorado River cutthroat trout, rainbow trout	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], roundtail chub, razorback sucker[1]	200					1	Western Wyoming Alternative Variation
Pot Creek	Uintah, Utah	Brook trout	None	200					1	Western Wyoming Alternative Variation

[1]Species occurs greater than 5 miles downstream of the crossing. It is included in the analysis due to potential effects of water use during construction.

Table G-5 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region I Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives				ROW Crossings	Variation or Connector
					A	B	C	D		
Buck Spring	Carbon, Wyoming			10						Aeolus Design Option
Standpipe Spring	Carbon, Wyoming			10						Aeolus Design Option
Echo Springs	Carbon, Wyoming			40	X	X		X		
Cherokee Reservoir	Sweetwater, Wyoming	Brown trout, largemouth bass, rainbow trout	None	70		X				
Spring Draw Reservoir	Sweetwater, Wyoming	Brown trout, largemouth bass, rainbow trout	None	70		X				
Lower Willow Creek Spring	Sweetwater, Wyoming			70		X				
Baking Powder Reservoir	Moffat, Colorado			100	X	X	X	X		
Coal Bank Lake	Carbon, Wyoming	Bluegill, largemouth bass, rainbow trout	None	110	X			X		
Duck Lake	Carbon, Wyoming			115				X		
Detention Dam 1592 Number 1	Carbon, Wyoming			115.05				X		
Little Robber Detention Dam	Carbon, Wyoming			115.05				X		
McPherson Springs	Sweetwater, Wyoming			115.07				X		
Alkali Reservoir	Sweetwater, Wyoming			120	X					
Flat Draw Reservoir	Sweetwater, Wyoming	Brown trout, largemouth bass, rainbow trout	None	120	X					
Mexican Flats Reservoir Number 1	Carbon, Wyoming			120	X					
Coal Bank Spring	Carbon, Wyoming			130			X			
Gamblers Reservoir	Carbon, Wyoming	Largemouth bass, rainbow trout	None	170.05						Baggs Alternative Connector
River Bottom Reservoir	Carbon, Wyoming			170.05						Baggs Alternative Connector
Spence Spring	Moffat, Colorado			180.2	X					
Dresher Reservoir	Moffat, Colorado			190			X			
Biskup Reservoir	Moffat, Colorado			190			X			
Shiner Reservoir	Uintah, Utah	Bluegill, largemouth bass, rainbow trout	None	200					X	
Crouse Reservoir	Uintah, Utah	Rainbow trout, tiger trout	None	200						Western Wyoming Alternative Variation

Table G-5 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region I Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives				ROW Crossings	Variation or Connector
					A	B	C	D		
Zelph Calder Reservoir	Uintah, Utah	Brown trout, cutthroat trout, rainbow trout	None	200						Western Wyoming Alternative Variation
Blair Spring	Uintah, Utah			200						Western Wyoming Alternative Variation
Bowrey Spring	Uintah, Utah			200						Western Wyoming Alternative Variation
Chokecherry Spring	Daggett, Utah			200						Western Wyoming Alternative Variation
Cottonwood Spring	Daggett, Utah			200						Western Wyoming Alternative Variation
Fighting Spring	Daggett, Utah			200						Western Wyoming Alternative Variation
Whisky Springs	Daggett, Utah			200						Western Wyoming Alternative Variation
Beans Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Beef Steer Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Brown Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Camp Creek Springs	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Castello Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Ely Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Gap Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Iron Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Jones Springs	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Poison Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Titsworth Spring	Sweetwater, Wyoming			200						Western Wyoming Alternative Variation
Diamond Spring	Uintah, Utah			200						Western Wyoming Alternative Variation

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Stinking Water Creek	Moffat, Colorado	None	None	210	X			X	X	X	1	
Stinking Water Creek	Rio Blanco, Colorado	None	None	210	X			X	X	X	1	
Green River	Uintah, Utah	Brown trout, Colorado River cutthroat trout, mountain whitefish, rainbow trout, smallmouth bass	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], roundtail chub, razorback sucker[1]	213	X				X		1	
White River (tributary to Green River)	Uintah, Utah	Channel catfish, rainbow trout, northern pike	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], northern leopard frog, roundtail chub, razorback sucker[1]	217.01				X		X	1	
Coal Creek	Carbon, Utah	None	None	217.01				X		X		
Green River	Uintah, Utah	Brown trout, Colorado River cutthroat trout, mountain whitefish, rainbow trout, smallmouth bass	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], roundtail chub, razorback sucker[1]	217.01				X		X	1	
Minnie Maud Creek	Carbon, Utah	Cutthroat trout	None	217.02				X			1	
Minnie Maud Creek	Carbon, Utah	Cutthroat trout	None	218						X		
Minnie Maud Creek	Duchesne, Utah	None	None	217.02				X				
Soldier Creek	Carbon, Utah	Cutthroat trout	None	217.02				X		X		
Willow Creek	Uintah, Utah	Brook trout, Colorado River cutthroat trout (restoration area), rainbow trout	Colorado River cutthroat trout	217.01				X		X	1	
Argyle Creek	Duchesne, Utah	Cutthroat trout	None	217.01				X		X	1	
Horse Creek	Utah, Utah	Not surveyed	Not surveyed	219.5							1	Emma Park
Argle Creek	Duchesne, Utah	Cutthroat trout	None	219.2						X	1	
Summit Creek	Carbon, Utah	None	None	217.02				X		X		
Beaver Creek	Utah, Utah	Brown trout, cutthroat trout, rainbow trout	None	217.051					X		1	

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Clear Creek	Utah, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout	217.052					X	X		
Dairy Fork	Utah, Utah	None	None	217.052					X	X		
Horse Creek	Utah, Utah	Not surveyed	Not surveyed	217.051					X		1	
Indian Creek	Utah, Utah	Not surveyed	Not surveyed	217.052					X	X	1	
Kyune Creek	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	217.052					X			
Kyune Creek	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.2						X		
Kyune Creek	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.5							3	Emma Park
Mill Fork	Utah, Utah	None	None	217.051					X	X		
Price River	Utah, Utah	Brown trout, cutthroat trout, rainbow trout	Mountain sucker	217.051					X		2	
Sheep Creek	Utah, Utah	None	None	217.052					X	X	1	
Soldier Creek	Utah, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout, mountain sucker, northern leopard frog, southern leatherside chub	217.052					X	X	5	
Tabbyune Creek	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	217.051					X		1	
Tabbyune Creek	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.2						X	1	
Tabbyune Creek	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.5							1	Emma Park
Tie Fork	Utah, Utah	Bonneville cutthroat trout, brown trout, rainbow trout	Bonneville cutthroat trout	217.052					X	X	1	
West Fork Willow Creek	Duchesne, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	217.052					X	X		
White River (tributary to Price River)	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	217.052					X			
White River (tributary to Price River)	Wasatch, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	217.052					X			
Willow Creek	Carbon, Utah	Brown trout	None	217.051					X		1	
Willow Creek	Duchesne, Utah	Brown trout	None	217.051					X		1	
North Fork Gordon Creek	Carbon, Utah	Cutthroat trout	None	217.1				X			1	
Price River	Carbon, Utah	Brown trout	Mountain sucker	217.1				X			1	
Summit Creek	Carbon, Utah	None	None	217.1				X			1	

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Willow Creek	Carbon, Utah	Brown trout	None	217.1				X				
Willow Creek	Carbon, Utah	Brown trout	None	219.2						X		
Willow Creek	Carbon, Utah	Brown trout	None	219.4							1	Emma Park
Willow Creek	Carbon, Utah	Brown trout	None	219.6							1	Highway 191 Connector
Dry Creek	Sanpete, Utah	None	None	217.15				X			1	
Gooseberry Creek	Sanpete, Utah	Cutthroat trout	None	217.15				X			1	
Huntington Creek	Emery, Utah	Brown trout, Colorado cutthroat trout (to be restocked)	Colorado River cutthroat trout	217.15				X				
Maple Fork	Sanpete, Utah	Not surveyed	Not surveyed	217.15				X			1	
Mud Creek	Carbon, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout, mountain sucker	217.15				X			1	
Oak Creek	Sanpete, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout	217.15				X			1	
San Pitch River	Sanpete, Utah	Brown trout	Columbia spotted frog, mountain sucker, southern leatherside chub	217.15				X			1	
Upper Huntington Creek	Emery, Utah	Brown trout	None	217.15				X			1	
White Pine Fork	Sanpete, Utah	Not surveyed	Not surveyed	217.15				X			1	
Cottonwood Creek	Sanpete, Utah	Bonneville cutthroat trout, rainbow trout	Bonneville cutthroat trout	217.15				X			1	
Bear Creek	Utah, Utah	Not surveyed	Not surveyed	219.2						X		
Bear Creek	Utah, Utah	Not surveyed	Not surveyed	219.5								Emma Park
Kyune Creek Right Fork	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.2						X		
Kyune Creek Right Fork	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.5							1	Emma Park
White River Right Fork	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout, mountain sucker	219.2						X		
White River (tributary to Price River)	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.3						X	1	
White River (tributary to Price River)	Utah, Utah	Colorado River cutthroat trout	Colorado River cutthroat trout	219.5								Emma Park

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Spring Creek	Rio Blanco, Colorado	None	None	220.1		X	X					
Douglas Creek	Rio Blanco, Colorado	None	Northern leopard frog	220.1		X	X				1	
Little Water	Garfield, Colorado	None	None	220.1		X	X					
West Salt Creek	Garfield, Colorado	None	None	220.1		X	X				37	
White River	Rio Blanco, Colorado	Channel catfish, rainbow trout, northern pike	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], northern leopard frog, roundtail chub, razorback sucker[1]	220.1		X	X				1	
Bitter Creek	Garfield, Colorado	Brook trout, Colorado River cutthroat trout	Colorado River cutthroat trout	220.1		X	X					
Evacuation Creek	Rio Blanco, Colorado	None	None	220.1		X	X				1	
Green River	Emery, Utah	Brown trout, Colorado River cutthroat trout, mountain whitefish, rainbow trout, smallmouth bass	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], roundtail chub, razorback sucker[1]	220.1		X	X				1	
Green River	Grand, Utah	Brown trout, Colorado River cutthroat trout, mountain whitefish, rainbow trout, smallmouth bass	Bluehead sucker, bonytail[1], Colorado River cutthroat trout, Colorado pikeminnow, flannelmouth sucker, humpback chub[1], roundtail chub, razorback sucker[1]	220.1		X	X				1	
Price River	Emery, Utah	Brown trout	Bluehead sucker, Colorado pikeminnow, flannelmouth sucker	222.05		X					2	
Cedar Creek	Emery, Utah	None	None	222.3		X					1	
Huntington Creek	Emery, Utah	Brown trout, Colorado River cutthroat trout (to be restocked)	Bluehead sucker, Colorado River cutthroat trout	222.3		X					1	
Miller Creek	Carbon, Utah	None	None	223							1	Price Alternative Connector

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
South Fork Gordon Creek	Carbon, Utah	None	None	223								Price Alternative Connector
Huntington Creek	Emery, Utah	Brown trout, Colorado River cutthroat trout (to be restocked)	Bluehead sucker, Colorado River cutthroat trout	310		X						
Indian Creek	Emery, Utah	Not surveyed	Not surveyed	310		X					1	
Lowry River	Emery, Utah	Colorado River cutthroat trout, tiger trout	Bluehead sucker, Colorado River cutthroat trout	310		X						
North Fork Coal Fork	Sanpete, Utah	None	None	310		X						
San Pitch River	Sanpete, Utah	Brown trout	Columbia spotted frog, mountain sucker, southern leatherside chub	310		X					1	
South Fork Coal Fork	Sanpete, Utah	None	None	310		X						
Blue Slide Fork	Sanpete, Utah	None	None	310		X						
Coal Fork	Sanpete, Utah	None	None	310		X					1	
Cove Creek	Sanpete, Utah	None	None	310		X						
Dry Pole Fork	Sanpete, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout	310		X						
North Creek	Sanpete, Utah	None	None	310		X					1	
North Fork Pleasant Creek	Sanpete, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout	310		X						
Pleasant Creek	Sanpete, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout	310		X					3	
Straight Fork	Sanpete, Utah	None	None	310		X					3	
Deer Creek	Emery, Utah	Not surveyed	Not surveyed	310		X					1	
Cottonwood Creek	Duchesne, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.05	X				X			
Montes Creek	Uintah, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.05	X				X		1	
Dry Gulch Creek	Duchesne, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.05	X				X		1	
Dry Gulch Creek	Uintah, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.05	X				X		1	

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Uinta River	Uintah, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.05	X				X		1	
Currant Creek	Duchesne, Utah	Brown trout, Bonneville cutthroat trout	Bonneville cutthroat trout, bluehead sucker, flannelmouth sucker	320.1	X						1	
Currant Creek	Wasatch, Utah	Brown trout, Bonneville cutthroat trout	Bonneville cutthroat trout, bluehead sucker, flannelmouth sucker	320.1	X						1	
Dry Gulch Creek	Duchesne, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.1	X							
Duchesne River	Duchesne, Utah	Brown trout	Bluehead sucker, flannelmouth sucker, roundtail chub	320.1	X						1	
Lake Fork River	Duchesne, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub	320.1	X						1	
Red Creek	Duchesne, Utah	Bonneville cutthroat trout, brown trout, rainbow trout	Bonneville cutthroat trout	320.1	X						1	
Sheep Creek	Utah, Utah	None	None	320.1	X						2	
Soldier Creek	Utah, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout, mountain sucker, Columbia spotted frog, northern leopard frog, southern leatherside chub	320.1	X						1	
Strawberry River	Duchesne, Utah	Brook trout, brown trout, Colorado River cutthroat trout	Bluehead sucker, Colorado River cutthroat trout	320.1	X						1	
Strawberry River	Wasatch, Utah	Brook trout, brown trout, Colorado River cutthroat trout	Bluehead sucker, Colorado River cutthroat trout	320.1	X						1	
Tie Fork	Utah, Utah	Bonneville cutthroat trout, brown trout, rainbow trout	Bonneville cutthroat trout	320.1	X						1	
Willow Creek	Wasatch, Utah	Colorado River cutthroat trout	Boreal toad, Columbia spotted frog, Colorado River cutthroat trout	320.1	X							
Bennie Creek	Utah, Utah	Bonneville cutthroat trout, brown trout, rainbow trout	Bonneville cutthroat trout	320.15	X				X	X		
Crab Creek	Utah, Utah	None	None	320.15	X				X	X		
Hop Creek	Juab, Utah	Brown trout	Southern leatherside chub	320.15	X				X	X		
Lake Fork	Utah, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout	320.15	X				X	X	1	

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Nebo Creek	Utah, Utah	Bonneville cutthroat trout, brown trout, rainbow trout	Bonneville cutthroat trout	320.15	X				X	X		
Soldier Creek	Utah, Utah	Bonneville cutthroat trout	Bonneville cutthroat trout, northern leopard frog, southern leatherside chub	320.15	X				X	X		
Thistle Creek	Utah, Utah	Bonneville cutthroat trout, brown trout, rainbow trout	Bonneville cutthroat trout, mountain sucker, southern leatherside chub, southern Bonneville pyrg (spring)	320.15	X				X	X	1	
Hop Creek	Juab, Utah	Brown trout	Southern leatherside chub	320.2	X			X	X	X	1	
Salt Creek	Juab, Utah	Brown trout	None	320.2	X			X	X	X		
Antelope Creek	Duchesne, Utah	None	None	325.1					X			
Argyle Creek	Duchesne, Utah	Cutthroat trout	None	325.1					X		3	
Duchesne River	Duchesne, Utah	Brown trout, mountain whitefish, Rainbow trout	Bluehead sucker, flannelmouth sucker, roundtail chub	325.1					X		1	
Lake Fork River	Duchesne, Utah	Brook trout, brown trout, cutthroat trout, grayling, rainbow trout	Bluehead sucker, flannelmouth sucker, roundtail chub	325.1					X		1	
Sowers Creek	Duchesne, Utah	None	Boreal toad	325.1					X		15	
Minnie Maud Creek	Duchesne, Utah	Cutthroat trout	None	325.2					X			
Muddy Creek	Emery, Utah	None	Bluehead sucker, flannelmouth sucker, mountain sucker, southern leatherside chub	330.1			X				1	
Blackham Creek	Sevier, Utah	Cutthroat trout, rainbow trout	None	330.1			X				1	
Cottonwood Creek	Emery, Utah	None	Bluehead sucker	330.1			X				1	
Ferron Creek	Emery, Utah	None	Bluehead sucker, flannelmouth sucker	330.1			X				1	
Gooseberry Creek	Sevier, Utah	Brown trout, rainbow trout	Southern leatherside chub	330.1			X				1	
Ivie Creek	Millard, Utah	Brown trout, rainbow trout	None	330.1			X				1	
Little Creek	Sevier, Utah	Brown trout, rainbow trout	Southern leatherside chub	330.1			X					
Lost Creek	Sevier, Utah	Brown trout, rainbow trout	Southern leatherside chub	330.1			X				1	
Meadow Creek	Sevier, Utah	Brown trout, cutthroat trout, rainbow trout	None	330.1			X				1	
Niotche Creek	Sevier, Utah	Cutthroat trout	None	330.1			X				1	

Table G-6 Game Fish and Special Status Species Occurrence in Streams, Region II Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Pharo Creek	Millard, Utah	None	None	330.1			X					
Quitchupah Creek	Emery, Utah	None	Flannelmouth sucker, mountain sucker, southern leatherside chub	330.1			X				1	
Quitchupah Creek	Sevier, Utah	None	Flannelmouth sucker, mountain sucker, southern leatherside chub	330.1			X				1	
Saleratus Creek	Sevier, Utah	None	None	330.1			X				1	
Sevier River	Sevier, Utah	Brown trout, channel catfish	Southern leatherside chub	330.1			X				1	
Spring Creek	Sevier, Utah	None	None	330.1			X					
Willow Creek	Millard, Utah	Cutthroat/rainbow trout hybrid, rainbow trout	None	330.1			X				1	
Yogo Creek	Sevier, Utah	Cutthroat trout, rainbow trout	None	330.1			X				1	
Trough Hollow Creek	Sevier, Utah	None	None	330.1			X					
West Creek	Juab, Utah	None	None	340	X						1	
Currant Creek	Juab, Utah	Brown trout	California floater, Columbia spotted frog, least chub, northern leopard frog	340	X							
Unnamed tributary to Currant Creek	Juab, Utah	None	Columbia spotted frog	340	X							
Birch Creek drainage	Juab, Utah	None	Boreal toad	340	X							
Salt Creek	Juab, Utah	Brown trout	None	340	X						1	
Sevier River	Juab, Utah	Black bullhead, channel catfish, green sunfish, smallmouth bass, walleye, yellow perch	Mountain sucker, southern leatherside chub	370		X				X	1	
Sevier River	Millard, Utah	Black bullhead, channel catfish, green sunfish, smallmouth bass, walleye, yellow perch	Mountain sucker, southern leatherside chub	380		X				X	1	
Sevier River	Millard, Utah	Black bullhead, channel catfish, green sunfish, largemouth bass, smallmouth bass, walleye, white bass, white crappie, yellow perch	Mountain sucker, southern leatherside chub	410			X				1	

[1]Species occurs greater than 5 miles downstream of the crossing. It is included in the analysis due to potential effects of water use during construction.

Table G-7 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region II Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Box Elder Reservoir Number 3	Moffat, Colorado	Bluegill, largemouth bass, rainbow trout	None	210	X			X	X	X		
Box Elder Reservoir Number 2	Moffat, Colorado	Bluegill, largemouth bass, rainbow trout	None	210	X			X	X	X		
Box Elder Reservoir	Moffat, Colorado	Bluegill, largemouth bass, rainbow trout	None	210	X			X	X	X		
Boulger Reservoir	Sanpete, Utah	Rainbow trout, Yellowstone cutthroat trout	None	217.15				X				
Electric Lake	Emery, Utah	Tiger trout, Yellowstone cutthroat trout	None	217.15				X				
Horse Ridge Spring	Emery, Utah	None	None	219.2						X		
Pipe Spring	Emery, Utah	None	None	219.6						X		
Cactus Reservoir	Rio Blanco, Colorado	Bluegill, largemouth bass, rainbow trout	None	220.1		X	X					
Coon Spring	Emery, Utah			222.05		X					X	
Good Water Spring	Emery, Utah			222.05		X						
Cottonwood Spring	Emery, Utah			222.3		X						
Coyote Spring	Emery, Utah			222.3		X					X	
Millerton Reservoir	Carbon, Utah	Brown trout, cutthroat trout, rainbow trout	None	223								Price Alternative Connector
Goat Ranch Spring	Carbon, Utah			223								Price Alternative Connector
Huntington Reservoir	Emery, Utah	Brown trout, cutthroat trout, tiger trout	None	310		X						
Potters Ponds	Emery, Utah	Rainbow trout	None	310		X						
Apple Tree Spring	Sanpete, Utah			310		X						
Elk Spring	Emery, Utah			310		X						
Pine Spring	Emery, Utah			310		X						
Starvation Reservoir	Duchesne, Utah	Rainbow trout, smallmouth bass, walleye, yellow perch	None	320.1	X							
Long Hollow Spring	Utah, Utah			320.15	X				X	X		
Lookout Spring	Utah, Utah			320.15	X				X	X		
Sky High Spring	Utah, Utah			320.15	X				X	X		
Cottonwood Spring	Utah, Utah			320.15	X				X	X		
Bradley Springs	Juab, Utah			320.2	X			X	X	X	X	
Boreham Lake	Duchesne, Utah			325					X			
Saleratus Reservoir	Sevier, Utah	Largemeouth bass	None	330.1			X					

Table G-7 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region II Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives						ROW Crossings	Variation or Connector
					A	B	C	D	E	F		
Scipio Lake	Millard, Utah	Bluegill, catfish spp., crappies, largemouth bass, smallmouth bass, walleye	None	330.1			X					
Creepy Spring	Sevier, Utah			330.1			X					
Josiah Springs	Sevier, Utah			330.1			X					
Mud Spring	Sevier, Utah			330.1			X					
Mud Spring	Sevier, Utah			330.1			X					
Prowse Spring	Sevier, Utah			330.1			X					
Tidwell Spring	Juab, Utah			360	X			X	X			
Dog Valley Reservoir	Juab, Utah			370		X						
Fishers Spring	Millard, Utah			400						X		Lynndyl Alternative Connector
D M A D Reservoir	Millard, Utah	Channel catfish, white bass	None	410			X				X	

Table G-8 Game Fish and Special Status Aquatic Species Occurrence in Streams, Region III Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives			ROW Crossings	Variation or Connector
					A	B	C		
Magotsu Creek	Washington, Utah	None	Arizona toad, bluehead sucker, flannelmouth sucker, roundtail chub, Virgin spinedace	501	X			1	
Moody Wash	Washington, Utah	None	Arizona toad, Virgin spinedace	502	X			1	
Spring Creek	Washington, Utah	None	Virgin spinedace	501	X			1	
Shinbone Creek	Washington, Utah	None	None	503					Ox Valley East Alternative Variation
Spring Creek	Washington, Utah	None	Virgin spinedace	503				1	Ox Valley East Alternative Variation
Spring Creek	Washington, Utah	None	Virgin spinedace	504				1	Ox Valley West Alternative Variation
Shinbone Creek	Washington, Utah	None	None	505					Ox Valley East & West Alternative Variation
South Fork Pinto Creek	Washington, Utah	Rainbow trout	None	506					Pinto Alternative Variation
Little Pinto Creek	Iron, Utah	None	None	506				1	Pinto Alternative Variation
Magotsu Creek	Washington, Utah	None	Bluehead sucker, flannelmouth sucker, roundtail chub, Virgin spinedace	506				1	Pinto Alternative Variation
Pinto Creek	Iron, Utah	Rainbow trout	None	506				4	Pinto Alternative Variation
Pinto Creek	Washington, Utah	Rainbow trout	None	506				4	Pinto Alternative Variation
Santa Clara River	Washington, Utah	Brook trout, brown trout, green sunfish, rainbow trout	Arizona toad	506				2	Pinto Alternative Variation
Clover Creek	Lincoln, Nevada	Rainbow trout	Meadow Valley Wash desert sucker, Meadow Valley speckled dace	510		X		1	
Meadow Valley Wash	Lincoln, Nevada	Rainbow trout	Meadow Valley Wash desert sucker, Meadow Valley speckled dace, Arizona toad	520			X	1	
Muddy River	Clark, Nevada	None	Meadow Valley Wash desert sucker, Meadow Valley speckled dace, Moapa speckled dace, Moapa White River springfish, Virgin River chub	540		X		1	
Meadow Valley Wash	Clark, Nevada	None	Meadow Valley Wash desert sucker, Meadow Valley speckled dace, Arizona toad	540		X		1	
Muddy River	Clark, Nevada	None	Meadow Valley Wash desert sucker, Meadow Valley speckled dace, Moapa speckled dace, Moapa White River springfish, Virgin River chub	550	X			1	

Table G-9 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region III Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives			ROW Crossings	Variation or Connector
					A	B	C		
Smelter Knolls Reservoir	Millard, Utah			450	X	X	X		
West Clay Knoll Reservoir	Millard, Utah			460			X		
West Marshall Tract Reservoir	Millard, Utah			460			X		
Little Drum Spring	Millard, Utah			470	X	X			
Lower Big Wash Reservoir	Beaver, Utah			480	X	X	X	X	
Thermo Hot Springs	Beaver, Utah			480	X	X	X		
Rock Spring	Iron, Utah			500.02	X				
Sand Spring	Iron, Utah			500.02	X				
Newcastle Reservoir	Iron, Utah	Rainbow trout, smallmouth bass, wiper	None	500.05	X				
Abe Spring	Washington, Utah			501	X				
Hamblin Spring	Washington, Utah			501	X				
Hiway Spring	Washington, Utah			501	X				
Hyatt Spring	Washington, Utah			501	X				
Lone Spring	Washington, Utah			501	X				
Oak Spring	Washington, Utah			501	X				
Yellow Spring	Washington, Utah			501	X				
Cole Spring	Washington, Utah			502	X				
Eightmile Spring	Washington, Utah			502	X				
Jackson Spring	Washington, Utah			502	X				
Rods Spring	Washington, Utah			502	X				
Cliff Spring	Washington, Utah			503					Ox Valley East Alternative Variation
Cottonwood Spring	Washington, Utah			503					Ox Valley East Alternative Variation
Mud Spring	Washington, Utah			503					Ox Valley East Alternative Variation
Rose Spring	Washington, Utah			503					Ox Valley East Alternative Variation
Twin Spring	Washington, Utah			503					Ox Valley East Alternative Variation
Willow Spring	Washington, Utah			503					Ox Valley East Alternative Variation
Bullrush Spring	Washington, Utah			505					Ox Valley East & West Alternative Variation

Table G-9 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region III Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives			ROW Crossings	Variation or Connector
					A	B	C		
Joe Spring	Washington, Utah			505					Ox Valley East & West Alternative Variation
Tom Spring	Washington, Utah			505					Ox Valley East & West Alternative Variation
Baker Reservoir	Washington, Utah	Brown trout, green sunfish, rainbow trout	None	506					Pinto Alternative Variation
Newcastle Reservoir	Iron, Utah	Rainbow trout, smallmouth bass, wiper	None	506					Pinto Alternative Variation
Cove Spring	Washington, Utah			506					Pinto Alternative Variation
Fourmile Spring	Washington, Utah			506					Pinto Alternative Variation
Mud Spring	Washington, Utah			506					Pinto Alternative Variation
Platt Spring	Washington, Utah			506					Pinto Alternative Variation
Nervine Spring	Washington, Utah			506					Pinto Alternative Variation
Rolling Hills Reservoir	Lincoln, Nevada			510		X			
Jacks Canyon Reservoir	Lincoln, Nevada			510		X			
Lafes Reservoir	Lincoln, Nevada			510		X			
Abe Spring	Lincoln, Nevada			510		X			
Acoma Spring	Lincoln, Nevada			510		X			
Tule Spring	Lincoln, Nevada			510		X			
Shoemake Spring	Lincoln, Nevada			510		X			
Summit Spring	Lincoln, Nevada			510		X			
Mud Springs	Lincoln, Nevada			510		X			
Sams Camp Spring	Lincoln, Nevada			510		X			
Topah Spring	Lincoln, Nevada			510		X			
Buckboard Spring	Lincoln, Nevada			520			X		
Chokecherry Spring	Lincoln, Nevada			520			X		
Coyote Spring	Lincoln, Nevada			520			X		
Keel Spring	Lincoln, Nevada			520			X		
Miller Spring	Lincoln, Nevada			520			X		
Miser Spring	Lincoln, Nevada			520			X		
Nelson Spring	Lincoln, Nevada			520			X		
Oak Spring	Lincoln, Nevada			520			X		

Table G-9 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region III Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives			ROW Crossings	Variation or Connector
					A	B	C		
West Oak Spring	Lincoln, Nevada			520			X		
Gypsum Spring	Clark, Nevada			630	X				

Table G-10 Game Fish and Special Status Aquatic Species Occurrence in Streams, Region IV Corridors

Stream Name	County, State	Game Fish	Special Status	Segment ID	Alternatives A	Alternatives B	Alternatives C	ROW Crossings	Variation or Connector
Las Vegas Wash	Clark, Nevada	Largemouth bass	Razorback sucker (near confluence with Lake Mead)	660	X			1	
Las Vegas Wash	Clark, Nevada	Largemouth bass	Razorback sucker (near confluence with Lake Mead)	670		X	X		
Hemenway Wash	Clark, Nevada	None	None	710		X	X	1	
Hemenway Wash	Clark, Nevada	None	None	730				1	River Mountain Alternative Connector
Hemenway Wash	Clark, Nevada	None	None	750		X	X		
Hemenway Wash	Clark, Nevada	None	None	760		X		1	

Table G-11 Game Fish and Special Status Aquatic Species Occurrence in Waterbodies, Region IV Corridors

Surface Water Feature	County, State	Game Fish	Special Status	Segment ID	Alternatives A	Alternatives B	Alternatives C	Intersects ROW	Variation or Connector
Gypsum Spring	Clark, Nevada			630	X				
Lake Mead	Clark, Nevada	Bluegill, channel catfish, crappies, largemouth bass, striped bass	Razorback sucker	670		X	X		
Lake Mead	Clark, Nevada	Bluegill, channel catfish, crappies, largemouth bass, striped bass	Razorback sucker	710		X	X		
C C C Reservoir	Clark, Nevada			770			X		
Dry Lake Reservoir	Clark, Nevada			770			X		

Table G-12 U.S. Forest Service Species Considered in the TransWest Express Transmission Project Technical Report

Common Name	Scientific Name	Status	Regional Forester's Sensitive Species and MIS by National Forest[1]					Species Excluded from Further Analysis due to Lack of Potential Habitat within Project Corridors[1,2]	Reason Species was Excluded from Further Analysis
			Utah						
			A	D	FL	ML	U		
AMPHIBIANS									
Boreal (western) toad	*Bufo boreas boreas*	FS	X	X	X	X	X	D: Yes FL: Yes ML: Yes U: No (Strawberry Reservoir)	No suitable habitat is present within Project corridors on the Dixie, Fishlake, and Manti-La Sal national forests.
Columbia spotted frog	*Rana luteiventris*	FS	?			X	X	No.	N/A
FISH									
Bonneville cutthroat trout	*Oncorhynchus clarki utah*	FS, MIS		X	X	X	X	D: Yes FL: Yes ML: No (Dry Pole Creek) U: No (Soldier Creek)	No suitable habitat is present within the Project corridors on the Dixie and Fishlake national forests.
Bonytail	*Gila elegans*	FE	–[3]	–[3]	–[3]	–[3]	–[3]	No. See footnote 3.	N/A
Colorado pikeminnow	*Ptychocheilus lucius*	FE	–[3]	–[3]	–[3]	–[3]	–[3]	No. See footnote 3.	N/A
Colorado River cutthroat trout	*Oncorhynchus clarki pleuriticus*	FS, MIS	X	X	X	X	X	D: Yes FL: Yes ML: No (Lowry Water) U: No (Willow Creek)	No suitable habitat is present within the Project corridors on the Dixie and Fishlake national forests.
Humpback chub	*Gila cypha*	FE	–[3]	–[3]	–[3]	–[3]	–[3]	No. See footnote 3.	N/A
June sucker	*Chasmistes liorus*	FE					–[3]	No. See footnote 3.	N/A
Razorback sucker	*Xyrauchen texanus*	FE	–[3]	–[3]	–[3]	–[3]	–[3]	No. See footnote 3.	N/A
Southern leatherside chub	*Gila robusta robusta*	FS, MIS		X	X	X	X	D: Yes FL: No (Little Creek) ML: Yes U: No (Soldier Creek)	No suitable habitat is present within the Project corridors on the Dixie and Manti-La Sal national forests.

Table G-12 U.S. Forest Service Species Considered in the TransWest Express Transmission Project Technical Report

Common Name	Scientific Name	Status	Regional Forester's Sensitive Species and MIS by National Forest[1]					Species Excluded from Further Analysis due to Lack of Potential Habitat within Project Corridors[1,2]	Reason Species was Excluded from Further Analysis
			Utah						
			A	D	FL	ML	U		
Brook trout	*Salvelinus fontinalis*	MIS		X	X			No	No suitable habitat is present within Project corridors on the Dixie and Manti-La Sal national forests.
Brown trout	*Salmo trutta*	MIS		X	X			No	N/A
Cutthroat trout	*Oncorhynchus clarki*	MIS	X	X	X			No	N/A
Lake trout	*Salvelinus namaycush*	MIS			X			Yes	No suitable habitat is present within Project corridors on the Fishlake National Forest.
Rainbow trout	*Oncorhynchus mykiss*	MIS		X	X			No	N/A
Virgin spinedace	*Lepidometa mollispinus mollispinus*	MIS		X				No	N/A
Macroinvertebrates	No specific species	MIS	X			X		No	N/A

[1] A = Ashley, D = Dixie, FL = Fishlake, ML = Manti-La Sal, and U = Uinta Planning Area of the Uinta-Wasatch-Cache. Shaded occurrence indicates that suitable habitat is present within the Project corridor on the National Forest.

[2] If a specific forest is not indicated, then the Yes or No decision applies to all the National Forests that have the species listed as sensitive.

[3] Species does not occur within Forests crossed by Project corridors. However, the species is included in the analysis because potential water depletions in the Upper Colorado River Basin must be addressed.

Status: FE = Federally endangered, FS = Forest Sensitive, and MIS = Management Indicator Species.

Table G-13 Waterbodies and Associated Species Crossed by Project Alternatives on Forest Lands

Waterbody Name	Project Region	County, State	Forest[1]	Sensitive Species and MIS	Segment No.	Alternatives						ROW Crossings	Subwatersheds
						A	B	C	D	E	F		
Indian Creek	II	Utah, Utah	U	Not surveyed	217.05					X	X	1	Upper Soldier Creek
Sheep Creek	II	Utah, Utah	U	None	217.05					X	X	1	Lower Soldier Creek
Tie Fork	II	Utah, Utah	U	Bonneville cutthroat trout (FS & MIS)	217.05					X	X	1	Tie Fork
Dry Creek	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	217.15				X			1	Dry Creek – San Pitch River
Gooseberry Creek	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	217.15				X			1	Gooseberry Creek
Huntington Creek	II	Sanpete, Utah	ML	Colorado River cutthroat trout (FS & MIS), macroinvertebrates (MIS)	217.15				X			0	Right Fork Huntington Creek
Maple Fork	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	217.15				X			1	Cottonwood Canyon-San Pitch River
Upper Huntington Creek	II	Emery, Utah	ML	Macroinvertebrates (MIS)	217.15				X			1	Right Fork Huntington Creek
White Pine Fork	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	217.15				X			1	Cottonwood Canyon-San Pitch River
Cottonwood Creek	II	Sanpete, Utah	ML	Bonneville cutthroat trout (FS & MIS), macroinvertebrates (MIS)	217.15				X			1	Cottonwood Canyon-San Pitch River
Boulger Reservoir	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	217.15				X			0	Right Fork Huntington Creek
Electric Lake	II	Emery, Utah	ML	Macroinvertebrates (MIS)					X			0	Right Fork Huntington Creek
Deer Creek	II	Emery, Utah	ML	Macroinvertebrates (MIS)	310		X					0	Huntington Lake – Huntington Creek
Dry Pole Creek	II	Sanpete, Utah	ML	Bonneville cutthroat trout (FS & MIS), macroinvertebrates (MIS)	310		X					0	Pleasant Creek
Indian Creek	II	Emery, Utah	ML	Macroinvertebrates (MIS)	310		X					1	Indian Creek
Lowry River	II	Emery, Utah	ML	Colorado River cutthroat trout (FS & MIS), macroinvertebrates (MIS)	310		X					0	Lowry River
North Fork Coal Creek	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	310		X					0	Pleasant Creek
Straight Fork Creek	II	Sanpete, Utah	ML	Macroinvertebrates (MIS)	310		X					3	Pleasant Creek
Potters Pond	II	Emery, Utah	ML	Macroinvertebrates (MIS)	310		X					0	Lowry River

Table G-13 Waterbodies and Associated Species Crossed by Project Alternatives on Forest Lands

Waterbody Name	Project Region	County, State	Forest[1]	Sensitive Species and MIS	Segment No.	Alternatives						ROW Crossings	Subwatersheds
						A	B	C	D	E	F		
Pine Spring	II	Emery, Utah	ML	Macroinvertebrates (MIS)	310		X					0	Huntington Lake – Huntington Creek
Sheep Creek	II	Utah, Utah	U	None	320.10	X						3	Lower Soldier Creek
Soldier Creek	II	Utah, Utah	U	Bonneville cutthroat trout (FS & MIS), southern leatherside chub (FS), Columbia spotted frog (FS)	320.10	X						1	Lower Soldier Creek
Strawberry River	II	Wasatch, Utah	U	Colorado River cutthroat trout (FS & MIS)	320.10	X						1	Soldier Creek – Strawberry River
Tie Fork	II	Utah, Utah	U	Bonneville cutthroat trout (FS & MIS), southern leatherside chub (FS)	320.10	X						1	Tie Fork
Willow Creek	II	Wasatch, Utah	U	Boreal toad (FS), Columbia spotted frog (FS), Colorado River cutthroat trout (FS & MIS)	320.10	X						0	Willow Creek
Soldier Creek	II	Utah, Utah	U	Bonneville cutthroat trout (FS & MIS), southern leatherside chub (FS), Columbia spotted frog (FS)	320.15	X					X	0	Lower Soldier Creek
Long Hollow Spring	II	Utah, Utah	ML	None	320.15					X	X	0	Lake Fork
Lookout Spring	II	Utah, Utah	ML	None	320.15					X	X	0	Lower Soldier Creek
Sky High Spring	II	Utah, Utah	ML	None	320.15					X	X	0	Lower Soldier Creek
Salt Creek	II	Juab, Utah	U	None	320.20	X					X	0	Pole Creek – Salt Creek
Sowers Creek	II	Duchesne, Utah	A	Boreal toad (FS), macroinvertebrates (MIS)	330.10					X		1	Tabby Canyon – Sowers Canyon
Ivie Creek	II	Millard, Utah	FL	Brown trout (MIS), rainbow trout (MIS)	330.10			X				1	Pharo Creek – Ivie Creek
Little Creek	II	Millard, Utah	FL	Southern leatherside chub (FS), brown trout (MIS), rainbow trout (MIS)	330.10			X				0	Meadow Creek
Meadow Creek	II	Sevier, Utah	FL	Brown trout (MIS), cutthroat trout (MIS), rainbow trout (MIS)	330.10			X				1	Meadow Creek
Niotche Creek	II	Sevier, Utah	FL	Cutthroat trout (MIS)	330.10			X				0	Niotche Creek

Table G-13 Waterbodies and Associated Species Crossed by Project Alternatives on Forest Lands

Waterbody Name	Project Region	County, State	Forest[1]	Sensitive Species and MIS	Segment No.	Alternatives						ROW Crossings	Subwatersheds
						A	B	C	D	E	F		
Pharo Creek	II	Millard, Utah	FL	None	330.10			X				1	Pharo Creek – Ivie Creek
Saleratus Creek	II	Sevier, Utah	FL	None	330.10			X				0	Saleratus Creek
Saleratus Reservoir	II	Sevier, Utah	FL	None	330.10			X				0	Saleratus Creek
Creepy Spring	II	Sevier, Utah	FL	None	330.10			X				0	Water Hollow – Salina Creek
Josiah Spring	II	Sevier, Utah	FL	None	330.10			X				0	Soldier Canyon
Mud Spring	II	Sevier, Utah	FL	None	330.10			X				0	Soldier Canyon
Prowse Spring	II	Sevier, Utah	FL	None	330.10			X				0	Soldier Canyon
Magotsu Creek	III	Washington, Utah	D	Virgin spinedace (MIS)	501	X						1	Magotsu Creek
Spring Creek	III	Washington, Utah	D	Virgin spinedace (MIS)	501	X						1	Magotsu Creek
Abe Spring	III	Washington, Utah	D	None	501	X						0	Magotsu Creek
Hamblin Spring	III	Washington, Utah	D	None	501	X						0	Holt Canyon
Hiway Spring	III	Washington, Utah	D	None	501	X						0	Magotsu Creek
Oak Spring	III	Washington, Utah	D	None	501	X						0	Magotsu Creek
Yellow Spring	III	Washington, Utah	D	None	501	X						0	Holt Canyon
Rods Spring	III	Washington, Utah	D	None	502	X						0	Manganese Wash – Santa Clara River
Moody Wash	III	Washington, Utah	D	Virgin spinedace (MIS)	502	X							Magotsu Creek

[1] A = Ashley; D = Dixie National Forest; FL = Fishlake National Forest; ML = Manti-LaSal National Forest; and U = Uinta Planning Area of the Uinta-Wasatch-Cache National Forest.

FS = Forest Sensitive and MIS = Management Indicator Species

Table G-14 Waterbodies and Associated Species Crossed by Project Alternative Variations on Forest Lands

Waterbody Name	Project Region	County, State	Forest[1]	Sensitive Species and MIS	Segment No.	Variation or Connector Name	ROW Crossings	Subwatershed
Shinbone Creek	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Calf Springs Creek
Spring Creek	III	Washington, Utah	D	Virgin spinedace (MIS)	503	Ox Valley East Alternative Variation	1	Calf Springs Creek
Cliff Spring	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Lower Shoal Creek
Cottonwood Spring	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Lower Shoal Creek
Mud Spring	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Lower Shoal Creek
Rose Spring	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Lower Shoal Creek
Twin Spring	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Calf Springs Creek
Willow Spring	III	Washington, Utah	D	None	503	Ox Valley East Alternative Variation	0	Calf Springs Creek
Spring Creek	III	Washington, Utah	D	Virgin spinedace (MIS)	504	Ox Valley West Alternative Variation	1	Calf Springs Creek
Shinbone Creek	III	Washington, Utah	D	None	505	Ox Valley East and West Alternative Variation	0	Calf Springs Creek
Bullrush Spring	III	Washington, Utah	D	None	505	Ox Valley East and West Alternative Variation	0	Calf Springs Creek
Joe Spring	III	Washington, Utah	D	None	505	Ox Valley East and West Alternative Variation	0	Calf Springs Creek
Tom Spring	III	Washington, Utah	D	None	505	Ox Valley East and West Alternative Variation	0	Calf Springs Creek
Magotsu Creek	III	Washington, Utah	D	Virgin spinedace (MIS)	506	Pinto Alternative Variation	1	Magotsu Creek
South Fork Pinto Creek	III	Washington, Utah	D	Rainbow trout (MIS)	506	Pinto Alternative Variation	0	Pinto Creek
Pinto Creek	III	Washington, Utah	D	Rainbow trout (MIS)	506	Pinto Alternative Variation	4	Pinto Creek
Santa Clara River	III	Washington, Utah	D	Brook trout (MIS), brown trout (MIS), rainbow trout (MIS)	506	Pinto Alternative Variation	2	Mahogany Creek – Santa Clara River
Cove Spring	III	Washington, Utah	D	None	506	Pinto Alternative Variation	0	Pinto Creek
Fourmile Spring	III	Washington, Utah	D	None	506	Pinto Alternative Variation	0	Mahogany Creek – Santa Clara River
Mud Spring	III	Washington, Utah	D	None	506	Pinto Alternative Variation	0	Mahogany Creek – Santa Clara River
Nervine Spring	III	Washington, Utah	D	None	506	Pinto Alternative Variation	0	Mahogany Creek – Santa Clara River
Platt Spring	III	Washington, Utah	D	None	506	Pinto Alternative Variation	0	Pinto Creek

[1] A = Ashley; D = Dixie National Forest; FL = Fishlake National Forest; ML = Manti-LaSal National Forest; and U = Uinta Planning Area of the Uinta-Wasatch-Cache National Forest.

S = Forest Sensitive and MS = Management Indicator Species

Table G-15 Estimated Ground Disturbance of Riparian Habitat on Forest Lands

Forest Name	Alternatives											
	II-A		II-B		II-C		II-D		II-E		II-F	
	100 Feet	300 Feet	100 Feet	300 Feet	100 Feet	300 Feet	100 Feet	300 Feet	100 Feet	300 Feet	100 Feet	300 Feet
Uinta Planning Area of the Uinta-Wasatch-Cache												
Construction	7	16					<1	<1	4	10	5	16
Operation	2	5					<1	<1	1	4	2	5
Manti-LaSal												
Construction	1	2	6	20			4	19	1	2	1	2
Operation	<1	1	3	8			2	7	<1	1	<1	1
Ashley												
Construction									22	69	<1	<1
Operation									4	12	<1	<1
Fishlake												
Construction			<1	<1	8	28						
Operation			<1	<1	2	7						

Forest Name	Alternatives					
	III-A		III-B		III-C	
	100 feet	300 feet	100 feet	300 feet	100 feet	300 feet
Dixie						
Construction	4	11				
Operation	1	3				

* Blanks indicate that the alternative does not cross the subwatershed.

Table G-16 State Designated Noxious Weeds

Common Name	Scientific Name	Nevada Noxious Weed List[1]	Utah Noxious Weed List[2]	Wyoming Noxious Weed List[3]	Colorado Noxious Weed List[4]
Velvetleaf	*Abutilon theophrasti*	-	-	-	C
Russian knapweed/quackgrass	*Acroptilon repens*	B	X	X	B
Jointed goatgrass	*Aegilops cylindrica*	-	-	-	B
Camelthorn	*Alhagi camelorum*	A	-	-	A
Spurred anoda	*Anoda cristata*	-	-	-	B
Corn chamomile	*Anthemis arvensis*	-	-	-	B
Mayweed chamomile	*Anthemis cotula*	A	-	-	B
Common burdock	*Arctium minus*	-	-	X	C
Absinth wormwood	*Artemisia absinthium*	-	-	-	B
Giant reed	*Arundo donax*	A	-	-	-
Sahara mustard	*Brassica tournefortii*	B	-	-	-
Downy brome	*Bromus tectorum*	-	-	-	C
Hoary cress	*Cardaria draba/C. pubescens*	C	X	X	B
Plumeless thistle	*Carduus acanthoides*	-	-	X	B
Musk thistle	*Carduus nutans*	B	X	X	B
Wild caraway	*Carum carvi*	-	-	-	B
Purple Star thistle	*Centaurea calcitrapa*	A	-	-	-
Diffuse knapweed	*Centaurea diffusa*	B	X	X	B
Iberian starthistle	*Centaurea iberica*	A	-	-	-
Spotted knapweed	*Centaurea masculosa*	A	X	X	B
Malta star thistle	*Centaurea melitensis*	A	-	-	-
Meadow knapweed	*Centaurea pratensis*	-	-	-	A
Yellow starthistle	*Centaurea solstiltialis*	A	X	-	A
Squarrose knapweed	*Centaurea squarrosa/C. virgata*	A	-	-	A

Table G-16 State Designated Noxious Weeds

Common Name	Scientific Name	Nevada Noxious Weed List[1]	Utah Noxious Weed List[2]	Wyoming Noxious Weed List[3]	Colorado Noxious Weed List[4]
Rush skeletonweed	*Chondrilla juncea*	A	-	-	A
Ox-eye daisy	*Chrysanthemum leucanthemum*	-	X	X	B
Chicory	*Cichorium intybus*	-	-	-	C
Water hemlock	*Cicuta maculata*	C	-	-	-
Canada thistle	*Cirsium arvense*	C	X	X	B
Bull thistle	*Cirsium vulgare*	-	-	-	B
Chinese clematis	*Clematis orientalis*	-	-	-	B
Poison hemlock	*Conium maculatum*	C	X	-	C
Field bindweed	*Convolvulus arvensis*	-	X	X	C
Common crupina	*Crupina vulgaris*	A	-	-	A
Bermudagrass[5]	*Cynodon dactylon*	-	X	-	-
Houndstongue	*Cynoglossum officinale*	A	X	X	B
Yellow nutsedge	*Cyperus esculentus*	-	-	-	B
Common teasel	*Dipsacus fullonum*	-	-	-	B
Cutleaf teasel	*Dipsacus laciniatus*	-	-	-	B
Russian olive	*Elaeagnus angustifolia*	-	-	X	B
Redstem filaree	*Erodium cicutarium*	-	-	-	C
Cypress spurge	*Euphorbia cyparissias*	-	-	-	A
Leafy spurge	*Euphorbia esula*	B	X	X	B
Myrlte spurge	*Euphorbia myrsinites*	-	-	-	A
Skeletonleaf bursage	*Franseria discolor*	-	-	X	-
Goats rue	*Galega officinalis*	A	-	-	-
Halogeton	*Halogeton glomeratus*	-	-	-	C
Dame's rocket	*Hesperis matronalis*	-	-	-	B

Table G-16 State Designated Noxious Weeds

Common Name	Scientific Name	Nevada Noxious Weed List[1]	Utah Noxious Weed List[2]	Wyoming Noxious Weed List[3]	Colorado Noxious Weed List[4]
Venice mallow	*Hibiscus trionum*	-	-	-	B
Orange hawkweed	*Hieracium aurantiacum*	-	-	-	A
Hydrilla	*Hydrilla verticillata*	A	-	-	A
Black henbane	*Hyoscyamus niger*	A	X	-	B
Klamath weed/St. John's wort	*Hypericum perforatum*	A	X	X	C
Dyer's woad	*Isatis tinctoria*	A	X	X	A
Perennial pepperweed	*Lepidium latifolium*	C	X	X	B
Sericea lespedeza	*Lespedeza cuneata*	-	-	-	A
Dalmation toadflax, broad-leaved	*Linaria dalmatica*	A	X	X	B
Dalamation toadflax, narrow-leaved	*Linaria genistifolia*	-	-	-	B
Yellow toadflax	*Linaria vulgaris*	A	X	X	B
Purple loosestrife	*Lythrum salicaria, L.virgatum* and their cultivars	A	X	X	A
Scentless chamomile	*Matricaria perforata*	-	-	-	B
Eurasian water-milfoil	*Myriophyllum spicatum*	A	-	-	B
Scotch thistle	*Onopordum acanthium*	B	X	X	B
Wild proso millet	*Panicum miliaceum*	-	-	-	C
African rue	*Peganum harmala*	A	-	-	A
Green fountain grass	*Pennisetum setaceum*	A	-	-	-
Sulfur cinquefoil	*Potentilla recta*	A	X	-	B
Austrian fieldcress	*Rorippa austriaca*	A	-	-	-
Mediterranean sage	*Salvia aethiopis*	A	-	-	A
Giant salvinia	*Salvinia molesta*	A	-	-	A
Bouncingbet	*Saponaria officinalis*	-	-	-	B

Table G-16 State Designated Noxious Weeds

Common Name	Scientific Name	Nevada Noxious Weed List[1]	Utah Noxious Weed List[2]	Wyoming Noxious Weed List[3]	Colorado Noxious Weed List[4]
Tansy ragwort	*Senecio jacobaea*	-	-	-	A
Carolina horse-nettle	*Solanum carolinense*	B	-	-	-
White horse-nettle	*Solanum elaeagnifolium*	B	-	-	-
Sow thistle	*Sonchus arvensis*	A	-	X	C
Johnson grass	*Sorghum halepense/S. almum*	C	X	-	C
Austrian peaweed	*Sphaerophysa salsula / Swainsona salsula*	A	-	-	-
Medusahead	*Taeniatherum caput-medusae*	B	X	-	A
Salt cedar (tamarisk)	*Tamarix spp*	C	X	X	B
Common tansy	*Tanacetum vulgare*	-	-	X	B
Puncture vine	*Tribulus terrestris*	C	-	-	C
Moth mullein	*Verbascum blatteria*	-	-	-	B
Common mullein	*Verbascum thapsus*	-	-	-	C
Syrian bean caper	*Zygophyllum fabago*	A	-	-	-

Sources: Colorado Department of Agriculture No Date; Nevada Department of Agriculture 2005; Utah Department of Agriculture and Food 2008; Wyoming Department of Agriculture No Date.

[1] The following weeds are officially designated and published as noxious by the State of Nevada. All noxious weed species are illustrated by associated categories A, B, or C.

[2] The following weeds are officially designated and published as noxious for the State of Utah, as per the authority vested in the Commissioner of Agriculture under Section 4-17-3, Utah Noxious Weed Act.

[3] The following weeds are officially designated and published as noxious for the State of Wyoming, per the Wyoming Weed and Pest Control Act Designated List (Designated Noxious Weeds .S. 11-5-102 (a)(xi) and Prohibited Noxious Weeds W.S. 11-12-104).

[4] The following weeds are officially designated by the Commissioner for the State of Colorado. Category A species are designated for eradication. Category B species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, develops and implements state noxious weed management plans designed to stop the continued spread of these species. Category C species are species for which the Commissioner, in consultation with the state noxious weed advisory committee, local governments, and other interested parties, will develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans will not be to stop the continued spread of these species but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species.

[5] Bermudagrass shall not be a noxious weed in Washington County, Utah and shall not be subject to provisions of the Utah Noxious Weed Act within the boundaries of the county.

Appendix H
Inventoried Roadless Area and Unroaded/Undeveloped Area Attributes

Appendix H
Inventoried Roadless Area and Unroaded/Undeveloped Area Attributes

There are 25 IRAs and 23 unroaded/undeveloped areas (often overlapping) within the analysis area. These areas listed in **Table 3.15-5**, and shown on **Figures 3.15-9** through **3.15-12**. This appendix contains supporting information regarding the nine IRA natural resources attributes and the six wilderness attributes that apply to both IRAs and unroaded/undeveloped areas as identified in Section 3.15, Special Designation Areas.

Roadless Area Characteristics

1. High quality or undisturbed soil, water, and air;
2. Sources of public drinking water;
3. Diversity of plant and animal communities;
4. Habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land;
5. Primitive, Semi-Primitive Non-Motorized, and Semi-Primitive Motorized classes of dispersed recreation that provide recreation opportunities in areas with wilderness-like attributes but allow mechanized travel;
6. Reference landscapes of relatively undisturbed areas serve as a barometer to measure the effect of development on other parts of the landscape;
7. Natural appearing landscapes with high scenic quality;
8. Traditional cultural properties and sacred sites; and
9. Other locally identified unique characteristics, such as, uncommon geological formations, unique wetland complexes, or social, cultural, or historical characteristics.

Wilderness Quality or Attributes

1. Untrammeled (is the land unhindered and free from modern human control or manipulation?).
2. Natural (are the land's ecological systems substantially free from the effects of modern civilization?).
3. Undeveloped (Is the land essentially without permanent improvements or modern human occupation?).
4. Outstanding opportunities for solitude or primitive/unconfined recreation (Can the land provide a solitary and natural recreation experience?).
5. Special features (Does the land possess special ecological, geologic, scenic, or other significance?). Alternatives that allow surface-disturbing activities such as road and well pad construction could potentially affect special ecological, geologic, or scenic features of an IRA.
6. Manageability (Can the land be managed to meet the wilderness size criteria of 5,000 acres?).

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
Region II		
Ashley National Forest *Sources:* *USFS, 2008. DRAFT Potential Wilderness Report for Forest Plan Revision for the Ashley National Forest. Available at: https://fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5276928.pdf. Last accessed January 24, 2013.* *UDWR GIS files for big game, USFWS files for sage grouse.*		
IRA#401009 / Alkali Canyon URUD	30,356 / 16,885	**Soils/Water/Air:** Water contributes to the Duchesne River instream flows and supplies spring and pond water for grazing. **Diversity of plant and animal communities:** Pinyon pine, Douglas-fir, and juniper in north, canyon walls, and southern drainages. Tops of southern plateaus contain sagebrush and grass with areas of mountain mahogany. High value winter range for deer and elk, summer habitat for pronghorn, also provides migration corridors. Contains broodrearing, occupied and winter Greater sage grouse habitat. **Landscape character and scenic integrity:** Moderate natural integrity/appearance due to grazing and vegetation treatments; the character has effects from spring developments, stock ponds, and range fences, oil and gas wells, a few unclassified roads, and motorized uses allowed through travel variances. The sights, sounds, and smells from motorized activities on nearby roads also affect the character. Several spring developments, stock ponds, and fences are located in the central and southern portion of the potential wilderness area, and a fence follows the boundary with Uintah and Ouray tribal lands. Motorized access to developments is allowed for maintenance. Portions of six oil and gas leases cover parts of the potential wilderness area, and applications for exploratory wells have been filed. Several plugged and abandoned oil and gas wells are within or immediately adjacent to the potential wilderness area. **Heritage resources:** Prehistoric sites show features that may be vision quest or ceremonial sites, with religious or traditional cultural property significance. **Solitude and primitive recreation:** The area is mapped as 6,354 acres (38 percent) semi-primitive non-motorized, 8,168 acres (48 percent) semi-primitive motorized, and 2,363 acres (14 percent) roaded natural ROS classes. Most recreational activities take place along the western and eastern boundaries and in Alkali Canyon along roads. The majority of the potential wilderness area does not draw visitors, due to lack of attractions and access routes. ATV use is restricted to roads excluded from the potential wilderness area. The potential wilderness area is open to cross country over-snow motorized vehicle travel. Such use in the area is infrequent. Some snowmobiling occurs along the southern boundary on roads and areas bordering Bad Lands Cliffs and Argyle Canyon. Encounters with others are common in the area, especially along the boundaries and near excluded road corridors. There may be opportunities for solitude in the north-central part of the area, but the terrain and vegetation offer little to attract visitors. **Special features:** No other unique characteristics. **Manageability:** The area is about 4 miles across at its widest east-west span, and has only a few sections on the north which are more than a mile from a road due to the locations of roads in excluded corridors. Most of the boundary can be located but may be difficult to enforce. Adjacent roads and roads in excluded corridors provide for visitor access but also add to potential conflict with other recreation uses and resource demands. Manageability would be somewhat difficult dues to edge effects.
IRA #0401010 / Sowers Canyon East URUD	21,869 / 17,028	**Soils/Water/Air:** Water contributes to the Duchesne River instream flows and supplies spring and pond water for grazing. One impaired stream (Sowers Creek). **Diversity of plant and animal communities:** High value winter range for deer and elk, summer habitat for pronghorn, also provides migration corridors. Contains broodrearing, occupied and winter Greater sage grouse habitat. Drainages are covered with sparse pinyon pine, Douglas-fir, and juniper; plateaus at lower end of canyon contain dense pinyon-juniper. Areas of grasses and mountain mahogany are intermixed with conifers. **Landscape character and scenic integrity:** The area has effects to natural systems from livestock grazing and vegetation treatments: The area has effects from fences, water developments for grazing, gas wells; and sights, sounds, and smells of motorized activities on nearby roads and trails. A 230 kV electrical transmission line and right-way along the full length of Sowers Canyon is excluded from the potential wilderness area. Several spring developments, stock ponds, and fences are located throughout the area, and a fence follows the northern and southern boundaries. Motorized access to developments is allowed for maintenance. **Heritage resources:** Surveys show both historic and prehistoric activity in the area. **Solitude and primitive recreation:** The area is mapped as 4,006 acres (22 percent) semi-primitive non-motorized, 9,573 acres (57 percent) semi-primitive motorized, and 3,449 acres (21 percent) roaded

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		natural ROS classes. Recreational activities mostly occur along the Sowers Canyon road at the forks of drainages to the canyon. The upper areas of the potential wilderness are used very little due to steep terrain and limited access by roads and trails. Some excluded roads are open to ATV use. The area is open to cross country over-snow motorized vehicles. Snowmobiling activity is very light and occurs mainly along the southern boundary of the potential wilderness area. The opportunities are good due to the limited recreation pressure, non-motorized Trail 101 in Clem Hollow, the screening effects of terrain, and the part of the area with little influence from motorized activities. There are influences from motorized activities along the boundary and excluded roads (including Sowers Canyon road) which detract from the overall opportunities. **Special features:** No other unique characteristics. **Manageability:** The area would be difficult to manage as wilderness. Boundaries on all but the north follow road corridors and have penetrating excluded road corridors off of them, where exploratory gas wells, power lines, wildlife projects, and motorized recreation activities are common. The area is unlikely to be combined with the adjacent Cottonwood potential wilderness area due to the Sowers Canyon road and power line between the areas, and conflicting activities are dispersed throughout the area so boundary changes are unlikely to improve manageability.
IRA #0401011 / Cottonwood Canyon URUD	30,039 / 25,989	**Soils/Water/Air:** Water contributes to the Duchesne River instream flows and supplies spring and pond water for grazing. One impaired stream (Left Fork Indian Canyon). **Diversity of plant and animal communities:** High value winter range for deer and elk, summer habitat for pronghorn, also provides migration corridors. Contains broodrearing, occupied and winter Greater sage grouse habitat. Dense mixed conifer dominated by Douglas fir on north slopes with grass sagebrush and mountain mahogany on less steep slopes. **Landscape character and scenic integrity:** The area has moderate integrity, with effects to natural systems from livestock grazing, vegetation treatments. The area has been affected by fences, water developments for grazing, gas well sites, and the sights, sounds, and smells of motorized activities nearby roads and trails yearlong. A 230 kV electrical transmission line and right-way along the full length of Sowers Canyon. A communication site is located at the summit of Left Fork Indian Canyon immediately adjacent to the western boundary. **Heritage resources:** Evidence of prehistoric activity but no cultural sites found. **Solitude and primitive recreation:** The area is mapped as 8,880 acres (34 percent) semi-primitive non-motorized, 4,305 acres (17 percent) semi-primitive motorized, and 12,804 acres (49 percent) roaded natural ROS classes. Recreational activities mostly occur along the canyon bottoms along roads. The rest of the potential wilderness area is used very little due to steep terrain and limited access routes. Some excluded roads are open to ATV use. The area is open to cross country over-snow motorized vehicles. Snowmobiling activity is very light and occurs mainly along the southern boundary of the potential wilderness area. The opportunities are excellent in some parts of the area due to the limited recreation pressure, the screening effects and challenge of the terrain in the canyon areas where there is no motorized use. There are influences from motorized activities along the boundary and excluded roads (including Sowers Canyon road) which detract from the overall opportunities. **Special features:** No other unique characteristics. **Manageability:** The area would be difficult to manage as wilderness. Boundaries on all but the north follow road corridors and have penetrating excluded road corridors off of them, where exploratory gas wells, power lines, wildlife projects, and recreation activities are common. Different boundaries would not resolve conflicts with oil and gas leases or other activities. The area is unlikely to be combined with the adjacent Sowers Canyon area due to the Sowers Canyon road and power line.
401012/ Right Fork Indian Canyon URUD/ First Canyon URUD	46, 312/ 37,447 / 6,725	**Soils/Water/Air:** Water contributes to the Duchesne River instream flows and supplies spring and pond water for grazing. **Diversity of plant and animal communities:** High value winter range for deer and elk, summer habitat for pronghorn, also provides migration corridors. South Fork Avintaquin Creek contains a wild population of Colorado River cutthroat trout. Contains broodrearing, occupied and winter Greater sage grouse habitat. Vegetative cover in the Right Fork Indian Canyon URUD is a broad mosaic with areas of Douglas-fir dominated mixed conifer forests; pinyon pine/juniper; shrub dominated areas with mountain mahogany, bitterbrush, and sagebrush; and grasslands with or without shrubs. Aspen is present in many locations. Within the First Canyon URUD, on the south ridges the vegetation includes a subalpine fir and Douglas-fir mix along with sagebrush and grass communities including spiked big sagebrush in late spring snow beds. The forest transitions to mixed conifers with aspen near the canyons, and to grasses and shrubs on steep southern aspects. **Landscape character and scenic integrity:** Right Fork Indian Canyon URUD area has moderate integrity, with effects to natural systems from livestock grazing, vegetation treatments. The area has been affected by fences, water developments for grazing, inactive and active gas well

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		sites near the boundaries, several excluded road corridors, and sights, sounds, and smells of motorized uses on nearby roads by full size and trail vehicles yearlong. However, some parts of the area are removed from the influences of roads and road-based activities. The natural integrity of the First Canyon URUD is high, with minimal effects from livestock grazing and other activities. The minor effects to the character are from allowed motorized uses on excluded and boundary roads, a range fence along the northern boundary, spring developments, and three unclassified roads with a total length of one mile. **Heritage resources:** Private lands in Right Fork Indian Canyon URUD canyon bottom suggest some early 19th century homesteading in the area. Surveys have not revealed any prehistoric sites. There is potential for locating historic tribal camps in the First Canyon URUD; however, surveys have not revealed any prehistoric sites. **Solitude and primitive recreation:** Fork Indian Canyon URUD opportunities are excellent in some parts of the area due to the limited recreation pressure, the screening effects and challenge of the terrain in the canyon areas where there is no motorized use. Wilbur and Lake Canyons have popular trails for nonmotorized use to Gray Head Peak and connecting to Reservation Ridge Backway. There are influences from motorized activities along the boundary and excluded roads which detract from the overall opportunities. The First Canyon URUD is narrow and affected somewhat by the infrequent road uses along the boundary. Some areas have views of surrounding developments. The topography and vegetation provide areas of isolation, particularly in canyons. **Special features:** No other unique characteristics. **Manageability:** The Fork Indian Canyon URUD would be difficult to manage as wilderness. Boundaries on all but the north follow road corridors and have penetrating excluded road corridors with exploratory gas wells, wildlife projects, and dispersed recreational activities along them. Different boundaries would not resolve conflicts due to the many excluded road corridors. Boundaries of the First Canyon URUD can be described; however, would be difficult to manage as wilderness due to its small size and several road corridors, and motorized uses on interior and boundary roads.
401013/ Mill Hollow URUD	11.892 / 6,128	**Soils/Water/Air:** Water contributes to the Duchesne River instream flows and supplies spring and pond water for grazing. **Diversity of plant and animal communities:** High value winter range for deer and elk, summer habitat for pronghorn, also provides migration corridors. South Fork Avintaquin Creek contains a wild population of Colorado River cutthroat trout. Contains broodrearing, occupied and winter Greater sage grouse habitat. On the south ridges the vegetation includes a subalpine fir and Douglas-fir mix along with sagebrush and grass communities including spiked big sagebrush in late spring snow beds. The forest transitions to mixed conifers with aspen near the canyons, and to grasses and shrubs on steep southern aspects. The north facing slopes are mostly covered with Douglas-fir and mixed pinyon pine and juniper. Upper slopes support a shrub mix, including mountain mahogany, bitterbrush, and sagebrush. The steepest south facing slopes have grasses and shrubs. **Landscape character and scenic integrity:** Livestock grazing and recreational hunting are the most common uses. The natural integrity is high, with minimal effects from livestock grazing and other activities. The minor effects to the character are from the allowed motorized uses on excluded and boundary roads, a range fence along the northern boundary, and spring developments in the south and west. **Heritage resources:** There is potential for locating historic tribal camps. Surveys have not revealed any prehistoric sites. **Solitude and primitive recreation:** The area is narrow and affected somewhat byte infrequent road uses along the boundary. Some areas have views of surrounding developments. The topography and vegetation do provide areas of isolation, particularly in canyons. One system trail traverses the northern portion of the area from Reservation Ridge to the lower end of Mill Hollow. **Special features:** No other unique characteristics. **Manageability:** The boundaries can be described, however the area would be difficult to manage as wilderness due to its small size, excluded road corridors, and motorized activities in corridors and along the boundaries which result in motorized settings across the area.

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
Fishlake National Forest **Sources:** *USFS 2006. Fishlake OHV Route Designation Project, Final Specialist Report/Undeveloped Character. Available at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm9_019886.pdf. Last accessed January 24, 2013.UDWR GIS files for big game, USFWS files for sage grouse.*		
Browns Hole URUD	0. / 8,212	**Summary of Wilderness Quality or Attributes**: Located about 15 miles east of Salina. Bordered by Highway 70 to the north and agricultural lands and roads to the west/south; non-USFS lands to the east. Mountain area bisected by USFS roads, particularly on ridges. Data are not available to document outstanding opportunities for solitude or primitive and unconfirmed recreation. Relative small size may make preservation and use in an unimpaired condition less practicable.
Moroni Peak URUD	0 / 10,890	**Summary of Wilderness Quality or Attributes**: Bordered by Highway 70 to the north/northeast. Abuts two IRAs to the south and west and one URUD to the southeast. Valleys contain several roads and trails. Data are not available to document outstanding opportunities for solitude or primitive and unconfirmed recreation. The size is sufficient to make practicable its preservation and use in an unimpaired condition.
Mt Terrill URUD	0 / 30,035	**Summary of Wilderness Quality or Attributes**: Medium natural integrity due to fire suppression, invasive species and overgrazing; effects to undeveloped character from roads and motorized routes and private land development; opportunities for primitive recreation near Mt. Marvin, but not necessarily solitude due to motorized routes and sights and sounds of Fishlake basin; special features include unique plant species and genetically pure cutthroat trout; medium manageability due to numerous cherry-stemmed roads and motorized trails.
North Pavant IRA/URUD	53,232 / 64180	**Soils/Water/Air:** No impaired streams. **Diversity of plant and animal communities:** Contains crucial winter habitat for mule deer and elk. No USFWS critical habitat. Dominant vegetation is the in the Wasatch mountain ecoregion are mountain shrub, mixed conifer and pinyon-juniper. Continued grazing and fire exclusion have allowed pinyon-juniper expansion (SWCA 2007). **Landscape character and scenic integrity:** Rugged mountain areas. Some changes to natural integrity/appearance due to grazing and vegetation treatments; effects to undeveloped character from grazing, and motorized activities. Bordered by agricultural lands to the east; foothills, highway 15, and Town of Scipio to the north; foothills with numerous trails, Highway 15 and the Town of Holden to the west. To the south, the ridgeline from jack's Peak to coffee Peak is excluded from the IRA/URUD area. **Heritage resources:** Unknown**. Solitude and primitive recreation:** Opportunities solitude and primitive recreation but proximity to town and developed areas and excluded roads detract from overall opportunities. **Special features.** No other unique characteristics. **Manageability:** May be difficult to manage as wilderness at IRA/URUD edges and excluded roads due to high potential for unauthorized UHV use.
Oak Creek IRA/URUD	16,755 / 78,296	**Summary of Wilderness Quality or Attributes:** Contains crucial winter habitat for mule deer. No USFWS critical habitat. No impaired streams. Data are not available to document outstanding opportunities for solitude or primitive and unconfirmed recreation. The size is sufficient to make practicable its preservation and use in an unimpaired condition.
Oak Ridge URUD	0 / 12,478	**Summary of Wilderness Quality or Attributes:** Natural integrity lessened by pinion-juniper encroachment and cattle grazing. No impaired streams. Undeveloped character compromised by numerous roads and trails. Solitude and primitive recreation impacted because of size and shape, motorized use in the area and sights and sounds of agricultural areas to the east, contains portions of the Great Western Trail (trailhead is excluded from the URUD area). Manageability compromised by small size, trails, and uses along excluded roads and areas. Data are not available to document outstanding opportunities for solitude or primitive and unconfirmed recreation. The size is sufficient to make practicable its preservation and use in an unimpaired condition.
The Rocks URUD	0 / 6,266	**Summary of Wilderness Quality or Attributes:** No impaired streams. Natural integrity lessened by pinion-juniper encroachment and cattle grazing, medium undeveloped character, contains numerous roads and trails. Opportunities solitude and primitive recreation lessened because of relatively small size and shape, motorized use in the area and sights and sounds of agricultural areas to the east. There are no special features; manageability compromised by small size, trails, and uses along excluded roads and areas.

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
Manti-La Sal National Forest *Sources:* *USFS, unpublished. Undeveloped Character Specialist Report for the Mani-La Sal National Forest. Available upon request.* *UDWR GIS files for big game, USFWS files for sage grouse.*		
Boulger-Black Canyon IRA/URUD	23,266 / 24,430	**Soils/Water/Air:** Watersheds within the unit provide irrigation, power generation, and community water supplies for Castle Dale and Orangeville and Spring City. No impaired streams. Water collection ditches and tunnels for trans-mountain water diversions exist in the heads of each major drainage. Black Canyon and Reeder canyon supply water for culinary water and irrigation for private land in Joes Valley, Orangeville, CastleDale, and energy production at the Huntington Power Plant. **Diversity of plant and animal communities:** Pinyon-juniper and Gambel oak-curl-leaf mountain mahogany at lower elevations; aspen-meadow, Douglas-fir and spruce fir communities and forb- grass communities at the highest elevations. Critical summer and high value winter habitat for Rocky Mountain elk, high value summer and high value winter habitat for mule deer, important calving/fawning, rearing, and winter habitat for big game. Contains broodrearing, occupied and winter Greater sage grouse habitat. Aspen/mixed conifer habitat supports a variety of raptor species including northern goshawk and serves as nesting and foraging habitat. Wildlife also includes mountain lion, black bear and snowshoe hare. The area includes wetlands off of Middle Mountain Road. Riparian areas are well developed but larger channels are still recovering from the 100-year flood events. The spruce trees over 6" in diameter are dead, dying or at risk of mortality from the ongoing spruce beetle epidemic on the Manti Division. Tarweed, an undesirable native plant dominates the head of Reeder Canyon and a small area of Black Canyon. **Landscape character and scenic integrity:** The area appears natural in many areas however, evidence of past timber activities is present in the form of over grown trails and old mills. Forest System Road 054 affects the integrity of the area. A boundary adjustment north Reeder Ridge Road would improve the integrity of the area. The integrity and appearance of the Black Canyon area is maintained. The Reeder Canyon OHV trail cuts through the southern third of the area. **Heritage resources:** Area contains NRHP-eligible prehistoric archaeological sites. Paleontological values are known to be present. Remnants of a historic sawmill can be found in Black Canyon and Reeder Canyon Trail. **Solitude and primitive recreation:** The area is surrounded by roads and some private lands. The surrounding area is heavily used by recreationists. To the West is Skyline Drive, a portion of the Great Western Trail. To the east lies Middle Mountain and Upper Joes Valley. Potter's Ponds Developed Recreation Site borders the area and is extremely popular for hunting, camping and fishing. URUD area includes approximately 14 miles of motorized trail and 9 miles of non-motorized trail and a popular developed recreation area. Opportunity for solitude is limited because of accessibility down the ridges. The spruce fir stands on north-facing slopes could provide some solitude, however noise from routes surrounding the area is noticeable in some areas. The Black Canyon interior area can provide a sense of solitude. Several miles of hiking and OHV trail traverse the area from Miller's Flat to Skyline Drive. The non-motorized trails could provide a primitive recreation experience. Primitive camping is available throughout the area. **Special features:** The Reeder Canyon trail, part of the Arapeen Trail System, is popular among the local off-highway vehicle (OHV) community. **Manageability:** Manageability of the area for wilderness is fair due to natural boundaries and owning to the intrusions and the accessibility at the top of the unit. Intrusions from west are short other than the Black Canyon road. The canyon entrances could be controlled and topography would control the rest.
Cedar Knoll IRA/URUD	22,483 / 28,349	**Soils/Water/Air:** Watersheds within the unit provide irrigation and community water supplies for Spanish Fork and Utah County. Landslides resulting from the floods of 1983 altered portions of the area. **Diversity of plant and animal communities:** Areas below 6,500 feet covered by sagebrush-grassland vegetation types, higher elevations contain climax pinyon-juniper and oak-mountain brush communities, with mixed conifer and spruce forest types on north facing slopes. Critical winter habitat for mule deer as well as high value winter/spring and spring/fall habitat for both mule deer and elk. The area is an important transition range and migratory corridor to winter range habitat for big game. Oak brush supports a diversity of small mammals and migratory birds. **Landscape character and scenic integrity:** Overall low rating for natural integrity/appearance. Historic and current activities such as rangeland treatments, fencing, OHV use, and fire suppression have altered the appearance and integrity of the area. Landslides resulting from the floods of 1983 altered portions of the area and are revegetating. The Birdseye quarry is located on the border of the area and was mined for metamorphosed oolitic limestone. Several mining claims have been visibly posted in the area. A transmission line lies just outside the western edge of the URUD area and a pipeline lies just to the south. The area contains water collection ditches

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		for Smiths Reservoir. The area is receiving increased pressure from off-highway vehicle (OHV) uses. Fences and water developments from grazing are present. The area is bounded by private lands and roads. Treatments are needed to limit and/or reduce the spread of noxious weeds. **Heritage resources:** Prehistoric and historic cultural values are presumed to be present, but area has not been inventoried. **Solitude and primitive recreation:** Heavy recreation use occurs in the fall, as it is a popular area for hunting. Illegal ATV use is occurring and has had an effect on the area. The public has opened several new trails. Approximately 5.2 miles of motorized trail and 19 miles of non-motorized are included in this area, as well as dispersed camping areas. The vegetative composition and density does not provide much seclusion. Sights and sounds of traffic from Highway 89 and an occasional train are present into the interior of the area. Only the deep interior area within the Cedar Knolls unroaded and undeveloped area provides the solitude experience. Trails for hiking are present within the area. If the area were designated wilderness the existing motorized trails could be converted to hiking trails with some reclamation work to convert double-track trails to single-track. Opportunities for hunting and wildlife viewing remain present. **Special features:** There are some red colored soils and rock formations in the Lake Fork Drainage. **Manageability:** The areas manageability as a wilderness is compromised by the unauthorized OHV use on trails open only to mechanized and non-motorized uses. Additionally OHV users have created a few segments of unauthorized trails off of FR070. Approximately 11 miles of unauthorized OHV routes have been identified in this area. The juniper, oak, and other vegetation of the area and rolling terrain does not provide a sufficient barrier to prevent unauthorized intrusions especially along trails and fence lines. Overall rating is low.
Coal Hollow IRA/URUD	6,264 / 7,094	**Soils/Water/Air:** Watersheds within the unit provide irrigation and community water supplies for Spanish Fork and Utah County. **Diversity of plant and animal communities:** Vegetation ranges from climax pinyon-juniper and oak mountain through brush communities at lower elevations to aspen forb-grass communities at the highest elevation. Mixed conifer and spruce occur on north facing slopes. Noxious weeds are an issue within the area. Critical winter habitat for mule deer as well as high value winter/spring and spring/fall habitat for both mule deer and elk. This area is an important transition range and migratory corridor to winter range habitat for big game. Oak brush supports a diversity of small mammals and migratory birds. **Landscape character and scenic integrity:** The area appears relatively natural. The integrity of the area is compromised by unauthorized OHV routes, fence lines and water developments. There are livestock water developments in the area that require periodic heavy maintenance or reconstruction. Noxious weeds are an issue within the area. Prevalent species include musk thistle, whitetop, knapweed, and scotch thistle. **Heritage resources:** Prehistoric and historic cultural values are presumed to be present, but area has not been inventoried. **Solitude and primitive recreation:** Flat streamside areas adjacent to Forest Road #070 in Lake Fork Canyon receive moderate to heavy dispersed recreation use from early May through the fall hunting seasons. Most recreationists come from nearby communities in Utah County and are primarily participating in camping and OHV riding. Approximately 8 miles non-motorized trail, and dispersed camping. OHV use is common along roads bordering the area. Opportunity for solitude is poor because general vegetative composition and density does not provide much cover and seclusion. The entire area is subject to the sights and sounds of the trains and traffic along the US 6 corridor as well as the traffic on the roads along the majority of the border. Much of the southern area is less than a mile wide which also limits seclusion. Opportunities for hiking and equestrian use are limited to a small amount of trail. The small size and shape of the area limits any real primitive experience. **Special features: N**o special features. **Manageability:** Manageability of the area for wilderness is fair to poor. The pinyon-juniper and Gamble oak vegetation types and moderate slopes are not effective barriers to unauthorized OHV travel. Unauthorized OHV activity is present along fenced allotment boundaries. The northern edge is bounded by private lands and activities on these lands can impact the area.
East Mountain IRA/URUD	30,680 / 28,302	**Soils/Water/Air:** Watersheds within the unit provide irrigation and community water supplies for Huntington and other Emery County communities. The area is a significant contributor of water for communities, agriculture and industrial users in Emery County. Two springs are developed for community systems by the road corridor in Rilda Canyon. Springs are developed for public and administrative use above Forks of Huntington Campground and Stuart Guard Station. Each is located within the Candland Mountain area. Soil stability is good throughout with the exception of the steep headwalls. **Diversity of plant and animal communities:** Vegetation ranges from climax pinyon-juniper communities at lower elevations through Gambel oak, sagebrush, curl-leaf mountain mahogany, forb, grass, and aspen communities. Spruce, white fir, Douglas-fir and subalpine fir occur on north facing slopes or in canyon bottoms. Critical summer habitat for elk, high value summer habitat for mule deer, and important calving/fawning and rearing habitat for big game. Contains broodrearing, occupied and winter Greater

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		sage grouse habitat. Raptors include golden eagles and northern goshawk. Mountain lions and black bear frequent this unit as well as small mammals and birds. Scad Valley Creek has a pure strain of Colorado River cutthroat trout. The Mont E. Lewis Botanical area in Scad Valley is a montane cold-calcic spring and meadow that contains approximately 200 identified plant species. **Landscape character and scenic integrity:** This area contains approximately 30 miles of non-motorized trail which include the Left Fork of Huntington National Recreation Trail. Telemetry sites are present on Candland Mountain. The appearance of the area appears intact in most areas. Subsidence from coal mining is evident in some areas as crevices. The integrity of the area is mostly intact in the Candland Mountain area. A couple of roads are cherry-stemmed into the area for trail access and coal mining. The integrity is best north of Crandall Canyon where intrusions are limited. Historic grazing has affected vegetation composition in isolated spots. Sheep herder camp trailer adjacent existing classified roads is important for sheep control. Spruce trees over 6" in diameter are dead, from the ongoing spruce beetle in the area. The area has been extensively mined using underground mining methods. **Heritage resources:** Prehistoric and historic cultural values are presumed to be present, based on adjacent areas. **Solitude and primitive recreation:** The area is surrounded by private lands, state highways, and Forest Service system roads. East of the area lies the Huntington-Eccles Scenic Byway. This corridor is the main route crossing the Manti Division and is used heavily as an access to the forest, for coal access/transport, by tourists, and by anglers. To the west lies the Miller's Flat/Upper Joes Valley area. This area is one of the most popular areas on the forest. The area is used heavily by motorized and non-motorized recreationists. Opportunity for solitude is influenced by the industrial traffic noise along SR 31 and recreation traffic on Miller's Flat Road. Noise from coal mining exhaust fans decreases the feeling of solitude in the area. The southeastern canyons in the area are affected by the influences of coal mining. The Left Fork of Huntington Trail, Horse Creek, and Candland Mountain provide the highest degree of solitude in the area. Primitive recreation, such as camping, hunting, hiking, climbing, or cross-country skiing and seeing nature relatively undisturbed, is good in the northern half of the area. South of Crandall Canyon fewer trails exist. **Special features:** Special features include the Huntington National Recreation Trail, hunting, fall foliage, the geologic structure exposed by erosion in the canyons. The Mont E. Lewis Botanical area in Scad Valley is a montane cold-calcic spring and meadow that contains approximately 200 identified plant species. Several of the plant species are rare and only occur on a few sites. **Manageability:** Manageability for wilderness varies due to the cherry-stemmed access routes up several of the canyons and the private land that borders portions of the area. From Crandall Canyon north, the area is relatively unencumbered and has few intrusions, and could be managed as an unroaded and undeveloped area. Boundaries are easily identifiable. There are a few user-created routes particularly on the south end but the topography limits the use.
Nuck Woodward IRA Nuck Woodward-Gentry Mountain URUD	12,071/ 24,567	**Soils/Water/Air:** Watersheds within the unit provide irrigation and community water supplies for Carbon County, Huntington city, and other Emery County community water supplies. Three water sources for community systems are included in the area. Numerous constructed ponds and spring developments with troughs are scattered throughout the area. One irrigation water diversion is located in Bob Wright Canyon near the forest boundary. **Diversity of plant and animal communities:** The dominant vegetation type is aspen intermixed with sagebrush. Dense spruce-fir communities dominate north facing slopes while oak and mountain brush are found on the eastern edge of the area. There are well developed riparian areas with willows, Carex and sedges. High value summer habitat for mule deer and critical summer and high value winter for elk. Important for fawning/calving and rearing for deer and elk. Large carnivores such as black bear and mountain lion traverse this unit. Many small mammals and raptor species and including golden eagles can be seen here. Riparian habitat is host to a wide array of species including migratory birds. Tie Fork Creek has a core population of Colorado River cutthroat trout. **Landscape character and scenic integrity:** Historic and current use, as well as the acts of nature altered the area outside of the canyons so that it has lost some of its natural appearance and to some extent the integrity. The integrity of the area is maintained on the steep slopes-and side canyons. Ridges are modified by OHV travel. Harvesting and/or burning of aspen to stimulate regeneration are needed in the area. The spruce beetle outbreak has killed much of the spruce over 6". **Heritage resources:** Some NRHP-eligible prehistoric sites are present, but much of the area remains unsurveyed. **Solitude and primitive recreation:** Approximately 24 miles of non-motorized trail and 8 miles of motorized single-track trail (motorcycles and non-motorized uses only) are present in this area. Dispersed camping and off-highway vehicle (OHV) use is common along roads bordering the area. The Pole Canyon and Gentry Mountain trails provide some of the only motorized single-track trail experiences on the Manti Division. Opportunity for solitude is fair within the northern half of the area (Nuck Woodward area), owing to the aerial extent and the

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		isolated stands of dense timber. There are 24 miles of non-motorized trail opportunities. Opportunity for solitude is fair in the southern half (Gentry Mountain area). The Gentry Hollow and Pole Canyon motorized trails and influences from SR 31 affect the feeling of solitude in these drainages. Away from motorized corridors the sense of solitude is good owing to topography and vegetation. Opportunities for primitive recreation exist in the area. There are several miles of single-track trail that are suitable for hiking and equestrian use. The trails are currently shared with mountain bikes and two trails are open to motorcycles. **Special features:** Special features include the eastern escarpment of the Wasatch Plateau, and views into Castle Valley. **Manageability:** Manageability of the area for wilderness is fair to poor. The rugged terrain in the canyons is easily manageable, however the large flat ridges and rolling uplands are readily accessible to OHV use, and is crossed with unclassified roads and roads used for coal and gas exploration.
Oak Creek IRA/URUD	16,755 / 5,349	**Soils/Water/Air:** Watersheds within the unit provide irrigation and community water supplies for the City of Milburn and Sanpete County. Watershed treatments may be needed to maintain supply and quality of water. Class II Airshed. Slope failures in the mid-1980s caused stream channel damage and impacted community and irrigation water supplies at Milburn specifically, and Sanpete Valley generally. **Diversity of plant and animal communities:** Vegetation ranges from climax pinyon-juniper woodland at lower elevations through oakbrush and mountain brushland to aspen, forb-grass communities at higher elevations. Mixed conifer stands occur on north facing slopes throughout the unit. Contains designated critical summer, high value spring/fall, and high value winter/spring habitat for elk and critical winter, high value spring/fall, and high value winter/spring for mule deer which is important transition range, winter range, and fawning/calving habitat for these species. The oak brush and mountain brush is also important for black bear and mountain lion and many small mammals and migratory birds. Many raptor species and their prey can be found in this unit. **Landscape character and scenic integrity:** Unauthorized ATV use along the east boundary of the unit adjacent to the Skyline Drive has had some impact. Medium natural integrity/appearance, due to historic and current uses (primarily grazing and OHV use) and some slope failures. Grazing is a primary use in the area; livestock water development and fences required periodic maintenance. Historic and current uses, as well as the acts of nature, have altered the vegetative composition of the area so that it may appear unnatural to a trained observer. The integrity of the area is moderately well maintained. **Heritage resources:** Prehistoric and historic cultural values are presumed to be present, but much of the area has not been inventoried. Historic mill sites are present in the area and prehistoric archaeological sites associated with seasonal use of the area. **Solitude and primitive recreation:** The terrain is steep and inaccessible by roads; therefore very little public use occurs here except hunting in the fall. There is a limited amount of hiking in the non-motorized trail that goes up the bottom of Oak Creek and some recreational horseback riding. Snowmobiling occurs frequently on top of the included ridges. Opportunity for solitude varies by location. The steepness of the slope and the short vegetation make it difficult to obtain a full sense of seclusion on most of the area. Roads surround the valley that the area occupies. Sights and sounds from these roads could affect the sense of solitude. Overall rating of medium. Primitive recreation, such as camping, hiking, climbing, or cross-country skiing and seeing nature undisturbed is possible. Overall rating of medium. **Special features:** no special features. **Manageability:** The Oak Creek non-motorized trail #053 bisects this area. Manageability of the area for wilderness is generally good, owing to the dense vegetation and steep slopes. Unauthorized OHV use and dispersed camping impacts portions of the area. The Oak Creek non-motorized trail #053 bisects this area. This trail is receiving heavy pressure from motorized users and has been illegally converted in some sections to an ATV (52") trail width. This is an ongoing management challenge.
Sanpitch IRA/URUD	29,107 / 21,680	**Soils/Water/Air:** Watersheds within the unit provide irrigation and community water supplies for Levan, Nephi, and Juab County. Class II airshed. "During the wet years of 1983 and 1984 there was significant earth movement within the unit. We believe there may be additional needs for terracing and other types of stabilization work within the unit." (Juab County 2004). **Diversity of plant and animal communities:** Vegetation ranges from climax pinyon-juniper communities at lower elevations through mountain brush-Gambel oak communities to sagebrush-forb/grass communities at the highest elevation. Mixed conifer communities are found on north slopes, and aspen communities are scattered throughout. Habitat for several fish and wildlife species is found within the unit. The Utah Division of Wildlife Resources identified the following wildlife habitat within the area: Rio Grande turkey critical spring/summer/fall habitat, snowshoe hare habitat, ruffed grouse habitat, blue grouse habitat, mule deer high value spring/fall/winter habitat, moose critical year long and high value winter habitat, Rocky Mountain elk spring/fall/winter habitat, black bear habitat of high value. **Landscape character and scenic integrity:** The area, though extensively used by man historically for

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		grazing and hunting, shows little evidence of man's presence, except for vegetative changes, two track roads, and occasional campsites. Medium natural integrity/appearance, due grazing, hunting and mineral exploration; livestock use 5000 animal unit month (AUM)'s occurs on 15,000 suitable acres within the area. There are 8.0 miles of fence, and 12 water developments that require heavy maintenance or reconstruction during a 20 year period. Reseedings are apparent adjacent west of the Old Pinery Springs in section 24 T13S, R1E. Overall rating is medium. **Special features:** special features include the Red Cliffs overlooking Nephi; medium manageability, impacted somewhat by roads around and within the area. **Heritage resources:** Lithic scatters, projectile points, and ancient campsites, have been identified in the area, but the area has not been fully inventoried. **Solitude and primitive recreation:** Approximately 27 miles of non-motorized trail traverse the area. Recreation consists of hunting in the fall. A few people drive the Red Cliffs Road FR 127, which cherry-stems into the northern part of this area on the north end to partake of the scenic views, with 4-wheelers or high-clearance vehicles; however, because of the remoteness of the area, visitor use has been limited. Opportunity for solitude is fair owing to the vegetative density and height, except on the steep western slopes where vegetation is short or absent and provides inadequate cover. Many of the surrounding communities and travel corridors can be viewed from the area. Overall rating is medium. Primitive recreation such as camping, hiking, climbing, or cross-country skiing and seeing nature undisturbed is possible away from the ridges, and could be developed on the ridges by road closure and site rehabilitation. Many miles of non-motorized trails cover the area. Overall rating is medium. **Manageability:** The area is very steep and rugged. Manageability of the area for wilderness is good on the steep slopes. Ridges in the area have a low manageability due to unclassified routes from unauthorized uses and old chaining projects. “Because of the roads around and within the area, management would be difficult or impossible”. (Juab County 2004) Overall rating is medium.
Uinta National Forest Sources: *USFS 2003. Uinta National Forest 2003 Land and Resource Management Plan. Appendix C: Roadless Area Reevaluation and Recommendation For Wilderness. Available by request.* *Earth Justice 2004. Consent to oil and gas leasing in Uinta National Forest Diamond Fork and Tie Fork Roadless Areas. Internet website: http://earthjustice.org/sites/default/files/library/signon/Uinta_NF_leasing_letter.pdf. Last accessed February 2013.* *UDWR GIS files for big game, USFWS files for sage grouse*		
IRA #418008, Chipman Creek	9,359 / NA	**Soils/Water/Air:** Overall low ranking soil, water air. Less than 1% of are in landslide-prone soils. Class II area for air quality with small portion of area in Utah County (non-attainment zone) but sensitive receptors are 70 miles away; contains 398 acres riparian vegetation, contains tributaries to the Strawberry Reservoir which is a 303 (d) listed water body. No diversion points for public drinking water. **Diversity of plant and animal communities**: This roadless area includes important habitat for the greater sage grouse population at Strawberry Valley. The area also provides valuable habitat for a wide variety of other wildlife including mule deer, elk, moose, and black bear. Big game summer range can be found within the area. UDWR has identified this area as a critical spring and summer nursery area for elk. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into other areas such as the Manti-La Sal National Forest to the south or the Ashley National Forest to the east. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. It also provides important habitat for other species, including the sandhill crane (state sensitive/SE), the flammulated owl and northern goshawk (both FS sensitive/SE), the three-toed woodpecker (FS sensitive/PIF priority/SE), and the broad-tailed hummingbird and Brewer’s sparrow (both state sensitive/PIF priority/SE).No TESCP or SE plants have been located within this area. Invasive species are mainly musk thistle and tamarisk (salt cedar); acreage unknown. **Landscape character and scenic integrity:** Much of the area is natural appearing, though there are several roads cherry stemmed within the area on the east and west ends. The potential for oil and gas discovery in this area is high and exploration activities have been conducted in the past. Range improvements are limited to a few water developments associated with permitted sheep grazing. The Deseret Generation and Transmission power line corridor was constructed in 1982, and now forms the southern boundary of the area. Rated as medium high overall. Partial retention on 5,783 acre, retention on 2,809 acres. **Heritage resources:** Rated high; there are several known American Indian camps in this area, and there is moderate potential for finding more. There is similar potential to locate historic herding and logging sites in this area. **Solitude and primitive recreation:** Recreation use primarily occurs during fall big game

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		hunting seasons. Snowmobiling, hiking, horseback riding and wildlife viewing are other activities that are provided in this area. Opportunities for backpacking, hiking, and camping exist. Solitude and primitive recreation: Rated low for opportunities for solitude. Rated low primitive and unconfined recreation opportunities, with the exception of hunting which is rated high. Opportunities for primitive recreation (hiking and primitive camping) within the interior; opportunities for solitude lowered at IRA borders and along excluded cherry-stemmed roads and developed campground because of activity, OHV noise and access ability. **Special features:** Abundance of wildlife, but not other features. **Manageability:** There are no topographic features that would provide manageable wilderness boundaries. Five roads are cherry stemmed within the area and/or very long and deeply intrusive. The area is surrounded by or adjacent to minor roads that separate the area from other undeveloped areas. Overall rating of low manageability due to boundaries that are unrecognizable, do not conform to terrain and do no constitute a barrier to prohibited use. Manageability lowered by unauthorized OHV use along exclosure roads and border roads (including FR #335 road). **Summary**: Most values are low and medium. Heritage resources have a high value.
IRA #418009, Willow Creek	8,049 / NA	**Soils/Water/Air:** Overall high ranking soil, water air. Soil: 11 percent of area lies in landslide prone soils, Air: Class II airshed, Wasatch County (attainment zone), Water: 656 acres of riparian vegetation. No points of diversion for public drinking water. **Diversity of plant and animal communities**: This area provides valuable habitat for a wide variety of wildlife species including elk and black bear. Summer range for big game can be found within the area and some of the area has been designated by UDWR as High Value Winter Range for deer and elk. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into other areas such as the Manti-La Sal National Forest to the south or the Ashley National Forest to the east. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. This area provides important habitat for the northern goshawk and flammulated owl (both FS sensitive/SE), the three-toed woodpecker (FS sensitive/PIF priority/SE), and the broad-tailed hummingbird and Brewer's sparrow (both state sensitive/PIF priority/SE). ii) Plants: Duchesne River twinpod, Skyline ground-daisy, Book Cliffs twinpod, and Utah fescue (all proposed FS sensitive/SE), and Pohl's milkvetch (state sensitive/SE), are located here. Invasive species are mainly musk thistle and tamarisk (saltcedar); acreage unknown. **Landscape character and scenic integrity:** Some of the area is natural appearing. There are several roads that are cherry stemmed within the area on the north and south. The potential for oil and gas discovery in this area is high and exploration activities have been conducted in the past. Range improvements are limited to a few water developments associated with permitted sheep grazing. The Deseret Generation and Transmission power line corridor forms the northern boundary of the area. Rated as medium, with partial retention on 13,774 acres. **Heritage resources:** Approximately 200 acres have been surveyed in this unit, and no heritage sites have been found. There is moderate to high potential for locating American Indian camps and a low potential for locating historic herding sites. **Solitude and primitive recreation:** Recreation use primarily occurs during fall big game hunting seasons. Opportunities for snowmobiling and hiking are also provided. Opportunity for solitude and primitive recreation such as backpacking, hiking, and camping exists. Rated moderate for opportunities for solitude. Rated low to moderate for primitive and unconfined recreation opportunities, with the highest rating being for hunting, fishing and skiing. Opportunities for solitude lowered at IRA borders and along excluded cherry-stemmed roads and developed campground because of activity, OHV noise and access ability. **Manageability:** Overall rating of low manageability due to boundaries that are unrecognizable, do not conform to terrain and do not constitute a barrier to prohibited use. There are several roads that are cherry stemmed within the area on the north and south. **Summary:** Most values are medium and low. The soil, air, and water category has a high value.
IRA #418015, Strawberry Ridge	17,274 / NA	**Soils/Water/Air**: Soils: 7 percent of area lies in landslide prone soils. Air: Class II airshed, primarily in Utah County (non-attainment zone for particulate matter. Water: 278 acres of riparian vegetation. This area contains Sixth Water Creek, a 303(d) listed stream, and also contains several tributaries to Diamond Fork Creek and Strawberry Reservoir, both of which are listed as 303(d). Area contains 3 points of water diversion for domestic purposes; 3 points of water diversion for irrigation purposes. **Diversity of plant and animal communities:** The area provides good summer range for deer and elk. Deer winter in some of the lower elevation areas. Moose and black bear utilize the area occasionally. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into other areas such as the Manti-La Sal National Forest to the south and the Ashley National Forest to the east. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. This area contains known nests and provides foraging habitat for the northern

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		goshawk (FS sensitive/SE). The broad-tailed hummingbird, Virginia's warbler, black-throated gray warbler, and Brewer's sparrow (all state sensitive/PIF priority/SE) are known to inhabit the area, and the area contains known Bonneville cutthroat trout (FS sensitive/SE) populations. It also provides habitat for the bald eagle (threatened/SE), the flammulated owl (FS sensitive/ SE), the Lewis' woodpecker (state sensitive/PIF priority/SE), and the rubber boa and Utah milk snake (both state sensitive/SE). This area also contains potential secondary habitat for the Canada lynx (threatened/SE). Sixth Water Creek, a tributary to Diamond Fork Creek, runs through the northern end of this area. Diamond Fork Creek contains a portion of a Bonneville Cutthroat Trout (FS sensitive/SE) metapopulation. The metapopulation may extend into Sixth Water. There are no known TESCP or other SE plants in this area. Invasive plant species consist of musk thistle, Canada thistle, and hoary cress (whitetop); acreage unknown. **Landscape character and scenic integrity: Ra**ted as medium. The unit has a high natural integrity, being bounded on the top by the ridgeline and the bottom by the base of the slopes. It has a high natural appearance. The potential for oil and gas discovery in this area ranges between high and moderate. Exploratory activities have been conducted in the past to locate these resources. Cattle graze portions of this area where it lies within established allotments. Several range improvements, including fences and troughs, are located within the area. Partial retention: 13,464 acres; Retention: 567 acres. **Heritage resources:** Known European-American livestock herding sites and American Indian camps. **Solitude and primitive recreation:** Recreation use consists primarily of deer and elk hunting in the late fall. Other activities include snowmobiling, hiking, biking, and camping. ATV use is allowed on the West Portal and Ridge Roads that surround the unit. Unauthorized off-road/trail use of ATVs is occurring within the unit. Rated low overall for opportunities for solitude. Opportunities for solitude are few due to the narrow configuration of the area and the proximity to roads. Opportunities for Primitive and unconfined recreation rated high for hunting, moderate for camping and backpacking and low for all other activities. Opportunities for primitive recreation are primarily confined to hiking and horseback riding in the canyon bottoms. The area offers few, if any, challenging experiences. **Special features**: high wildlife, no other features. A portion of the Great Western Trail traverses this unit. **Manageability:** The steep side slopes of Strawberry Ridge would provide a manageable wilderness boundary. Boundaries are recognizable and conform to terrain. Rated lower for manageability of boundaries and moderate for whether the boundaries constitute a barrier to prohibited use because it contains 3 or 4 and/or short and mildly intrusive cherry stem roads and is surrounded by or adjacent to major paved highways or roads that separate the area from other undeveloped areas. **Summary**: Most values are medium. Fish metapopulations and heritage resources have high values.
IRA #418016, Diamond Fork	35,210 / NA	**Soils/Water/Air:** 12 percent of area lies in landslide prone soils. Air: Class II airshed, Utah County is a non-attainment area for particulate matter. Water: 608 acres of riparian vegetation. This area contains Sixth Water Creek, a 303(d) stream, and contains tributaries to and borders Diamond Fork Creek, which is also a 303(d) stream. There are 9 points of water diversion for domestic purposes; 6 points of water diversion for irrigation purposes. **Diversity of plant and animal communities:** Nesting habitat for the golden eagle historically existed within this area and two historic golden eagle eyries are found here. The area is currently used as a year-round foraging area by golden eagles and a wintering foraging area by bald eagles. Diverse vegetation provides habitats for a variety of game and non-game wildlife. This area contains both winter and summer range for mule deer and elk and a portion of the area is classified by UDWR as High Value Winter Range for deer. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into other areas such as the Manti-La Sal National Forest to the south or the Ashley National Forest to the southeast. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. The bald eagle (threatened/SE), the sandhill crane (state sensitive/SE), the Townsend's big-eared bat and Bonneville cutthroat trout (both FS sensitive/SE), and the broad-tailed hummingbird, Virginia's warbler, black-throated gray warbler, and Brewer's sparrow (all state sensitive/PIF priority/SE) are known to inhabit the area. This area also provides habitat for the northern goshawk, peregrine falcon, flammulated owl, and spotted bat (all FS sensitive/ SE), the western yellow-billed cuckoo (candidate/SE), the northern three-toed woodpecker (FS sensitive/PIF priority/SE), the Lewis' woodpecker (state sensitive/PIF priority/SE), and the western red bat, rubber boa, Sonoran mountain kingsnake, and Utah milk snake (all state sensitive/SE). This area also contains potential secondary habitat for the Canada lynx (threatened/SE). This area contains tributaries to Diamond Fork Creek, which sustains a portion of a Bonneville Cutthroat Trout (FS sensitive/SE) metapopulation. The metapopulation may extend into Sixth Water, which is within the boundaries of the roadless area. There are no known TESCP or SE plants in this area. Invasive plant

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		species consist of musk thistle, Canada thistle, and hoary cress (whitetop); acreage unknown. **Landscape character and scenic integrity:** The unit has lost its natural appearance and integrity in many areas due to the development of roads, telecommunication sites, power lines, etc. The Teat Mountain electronic site is also cherry stemmed within this area. A portion of the Central Utah Project has is underway directly adjacent to this area that may affect the natural integrity of this unit. Numerous range fences, troughs, and ponds can be found within the area associated with permitted cattle grazing. There has been some range revegetation work in the Tank Hollow, Sheep Creek, and Monks Hollow-Brimhall Canyon areas. Partial Retention: 8,349 acres, Retention: 2,660 acres. **Heritage resources:** This area contains one known historic water diversion site. There is moderate potential for locating homesteading sites, livestock herding sites, and American Indian campsites in this area. There are ancient American Indian sites in the management area. The area is also a known travelway for historic Ute peoples (those using the area in the last 150 years)…. One of the sites of a skirmish between Mormon Settlers and Utes occurred in Little Diamond Creek in 1866; part of that culturally significant site is on National Forest System lands." **Solitude and primitive recreation:** The area is heavily hunted during the general deer hunt. Dispersed recreation is heavy in this area. There are several hiking, biking, horse and ATV trails in this area. The main recreation attractions are the Fifth Water Hot Springs and the ATV trail and trailhead found at Monks Hollow. Some snowmobile use also occurs along the major corridors surrounding this unit. There are some opportunities for solitude and primitive recreation; however, in other areas this is limited due to easy access from surrounding roads. Rated low overall for opportunities for solitude. Opportunities for primitive and unconfined recreation rated high for hunting and camping, moderate for fishing and backpacking, and low for all other activities. Opportunities for challenging experiences are limited. **Special features:** high wildlife, moderate for other geological, ecological or scenic features, which include Fifth Water Hot Springs. **Manageability:** Rated high for boundaries are recognizable and moderate for boundaries that conform to terrain. Rated low for manageability of boundaries and moderate for whether the boundaries constitute a barrier to prohibited use because it contains 3 or 4 and/or short and mildly intrusive cherry stems. Portions of the area are traveled extensively by ATV's and have resulted in tracks traversing most of the area. The rolling nature of the country makes control of this use very difficult. **Summary**: Most values are high and medium. Soil, air, and water; wildlife; fish metapopulations; heritage resources; and unique characteristics have high values.
IRA #418017, Tie Fork	19,615 / NA	**Soils/Water/Air:** Soil: 3 percent of area lies in landslide prone soils. Air: Class II airshed, mostly in Utah County (non-attainment zone for particulate matter. Water: 140 acres of riparian vegetation. No points of diversion for public drinking water. **Diversity of plant and animal communities:** Diverse vegetation provides habitat for a variety of game and non-game wildlife. The area provides both summer and winter range for mule deer and elk. Goshawks are known to nest in the area. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into other areas such as the Ashley National Forest to the east or the Manti-La Sal National Forest to the south. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. This area contains known nest sites and provides foraging habitat for the northern goshawk (FS sensitive/SE) and it contains known Colorado River cutthroat trout (FS sensitive/SE) populations. The broad-tailed hummingbird and Brewer's sparrow (both state sensitive/PIF priority/SE) are also known to inhabit the area. The area provides potential habitat for the western yellow-billed cuckoo (candidate/SE), the Virginia's warbler and black-throated gray warbler (both state sensitive/PIF priority/SE), and the rubber boa (state sensitive/SE). This area also contains potential secondary habitat for the Canada lynx (threatened/SE). Tie Fork Creek is a tributary to Soldier Creek, which contains a portion of a Bonneville cutthroat trout (FS sensitive/SE) metapopulation. Soldier Creek is in close proximity to the southern boundary of the area. Pohl's milkvetch (SE) and Ute ladies'-tresses (threatened/SE) are located here. GIS analysis shows that the area contains suitable habitat for clay phacelia (endangered/SE) and for Utah fescue, Book Cliffs twinpod, and Skyline ground daisy (all proposed FS sensitive/SE), but these species have not been located in the area. No noxious weeds reported in the area. **Landscape character and scenic integrity:** The area has a high natural appearance except where some timber harvest has occurred in the West Canyon area. The potential for oil and gas discovery in this area is high, and exploration activities have been conducted in the past. There are no active mines located in this area. There are approximately 490 acres in this area where private mineral rights are held. This roadless area lies within an established grazing allotment. Due to topography, very little livestock use occurs. There are some range improvements including fences, troughs, and ponds. Partial

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		Retention: 6,826 acres. **Heritage resources:** 16 historic charcoal preparation sites, logging, herding, and American Indian campsites were found. The potential of finding additional sites of these kinds and some tie hacking sites is moderate. **Solitude and primitive recreation:** Dispersed recreation is moderate in this area, except during the big game hunting seasons. There are several trails available for hiking, mountain biking, and horseback riding within this unit. A portion of the Center Trail lies within this area. This trail runs from Spanish Fork Canyon north to Halls Fork and is a part of the Great Western Trail. Some unauthorized ATV use is occurring off designated routes within this unit. There are opportunities for solitude and primitive recreation in portions of the area, but rated low overall for opportunities for solitude. Opportunities for primitive and unconfined recreation rated high for hunting, moderate for hiking and low for all other activities. **Special features:** Rated high for wildlife, low for other geological, ecological or scenic features. **Manageability:** The Tie Fork area has relatively manageable boundaries due to the steep terrain. Several roads are cherry stemmed for a considerable distance within the area and compromise the integrity of the area. A small section of private land is adjacent to the area on the east. Utility corridors border the area to the north, west, and south. Rated moderate for boundaries are recognizable, conform to terrain, are manageable and constitute a barrier to prohibited use. **Summary:** Most values are low-medium to medium. Fish metapopulations and heritage resources have high values
IRA #418019, Soldier Summit	6,850 / NA	**Soils/Water/Air:** 6 percent of area lies in landslide prone soils, Class II airshed, Wasatch County (attainment zone), contains 93 acres of riparian vegetation. Contains 2 points of water diversion for municipal purposes. **Diversity of plant and animal communities:** Provides summer range, as well as some winter range, for deer and elk herds. Diverse vegetation provides habitat for a variety of other game and non-game species. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into other areas such as the Ashley National Forest to the east or the Manti-La Sal National Forest to the south. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. **Landscape character and scenic integrity:** Low to medium character and integrity. Natural appearance of the area is high. Sheep grazing is the primary commodity use of the area, and a limited number of range improvements can be found within this unit. Exploration activities have been conducted in the past. There are no active mines located in this area. Partial Retention: 3,133 acres. **Heritage resources:** Cultural resource inventories have been conducted in conjunction with oil and gas exploration, and no significant cultural discoveries have been reported. There is a low to moderate potential of finding historic mining, logging, and American Indian camps here. **Solitude and primitive recreation:** Greatest recreation use occurs during the annual elk and deer hunts. The balance of the use comes mainly from snowmobile and horseback riders. Rated moderate overall for opportunities for solitude. Opportunities for primitive and unconfined recreation rated high for hunting, moderate for camping and backpacking, and low for all other activities. **Special features:** No special features. **Manageability:** Rated moderate for boundaries are recognizable, but low in terms of conformance to terrain, manageability and ability to constitute a barrier to prohibited use, primarily due to size of IRA (<10,000 acres), and number of intrusive cherry stems. **Summary:** Most values are low-medium to medium.
IRA #418021, Hop Creek Ridge	6,250 / NA	**Soils/Water/Air:** Soil: 10 percent of area lies in landslide prone soils. Air: Class II airshed, Juab County (attainment zone). Water: 179 acres of riparian vegetation. 2 points of water diversion for irrigation purposes. **Diversity of plant and animal communities:** Wintering bald and golden eagles are known to converge at the south end of the unit along the highway. Wild turkeys were released on state land that borders this area and it is assumed that they have expanded into this unit. The area provides winter and summer range for mule deer and elk, and a portion of the area is classified by UDWR as Critical Winter Range for elk. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from and into the San Pitch Range to the south. The area also provides potential corridor habitat for mammals such as wolverines and Canada lynx. This area also contains known populations of Bonneville cutthroat trout (FS sensitive/SE. The area provides potential habitat for the peregrine falcon (FS sensitive/SE), the western yellow-billed cuckoo (candidate/SE), and the Merriam's shrew, rubber boa, and Utah milksnake (all state sensitive/SE). This area also contains potential secondary habitat for the Canada lynx (threatened/SE).No TESCP or SE plants have been located within this area. Invasive plant species consist mainly of tamarisk (salt cedar); acreage unknown. **Landscape character and scenic integrity:** The potential for oil and gas discovery in this area is low, but exploration activities have been conducted in the past. Cattle graze the area and some associated range improvements can be found within the unit. The natural integrity and appearance is moderate. Partial Retention: 4,745 acres, Retention: 412. **Heritage resources:** There is a low potential of finding either historic European-American or American Indian sites here. No known sites within

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
		this area. **Solitude and primitive recreation:** This area offers few recreation opportunities other than hunting and limited dispersed camping. Opportunities for solitude are moderate due to the narrow configuration of the area. There are limited opportunities for primitive recreation and challenging experiences. Opportunities for primitive and unconfined recreation rated high for hunting, and low for all other activities. **Special features:** Rated high for wildlife, low for other geological, ecological or scenic features. **Manageability:** The Hop Creek Ridge roadless area has manageable boundaries. Rated moderate for boundaries are recognizable, conform to terrain, are manageable and constitute a barrier to prohibited use. 1 or 2 and/or very short cherry stems that intrude almost unnoticeably. Surrounded by or adjacent to minor roads that separate the area from other undeveloped areas. **Summary:** Most values are medium and low. Wildlife has a high value.
IRA #418028, Golden Ridge	33,976 / NA	**Soils/Water/Air:** Soil: 9 percent of area lies in landslide prone soils. Air: Class II airshed, most of area is in Utah County (non-attainment zone for particulate matter). Water: 623 acres of riparian vegetation. Contains 2 points of water diversion for domestic purposes and 1 point of water diversion for irrigation purposes. **Diversity of plant and animal communities:** The area provides valuable habitat for game and non-game wildlife species, including black bears, cougars, mule deer, and elk. Summer range and some winter range for mule deer and elk are located within this area. Portions of the area are classified by UDWR as High Value Winter Range for deer and Critical Winter Range for elk. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into the San Pitch Range to the south. It also provides potential corridor habitat for mammals such as wolverines and Canada lynx. This area contains known nest sites and provides foraging habitat for the northern goshawk (FS sensitive/SE) and contains known Bonneville cutthroat trout (FS sensitive/SE) populations. The broad-tailed hummingbird, Virginia's warbler, and black-throated gray warbler (all state sensitive/PIF priority/SE) are also known to inhabit the area. The area provides habitat for the bald eagle (threatened/SE), the western yellow-billed cuckoo (candidate/SE), the flammulated owl (FS sensitive/SE), the northern three-toed woodpecker (FS sensitive/PIF priority/SE), the Lewis' woodpecker and Brewer's sparrow (both state sensitive/PIF priority/SE), and the western red bat, rubber boa, smooth green snake, Sonoran mountain kingsnake, and Utah milk snake (all state sensitive/SE). This area also contains potential secondary habitat for the Canada lynx (threatened/SE). This area contains tributaries to Soldier Creek, which sustains a portion of a Bonneville cutthroat trout (FS sensitive/SE) metapopulation. No TESCP or SE species have been located within this area. Invasive plant species consist mainly of tamarisk (salt cedar); acreage unknown. **Landscape character and scenic integrity:** The area is adjacent to private land on the east and a portion of the northern boundary is a utility corridor. The unit has a high natural appearance and the boundaries along the western side of the area are somewhat natural in that they follow ridgelines. Partial Retention: 24,388 acres; Retention: 3,566 acres. **Heritage resources:** One known American Indian campsite. There is a low to moderate potential of finding additional American Indian and historic herding sites. Remnants of a historic Forest Service administrative site are also within this area. **Solitude and primitive recreation:** This area provides a considerable variety of recreation experiences. An extensive trail system provides opportunities for hiking, horseback riding, mountain biking, snowmobiling, and cross-country skiing. The close proximity of several Forest Service campgrounds has resulted in this being one of the more popular areas for dispersed recreation use. The main stream is Nebo Creek and the lower reaches provide an excellent fishery. The Mount Nebo National Scenic Byway forms the western boundary and this unit is an important viewshed. There are opportunities for solitude in the steep, rugged canyons that make up a good portion of the area; overall rating is high. Primitive recreation is the major form of recreation in this unit. Challenging experiences are limited to hiking in steep, rugged terrain. Opportunities for primitive and unconfined recreation rated high for hunting, moderate for most other activities. **Special features:** Rated high for wildlife, moderate for other geological, ecological or scenic features. **Manageability:** Rated moderate for boundaries are recognizable, conform to terrain, are manageable and constitute a barrier to prohibited use. Contains 3 or 4 and/or short and mildly intrusive cherry stems. Surrounded by or adjacent to major paved highways or roads that separate the area from other undeveloped areas. Area can also be accessed on the east side from the Nebo Creek Road, which is cherry stemmed into the area for approximately two miles. **Summary:** Most values are medium and high. Soil, air, and water; fish metapopulations; and heritage resources have high values.

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
IRA #418029, Nephi	15,661 / NA	**Soils/Water/Air:** Soil: 8 percent of area lies in landslide prone soils. Air: Class II airshed, a portion of area is in Utah County (non-attainment zone for particulate matter). Water: 261 acres of riparian vegetation. Contains 9 points of water diversion for municipal purposes (Nephi and Mona), 1 point of water diversion for domestic purposes, and 5 points of water diversion for irrigation purposes. **Diversity of plant and animal communities:** Diverse vegetation provides habitat for a variety of game and non-game wildlife species. Elk and mule deer summer range and some winter range can be found here. Portions of the area are classified by UDWR as High Value Winter Range for elk. This roadless area provides corridor habitat for large mammals, including black bears and cougars, moving from or into the San Pitch Range to the south. It also provides potential corridor habitat for mammals such as wolverines and Canada lynx. This area contains known nest sites and provides foraging habitat for the northern goshawk (FS sensitive/SE). It also contains known Bonneville cutthroat trout and Townsend's big-eared bat (both FS sensitive/SE) populations. The area provides habitat for the bald eagle (threatened/SE), the peregrine falcon and flammulated owl (both FS sensitive/SE), the western yellow-billed cuckoo (candidate/SE), the northern three-toed woodpecker (FS sensitive/PIF priority/SE), the Lewis' woodpecker, black-throated gray warbler, and Brewer's sparrow (all state sensitive/PIF priority/SE), and the Williamson's sapsucker, western red bat, rubber boa, and Utah milk snake (all state sensitive/SE). This area also contains potential secondary habitat for the Canada lynx (threatened/SE). No TESCP or SE species have been located within this area. Invasive plant species consist mainly of tamarisk (saltcedar); acreage unknown. **Landscape character and scenic integrity:** The area has a high natural appearance. Some mining activities and watershed restoration projects have detracted from the natural appearance in some places. The central and northern blocks lie within established allotments, and are grazed by cattle. A number of range improvements can be found within sections of this roadless area, including fences and water developments. The Privateer Mine, which is in private ownership, is not operational. There are approximately 40 acres in this area where private mineral rights are held Partial Retention: 5,506 acres, Retention: 1,285 acres, Preservation: 8,609 acres. **Heritage resources:** These units contain one known salt mining site and several historic recreation cabins. There is a low to moderate potential of finding American Indian sites or historic quarrying, mining, and herding sites. **Solitude and primitive recreation:** The area receives tremendous pressure during the general deer hunt. Primitive recreation in the form of hiking, horseback riding, motorcycle riding, camping, and hunting are the major recreation uses of this area. There are some adjacent developed recreation sites that receive heavy use. People visiting the wilderness or camping in nearby campgrounds frequently use all three of the larger blocks of this roadless area. Use is expected to increase as overcrowded visitors to the Mount Timpanogos Wilderness Area seek a more primitive area in which to recreate. The Willow Creek and Privateer Mine portions of this roadless area receive much less use from the public. There are opportunities for solitude throughout much of the area, although this solitude is encroached upon somewhat on the east side due to noise generated from vehicles on the Mount Nebo National Scenic Byway. The west side of this area offers many more opportunities for solitude, as it is adjacent to designated wilderness. Overall rating as moderate for opportunities for solitude. There are opportunities for primitive recreation in the form of hiking, camping, and horseback riding. Some of the country is extremely rugged, offering many opportunities for challenging experiences such as mountain climbing and cliff climbing. Opportunities for primitive and unconfined recreation rated high for hunting, moderate for other summer activities and low for winter activities. **Special features:** Rated high for wildlife, moderate for other geological, ecological or scenic features. **Manageability:** Rated moderate for boundaries are recognizable, conform to terrain, are manageable and constitute a barrier to prohibited use. This unit is unique in that it consists of five individual blocks that lie immediately adjacent to the existing Mount Nebo Wilderness Area. **Summary:** Most values are high. Public drinking water sources; ROS classes; scenic integrity; heritage resources; and size and context have high values.

Table H-1 Inventoried Roadless Areas and Unroaded/Undeveloped Areas within the Project Analysis Area

IRA/ Unroaded-Undeveloped Area	Acres IRA/ URUD	IRA/URUD Wilderness Quality or Attributes and Roadless Area Characteristics
Region III		
Dixie National Forest *Sources:* *USFS 2009. Inventoried Roadless Areas and Unroaded and Undeveloped Areas Specialist Report for the Dixie National Forest Motorized Travel Plan. Prepared May 2008, updated March 2009. Available at: http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5220839.pdf. Last accessed January 24, 2013.* *UDWR GIS files for big game, USFWS files for sage grouse.*		
Atchinson IRA/URUD	17,663 / 24,306	**Summary of Roadless Area Characteristics and Wilderness Quality:** Contains crucial winter habitat for mule deer. No USFWS critical habitat. Low natural integrity; medium undeveloped character; medium opportunities for solitude; low opportunities for primitive recreation; medium manageability.
Bull Valley IRA/URUD	10,919 / 13,372	**Summary of Roadless Area Characteristics and Wilderness Quality**: Contains crucial winter habitat for mule deer. No USFWS critical habitat. Low natural integrity; medium undeveloped character; medium opportunities for solitude; high opportunities for primitive recreation; medium manageability.
Cove Mountain IRA/URUD	16,639 / 15,678	**Summary of Roadless Area Characteristics and Wilderness Quality:** Contains crucial winter habitat for mule deer. No USFWS critical habitat. Low natural integrity; medium undeveloped character; medium opportunities for solitude; medium opportunities for primitive recreation; medium manageability.
Gum Hill IRA	3,182	**Summary of Roadless Area Characteristics and Wilderness Quality:** Contains crucial winter habitat for mule deer. No USFWS critical habitat.
Kane Mountain URUD	9635	**Summary of Roadless Area Characteristics and Wilderness Quality:** Contains crucial winter habitat for mule deer .Low natural integrity; medium undeveloped character; medium opportunities for solitude; low opportunities for primitive recreation; low manageability.
Moody Wash IRA/ Mogotsu IRA Moody Wash/Mogotsu URUD	31,857/ 16,771 / 58,994	**Summary of Roadless Area Characteristics and Wilderness Quality:** Moody Wash IRA contains crucial winter habitat for mule deer. No USFWS critical habitat. There is one TCP within the Mogotsu IRA. Medium natural integrity; medium undeveloped character; high opportunities for solitude; low opportunities for primitive recreation; low manageability.
Pine Valley Mountain URUD	154, 419	**Summary of Roadless Area Characteristics and Wilderness Quality:** Low-high natural integrity; low-high undeveloped character; low-high opportunities for solitude; low-high opportunities for primitive recreation; low-medium manageability.