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January 5, 2009

Tom Schroeder, Program Principal
State of Wyoming
Department of Environmental Quality – Industrial Siting Division
Herschler Building 4-W, 122 West 25th Street
Cheyenne, WY 82002

Subject: Section 109 Permit Application pursuant to Section 35-12-109 of the Wyoming Environmental and Quality Act and Industrial Development Information and Siting Act for the construction and operation of Campbell Hill Windpower Project

Dear Mr. Schroeder:

Three Buttes Windpower, LLC (Three Buttes), a wholly owned subsidiary of Duke Energy Corporation (Duke Energy), is pleased to submit a Section 109 for construction of the Campbell Hill Windpower Project to be located near Glenrock, Wyoming.

Sixty (60) hard copies of the application and an electronic copy on a compact disc are included with the application along with the requested fee payment. I will be the designated contact for Three Buttes and can be reached at (512) 480-9119 or by email at RTNerzig@dukeenergy.com. Jennifer Scoggin of Holland and Hart is designated as our legal counsel for the Industrial Siting process for the project. Jennifer can be reached at (307) 778-4200 or by email at JScoggin@HollandHart.com.

We are looking forward to continuing our positive working relationship with you and your staff to ensure the review process is as efficient as possible. Please let me know if there is anything Three Buttes or Duke Energy can do to assist in making the review process as efficient as possible.

Sincerely,

R. Nerzig

Richard Nerzig
VP, Wind Development

Verification

I, Richard T. Nerzig, Duke Energy Corporation Vice President of Wind Energy Project Development, hereby affirm and certify that the enclosed Section 109 Permit Application for the Campbell Hill Windpower Project is truthful and accurate and complete to the best of my knowledge.

____

Subscribed and sworn before me this __2__ day of __Jan__, 2009.

____

GINA RAGIEL
No. 01RA6098973
Notary Public, State of New York
Qualified in Nassau County
My Commission Expires 09/22/20 11

Notary Public for _______

My Commission expires: 9/22/11

Wyoming Industrial Development Information and Siting Act

Section 109 Permit Application
Campbell Hill Windpower Project

Prepared for

Duke Energy Corporation/
Three Buttes Windpower, LLC

January 2009

Prepared By:

CH2MHILL

9193 South Jamaica Street
Englewood, CO 80112

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Acronyms and Abbreviations

3-D	three dimensional
AADT	annual average daily traffic
ac/dc	alternating current and direct current
ACHP	Advisory Council on Historic Preservation
APLIC	Power Line Interaction Committee
AQD	Air Quality Division
AWEA	American Wind Energy Association
BEA	U.S. Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BMP	Best management practice
BNSF	Burlington Northern Santa Fe
CANDO	Converse Area New Development Organization
CCTNT	Converse County: Together Now & Tomorrow
CESQG	conditionally exempt small quantity generator
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
Commission	Wyoming Public Service Commission
CPCN	Certificate of Public Convenience and Necessity
CRAI	Cultural Resource Analysts, Inc.
CUP	Conditional Use Permit
dB	decibel
dBA	A-weighted decibel
DFGD	dry flue gas desulfurization
DOE	U.S. Department of Energy
CWA	Clean Water Act

DT	Downtown Assembly
E&E	Energy and Environment
EB	eastbound
EHS	Environmental Health and Safety
EIA	Energy Information Administration
EIS	Environmental Impact Statement
EMS	Emergency Medical Service
EMT	Emergency Medical Technician
EPA	U.S. Environmental Protection Agency
EPC	engineer-procure-construct
EPS	Economic Profile System
E-stop	Emergency stop
ESA	Endangered Species Act
ESP	electrostatic precipitation
ESS	electrical simplification system
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FIRM	Federal Insurance Rate Map
FMV	Fair market value
FR	Federal Register
ft	foot/feet
ft^2	square foot/feet
FTE	full-time equivalent
FY	fiscal year
GCC	Glenrock Coal Company
GDP	gross domestic product
GE	General Electric Company
GIS	geographic information system
Glenrock	Glenrock Wind Energy Project

gpd	gallon per day
HB	House Bill
Hz	Hertz
hp	horsepower
I-25	Interstate 25
I-80	Interstate 80
IBC	International Building Code
IEC	International Electrotechnical Commission
IMPLAN	Impact Analysis for Planning
I-O	input-output
IRP	Integrated Resource Plan
ISA	Industrial Development Information and Siting Act
ISC	Industrial Siting Commission
ISD	Industrial Siting Division
ISO	International Organization for Standardization
kHz	kiloHertz
KOP	key observation point
kV	kilovolt
L_{eq}	Equivalent sound level
L_{dn}	day-night sound level
LOS	level of service
LQD	Land Quality Division
m	meter
mm	millimeter
m/s	meter per second
m^2	square meter
MBTA	Migratory Bird Treaty Act
MCE	maximum considered earthquake
MEHC	MidAmerican Energy Holdings Company
met	meteorological
MFI	median family income

mpg	mile per gallon
MW	megawatt
NAICS	North American Industry Classification System
NB	northbound
NEC	National Electric Code
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Agency
NHPA	National Historic Preservation Act
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunication Information Agency
NWI	National Wetland Inventory
O&M	operations and maintenance
OES	Occupational Employment Statistics
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PCE	personal consumption expenditure
Project	Campbell Hill Windpower Project
REMI	Regional Economic Models, Inc.
RERT	Regional Emergency Response Team
RIMS II	Regional Industrial Multiplier System II
RMP	Resource Management Plan
ROI	region of influence
Rolling Hills	Rolling Hills Wind Energy Project
rpm	revolutions per minute
RV	recreational vehicle
SB	southbound
SCADA	supervisory control and data acquisition
SH	State Highway

SHPO	State Historic Preservation Office
SO_2	sulphur dioxide
SPCC	Spill Prevention, Control and Countermeasure Plan
SR	State Route
SSURGO	Soil Survey Geographic Database
SWPPP	Storm Water Pollution Prevention Plan
SWTSD	solid waste treatment, storage, and disposal
TAC	Technical Advisory Committee
TESS	threatened and endangered sensitive species
Three Buttes	Three Buttes Windpower, LLC
TMDL	Total Maximum Daily Load
UI	unemployment insurance
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VCI	vapor corrosion inhibitor
VDI	Verein Deutscher Ingenieure
WB	westbound
WDEQ	Wyoming Department of Environmental Quality
WECC	Western Electricity Coordinating Council
WEST	Western Ecosystems Technology
WGFD	Wyoming Game and Fish Department
WGO	Wyoming Governor's Office
WHDP	Wyoming Housing Database Partnership
WQD	Water Quality Division
WRA	Wind Resource Area
W.S.	Wyoming Statute

WSEO	Wyoming State Engineer's Office
WTG	wind turbine generator
WTGS	wind turbine generator system
WYDOT	Wyoming Department of Transportation
WYNDD	Wyoming Natural Diversity Database
WYO	Wyoming Highway
WYPDES	Wyoming Pollutant Discharge Elimination System
WYR	Wyoming Register
yd^2	square yard
ZOR	zone of risk

Executive Summary

Three Buttes Windpower, LLC (Three Buttes), an indirect and wholly owned subsidiary of Duke Energy Corporation (Duke Energy), is submitting a Section 109 Permit Application pursuant to Wyoming Statute (W.S.) § 35-12-109 of the Industrial Development Information and Siting Act (ISA) on January 5, 2009, for the construction and operation of the Campbell Hill Windpower Project (Project) to be constructed in a single phase near Glenrock, Wyoming.

Three Buttes proposes to own, construct, and operate the Project. The Project will be located on leased private lands located in Converse County using General Electric Company (GE) 1.5-megawatt (MW) sle model wind turbine generators (WTGs), for a nameplate capacity of 99 MW.

The Project will include engineering, purchase, and construction of all equipment and facilities necessary for a fully operational wind energy electrical generation project. The Project will be executed utilizing a modified Multi-Prime Process whereby Three Buttes will contract with an Engineering Consultant and a Construction Contractor and utilize the Duke Energy supply chain to procure major equipment such as WTGs, main power transformers, cable, and breakers.

Three Buttes requests issuance of a Section 109 Permit pursuant to W.S. § 35-12-109 that covers the development of the Project.

ISA Statute and Cost

A Jurisdictional Meeting was held with the Wyoming Department of Environmental Quality (WDEQ) Industrial Siting Division (ISD) on October 15, 2008, to determine whether the Project is under the jurisdiction of the ISA. ISD staff reviewed estimated capital costs and determined that the Project is above the current statutory capital construction cost threshold of $178.9 million (W.S. § 35-12-102(vii)). Therefore, Three Buttes is required to obtain an ISA permit for the Project prior to construction and operation, as specified by ISA rules and statutes.

Location

The Project site is located in Converse County, Wyoming, approximately 4 to 12 miles northwest of Glenrock. North-south oriented ridges and valleys occur throughout the Project area, rising to a high point at the Three Buttes Summit, which is in the center of the Project. Several intermittent drainage channels intersect the Project and are tributary to the Lone Tree Gulch (located east of the Project) and the Cole Creek drainage (located west of the Project). The Project site is relatively undeveloped except for livestock grazing and previous exploration and drilling for oil in portions of the Project area. A private gravel road is oriented north-south through the Project area, and several unimproved two-track roads traverse the Project. Elevation throughout the Project area ranges from approximately 5,379

to 6,070 feet above mean sea level. The Project site is approximately 5.2 miles from PacifiCorp Energy's Glenrock Wind Energy Project (Glenrock).

Workforce and delivery vehicles are expected to use Interstate 25 (I-25), Wyoming State Highway 256, and Natrona County Road 701 (Cole Creek Road) to access private roads in the Project area. Turbine and tower deliveries requiring wider trucks and higher clearance will avoid the I-25 Exit 182 interchange and low bridges by following a specific route identified in coordination with Wyoming Department of Transportation (WYDOT) to avoid disruption and ensure safe travel conditions.

Land Use

The Project and transmission corridor will be located on leased private fee lands. Leased land for the Project includes 10,480 acres, and leased land for the transmission line right of way includes 4,400 acres in Converse County. The Project site is relatively undeveloped except for livestock grazing and previous oil exploration and drilling activities. There are no active residences located within the Project area. In addition, the Project will not require the use of any federally managed Bureau of Land Management (BLM) lands. The main access road to the Project area will cross one parcel of State of Wyoming land. Three Buttes is currently in the process of obtaining a Special Use Lease from the Office of State Lands and Investments.

Components

The primary components of the Project will include WTGs mounted on tubular towers, transformers, electrical collector lines, fiber optic communication cable, turbine access roads, necessary meteorological towers, a supervisory control and data acquisition (SCADA) system, substation. Approximately 10 miles of 230-kilovolt (kV) transmission line and a switching station will be constructed to interconnect to an existing PacifiCorp transmission line located approximately 10 miles south of the Project. Additional appurtenant infrastructure includes an operations and maintenance (O&M) building, which will be stick-built and erected within the Project site. A temporary concrete batch plant will be utilized on site during the construction period.

Duke Energy will have general oversight of the wind turbine generation supply and delivery, balance of plant engineering, procurement, planning, scheduling, cost control, evaluation of proposals and equipment, permitting, construction, commissioning, testing, and operation of the facility. The selection of the Engineering Consultant and Construction Contractor will be done through a competitive bid process and through an alliance with previously evaluated and selected Engineering Consultants and Construction Contractors.

Construction Schedule

Three Buttes plans to begin road construction in February 2009 and proposes to commence Project construction as soon as all relevant permits have been obtained. An Engineering Consultant and Construction Contractor will be selected in January 2009 through a competitive bidding and evaluation process. The contractor will construct the wind energy facility using an engineered design from Duke Energy.

Three Buttes anticipates an approximate 12-month construction period, excluding the geotechnical investigations and surveying work that was initiated in October 2008. Road construction for the Project is anticipated to begin in February 2009. The majority of the work will be concentrated in a 9-month period (April 2009 through December 2009), during which the concrete pads will be constructed and the WTGs will be delivered, installed, and commissioned. The 66 WTGs are currently scheduled for delivery in July 2009. WTG erection and commissioning will occur July through September 2009. During this time, personnel from the equipment manufacturer will be on site to supervise the installation and commissioning of the WTGs. The current estimated completion date of the Project (i.e., under normal construction circumstances, weather conditions, labor availability, and materials delivery) is December 31, 2009.

Construction and Operation Workforce Requirements

Three Buttes has prepared a construction operation workforce estimate for the Project and anticipates an approximate 12-month construction period, beginning February 2009 and ending January 2009. Detailed estimates of the operation workforces are provided below.

Construction Workforce

Access roads will be constructed beginning in February 2009, and appurtenant infrastructure will be developed when all permits are obtained, planned for April 2009. The construction workforce will vary from a low of nine in January 2010 to a high of 129 construction trades people during the peak of construction activities in July 2009. Over the 12-month construction period, there will be a monthly average of approximately 77 full-time equivalent workers onsite.

Operations Workforce

During the operations phase, an estimated full-time permanent workforce of approximately 11 persons will be employed by the Project.

Transportation

The WTGs, steel tubular towers, and electrical collector line will be trucked directly to the Project site using semi-tractor trailers. It is expected that turbine nacelles (machine heads) and hubs will be transported trucked to the Project site from the south. Blades and tower sections will likely be transported from several surrounding states, and may include North Dakota, South Dakota, Iowa, or Texas.

The Project workforce and delivery vehicles will access the site using I-25, US 20/26/87, Wyoming State Highway 256, Natrona County Road 701 (Cole Creek Road), and an existing private gravel road. Transportation routes associated with over-sized loads have not been finalized. However, based on input from WYDOT, over-sized load deliveries will avoid the I-25 Exit 182 interchange due to road construction activities and low bridge clearances.

Public Involvement Activities

Three Buttes representatives conducted meetings with State of Wyoming agencies and elected local government officials as part of the pre-application filing process to meet with stakeholder, receive comments and input, and identify potential mitigation solutions. Three Buttes representatives have participated in numerous informational meetings and presentations and have actively sought out potentially affected municipalities, counties, state agencies, and other stakeholders to discuss potential environmental and socioeconomic issues and mitigation recommendations and solutions.

The Project area of study, as identified by ISD staff during the Jurisdictional Meeting, determined the elected local government officials invited to the meetings by Three Buttes.

Socioeconomic Impacts

The socioeconomic impact analysis evaluated the benefits and impacts to the social and economic resources in the area of study and primary area of impact. To measure potential impacts, the socioeconomic analysis compared the expected future conditions in the area of study with and without the Project. The area of study was defined as Converse and Natrona counties. The counties included in the area of study were determined in consultation with ISD staff.

Both local communities and the state overall will realize benefits from the Project. Wyoming will gain economic benefits including permanent job creation, tax revenues, and expansion of clean and renewable energy generation within the region. Locally, the Project will result in potential allocation and distribution of impact assistance payment funds, local spending on goods and services, additional local economic activity, increased land lease revenues (i.e., to ranch landowners), tax revenues, and minimal environmental impacts.

Due to the relatively small size of the construction workforce, the Project will place minimal demands on water, sewer, roads, electrical lines, or other local infrastructure. Therefore, construction and operation of the Project will not significantly affect the various public and non-public facilities and municipal services as a result of in-migration of workers for non-basic employment opportunities.

Environmental Impacts

Three Buttes has reviewed existing data and conducted cultural resource inventories, wetlands and waters of the U.S. delineations, threatened and endangered species habitat evaluations, greater sage-grouse pellet counts, avian-use fixed-point surveys, bat detection surveys, raptor nest surveys, and noise and visual resource analyses to document and

characterize baseline conditions of the Project area. After the baseline information was compiled, Three Buttes sited Project components to minimize the potential for environmental and natural resource impacts in the Project area. Minimization activities included relocating WTGs from the preliminary Project layout to reduce potential conflicts with raptor nests and greater sage-grouse leks and nesting habitat, relocating high-risk nests to areas of low collision risk, and avoiding and minimizing impacts to both known and newly identified cultural resource sites eligible for listing on the National Register of Historic Places (NRHP).

Avian-use surveys were conducted during the fall migration season in 2008. Additional avian-use surveys, including raptor nest and greater sage-grouse lek surveys, will be completed in spring 2009. Based on fixed-point avian use data collected for the Project area, observed fall mean raptor use was 1.12 birds per 20-minute survey. Fall mean raptor use at the Project is within the range of fall raptor use reported for other Wind Resource Areas. The estimate of nest density for the Project (0.44 nests per square mile) was compared to estimates of nest densities from other wind projects where the data is public information. Total raptor nest density falls within the range of active nest density estimates reported at the other Wind Resource Areas, and it is expected that active nest density for the Project area would be on the low end of the scale of other Wind Resource Areas studied.

The data collected during the 2008 avian-use surveys suggest that the Project is not within a major migratory pathway, either for diurnal or nocturnal migrants. In addition, the Project area does not appear to provide important stopover habitat for migrant songbirds.

One occupied greater sage-grouse lek is located approximately 1.9 miles north of the Project, and one occupied and one unknown lek are located approximately 2.0 miles southwest of the Project area approximately 0.3 mile east of the proposed transmission line.

A jurisdictional wetland and waters of the U.S. delineation was completed within the Project site. Preliminary site layout, access roads, and electrical collection line construction activities have been designed to minimize discharges of dredged or fill materials into potential jurisdictional waters of the U.S. Micrositing appurtenant linear features during the final design phase will likely further reduce these potential impacts to jurisdictional and nonjurisdictional waters to the extent practicable. Clean Water Act (CWA) compliance will be required.

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1.0 Purpose, Need, and Benefit

Recent national and regional forecasts project an increase in consumption of electrical energy continuing into the foreseeable future. This increased consumption requires development of new generation facilities to satisfy demand, as substantiated by the following sources:

- The Energy Information Administration (EIA), a statistical agency of the U.S. Department of Energy (DOE), predicts in the *Annual Energy Outlook 2008* (June 2008) that total electricity demand will grow by 0.7 percent per year from 2006 through 2030, with total renewable generation growing by 2.2 percent per year from 2006 to 2030 (DOE/EIA, 2008).
- The Western Electricity Coordinating Council (WECC), which forecasts electricity demand in the western United States, states in the *10-Year Coordinated Plan Summary 2006-2015* (July 2006) that peak demand and annual energy requirements in the Rocky Mountain Power Pool Area, which includes Wyoming, are projected to grow at annual compound rates of 2.4 percent and 2.2 percent, respectively, from 2006 through 2015 (WECC, 2006).

Further substantiation of the need for energy development is the Western Governors' Association goal of developing 30,000 megawatts (MW) of clean energy by 2015 from traditional and renewable energy sources, as well as the Energy Policy Act of 2005, which encourages the development of renewable energy resources, including wind energy, as part of an overall strategy to develop a diverse portfolio of domestic energy supplies for the future. It is Duke Energy's general policy to encourage development of wind energy in appropriate areas.

1.1 Purpose and Need

The objective of Three Buttes is to construct, own, and operate a renewable wind energy facility that will provide wind-generated electricity to the PacifiCorp power grid in central Wyoming. Wind-generated power produced by the Project would further advance the objectives of the President's National Energy Policy to diversify energy sources by utilizing non-hydroelectric renewable sources, such as wind, to a greater extent (National Energy Policy Development Group, 2001). The Project also supports Governor David Freudenthal's desire to diversify Wyoming's energy supply resources. In addition, the Project would support PacifiCorp's Request for Proposal for a renewable energy resource to serve the region, for which Duke Energy was the successful bidder.

Duke Energy is one of the largest electric power companies in the country, supplying and delivering energy to approximately 3.9 million customers in the United States. As previously detailed, Three Buttes will be an indirect, wholly owned subsidiary of Duke Energy. Duke Energy owns and operates electric generation for large and small energy consumers, including municipalities and utilities, using a variety of generation resources.

Three Buttes plans to initiate construction of the Project in early 2009 and complete construction in December 2009. The output of the Project will add 99 MW of renewable electrical generation into the PacifiCorp Wyoming transmission line grid.

1.2 Economic Benefits of the Project

Development of the Project carries significant economic benefits, including creation of new jobs and businesses, added *ad valorem* taxes, supporting of the local economy, and reduced reliance on conventional electrical energy generation.

Wind power in this region of Wyoming will be converted via kinetic energy into a more useful form of energy (i.e., electricity) with no requirements for additional fuel sources or release of greenhouse gas emissions. The expansion of renewable wind energy projects furthers one of the State's objectives of using a key attribute (wind) effectively for the long-term economic benefit of its residents.

A typical concern with the location of new industries is that demand for services such as schools, roads, water supply, and waste disposal associated with population increases will increase more than the tax base that the new industry brings. While providing positive benefits to the local economy, the Project will have minimal impacts on communities and their infrastructure. Construction of the Project does not involve the "boom and bust" economic and social conditions associated with some other large electrical generation or oil and gas energy development projects experienced in Wyoming. Local communities will be able to plan for and accommodate the incremental changes resulting from the in-migrating temporary construction workforce.

Due to the relatively short timeframe for construction and the limited operations workforce required, the Project will place minimal demands on water, sewer, roads, electrical lines, or other local infrastructure. In addition, there would be little measurable increase in non-basic employment, as these jobs are generated from ongoing employment of the existing base of construction workers and would be maintained through the continued employment of both local and non-local construction workers. Therefore, construction and operation of the Project will not significantly affect the various public and non-public facilities and services described above from the in-migration of workers for non-basic employment opportunities.

Economic benefits of the proposed Project to both local communities and the state of Wyoming include the following:

- Potential allocation and distribution of impact assistance funds over a 12-month construction period
- Continued investment in new wind energy in Converse County
- Land lease revenues for local area ranchers
- Expansion of the local service industry
- Development of a zero carbon source of wind-generated electricity
- Negligible impacts to local government and municipal services

- Millions of dollars spent on local purchases
- Creation of jobs and stable employment
  - Peak of approximately 129 temporary construction jobs
  - Addition of up to approximately 11 permanent full-time jobs
- Increased sales and use tax revenues from temporary and permanent employees purchasing goods and services during construction and operation of the Project
- Additional *ad valorem* taxes paid by Three Buttes
- Increased need for local goods and services
- Additional property taxes paid by new employees moving into the area

1.3 Local Benefits

There are six major local benefits attributable to the Project, as described below:

- The potential distribution of impact assistance funds
- Increased local spending
- Increased local economic activity
- Land lease revenue payments
- Tax effects
- Environmental benefits

1.3.1 Potential Distribution of Impact Assistance Funds

Pursuant to Wyoming Statute (W.S.) § 35-12-102(a)(vii), the proposed costs of the Project were reviewed by the Wyoming Department of Environmental Quality (WDEQ) Industrial Siting Division (ISD) and determined to exceed the current statutory threshold construction cost amount of $178.9 million. Therefore, the Project falls under the Industrial Development Information and Siting Act (ISA), and local governments are eligible to receive Impact Assistance Payments. **Appendix A** provides an estimate of the amount of Impact Assistance Payments that can be expected as a result of the Project.

The amount of impact assistance is based on the growth of sales and use taxes during the previous 12-month period. The calculation uses an average of all the sales and use taxes in the Project county (in this case, Converse County) for the preceding 12-month period and is based on the growth of sales and use taxes after construction is initiated. The Wyoming Department of Revenue (WDOR) is responsible for calculating the prior 12 months of sales and use taxes to establish a baseline total. The following month's sales and use tax is then compared to the baseline to determine that month's impact assistance funding. The difference, the growth in sales and use taxes, is the amount to be distributed in the Impact Assistance Payments. It is important to note that only sales and use taxes are used for the calculation. The actual Impact Assistance Payments are issued by the WDOR and come from Wyoming's General Fund, rather than from the Project proponent.

1.3.2 Increased Local Spending

Spending on construction and operation of the Project will positively affect the local economy directly, through the purchase of local goods and services, and indirectly as those purchases, in turn, generate purchases of intermediate goods and services from other related sectors of the economy. In addition, direct and indirect increases in employment and income will enhance overall local purchasing power, thereby inducing further spending on goods and services. This cycle is expected to continue until the dollars spent eventually leak out of the local economy as a result of taxes, savings, or purchases of non-locally produced goods and services.

1.3.3 Increased Local Economic Activity

The Project will be a modest to moderate source of new economic activity in the region. Specifically, the 11 permanent operations and maintenance (O&M) positions will provide new and local wage jobs (i.e., jobs above entry level and providing industry-scale income). These positions may also add to the local economy through the employee purchase of residential homes, thereby increasing the local tax base.

1.3.4 Land Lease Revenue Payments

Lease payments for land to local area ranchers will be an important source of secondary income to the landowners. This income, in turn, is expected to flow into the local economy, generating additional local benefits. In this case, the local benefit is truly realized due to the fact that the landowners live in the local area. After the Project is operational, this land will serve a dual purpose by allowing for the continued use of conventional livestock grazing and ranching activities. In addition, the State of Wyoming will benefit from payments for road access.

1.3.5 Tax Effects

Tax effects are an important consideration and benefit of the Project. The primary tax benefit would be the *ad valorem* taxes collected over the life of the Project. In conjunction with associated ancillary activities, state and local tax revenues also would be generated during construction and anticipated 20-year life of operation of the proposed facility. Although some of these tax revenues will be distributed on a local level, the state controls such distribution.

1.3.6 Environmental Benefits

The environmental benefits of the Project are substantial. Wind power is a renewable and non-polluting source of electricity. The Project will result in a substantial contribution to Duke Energy's overall renewable electrical generation and will not create direct pollutant emissions during operation. In addition, unlike most other electrical generation sources, wind turbine generators (WTGs) do not consume water or require additional fuel sources. Lastly, construction and operation of the Project is a low-impact, non-extractive source of electrical generation, typically resulting in disturbance to only approximately 3 percent of the lands within the defined Project area.

2.0 Applicant and Facility Description

In accordance with W.S. 35-12-109, the application shall contain the information required by the ISA with respect to both the construction period and the following information the Council determines necessary.

The following sections provide information relevant to W.S. 35-12-109 and detailed Project-specific information relating to the intention of Three Buttes to construct, own, and operate a 99-MW wind energy facility northwest of Glenrock, Wyoming.

2.1 Applicant Information

Rule I Section 7(a) (W.S. § 35-12-109(a)(i)) - Name and Address of Applicant. An application for a permit shall be filed with the division, in a form as prescribed by council rules and regulations, and shall contain the name and address of the applicant, and, if the applicant is a partnership, association or corporation, the names and addresses of the managers designated by the applicant responsible for permitting, construction or operation of the facility.

Applicant:

Three Buttes Windpower, LLC
7000 North Mopac, Suite 475
Austin, TX 78731

The following manager has been designated by Three Buttes to be responsible for permitting and constructing the Project:

Mr. Richard T. Nerzig
Vice President, Wind Development
Duke Energy Corporation
7000 North Mopac, Suite 475
Austin, TX 78731

Three Buttes is an indirect and wholly-owned subsidiary of Duke Energy, a Fortune 500 company headquartered in Charlotte, North Carolina, and one of the largest electric power companies in the United States with approximately 17,800 employees.

Recognized as one of the best operators in the country, Duke Energy is currently managing more than 6,600 MW of power generation at 23 facilities throughout the United States. The company specializes in developing innovative and environmentally sound generation solutions using a diverse mix of fuels, including natural gas, coal, waste coal, biomass, as well as wind and other renewable sources. Duke Energy has nearly 500 MW of wind power projects in operation and an additional 5,000 MW of wind power projects under development in 12 states.

2.2 Point of Delivery - Goods and Services

39-15-111(c) – Distribution. If any person commences after the effective date of this act to construct an industrial facility, as that term is defined in W.S. 35-12-102, under a permit issued pursuant to W.S. 35-12-106, or if the federal or state government commences to construct any project within this state with an estimated construction cost as specified in the definition of industrial facility in W.S. 35-12-102 the state treasurer shall thereafter pay to the county treasurer and the county treasurer will distribute to the county, cities and towns of that county in which the industrial facility or project is located, impact assistance payments from the monies available under paragraph (b)(i) of this section.

For purposes of this subsection, the industrial facility or federal or state government project will be deemed to be located in the county in which a majority of the of construction costs will be expended.

The construction and operation of the Project will result in the purchase of goods and services, both for the Project itself and for the needs of the associated construction and operations workforce. Goods and services procured for construction activities will be obtained from various local, regional, and national vendors. Three Buttes anticipates that the majority of the Project's components will be trucked to the Project site.

Converse County will be the primary point of delivery for components associated with the Project.

2.3 Site Selection

W.S. § 35-12-109(a)(vii) - Site Selection. An application for a permit shall be filed with the division, in a form as prescribed by council rules and regulations, and shall contain a statement of why the proposed location was selected.

The Project site was selected for the following primary reasons: (1) the site is expected to result in a desirable wind resource based on previously collected meteorological data and production estimates; (2) the site is located near the existing PacifiCorp 230-kilovolt (kV) transmission line; (3) feasibility studies from PacifiCorp Transmission conclude that interconnection to the existing PacifiCorp transmission line is feasible; and (4) successful implementation and operation of the Project will help to meet PacifiCorp's growing generation and renewable resource needs.

2.4 Nature and Location of the Facility

Rule I Section 7(b) (W.S. § 35-12-109(a)(iii)) - Nature and Location of Facility. An application for a permit shall be filed with the division, in a form as prescribed by council rules and regulations, and shall contain a description of the nature and location of the facility; and - A description of the specific, geographic location of the proposed industrial facility.

The Project site is located in Converse County, Wyoming, approximately 4 to 16 miles northwest of Glenrock (Figure 2-1). The Project site will be accessed using I-25, Wyoming State Highway 256, Natrona County Road 701 (Cole Creek Road), and a private gravel

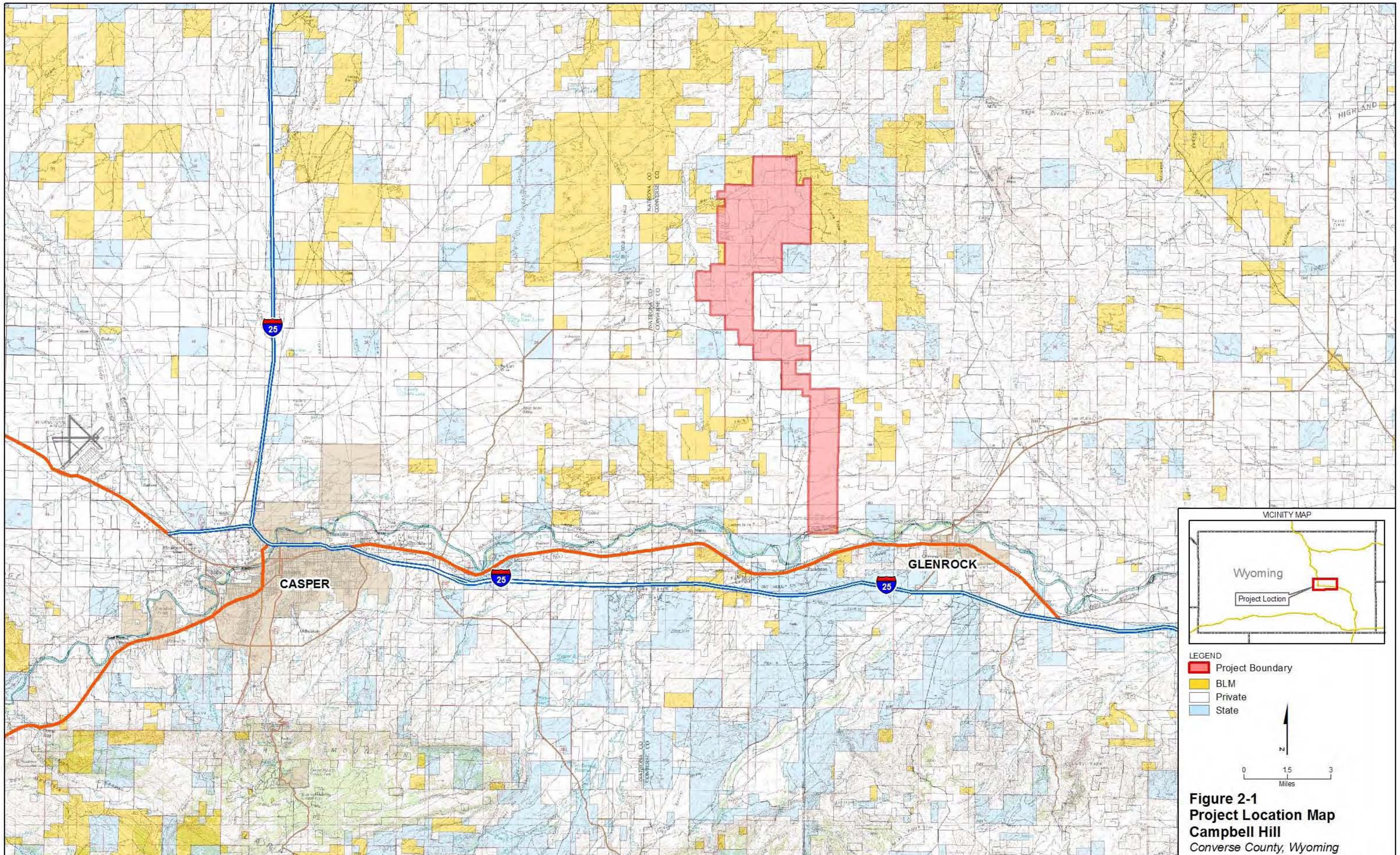

FIGURE 2-1
Project Location Map

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road. The dominant drainage feature on the Project site is the Lone Tree Gulch along with its associated tributaries. The elevation throughout the Project site ranges from approximately 5,370 to 6,070 feet above mean sea level.

The Project area occurs within the Northwestern Great Plains ecoregion, which includes gently sloping to rolling, moderately dissected shale plains. There are some steep, flat-topped buttes, particularly in eastern Wyoming. Native grasslands persist in rangeland areas on broken topography.

In general, the Project area supports a typical shortgrass prairie community. Dominant species in this grassland include notable amounts of threadleaf sedge (*Carex filifolia*), as well as the more common blue grama grass (*Chondrosum gracilis*), buffalo grass (*Buchloë dactyloides*), slender wheatgrass (*Elymus trachycaulus*), and western wheat grass (*Pascopyron smithii*), with a number of common early season grassland forbs (wildflowers). Many locations also support relatively large amounts of different ground lichens, as well as yucca (*Yucca glauca*) and, in places, large amounts of prickly pear cactus (*Opuntia polyacantha*). Big sagebrush (*Artemisia tridentata* var. *wyomingensis*) occurs as scattered individuals throughout the grassland or in relatively dense shrubland stands. Some drainage bottoms support a distinct plant community dominated by large swaths of shadscale (*Atriplex confertifolia*), which is an indicator of alkaline soils, with an understory of dense sweet alyssum (*Alyssum alyssoides*. Large areas of exposed rock outcrop and unvegetated soils occur along the ridge edges and tops, which support very little vegetation.

2.5 Preliminary Site Plan

Rule I Section 7(b)(i) - Preliminary site plans at an appropriate scale indicating the anticipated location for all major structures, roads, parking areas, on-site temporary housing, staging areas, construction material sources, material storage piles and other dependent components.

Three Buttes has completed a preliminary site plan layout for the Project. Please see **Appendix B** for the preliminary site plan.

2.6 Land Ownership

Rule I Section 7(b)(ii) – Land Ownership. The area of land required by the industrial facility and a land ownership map covering all the components of the proposed industrial facility.

The Project and transmission corridor are located on private fee lands leased by Three Buttes. Leased land in Converse County includes 14,880 acres; of this, approximately 4,400 acres are leased for the transmission line easement (Table 2-1). One parcel of state land will be crossed to access the Project Site. Three Buttes has applied to the Wyoming Office of State Lands and Investments for a Special Use Easement from the State of Wyoming Board of Land Commissioners for the use of state-owned parcels within the Project boundary. In addition, no federal or state lands will be utilized for the WTGs and appurtenant linear features, including access roads, collector lines, and transmission line. Table 2-1 provides the legal description of the Project's location.

TABLE 2-1
Site Legal Description – Leased Acreage

Township	Range	Section(s)	Parcel Description	Acreage
Wind Farm				
35N	76W	4, 5, 8, 9, 5, 17, 19, 23	All	5,120
35N	76W	22	NE1/2 (triangular)	320
35N	76W	25	W1/2	320
36N	76W	32	All	640
36N	76W	33	W1/2, SE1/4SE1/4	360
35N	76W	30	All	640
35N	76W	6	E1/2SE1/4	80
35N	76W	6	All except E1/2SE1/4	560
35N	76W	7	E1/2E1/2	160
35N	76W	7	All except E1/2E1/2	480
35N	76W	18	E1/2	320
35N	76W	18	W1/2	320
35N	76W	26	NE1/4NE1/4	40
35N	77W	13	SE1/4SE1/4	40
35N	77W	24	S1/2, NE1/4, SE1/4NW1/4	520
35N	77W	24	W1/2NW1/4, NE1/4NW1/4	120
35N	77W	1	SE1/4NE1/4 and SE1/4SE1/4	80
35N	77W	12	E1/2E1/2	160
35N	77W	13	SW1/4SE1/4	40
35N	77W	25	NE1/4	160
			Wind Farm Total	**10,480**
Transmission Corridor				
34N	76W	4	W1/2 and S1/2S1/2	480
34N	76W	10, 15, 22, 27, 34	All	3,200
34N	76W	9	NE/4 of the NE/4	40
35N	76W	31	NE1/4	160
35N	76W	32	E1/2 and N1/2NW1/4	400
35N	76W	33	SW1/4	120
			Transmission Corridor Total	**4,400**

Source: Three Buttes, 2008.

2.7 Project Phase Descriptions and Future Modifications

W.S. § 35-12-109(a)(vi) - Future Additions and Modifications. An application for a permit shall be filed with the division, in a form as prescribed by council rules and regulations, and shall contain future additions and modifications to the facility to which the applicant may wish to be approved in the permit.

The Project will be constructed in a single 99-MW phase during an anticipated 12-month construction period. No future phases or modifications to the Project are planned.

2.8 Wind Energy Facility Components

Rule I Section 7(c) - A general description of the major components of the proposed industrial facility such as boilers, steam generators, turbine generators, cooling facilities, production equipment, and dependent components.

The Project will have up to 66 GE 1.5-MW sle model WTGs. Facilities and related infrastructure will include WTGs mounted on tubular towers, transformers, and electric and fiber optic communications cable. Some electrical collector cables may be installed above ground where doing so would minimize environmental impact or be necessary due to terrain. Access roads, meteorological towers, a supervisory control and data acquisition (SCADA) system, and an O&M building also will be constructed. A Project substation will be constructed within the Project area, and approximately 10 miles of 230-kV transmission line will extend southward to a new switching station to interconnect with the existing PacifiCorp transmission line. Please refer to the preliminary site plan included in Appendix B.

2.8.1 Wind Turbine Generators

The GE 1.5-MW sle WTG is a three-blade, active yaw-and-pitch regulated machine with power and torque control capabilities. The blade diameter is 77 meters (m) (253 feet [ft]), and the height at the hub is expected to be up to 80 m (262 ft) (Figure 2-2). The swept area of the rotor is 4,657 square meters (m^2) (5,570 square yards [yd^2]), and the rotor typically operates at 20 revolutions per minute (rpm). The Project will include construction and erection of up to 66 WTGs. The turbines will be mounted on a poured concrete pad and spaced at distances equal to approximately two to three rotor diameters apart, dependent on the specific turbine site characteristics.

WTGs consist of three main structures: steel tubular tower, nacelle, and rotor blades. The WTGs for the Project will be grouped in strings, interconnected with an underground power collection system, and linked to an existing PacifiCorp transmission line by approximately 10 miles of newly constructed 230-kV transmission line.

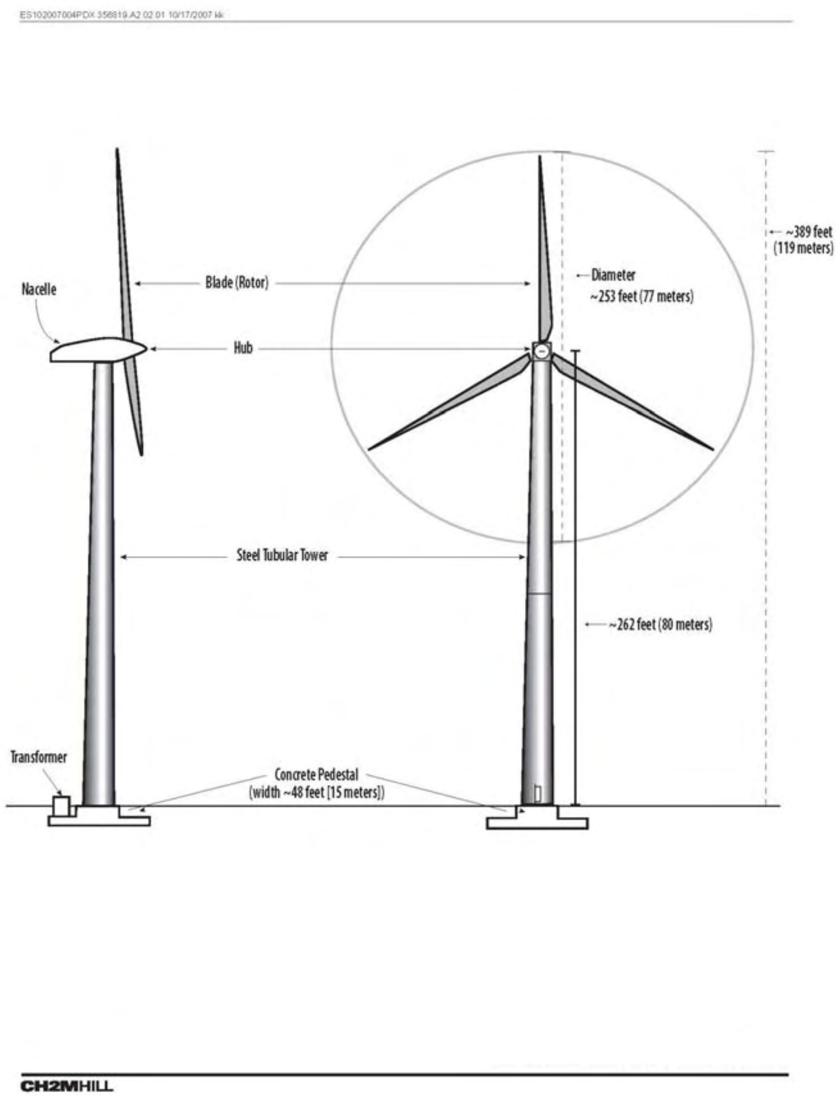


FIGURE 2-2
Wind Turbine and Tower

2.8.2 Rotor Blades

The GE WTGs are powered by three fiberglass epoxy or polyester resin blades connected to a central rotor hub. Wind creates lift on the blades, causing the rotor hub to spin. This rotation is transferred to a gearbox where the speed of rotation is increased to the speed required for the attached electric generator that is housed in the nacelle. The rotor blades turn slowly, typically less than 20 rpm at the hub. Although the blades are non-metallic, they are equipped with a sophisticated lightning protection system.

2.8.3 Nacelle

The gearbox, generator, and various pieces of control equipment are enclosed within the nacelle, which houses the unit that protects the turbine mechanics and electronics from environmental exposure. A yaw system is mounted between the nacelle and the top of the tower on which the nacelle resides. The yaw system is composed of a bearing surface for directional rotation of the turbine and a drive system consisting of a drive motor(s) to keep the turbine pointed into the wind to maximize energy capture. A wind vane and anemometer are mounted at the rear of the nacelle to signal the controller with wind speed and direction information.

2.8.4 Tower Structures

The tower that supports the GE WTG is expected to be a tapered monopole, approximately 80 m (262 ft) in height. It is supported by a reinforced-concrete foundation, ranging from 15 to 24 m (48 to 80 ft) in width, depending on final engineering design. The towers will be uniformly painted a neutral color that complies with Federal Aviation Administration (FAA) requirements for daylight marking. The towers feature a locked entry door at ground level and an internal access ladder with safety platforms for access to the nacelle. A controller cabinet will be located inside each tower at its base. Towers are pre-fabricated in three sections and delivered and assembled onsite. The GE tower is designed to withstand the maximum wind speeds expected at the Project site. Survival wind speed (maximum wind the tower can withstand before failing) is 55 meters per second (m/s), and the 50-year return wind speed (recurrence interval) at the Project site is 52 m/s.

2.8.5 Transformer

A step-up transformer will be installed at the base of each WTG to increase the output voltage of the WTG to the voltage of the power collection system (34.5 kV). Small concrete slab or fiberglass foundations, a concrete vault, or other suitable base will be used to support the step-up transformers.

2.8.6 Foundations

The tower for the WTG will be set on a poured-in-place concrete foundation. The actual foundation design for each turbine will be determined based on site-specific geotechnical information and structural loading requirements of the selected turbine model.

2.9 Additional Project Features

Rule I Section 7(c) - A general description of the major components of the proposed industrial facility such as boilers, steam generators, turbine generators, cooling facilities, production equipment, and dependent components.

2.9.1 Access Roads

New gravel access roads will be constructed in areas where existing roads do not provide access to WTG or substation locations and along the length of turbine strings. Access roads will be designed under the direction of a professionally licensed engineer and compacted to meet turbine and transformer equipment load requirements specified by the vendor.

Proposed access roads will be located to minimize disturbance and minimize impact on sensitive resources (e.g., raptor nests, cultural resource sites, sage-grouse leks, wetlands and waters of the U.S.). To allow safe passage of the large transport equipment used in construction, all-weather gravel roads will be built with adequate drainage and compaction to handle expected loads. Road widths would be approximately 40 feet.

The Project is anticipated to include approximately 20 miles of newly constructed access roads and 15 miles of improved existing roads.

2.9.2 Power Collection System

The Project electrical system will consist of three key elements:

1. A collector system, which collects energy generated at low to medium voltage from each WTG, transforms it to 34.5 kV through a pad-mounted transformer, and delivers the power through a network of electrical conductors
2. A Project substation, which transforms energy delivered by the collector systems from 34.5 kV to 230 kV
3. A 230-kV transmission line, which will deliver the electricity and interconnect to the existing PacifiCorp transmission line.

The majority of the collector system will be buried directly in the soil approximately 3 to 4 ft below the ground surface. However, where site-specific considerations require, the collector system may be above ground. Using above-ground structures allows the collector cables to cross other facilities and span drainages or intermittent streams, thus reducing environmental impacts. If used, overhead pole structures will generally be about 35 to 80 ft tall, depending on terrain. The final design may include an overhead collector cable route in certain locations.

Examples of site-specific conditions that will make it environmentally or economically advantageous to run portions of the collection system above ground are as follows:

- Steep terrain where the use of backhoes and trenching machines is not feasible or safe
- Stream and wetland crossings where an above-ground line avoids or minimizes environmental impacts
- Soil with low thermal conductivity, preventing adequate heat dissipation from the conductor
- Rocky conditions that significantly increase trenching costs
- An economic advantage for overhead construction on circuits into the substation.

Because detailed geotechnical studies have not yet been completed for the Project, it is not possible to determine whether above-ground collector cables will be advantageous; however, the design anticipates the use of some overhead lines.

2.9.3 SCADA System

A SCADA system will be installed to collect operating and performance data from each WTG and provide remote monitoring and operation of the WTGs when appropriate. The WTGs will be linked to one or more central computers via a fiber optic network. Fiber optic cables for the SCADA system will be installed in the collector cable trenches. The SCADA cables will be installed at least 3 to 4 ft below ground. The host computer(s) is expected to be located in the substation building control room at the Project site. SCADA software will consist of applications developed by the turbine vendor and/or a third-party SCADA vendor.

2.9.4 Substations

Output from the Project site will be delivered to a 34.5/230-kV collector substation that is centrally located on the Project site. The collector cable system will link each turbine to the next in an electrical grid pattern and to the collector substation. The substation site will be surrounded by a graveled, fenced area with transformer and switching equipment and an area to park vehicles. Transformers will be oil cooled and insulated. The substation equipment may include circuit breakers, power transformer(s), bus and insulators, disconnect switches, relaying equipment, battery and charger, surge arrestors, alternating current and direct current (AC/DC) supplies, control building, metering equipment, SCADA provision, grounding, and associated control wiring. The substation facilities will conform to all applicable Wyoming regulations and standards.

A new 230-kV transmission line will interconnect with the existing PacifiCorp transmission line via a switching station to be constructed in Sections 27 and 34, Township 34 North, Range 76 West. The 230-kV transmission line will be constructed across private fee lands and will not require the use of State of Wyoming or Bureau of Land Management (BLM) federal lands.

2.9.5 Meteorological Towers

Two existing meteorological (met) towers will remain as permanent met towers within the footprint of the Project site for the purpose of collecting meteorological data and forecasting conditions at the site. The permanent met towers will be metal tube (guyed) structures. The towers are 50 m (164 ft) and 60 m (197 ft) in height, respectively.

2.9.6 Operation and Maintenance Building

An O&M building will be constructed within the Project boundary. The O&M building will be approximately 4,500 square feet and will include space for offices; bathroom and kitchen facilities; a break room; a storage area; and a garage for vehicle, turbine, and equipment maintenance. A fenced, graveled area for parking and storage will be provided. The O&M building will use a new groundwater well to supply water for domestic use and discharge to an onsite septic system. Power for the O&M building is expected to be provided by Rocky Mountain Power.

2.9.7 Lighting Specifications

The WTGs will be grouped in strings, and some of the turbines will include installed aviation warning lights, as required by the FAA. The number of turbines with lights and the lighting pattern of the turbines will be determined in consultation with the FAA.

3.0 Construction and Operations Descriptions

This section provides information on the construction and operations of the Project, including general construction procedures, schedules, workforce estimates, housing plan, and safety mechanisms.

3.1 Time of Commencement and Construction Time

Rule I Section 7(a)(iv) – An application for a permit shall be filed with the Division, in a form as prescribed by Council rules and regulations, and shall contain information on the estimated time of commencement of construction and construction time.

Initial feasibility, wind resource assessment and modeling, preliminary layout, and limited permitting activities have been completed in 2008. Contingent upon approval from the Council and obtaining all other required permits, construction of the Project would initiate in February 2009 (i.e., the first quarter of 2009). The construction schedule would last approximately 12 months.

3.2 Construction Schedule

Rule I Section 7(e) - A statement that shall be a reasonable estimate of the calendar quarter in which construction of the industrial facility will commence, contingent upon the issuance of a permit by the Council.

Contingent upon approval from the ISC and obtaining all other required permits, Three Buttes anticipates initiation of Project construction activities in the first quarter of 2009. Three Buttes would begin road construction in February 2009 and proposes to commence all other Project construction activities as soon as all necessary permits have been obtained.

A general overview of the construction processes associated with the Project is provided below. Section 3.4 provides a detailed description of the planned construction procedures.

Engineering and Final Design – Perform site geotechnical investigations, civil engineering (roads and stormwater), electrical engineering design (collection system, switching station, and substation), site surveying, and complete final structural engineering (foundations). Engineering and design activities were initiated in 2008 to support physical site construction planned to commence in the first quarter of 2009.

Site Civil Construction – Establish site access and guard station; begin contractor mobilization onsite; performing site grading; build site access roads; remove and grub vegetation from construction and laydown areas (primarily for fire safety); construct stormwater control structures, the O&M building, and a weatherproof equipment and parts storage area (which may be either separate or combined with the O&M building); and complete WTG clearing, and pad excavation.

WTG Foundations – Pour and cure concrete mud mat, install rebar for concrete tower foundations, and pour and cure concrete foundation.

Electrical Collection System – Construct electrical substations; build electrical collection system; interconnect towers, meteorological towers, and substation with power-conducting cables and signal cables; interconnect circuits to substation; and perform shake-down tests.

Substation and Interconnection Station - Construct substation, install transformer and other substation equipment, and energize collection system.

WTGs – Deliver WTG and components to each turbine pad, erect towers; install nacelles and rotors, install transformers; install permanent meteorological towers (as necessary), and perform final commissioning of each WTG.

Site Cleanup and Restoration – Perform site restoration, cleanup, and heavy equipment demobilization.

Additional temporary activities will include installation of onsite temporary offices and sanitary facilities, and set up of portable concrete batching plant.

The current construction schedule for the Project is summarized in Figure 3-1.

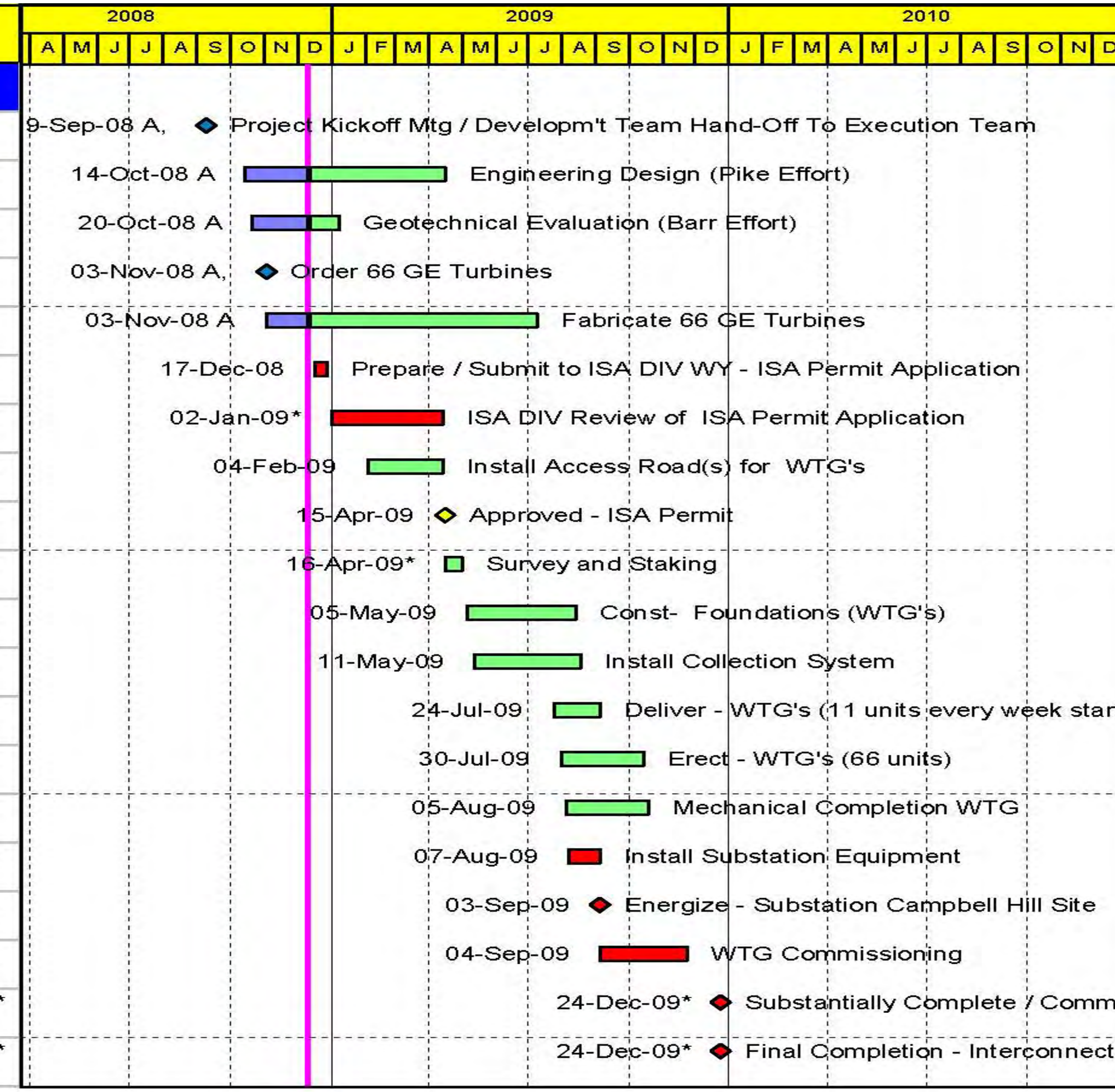
3.3 Construction Completion Schedule

Rule I Section 7(f) - A statement that shall be a reasonable estimate of the maximum time period required for construction of the industrial facility and an estimate of when the physical components of the industrial facility will be ninety (90) percent complete, and the basis for that estimate.

As detailed in Figure 3-1, erection and commissioning of the WTGs is anticipated to be completed in December 2009. Therefore, the Project is anticipated to be 90-percent complete in the fourth quarter of 2009.

Campbell Hill - Preliminary - In Svc 12/09 Rev 1

Activity ID	Activity Name	Start	Finish
CH1980	Project Kickoff Mtg / Developm't Team Hand-Off To Execution Team	09-Sep-08 A	
CH3210	Engineering Design (Pike Effort)	14-Oct-08 A	16-Apr-09
CH3220	Geotechnical Evaluation (Barr Effort)	20-Oct-08 A	09-Jan-09
CH10920	Order 66 GE Turbines	03-Nov-08 A	
CH10930	Fabricate 66 GE Turbines	03-Nov-08 A	09-Jul-09
CH2120	Prepare / Submit to ISA DIV WY - ISA Permit Application	17-Dec-08	27-Dec-08
CH3330	ISA DIV Review of ISA Permit Application	02-Jan-09*	14-Apr-09
CH1550	Install Access Road(s) for WTG's	04-Feb-09	13-Apr-09
CH2280	Approved - ISA Permit		15-Apr-09
CH10960	Survey and Staking	16-Apr-09*	30-Apr-09
CH1330	Const- Foundations (WTG's)	05-May-09	13-Aug-09
CH1670	Install Collection System	11-May-09	18-Aug-09
CH1430	Deliver - WTG's (11 units every week starting SNLT 7/24/09)	24-Jul-09	03-Sep-09
CH1260	Erect - WTG's (66 units)	30-Jul-09	13-Oct-09
CH1290	Mechanical Completion WTG	05-Aug-09	19-Oct-09
CH1650	Install Substation Equipment	07-Aug-09	03-Sep-09
CH1190	Energize - Substation Campbell Hill Site		03-Sep-09
CH1300	WTG Commissioning	04-Sep-09	23-Nov-09
CH1640	Substantially Complete / Commissioning Complete (FNLT 12/31/09)		24-Dec-09*
CH1660	Final Completion - Interconnect Complete / Begin Comm Ops (FNLT 12/31/09)		24-Dec-09*



Legend		Campbell Hill Wind Project	
Remaining Lvl Of Eff	LOE Completed	Preliminary Project Summary	Printed: 24-Dec-08
Critical LOE	Actual Work		Data Date: 12-Dec-08
			Page 1 of 1

FIGURE 3-1
Construction Schedule

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3.4 Construction Procedures

The general construction contractor and subcontractors would prepare the construction site; complete site civil work including access roads; install WTG pads and erect WTGs; install appurtenant linear facilities; oversee construction; and complete final cleanup and restoration of the turbine crane pads, widened access roads, and other temporary disturbance areas. Heavy construction equipment used to construct the Project would include earth-moving equipment, cranes, and support staff light trucks. Table 3-1 details the general equipment that is likely to be used for the Project.

TABLE 3-1
List of General Construction Equipment for the Campbell Hill Windpower Project

Equipment	Construction Use
Bulldozers	Road and Pad Construction
Motor Graders	Road and Pad Construction
Gravel Truck Haulers / Bottom Dump	Hauling and Placement of Road Aggregate
Water Trucks	Compaction, Erosion, and Dust Control
Roller/Compactors	Road and Pad Compaction
Backhoe/Trenching Machines	Excavating Foundations, Trenches for Underground Utilities
18-Wheel Semi-Tractors	Turbine Component Delivery
Truck-Mounted Drill Rigs	Drilling Soil Test Bore Holes
Concrete Trucks and Pumps	Pouring Tower and Other Structure Foundations
Conventional and Small Cranes	Off-Loading Equipment Onsite, Set Tower Components
Heavy and Intermediate Cranes	Off-Loading Equipment Onsite, Erecting Towers, Nacelles, and Rotors
Cement Trucks	Hauling Tower Base Cement Material
Pickup Trucks	General Use by Construction Personnel
Small Hydraulic Cranes/Forklifts	Loading and Unloading Minor Project Equipment
All-terrain Vehicles	Site Access
Rough-terrain Forklift	Lifting Equipment
Concrete Batch Blant	On-site concrete mixing for turbine foundations

Source: CH2M HILL, 2008.

3.4.1 Site Civil Work/Preparation

Prior to breaking ground, the construction work area will be surveyed and clearly demarcated with stakes and flagging. Access roads, WTG locations, and other site locations will be grubbed, cleared, and prepared for site activities. Roads are expected to be constructed in advance of other Project features, depending on the timing for receipt of necessary permits. Grading will be minimized and all topsoil will be preserved, to the extent

practicable. Excavated topsoil will be stockpiled alongside the excavated area for replacement after construction or as agreed with the landowner.

The tower sections, rotor blades, and other WTG components are intended to be delivered directly to the WTG locations using the completed access roads for onsite assembly.

3.4.2 Access Roads and Crane Pads

Access roads have been located to minimize disturbances, maximize transportation efficiency, and avoid sensitive resources and unsuitable topography to the extent practicable. Existing roads will be used where practicable and will be built to Project road design specifications (i.e., some areas may need to be widened to accommodate delivery of WTG equipment or movement of construction equipment). Raw materials used for access road and crane pad preparation will primarily consist of aggregate, such as gravel or crushed rock, and water for dust control and road compaction. In conjunction with the access road construction, crane pads will be established at each WTG location. The purpose of the crane pads is to provide enough space for placement of a large crane to install the tower sections, nacelle, blades, and other components. The crane pads also provide access to the area for maintenance, if necessary. When construction is complete, an approximate area 40-ft-long by 50-ft-wide will be maintained for O&M procedures.

3.4.3 Tower Foundations

After road and pad construction is complete, crews will begin installation of the tower foundations immediately adjacent to the crane pads. The concrete foundations will be excavated, a mud mat poured and cured, forms set, rebar installed, and the concrete poured and cured to create the foundation. Dependent upon the foundation design, each tower foundation will require approximately 400 cubic yards of concrete.

During construction, a licensed engineer will prepare a special inspection report for each foundation excavation and pour. The source of aggregate for the concrete will be determined through a competitive bid process with local companies who can provide aggregate from nearby quarries. The Project will use an onsite portable concrete batch plant.

3.4.4 Tower Assembly

After the concrete foundations are in place and cured, the WTG towers, nacelles, and blades will be delivered to each WTG location in the order of assembly. Large cranes will be brought onsite to lift the multiple tower sections, nacelle, and three-bladed rotor into place. The first step will be to lift and secure the down tower electrical assembly to the foundation. Next, the first tubular tower base section will be lifted over the down tower assembly and secured to the foundation. Subsequent tower sections will be connected to the base tower section. The nacelle, rotor, and other WTG equipment will then be delivered to the turbine pad location. Blades will be bolted to the rotor hub, lifted to the central hub by a construction crane, and connected to the nacelle.

3.4.5 Underground Electric Conductor

Underground electrical and communication cables will be buried adjacent to and connecting with WTG arrays. Electrical cables will be direct buried 3 to 4 ft underground by a special

purpose tool and backfilled or plowed. Disturbed areas will be contoured and reseeded with the designated reclamation seed mixture.

3.4.6 Substation and Switch Yard

The Project substation and switch yard sites will be cleared and graded. The substation will occupy an area of approximately 2 acres. After site preparation, transformer pads, oil spill containment structure, and other foundations will be excavated, forms set, rebar installed, and the concrete poured and cured to create the foundation. Electrical and other equipment will be transported to the site by truck and installed with appropriate construction equipment. Following construction, the substation and switchyard facilities will be surrounded by a security fence pursuant to prudent and adopted utility practices.

3.4.7 Transformers

Pad-mounted transformers will be located within approximately 20 ft of the base of each turbine tower. The approximately 5-square-feet (ft^2) steel-transformer box housing the transformer circuitry will be mounted on an approximately 6-ft^2 pad or vault made of fiberglass or concrete. Transformers will contain non-polychlorinated biphenyl (PCB) mineral oil and will be sealed.

3.4.8 Testing

After all WTGs are erected and electrical collection systems are interconnected, all systems, controls, and safety equipment will be calibrated and tested before being placed into service. Qualified technicians, turbine experts, and electricians will test and inspect all WTG components, transformers, communications systems, substation and switchyard, and transmission systems to ensure that they comply with required design specifications and are working properly. Each WTG and associated piece of equipment will be tested and inspected upon individual completion. All tests will be conducted and problems corrected prior to final interconnection commissioning.

3.4.9 Cleanup and Reclamation

After construction, temporarily disturbed areas (i.e., crane pads, laydown areas, and collector lines) will be restored similar to pre-construction conditions. The site revegetation plan is detailed in Section 7.5.1.

3.4.10 Construction Environmental, Health, and Safety Plan

Three Buttes will prepare a site Environmental, Health, and Safety (EHS) Plan that outlines overall expectations for EHS performance on the Project site for all employees, contractors, and subcontractors. The EHS Plan will require that the general contractor and the turbine supplier prepare specific plans and procedures to be approved by Three Buttes and put in place prior to commencement of construction. The EHS Plan will cover all work to be performed by the general contractor, turbine supplier, and all site subcontractors during construction, operation, and decommissioning of the Project. In addition, all site personnel will comply with all safety requirements of Occupational Safety and Health Administration (OSHA), State of Wyoming, and local ordinances, as applicable.

The general contractor will be required to maintain adequate first-aid facilities throughout the construction period. Specifically, prior to construction, the general contractor and turbine supplier will provide and maintain for the protection of its employees such safety equipment, guarding, and personal protective apparel as is prescribed for safety practices or as required by any law, ordinance, rules, or the exercise of ordinary prudence for the type of work being performed. Lastly, a Three Buttes construction management representative will be onsite during the construction phase to monitor the health and safety performance of the general contractor.

3.5 Construction Workforce Estimate

Rule I Section 7(v) - Estimated number and job classifications, by calendar quarter, of employees of the applicant, or contractor or subcontractor of the applicant, during the construction phase and during the operating life of the facility.

The estimated number of construction workers by month and calendar quarter is shown in Figure 3-2. Three Buttes anticipates that the onsite construction workforce will vary from a low of 9 in January 2010 during road construction to a high of 129 construction trades people during the peak of construction activities in July 2009. Over the 12-month construction period, there would be a monthly average of approximately 77 full-time equivalent workers onsite. Table 3-2 presents the workforce personnel breakdown.

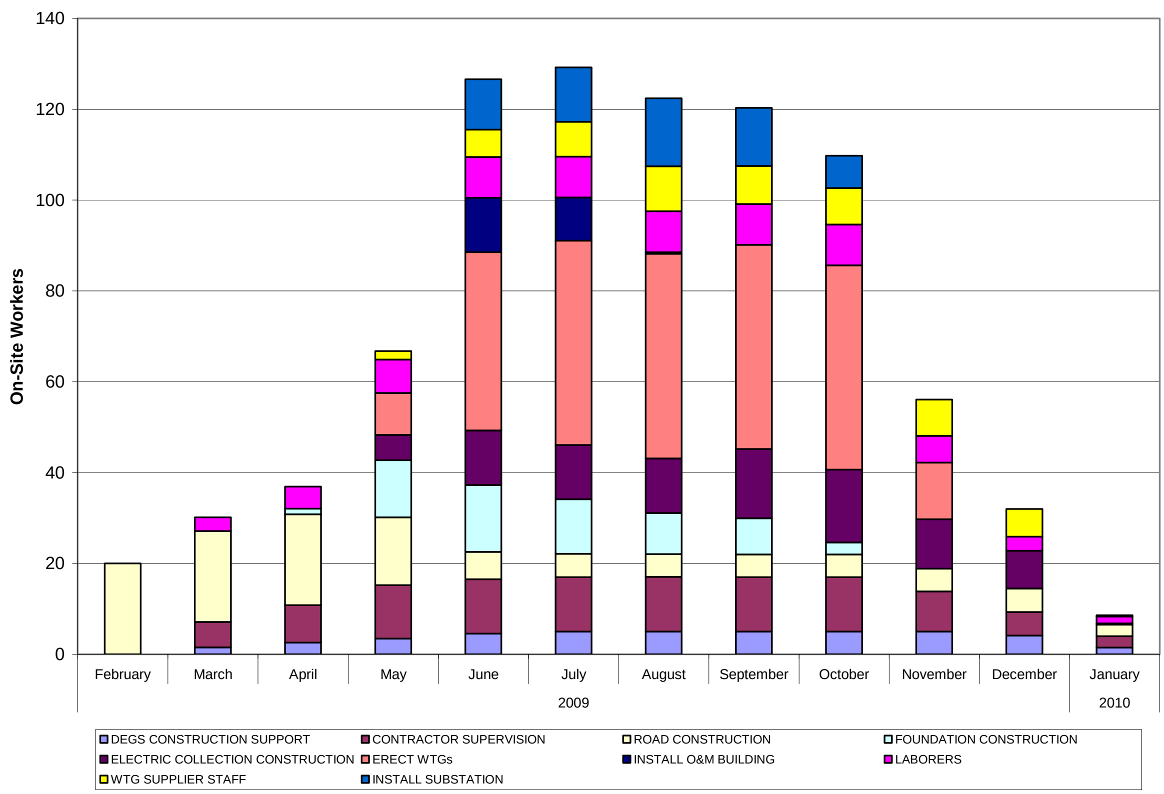

FIGURE 3-2
Construction Phase Workforce (by Month and Trade Type)

TABLE 3-2
Three Buttes Campbell Hill On-Site Construction Workforce Schedule

Month	Three Buttes Construction Support	Contractor Supervision	Road Construction	Foundation Construction	Electric Collection Construction	Erect WTGs	Install Substation	Install O&M Building	Laborers	Turbine Supplier On-site Personnel	Grand Total
Feb-09	0	0	20	0	0	0	0	0	0	0	20
Mar-09	2	6	20	0	0	0	0	0	3	0	30
Apr-09	3	8	20	1	0	0	0	0	5	0	37
May-09	3	12	15	13	6	9	0	0	7	2	67
Jun-09	5	12	6	15	12	39	11	12	9	6	127
Jul-09	5	12	5	12	12	45	12	9	9	8	129
Aug-09	5	12	5	9	12	45	15	0	9	10	122
Sep-09	5	12	5	8	15	45	13	0	9	8	120
Oct-09	5	12	5	3	16	45	7	0	9	8	110
Nov-09	5	9	5	0	11	12	0	0	6	8	56
Dec-09	4	5	5	0	8	0	0	0	3	6	32
Jan-10	2	3	3	0	0	0	0	0	2	0	9

Source: Three Buttes and CH2M HILL, 2008.

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Three Buttes will require its general contractor to use local workers to the extent practicable and has solicited local contractors via http://www.duke-energy.com/ for screening by the general contractor.

3.5.1 Local Workforce

It is assumed that the proportion of local workers filling job openings will vary by trade and skill level. Three Buttes estimates the following proportions of local construction workforce may be potentially employed by the Project: 60 percent for geotechnical investigation, 100 percent for surveying, 20 percent for civil and electrical construction, 15 percent for WTG and meteorological tower erection, 10 percent for the field office, and 0 percent for the turbine supplier.

Based on the workforce assumptions above, a preliminary estimate of the number of local onsite workers is likely to peak at about 31 during June 2008. Figure 3-3 presents an estimate of local construction workforce by trade that may be potentially employed at the Project.

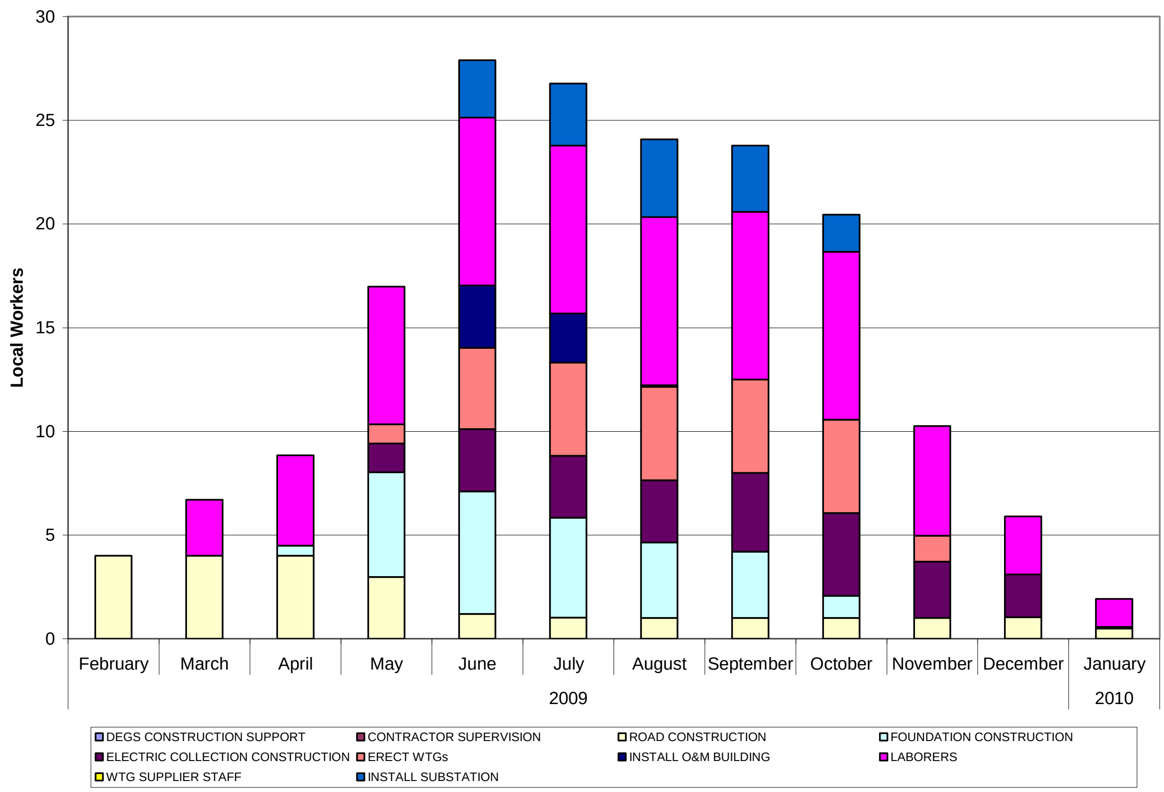

FIGURE 3-3
Local Construction Workforce (by Month and Trade Type)

3.5.2 Non-Local Workforce

Based on the type of labor required to complete construction contracts on the wind energy facility, a majority of the resulting construction workers is likely to be non-local and enter the region. Figure 3-4 provides an estimate of the peak non-local construction workforce.

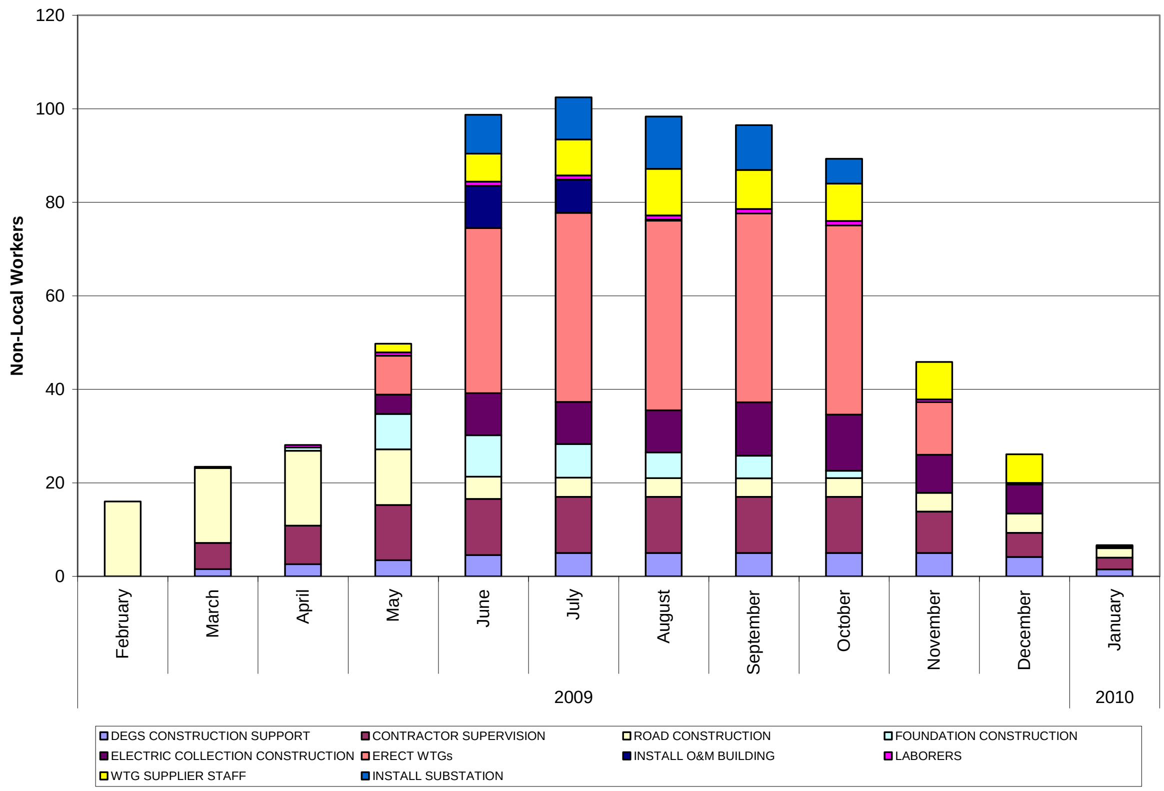

FIGURE 3-4
Non-Local Construction Workforce (by Month and Trade Type)

3.6 Operations Workforce Employment

Rule I Section 7(v) - Estimated number and job classifications, by calendar quarter, of employees of the applicant, or contractor or subcontractor of the applicant, during the construction phase and during the operating life of the facility.

A long-term benefit of the Project comes from the permanent employees who will operate and maintain the wind energy facility. Upon completion, operation of the Project will require approximately 11 full-time employees. The full-time job classifications and estimated number of personnel are displayed in Table 3-3.

It is anticipated that the Project will have an initial operations workforce in place in late 2009. Employees will be full-time over the calendar year and the anticipated life of the Project. It is assumed that 50 percent of these employees will be people who currently reside within the Project area.

TABLE 3-3
Estimated Operations Workforce Summary by Job Classification

Job Classification	Number of Personnel
WTG Maintenance Operators	8
SCADA Instrument Technician	1
Administration	1
Plant Engineer/Manager	1

Source: Three Buttes, 2008.

3.7 List of Permits Required for Construction

It is expected that all permits required for construction will be obtained prior to the initiation of construction activities, excluding road construction, in spring 2009. The anticipated permits required for construction are listed by regulatory agency in Table 3-4.

TABLE 3-4
List of Potential Permits for Construction and Operation of Project

Agency	Permit/Decision	Status	Anticipated Permit Date
Federal			
Federal Aviation Administration	Notice of Proposed Construction or Alteration	Pending final design and file prior to construction	March 2009
U.S. Environmental Protection Agency (EPA)	Spill Prevention Control and Countermeasure (SPCC) Plan	In preparation. Will be prepared and implemented on site prior to filling of oil in main power transformers and/or pad mounted transformers	NA
U.S. Army Corps of Engineers (USACE)	Clean Water Act- Section 404 Nationwide or Individual Permit	Submittal pending final design and USACE jurisdictional determination	March 2009 if required
Department of Commerce - National Telecommunication Information Agency (NTIA)	Impacts to Telecommunication Systems and RADARs	Received notice from NTIA of no anticipated impact to radio frequency transmissions, on October 2008	Received
Federal Communications Commission	Licensed Microwave Study	No conflict with licensed microwave systems, July 2008	Received
State of Wyoming			
Wyoming Department of Environmental Quality	Wyoming Industrial Development Information and Siting Act / Industrial Siting Commission Order	Submit application January 2009	April 2009
	Wyoming Pollutant Discharge Elimination System (WYPDES)—Large Construction General Permit (WYR10-0000)	Submit application plus Stormwater Pollution Prevention Plan (SWPPP) 30 days prior to construction	February 2009
	Temporary/Portable Source Air Permit	Provided by batch plant operator	May 2009

TABLE 3-4
List of Potential Permits for Construction and Operation of Project

Agency	Permit/Decision	Status	Anticipated Permit Date
	Permit to Construct Small Wastewater Facilities (Septic Tanks and Leachfields)	Pending final design	April 2009
	Section 401 Water Quality Certification	Not anticipated	March 2009, if applicable
	Temporary Increase in Turbidity	Not anticipated	March 2009, if applicable
	General Permit for Wetland Mitigation	Not anticipated	March 2009, if applicable
Wyoming State Engineers Office (WSEO)	Permits to appropriate groundwater (use, storage, wells, dewatering) or water stored in impoundments or reservoirs	Pending final design	January 2009
Wyoming Public Utility Commission	Certificate of Public Convenience and Necessity (CPCN)	CPCN Application submitted and awaiting hearing	February 2009
Wyoming Department of Transportation (WYDOT)	Port of Entry	Prior to construction	February 2009
	Permit for Oversized / Overweight Loads	Prior to construction	February 2009

Source: Three Buttes and CH2M HILL, 2008.

3.8 Operation and Maintenance Activities

Rule I Section 7(d) - A description of the operating nature of the proposed industrial facility, the expected source and quantity of its raw materials, and energy requirements.

WTGs are used to generate electricity from the kinetic power of the wind. No additional raw materials or energy requirements are required to operate the WTGs. Minimal energy will be required to operate the Project. Electricity will be required for the O&M building, facility lighting, and the station service needs for the Project.

3.8.1 Anticipated Operation Life

Rule I Section 7(d)(i) - The proposed on-line life of the industrial facility and its projected operating capacity during its on-line life and, for transmission lines exceeding one hundred fifteen thousand (115,000) volts included as part of the proposed industrial facility, a projection indicating when such lines will become insufficient to meet the future demand and at what time a need will exist to construct additional transmission lines to meet such demands.

The economic life of the Project is anticipated to be 20 years, but may be extended depending on market conditions and overall condition of infrastructure. The 230-kV transmission line is being constructed to serve the electrical output of the WTGs, and the economic life is anticipated to be approximately 20 years as well.

3.8.2 Facility Operations

Rule I Section 7(d)(ii) - Products needed by facility operations and their source.

After construction is complete, onsite personnel will operate and maintain all components of the Project, including the substation.

3.8.2.1 Wind Turbine Generators

Routine maintenance of the WTGs will be necessary to maximize performance and detect potential malfunctions. O&M procedures will be established that define specific routine WTG maintenance and inspection activities in accordance with the WTG manufacturer's recommendations. Scheduled maintenance will be conducted approximately every 6 months on each WTG. On average, each WTG would require 40 to 50 hours of scheduled mechanical and electrical maintenance per year. O&M personnel will perform routine maintenance, including periodically replacing lubricating fluids, checking parts for wear, and recording operating parameters. All roads, pads, and trenched areas will be inspected regularly and maintained to minimize erosion. The O&M staff will perform most repairs with the assistance of contracted personnel, as needed.

Each WTG will be monitored continuously by a SCADA system that communicates major aspects of operation (through communication lines) to the O&M staff and a 7-day-per-week, 24-hour-per-day facility. Alarm systems will be triggered if operational characteristics fall outside set limits. Each WTG has an automatic braking system to shut down the WTG blades in the event of malfunction or excessive wind speed. Any problems will be reported promptly to onsite O&M personnel for correction.

3.8.2.2 Operations and Maintenance Buildings

An O&M building will be constructed for the Project. The O&M building will be approximately 4,500 ft^2 and will include office space for several contractors; bathroom and kitchen facilities; a break room; a storage area; a garage for vehicle, turbine, and equipment maintenance; and the SCADA equipment. A fenced, graveled area for parking and storage also will be provided. The O&M building will use a (new) groundwater well to supply water for domestic use and will discharge to an onsite septic system. Power for the O&M building will be provided by Rocky Mountain Power.

3.8.2.3 Transformers and Substations

Substations, large step-up transformers, and pad-mounted transformers would be maintained as part of normal operations and maintenance activities and would be accessed from the access roads. In the event of transformer or other device failure, replacement of this equipment could be accomplished from the access roads.

3.8.2.4 Underground Collection Line

Periodic maintenance of underground collection lines would be required during the life of the Project. Maintenance activities would be conducted pursuant to prudent utility practices. Maintenance disturbance associated with all buried collection lines would typically be limited to an approximate 25- to 50-ft-wide construction corridor associated with each proposed linear disturbance. All electrical terminations will occur aboveground in appropriate weather-tight electrical enclosures to facilitate ease of maintenance.

Underground collection lines are relatively maintenance free, but maintenance would be conducted as needed.

3.8.2.5 Products Used for Operations

The Project site is expected to generate minimum to zero hazardous waste during construction and will operate as a conditionally exempt small quantity generator (CESQG). No substantial quantities of industrial materials will be brought onto or removed from the Project site during operations. After the Project is constructed, commissioned, and deemed operational, no new raw materials will be required for the Project's operations. The only materials that will be brought onto the site will be those related to maintenance or replacement of Project elements (e.g., nacelle or turbine components and electrical equipment).

Potentially hazardous materials to be used during O&M of the WTGs and associated facilities may include mineral oils (turbine lubricant and transformer coolant), synthetic oils (turbine lubricant and gear oil), general lubricants, general cleaners, ethylene glycol (anti-freeze), vehicle fuel, herbicides for weed control, non-empty aerosol cans (estimated at less than 10 cans per year), and incidental and occasional use of solvents (estimated to be less than 2 to 3 gallons per year). Universal waste streams include minimal quantities of spent batteries and fluorescent lamps. These materials will be stored at the O&M building.

Hazardous materials will be used in a manner that is protective of human health and the environment and will comply with all applicable local, state, and federal environmental laws and regulations. Accidental releases of hazardous materials (e.g., spills of vehicle fuel during construction or lubricating oil for turbines) will be prevented or minimized through proper containment of these substances during use and transportation to the site. Lubricating oil will be used primarily within the turbines themselves, where any spill will be contained. Oily waste, rags, or dirty or hazardous solid waste will be collected in sealable drums and removed for recycling or transported and disposed of by a licensed contractor.

In the unlikely event of an accidental hazardous materials spill or release, the spill or release will be cleaned up and the contaminated soil or other materials will be treated and disposed of according to applicable local, state, and federal environmental laws and regulations. Spill kits containing items such as absorbent pads will be appropriately located onsite for use on accidental spills, if any were to occur. Employees in contact with hazardous materials will be instructed in the proper handling and storage of these materials, as well as the location of spill kits.

Office waste, such as paper food packaging and scraps, will be generated at the O&M building. This waste is estimated to be less than 1,000 pounds per month and will be separated and periodically removed for recycling or disposal at a locally permitted landfill.

The only other source of waste at the Project site will be incidental waste from repair or replacement of electrical or turbine equipment. No industrial wastewater will be generated during operations. Sewage from the O&M building will be disposed of onsite through a septic system. The O&M personnel will be responsible for the waste management program, ensuring that solid waste is disposed of in dumpsters and any hazardous wastes are properly disposed of in accordance with applicable rules. Solid waste generated from the Project's operation is expected to be minimal.

3.9 Health and Safety

This section describes potential human health and safety issues related to construction and operation of a typical wind energy project. Based on the expected major activities associated with the Project, potential physical hazards to workers and potential safety and health issues are identified below.

3.9.1 Occupational Hazards

Construction and operations workers at any facility are subject to the risk of injuries and fatalities from physical hazards. While such occupational hazards can be minimized when workers adhere to safety standards and use appropriate protective equipment, fatalities and injuries from on-the-job accidents can still occur. Occupational health and safety are protected on the federal level through OSHA (29 United States Code [U.S.C.] 651 et seq.); Wyoming has additional laws and regulations that build on the federal law. It is Duke Energy's firm belief and commitment that workplace accidents and injuries are preventable and that a zero injury and illness culture at every worksite is a fundamental aspect of EHS excellence and improvement.

Some of the occupational hazards associated with wind energy projects are similar to those of the heavy construction and electric power industries, while others are unique to wind energy projects (i.e., heights, high winds, energized systems, and rotating/spinning equipment). In particular, the hazards of installing and repairing turbines can be similar to those of building and maintaining bridges and other tall structures.

GE will provide an O&M manual that will include system safe operating limits and descriptions, startup and shutdown procedures, alarm response actions, and an emergency procedures plan. The emergency procedures plan will identify probable emergency situations and the actions required of operating personnel. The emergency procedures plan will address overspeeding, icing conditions, lightning storms, earthquakes, broken or loose guy wires, brake failure, rotor imbalance, loose fasteners, lubrication defects, sandstorms, fires, floods, and other component failures.

3.9.2 Safety Hazards

One of the primary safety hazards of wind turbines is the potential for a rotor blade to break and parts to be thrown off. This could occur as a result of rotor overspeed, although such an occurrence has been extremely rare and happens mostly with older and smaller turbines (BLM, 2005). Material fatigue can cause a blade to break; however, these types of events are very rare, and the probability of a fragment hitting a person is even lower (BLM, 2005). A blade or turbine part has rarely traveled farther than 1,640 ft (500 m) from the tower, and most pieces land within 328 to 656 ft (100 to 200 m) (BLM, 2005).

A related safety hazard is ice throw, which can occur if ice builds up on the turbine blades.

Unauthorized or illegal access to the site facilities is another potential public safety issue.

Dry vegetation and high winds can combine to cause potential fire hazards around WTGs. Under these conditions, fires have started for a variety of reasons, including electrical shorts, insufficient equipment maintenance, contact with power lines, and lightning. The

International Electrotechnical Commission (IEC) requires that the design of a WTG electrical system comply with relevant IEC standards (IEC, 1999).

3.9.3 Safety and Emergency Systems

Safety and emergency systems are incorporated into the design of the WTGs to ensure safe and reliable operation. The following sections describe these safety systems.

3.9.3.1 Braking System

The electrically actuated individual blade pitch systems act as the main braking system for the WTG. Braking under normal operating conditions is accomplished by feathering the blades out of the wind. Any single-feathered rotor blade is designed to slow the rotor, and each rotor blade has its own back-up battery bank to provide power to the electric drive in the event of a grid line loss.

The WTG is also equipped with a mechanical brake located at the output (high-speed) shaft of the gearbox. This brake is only applied immediately on certain emergency stops (E-stops). This brake also prevents rotation of the machinery as required by certain service activities.

3.9.3.2 Turbine Control

The GE 1.5-MW sle 60-Hertz (Hz) WTG can be controlled automatically or manually from either the control panel located inside the nacelle or from a personal computer located in a control box at the bottom of the tower. Control signals also can be sent from a remote computer via a SCADA system, with local lockout capability provided at the turbine controller.

Using the tower-top control panel, the machine can be stopped, started, and turned out of the wind. Service switches at the tower top prevent service personnel at the bottom of the tower from operating certain systems of the turbine while service personnel are in the nacelle. To override any machine operation, stop buttons located in the tower base and in the nacelle can be activated to stop the turbine in the event of an emergency.

3.9.3.3 Tower Access

Access to the nacelle is provided by a ladder, and a fall-arresting safety system is included. Interior lights are installed at critical points from the base to the top of the tower.

3.9.3.4 Blade Pitch

Three independent back-up battery packs or spring units are provided to power each individual blade pitch system to feather the blades and shut down the machine in the event of a grid line outage or other fault. Having all three blades outfitted with independent pitch systems provides redundancy of individual blade aerodynamic braking capability.

3.9.3.5 Controlled Site Access

Three Buttes plans to control access to both the active construction zone and operational wind farm by implementing a required check in and gate access system.

3.9.3.6 Lightning Protection System

The rotor blades are equipped with a strike sensor mounted in the blade tip. Additionally, a solid copper conductor running from the blade tip to the root provides a grounding path that leads to the grounding system at the base of the tower foundation. The turbine is grounded and shielded to protect against lightning; however, lightning is an unpredictable force of nature, and it is possible that a lightning strike could damage various components notwithstanding the lightning protection deployed in the WTG.

3.9.4 Electrical Safety

For electrical safety, one or more grounding rods may be installed. Alternatively, a metal grounding grid or metal net may be installed over the entire footprint of the substation. These grounding features also provide for lightning grounding. On rocky sites with little to no soil mantle, adequate electrical grounding may be problematic and may require the installation of a grounding well reaching to the uppermost saturated zone below the ground surface. Each turbine tower will have similar lightning grounding needs. Either ground rods, grounding grids, or, if necessary, grounding wells will need to be installed for each tower. Concrete pads will be installed for each transformer.

3.9.5 Fire Safety

Unlike thermal power plants, wind power projects pose a much smaller risk of explosion or fire because there is no need to transport, store, or combust fuel to generate power. As with any major construction undertaking, construction of the Project does present some fire risks. Fire risk mitigation starts with Project design, especially the electrical design, which must comply with the National Electric Code (NEC) and National Fire Protection Agency (NFPA) regulations. A strict fire prevention plan will be enforced both during construction and operations of the Project to mitigate fire risks.

Because there are no residences within 3 miles of the Project site, the risk that unintentional or accidental fire or explosion during both construction and operations will spread to sensitive or occupied areas is minimal. The Project site is generally arid rangeland with a predominant groundcover of grasses and sagebrush; therefore, the highest expected fire risks are grass fires during the hot, dry summer season. Fire risk potential will be tracked and reported during the summer, and this risk will be actively posted at the construction job site during the high risk season. The Project site roads will act as firebreaks and will allow for quick access of fire trucks and personnel in the event of a grass fire.

Fire Protection Services for the Project are described in detail in Section 3.9.6. The EHS Plan will include specifics regarding range fire prevention and property protection.

3.9.5.1 Lightning Fires

Lightning-induced fires can occur in the Project area. As shown in the flash density map (Figure 3-5), the Project area and Wyoming in general are moderately prone to lightning strikes. The map is based on data from lightning flash sensors installed nation-wide over a 4-year period. Because the wind turbines will be the tallest structures in the surrounding area, the probability of a lightning strike may be higher; however, the mitigation measures in place are designed to reduce this risk significantly. Both the WTGs and the substation are equipped with specially engineered lightning protection systems.

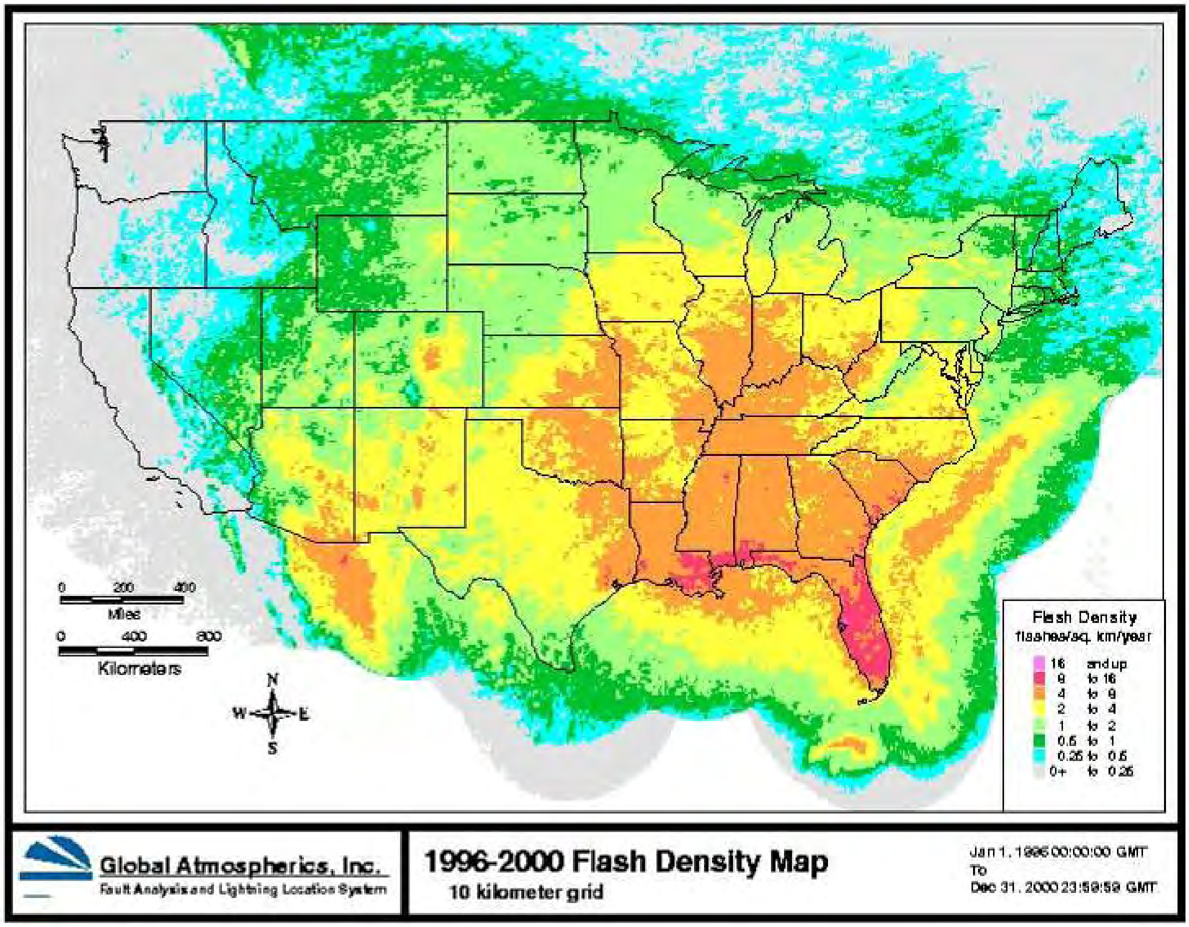

FIGURE 3-5
Lightning Flash Density Map

3.9.5.2 Turbine Fires

As with almost any complex machine, there is some potential for fire inside the WTGs. With the types of modern wind turbines proposed for the Project, turbine malfunctions leading to fires in the nacelle are extremely rare. The turbine is equipped with several thermal couple-type temperature sensors to detect overheating of turbine machinery. Internal fires would be detected by these sensors and the turbine's control system, causing the machine to shut down immediately and send an alarm signal to the central SCADA system. The SCADA, in turn, would notify operators of the alarm by cell phone or pager.

In the event of a nacelle fire, Project operations staff and fire personnel would not attempt to climb the tower to put it out, but only prevent the fire from spreading to any adjacent land. The fire would be contained by use of fire suppressant material or a small controlled burn around the base of the tower outside of the graveled area surrounding the tower base.

3.9.5.3 Substation Fires

Substation transformers are filled with mineral oil, presenting a potential fire risk. The Project substation will be constructed and designed with a very robust grounding system to mitigate the potential for lightning strike damage, including an underground grounding

grid with multiple grounding rods and direct buried copper cable. In addition, overhead shielding wires that span across the steel pole structures provide a cone of protection over the entire substation.

The substation transformers will be surrounded by a containment trough filled with heavy, nonflammable gravel, which will limit the amount of oil exposed in the event that an oil leak from the transformer tanks combines with a fire. The containment trough will reduce the fire hazard potential from the oil by reducing the surface area of a potential mineral oil spill.

3.9.6 Emergency and Law Enforcement Services

Three Buttes has secured access to the Project via the primary access road for the construction period and operational life of the Project via the Coal Creek access road in Natrona County. Response time via the Project access road will be substantially less for fire and ambulance crews from Natrona County departing from the Casper area than for Converse County services departing from Glenrock. Although an existing formal mutual aid agreement between the Converse and Natrona Counties has not been identified yet, the established pattern of cooperation and mutual aid between Counties is well established for emergency medical and fire response services, as confirmed in discussions with Jeff Nelson, Glenrock Fire Chief, and Clyde Young, Natrona County Fire District Chief. Similarly, Sean Graham, of Casper Medical Center's Wyoming Life Flight, has confirmed that 911 calls from Converse County are routed to Natrona County when their helicopter service provides the most appropriate response capability to remote locations. We understand through discussions with other Wyoming counties that it is not uncommon to develop such mutual aid agreements when appropriate to ensure the health and safety of workers.

Three Buttes has initiated discussions and participated in council meetings with various stakeholders in both Converse and Natrona Counties. It has been the intent of Three Buttes to understand the capabilities of the Counties to provide such services to the Project. Converse County has requested that Three Buttes undertake the redesign, and reconstruction of a degraded county road and stream crossing to provide Converse County access to the Project area for long-term, secure emergency response and law enforcement access; however, this is cost prohibitive to the economics of the Project and is not practical from a scheduling and permitting standpoint.

Currently, unsecured access to the Project area by the Glenrock Fire Department and Natrona County Emergency Medical Services (EMS) is available via private road across the property of cooperating landowners. In this unique circumstance it is advisable that a formal Intergovernmental Agreement be recorded between the governing bodies of Converse and Natrona County to assure a viable long-term servicing of the Project. Three Buttes would consider bringing in private EMS on site if further investigation determines it may be appropriate for Three Buttes internal EHS plan.

3.9.6.1 Medical Emergencies

Medical emergencies generally will be handled by calling 911 and alerting the EMS system. Calls to 911 from the Project area go to either the Converse County or Natrona County Sherriff and Police offices in Glenrock or Casper, respectively, where the appropriate Fire/Ambulance Crews are paged for dispatch. Due to the remote location of the Project

and slow overland response time by ambulance access to the Project, it is likely that 911 emergency medical incidents would be handled via helicopter service provided by the Wyoming Medical Center's Life Flight (1233 E. 2nd St., Casper, Wyoming, 800-422-2222), which would transport patients to the Wyoming Medical Center. In addition, three EMT-qualified firefighters are on duty 24 hours per day, 7 days per week at the Natrona County Fire District Rural Station No. 1 and available to serve the emergency medical needs of the Project via land access. This station is located at the intersection of U.S. Highway (US HWY) 20/26 and the Cole Creek Road, approximately 14 miles from the Project area along the designated access route to the Project.

Three Buttes will proactively coordinate with Wyoming Life Flight to ensure that landing zone requirements are met at all times during construction and operation of the Project for both daytime and nighttime response calls and that appropriate Three Buttes and contractor crews are adequately trained in rescue techniques used while working in turbine towers and nacelles. The Wyoming Medical Center is a 205 bed, acute-care, regional hospital located in Casper. It is located approximately 25 miles from the Project area and is the anticipated provider of both emergency and routine hospital services to the workforce.

3.9.6.2 Fire Emergencies

Fire emergencies will be handled by calling 911 and alerting either the Converse County or Natrona County Sherriff and Police office in Glenrock or Casper, respectively, where the appropriate fire crews are paged for dispatch. The Natrona County Fire District Rural Station No. 1 is located at the intersection of US HWY 20/26 and the Cole Creek Road, approximately 14 miles from the Project area. The station houses a full-time, paid fire crew with a staff of 3 EMT qualified firefighters on duty 24 hrs/day, 7 days/week. Natrona County Fire District Chief, Clyde Young, anticipates serving the fire prevention and response needs of the Project and coordinating with Three Buttes to ensure proper training is received for addressing fire response issues unique to wind energy projects.

The Glenrock Fire Department has a rural fire truck located approximately 6 miles from the Project entrance along the Cole Creek Road to the south of the Project. Unsecured access to the Project from this direction is available for fire emergencies via private road across the property of cooperating landowners. Glenrock Fire Department Chief, Jeff Nelson, anticipates serving the fire prevention and response needs of the Project in coordination with Natrona County, and expects to coordinate with Three Buttes to ensure proper training is received for addressing fire response issues unique to wind energy projects.

Due to the remote location of the Project and challenging response time for fire emergencies, it is likely that fire crews from both counties would respond in the cooperative manner typical of rural firefighting scenarios in the region, and the closest, most appropriate crews available at the time would arrive first to address potential fire emergencies. Three Buttes will proactively coordinate with fire departments from both counties to minimize fire safety hazards, coordinate response efforts, and effectively train Three Buttes and subcontracting personnel in fire safety issues.

All construction and operations personnel, working on the turbines, will work in pairs. All turbine maintenance staff will be trained in lowering injured colleagues to prepare for the possibility of an injury while working in the wind turbine that prevents a worker from

climbing down the tower safely. A rescue basket, especially designed for this purpose, will be kept at the operations and maintenance facility and will be available for use by local emergency medical services and fire personnel. Training in its use will also be provided to local EMS, Wyoming Life Flight rescue teams, and firefighting personnel.

3.9.6.3 Law Enforcement

Access to the Project area by the Converse County Sherriff is currently provided via the designated Project access road from Natrona County and via private roads across the property of cooperating landowners. It is the understanding of Three Buttes at this time that enforcement capabilities cannot be provided by Natrona County due to jurisdictional limitations. However, adequate access for Converse County Law Enforcement will be ensured by Three Buttes during the construction and operation period via the primary access road in Natrona County, so that impacts that may impair the health, safety, or welfare of the resource or the health, safety, or welfare of the people in the area of primary affect are avoided.

3.9.7 Operations EHS Program

As the Project becomes operational, Duke Energy wind fleet programs and procedures will be deployed and implemented to ensure that EHS Plan expectations, roles, and responsibilities are well documented and understood by employees, contractors, and visitors. Components of the EHS programs include emergency response, training, environmental requirements, contractor management, and comprehensive safety programs, including wind-specific risks such as tower climbing and rescue, severe weather, confined space entry, lockout tagout, electrical safety, and other site- and equipment-specific requirements. The Project site also will have access to Duke Energy’s corporate EHS support function, which will provide comprehensive support for the site, including avian and other biological programs. It is Duke Energy’s intent that all wind projects implement the appropriate programs, procedures, and training that result in a sustained zero injury and illness culture.

3.9.8 Site Decommissioning

Duke Energy, the parent company of Three Buttes, is a self-bonded public utility and corporation. Therefore, if the Project were to terminate operations in the future, Duke Energy is financially responsible to ensure the adequate decommissioning of the facilities. Duke Energy would also obtain the necessary authorization(s) from the appropriate regulatory agencies to decommission the facilities. Generally, wind farm projects that are decommissioned contain a high “scrap value” due to the materials and equipment contained in the infrastructure (i.e., steel infrastructure, electric generators, and copper).

Decommissioning is a step-by-step, methodical deconstruction process that involves removing and disposing of the infrastructure and appurtenant facilities associated with the Project. With some exceptions, site decommissioning would involve the reverse of site development. A typical decommissioning procedure is as follows:

- All turbines and their towers would be dismantled and either recycled at other wind energy projects, sold for scrap, or disposed of offsite as solid waste.

- Turbine towers constructed partially of concrete would be broken up.
- Foundations would be removed to a depth of 3 feet below grade. Broken concrete could be potentially used by highway departments for road base or bank stabilization.
- Electronic equipment would be recycled or disposed of (in some cases as hazardous waste because of the heavy metals present) in landfills or properly licensed hazardous waste facilities.
- Transformers and electrical control devices would be reused in other applications or sold as scrap after fluid removal.
- Turbine foundations and below-ground cable runs may be left in place.
- The access road, onsite roads, rock or gravel in the electrical substations, transformer pads, and building foundations would be removed and recycled if no longer needed.
- If the buried and overhead power lines could not be used, all structures, conductors, and cables would be removed unless otherwise allowed to remain in place.

Disturbed land areas covered in rock or gravel or building/tower footprints would be restored to original grade (which would include adjusting soil compaction that might have resulted from previous uses) and reseeded or replanted with native vegetation. Reclamation procedures would be based on site-specific requirements and techniques commonly employed at the time the area is to be reclaimed and would include regrading, adding topsoil, and revegetation of all disturbed areas. If requested by the landowner, all disturbed areas would be reclaimed and restored so that prior ranching uses could be resumed.

Dismantlement of electrical substations and storage buildings would be accompanied by inspection for the presence of industrial contamination from minor spills or leaks and decontamination, as necessary. Lastly, demolition or removal of equipment and facilities will meet applicable environmental and health regulations and every attempt will be made to salvage economically recoverable materials.

The potential fire risks during decommissioning and construction are similar in nature to those described in Section 3.9.5 for construction and operation but are lower for Project decommissioning. Fire prevention measures during decommissioning would be substantially similar to those described for Project construction.

4.0 Public Involvement

Rule I Section 7(g) - The applicant shall identify what it deems to be the area of site influence and the local governments primarily affected by the proposed industrial facility as defined in sections 2(b) and (c), respectively, of the regulations. The immediately adjoining area(s) and local governments shall also be identified with a statement of the reasons for their exclusion from the list of area(s) or local governments primarily affected by the proposed industrial facility.

The area of study was defined as Converse and Natrona counties. These two counties were identified early in the analysis and in consultation with the ISD. Based on a review of the two-county study area, the area of site influence is defined as a more geographically restrictive area within which impacts are expected to be concentrated. The geographical area within which non-local workers are likely to find accommodations, and where community impacts would be concentrated, is restricted to Converse and Natrona counties.

The Area of Site Influence is defined as locations that may be affected environmentally, socially, or economically, in any significant degree, by the location of the industrial facility at the proposed site. This area encompasses communities located within a 60-mile (or 1-hour) drive from the Project site and includes the urban areas of Casper (comprised of the incorporated communities of Casper, Bar Nunn, Evansville, and Mills), Glenrock, Rolling Hills, and Douglas, Wyoming. Large areas of Converse and Natrona counties would remain outside the Area of Site Influence. Other urban areas that could contain industries potentially affected by the proposed Project are relatively distant: Cheyenne (180 miles), Gillette (180 miles), Laramie (225 miles), and Rawlins (120 miles). Three Buttes desires to maximize the benefits of the Project to the local communities while minimizing adverse impacts as much as possible.

Three Buttes conducted a series of meetings with state agencies and local officials and undertook additional outreach activities that met and exceeded the ISA requirements. These activities are summarized below, and additional details are provided in **Appendix C**.

4.1 Meeting Activities

Formal meetings were scheduled by Three Buttes to present the Project and receive comments from state agency and local government officials, and to provide the opportunity for involvement of the local communities. The information presented in Table 4-1 is a summary list of these formal public and agency involvement activities.

TABLE 4-1
Local Government, State Agency, and Community Meetings

Organization	Date	General Discussion
WDEQ-ISD	October 15, 2008	Jurisdictional Meeting - provided overview of Project and Industrial Siting Application process; Project workforce and operation requirements; construction schedule and costs; local agency consultation and public involvement.
Glenrock Town Council, Rolling Hills Town Council – Local Government	November 17, 2008	Project details regarding workforce and operation requirements; construction schedule and costs; local agency consultation and public/agency involvement were presented at each meeting. Three Buttes and CH2M HILL representatives responded to questions and addressed issues and concerns.
Converse County Commissioners, Douglas Town Council – Local Government	November 18, 2008	
Wyoming Department of Transportation (Casper Office) – State Government	November 18, 2008	
Casper City Council – Local Government	November 18, 2008	
Natrona County Commissioners, Evansville City Council – Local Government	November 18, 2008	
Wyoming State Agencies Meeting – State Government	November 19, 2008	
WYDEQ-ISD	December 15, 2008	Pre-application meeting to discuss schedule, identified issues of importance, and application requirements.

Source: CH2M HILL, 2008

4.1.1 Meeting Format/Information Provided

The meeting format and the information provided at the meetings for local government officials and state agencies presented in Table 4-1 were generally the same. The format and information consisted of the following:

- Informational Boards were displayed at the Public Open House and State Agency meeting around the room for attendees to see and discuss with Three Buttes planners prior to and following a formal presentation. Displays included the following:
  - A map of the general Project location
  - A map of the preliminary Project Boundaries
  - Information on economic benefits (such as jobs and tax revenue)
  - Information on Duke Energy's relationship to Three Buttes, and Duke Energy's commitment to renewable power
  - A tentative schedule
  - Information on the Informational Meetings and opportunities
- A PowerPoint presentation detailing Duke Energy, Three Buttes, and Project details was presented to each audience. Please see Appendix C.
- A fact sheet was made available to attendees. Please see Appendix C.
- A question-and-answer session followed each presentation.

- Tom Schroeder, a representative of the ISD, was on hand to answer questions and provide ISA statute procedures and application information.

4.1.2 Meeting Notices and Attendees

The state agencies and local entities notified of the meetings were those specified by statute in the ISA permit regulations. An e-mail announcement and follow-up letter invitation were also provided to a list of local stakeholders and local government officials. Copies of the meeting invitations, list of the names/entities invited, and attendee sign-in sheets from the meetings are included in Appendix C.

4.1.3 Additional Meetings

Additional meetings were held with local and state government agencies and parties relevant to permitting and planning the Project. The following is a list of meetings additional to the formal meetings described in Table 4-1.

- Jurisdictional Meeting with ISD staff on October 15, 2008 in Cheyenne, Wyoming.
- Phone meeting with Mike Hagler, Natrona County Road and Bridge Department, on October 30, 2008 to discuss the use of Cole Creek Road and the intention for a road use agreement with Natrona County.
- Meeting with the Wyoming State Historical Preservation Office (SHPO) on November 3, 2008, in Cheyenne, Wyoming to discuss Three Buttes preliminary Class III cultural resource inventory work, SHPO concurrence with plans for avoidance of impact to cultural resources.
- Meeting with Wyoming Game and Fish Department (WGFD) on November 6, 2008 in Cheyenne, Wyoming to discuss baseline data collected, site characterization, and WGFD concurrence with impact avoidance strategies and post construction monitoring plans.
- Meeting with Clint Becker, Converse County Sheriff, on November 18, 2008, in Douglas, Wyoming.
- Meeting with U.S. Fish and Wildlife Service (USFWS) officials (Wyoming Field Office) on November 24, 2008, in Cheyenne, Wyoming.
- Phone meeting with Sean Graham, Wyoming Life Flight, Ambulance Director, on December 12, 2008, to discuss existing helicopter response requirements and response coordination with Converse County.
- Phone meeting with Jeff Nelson, Glenrock Fire Chief on December 15, 2008 to discuss existing fire response coordination with Natrona County and service of the Project.
- Phone meeting with Tim Axt, Burlington Northern Santa Fe (BNSF) Railway on December 15, 2008 to coordinate workforce and delivery schedule for WY 256 rail crossing
- Meeting with the Converse County Commissioners on December 16, 2008 in Douglas, Wyoming to discuss plan for emergency and law enforcement services.

- Phone meeting with Clyde Young, Natrona County Fire District Chief on December 17, 2008 to discuss existing fire response coordination with Converse County and plans to service the Project.
- Meeting with the USFWS on December 19, 2008 in Cheyenne, Wyoming to discuss concurrence with Three Buttes impact avoidance, mitigation, and monitoring plan for the construction and operation of the Project.
- Phone meeting with Richard Currit, Wyoming State Historic Preservation Office, on Decmber 19, 2008 to discuss impact avoidance and mitigation of cultural resources.

4.2 Additional Activities

The activities described in this section are not specifically required by the ISA permit application process. However, Three Buttes planners undertook these additional activities as a way to better understand community perspectives and ensure public support of the Project by proactively addressing identified concerns.

4.2.1 Newspaper Advertisements

Newspaper advertisements announcing the informational open house were placed in the *Douglas Budget*, *Glenrock Independent*, and *Casper Star Tribune* approximately one week in advance of the open house event. These are the main local newspapers serving residents of Converse and Natrona counties. The advertisement invited the public to come to the open house to learn more about the Project and ask questions of Three Buttes representatives. See Appendix C for a copy of the advertisement.

4.2.2 Public Open House

A public town hall open house was held in Glenrock Town Hall on November 17, 2008. Notification of the open house was made primarily through newspaper advertisement as detailed above. The purpose of the open house was to give residents and community members and leaders an opportunity to find out more information and to provide comments. Open house details are below:

- An open house was held at the Glenrock Town Hall in Glenrock, Wyoming on the evening of November 17, 2008.
- The format for the public open house held in Glenrock included informational poster board displays and questions and answers with Three Buttes representatives.
- Tom Schroeder, a representative of the ISD was in attendance to answer questions and provide additional ISA statute information.

Display board stations were provided at the public open house, and a fact sheet was distributed. A copy of the fact sheet and the list of attendees who signed in at the open house are included in Appendix C.

4.3 Questions and Answers

The types and nature of the questions posed were similar across all the meetings, and included such topics as:

- The ISA process and impact assistance fund allocations.
- Construction processes, schedules, and timelines.
- Socioeconomic issues, including jobs/employment, housing, tax revenue, and community partnerships.
- Environment, safety, solid waste, and decommissioning plan.
- Technical aspects of WTGs and transmission line.
- Transportation concerns regarding impacts to the access route and potential traffic interruptions.
- Natrona County's role in and economic benefit from a project in Converse County.
- Desire to educate local contractors on risk, benefit, and contractual issues relevant to participating in construction activities.
- Lease renewal and decommissioning issues.

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5.0 Socioeconomic Baseline Data and Analysis of Impacts

5.1 Introduction

Title 35 Public Health and Safety, Chapter 12 Industrial Development and Siting of the Statutes of the State of Wyoming provides guidance relative to the socioeconomic topics of concern that shall be addressed during the permit application process. The following aspects of the socioeconomic environment that could experience adverse impacts associated with construction and operation of the proposed facility shall be addressed: economic base, housing, transportation, sewer and water facilities, solid waste facilities, police and fire facilities, educational facilities, health and hospital facilities, and water supply.

The Industrial Siting Council (ISC) shall grant a permit either as proposed or as modified by the council if it finds and determines that the facility will not pose a threat of serious injury to the environment or to the social and economic condition or inhabitants or expected inhabitants in the affected areas; and will not substantially impair the health, safety, or welfare of the inhabitants. For the purposes of this permit application, the definitions of "health," "safety," and "welfare" are as follows. Health shall mean the state of being sound in body or mind and includes psychological as well as physical well-being. Safety shall mean freedom from fear of injury or threat of injury. Such injury or threat of injury may be premised on crime rates, traffic accident rates, dangers of industrial accidents or mishaps, or other similar considerations. Welfare shall mean considerations of public convenience, public well-being, and general prosperity. The term also properly covers those subjects encompassed under health and safety.

Guidance is provided regarding information that should be included in the permit application and includes the following: area of site influence and local governments primarily affected by the proposed industrial facility, construction and operations workforce estimates, and inventory and evaluation of the social and economic conditions in the area of site influence.

5.1.1 Construction and Operations Workforce Estimates

Estimates shall be provided of the number of employees needed to complete the construction and operation of the facility by the applicant, its contractors, and subcontractors. These estimates shall include job classifications by calendar quarter, seasonal fluctuations and the peak employment during both construction and operation, annual payroll, and expected benefits, if any, to be provided including housing allowance, transportation allowances, and per diem allowances.

5.1.2 Inventory and Evaluation of the Social and Economic Conditions

The social and economic conditions are inventoried and evaluated as they currently exist, projected as they would exist in the future without the proposed industrial facility and as they would exist with the facility.

Potential impacts associated with the proposed facility are primarily driven by the number of new direct construction and operations workers entering the region and the additional service workers and families required to support these direct workers. Where appropriate, level of service (LOS) ratios are calculated for resources, and comparisons made with statewide, national, local, and standard ratios to provide a perspective for succeeding impact assessment. LOS ratios express the quantity of a service (e.g., expressed as the number of firefighters or law enforcement officers in a service area) in relation to the population contained in the respective service area (e.g., per 10,000 residents). These ratios provide a means of comparing service levels across service areas and over time or against target or standard levels. LOS ratios are used to estimate the number of additional service personnel required to meet the demands of new residents while maintaining existing levels of service. If it appears that the resources are unlikely to be able to accommodate the new demands of the Project, then mitigation measures are proposed.

There are three major benefits attributable to the Project: tax revenues, direct employment, and secondary employment. Construction of the Project will provide employment opportunities for local and non-local workers. It is likely that some construction workers (and possibly family members) would relocate to the study area for the entire duration or a portion of the construction phase. Personal consumption expenditures by direct workers would generate sales tax revenues for the counties and municipalities that contain the points of sale. The purchase of equipment, supplies, materials, and services necessary for construction and operation of the Project could create indirect jobs, and purchases by direct workers could induce additional employment.

To the degree that workers (with or without their family members) temporarily relocate to the area as a direct result of construction of the Project, additional demands would be placed on resources in the area of site influence. For example, accommodations (permanent or temporary) would be required to house the relocating workers, and new residents (even if temporary) could increase the demand for community resources and services such as public education and police and fire protection. Should the additional demand exceed the capacity of the existing service providers, it could be necessary to implement mitigation measures to alleviate the capacity issues.

5.2 Study Area and Area of Site Influence

Rule I Section 7(g) – The applicant shall identify what it deems to be the area of site influence and the local government primarily affected by the proposed industrial facility as defined in Sections 2(b) and (c), respectively, of these regulations. The immediately adjoining area(s) and local governments shall also be identified with a statement of the reasons for their exclusion from the areas(s) or local governments primarily affected by the proposed industrial facility.

5.2.1 Study Area

The socioeconomic impact analysis methodology involves a description of existing (i.e., baseline) conditions in the broader study area and more spatially confined area of site influence. The counties comprising the study area were identified early in the analysis and in consultation with the WDEQ-ISD as those containing potential relocation sites for workers commuting to the construction site. This decision was based on (i) information regarding the most likely counties from which workers commute into Converse County from other counties in Wyoming for work, and (ii) the distance and driving time separating communities and the Project site.

Commuting Patterns. Of the residents of Converse County who commute to jobs in other counties in Wyoming, about 57 percent work in Natrona County and of persons who work in Converse County but reside elsewhere, 33 percent live in Natrona County. For Converse County, the strength of these in- and out-flows of workers is far greater than with any other county as can be seen from the information presented in Table 5-1. Converse County also has sizeable commuter flows with two other neighboring counties: commuter out-flows to Campbell County (24 percent of all out-flows to other counties); and in-flows from Platte County (14 percent of all in-flows from other counties).

Commute Distance and Driving Time. A commonly utilized criterion regarding daily commuting is that one-way distance should not exceed about 60 miles or consume more than one hour of driving time. The incorporated communities located within 60 miles and 60 minutes driving time of the Project site include: the Casper urban area comprised of Casper, Bar Nunn, Evansville, and Mills about 25 miles and 50 minutes driving time distant; Glenrock and Rolling Hills less than 20 miles and about 35 minutes driving time distant; and Douglas just over 40 miles and about one hour driving time distant.

The Study Area is defined in such a way as to capture the direct and secondary economic impacts associated with the construction and operation of the proposed project. These impacts are mainly associated with the purchase of equipment, materials, goods, and services required for construction and operation of the Project and expenditures made by workers for personal items. It is likely that these impacts will be centered in the Casper urban area (with a population of about 60,000 persons). Other urban areas that could contain industries potentially affected by the proposed project are relatively distant: Cheyenne (180 miles), Gillette (180 miles), Laramie (225 miles), and Rawlins (120 miles). Since the Project site to close to Casper and has convenient access to I-25, the majority of socioeconomic impacts are likely to occur in a study area comprised of Converse and Natrona counties as shown in Figure 5-1.

TABLE 5-1
Converse County Inter-Commuter Flows (4th Quarter, 2005)

County Of Origin Or Destination	Inflow	Outflow
Albany	**1.2%**	**1.4%**
Big Horn	**1.3%**	**0.4%**
Campbell	8.2%	24.4%
Carbon	3.2%	0.4%
Converse	NA	NA
Crook	0.7%	0.0%
Fremont	2.6%	0.9%
Goshen	4.7%	2.1%
Hot Springs	0.6%	1.0%
Johnson	0.1%	0.3%
Laramie	7.1%	4.1%
Lincoln	0.6%	0.4%
Natrona	33.3%	57.3%
Niobrara	8.2%	0.7%
Park	0.2%	0.9%
Platte	14.0%	1.0%
Sheridan	4.2%	1.0%
Sublette	0.5%	0.7%
Sweetwater	6.6%	2.4%
Teton	0.0%	0.2%
Uinta	0.1%	0.3%
Washakie	0.2%	0.1%
Weston	2.3%	0.0%

NA = Not Applicable

Source: Wyoming DOE, 2007a.

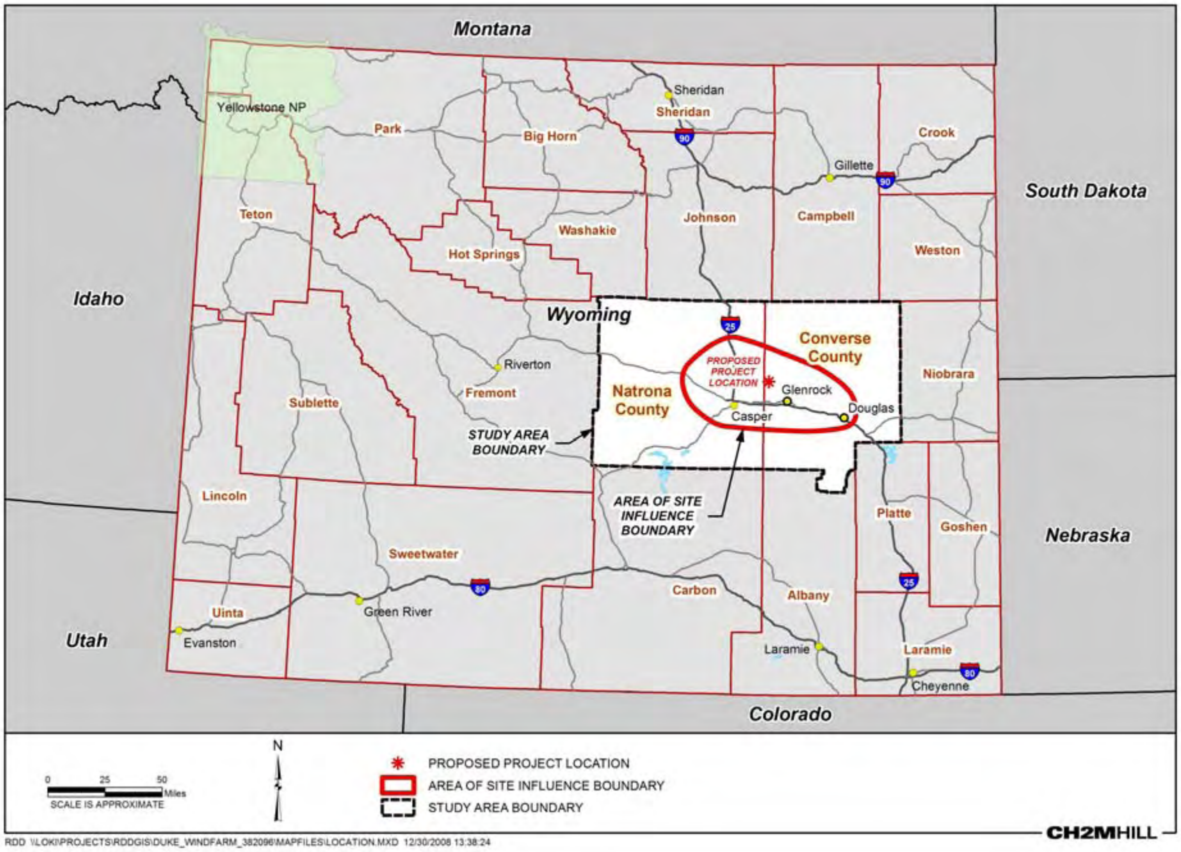

FIGURE 5-1
Counties Comprising the Study Area and the Extent of the Area of Site Influence

5.2.2 Area of Site Influence and Local Governments Primarily Affected by the Proposed Industrial Facility

An area of site influence is defined as locations that may be affected environmentally, socially, or economically, in any significant degree, by the location of the industrial facility at the proposed site. A local government primarily affected by the proposed industrial facility means any defined geographical area or unit of local government or special district in which the construction and operation of the industrial facility may significantly affect the environment, population, level of economic well-being, or level of social services or may threaten the health, safety, or welfare of present or expected inhabitants. Any such local government body or special district is within the area of site influence.

The geographical area within which non-local workers are likely to find accommodations, and where community impacts would be concentrated, is more restrictive than the study area comprised of Converse and Natrona counties. Based on a review of the two-county study area, the area of site influence is defined as a more geographically restrictive area within which impacts are expected to be concentrated. This area encompasses communities located with a drive of 60 miles (or one hour) from the Project site and includes the urban area of Casper (comprised of the incorporated communities of Casper, Bar Nunn, Evansville, and Mills), Glenrock, Rolling Hills, and Douglas. The communities of Alcova,

Edgerton, and Midwest are located within 60 miles of the Project site, however, estimated driving time is between one and a quarter and one and a half hours and they are not included in the analysis. The area of site influence is shown in Figure 5-1. It is within this area and the communities contained within it that the majority of construction and operations workers are expected to reside and within which Three Buttes will concentrate efforts to house non-local workers. Three Buttes desires to maximize the benefits of the Project to the local communities, while minimizing adverse impacts as much as possible. While the intent of Three Buttes is to ensure that adequate housing is available within the Casper urban area, Glenrock, Rolling Hills, and Douglas for the workforce at the Project, it is recognized that some members of the workforce may choose to temporarily reside outside these cities.

5.2.3 Local Governments Primarily Affected by the Project.

Based on the definitions of study area and area of site influence presented above, the local governments primarily affected by the proposed industrial facility include the following:

- Converse County and the incorporated cities and towns of Douglas, Glenrock, and Rolling Hills; and
- Natrona County and the incorporated cities and towns of Bar Nunn, Casper, Evansville, and Mills.

5.2.4 Local Governments Excluded from the Area of Site Influence

Communities excluded from the area of site influence because of excessive commuting distance from the project site are:

- Lost Springs in Converse County; and
- Alcova, Edgerton and Midwest in Natrona County.

5.3 Baseline Socioeconomic Conditions

Rule I Section (7)(i) – An evaluation of the social and economic conditions in the area of site influence. The social and economic conditions shall be inventoried and evaluated as they currently exist, projected as they would exist in the future without the proposed industrial facility and as they will exist with the facility.

This section presents a summary of baseline socioeconomic conditions within the broader study area. The purpose of this section is to provide details of existing conditions regarding pertinent socioeconomic resources within the study area and to provide a frame of reference against which to assess Project-related impacts. The resources addressed include population; economic conditions; housing (permanent and temporary); education; public safety; health care; municipal services; and transportation facilities.

5.3.1 Population

Rule I Section (7)(i)(iii) – A study of the area population including a description of methodology used. The study may include, but is not limited to, an evaluation of demographic characteristics for the current population and projections of the area population without the proposed industrial facility.

Past, present, and future characteristics of the population in the study area are described in this subsection. These characteristics include historical trends for the study area, counties, and incorporated places; age composition of the county populations; and migration patterns.

Population characteristics that are important in determining the location and availability of the local labor force include the location of population centers and the age distribution of the population (i.e., the identification of areas where persons of working age reside).

Historical Population Trends. Overall, the population of the two-county study area has seen steady growth since 1920 except for during the 1930s and 1980s when it experienced a decline. Between 1920 and 2007, the population of Converse County increased by 64 percent at an average annual rate of 0.6 percent: substantially below the 169 percent and 1.3 percent, respectively, registered by the state. The county experienced a steady decline in population between 1920 and 1970 followed by an increase, as can be seen from the information presented in Table 5-2 and Figure 5-2.

The population trend between 1970 and 2007 for Converse County exhibited a marked "boom-bust" cycle that saw rapid growth starting in 1974 and peaking in 1982. During this "boom" period, population increased at a rate in excess of 10 percent annually, on average. During the "bust" period of 1982 through 1991, population fell at a rate of over 3 percent annually, on average. Steady, consistent population growth occurred between 1991 and 2007 at an average annual rate of 1 percent. This pattern is evident in Figure 5-3, which illustrates year-to-year percentage population change.

Natrona County also experienced a "boom-bust" cycle, but less pronounced than that of Converse County. The "boom" period between 1973 and 1982 saw population increase at an average annual rate of 4.3 percent. The "bust" period between 1982 and 1990 saw a rate of decline in population of 2.8 percent annually, on average. This was followed by a period of steady population growth that took place at an average annual rate of 0.9 percent. At the state level, the "boom-bust" cycle was less pronounced. The cyclical nature of the trend is evident in Figure 5-3 where the timing and magnitude of the trends are illustrated.

TABLE 5-2
Population Trends in the Study Area (1920-2007)

Geographical Area	1920	1930	1940	1950	1960	1970	1980	1990	2000	2007
Converse County	7,871	7,145	6,631	5,933	6,366	5,938	14,069	11,128	12,052	12,868
Natrona County	14,635	24,272	23,858	31,437	49,623	51,264	71,856	61,226	66,533	71,750
Study Area	22,506	31,417	30,489	37,370	55,989	57,202	85,925	72,354	78,585	84,618
State of Wyoming	194,402	225,565	250,742	290,529	330,066	332,416	469,557	453,588	493,782	522,830

Sources: Wyoming EAD, 2007b; 2007c.

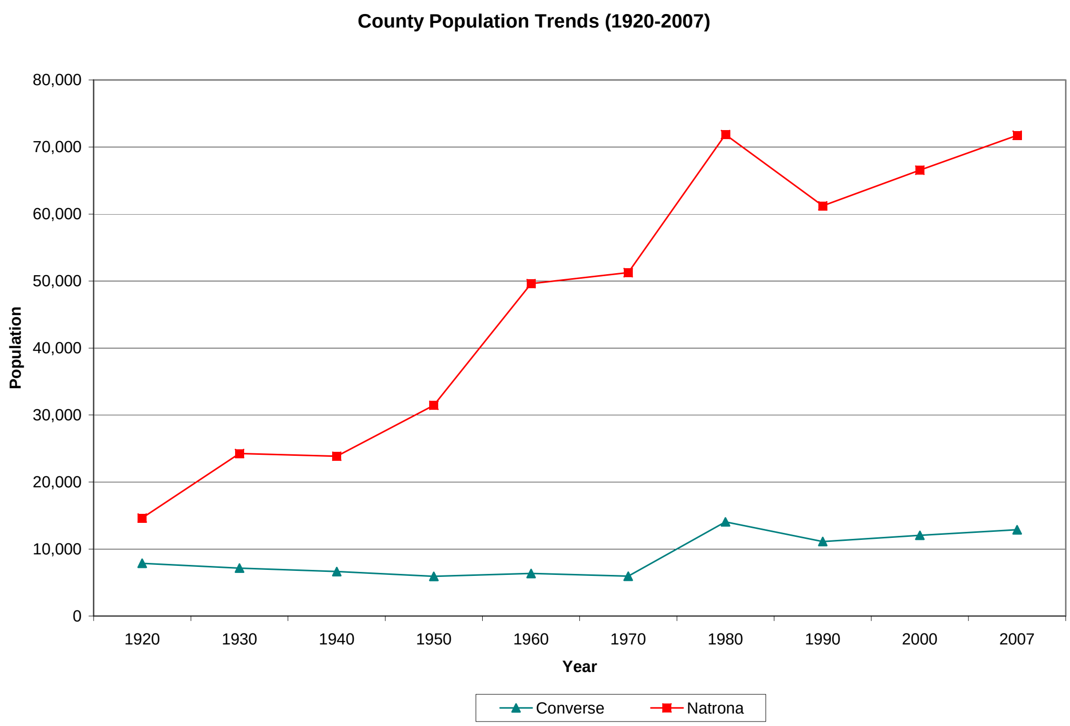

FIGURE 5-2
Historic County Population (1920-2007)

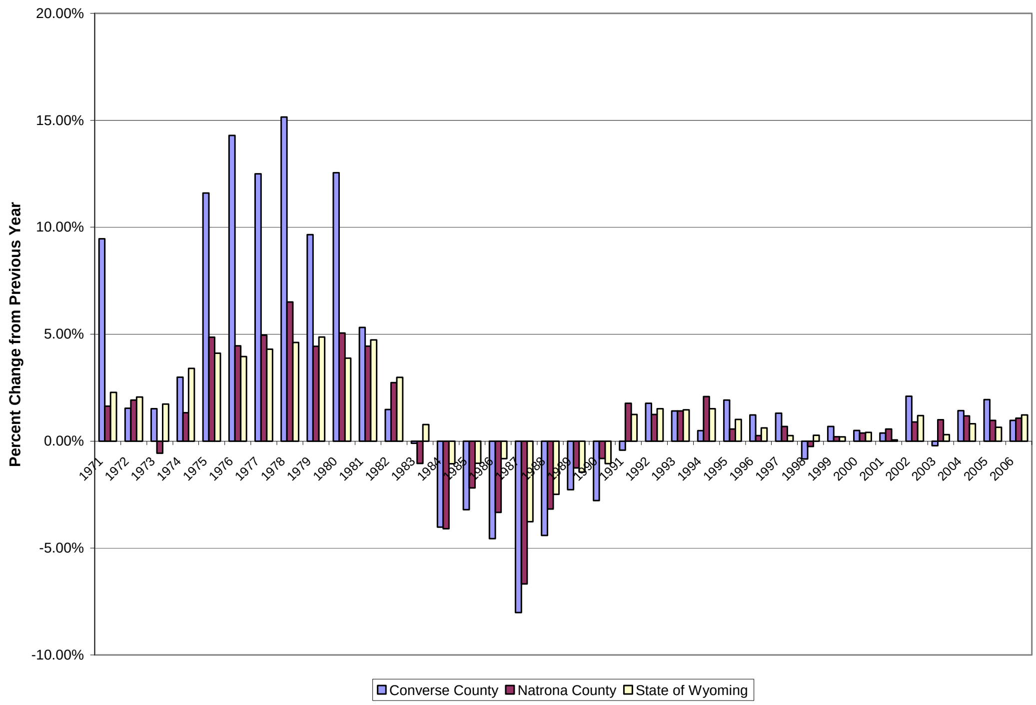

FIGURE 5-3
Population Growth Trends: Counties and State (1970-2007)

At the beginning of the period 1920 through 2007, the population of the study area comprised about 11.5 percent of that of the state of Wyoming. This percentage reached its highest level in 1980 with 18.3 percent of the state population. Its share declined to 13.5 percent in 1990 and has remained relatively constant since then. Table 5-3 displays the share of the state of Wyoming population contributed by each of the two counties separately and the study area. Smaller Converse County showed a steadily decreasing share between 1920 and 1970 with a slight upturn since then. In contrast, Natrona County's share of state population increased from 7.5 percent to almost 14 percent over the time period.

TABLE 5-3
Share of State of Wyoming Population (1920-2007)

Geographical Area	1920	1930	1940	1950	1960	1970	1980	1990	2000	2007
Converse County	4.0%	3.2%	2.6%	2.0%	1.9%	1.8%	3.0%	2.5%	2.4%	2.5%
Natrona County	7.5%	10.8%	9.5%	10.8%	15.0%	15.4%	15.3%	13.5%	13.5%	13.7%
Study Area	11.6%	13.9%	12.2%	12.9%	17.0%	17.2%	18.3%	16.0%	15.9%	16.2%

Source: CH2M HILL, 2008.

Population Density and Location. The majority of the population of each county resides in incorporated communities. The cities of Douglas and Glenrock together contained over 62 percent of the 2007 total population of Converse County (44 percent is contributed by Douglas). The City of Casper was home to almost 74 percent of Natrona County residents, and the larger Casper urban area (Casper, Evansville, Mills, and Bar Nunn) contained

almost 84 percent of the county population. The spatial distribution of population as of the year 2000 is illustrated in Figure 5-4.

Age of the Population. With regard to the age composition of the population, those of the two counties exhibit similar trends to that of the state as can be seen in Figure 5-5. Over the period 1980 to 2006, the proportion of the population under 14 years of age has declined consistently, by over 5 percentage points. Since 1990, the proportion of the population aged between 25 and 44 years has also declined steadily. The proportion of the population aged between 45 and 54 years has increased steadily and noticeably since 1990, and the proportion of persons over 54 years of age has also increased.

In the case of Converse County, the proportion of young persons (14 years of age and less) was, until 2006, noticeably higher than in the state or Natrona County. The county had, until 2006, a smaller proportion of its population in the 65 years and older age category than either the state or Natrona County. The age composition of the Natrona County population mirrored closely that of the state during all time periods and across all age categories.

Population Migration. Population change in an area is attributable to births, deaths, and net migration. An indication of the relative role played by migration can be gained from an inspection of information developed by WYDOT. Drivers taking up residency in the state from elsewhere are required to obtain a state-issued driver's license and surrender one when leaving the state. During the period 2001 through 2007, the study area (and Natrona County) experienced increasing net in-migration in each year (except 2004) as shown in Figure 5-6. By 2007, a net migration of over 800 persons took place. For Converse County, net migration decreased from 2001 through 2004 and then rose to a 7-year high of 170 persons in 2007.

Future Population. Population projections prepared by the Wyoming Department of Administration and Information, Economic Analysis Division (EAD, 2007d) forecast that the population of the study area will increase by about 7,600 residents between 2010 and 2020 (an 8.6 percent increase occurring at an average annual rate of 0.8 percent) as indicated in Table 5-4. The population of Converse County is forecast to grow at a modest average annual rate of 0.6 percent and Natrona County at a rate of 0.9 percent annually. The population of the State of Wyoming is projected to grow at an average annual rate of 0.7 percent over the same time period.

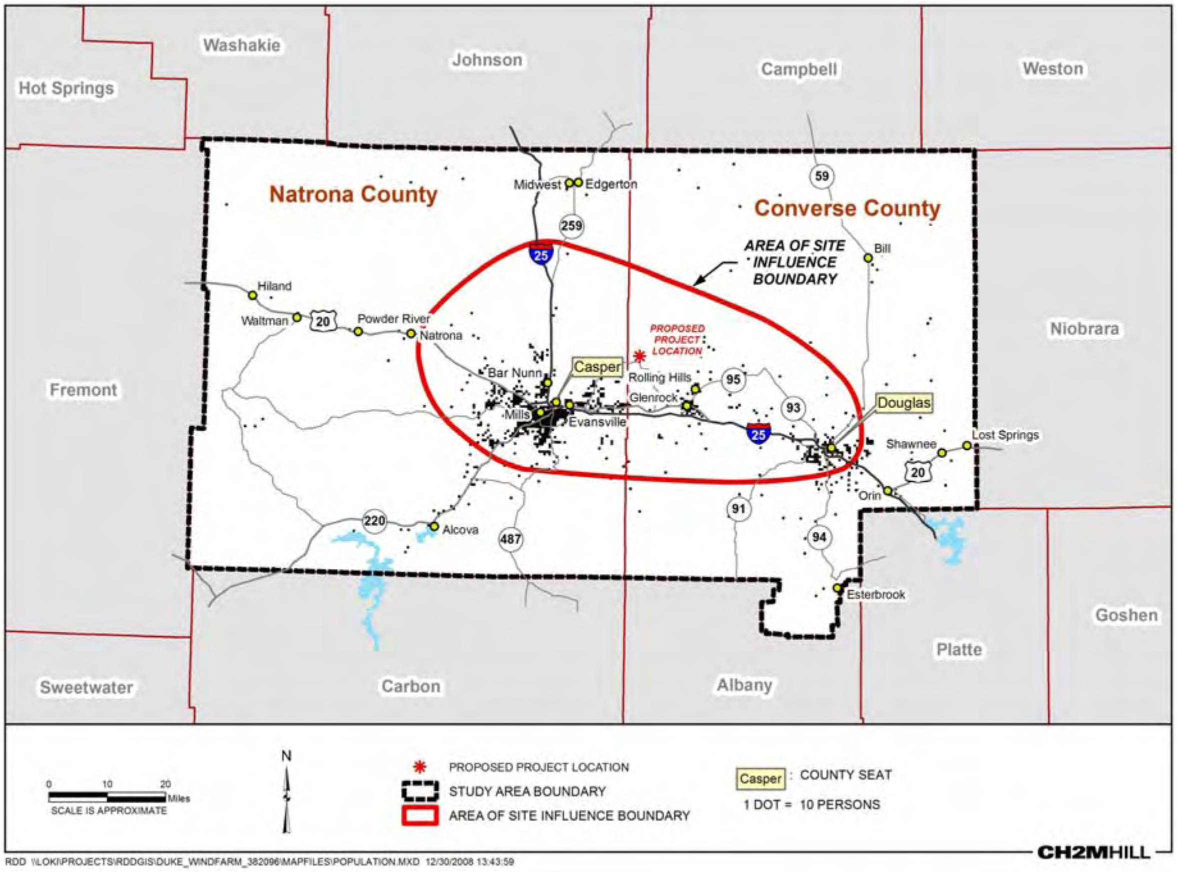

FIGURE 5-4
Population Distribution in the Study Area (2000 Census)

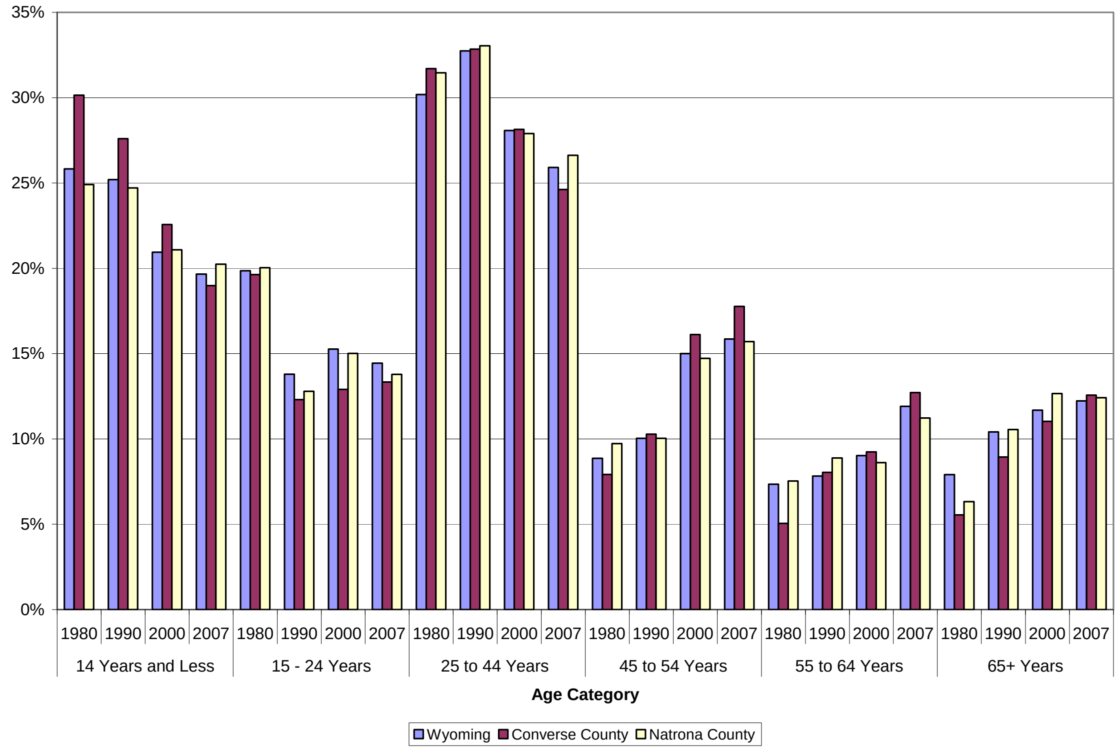

FIGURE 5-5
Population Age Distribution in the Study Area (1980-2007)

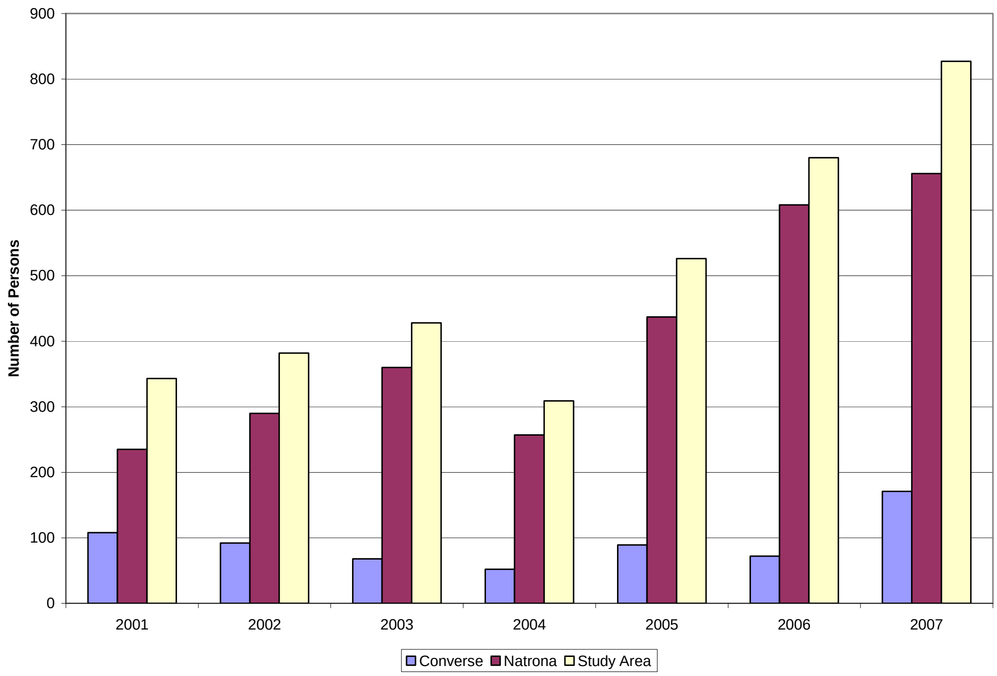

FIGURE 5-6
Net Migration for Counties and Study Area (2001-2007)

TABLE 5-4
Population Forecasts for State, Counties, and Places

	2010 Forecast	2015 Forecast	2020 Forecast	2010-2020 Change		
Geographical Area	**2010**	**2015**	**2020**	**Numeric**	**Percent**	**Average Annual Percent**
Wyoming	**540,040**	**559,210**	**579,090**	**39,050**	**7.23%**	**0.70%**
Converse County	13,400	13,820	14,240	840	6.27%	0.61%
City of Douglas	5,871	6,055	6,239	368	6.27%	0.61%
Town of Glenrock	2,475	2,552	2,630	155	6.26%	0.61%
Town of Lost Springs	1	1	1	0	0.00%	0.00%
Town of Rolling Hills	495	511	526	31	6.26%	0.61%
Balance of Converse County	4,558	4,701	4,844	286	6.27%	0.61%
Natrona County	74,560	77,920	81,320	6,760	9.07%	0.87%
Town of Bar Nunn	1,190	1,244	1,298	108	9.08%	0.87%
City of Casper	55,409	57,906	60,433	5,024	9.07%	0.87%
Town of Edgerton	186	195	203	17	9.14%	0.88%
Town of Evansville	2,503	2,616	2,730	227	9.07%	0.87%
Town of Midwest	458	479	500	42	9.17%	0.88%
Town of Mills	3,098	3,237	3,379	281	9.07%	0.87%
Balance of Natrona County	11,715	12,243	12,777	1,062	9.07%	0.87%
Study Area Total	**87,960**	**91,740**	**95,560**	**7,600**	**8.64%**	**0.83%**

Source: Wyoming EAD, 2007d.

5.3.2 Economic Conditions

Rule I Section 7(i)(ii) – A study of the area economy including a description of methodology used. The study may include, but is not limited to, the following factors:

(A) Employment projections by major sector;
(B) Economic bases and economic trends of the local economy;
(C) Estimates of basic versus non-basic employment;
(D) Unemployment rates

This section addresses past, present, and future economic conditions (labor force, employment, and unemployment), income and earnings by industrial sector; commuting patterns and work centers, existing labor characteristics and availability, and government revenues (property, sales, use, and lodging taxes).

5.3.2.1 Past and Present Economic Conditions

Rule I Section 7(i)(ii)(B and D) – A study of the area economy including a description of methodology used. The study may include, but is not limited to, the following factors:

(B) Economic bases and economic trends of the local economy;
(D) Unemployment rates

During the period 1990 through 2007, total employment in the study area increased by just over 10,250 jobs or 29 percent as can be seen from Figure 5-7. This compared with a change of 25 percent for the State of Wyoming over the same time period. Natrona and Converse counties experienced moderate growth with 30 percent and 22 percent increases, respectively.

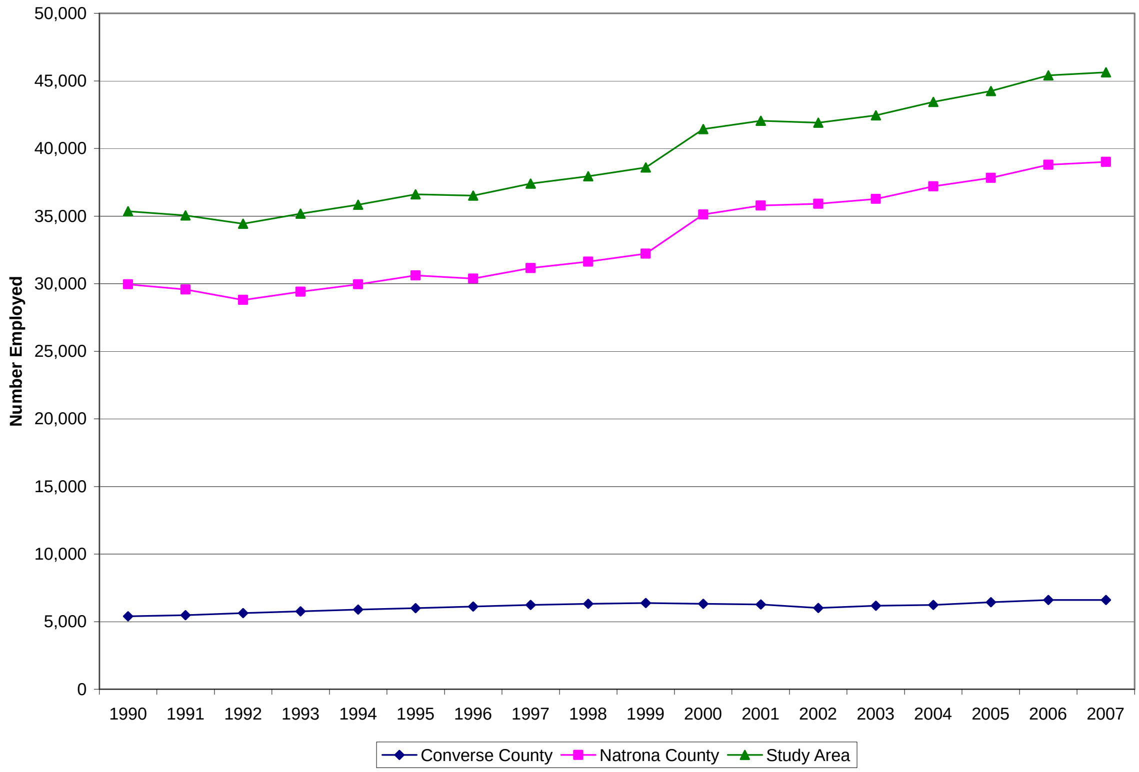

FIGURE 5-7
Employment in the Study Area by County (1990-2007)

The unemployment rate in the study area has generally trended downwards over the period 1990 to 2007 with periodic increases when employment growth faltered (e.g., 1992-1993, 1995-1996, and 2001-2003). Unemployment rates for each of the counties of the study area illustrate similar trends over the time period. The two counties of the study area experienced a marked drop in their unemployment rates between 1999 and 2001, followed by a rise through 2003, and then a decline to their lowest levels in 2007. The trend in unemployment rates in the study area, Converse and Natrona counties, and the state during the period 1990 through 2007 can be seen in Figure 5-8.

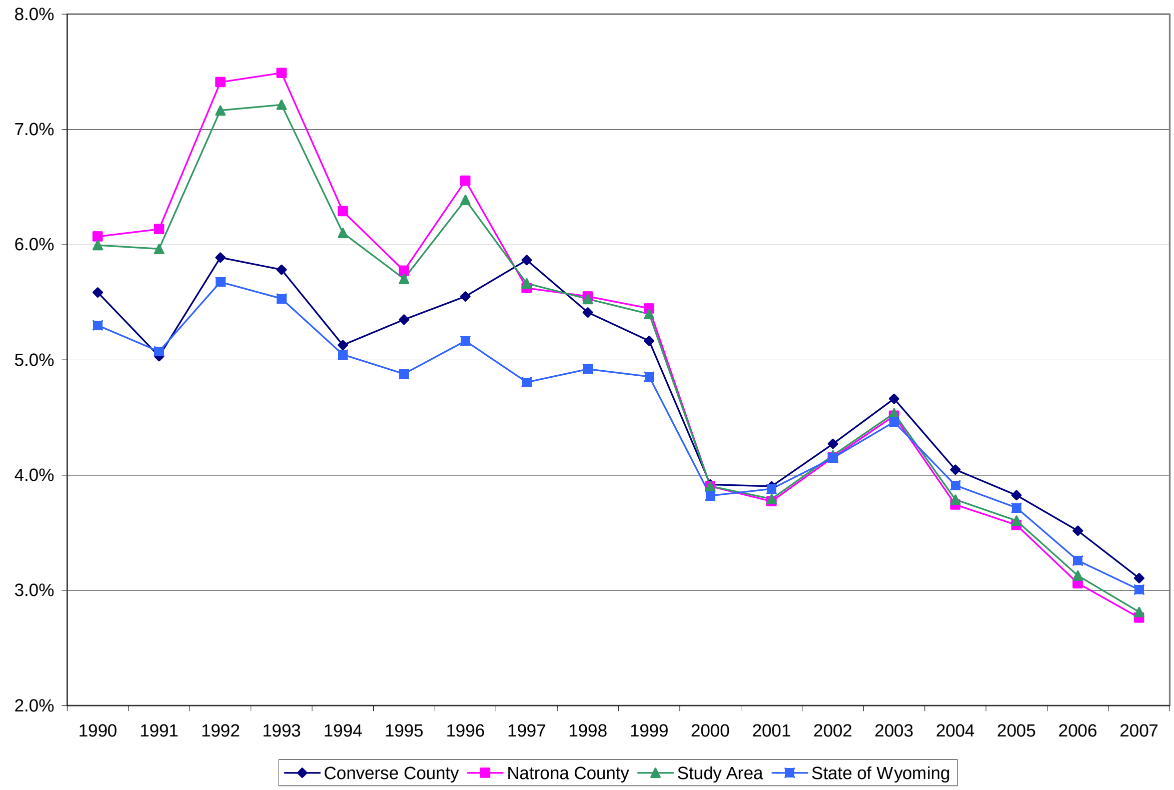

FIGURE 5-8
Unemployment Rate for Counties in the Study Area (1990-2007)

5.3.2.2 Existing Economic Conditions

Rule I Section 7(i)(ii)(C) – A study of the area economy including a description of methodology used. The study may include, but is not limited to, the following factors:

(C) Estimates of basic versus non-basic employment.

Employment by Industrial Sector. Over the period 1970 through 2000, total employment in the study area increased by over 23,400 jobs as shown in Table 5-5. The sector of the economy experiencing the greatest change was the services and professional sector where the number of full- and part-time jobs increased by over 19,100 jobs as can be seen from Figure 5-9. This increase comprised over 81 percent of total job growth over the period. The contribution made by this sector to total employment increased from 52 percent in 1970 to over 65 percent in 2000. Much of this increase was accounted for by gains in health, legal and business services (10,100 jobs), and retail trade (5,100 jobs). The government and construction sectors also posted increases, while employment in farming and mining declined. The changes in employment by sector for each of the counties comprising the study area are presented in Table 5-5 and Figure 5-10.

TABLE 5-5
Study Area: Employment by Industrial Sector (1970 and 2000)

	1970		2000		Change in Employment (1970-2000)	
	Number	**Percent of Total**	**Number**	**Percent of Total**	**Number**	**Percent of Numeric Change**
Total Employment	28,499		51,950		23,451	
Wage and Salary Employment	23,819	83.58%	39,922	76.85%	16,103	68.67%
Proprietors' Employment	4,680	16.42%	12,028	23.15%	7,348	31.33%
Farm and Agricultural Services	1,272	4.46%	1,689	3.25%	417	1.78%
Farm	1,068	3.75%	944	1.82%	-124	-0.53%
Agricultural Services	204	0.72%	745	1.43%	541	2.31%
Mining	4,072	14.29%	3,821	7.36%	-251	-1.07%
Manufacturing (incl. forest products)	1,643	5.77%	2,003	3.86%	360	1.54%
Services and Professional	14,895	52.26%	34,031	65.51%	19,136	81.60%
Transportation and Public Utilities	2,099	7.37%	2,768	5.33%	669	2.85%
Wholesale Trade	1,590	5.58%	2,895	5.57%	1,305	5.56%
Retail Trade	4,317	15.15%	9,412	18.12%	5,095	21.73%
Finance, Insurance and Real Estate	1,807	6.34%	3,773	7.26%	1,966	8.38%
Services (Health, Legal, Business, Others)	5,082	17.83%	15,183	29.23%	10,101	43.07%
Construction	1,727	6.06%	3,383	6.51%	1,656	7.06%
Government	4,890	17.16%	7,023	13.52%	2,133	9.10%

Source: Wyoming EAD, 2007e.

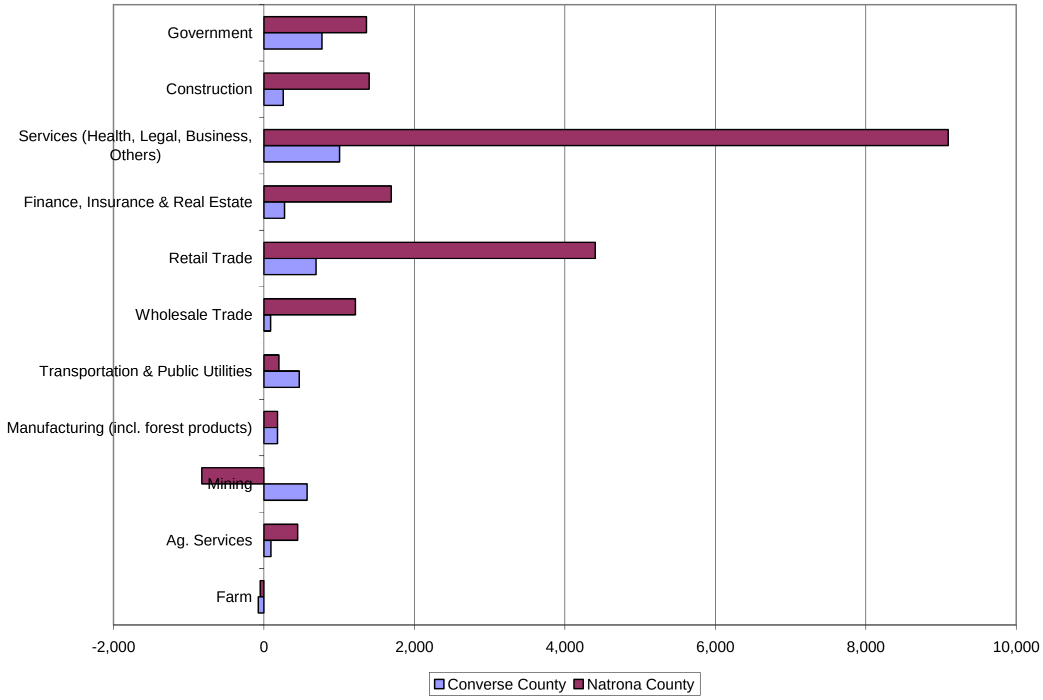

FIGURE 5-9
Change in Employment by Sector and County (1970-2000)

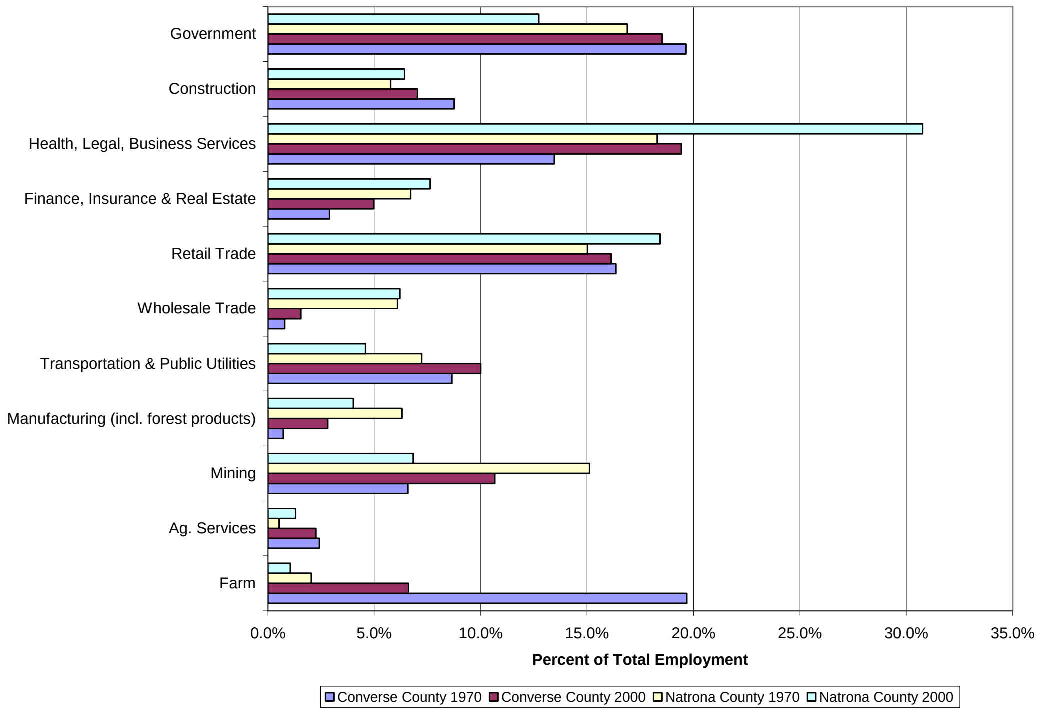

FIGURE 5-10
Industrial Sector Share of Total Non-Farm Employment (1970 and 2000)

As of 2006, major shares of nonfarm employment in Converse County were contributed by the following industrial sectors: local government (16 percent), mining (12 percent), retail trade (11 percent), construction (9 percent), accommodation and food services (8 percent), and transportation and warehousing (7 percent) as shown in Table 5-6. It should be pointed out that information regarding a number of industrial sectors is withheld in order to avoid possible identification of individual enterprises: utilities, wholesale trade, and a number of services including health care. The mining and local government sectors have significantly greater shares of total employment than at the state level: 12 percent versus 8 percent for mining; and 16 percent versus 11 percent for local government.

TABLE 5-6
Share of Employment by Industrial Sector (2006)

Industrial Sector	Wyoming	Converse County	Natrona County
Forestry	0.7%	1.2%	Not Disclosed
Mining	8.1%	12.3%	10.3%
Utilities	0.7%	Not Disclosed	Not Disclosed
Construction	9.3%	8.9%	7.8%
Manufacturing	3.2%	1.8%	4.1%
Wholesale Trade	2.6%	Not Disclosed	5.3%
Retail Trade	11.3%	10.7%	12.5%
Transportation	3.8%	7.0%	Not Disclosed
Information	1.4%	1.2%	1.3%
Finance and Insurance	3.3%	2.9%	3.6%
Real Estate	4.2%	3.9%	4.6%
Professional and Technical Services	4.6%	3.1%	4.7%
Management	0.3%	Not Disclosed	0.2%
Administrative Services	3.3%	Not Disclosed	4.3%
Educational Services	0.9%	Not Disclosed	0.7%
Health Care	7.3%	Not Disclosed	11.0%
Arts, Entertainment and Recreation	1.8%	1.6%	1.8%
Accommodation and Food Services	8.9%	8.1%	6.8%
Other Services	5.6%	5.7%	6.2%
Federal Civilian	2.0%	0.8%	1.3%
Federal Military	1.7%	1.1%	0.8%
State Government	3.9%	1.8%	1.4%
Local Government	11.2%	16.0%	7.9%

Source: BEA, 2008.

For Natrona County, major shares of nonfarm employment were contributed by the following industrial sectors: retail trade (13 percent), health care (11 percent), mining (10 percent), local government (8 percent), construction (8 percent), and accommodation and food services (7 percent) as shown in Table 5-6 and Figure 5-11.

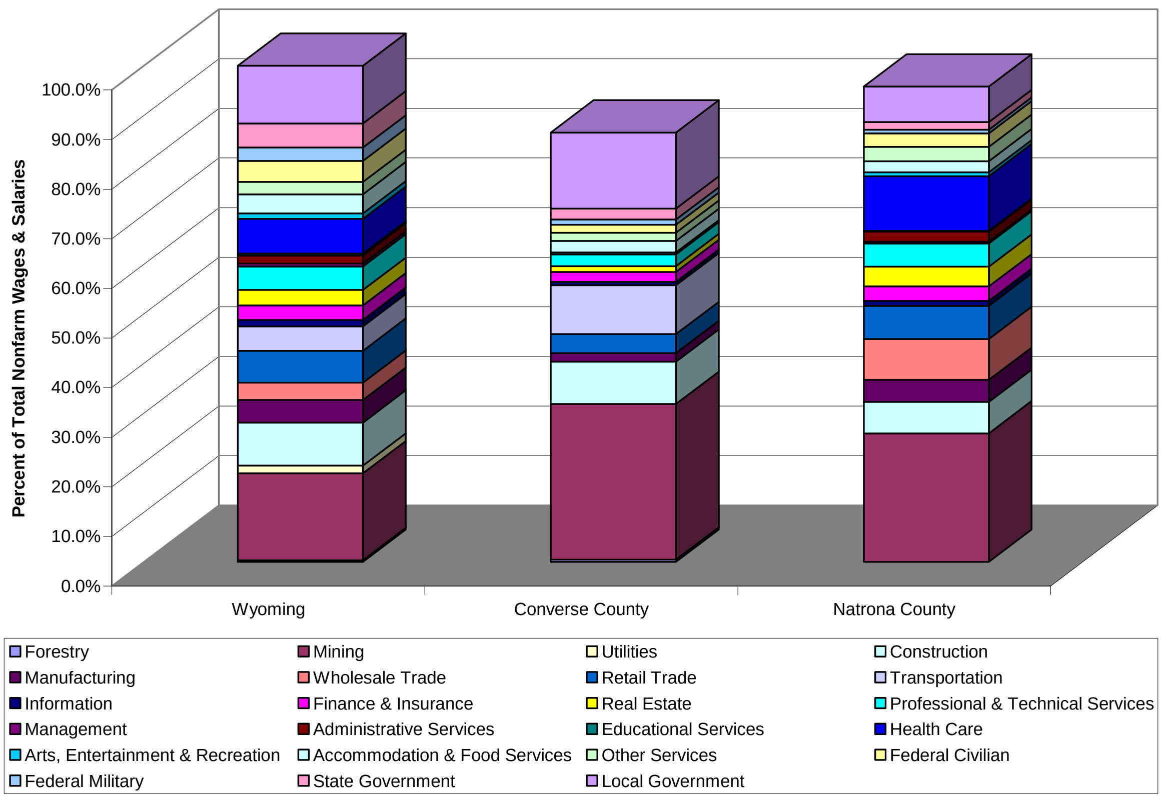

FIGURE 5-11
Non-Farm Employment, Contribution by Industrial Sector for County and State (2006)

Earnings and Income. Total aggregate personal income increased in each of the counties over the period 1980 through 2006 (unadjusted for inflation), from $167.6 million to $460.7 million in Converse County and from $1.038 billion to $3.101 billion in Natrona County as shown in Figure 5-12. However, as the absolute level of aggregate personal income for each of the counties increased, their share of the statewide aggregate total amount declined, as can be seen from the information presented in Figure 5-12. In 1980, the study area contributed almost 22 percent of total statewide aggregate personal income. This share declined thereafter and remained relatively stable from 1986 onwards at about 17 percent as can be see from Figure 5-13.

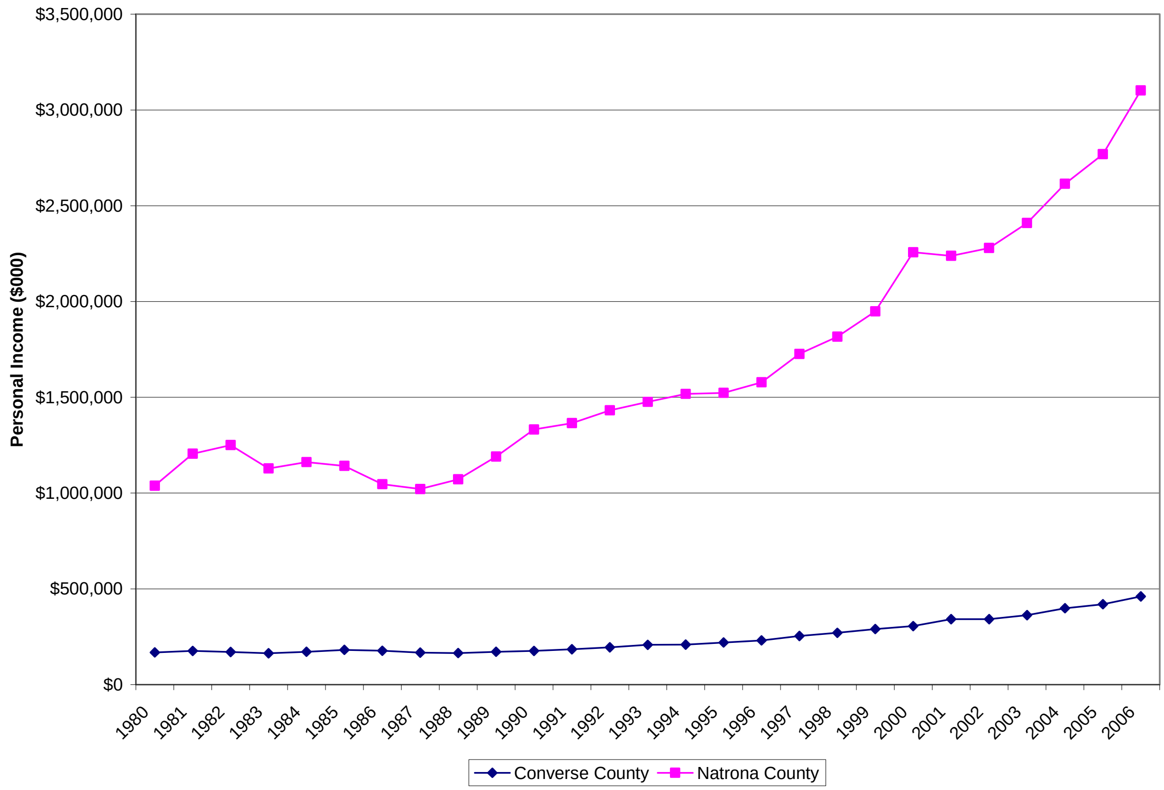

FIGURE 5-12
Aggregate Personal Income by County (1980-2006)

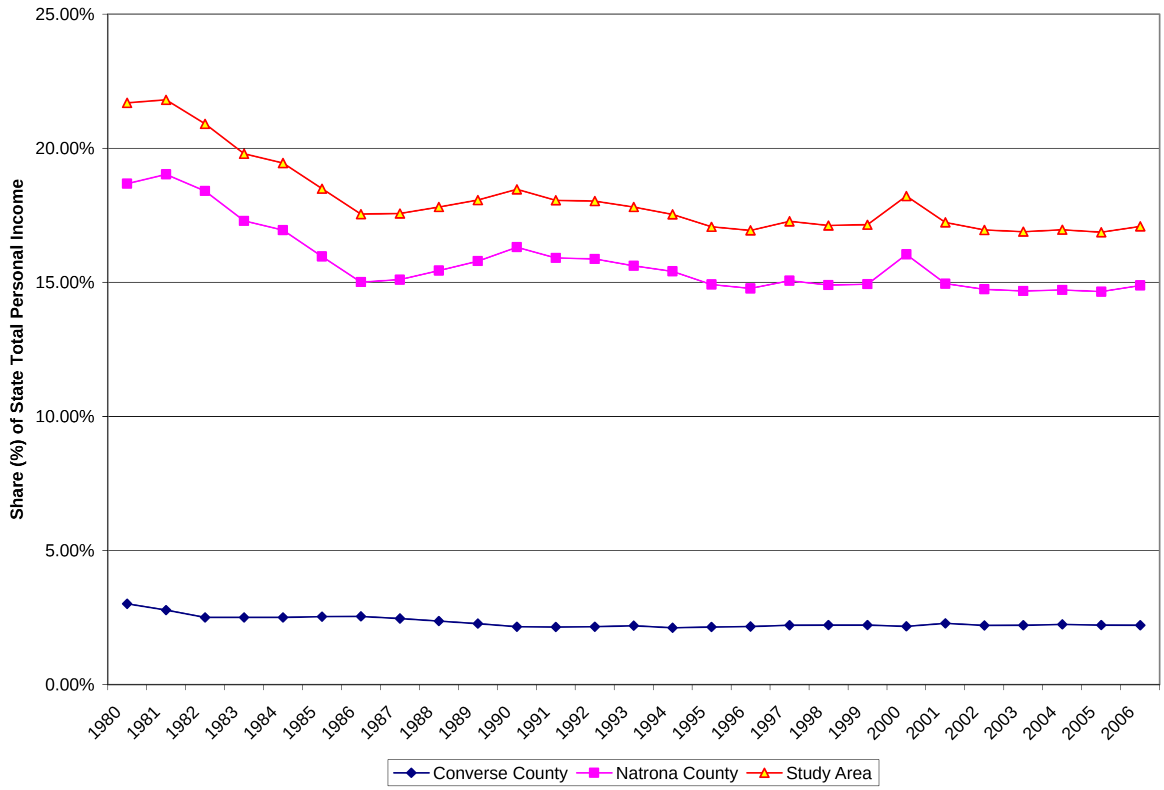

FIGURE 5-13
County Share of Aggregate State-wide Personal Income (1980-2006)

The greatest share (usually between about 60 and 70 percent) of personal income is derived from wages and salaries (excluding contributions to government social insurance). However, as can be seen from the information presented in Figure 5-14, that share declined consistently between 1980 and about 1988-1989 for the counties and the state, from between 75-80 percent to 60-65 percent. The share then increased steadily through 2006.

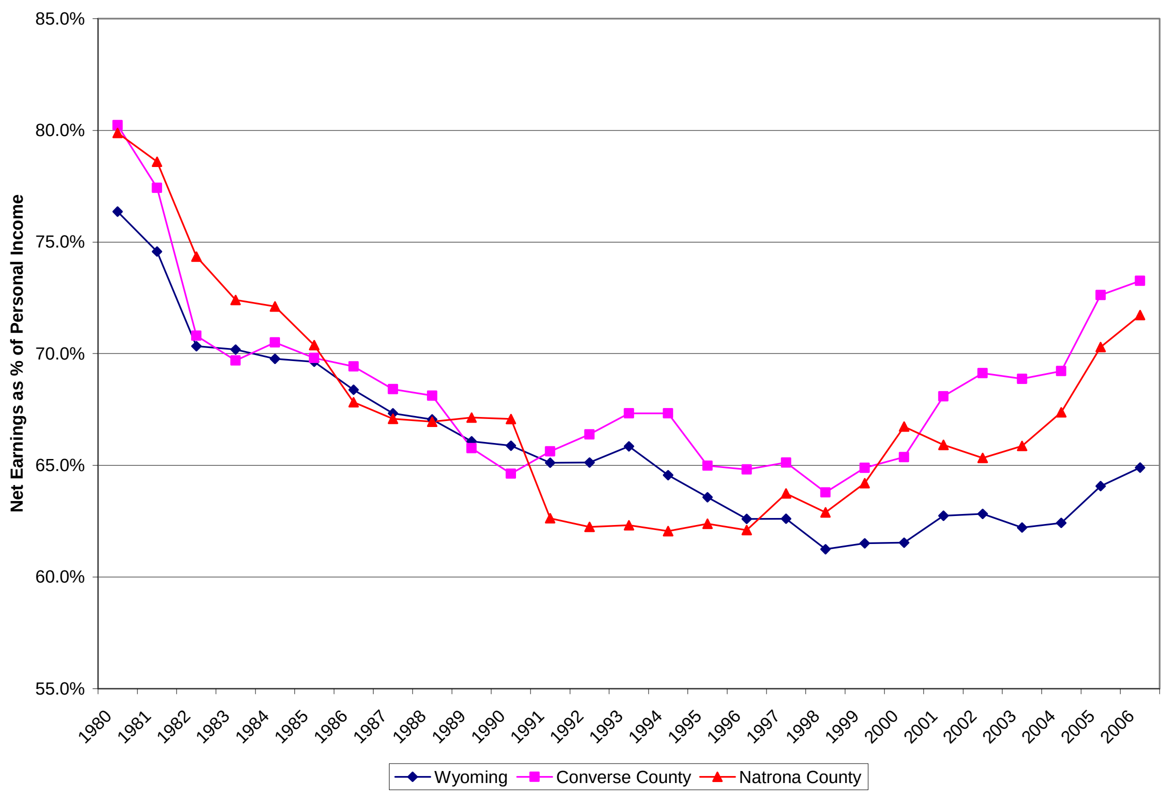

FIGURE 5-14
Net Earnings as Share of Personal Income (1980-2006)

The largest share of total non-farm earnings in the state of Wyoming in 2006 (which totaled over $15 billion) was contributed by the services sector (27 percent, including 6.5 percent by health care and social assistance), mining sector (18.9 percent), and state and local government sector (16.0 percent). Other notable sectors were construction (9.2 percent) and retail trade (6.2 percent). Differences in these sector contributions exist between the counties and the state as can be seen from the information contained Figure 5-15.

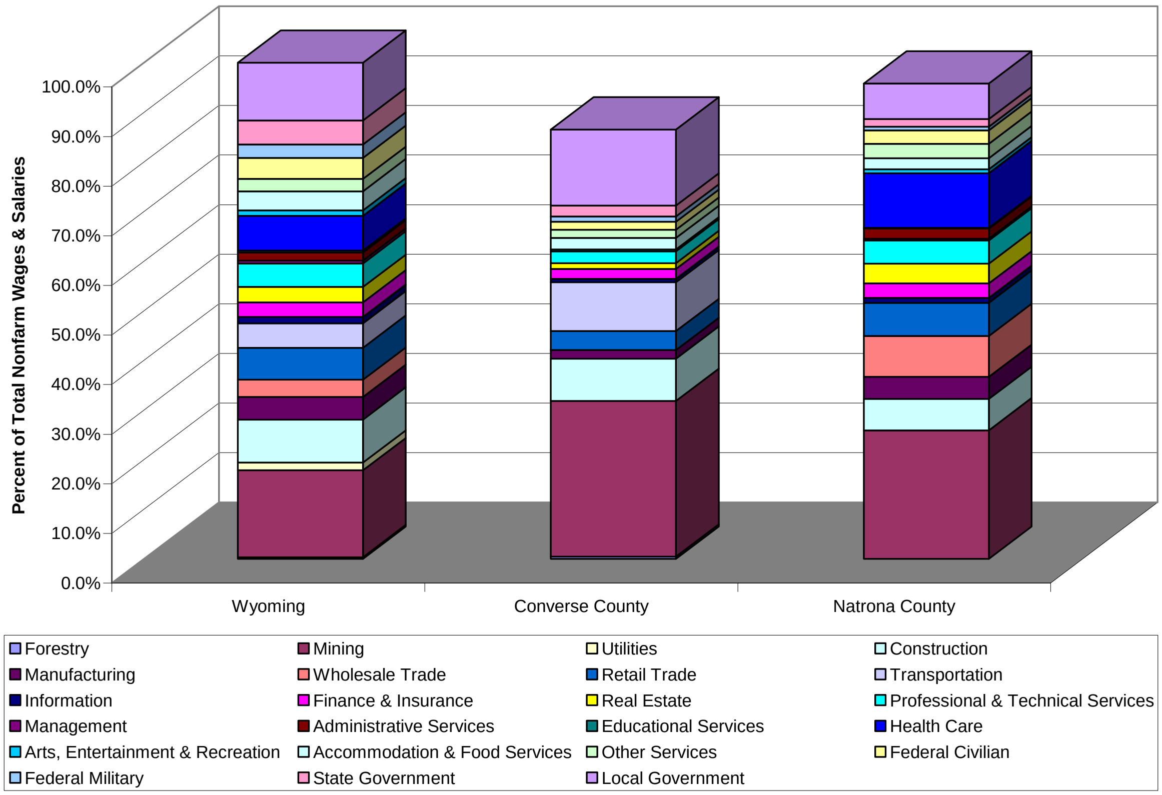

FIGURE 5-15
Non-Farm Earnings, Contribution by Industrial Sector for County and State (2006)

When compared to the state as a whole, Converse County exhibits a concentration of non-farm earnings in the mining and state and local government sectors of the economy. Mining contributed almost 33 percent of non-farm earnings (compared with almost 19 percent for the state), local government contributed 15.5 percent (compared to 11.5 percent for the state), and the transportation sector contributed 10 percent (compared to 5 percent for the state) as can be seen from Figure 5-15. With total non-farm earnings of almost $305 million in 2006, Converse County contributed about 2 percent of the state total.

For Natrona County in 2006, contributions by the mining sector (27 percent) exceeded the corresponding value for the state of 19 percent while the contribution by the state and local government sector (almost 9 percent) was significantly smaller than that for the state (16 percent) as can be seen from Figure 5-15. With total non-farm earnings of $2.487 billion in 2006, Natrona County contributed 16 percent of the state total.

Because there are large variations in annual earning per job across the different sectors of the economy, the correspondence between a sector’s employment share and its share of earnings can be quite different. In the case of the state of Wyoming, the mining sector of the economy contributes 8.1 percent of non-farm employment but 18.9 percent of earnings. The retail trade sector contributes 11.3 percent of employment but only 6.2 percent of earnings, and the accommodations and food services sector contributes 8.9 percent of employment but only 4.2 percent of earnings. These discrepancies are evident in the information

presented in Figure 5-16. Such inequalities can be explained by the values of earning per job: over $92,000 annually in mining, $21,700 for the retail sector, and $16,300 for the accommodations and food services sector. Such wage differences are also reflected at the county levels.

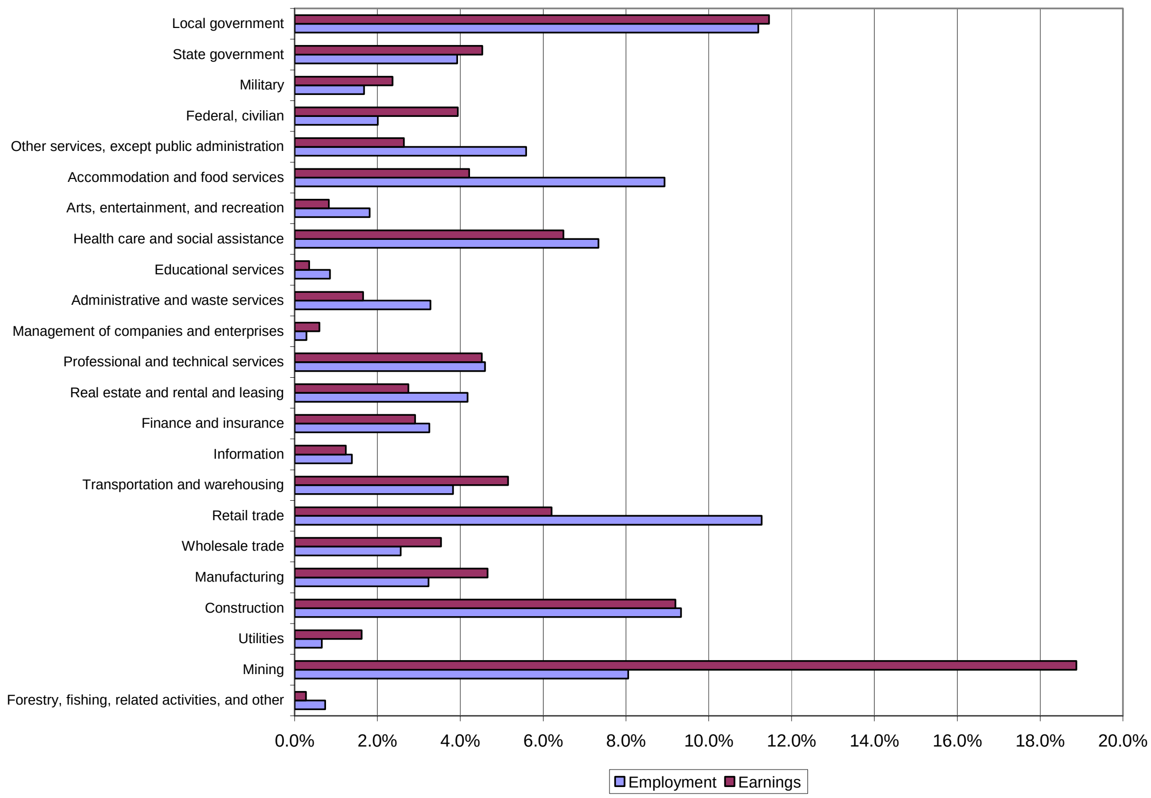

FIGURE 5-16
Employment and Earnings Shares by Industrial Sector, State of Wyoming (2006)

A comparison of the correspondence between employment share and earnings share, by industrial sector, for the state and each of the counties comprising the study area is illustrated in Figure 5-17.

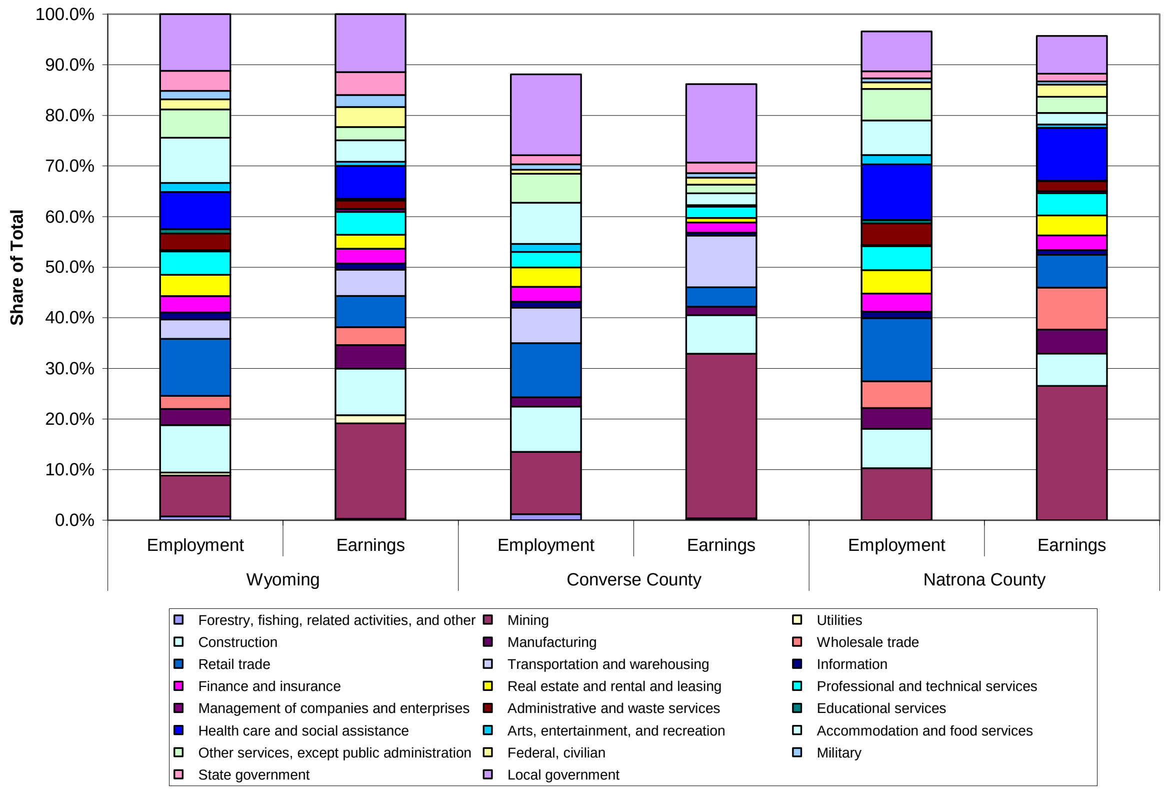

FIGURE 5-17
Employment and Earnings Shares by Industrial Sector for State of Wyoming, Converse County, and Natrona County (2006)

Work Centers and Bedroom Communities. Depending upon the balance between the number of employment opportunities in a county and the number of employed persons who reside in the county, the county can be classified between the two extremes of work center and bedroom community. In the case of a work center, there are typically more job opportunities in the area than resident workers, and for a bedroom community, the reverse is true. The differentiation between counties in highly urban and metropolitan regions can be quite distinct with the cost of housing playing a significant role. In predominantly rural areas where employment opportunities can often be concentrated in a few large communities, the differentiation between work center and bedroom community can also be quite marked.

Information derived from the U.S. Census of 2000 provides a detailed picture of commuting patterns on a county-by-county basis and is indicative of the economic linkages and interdependencies between counties. Table 5-7 presents information regarding the main workplaces for the residents of each of the counties comprising the study area. In all cases, as expected, the overwhelming majority of county residents work in the same county. Geographically adjacent counties account for the highest commuter flows (e.g., Converse County residents commuting to Natrona County and Natrona County residents commuting to Converse County).

TABLE 5-7
County Economic Interdependencies

Place of Residence County	Workplace County	Commuters	Place of Residence County	Workplace County	Commuters
Converse Co. WY	Converse Co. WY	4,477	Natrona Co. WY	Natrona Co. WY	31,031
Converse Co. WY	Natrona Co. WY	812	Natrona Co. WY	Converse Co. WY	375
Converse Co. WY	Campbell Co. WY	349	Natrona Co. WY	Campbell Co. WY	210
Converse Co. WY	Laramie Co. WY	25	Natrona Co. WY	Carbon Co. WY	123
Converse Co. WY	Platte Co. WY	22	Natrona Co. WY	Fremont Co. WY	73
Converse Co. WY	Sweetwater Co. WY	21	Natrona Co. WY	Platte Co. WY	67
Converse Co. WY	Niobrara Co. WY	20	Natrona Co. WY	Sweetwater Co. WY	39
			Natrona Co. WY	Denver Co. CO	36
			Natrona Co. WY	Park Co. WY	33
			Natrona Co. WY	Johnson Co. WY	27
			Natrona Co. WY	Harris Co. TX	27
			Natrona Co. WY	Clark Co. NV	25
			Natrona Co. WY	Jefferson Co. CO	25
			Natrona Co. WY	Cascade Co. MT	23
			Natrona Co. WY	Sheridan Co. WY	21
			Natrona Co. WY	Boulder Co. CO	20

Source: U.S. Census Bureau, 2000.

The federal Bureau of Economic Analysis (BEA) reports annually, at the county level, on personal income in terms of location of residence. Estimates are developed on how much money is earned in a county by persons residing outside the county (referred to as “total gross earnings outflow”) and how much money is brought into a county by residents who work outside the county (referred to as “total gross earnings inflow”). Subtracting one value from the other gives the “net residence adjustment” that indicates the role of the county as a “bedroom community” or “work center.” Where the total gross earnings inflow exceeds the total gross earnings outflow, the net residence adjustment will be positive and the community is classed as a bedroom community. Conversely, where the total gross earnings outflow exceeds the total gross earnings inflow, the net residence adjustment will be negative and the community is classed as a work center. Where there is a relative balance between inflow and outflow of income, the community or county has a jobs-to-housing balance. The role that a county plays over time can change as the location of residences and job opportunities change differentially.

Converse County is classed as a bedroom community and Natrona County has a balance between jobs and housing. Table 5-8 shows the net residence adjustment and classification for each county.

TABLE 5-8
County Commuting Patterns

County	Net Residence Adjustment (Percent of Total Income in County in 2005)	Bedroom Community or Job Center
Converse	+12.6%	Bedroom Community
Natrona	-0.1%	Balanced Community

Source: Sonoran Institute, 2005.

In Converse County, over the period 1990 through 2005, incomes have been increasing but income attributable to inflows has increasingly exceeded that associated with outflows. In 2005, there was a net inflow of almost $55 million, and the net residential adjustment value stood at +12.6 percent, as shown in Figure 5-18. For Converse County, the role as a bedroom community has become steadily more apparent over the period.

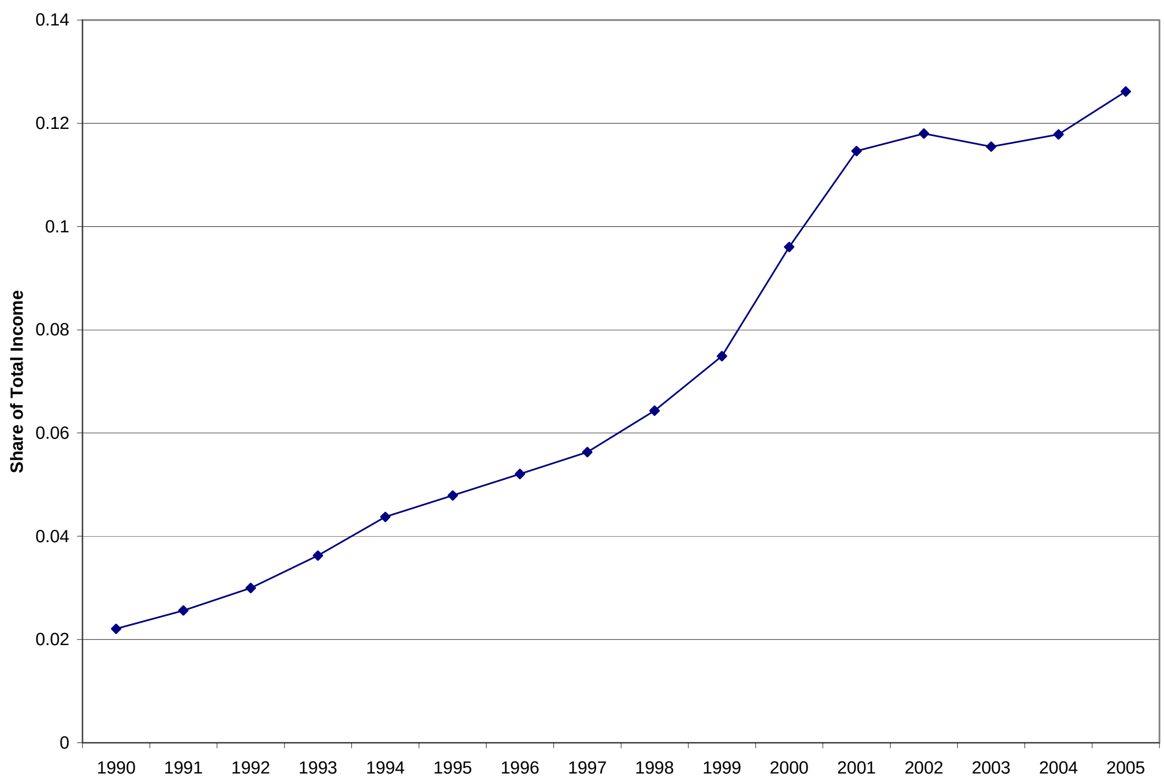

FIGURE 5-18
Net Residential Adjustment for Converse County (1990-2005)

The corresponding net residential adjustment values for Natrona County, as can be seen in Figure 5-19, have steadily decreased indicating a swing toward the role of a work center. However, the imbalance between inflow and outflow remains small, indicating a relative balance between jobs and housing.

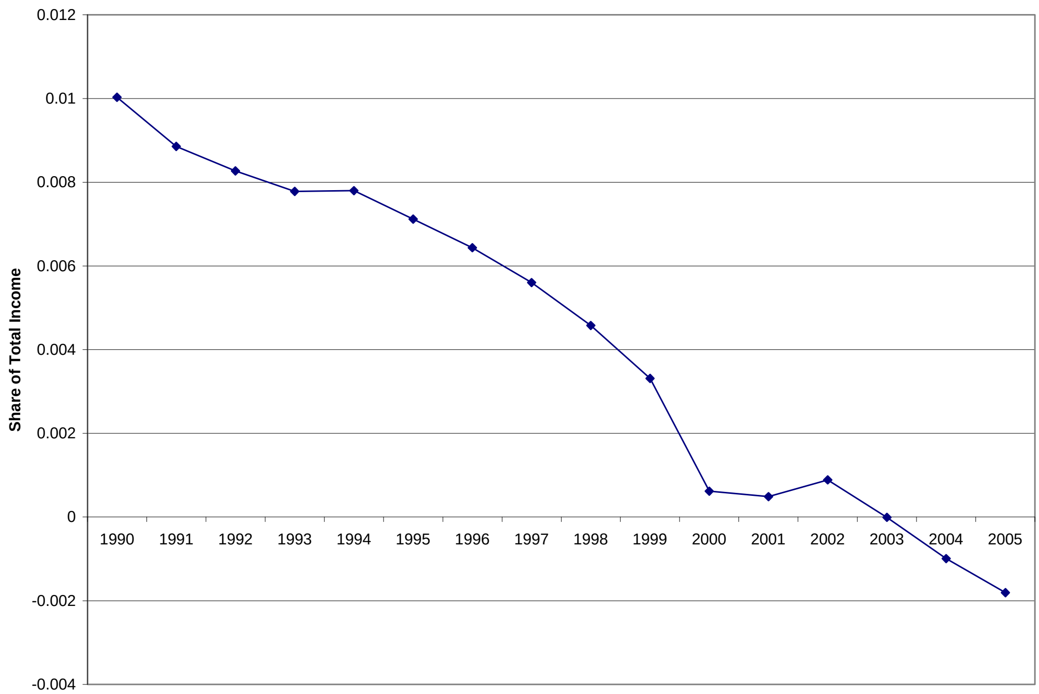

FIGURE 5-19
Net Residential Adjustment for Natrona County (1990-2005)

5.3.2.3 Existing Labor Characteristics and Availability

The following sections focus on past, present, and projected employment and earnings for the construction industry in the study area.

General Construction Labor Characteristics. The number of jobs in the construction trades exhibits a cyclical pattern. The period between 1970 and about 1993 comprised one complete cycle representing the "boom" and "bust" of the energy resources development period in both counties, but most noticeably in Natrona County. As can be seen in Figure 5-20, employment in the construction sector in Natrona County increased from 1,485 jobs in 1970 to 4,615 jobs in 1979 only to decline to 2,140 jobs by 1993. The period after 1993 saw a steady increase in employment to 4,036 by 2006: still below the peak year of 1979.

In the case of Converse County, employment in the construction sector increased from 211 in 1973 to 773 in 1980 followed by a decline to 311 by 1990. This was followed by a period of modest growth culminating in 633 jobs by 2006 as shown in Figure 5-20. The recovery period between 1993 and 2006 saw the following increases in construction employment: 71 percent in Converse County; 69 percent in Natrona County; and 68 percent for the state of Wyoming.

The average annual wage for persons in construction and extraction occupations for the state of Wyoming (as of May 2006) was $39,194, which was 14 percent higher than the average for all occupations ($34,246). Average annual wages for workers in construction and

extraction occupations were lower than the state level in Converse County ($38,370) but somewhat higher in Natrona County.

Through the period to 2012, specialty trade contractors and heavy and civil engineering construction contractors are two of the top 10 industries expected to add the most jobs. The demand for construction laborers and skilled trades people (e.g., carpenters, electricians, operating engineers, plumbers, and occupations requiring long-term on-the-job training) is also expected to increase substantially over this period. Prospects for the construction sector are also addressed in Section 5.3.2.5, Future Economic Conditions.

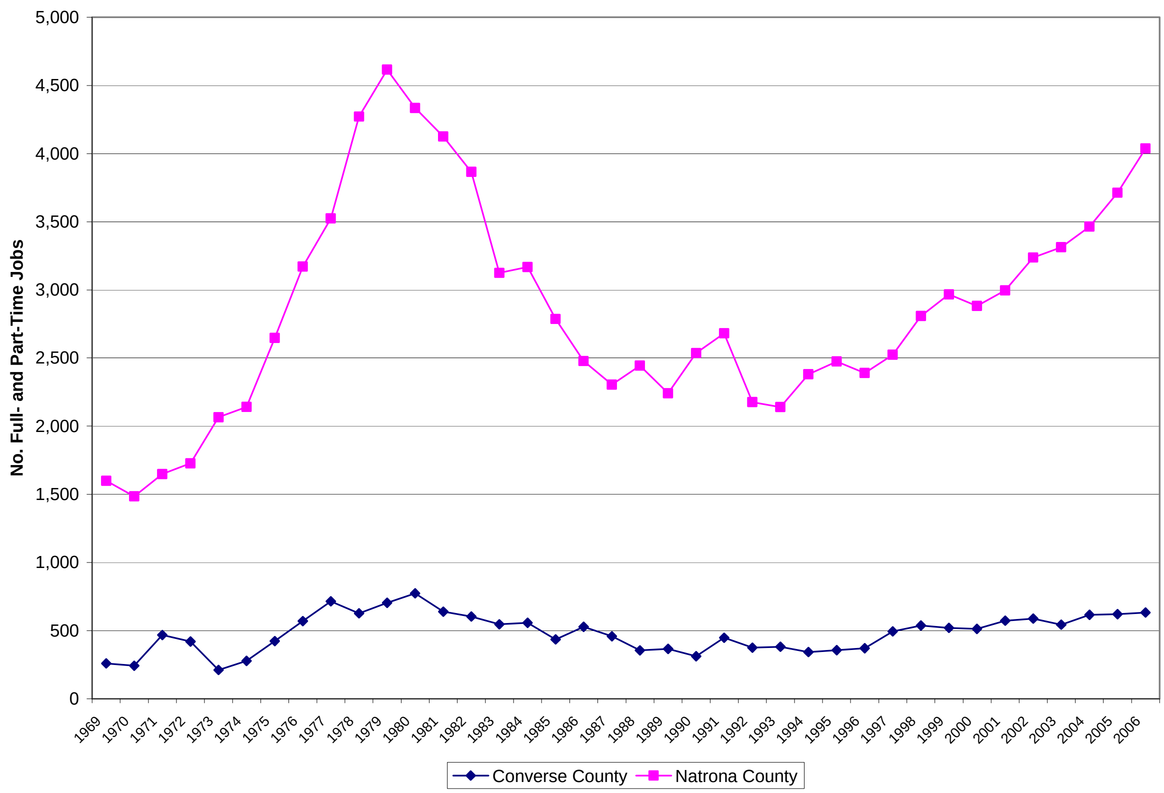

FIGURE 5-20
Construction Employment by County (1969-2006)

5.3.2.4 Governmental Revenues and Finances

Assessed Property Values. The assessed value of real property is the major source of *ad valorem* taxes. Properties are assessed at both the state and local (county) level: the state assesses the value of utility and mineral properties; the counties assess residential, agricultural, commercial, and industrial land and improvements.

The total assessed value of real property in 2007 for the two-county study area was $1.539 billion as displayed in Table 5-9. Of this total, 33 percent was contributed by Converse County and 67 percent by Natrona County. Together, the counties accounted for just over 7 percent of the assessed value of all real property in Wyoming.

TABLE 5-9
Assessed Valuation by Type of Property and County (2007)

	Locally Assessed Valuation				State Assessed Valuation		Total
County	**Agricultural Land**	**Commercial Land, Improvements and Personal Property**	**Residential Land, Improvements and Personal Property**	**Industrial Property**	**Non Minerals (Utilities, Railroads, and Airlines)**	**Minerals**	
Converse	$10,082,504	$13,872,388	$59,845,975	$48,081,944	$65,728,740	$308,161,966	$505,773,517
Natrona	$6,044,315	$142,967,781	$385,698,540	$54,316,636	$37,794,608	$406,617,408	$1,033,439,288
Study Area	$16,126,819	$156,840,169	$445,544,515	$102,398,580	$103,523,348	$714,779,374	$1,539,212,805
STATE	$193,407,094	$922,026,388	$3,617,168,638	$1,364,510,842	$807,774,018	$14,586,380,458	$21,491,267,438

Source: Wyoming Department of Revenue, 2007.

Of the six types of properties, the greatest contribution is associated with mineral properties which accounted for over 60 percent of total assessed value in Converse County and over 39 percent in Natrona County, as can be seen from Table 5-10. For the state as a whole, the contribution was almost 68 percent. In Converse County, the second largest contribution is associated with utilities (13 percent of the total), followed by residential land (12 percent) and industrial land (10 percent). For Natrona County, the second largest contribution is from residential land (37 percent of the total) followed by commercial land (14 percent of the total) reflecting the markedly more urban nature of the county.

TABLE 5-10
Contribution by Type of Property by County (2007)

County	Agricultural Land	Commercial Land, Improvements and Personal Property	Residential Land, Improvements and Personal Property	Industrial Property	Non Minerals (Utilities, Railroads, and Airlines)	Minerals	Total
Converse	1.99%	2.74%	11.83%	9.51%	13.00%	60.93%	100%
Natrona	0.58%	13.83%	37.32%	5.26%	3.66%	39.35%	100%
STATE	0.90%	4.29%	16.83%	6.35%	3.76%	67.87%	100%

Source: Wyoming Department of Revenue, 2007.

Ad valorem taxes (calculated by applying county- and use-specific mill rates to the assessed value of property) support a number of county and municipal operations including airports, fire protection, hospitals, libraries, museums, public health, recreational systems, special districts, and education. Table 5-11 displays the major beneficiaries of *ad valorem* taxes at the state level.

TABLE 5-11
Beneficiaries of *Ad Valorem* Taxes in Wyoming (2007)

Beneficiary	Percent of Total
Schools	54.47
Counties	18.53
Foundation Program	18.73
Special Districts	6.91
Municipalities	1.36

Source: Wyoming Department of Revenue, 2007.

Sales, Use, and Lodging Taxes. Sales and use tax collections are two principal sources of revenue for state and local governments. Local governments can also impose a lodging tax. The rates for each of these taxes for the counties of the study area are shown in Table 5-12.

TABLE 5-12
State and County Sales, Use, and Lodging Tax Rates

County	State Tax Rate	General Purpose Option	Specific Purpose Option	Total Sales and Use Tax Rate	Lodging Tax Rate
Converse	4%	1%	None	5%	3%
Natrona	4%	1%	None	5%	3%

Source: Wyoming Department of Revenue, 2007.

Sales Tax. The state-imposed sales tax rate is 4 percent, and revenues collected are divided 69 percent to the state and 31 percent to the counties. Each of the counties of the study area imposes a 1 percent general purpose optional sales tax. Revenue derived from the optional sales tax, less administrative costs, is returned by the state to the county of origin. Total sales tax collections for the years 2002 through 2007 for each county in the study area are presented in Table 5-13. Figure 5-21 shows sales tax collections by county. Collections remained relatively flat between 2001 and 2003, after which time they increased significantly, especially in Natrona County.

TABLE 5-13
Sales, Use, and Lodging Tax Collections (Fiscal Year 2002-2007)

	2002	2003	2004	2005	2006	2007
SALES TAX						
Converse County	$9,996,589	$9,791,374	$10,836,204	$12,083,692	$14,839,237	$15,066,741
Natrona County	$61,923,336	$62,181,247	$71,128,758	$78,432,104	$88,395,192	$93,393,353
State of Wyoming	$515,799,683	$503,970,199	$551,668,565	$603,951,798	$719,115,277	$799,254,374
USE TAX						
Converse County	$1,086,413	$1,524,036	$1,383,992	$1,564,483	$1,798,863	$1,888,515
Natrona County	$4,886,304	$3,190,012	$4,967,802	$4,165,076	$6,357,269	$7,493,952
State of Wyoming	$62,491,361	$54,866,020	$58,387,269	$64,326,659	$82,158,509	$113,045,113
LODGING TAX						
Converse County	$2,955	$3,822	$4,603	$4,179	$4,553	$4,484
Douglas	$55,896	$57,393	$84,436	$104,480	$130,936	$159,723
Glenrock	$2,849	$2,554	$3,865	$3,763	$2,670	$3,878
TOTAL	**$61,701**	**$63,769**	**$92,904**	**$112,421**	**$138,158**	**$168,085**
Natrona County	$9,924	$13,501	$16,494	$18,955	$10,575	$98,071
Bar Nunn	$1,141	$1,428	$1,786	$3,000	$2,740	$2,639
Casper	$435,095	$445,254	$495,972	$515,190	$609,841	$562,380
Edgerton	$2,374	$1,691	$3,312	$3,718	$4,730	$3,812
Evansville	$61,643	$58,035	$59,380	$80,629	$100,098	$181,317
Mills	$171	$200	$989	$1,986	$2,181	$8,027
TOTAL	**$510,348**	**$520,110**	**$577,933**	**$623,478**	**$730,165**	**$856,247**
State of Wyoming	**$3,939,521**	**$4,108,475**	**$4,738,192**	**$4,960,822**	**$5,859,863**	**$6,843,052**

Source: Wyoming Department of Revenue, 2007.

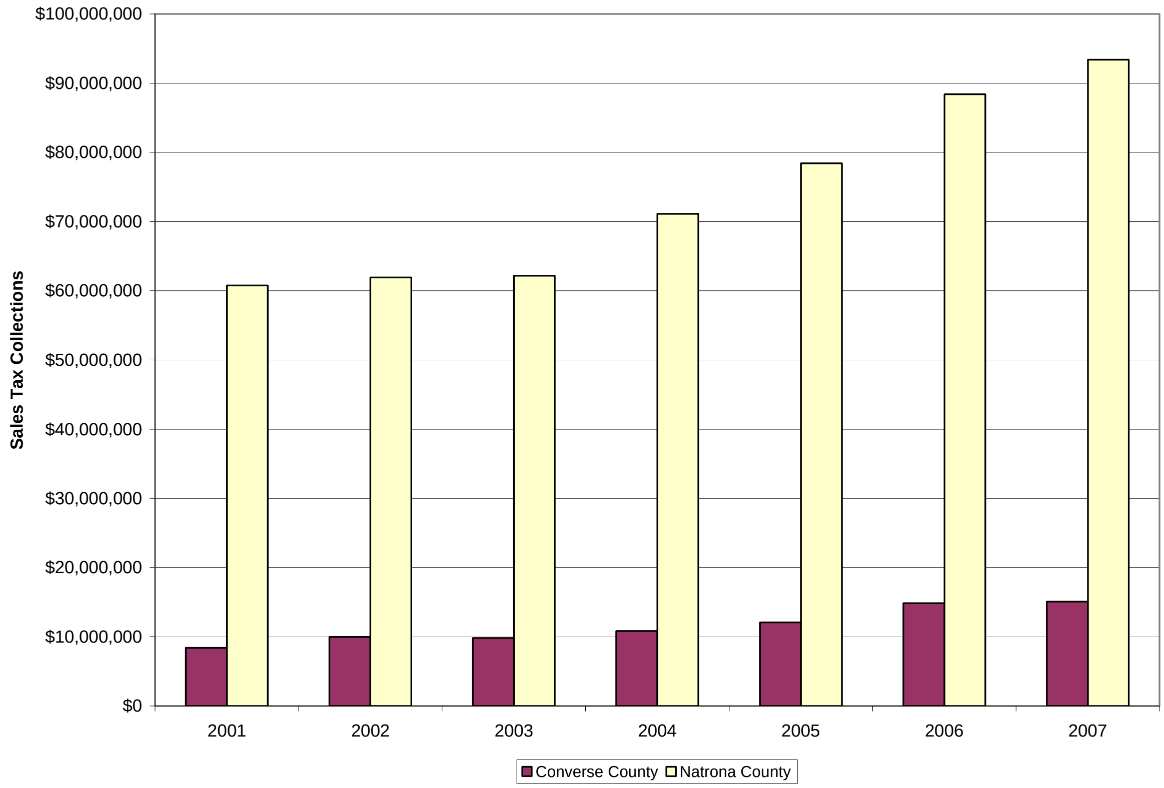

FIGURE 5-21
Sales Tax Collections by County (2001-2007)

Use Tax. A state use tax is imposed on purchases made outside a taxing jurisdiction for first time, storage, or other consumption within that jurisdiction thus preventing sales tax avoidance. Use tax is a complement to sales tax. Effective January 1, 1981, the adoption of an optional sales tax required a change in the use tax rate of equal amount. The state-imposed tax rate is 4 percent. State use tax collections are shared between state government and the county of origin on the same distribution basis as sales tax. Use tax collections by year and county are shown in Table 5-13.

Lodging Tax. Cities, towns, and counties may impose an excise tax of up to 4 percent on all sleeping accommodations for guests staying less than 30 days. All tax collections, less state administrative costs, are distributed to the taxing jurisdiction. At least 90 percent of the tax distributions must be used to promote travel and tourism. The tax rates for each of the counties comprising the study area are shown in Table 5-12, and tax collections are shown in Table 5-13.

Industrial Siting Impact Assistance Funds. Under the Industrial Development and Siting Statutes (W.S. 35-12-101 through 35-12-109), the criteria that potential industrial facilities must meet in order to be awarded a construction permit (found at W.S. 35-12-102(a)(vii)) also qualify a county or town to receive industrial impact assistance tax payments. The impact assistance payments are distributed to the county treasurer and the county treasurer distributes to the county and to the cities and towns therein based on a ratio established by

the industrial siting council during a public hearing held in accordance with W.S. 35-12-110. The industrial siting council reviews the distribution ratio for construction projects on a regular basis and makes appropriate adjustments. A governing body which is primarily affected by the facility, or any person issued a permit pursuant to W.S. 35-12-106, may petition the industrial siting council for review and adjustment of the distribution ratio upon a showing of good cause. The impact assistance payment is in addition to all other distributions under this section, but no impact assistance payment is made for any period in which the county or counties are not imposing at least a 1-percent tax authorized by W.S. 39-15-204(a)(i) and 39-16-204(a)(i) or at least a total of a 2-percent sales tax authorized under W.S. 39-15-204(a)(i), (iii) and (vi) and at least a total of a 2-percent use tax authorized under W.S. 39-16-204(a)(i), (ii) and (v). The project is deemed to be located in the county in which a majority of the construction costs will be expended, provided that upon a request from the county commissioners of any adjoining county to the industrial siting council, the council may determine that the social and economic impacts from construction of the industrial facility or federal or state government project upon the adjoining county are significant and establish the ratio of impacts between the counties and certify that ratio to the state treasurer who will thereafter distribute the impact assistance payment to the counties pursuant to that ratio.

This program of industrial impact assistance tax payments is designed to assist cities, towns, or counties in deflecting the impact a major industrial project may have on community resources. This program measures the increase in tax revenue caused by the industrial project and matches that increase with additional monies from the state General Fund to help communities respond to project-related impacts. This tax distribution is transferred from the state General Fund, via the office of the State Treasurer, directly to County Treasurers' offices. Figure 5-2 illustrates the impact assistance tax payments received from fiscal years (FY) 1994 through 2007 by county and cities or towns. These totals represent the amount of extra revenue counties, cities, and towns receive in direct proportion to any increase in their tax collection to mitigate project-related impacts.

The large majority of aggregate payments made over the 19-year period were to Campbell County which received almost $25 million (45 percent of total aggregate payments). The next largest amounts were paid to Sweetwater County (almost $16 million), Crook County ($3.8 million), Weston County ($3.5 million), and Carbon County ($2.6 million). These five counties accounted for over 92 percent of payments over the period.

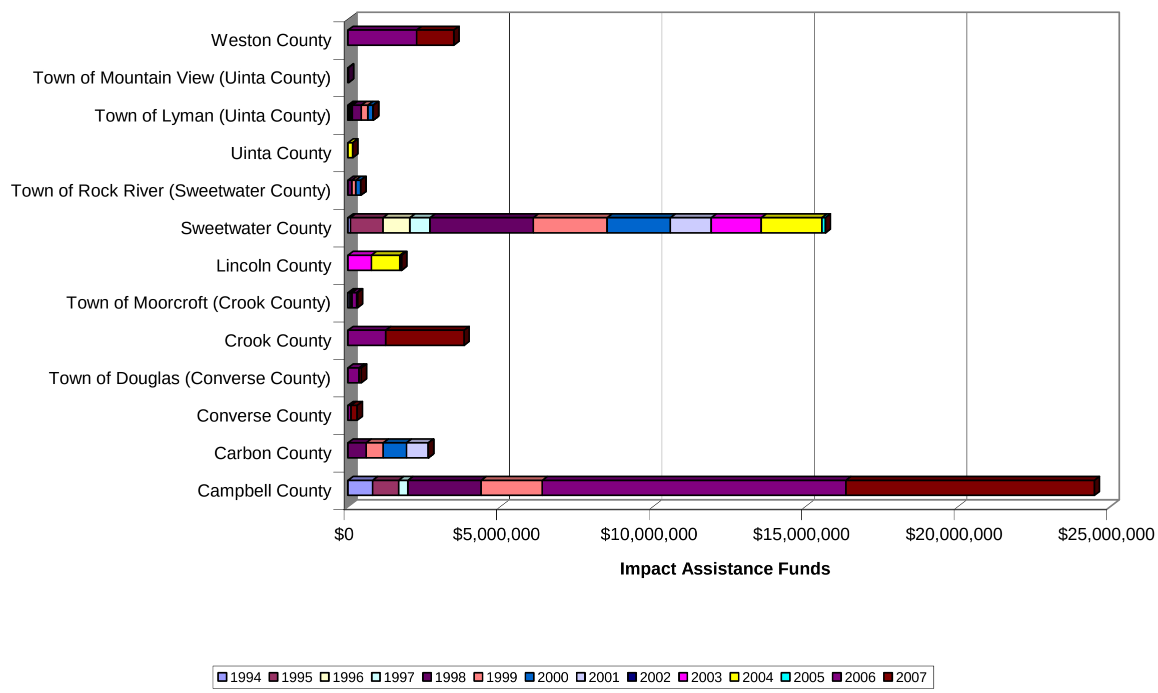

FIGURE 5-22
Impact Assistance Tax Payments (1995-2007)

Forecasts of the monthly impact assistance tax payments to Converse County are presented in Appendix A. These forecasts (made on a monthly basis) are based on the difference between two values: a "base period amount"; and a projected value derived from a simple linear regression of historical value. The "base period amount" is the monthly average value of sales and use tax revenues returned to the county and all municipalities within it over the preceding 4 years. The projected monthly value is extrapolated from the least squares fit linear regression using the monthly historic values from the preceding 4 years. Where the projected value exceeds the base period amount, the difference is the projected monthly impact assistance payment disbursed from the State general fund to the county and municipalities.

Governmental Finances. General revenues totaled over $22 million for Converse County in fiscal year (FY) 2001-2002 with the large majority (87 percent) being derived from local sources as can be seen from Table 5-14. Only small contributions came from intergovernmental sources (i.e., federal [2.3 percent of total] and state [6.6 percent of total]). In the case of Natrona County, general revenues totaled over $432 million, of which 78 percent were derived from local sources. Contributions from intergovernmental sources comprised 22 percent: federal (10 percent of total) and state (12 percent of total).

TABLE 5-14
Public Finances (2001-2002)

	Converse County	Natrona County
General Revenue	$22,754	$43,068
Intergovernmental	$2,034	$9,377
From Federal Government	$540	$4,377
From State Government	$1,494	$5,000
Own Sources	$19,862	$33,691
Taxes	$7,631	$25,533
General Expenditure	$23,843	$46,035
Capital Outlay	$280	$9,275
Major Functions:		
Education	$2,159	$3,396
Welfare	$95	$999
Hospitals	$9,742	$120
Health	$575	$1,900
Highways	$2,550	$3,322
Police Protection	$838	$2,718
Correction	$575	$3,506
Natural Res and Parks and Recreation	$723	$3,559
Sewerage and Solid Waste Management	$457	
Interest on General Debt	$1,657	$1,234
Outstanding Debt	$21,706	$17,229
Salaries and Wages	$6,994	$9,736

Note: Dollar amounts are in thousands
Source: U.S. Census Bureau, 2005.

The largest shares of general expenditures in Converse County are assigned to the county hospital (41 percent of total general expenditures), followed by highways (11 percent of the total) and education (9 percent of the total) as can be seen from Table 5-14. In Natrona County, major expenditure categories are parks and recreation (8 percent of total general expenditures), corrections (8 percent), education (7 percent), and highways (7 percent).

5.3.2.5 Future Economic Conditions

Rule I Section 7(i)(ii)(A) – A study of the area economy including a description of methodology used. The study may include, but is not limited to, the following factors:

(A) Employment projections by major sector.

Economic Projections. The following description of potential future economic conditions in the state is derived from the report entitled *10 Year Outlook Wyoming Economic and Demographic Forecast 2007 to 2016*, prepared by the Wyoming Department of Administration and Information, EAD (EAD, 2007a).

Wyoming's economy is largely driven by natural resources, and in 2005, the mining industry contributed approximately one-third of both the state's total earnings growth and job growth. In addition, the multiplier effect associated with the mining industry results in stimuli in many other industries such as wholesale trade, transportation, and professional and business services. The total job growth rate of 4.9 percent in 2006 was the second highest in the nation, and the personal income growth rate of 10.4 percent in 2006 was virtually the highest. The mining industry provides high-paying jobs, and as such, its strong presence in Wyoming means that income growth in the state is always closely associated with mining activity. Housing permits in Wyoming have outpaced the western United States and the United States as a whole since 2003. Residential construction is expected to slow down; however, housing in the state is expected to remain very affordable compared to the national average.

Wyoming's population is aging rapidly and is expected to continue to do so. In 2000, the median age of 36.2 in the state passed the national average of 35.3. By 2010, the expected median age of 39.3 for Wyoming will be 2.3 years older than the United States level, and the size of the older population (age 65 and over) will reach over 81,000 by 2014, compared to today's 61,000.

Although mining jobs are expected to slow to more sustainable levels, the increased demand for the natural resources in the state from national markets will help provide a steady source of mining jobs and revenues for the state. Outside of the mining industry, however, the state's future prospects will be somewhat limited by a job market that fails to attract high-growth job opportunities. Although migration has recently reversed to a positive trend, many younger workers will move to other states with more versatile job opportunities. Wyoming is the least diversified state in the nation in terms of employment distribution across industries in comparison to the nation.

Mining Industry. The mining sector has been the most significant economic and revenue player in Wyoming's recent history. After it experienced a boom in the late 1970s, a bust in the mid-1980s, and a slow and steady decline in the 1990s, the mining sector has demonstrated strong growth since 2000. The 33,000 mining jobs in 1981 were the highest level on record, and tallied 14.7 percent of total Wyoming non-agricultural wage and salary employment. However, by 1999, the number shrank to only 15,500. The employment increased 5.6 percent in 2000 and another 13 percent in 2001, holding up well in 2003 as mining prices rebounded. The number of mining jobs went up again over 10 percent annually in 2004. The energy-driven growth continues, as low industrial diversity ties the state's fortunes to mining extraction, which is dominated by natural gas production

recently. This sector is responsible for 40 percent of net payroll gains recently. Multiplier effects are also creating jobs in transportation, distribution, construction, and consumer-related industries, and the state is benefiting from a surge in mineral revenue. The outlook for future revenue and jobs from the state's mining industry looks strong with consistent growth anticipated.

The state benefits from increased mining activity in many ways. First, increased demand for oil, natural gas, and coal means increased mineral production revenue and sales and use tax collections for both state and local governments. In addition, because mining job salaries are over twice as much as the average for all industries, increased demand for mining employment trickles down into the economy through increased per capita income and increased levels of consumer spending. On the other hand, the state's economy and revenue also fluctuate significantly along with the rise and fall of mining prices.

Construction. Nationally, strong real estate and housing industries have been constant throughout the economy's ebbs and flows in recent years. The housing boom's economic contribution has been enormous, accounting for approximately one-fourth of real gross domestic product (GDP) growth over the past 5 years. The direct effects from housing are through construction activity, real estate transactions, and mortgage finance. The multiplier benefits are substantial, such as demand in numerous supplying industries, and the income earned from construction-related industries drives spending elsewhere in the economy. As the fastest growing sector in the 1990s, the construction industry in Wyoming added 7,100 jobs in that decade at an annual average rate of 5.2 percent. Again for 2002, the construction sector remained the strongest industry in the state, expanding by 1.9 percent due to historically low interest rates.

The substantial job growth in the general building and specialty trades subsectors is directly caused by the residential construction boom. From 1992 to 2002, total residential home permits averaged nearly 1,800 units per year, compared to an annual range of 500 to 800 units from 1987 to 1991. However, the number of permits expanded dramatically to 2,877 in 2003 and 3,318 in 2004. The single-family permits nearly doubled from 1,485 houses in 2001 to 2,815 in 2004, and 2,328 permits issued in 2003 broke the record set in 1980. Housing units authorized for the first 6 months of 2005 showed another 14 percent increase over the same period the previous year.

While the large amount of new housing construction in the early 1980s was driven by an oil industry boom accompanied by an inflow of migrants, the current housing market in the state is largely driven by price appreciations, much like the national trend. The annual net migration (in-migration less out-migration) to Wyoming was over 10,000 in the late 1970s and early 1980s, but only a couple of thousand in recent years. A few local markets in the state are trying to meet additional worker demand due to the booming mining exploration such as in Rock Springs, Pinedale, and Casper. On the other hand, in certain areas, rental markets are getting soft as a result of additional new housing. Many residents have taken advantage of low mortgage rates and moved to new houses, leaving their previous homes for sale or rent. In Laramie County, for instance, the number of residential units for sale in the first quarter of 2005 was more than twice as many as 2003, and the number of vacant units for rent almost tripled during the same period. Consequently, rental rates declined.

Overall, job growth in the construction industry is expected to increase in 2005 after it declined 3.4 percent in the past 2 years, albeit at a slower rate of around 4 percent annually. Total employment in construction will surpass the mining industry again by the end of the forecasting period, and 1,700 new jobs are expected be created during this time span.

Retail Sales. As the third largest sector in Wyoming's economy, the retail trade industry (North American Industry Classification System [NAICS]) experienced fast job growth in the first half of the 1990s, averaging nearly 2 percent each year. However, it has slowed down to only about 1 percent annually since then, largely due to out-migration from the state. After experiencing a 3.3 percent rise in 2000, the industry lost over 400 jobs during the past 3 years. In the near future, employment in this sector is expected to expand at a modest rate of less than 1 percent a year. While the average increase rate for the fiscal years 1991 to 2000 was 7.3 percent, the annual non-auto taxable retail sales were up only 3.1 percent from fiscal year 2001 to fiscal year 2003. However, mostly driven by strong natural gas exploration, expanding housing market, and net migration, the retail sales were robust again. For fiscal year 2004, both the taxable non-auto and auto retail sales recorded significant expansions, at 15.1 and 12.9 percent, respectively. The non-auto retail sales continued the strong pace in fiscal year 2005 and increased another 7.2 percent from the previous year's level. However, seemingly dragged down by the high gasoline prices, the automobile sales in the state almost came to a virtual stall, and only edged up a mere 1.4 percent during the past fiscal year. Much like the nation, the real concern for many retailers in the state is how to continue competing with remote sellers who do not have to charge sales tax.

Services. The economy is continuing its long-term trend of shifting more toward a service oriented than goods-oriented one. Much like the rest of the country, the service industries grew continually in Wyoming, even during the 1980s recession. The upward pace accelerated in the 1990s, at an annual rate of 3.3 percent. Despite the slowdown of the economy, total employment for various service industries still increased 2.5 and 2.2 percent in 2001 and 2002, respectively. Mainly caused by the decrease in food services and administrative services, overall employment increased only 1.6 in 2003 and 2.1 percent in 2004. The services sectors are forecasted to be the fastest growing industry, both in terms of growth rate and total number of new jobs. Business, social assistance, and health services will be the main drivers. Despite the structural difference between the Wyoming and national economies, the growing pace in services sector is similar for both. The service sector industry was and will be the fastest growing sector in the Wyoming economy as it continues to undergo a structural shift from goods-producing to service-producing economy. Wyoming's various services sectors are expected to add 20,330 jobs in the next 10 years.

Tourism. With over $1 billion in direct expenditures and 28,000 jobs, Wyoming's travel and tourism industry is an important part of the overall economy, particularly for the northwest region of the state. The primary attractions for tourists are Yellowstone National Park and the Grand Teton National Park. Each year, millions of people from all over the world visit them. However, tourism itself is not classified as an independent or separate economic sector, but mainly included in accommodation and food services sector. Its economic effect crosses many retail trade and services-related sectors such as gasoline stations, general merchandise stores, arts, entertainment, and recreation services. Unfortunately, most jobs directly connected with tourism are mostly lower skilled and lower paying by nature.

Looking into the future, travel and tourism for Wyoming may not deviate much from the past trend (i.e., an extremely slow increase). However, there are at least a few factors that could work to the advantage of the state's tourism industry. First, the weakened American currency may attract more international tourists. Second, the baby-boom generation (born between 1946 and 1964) is starting to retire or will retire in the next few years, assuming the elderly population is more interested in natural amenities than the younger generation. Third, the state's rising revenue and budget surplus are creating an opportunity to protect the state's attractiveness and enhance area attractions. However, the jobs created in the tourism industry are mostly seasonal, and typically low-paying, offering little in the way of long-term growth for the state.

Government. As the largest employment sector for Wyoming, the government jobs sector is one of the mainstays in the state's economy, particularly in the southeast region. It also serves as a big stabilizer to the overall economy. During Wyoming's economic bust period of the 1980s, government employment only experienced a 1-year decline in 1986, while the state's total employment suffered 18 percent contraction from 1981 to 1987.

Because of the nature of a sparsely distributed population, state and local governments have to hire a relatively large number of employees to serve the residents, from public schools, fire districts, to road maintenance. The proportion of Wyoming's state and local government full-time employees was the highest in the country in 2003, at 869 per 10,000 population, while the national average was 542 employees. Other states with higher state/local government employee rates were also states with big land areas and low population such as Alaska, New Mexico, and Nebraska. The lower proportions of government employment are states with high population density such as Pennsylvania and Florida. Wyoming also ranked the third highest in terms of per capita state and local government expenditures in 2002.

In 2004, the government sector contributed 64,590 jobs, or one-fourth of the total, to Wyoming's economy. However, it was one of the slowest growing industries in the 1990s, but has performed well since 2000. It will remain a consistent and steady source for new jobs in the future. From 1990 to 2000, government in Wyoming created 5,500 jobs for an annual growth rate of 1 percent, compared with the overall growth rate of 1.9 percent for the state as a whole. Nearly all of the new jobs added were in local government, which includes K-12 education and hospitals. State government experienced only a slight increase while federal government recorded a minor decline during the same period. Since 2000, state government jobs increased 3.1 percent annually due to the accelerating revenues from mineral production.

Over the forecast period, the government sector is expected to add 4,870 new jobs, for a total of 69,460 jobs in 2014. Most of the growth is projected to occur in local government, with slower growth for state government and contraction for federal government.

Future Employment Growth. Over the period 2006 through 2016, nonagricultural employment in the state is forecast to increase by 1.6 percent annually, on average, as shown in Table 5-15. Several industrial sectors are expected to exceed this rate of growth: construction (2.7 percent), wholesale trade (2.3 percent), transportation and warehousing (2.5 percent), professional and business services (2.4 percent), education and health care (3.3 percent), leisure and hospitality (2.4 percent), and other services (1.8 percent). Some of

the sectors with the lowest growth rates include utilities (0.5 percent), manufacturing (0.6 percent), and government (0.8 percent). As a result of these differing growth rates, the share that each sector contributes to total non-agricultural employment will change as shown in Table 5-15.

TABLE 5-15
Wyoming Nonagricultural Wage and Salary Employment (in thousands) (2006 and 2016)

			Change 2006-2016			Share of Total	
	2006	**2016**	**Numeric**	**Percent**	**Average Annual Percent**	**2006**	**2016**
Natural Resources and Mining	26,590	31,610	5,020	18.88%	1.74%	7.77%	7.87%
Utilities	2,300	2,410	110	4.78%	0.47%	0.67%	0.60%
Construction	23,610	30,900	7,290	30.88%	2.73%	6.90%	7.70%
Manufacturing	10,080	10,700	620	6.15%	0.60%	2.94%	2.66%
Wholesale Trade	8,200	10,280	2,080	25.37%	2.29%	2.40%	2.56%
Retail Trade	30,800	35,240	4,440	14.42%	1.36%	9.00%	8.78%
Transportation and Warehousing	11,290	14,470	3,180	28.17%	2.51%	3.30%	3.60%
Information	4,210	4,920	710	16.86%	1.57%	1.23%	1.23%
Financial Activities	11,100	12,690	1,590	14.32%	1.35%	3.24%	3.16%
Professional and Business Services	16,960	21,500	4,540	26.77%	2.40%	4.96%	5.35%
Education and Health Care	22,600	31,310	8,710	38.54%	3.31%	6.60%	7.80%
Leisure and Hospitality	32,520	41,010	8,490	26.11%	2.35%	9.50%	10.21%
Other Services	10,920	13,030	2,110	19.32%	1.78%	3.19%	3.25%
Government	65,550	70,730	5,180	7.90%	0.76%	19.15%	17.62%
Federal	7,330	7,330	0	0.00%	0.00%	2.14%	1.83%
State	15,310	16,090	780	5.09%	0.50%	4.47%	4.01%
Local	42,910	47,310	4,400	10.25%	0.98%	12.54%	11.78%
Total Non-agricultural Employment	342,280	401,530	59,250	17.31%	1.61%		

Source: Wyoming EAD, 2007a.

Between 2002 and 2006, real personal income in the state of Wyoming increased at an average annual rate of 5.4 percent. During the period 2006 to 2016, real personal income in the state is forecast to increase at an annual rate of 6.4 percent, as seen in Table 5-16. The projected rate of growth in the civilian labor force between 2006 and 2016 of 1.3 percent would be slightly lower than the rate experienced between 2002 and 2006 of 1.4 percent.

TABLE 5-16
Wyoming Personal Income, Wage and Salary Earnings, Labor Force, Employment and Unemployment (2002, 2006, 2016)

	2002	2006	2016
Total Personal Income (Then-year $)	$15,463,330	$20,948,050	$34,481,470
Real Personal Income (2000-year $)	$14,995,590	$18,472,030	$34,481,470
Per Capita Personal Income (Then-year $)	$30,991	$40,676	$61,236
Per Capita Personal Income (2000-year $)	$30,053	$35,868	$44,372
Median Household Income (Then-year $)	$39,963	$48,351	$65,626
Wages and Salaries	$7,568,720	$10,497.020	$17,237,250
Civilian Labor Force	269,650	284,690	324,630
Number Employed	258,460	275,620	315,210
Number Unemployed	11,190	9,070	9,430
Unemployment Rate (Percent)	4.2	3.2	2.9

Source: Wyoming EAD, 2007a.

Growth in the construction sector is highly sensitive to both population growth and governmental spending on infrastructure. Population growth in Wyoming is expected to slow in the next decade. Therefore, growth in construction employment is also expected to decline as illustrated by the information presented in Table 5-17. Growth in total construction employment is expected to slow from 5.1 percent, on an average annual basis, between 1990 and 2000 to 1.2 percent between 2000 and 2010.

TABLE 5-17
Construction Employment in Wyoming 1990, 2000, and 2010

	1990	2000	2010 Projected	Change 1990 to 2000	Projected Change 2000 to 2010	Average Annual Change 1990 to 2000	Projected Average Annual Change 2000 to 2010
General Contractors	2,099	4,285	5,242	2,186	957	7.4%	2.0%
Heavy Construction	3,866	5,301	5,408	1,435	107	3.2%	0.2%
Special Trade Contractors	4,815	8,085	9,291	3,270	1,206	5.3%	1.4%
Total Construction	10,779	17,671	19,941	6,892	2,270	5.1%	1.2%

Source: Wyoming DOE, 2003.

Projections also indicate that the industry mix in construction will change as the numbers of general contractors and specialty trade contractors are expected to grow more than the construction industry as a whole.

5.3.3 Housing

Rule I Section 7(iv) – Housing. An analysis of housing facilities by type, including a quantitative evaluation of the number of units in the area and a discussion of vacancy rates, costs, and rental rates of the units. The analysis should include geographic location, including a quantitative evaluation of the number of units in the area required by the construction and operation of the proposed industrial facility and a discussion of the effects of the proposed industrial facility on vacancy rates, costs, and rental rates of the units. Specific housing programs proposed by the applicant should be described in detail.

This section addresses five major topics: (1) the composition of the existing housing stock in the two-county study area; (2) residential construction trends in the study area; (3) housing costs, availability, and need; and (4) temporary accommodations.

5.3.3.1 Existing Housing Stock in the Study Area

The study area contained a total of 35,551 housing units (occupied and vacant) at the time of the U.S. Census in 2000, with 84 percent of them (29,882 units) located in Natrona County. Approximately 89 percent of the units were occupied; the remaining units were vacant. The housing vacancy rate was 17 percent in Converse County and 10 percent in Natrona County as shown in Table 5-18. Of the 4,038 vacant units in the study area, 36 percent were for seasonal, recreational, or occasional use; 26 percent were for rent; 11 percent were for sale; and 10 percent were rented or sold but not occupied.

Of the occupied housing units in the study area, almost 71 percent are owner-occupied and the remaining 29 percent are rental units. The proportion of renter-occupied units was 30.1 percent in Natrona County: almost identical to that for the state, and 26 percent in Converse County as shown in Table 5-18.

TABLE 5-18
Housing Stock, Occupancy, and Tenure (2000)

	Wyoming	Converse County	Natrona County
Occupied	86.5%	82.8%	89.8%
Vacant	13.5%	17.2%	10.3%
For rent	20.6%	28.2%	25.1%
For sale only	10.9%	9.4%	10.9%
Rented or sold, not occupied	6.2%	7.2%	10.9%
For seasonal, recreational, or occasional use	44.3%	41.1%	34.4%
For migrant workers	1.2%	0.8%	0.7%
Other vacant	16.8%	13.2%	18.1%
Owner-occupied	70.0%	74.1%	70.0%
Renter-occupied	30.0%	25.9%	30.1%

Source: U.S. Census Bureau, 2007a.

Of the housing units in the counties of the study area, the largest proportion are single family detached units with between 63 and 69 percent shares in Converse and Natrona counties, respectively. Mobile homes make up a larger portion of total housing units in Converse County (18 percent) than in Natrona County (13 percent) or the state of Wyoming (16 percent). Table 5-19 displays the breakdown of housing units by occupancy and type of structure for the state and counties of the study area.

TABLE 5-19
Housing Stock by Type of Structure (2000)

	Wyoming	Converse County	Natrona County
Total Housing Units:			
1, Detached	64.89%	63.45%	68.96%
1, Attached	3.65%	3.81%	1.75%
2	2.54%	0.97%	1.87%
3 or 4	4.56%	4.32%	4.59%
5 to 9	3.00%	1.78%	2.24%
10 to 19	1.89%	3.53%	2.34%
20 to 49	2.18%	2.40%	3.01%
50 or more	1.03%	0.78%	2.24%
Mobile Home	15.89%	17.90%	12.68%
Boat, RV, Van, etc.	0.38%	1.06%	0.33%
Owner-Occupied Housing Units:			
1, Detached	79.06%	77.26%	85.78%
1, Attached	3.00%	3.97%	1.57%
2	0.47%	0.26%	0.25%
3 or 4	0.36%	0.23%	0.34%
5 to 9	0.23%	0.00%	0.12%
10 to 19	0.10%	0.00%	0.09%
20 to 49	0.09%	0.00%	0.17%
50 or more	0.01%	0.00%	0.04%
Mobile Home	16.52%	18.02%	11.49%
Boat, RV, Van, etc.	0.17%	0.26%	0.16%
Renter-Occupied Housing Units:			
1, Detached	36.56%	36.05%	36.68%
1, Attached	5.11%	4.61%	2.17%
2	7.17%	1.98%	5.16%
3 or 4	13.97%	9.14%	13.84%

TABLE 5-19
Housing Stock by Type of Structure (2000)

	Wyoming	Converse County	Natrona County
5 to 9	8.65%	5.60%	6.47%
10 to 19	5.63%	12.18%	6.91%
20 to 49	6.81%	8.64%	9.44%
50 or more	3.53%	3.62%	7.64%
Mobile Home	12.51%	18.19%	11.61%
Boat, RV, Van, etc.	0.05%	0.00%	0.07%
Vacant Housing Units:			
1, Detached	55.87%	48.31%	50.96%
1, Attached	3.75%	2.26%	1.76%
2	2.91%	2.26%	3.13%
3 or 4	5.27%	12.92%	6.27%
5 to 9	4.54%	3.38%	4.08%
10 to 19	2.74%	5.33%	4.08%
20 to 49	2.62%	3.18%	3.43%
50 or more	0.76%	0.00%	1.53%
Mobile Home	19.57%	17.13%	22.72%
Boat, RV, Van, etc.	1.98%	5.23%	2.02%

Source: U.S. Census Bureau, 2007a.

Large shares of the housing stock (as of 2000) in the study area were constructed in the 1960s: 40 percent in Converse County and 31 percent in Natrona County compared to 27 percent for the state as shown in Table 5-20. The decade of the 1970s contributed the next highest share of the housing stock with between 14 and 15 percent for the study area counties. Relatively small shares of the housing stock were constructed in the 1980s and 1990s. Natrona County contains a larger share of older housing (constructed in the 1940s) than Converse County or the state: 19 percent versus 6 percent and 11 percent, respectively. More recent building activity is addressed later in this section.

The largest share of housing units contains either two or three bedrooms, and only between 2 and 3 percent of housing would be classed as substandard based on the lack of complete plumbing or kitchen facilities, as can be seen from the information presented in Table 5-20.

TABLE 5-20

Housing Stock by Age, Number of Bedrooms, and Quality (2000)

	Wyoming	Converse County	Natrona County
Age of Housing Units:			
Built 1990 to 2000	7.04%	5.56%	3.08%
Built 1980 to 1989	4.64%	3.63%	1.93%
Built 1970 to 1979	17.33%	15.63%	14.14%
Built 1960 to 1969	26.67%	39.72%	31.36%
Built 1950 to 1959	10.30%	9.33%	11.45%
Built 1940 to 1949	11.03%	6.09%	18.87%
Built 1939 or earlier	6.90%	3.53%	6.26%
Number of Bedrooms:			
No bedroom	1.97%	2.01%	2.25%
1 bedroom	11.00%	9.30%	11.22%
2 bedrooms	28.28%	28.96%	26.57%
3 bedrooms	36.75%	36.74%	34.91%
4 bedrooms	16.48%	17.48%	19.32%
5 or more bedrooms	5.51%	5.50%	5.74%
Lacking complete plumbing facilities	1.92%	2.93%	2.09%
Lacking complete kitchen facilities	2.25%	3.48%	2.20%
Median contract rent	$373	$290	$354

Source: U.S. Census Bureau, 2007a.

5.3.3.2 Housing Inventories Past and Present

The residential construction industry is highly cyclical in nature and sensitive to the state of the economy and financial conditions. Such cycles are often national and regional in scope, although noticeable differences on a small scale can occur.

The level of housing units authorized for construction in the state of Wyoming in 2006 (3,846 units) was last experienced in 1980 (3,845 units), as can be seen from the information presented in Figure 5-23. Residential construction activity in the state consistently declined from a high point in 1981 (with over 4,000 units permitted) to 1987 when 578 units were authorized for construction. The absolute low point was reached in 1989 when a total of 555 units were authorized for construction. Construction activity picked up with consistent growth between 1989 and 1994 and a total of 2,020 units were authorized for construction in the latter year. Activity remained relatively stable between 1994 and 2002, after which rapid growth occurred, culminating in an annual total of

4,002 units authorized for construction in 2005. Construction activity in 2006 declined slightly from the 2005 level.

The pattern of construction activity in the study area generally resembles that of the state described above, but with some differences as is evident in Figure 5-23. The increase in activity evident between 1991 and 2000 at the state level is present, but significantly less pronounced. The contribution that residential construction activity in the study area has made to that of the state has varied substantially. In 1981, the study area contributed about 21 percent of all new residential units authorized for construction in the state. By 1987, this share had declined to less than 1 percent. From 1987 through 1998, the share contributed by the study area was 5 percent or less (except in 1996), after which time the share increased to between 8 and 13 percent.

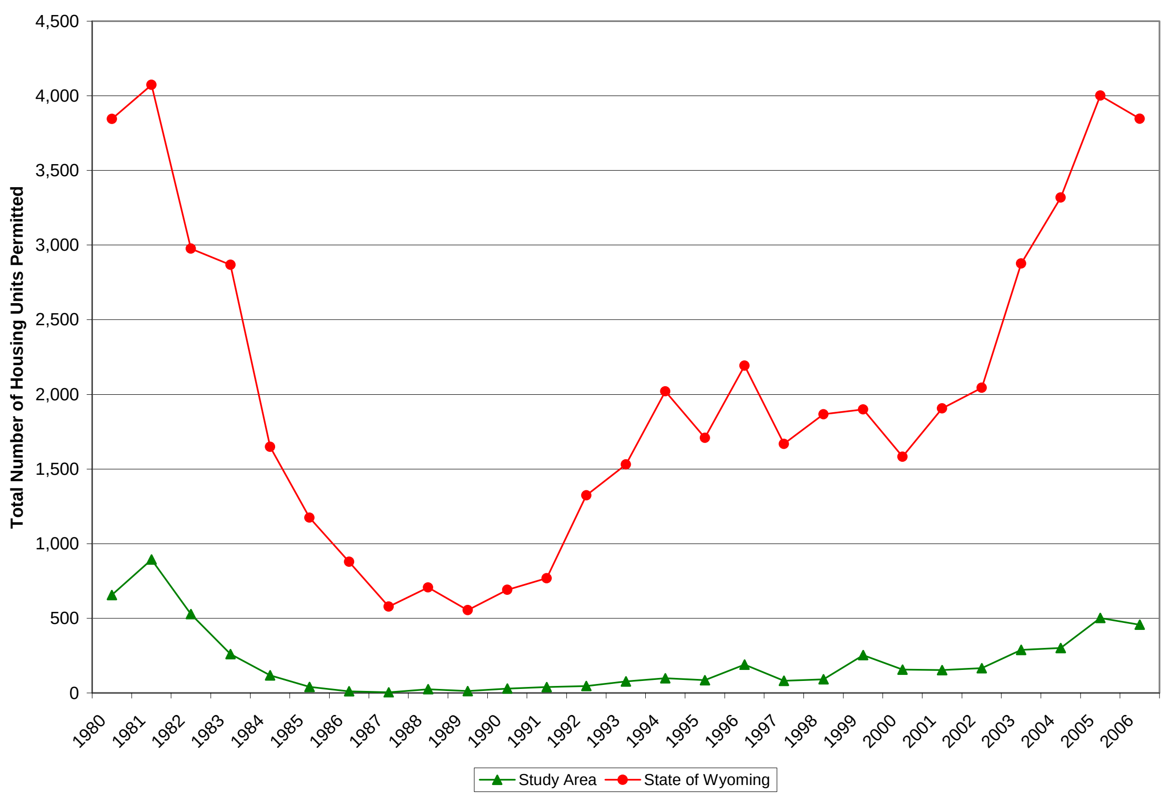

FIGURE 5-23
New Residential Construction for Study Area and State (1980-2006)

The majority of the housing authorized for construction in the study area was built in Natrona County with a relatively small contribution from Converse County, as can be seen from the information presented in Figure 5-24.

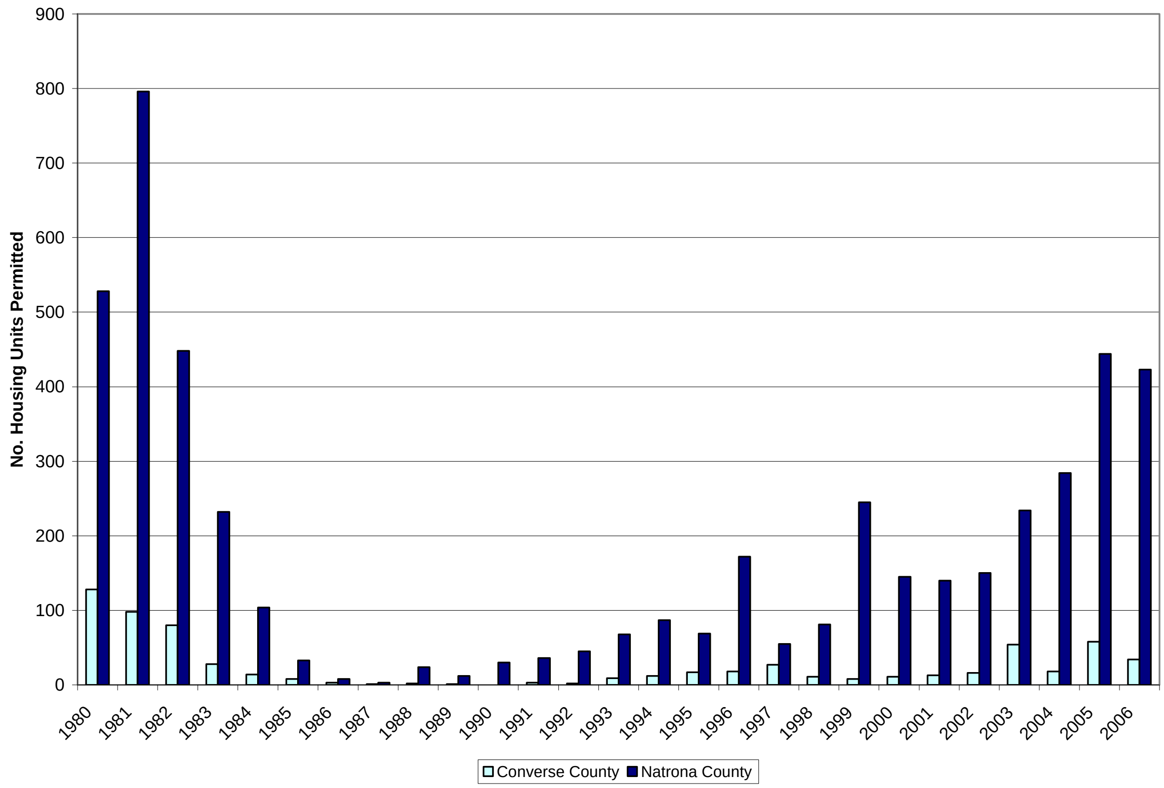

FIGURE 5-24
New Residential Construction by County (1980-2006)

Single-family units comprised the large majority of housing units constructed in all but a few years as can be seen from the information presented in Figure 5-25. Construction of structures containing five or more units in the study area has been concentrated in a few years, especially 1980 through 1982, 1997, and 1999 through 2001.

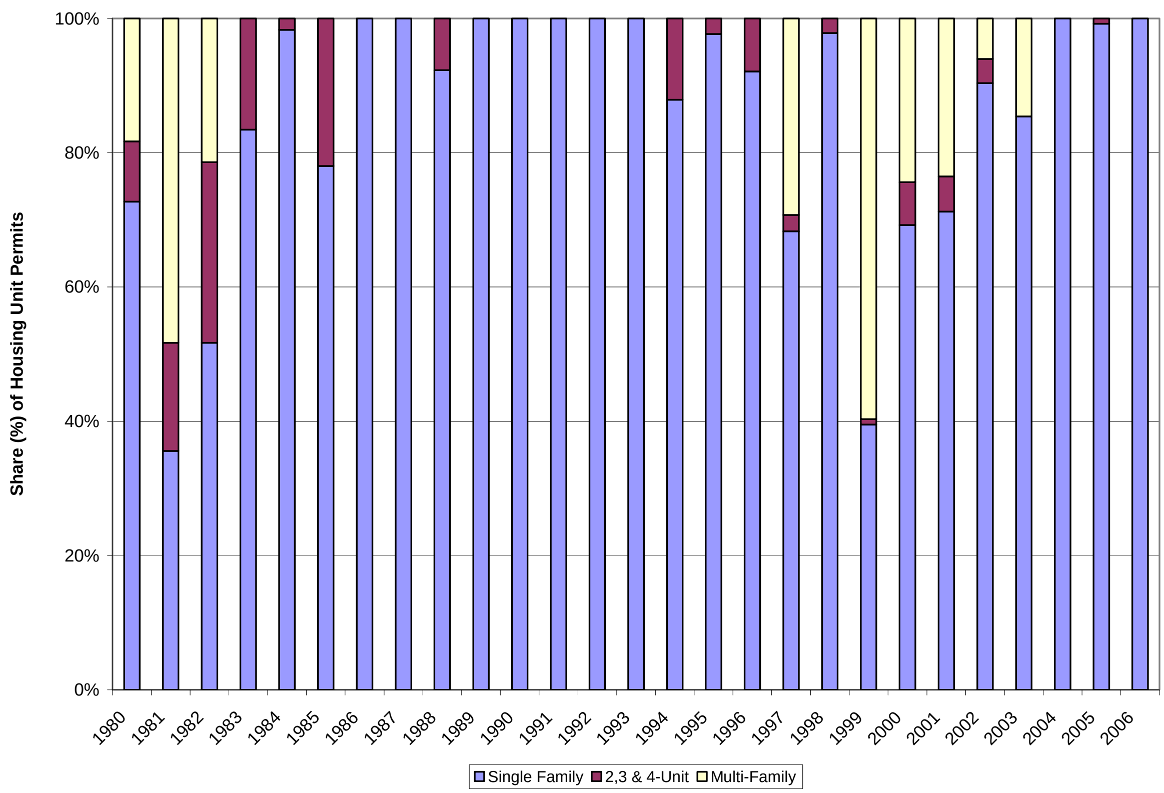

FIGURE 5-25
New Residential Construction by Type of Structure in the Study Area (1980-2006)

5.3.3.3 Home Value and Rental Housing Costs

Home Value. Through the 1960s, home values in the state of Wyoming and the counties comprising the study area experienced only modest change as can be seen from Figure 5-26. Average annual growth rates (presented in Table 5-21) were as follows: 2.2 percent for the state of Wyoming, 2.3 percent in Converse County, and 1.3 percent in Natrona County. The 1970s saw a steep rise in median values from around $14,000 to $17,000 to around $60,000 to $70,000 when dramatic average annual changes in value of 14.6 percent for the state, 17 percent in Converse County and 15.3 percent in Natrona County occurred. Between 1980 and 1990, values saw little upward movement, and the state and Converse and Natrona counties experienced average annual percentage decreases of 2.6 percent and 2.8 percent, respectively. This was followed by another growth spurt in the 1990s with average annual percentage changes between 4 percent and 5 percent. Robust growth in home values of around 9 percent annually continued through 2006.

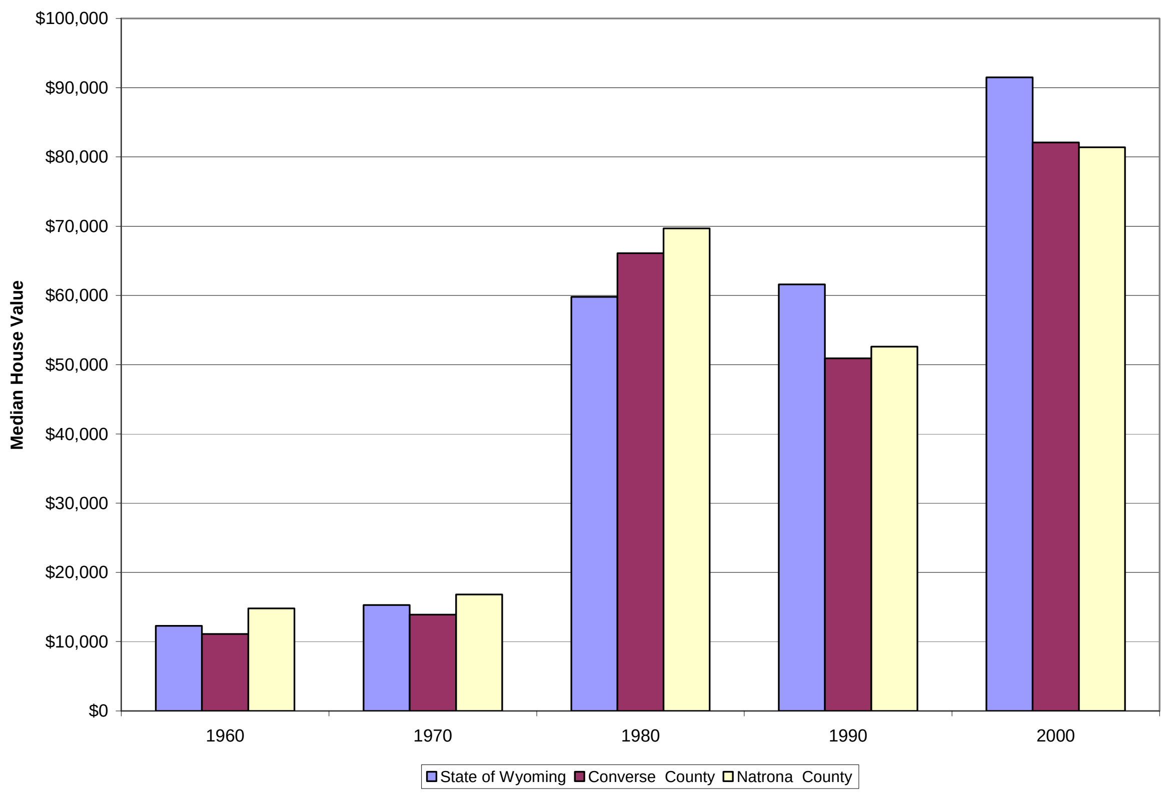

FIGURE 5-26
Median House Value for Counties in the Study Area and State (1960-2000)

TABLE 5-21
Average Annual Percentage Change in Home Value (1960 through 2006)

	1960-1970	1970-1980	1980-1990	1990-2000	2000-2006
State of Wyoming	2.2%	14.6%	0.3%	4.0%	9.1%
Converse County	2.3%	16.9%	-2.68%	4.9%	9.2%
Natrona County	1.3%	15.3%	-2.8%	4.5%	9.2%

Sources: U.S. Census Bureau, 2007a.

Rental Housing Costs. Over the period 1960 through 2006, rent levels have mirrored closely those of home values, as presented in Table 5-22 and Figure 5-27. A dramatic increase in rents took place in the 1970s with average annual increases of between 14 and 15 percent, followed by declines in the 1980s. The period from 1990 through 2006 saw robust increases in house rents.

TABLE 5-22
Average Annual Percentage Change in House Rents (1960-2006)

	1960-1970	1970-1980	1980-1990	1990-2000	2000-2006
State of Wyoming	0.7%	11.7%	2.1%	5.1%	5.7%
Converse County	0.5%	15.1%	-2.1%	4.6%	3.8%
Natrona County	0.5%	14.2%	-1.7%	5.0%	6.6%

Source: U.S. Census Bureau, 2007a.

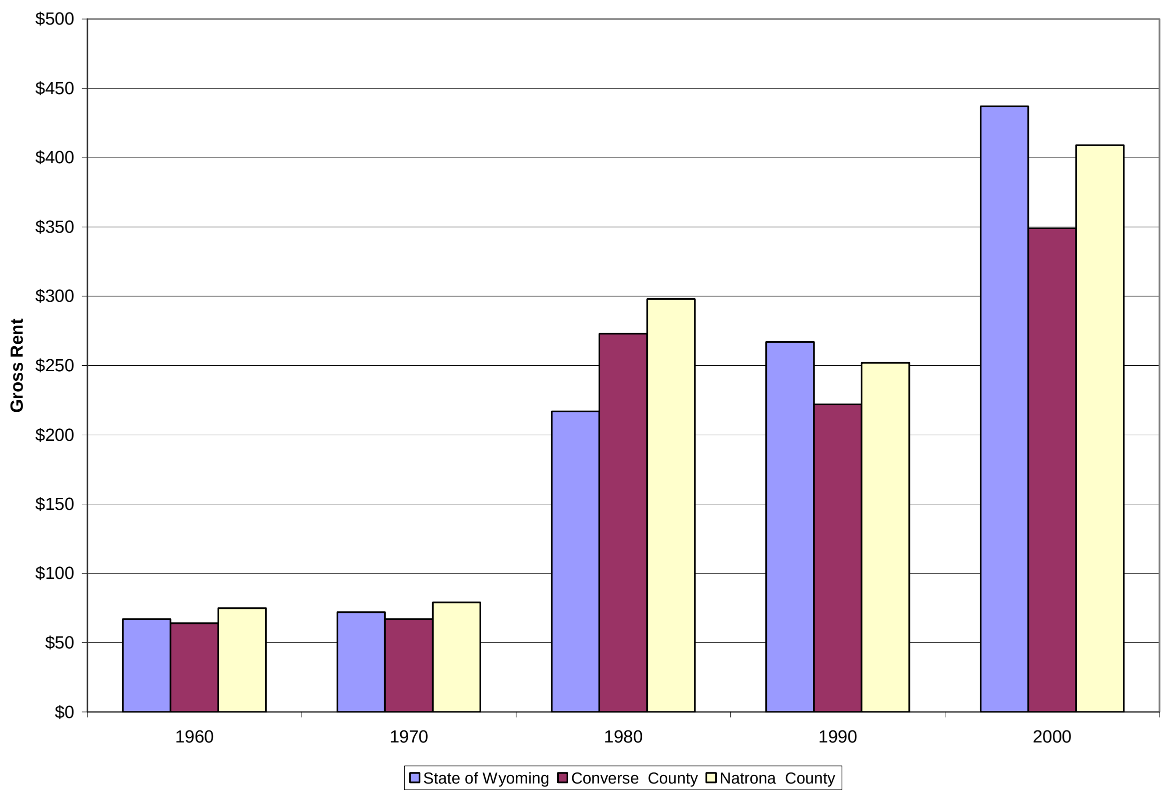

FIGURE 5-27
Gross Rents for Counties in the Study Area and State (1960-2000)

A detailed view of changes in house rental prices, between the second quarter of 2000 and the second quarter of 2007 at the state and county level is presented in Figure 5-28. Rent levels in Converse County have remained well below the state average, while those in Natrona County have generally tracked the state values and exceeded them since the end of 2004. House rents in both counties in the past year have risen noticeably.

Apartment rents show a very similar pattern as illustrated by the information presented in Figure 5-29. Rent levels in each of the counties have remained consistently below those of

the state. The start of 2005 saw a sharp rise in rent levels in Natrona County and the state, but the last 6 months represented by the data show a noticeable slackening of this rise and a drop in Converse County.

Mobile homes (and mobile home lots) provide an alternative form of rental housing, especially to apartments. Rents for mobile home and lots have also shown consistent price appreciation since 2000. Rental prices for mobile homes on lots increased steadily at the state level over the entire time period as shown in Figure 5-30. There was a rapid appreciation in 2006 followed by a decline in the last calendar quarter. The price trend for Natrona County followed closely that of the state. Converse County experienced steady rent appreciation through 2005, after which time values showed a sizeable increase. Mobile home lot rent levels in Converse County remained relatively flat between 2002 and 2006 whereas values in Natrona County experienced a sharp rise in 2005-2005 followed by a decline as shown in Figure 5-31.

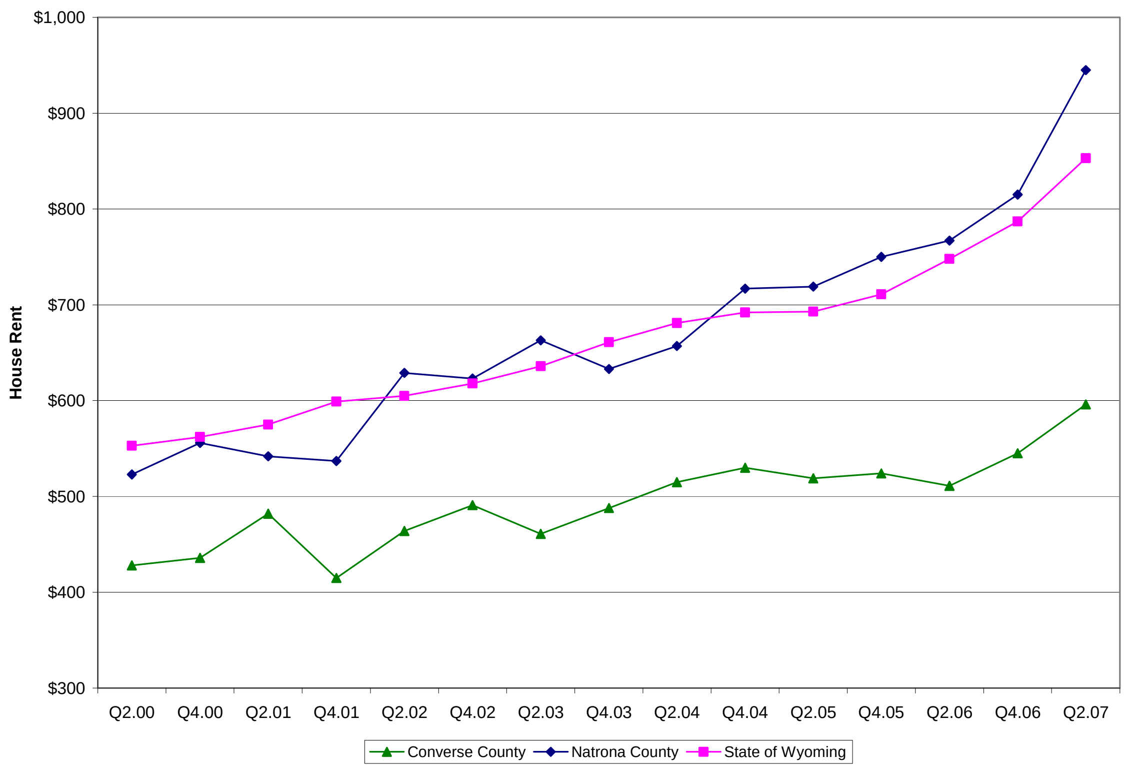

FIGURE 5-28
Monthly House Rent by County and State (2000-2006)

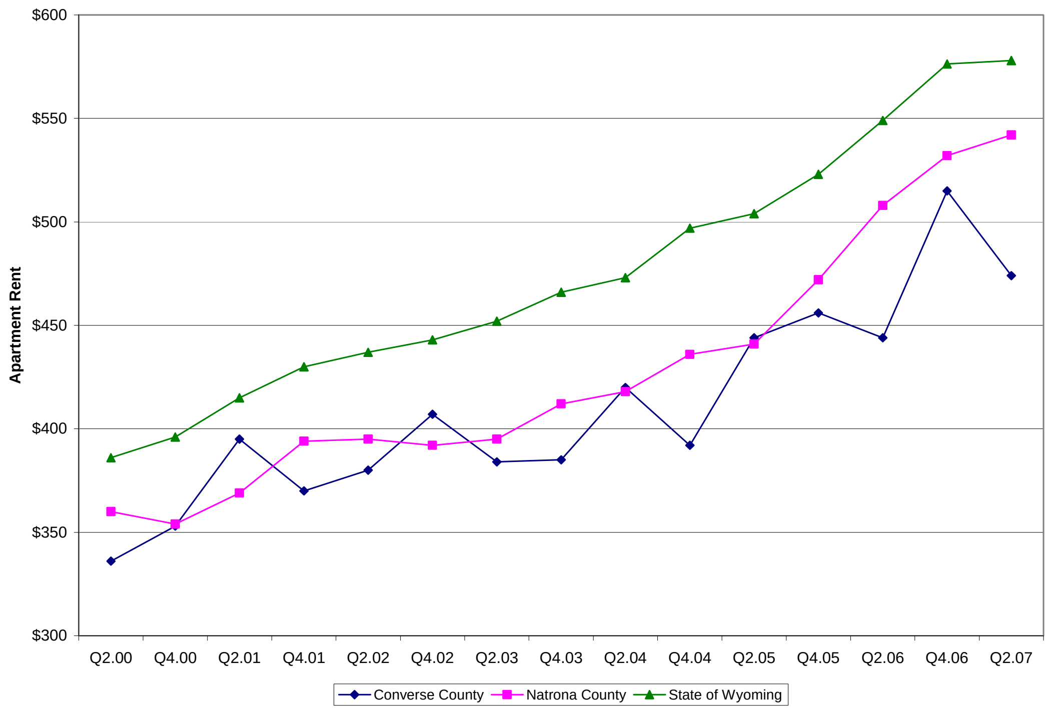

FIGURE 5-29
Monthly Apartment Rent by County and State (2000-2006)

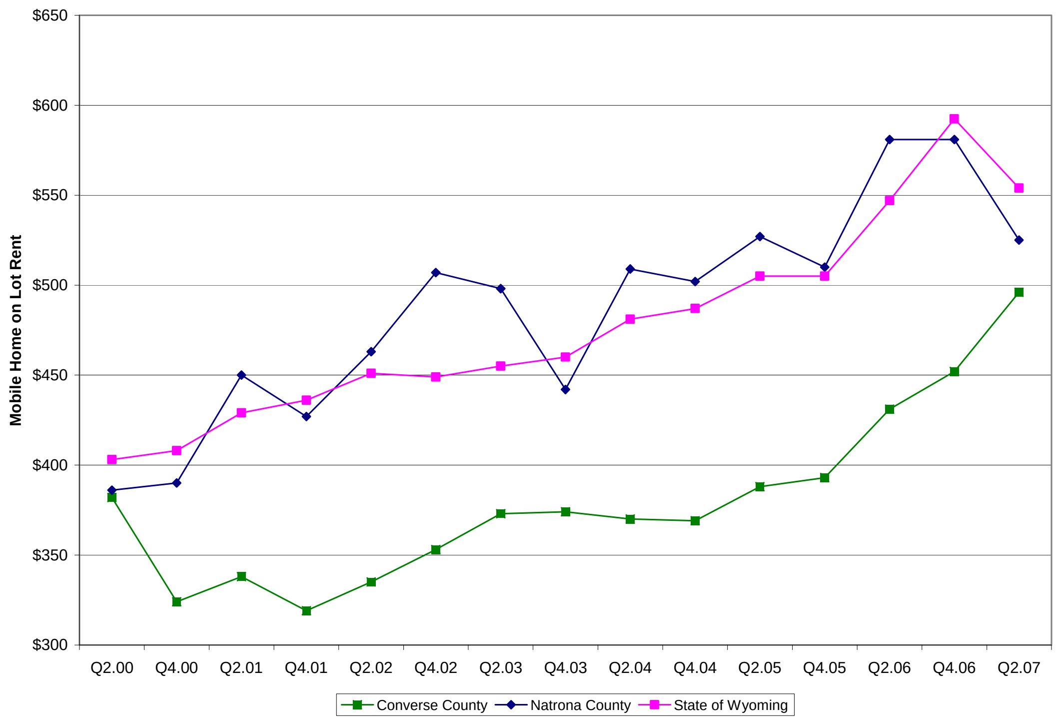

FIGURE 5-30
Monthly Mobile Home on Lot Rent by County and State (2000-2006)

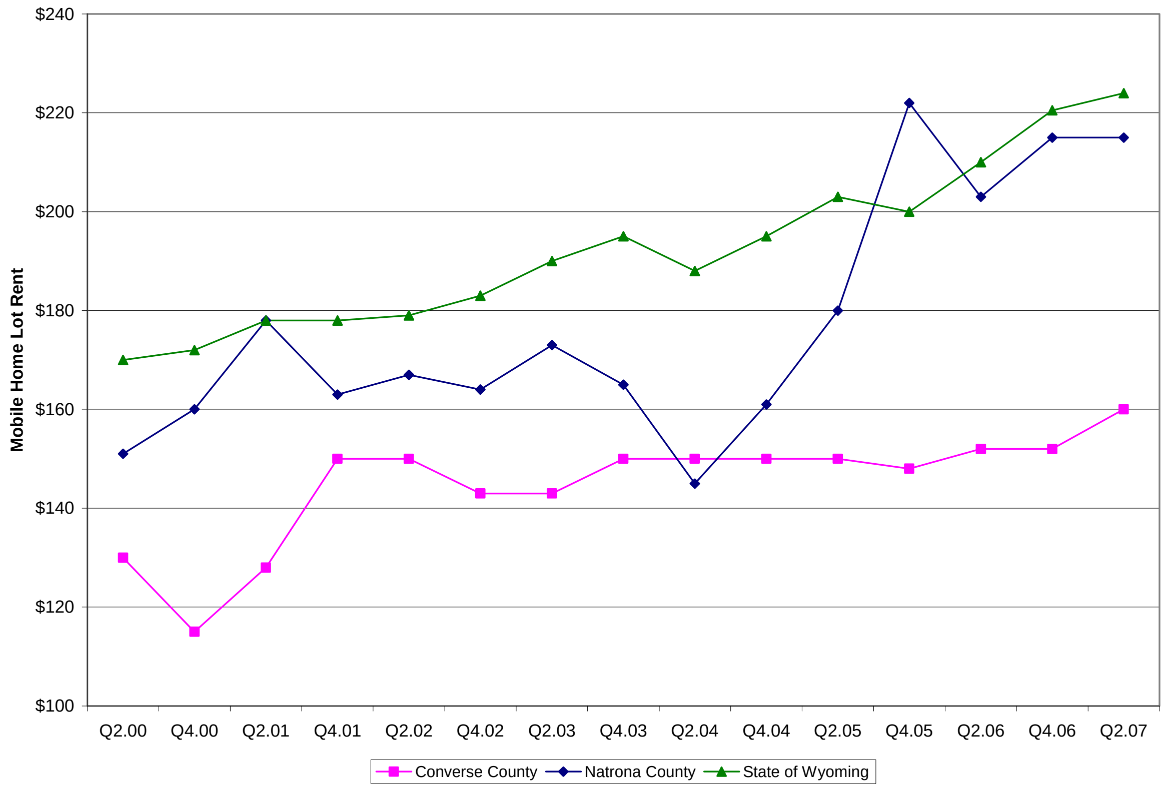

FIGURE 5-31
Monthly Mobile Home Lot Rent by County and State (2000-2006)

5.3.3.4 Rental Housing Vacancies

The State of Wyoming Housing Needs Forecast (Wyoming Housing Database Partnership [WHDP], 2008) estimates rental housing vacancy rates on a semi-annual basis (from 2001 to 2007) for each county in the state. Vacancy rates for each of the counties comprising the study area are shown in Table 5-23.

The natural vacancy rate can be thought of as the level of rental vacancies needed to accommodate normal turnover rates and search times for rental units in the marketplace. The natural vacancy rate is always greater than zero because factors such as imperfect information cause tenants to spend time searching for new units and landlords to hold some units off the market for a period of time. The rental housing natural vacancy rate can vary from place to place and over time; however, a commonly referenced level is 5 percent.

As can be seen from the information contained in Table 5-23 and Figure 5-29, vacancy rates in the rental housing markets of Converse and Natrona counties have consistently been below the natural vacancy rate of 5 percent. The rates indicate an extremely tight rental housing market in the area. The rates are developed from surveys undertaken semi-annually and where a sizeable sample size exists, dramatic swings in values are unlikely.

TABLE 5-23
Semi-Annual Rental Housing Vacancy Rate (Percent)

Year	Converse County	Natrona County
2001-1	4.58	2.51
2001-2	3.38	1.89
2002-1	1.90	3.55
2002-2	3.28	4.49
2003-1	3.08	2.72
2003-2	2.78	3.41
2005-1	3.97	2.57
2005-2	8.32	2.82
2005-1	5.08	2.65
2005-2	2.27	1.96
2006-1	4.70	1.57
2006-2	1.44	1.67
2007-1	0.75	0.57
2007-2	0.47	1.07

Source: Wyoming Housing Database Partnership, 2008.

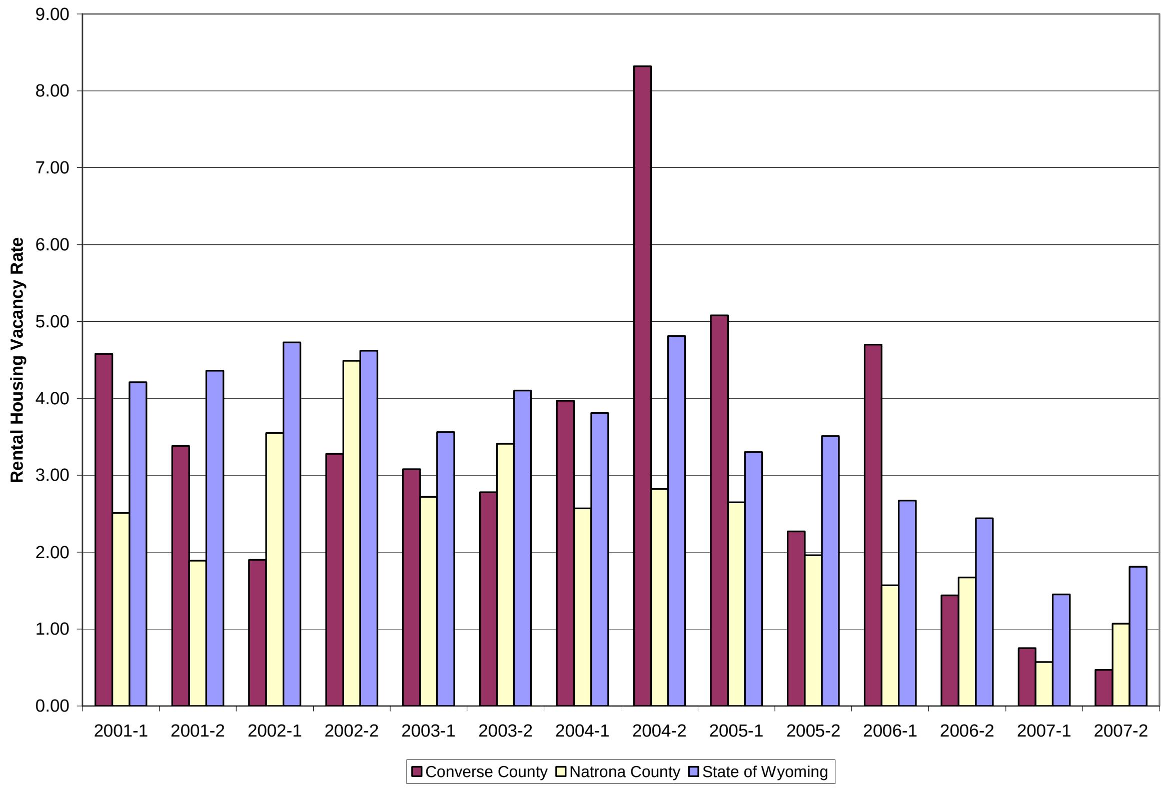

FIGURE 5-32
Rental Housing Vacancy Rate by County (2001-2007)

A survey conducted by the WHDP of mobile home parks throughout Wyoming during January 2007 estimated that for the counties comprising the study area, Converse County had the lowest vacancy rate of 1.02 percent, and Natrona County had a vacancy rate of 2.27. Table 5-24 displays the survey results for each of the counties.

TABLE 5-24
Available Mobile Home Lots to Rent (January 2007)

County	Surveys	Lots	Available	Vacancy Rate
Converse	2	196	2	1.02
Natrona	8	88	20	2.27

Source: Wyoming Housing Database Partnership, 2007.

5.3.3.5 Housing Survey of Needs

The WHDP develops predictions of the demand for housing within the state (down to the county and community level). They are presented in the 2007 Wyoming Housing Needs Forecast. Three separate viewpoints of the future were developed: a moderate growth scenario ending in 2020, a strong growth scenario forecast extending to 2030, and very strong growth scenario forecast extending to 2030.

The housing need predictions are a count of occupied housing units and represent unconstrained demand forecasts. That is, they refer to how the housing market will likely behave if future consumer choices are similar to trends established in the past. The year-to-year supply of housing is not modeled, but supply is assumed to materialize with sufficient household formation. Household formation, interpreted as housing demand, is a product of several factors, but it is defined here by population growth and household size.

Converse County. The household forecast indicates a total increase of 3,975 households in Converse County, from 4,694 in 2000 to 8,669 in 2030 as indicated in Table 5-25. Homeowners are expected to increase from 3,475 in 2000 to 6,762 by 2030. Renters are anticipated to increase from 1,219 in 2000 to 1,906 in 2030. Homeownership from the year 2000 to 2030 is expected to increase by 234 households for homeowners with extremely low incomes, by 312 households with incomes from 31 to 50 percent of median family income (MFI), and by 494 households with 51 to 80 percent of MFI.

Rental demand from the year 2000 to 2030 is expected to increase by 166 households for renters with extremely low incomes. Further, rental demand for those households with 31 to 50 percent of MFI is expected to increase by 160 households over the period.

Natrona County. The household forecast indicates a total increase of 19,650 households in Natrona County, from 26,819 in 2000 to 46,469 in 2030 as indicated in Table 5-25. Homeowners are expected to increase from 18,740 in 2000 to 34,638 by 2030. Renters are anticipated to increase from 8,079 in 2000 to 11,831 in 2030. Homeownership from the year 2000 to 2030 is expected to increase by 891 households for homeowners with extremely low incomes, by 1,445 households with incomes from 31 to 50 percent of MFI, and by 2,452 households with 51 to 80 percent of MFI.

Rental demand from the year 2000 to 2030 is expected to increase by 691 households for renters with extremely low incomes. Further, rental demand for those households with 31 to 50 percent of MFI is expected to increase by 867 households over the period.

TABLE 5-25
Household Forecast by County by Tenure (2000 to 2030)

	Converse County			Natrona County		
Year	Total	Home-owners	Renters	Total	Home-owners	Renters
2000	4,694	3,475	1,219	26,819	18,740	8,079
2005	5,122	3,833	1,289	28,941	20,488	8,453
2010	5,696	4,299	1,397	32,827	23,425	9,402
2015	6,374	4,850	1,525	36,528	26,317	10,211
2020	7,066	5,422	1,644	39,727	28,949	10,778
2025	7,836	6,063	1,773	42,905	31,631	11,274
2030	8,669	6,762	1,906	46,469	34,638	11,831

Source: Wyoming Housing Database Partnership, 2007.

5.3.3.6 Temporary Accommodations

Temporary accommodations, for purposes of this report, are defined as hotel and motel rooms and sites for recreational vehicles (RVs).

Hotels and Motels. Based on information from The State of Wyoming Department of Tourism and Smith Travel Research, a listing of hotels and motels by location and number of rooms was compiled. The information is presented in Table 5-26.

TABLE 5-26
Hotel and Motel Rooms by County and Community (2007)

County	Community	Hotel/Motel	No. Rooms
Converse	Douglas	Holiday Inn Express Hotel & Suites	76
		Best Western Douglas Inn & Conference Center	117
		Plains Motel	30
		Super 8	37
		1st Interstate Inn	43
		Alpine Inn	40
	Glenrock	All American Inn	21
	County Total		**364**
Natrona	Casper *	Skyler Inn	66
		Royal Inn	37
		National 9 Showboat Inn	45
		Holiday Inn Casper Convention Center	200
		Hampton Inn	121

TABLE 5-26

Hotel and Motel Rooms by County and Community (2007)

County	Community	Hotel/Motel	No. Rooms
		Days Inn	121
		Best Western Ramkota Hotel	229
		Courtyard	100
		Motel 6	111
		Parkway Plaza Hotel	287
		Topper Motel	20
		Quality Inn & Suites	92
		Westside Inn	42
		Super 8 West	66
		Red Stone Motel	59
		Holiday Inn Express Hotel	84
		Wingate by Wyndham	100
		C’mon Inn	125
		Colonial House Motel	19
		Sleep Inn & Suites	80
		Comfort Inn	56
		Shilo Inn Hotel	101
		Sage and Sand Motel	33
		Ranch House Motel	12
		Virginian Motel	19
		Yellowstone Motel	13
		Super 8 East	57
	County Total		**2,292**
Study Area Total			**2,656**

* Includes the communities of Casper, Bar Nunn, Evansville, and Mills.

Sources: Wyoming Official State Travel Website, 2008; CH2M HILL calculations.

Based on information from Smith Travel Research for the period from 2001 to 2007, hotel and motel vacancy rates are presented in Figure 5-33. The estimated occupancy rates are derived from hotels and motels mostly in Casper, Douglas, Wheatland, Evansville, Douglas, and Glenrock. The vacancy rate is highly seasonal ranging between highs around 60 percent in December and January to lows around 10 to 20 percent in June through August.
Since 2005, vacancy rates have been declining during all months of the year. Variation in monthly vacancy rate is shown in Figure 5-34.

The average daily room rate fluctuates depending on the month of the year as can be seen from the information presented in Figure 5-35. Room rates generally vary little from January through May and then gradually increase, peaking in July and August, and decrease throughout the remainder of the year. From 2002 to 2005, the average hotel rate increased approximately 4.2 percent a year or an average of $2. In 2006, the price increased almost $4 from the previous year resulting in a 6.7 percent increase. Table 5-27 displays the average daily hotel rate and percent change over the previous year.

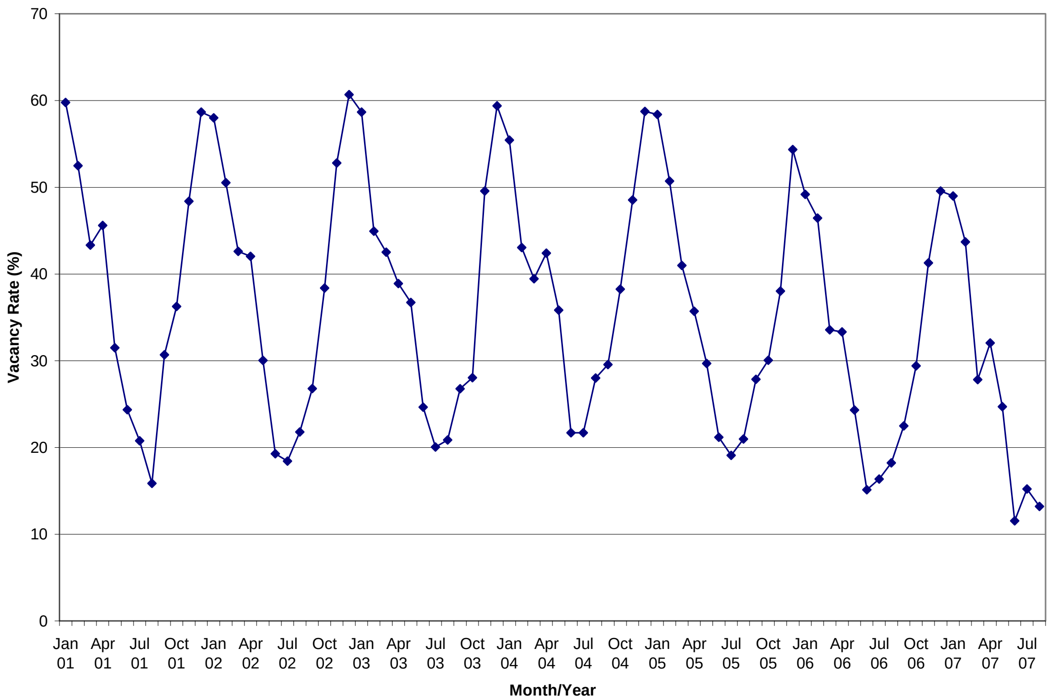

FIGURE 5-33
Hotel-Motel Vacancy Rate in the Study Area (2001-2007)

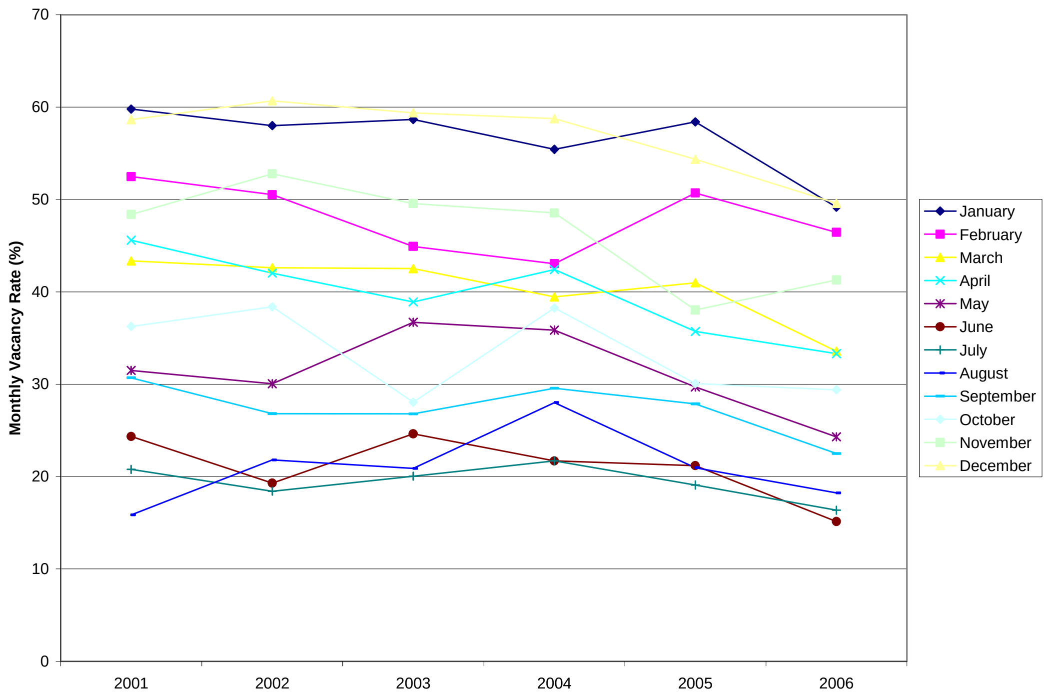

FIGURE 5-34
Hotel-Motel Average Room Rate in the Study Area (2001-2007)

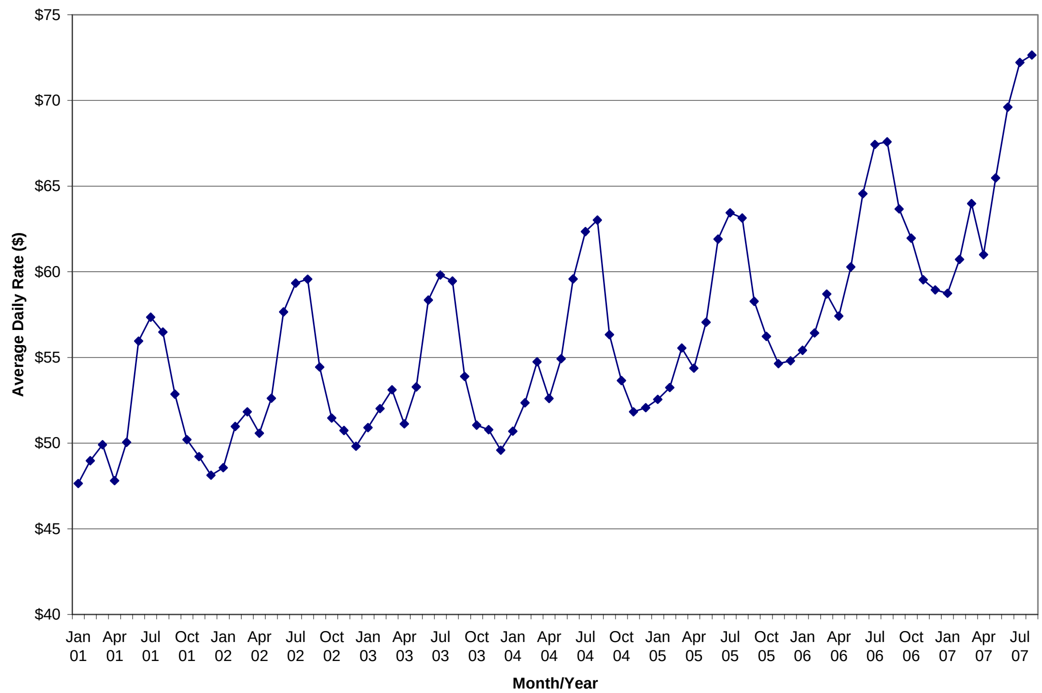

FIGURE 5-35
Hotel-Motel Average Daily Room Rate in the Study Area (2001-2007)

TABLE 5-27
Average Daily Hotel Room Rate

Year	Average Cost ($)	Percent Change Over Previous Year
2001	51.93	--
2002	53.92	3.8
2003	54.24	0.6
2004	56.09	3.4
2005	57.75	3.0
2006	61.62	6.7
2007*	66.46*	7.9*

* Year-to-date through August 2007

Source: Smith Travel Research, 2007.

Recreational Vehicle Sites. Many RV sites in the region provide accommodation for visits with durations of weeks or months. Table 5-28 displays the number of RV site hookups for year-round camping areas within the two-county study area. The City of Casper has the

most RV locations (seven sites) and Wright, Glenrock, and Douglas have one location each. Vacancy rates are not currently available for this type of temporary accommodation.

TABLE 5-28
Recreational Vehicle Sites by County (2007)

Study Area	Location	No. Sites
Converse County		**137**
Glenrock	Deer Creek Village RV Park	50
Douglas	Douglas KOA Campground	87
Natrona County		**402**
Casper	Alcova Lake Campground	200
Casper	Casper East RV Park and Campground	62
Casper	Casper Mountain Campgrounds	29
Casper	Fort Casper Campground	86
Casper	BLM Lodgepole Campground	14
Casper	Pathfinder Reservoir	3
Casper	Muddy Mountain-Rim Campground	8

Source: Wyoming Official State Travel Website, 2008.

5.3.4 Education

Rule I Section 7(vi)(H) – Public facilities and services availability and needs, which may include, but are not limited to: Educational facilities, including an analysis based upon enrollment per grade, physical facilities and their capacities, and other relevant factors with an assessment of the effect that the new population will have on programs and facilities.

The major topics addressed in this section are location and characteristics of educational facilities, current and historical school enrollment, student-teacher ratios, and capital improvement and expansion plans.

5.3.4.1 Location and Characteristics of Educational Facilities

The two-county study area contains the following three school districts: Converse County School District 1, Converse County School District 2, and Natrona County School District 1.

These three school districts, the service areas of which are illustrated in Figure 5-36, operate a total of 47 educational facilities categorized as follows: 34 elementary schools, seven junior high/middle schools, five high schools, and one kindergarten through 12th grade school. Natrona County District 1 is the largest district, with 34 educational facilities followed by eight for Converse County District 1 and five for Converse County District 2. Table 5-29 shows the type and number of schools by district and selected district-wide characteristics.

Revenues per student vary by school district with Converse County District 2 reporting the highest revenues per student at $27,811 followed by Natrona County District 1 and Converse County District 1 around $14,200 to $14,700 per student, respectively. Additionally, the contribution to total revenues from federal, state, and local sources for each of the school districts varies. Federal revenues comprise the smallest shares for all school districts at between 4 percent and 8 percent. Local revenue sources, comprised of property tax revenues and special impact aid funds, provide the most important funding source in Converse County District 1, where they make up 38 percent of all revenues. Converse County District 2 and Natrona County District 1 both receive the greatest proportion of their revenues from state sources: 58 percent and 66 percent, respectively.

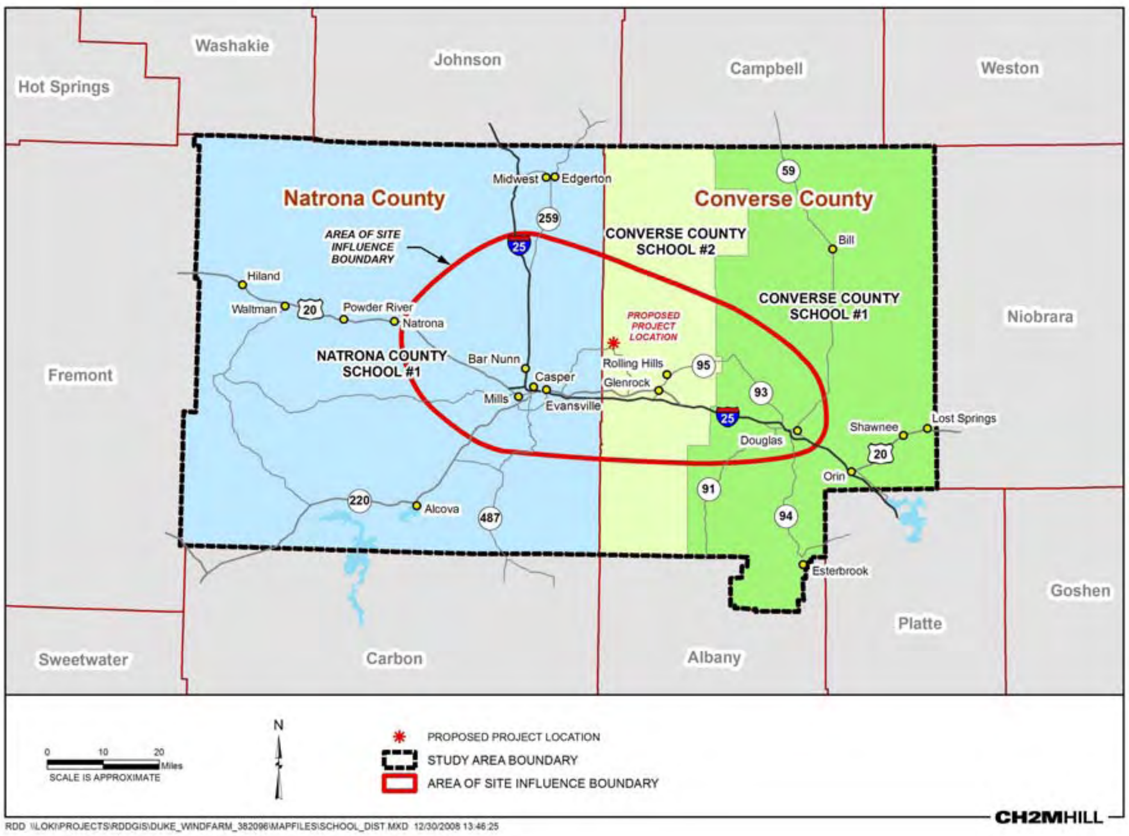

FIGURE 5-36
Public School Districts in the Study Area

TABLE 5-29
Selected Characteristics of School Districts in the Study Area

	Converse County School District No. 1	Converse County School District No. 2	Natrona County School District No. 1
Enrollment	1,617	691	11,444
Free and Reduced Eligibility (Percent)	26.3%	25.3%	31.2%
Number of Schools:			
Total	8	5	34
Elementary	5	2	25
Intermediate	1	1	0
Middle/Junior High	1	1	6
High	1	1	3
Staff (full-time equivalent)			
Total	305.8	136.0	1,940.4
Teachers	125.8	58.9	823.2
Student Instructional Support (certified)	32.9	12.2	174.7
Staff Instructional Support (certified)	8.9	3.4	63.5
Administration	13.0	8.0	74.9
Instruction and Instructional Support (classified)	58.7	19.1	393.0
Other General Support (classified)	66.5	34.4	411.1
Revenue Source (Percent)			
Local	37.7%	32.0%	21.0%
County	10.1%	5.5%	4.9%
State	45.2%	58.4%	65.7%
Federal	7.0%	4.1%	8.4%
Revenue per Student	$14,178	$27,811	$14,710

Source: Wyoming Department of Education, 2008.

5.3.4.2 Student Enrollment

Student enrollment as of October 1, 2007, totaled 14,055 in the study area, as shown in Table 5-30. Natrona County School District 1 had the highest enrollment with 11,604 students, followed by Converse County School District 1 with 1,755 students. Converse County District 2 had the lowest enrollment with 696.

TABLE 5-30
School District Enrollment

Year	Converse County District #1	Converse County District #2	Natrona County District #1	Study Area Total
2007	1,755	696	11,604	14,055
2006	1,617	691	11,444	13,752
2005	1,584	713	11,408	13,705
2004	1,587	739	11,546	13,872
2003	1,582	743	11,590	13,915
2002	1,688	771	11,650	14,109
2001	1,663	792	11,835	14,290
2000	1,660	783	12,038	14,481
1999	1,715	860	12,048	14,623
1998	1,747	879	12,271	14,897
1997	1,793	909	12,612	15,314
1996	1,828	894	12,885	15,607
1995	1,843	897	12,936	15,676
1994	1,809	906	13,100	15,815
1993	1,858	932	13,223	16,013
1992	1,819	914	13,015	15,748
1991	1,794	919	13,018	15,731
Change (1991-2007)				
Numeric	-39	-223	-1,414	-1,676
Percent	-2.2%	-24.3%	-10.9%	-10.7%
Average Annual Percent	-0.1%	-1.7%	-0.7%	-0.7%

Source: Wyoming Department of Education, 2008.

During the period 1991 through 2007, combined enrollment in the three school districts declined by 1,676 students (-10.7 percent), as can be seen from the information presented in Table 5-31 and Figure 5-37. The greatest numeric decline of 1,414 students occurred in Natrona County School District 1. However, the greatest percentage declines took place in Converse County School District 2 (-24.3 percent). Converse County District 1 experienced both the lowest numeric decline (39 students) and the lowest percentage decline (-2.2 percent).

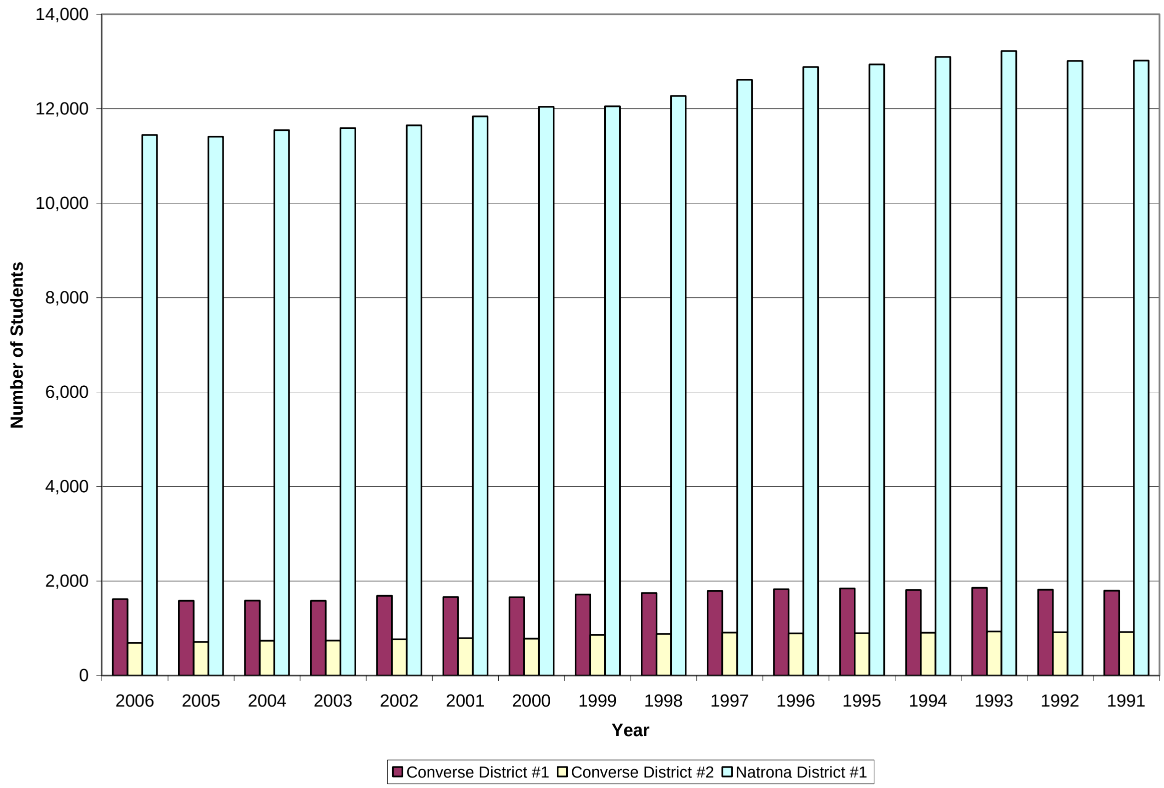

FIGURE 5-37
Public School Enrollment by School District (1991-2006)

5.3.4.3 Student-Teacher Ratios

A commonly used measure of overall school quality is the student-teacher ratio i.e., the ratio of total student enrollment in a school, school district, or other unit to the number of full-time equivalent (FTE) certified teachers. This ratio provides a means of comparing different educational units such as school districts to a state or national parameter. The approach taken here is to document trends in the student-teacher ratio for each of the school districts in the study area and compare their behavior to the respective values for the state as a whole and to national levels.

Of the three school districts comprising the study area, Converse County School District 2 (with a 2006 student/teacher ratio of 11.7) had the lowest ratio followed by Converse County District 1 with 12.9 and Natrona County District 1 with 13.9. All three school districts are below the national ratio of 15.7 while Converse County Districts 1 and 2 are also below the state ratio of 13.2. The Natrona School District 1 ratio of 13.9 exceeds slightly the state ratio. The ratio for the state of Wyoming has consistently been lower than that of the nation. Table 5-31 and Figure 5-38 display student-teacher ratios from 1995 to 2006 by school district for the study area, the state of Wyoming, and the nation. Until recently, the ratios for all school districts and the State of Wyoming have shown a consistent

decline (i.e., fewer students per teacher). In 2006, ratios in Converse County Districts 1 and 2 as well as the state of Wyoming in general showed slight increases in the student-teacher ratios.

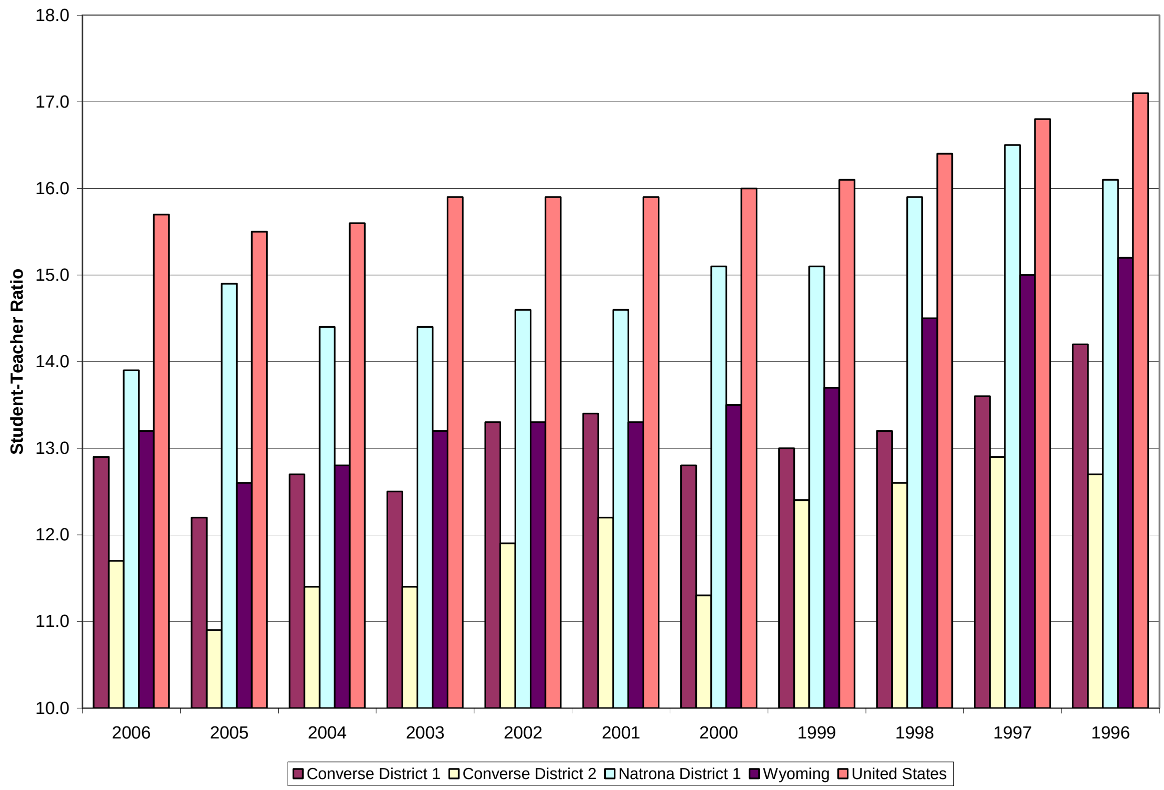

FIGURE 5-38
Student-Teacher Ratio by School District, State of Wyoming, and Nation (1996-2006)

5.3.4.4 Capital Improvement and Expansion Plans

The Capital Improvement Plans (CIPs) for the school districts are designed to address the requirements of anticipated baseline growth and changing demographic conditions in the school districts as well as periodic maintenance and repair of existing facilities and infrastructure.

5.3.5 Public Safety

Rule I Section 7(vi)(D) – Public facilities and services availability and needs, which may include, but are not limited to: Existing police and fire protection including specific new demands or increases in service levels created by the proposed industrial facility.

This section addresses the availability of fire protection and law enforcement services and crime levels in the counties comprising the study area.

5.3.5.1 Fire and Police Services

The two-county study area has a total of 15 fire stations operated by 12 fire departments, the majority of which are staffed on a volunteer basis. Table 5-32 lists the fire departments and selected personnel characteristics for each department. The largest departments are those of the City of Casper and Natrona County Fire Protection District in Natrona County. In 2007, the fire organizations on Converse County responded to 358 incidents of which 131 were fire calls and 60 were emergency medical services (EMS) rescue calls. In Natrona County, the fire organizations reported 8,215 incidents of which 419 were fire calls and 5,822 were EMS rescue calls.

TABLE 5-32
Fire Departments in the Study Area

	No. of Stations	No. of Firefighters				
		Full-time Paid	Volunteer	EMS Services	Basic EMTs	Advanced EMTs
Study Area Total	**17**	**101**	**400**		**130**	**49**
Converse County Total	**3**	**0**	**228**		**6**	**2**
Converse County Rural Fire Control Association	NA	0	105	No	0	0
Dave Johnston Power Plant Fire Brigade	1	0	46*	Yes	3	2
Douglas Volunteer Fire Department	1	0	35	NA	NA	NA
Glenrock/Converse County Volunteer Fire Department	1	0	42	No	3	0
Natrona County Total	**14**	**101**	**172**		**124**	**47**
Bar Nunn Volunteer Fire Department	1	0	21	Yes	18	0
Casper Fire Department	5	73	0	Yes	71	38
Casper Mountain Fire Department	1	0	86	NA	NA	NA
Evansville Fire Department	1	0	21	NA	NA	NA
Mills Volunteer Fire Department	1	0	35	Yes	7	6
Natrona County Fire Protection District	2	21	7	Yes	14	5
Natrona County International Airport Fire Department	1	7	2*	No	2	0
Salt Creek Emergency Services Stations 16 and 17	2	0	21	Yes	12	0

* Paid volunteers.

NA = No data available.

Source: Wyoming State Fire Marshal, 2008.

The Wyoming Emergency Response Act (35-9-151) established 7 Regional Emergency Response Teams (RERTs) under the authority of the director, Wyoming Office of Homeland Security. Members of these teams are specially trained and available to respond to hazardous materials and weapons of mass destruction incidents. Region 2 is comprised of Natrona, Converse and Niobrara counties and responsibility for this region rests with the Casper Fire Department.

Law enforcement in the study area is provided by the state (highway patrol), counties (Sheriff's departments), and municipalities (police departments) from a number of locations throughout the counties, as shown in Table 5-33.

TABLE 5-33
Police Stations in the Study Area

Name	Address	City	County
Glenrock Police Department	219 South 3rd Street Glenrock, WY 82637	Glenrock	Converse
Converse County Sheriff Department	107 North 5th Street Douglas, WY	Douglas	Converse
Douglas Police Department	101 North 4th Street Douglas, WY 82513	Douglas	Converse
Wyoming Highway Patrol	P.O. Box 2963 Casper, WY 82602	Casper	Natrona
Natrona County Sheriff Department	201 North David Street Casper, WY 82601	Casper	Natrona
Casper Police Department	201 North David Street Casper, WY 82601	Casper	Natrona
Evansville Police Department	235 North Curtis Street Evansville, WY 82636	Evansville	Natrona
Mills Police Department	704 Fourth Street Mills, WY 82644	Mills	Natrona

Source: Marchex, Inc., 2007a; 2007b

Over the period 1999 through 2006, the number of law enforcement officers within the study area has increased slightly from 326 to 370 and the total number of employees has increased from 427 to 482, as shown in Figure 5-39. As of 2007, each of the counties had the following number of officers: 34 in Converse County and 151 in Natrona County. Almost half the law enforcement officers in Converse County were members of the Douglas police department while over half the officers in Natrona County were members of the Casper police department.

In 2007, the number of officers per 1,000 residents varied from a low of 1.6 for Casper to 3.9 for Evansville as can be seen from the information presented in Figure 5-40. The number of index crimes per officer varied, in 2007, from a low of 5.3 in the area serviced by the Converse County Sheriff to a high of 31.9 in Casper as illustrated by the information presented in Figure 5-41. Over the period 1999 through 2007 the number of law enforcement officers in the Natrona County Sheriff's department remained virtually constant. However, over this time period the LOS declined from 4.1 officers per 1,000 residents to 3.2 while the number of index crimes per officers rose from 6.4 to 8.6. Selected characteristics (for 2007) of each of the local law enforcement agencies in the study area are presented in Table 5-34.

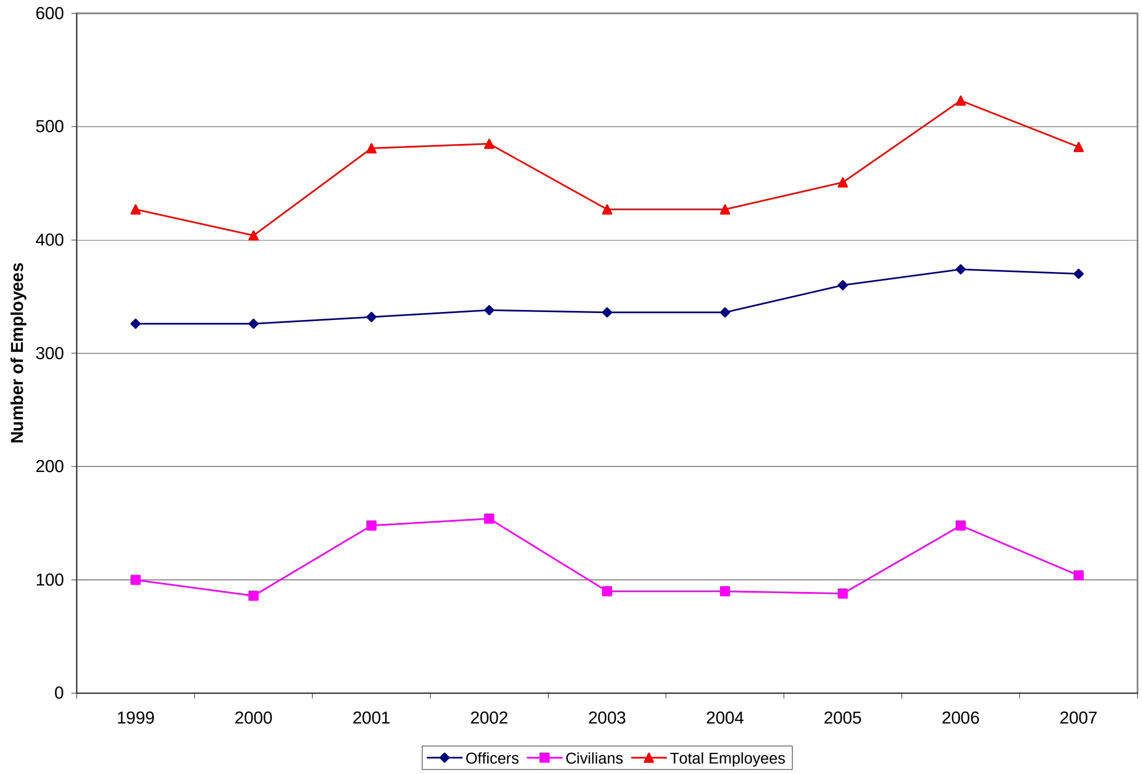

FIGURE 5-39
Number of Law Enforcement Personnel in the Study Area (1999-2007)

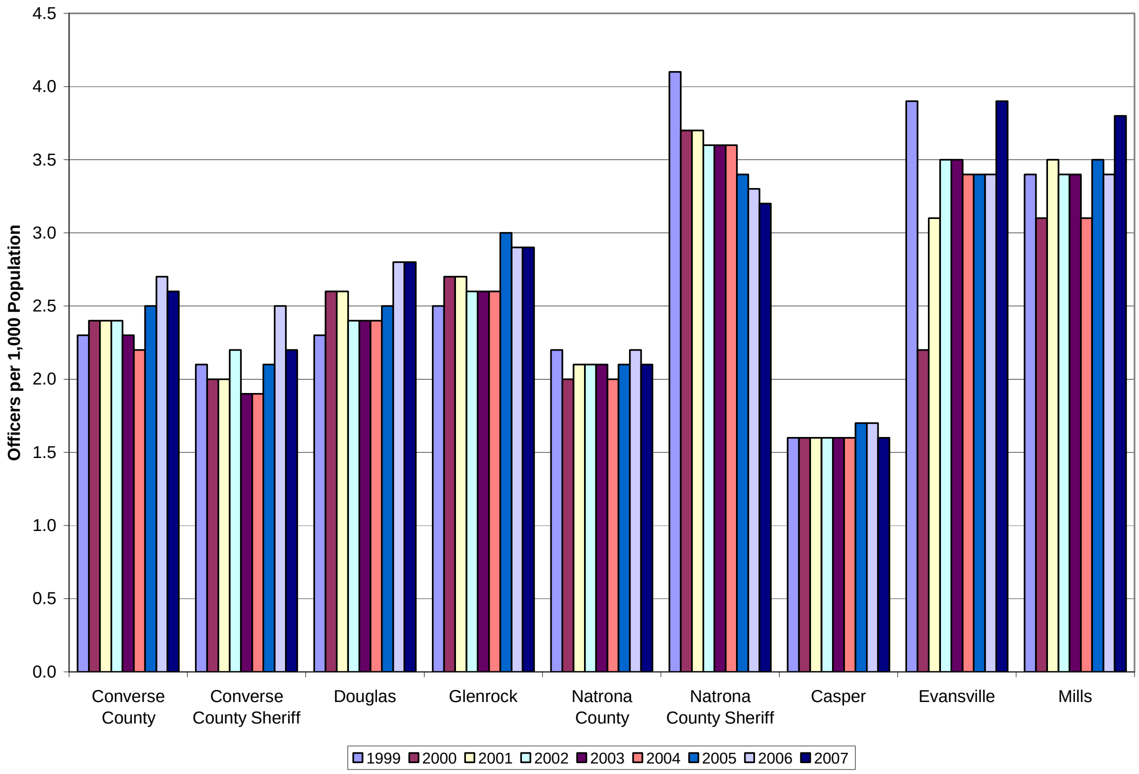

FIGURE 5-40
Number of Law Enforcement Officers per 1,000 Residents (1999-2007)

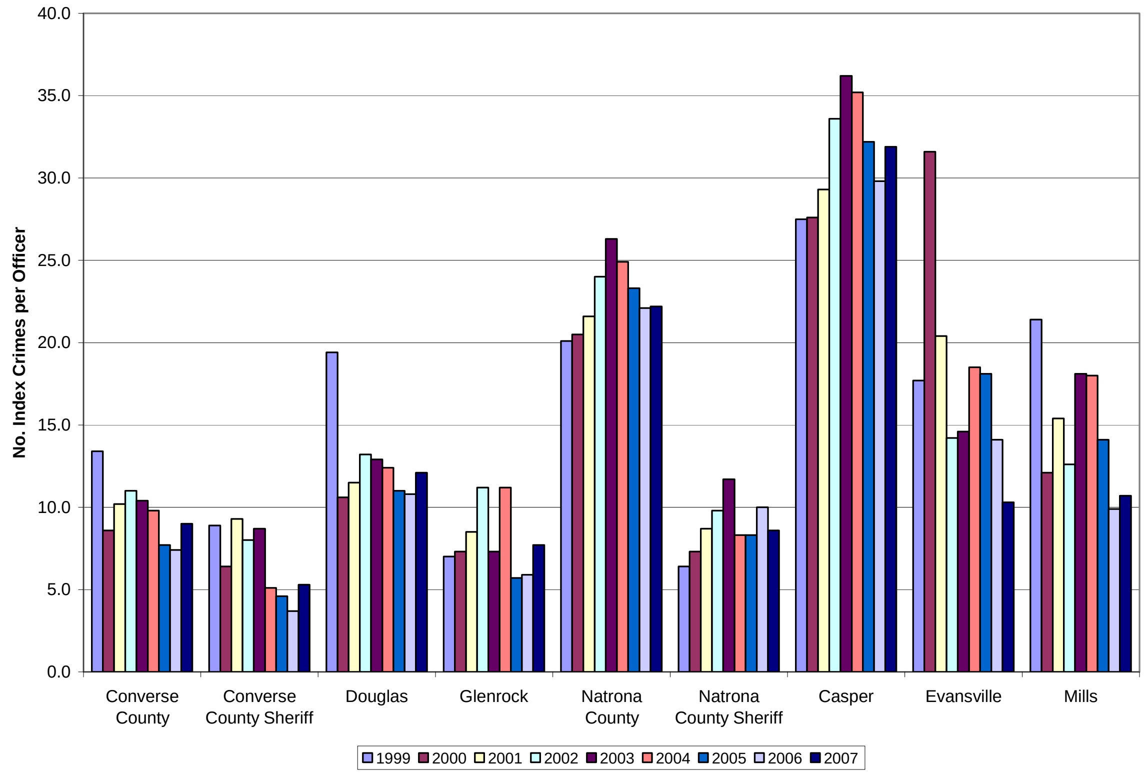

FIGURE 5-41
Number of Index Crimes per Officer (1999-2007)

TABLE 5-34
Law Enforcement Personnel (2007)

County/Agency	Employees			Officers per 1,000 Population	Index Crimes per Officer
	Total	Officers	Civilian		
Converse County	55	34	21	2.6	9.0
Converse County Sheriff	20	11	9	2.2	5.3
Town of Douglas	23	16	7	2.8	12.1
Town of Glenrock	12	7	5	2.9	7.7
Natrona County	182	151	31	2.1	22.2
Natrona County Sheriff	56	45	11	3.2	8.6
City of Casper	102	86	16	1.6	31.9
Town of Evansville	11	9	2	3.9	10.3
Town of Mills	13	11	2	3.8	10.7

Source: State of Wyoming, Office of Attorney General, 2007.

5.3.5.2 Crime

Reported crimes (i.e., crimes known to law enforcement) are categorized into the more serious Part 1 crimes and less serious Part 2 crimes. Part 1 crimes (also referred to as index crimes) are further subdivided into crimes against persons (murder, forcible rape, robbery, and aggravated assault) and crimes against property (burglary, larceny, and motor vehicle theft). Part 2 crimes are classified into the following groups: manslaughter by negligence; arson; other assault; forgery and counterfeiting; fraud; embezzlement; buying, receiving or possessing stolen property; vandalism; carrying or possessing weapons; prostitution and commercial vice; sex offenses (except rape and prostitution); drug abuse - sale and manufacture; drug abuse – possession; gambling; offenses against family and children; driving under the influence; liquor laws; drunkenness; disorderly conduct; vagrancy; and all other (except traffic).

Between 1999 and 2007, the number of reported index crime offenses in Converse County varied between a high of 374 (in 1999) and a low of 240 (in 2005) and the largest share (between 54 and 67 percent of the county annual totals) of these crimes were reported for the town of Douglas. Glenrock, the other municipality in the county, contributed between 11 and 25 percent of the annual county totals. Information regarding the number of reported index crimes is presented in Table 5-35 and Figure 5-42.

In the case of Natrona County, the number of index crimes increased from 2,715 in 1999 to 3,678 in 2003, after which time it declined to 3,347 in 2007. The number of reported crimes is directly related to the number of residents and, thus, most crimes occur in the largest community in the county: the City of Casper. This is evident from the information in Table 5-35.

TABLE 5-35
Number of Reported Index (Part 1) Crimes by Type by County (1999-2007)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Index Crimes									
State of Wyoming	16,496	16,200	17,297	17,641	17,614	17,703	16,978	16,241	16,083
Converse County	374	250	296	319	290	274	240	258	305
Converse County Sheriff	80	58	84	80	78	46	46	44	58
Douglas	252	148	161	172	168	161	154	173	193
Glenrock	42	44	51	67	44	67	40	41	54
Natrona County	2,715	2,742	2,965	3,365	3,678	3,485	3,478	3,355	3,347
Natrona County Sheriff	268	305	365	413	504	359	358	432	389
Casper	2,170	2,182	2,318	2,725	2,894	2,816	2,834	2,711	2,747
Evansville	106	158	143	114	117	148	145	113	93
Mills	171	97	139	113	163	162	141	99	118
Violent Crimes									
State of Wyoming	1,109	1,309	1,257	1,329	1,280	1,130	1,137	1,201	1,234
Converse County	27	13	43	27	29	19	21	20	36
Converse County Sheriff	7	5	15	9	12	6	6	1	12
Douglas	12	6	8	7	10	7	11	14	15
Glenrock	8	2	20	11	7	6	4	5	9
Natrona County	191	233	198	181	156	131	163	168	174
Natrona County Sheriff	24	20	16	19	12	8	16	15	9
Casper	145	173	156	148	125	108	135	130	152

TABLE 5-35
Number of Reported Index (Part 1) Crimes by Type by County (1999-2007)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Evansville	12	31	17	7	10	8	3	5	4
Mills	10	9	9	7	9	7	9	18	9
Property Crimes									
State of Wyoming	15,387	14,891	16,040	16,312	16,334	16,573	15,841	15,040	14,849
Converse County	347	237	253	292	261	255	219	238	269
Converse County Sheriff	73	53	69	71	66	40	40	43	46
Douglas	240	142	153	165	158	154	143	159	178
Glenrock	34	42	31	56	37	61	36	36	45
Natrona County	2,524	2,509	2,767	3,184	3,522	3,354	3,315	3,187	3,173
Natrona County Sheriff	244	285	349	394	492	351	342	417	380
Casper	2,025	2,009	2,162	2,577	2,769	2,708	2,699	2,581	2,595
Evansville	94	127	126	107	107	140	142	108	89
Mills	161	88	130	106	154	155	132	81	109

Source: State of Wyoming, Office of Attorney General, 2007.

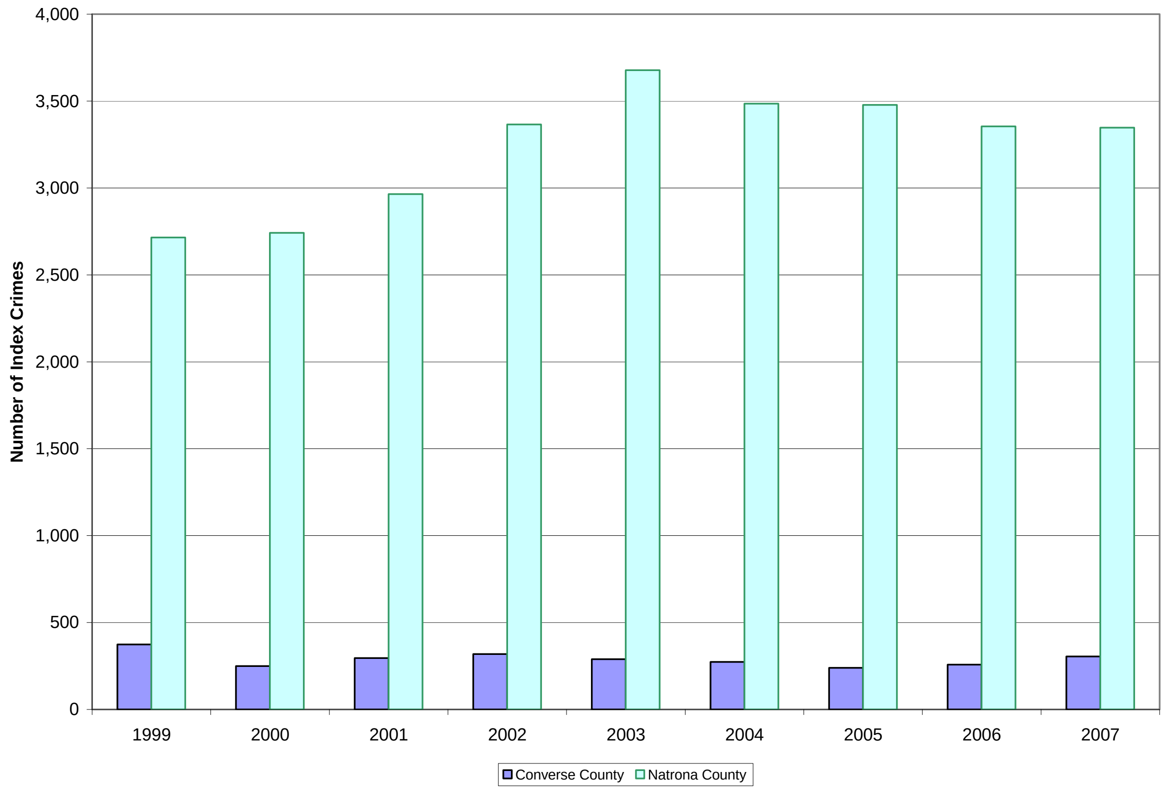

FIGURE 5-42
Number of Index Crimes by County (1999-2007)

To facilitate comparison between reporting areas with differing characteristics such as number of residents, crime is reported as a rate, i.e., the number of crimes per 10,000 residents. These index crime rates for counties and municipalities are presented in Table 5-36 and Figure 5-43. The index crime rate in Converse County exhibited an upward trend from 2000 to 2002 followed by a downward trend through 2005, ending with an uptick in 2006 and 2007. In the case of Natrona County, the index crime rate increased steadily between 2000 and 2003 and then declined steadily through 2007.

The large proportion of index crimes is classed as crimes against property. This type of crime represented between 92 and 94 percent of all index crimes in the state for the years 1999 through 2007, with an average value of 93 percent, as shown in Table 5-36. The remaining 6 to 8 percent of crimes were violent crimes, or crimes against persons, with an average value of 7 percent. Average violent crime rates were below the state level for the communities of Douglas in Converse County and Casper in Natrona County, as well as the unincorporated area of Natrona County. Average rates were noticeably above the state average for Glenrock in Converse County and the unincorporated area of Converse County. Violent and property crime rates for the state, counties, and municipalities for the years 1999 through 2007 are presented in Figure 5-44 and Figure 5-45 respectively.

TABLE 5-36
Index Crime Rates by County (1999-2007)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Index Crimes									
State of Wyoming	347.22	332.62	355.79	360.07	359.10	358.06	335.81	317.67	309.85
Converse County	301.86	207.43	245.60	260.41	235.58	219.90	190.73	199.86	232.90
Converse County Sheriff	183.57	127.95	185.31	173.65	168.47	97.73	96.82	90.02	115.72
Douglas	445.86	279.88	304.46	320.00	311.05	295.14	279.04	306.52	339.13
Glenrock	176.47	197.22	228.60	295.41	193.07	291.56	172.94	172.49	225.66
Natrona County	433.30	415.73	449.54	504.59	548.74	508.65	501.25	475.33	467.43
Natrona County Sheriff	258.86	266.00	318.33	351.97	427.37	297.31	282.85	332.82	279.39
Casper	448.06	439.53	466.92	544.27	575.11	550.37	550.08	518.18	523.90
Evansville	691.91	700.67	634.15	501.32	511.81	630.06	625.27	480.03	400.69
Mills	730.15	374.37	536.47	432.45	620.72	553.85	487.72	337.88	403.28
Converse County	301.86	207.43	245.60	260.41	235.58	219.90	190.73	199.86	232.90
Converse County Sheriff	183.57	127.95	185.31	173.65	168.47	97.73	96.82	90.02	115.72
Douglas	445.86	279.88	304.46	320.00	311.05	295.14	279.04	306.52	339.13
Glenrock	176.47	197.22	228.60	295.41	193.07	291.56	172.94	172.49	225.66
Natrona County	433.30	415.73	449.54	504.59	548.74	508.65	501.25	475.33	467.43
Violent Crimes as Percent of Index Crimes									
State of Wyoming	7%	8%	7%	8%	7%	6%	7%	7%	8%
Converse County	7%	5%	15%	8%	10%	7%	9%	8%	12%
Converse County Sheriff	9%	9%	18%	11%	15%	13%	13%	2%	21%
Douglas	5%	4%	5%	4%	6%	4%	7%	8%	8%
Glenrock	19%	5%	39%	16%	16%	9%	10%	12%	17%
Natrona County	7%	8%	7%	5%	4%	4%	5%	5%	5%
Natrona County Sheriff	9%	7%	4%	5%	2%	2%	4%	3%	2%
Casper	7%	8%	7%	5%	4%	4%	5%	5%	6%
Evansville	11%	20%	12%	6%	9%	5%	2%	4%	4%
Mills	6%	9%	6%	6%	6%	4%	6%	18%	8%
Property Crimes as Percent of Index Crimes									
State of Wyoming	93%	92%	93%	92%	93%	94%	93%	93%	92%
Converse County	93%	95%	85%	92%	90%	93%	91%	92%	88%

TABLE 5-36
Index Crime Rates by County (1999-2007)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
Converse County Sheriff	91%	91%	82%	89%	85%	87%	87%	98%	79%
Douglas	95%	96%	95%	96%	94%	96%	93%	92%	92%
Glenrock	81%	95%	61%	84%	84%	91%	90%	88%	83%
Natrona County	93%	92%	93%	95%	96%	96%	95%	95%	95%
Natrona County Sheriff	91%	93%	96%	95%	98%	98%	96%	97%	98%
Casper	93%	92%	93%	95%	96%	96%	95%	95%	94%
Evansville	89%	80%	88%	94%	91%	95%	98%	96%	96%
Mills	94%	91%	94%	94%	94%	96%	94%	82%	92%

Source: State of Wyoming, Office of Attorney General, 2007.

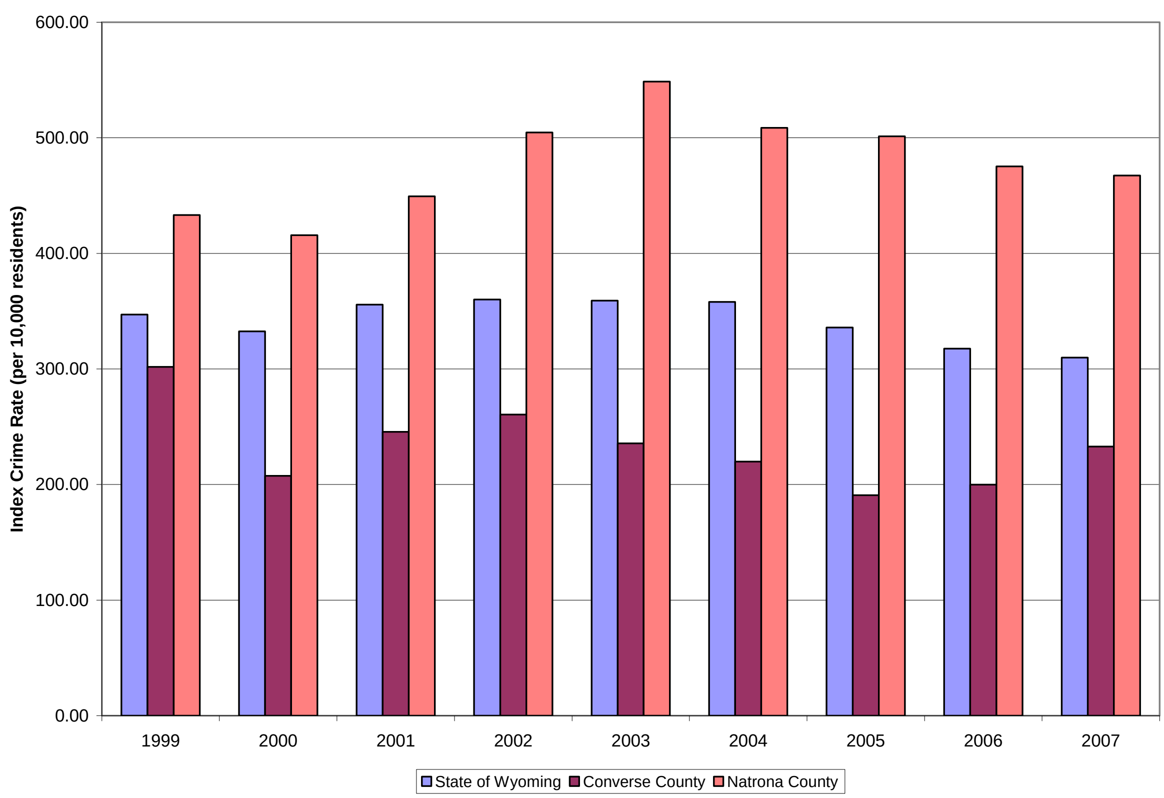

FIGURE 5-43
Index Crime Rate by County and State of Wyoming (1999-2007)

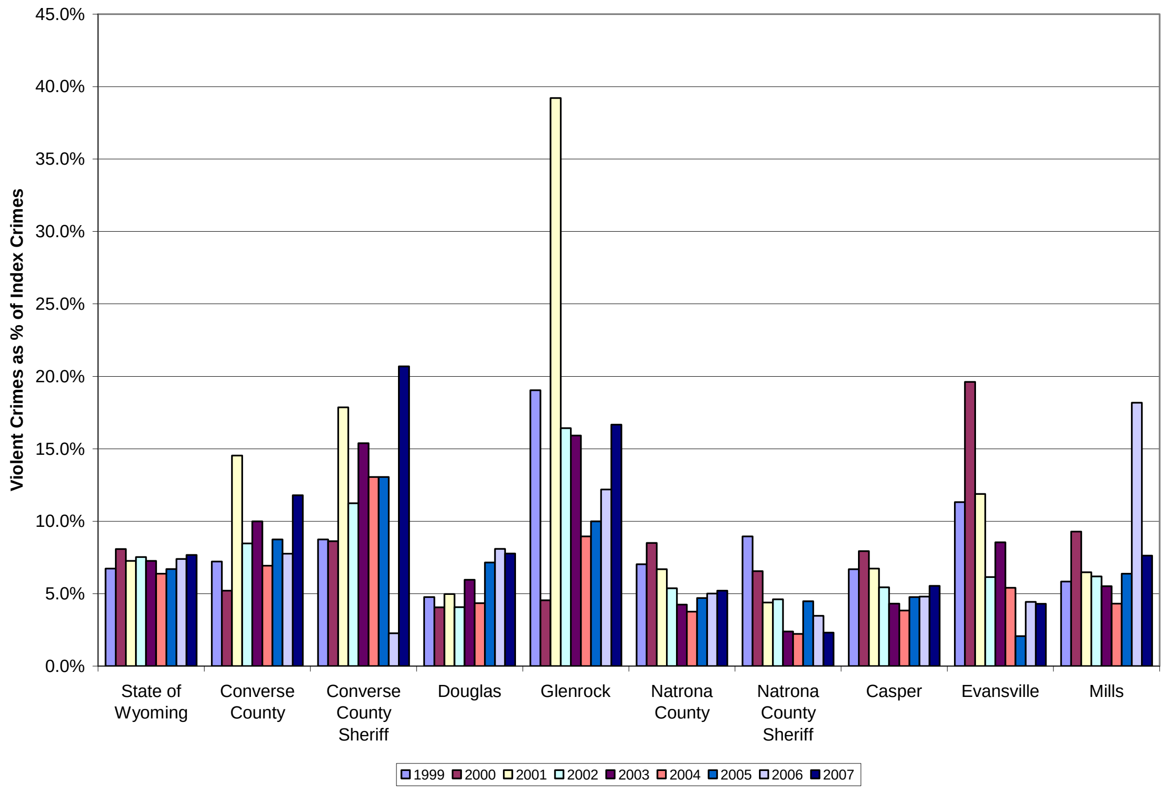

FIGURE 5-44
Violent Crime Rate by Reporting Agency (1999-2007)

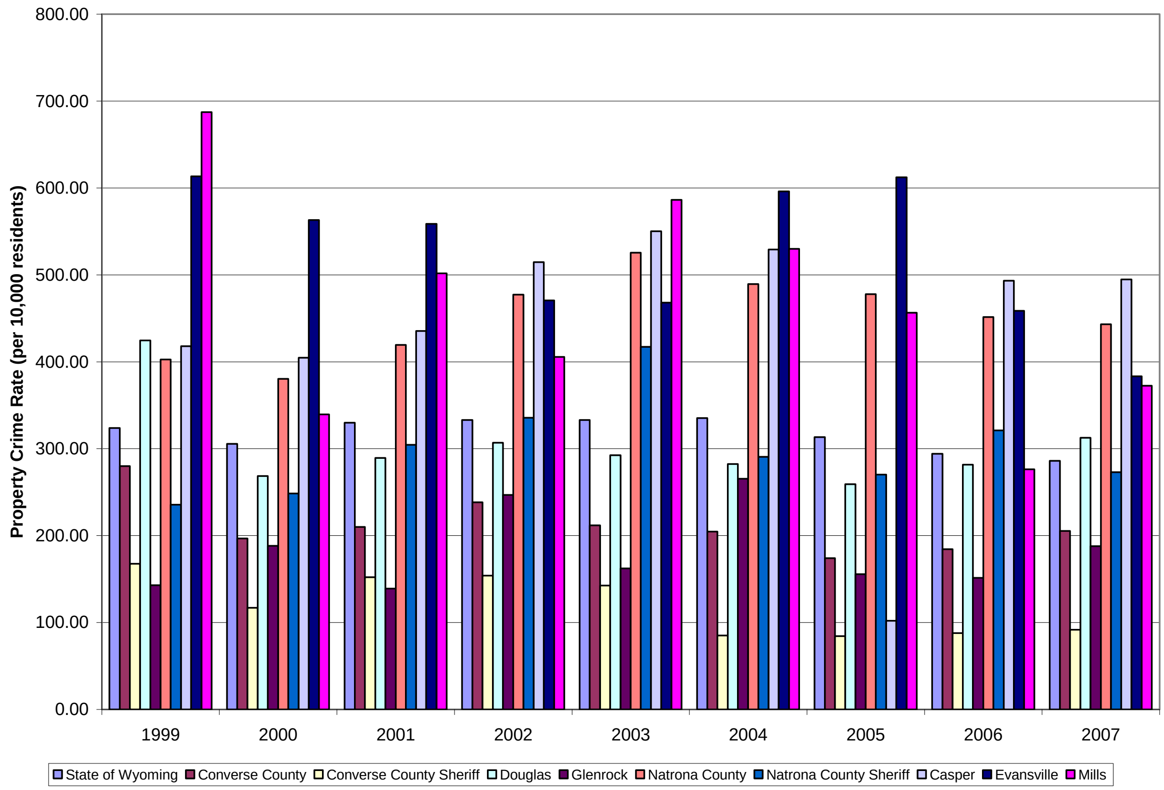

FIGURE 5-45
Property Crime Rate by Reporting Agency (1999-2007)

As of 2007, the Part 1 crime arrest rate for Converse County stood at 2.8 per 1,000 residents which was below the level in 2001 but well above the rate for the two previous years as can be seen from the information presented in Table 5-37. The corresponding rate in 2007 for Natrona County was 5.3. As can be seen from Table 5-37 and Figure 5-46, there was considerable variation in the rate across law enforcement jurisdictions.

Part 1 arrests comprise a small proportion of all arrests, averaging between 2 and 9 percent over the period 2001 through 2007 across both counties and all law enforcement jurisdictions. The large proportion of all arrests is associated with Part 2 crimes: averaging between 91 and 92 percent of all arrests. Although Part 2 crimes are considered less serious in nature than Part 1 crimes, they are significantly more numerous and often of an anti-social nature with the majority related to alcohol and drug abuse. Part 2 crimes are classified into the following groups: manslaughter by negligence; arson; other assault; forgery and counterfeiting; fraud; embezzlement; buying, receiving or possessing stolen property; vandalism; carrying or possessing weapons; prostitution and commercial vice; sex offenses (except rape and prostitution); drug abuse – sale and manufacture; drug abuse – possession; gambling; offenses against family and children; driving under the influence; liquor laws; drunkenness; disorderly conduct; vagrancy; and all other (except traffic). Information regarding Part 2 crimes is available only in the form of arrest data rather than reported crime, as is the case for Part 1 crimes.

TABLE 5-37
Part 1, Part 2, and Drug- and Alcohol-Related Offense Arrest Rates (2001-2007)

	2007	2006	2005	2004	2003	2002	2001
PART 1 OFFENSE ARREST RATE (per 1,000 population)							
Converse County	2.8	1.7	1.7	2.7	1.2	2.3	3.2
Converse County Sheriff	3.0	1.0	1.7	1.9	1.5	1.5	4.0
Douglas	3.0	2.3	1.3	3.5	0.9	1.3	1.3
Glenrock	2.1	1.7	2.6	2.6	1.3	6.2	6.3
Natrona County	5.3	3.9	5.1	4.9	5.9	5.7	4.5
Natrona County Sheriff	1.5	1.9	2.8	2.7	2.2	4.3	2.3
Casper	6.6	4.5	5.9	5.5	6.9	6.0	4.8
Evansville	2.7	3.1	3.8	6.2	5.0	7.7	7.7
Mills	2.6	2.1	1.7	1.3	3.5	3.1	4.4
PART 1 OFFENSE ARREST AS PERCENT OF TOTAL ARRESTS							
Converse County	3.6%	3.7%	4.2%	7.6%	3.5%	6.1%	8.3%
Converse County Sheriff	3.4%	3.0%	8.3%	8.9%	4.8%	6.0%	22.8%
Douglas	4.1%	3.8%	2.2%	7.9%	2.4%	3.3%	4.2%
Glenrock	3.1%	4.3%	6.3%	5.6%	3.9%	10.6%	6.2%
Natrona County	6.2%	4.7%	6.0%	5.7%	7.3%	7.9%	5.5%
Natrona County Sheriff	1.4%	1.6%	1.8%	1.9%	1.7%	3.2%	1.6%
Casper	8.9%	6.3%	9.5%	8.4%	11.3%	11.9%	8.2%
Evansville	4.5%	5.2%	3.5%	5.2%	3.8%	5.4%	4.1%
Mills	1.0%	1.5%	0.8%	0.6%	1.7%	2.3%	3.3%
PART 2 OFFENSE ARREST RATE (per 1,000 population)							
Converse County	75.0	44.7	38.5	33.2	33.5	35.3	35.8
Converse County Sheriff	86.19	33.14	18.52	19.55	30.02	23.66	13.46
Douglas	69.4	57.8	55.6	40.5	37.0	38.1	30.1
Glenrock	64.8	37.4	38.5	44.0	32.0	52.0	94.6
Natrona County	80.8	77.9	79.7	81.0	74.9	65.9	76.6
Natrona County Sheriff	104.1	118.0	148.0	142.2	128.0	130.0	141.5
Casper	67.7	66.6	55.9	59.1	54.2	44.5	53.6
Evansville	58.4	56.0	104.1	111.1	126.0	133.9	182.2
Mills	265.0	135.5	204.8	206.0	198.2	128.0	130.4

TABLE 5-37
Part 1, Part 2, and Drug- and Alcohol-Related Offense Arrest Rates (2001-2007)

	2007	2006	2005	2004	2003	2002	2001
DRUG- AND ALCOHOL-RELATED ARRESTS AS PERCENT OF TOTAL ARRESTS							
Converse County	52.3%	63.1%	69.3%	60.3%	62.5%	63.3%	48.9%
Converse County Sheriff	27.3%	37.1%	56.3%	43.6%	47.3%	57.8%	36.7%
Douglas	75.0%	75.8%	76.4%	71.7%	73.7%	75.9%	73.5%
Glenrock	63.8%	63.4%	58.9%	50.5%	61.8%	47.7%	35.1%
Natrona County	39.3%	37.6%	30.7%	34.2%	33.9%	32.4%	39.7%
Natrona County Sheriff	23.8%	21.7%	19.5%	20.1%	17.2%	18.0%	22.9%
Casper	44.0%	42.8%	37.8%	41.6%	41.4%	40.2%	46.6%
Evansville	55.3%	41.6%	37.8%	38.8%	39.8%	42.2%	56.1%
Mills	41.9%	51.5%	23.4%	31.0%	35.4%	30.5%	37.2%

Source: State of Wyoming, Office of Attorney General, 2007.

Arrest rates for Part 2 crimes are shown in Table 5-37 and Figure 5-47. Many of the Part 2 crime arrests are for drug- and alcohol-related offenses: averaging between 21 and 78 percent. Thus, large shares of all arrests (for both Part 1 and Part 2 crimes) are accounted for by drug- and alcohol-related offenses: averaging between 21 and 75 percent (as can be seen from the information presented in Table 5-37 and Figure 5-48). Arrest rates for Part 2 offenses are noticeably higher in the jurisdictions of the Converse County Sheriff and Natrona County Sheriff and in the towns of Mills and Evansville in Natrona County.

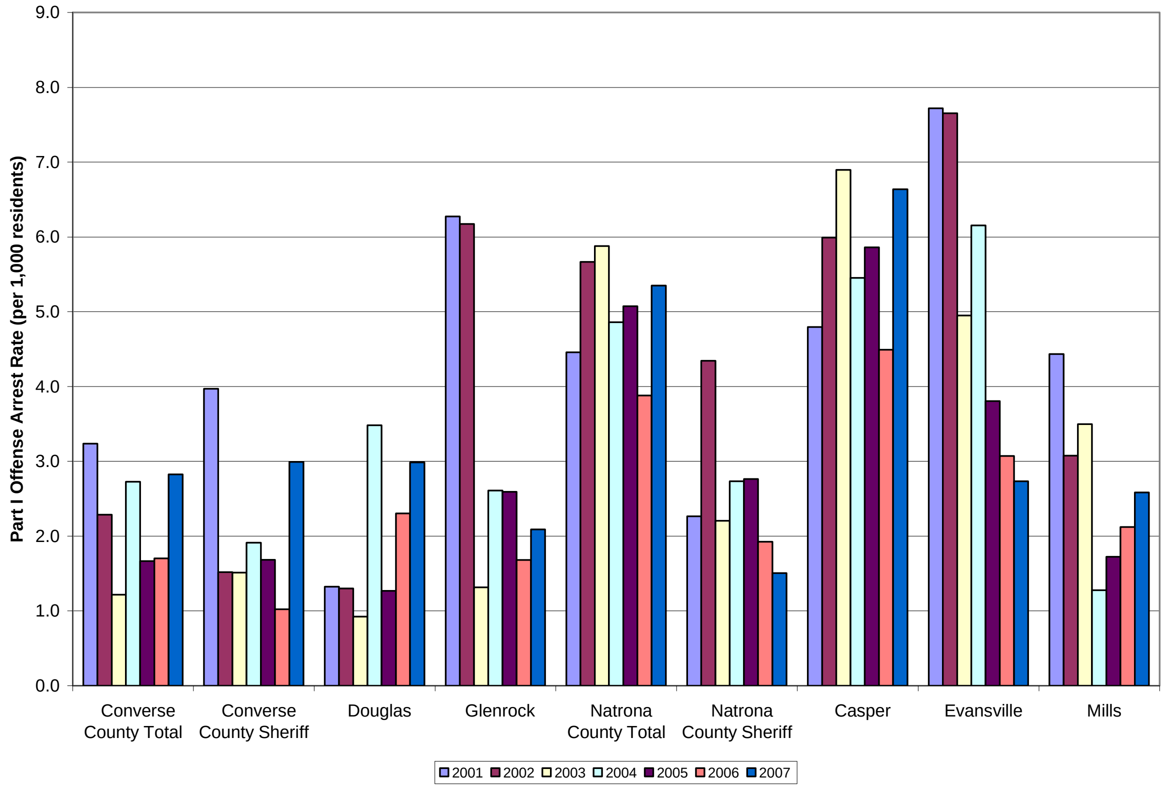

FIGURE 5-46
Part 1 Crime Offense Arrest Rate (2001-2007)

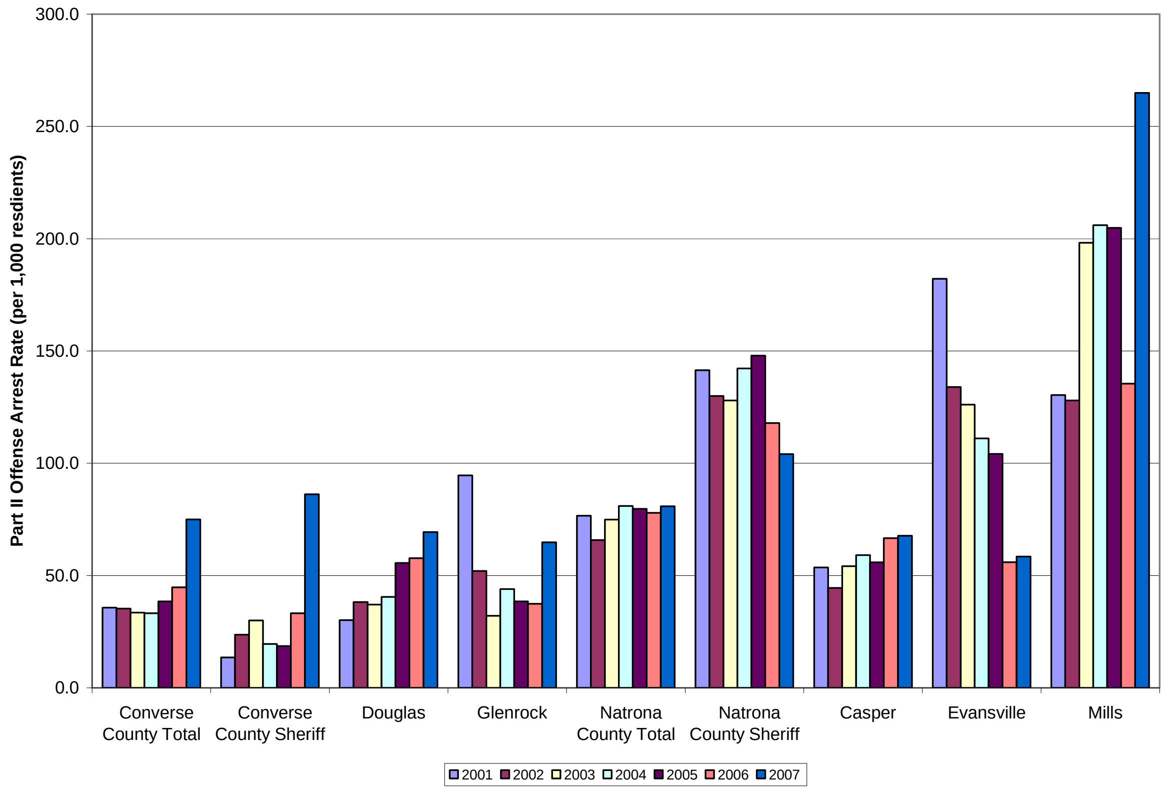

FIGURE 5-47
Part 2 Crime Offense Arrest Rate (2001-2007)

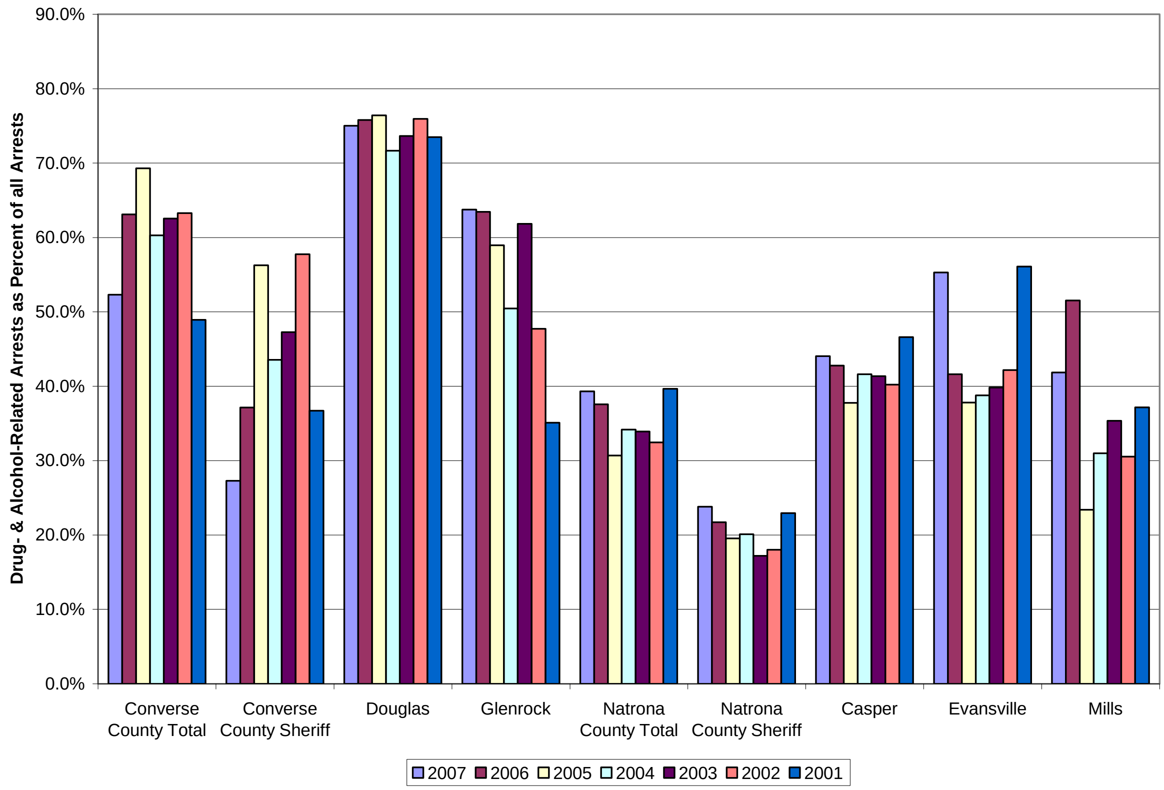

FIGURE 5-48
Drug- and Alcohol-Related Crime Arrests as Percent of Total Arrests (2001-2007)

5.3.6 Health Care

Rule I Section 7(vi)(E) – Public facilities and services availability and needs, which may include, but are not limited to: an analysis of health and hospital care facilities and services.

This section discusses the location and characteristics of health care facilities in the two-county study area, including the number and type of facilities, staffing levels, LOS measures, availability of emergency medical service, and the health needs of the existing population.

5.3.6.1 Location and Characteristics of Health Care Facilities

There are two hospitals in the study area: one located in each of the two counties as illustrated in Figure 5-49. They are Memorial Hospital of Converse County located in Douglas and Wyoming Medical Center located in Casper in Natrona County. Both hospitals are located in the major community and county seat of their respective counties. Natrona County has a large number of hospital beds compared to Converse County, and the LOS ratio (beds per 10,000 residents) is also higher, as presented in Table 5-38 and Figure 5-50. The admissions LOS and inpatient surgery LOS for Natrona County are substantially higher than for Converse County, while the outpatient visits and outpatient

surgery ratios are lower. These differences are explained by differences in the type and function of the hospitals. The Wyoming Medical Center offers a wider range of specialties and functions as a regional medical center compared to the more restricted range of services offered by the Memorial Hospital of Converse County. The emergency room visit LOS values are similar for both facilities.

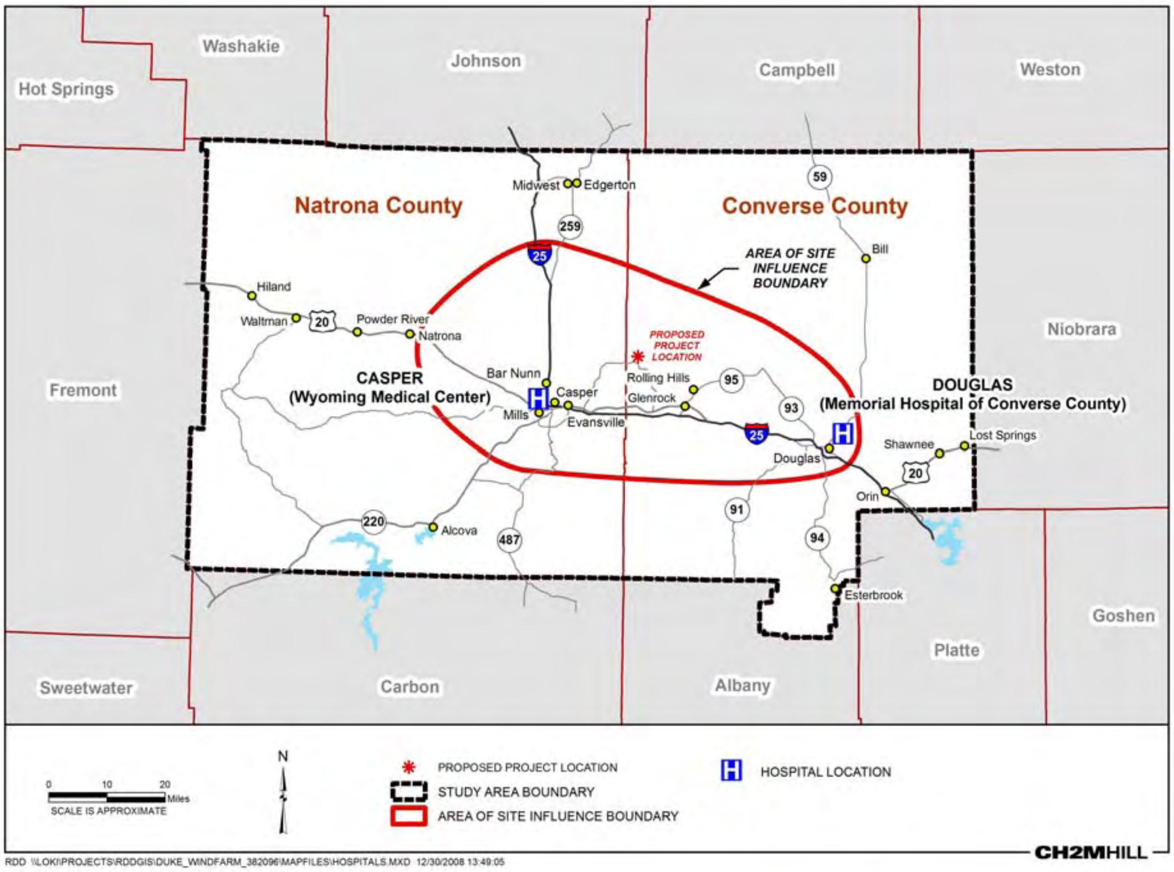

FIGURE 5-49
Location of Hospitals in the Study Area

TABLE 5-38
General Hospitals in the Study Area: Selected Statistics

	Converse County	Natrona County
Number of Beds	25	205
Admissions	810	9,867
Inpatient Surgeries	219	3,364
Outpatient Visits	24,075	69,594
Outpatient Surgeries	850	2,119
Emergency Room Visits	4,335	32,556
LOS Ratios (per 10,000 residents):		
Number of Beds	19	29
Admissions	630	1,397
Inpatient Surgeries	170	476
Outpatient Visits	18,721	9,851
Outpatient Surgeries	661	300
Emergency Room Visits	3371	4,608

Sources:
Wyoming Healthcare Commission, 2006; U.S. News & World Report, 2007; Wyoming Office of Rural Health, 2004; Wyoming EAD, 2007d; Wyoming Medical Center, 2007; Memorial Hospital of Converse County, 2008; Campbell County Memorial Hospital, 2008.

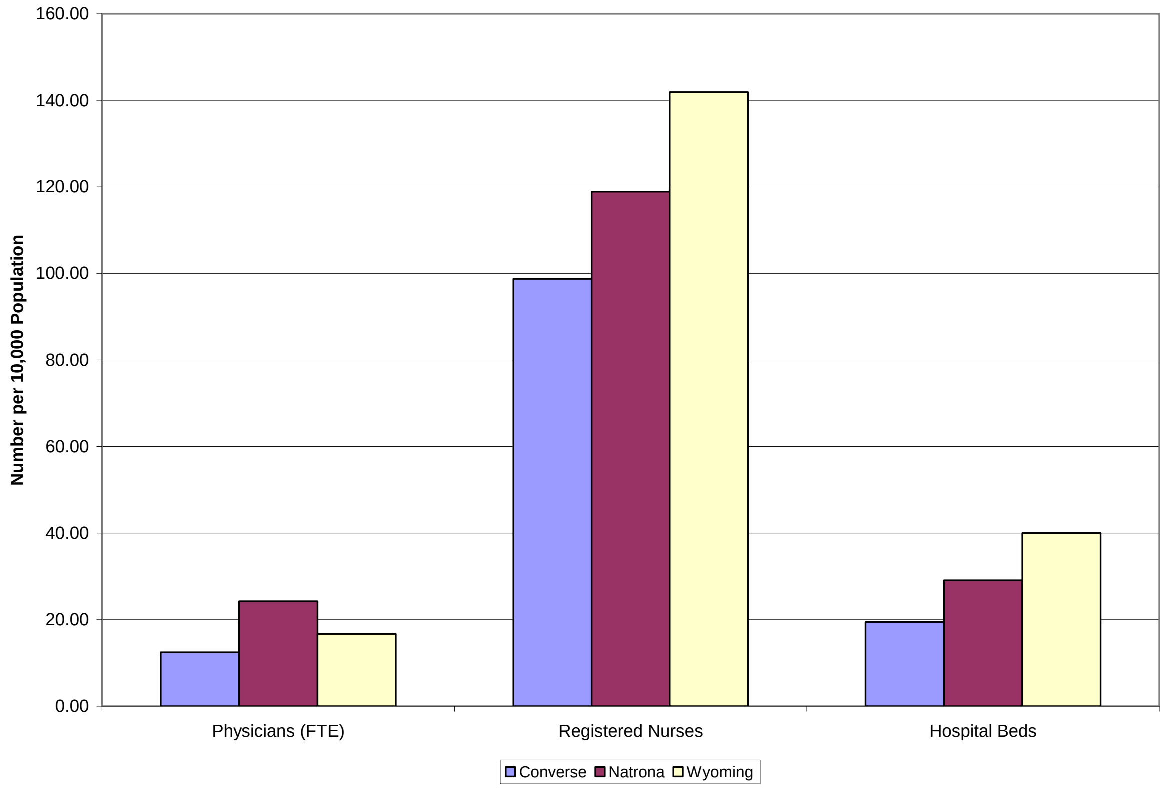

FIGURE 5-50
Level of Service Ratios for Health Care Professionals

The physician LOS for Natrona County is higher than for the state while that of Converse County is below as can be seen from the information presented in Table 5-39. Natrona County has higher LOS values than Converse County for registered nurses and dentists. However, the ratio is less than that of the state for registered nurses. Converse County exhibits the lowest ratio for physicians (12.4) and nurses (98.8) compared to the study area (22.4 and 116.1, respectively) and to the state of Wyoming (16.7 and 253.9, respectively). A comparison of LOS ratios for each of the counties is presented in Figure 5-50.

TABLE 5-39
Health Care Professionals in the Study Area (2006)

	Physicians		Nurses				Dentists		Pharmacists	
County	Full-time Equivalents	Number of Professionals	Total	Registered Nurse	Licensed Practical Nurse	Certified Nurse Assistant	Full-time Equivalents	Number of Professionals	Full-time Equivalents	Number of Professionals
Converse	16	18	254	127	14	113	3	4	7	6
Natrona	171	160	1,638	840	99	699	36	41	64	73
Study Area	187	178	1,892	967	113	812	39	45	71	79
Wyoming	858	961	13,076	7,306	1,260	4,510	232	266	342	399
LOS Ratios (per 10,000 residents in 2006)										
Converse	12.4	14.0	197.5	98.8	10.9	87.9	2.3	3.1	5.4	4.7
Natrona	24.2	22.6	231.8	118.9	14.0	98.9	5.1	5.8	9.1	10.3
Study Area	22.4	21.3	227.2	116.1	13.6	97.5	4.7	5.4	8.5	9.5
Wyoming	16.7	18.7	253.9	141.9	24.5	87.6	4.5	5.2	6.6	7.7

Sources:
Wyoming Healthcare Commission, 2006; U.S. News & World Report, 2007; Reid, 2007; Wyoming EAD, 2007d.

The majority of physicians in each of the counties and the state of Wyoming are full-time: 88 percent in Natrona County and 100 percent in Converse County. The state rate is 89 percent, as presented in Table 5-40. General medical staff vacancies include three staff in Converse County and 37 staff in Natrona County.

TABLE 5-40
Physician Staffing Levels by County

	Converse County	Natrona County	State of Wyoming
Total Number of Physicians	18	120	836
Full-Time Employed Physicians	16	91	637
Part-Time Employed Physicians	0	8	52
Full-Time Contract Physicians	2	14	108
Part-Time Contract Physicians	0	7	56
Number of General Medical Staff Vacancies	3	37	140

Source: Wyoming Office of Rural Health, 2004.

Table 5-41 provides information on the types of physicians in each county within the study area and LOS ratios. Natrona County had the higher LOS for both total physicians and specialist physicians compared to Converse County along with having higher levels of service than the state as a whole.

TABLE 5-41
Physician Level of Service Ratios by County

Staff and Contract Physicians	Converse County	Natrona County	State of Wyoming
Total Number of Physicians (full- and part-time)	18	120	836
Number of Specialists (full- and part-time)	11	94	576
Number of Family Practice and Internal Medicine Physicians (full- and part-time)	7	26	260
Physicians per 1,000 Residents	1.38	1.67	1.60
Specialists per 1,000 Residents	0.84	1.31	1.10
Family Practice Physicians per 1,000 Residents)	0.54	0.36	0.50

Source: Wyoming Office of Rural Health, 2004; Wyoming EAD, 2007d.

In 2002, the study area contained 587 certified emergency medical service (EMS) providers, 42 certified ambulance attendants, and seven ambulances, as can be seen from the information presented in Table 5-42. Natrona County had a higher certified ambulance attendant LOS that Converse County with a value of 3.3 versus 1.1.

TABLE 5-42
Emergency Medical Services by County

	Converse County	Natrona County
Certified EMS Providers	154	433
Certified Ambulance Attendants	13	29
Per 1,000 residents	1.1	3.3
Square Mile per Attendant	329	73.2
Number of Service Providers	1	3
Number of Ambulances (vehicles)	3	4
Ambulance Runs	548	892*

* Only two services reported.

Source: Wyoming Department of Health, 2002.

5.3.6.2 Health Needs of the Existing Population

This section discusses a report prepared for the Wyoming Health Care Commission in 2007 entitled Status and Future of Health Care Delivery in Rural Wyoming. Wyoming is undergoing significant changes in population. Some areas of the state are experiencing extraordinary growth, while others are in decline. Like many predominantly rural states, Wyoming is seeing a dramatic increase in the number of persons aged 65 and over. However, Wyoming is also experiencing substantial growth in the working-age population that supports the growth in extraction of natural resources. The two population shifts will put different pressures on the health care system. The increase in persons aged 65 and older will create more demand for geriatric care and care management of patients with multiple chronic conditions associated with the elderly. The increase of working-age persons will increase demand for dental services, preventive services, and primary care services associated with young families.

Wyoming has an adequate array of facilities offering inpatient services, hospitals, and skilled nursing facilities (nursing homes). Despite the availability of these institutional services and the presence of qualified clinical personnel, many Wyoming residents who could be served in Wyoming are using health services in Colorado and Nebraska.

The key findings of the analysis contained in the report are as follows:

- The demographic shift of the aging population will increase an already growing demand for health care professionals. Recruitment and retention should be priorities at all levels, from local to state, including public and private entities.
- To decrease the number of health care professionals who leave Wyoming, the state should support and encourage increased participation in programs with proven success.
- Stakeholders in Wyoming health care delivery recommended a step-wise strategy of integrating services in local communities and then building regional systems.

- Stakeholders believe there is no pattern of sustained leadership in health care in Wyoming, but there are potential sources of leadership that can be explored.
- Community members expressed concern about continuous population growth combined with the number of providers reaching retirement, and stressed the importance of recruitment and retention efforts.
- Respondents identified services for the elderly as a current or future need, particularly assisted living.
- Considering the combined effect of the direct and indirect impact on Wyoming's economy, health care accounts for 10.3 percent of the state's total employment, 10.5 percent of the state's total income, and 8.2 percent of the state's total output.
- The estimated total lost revenue for Wyoming hospitals due to inpatient out-migration to Colorado, Utah, and Nebraska was $101.3 million in 2003. As a result, an estimated $32.5 million less was spent in other economic sectors of Wyoming communities in the same year.
- Other states have formal or informal networks of providers to coordinate care. Examples of strong comprehensive networks across providers are the Alaska Federal Health Care Access Network and the Nebraska Rural Comprehensive Care Network.
- State health agencies use advisory groups to provide technical assistance and formulate recommendations. The Health Policy Commission in New Mexico, for example, is an independent commission monitoring the health status and health care services in the state.

5.3.7 Municipal Services

Rule I Section 7(vi)(B and C) - Public facilities and services availability and needs, which may include, but are not limited to:

(B) Sewer and water distribution and treatment facilities including the capability of these facilities to meet projected service levels required due to the proposed industrial facility. Use of facilities by the proposed industrial facility should be asse4ssed separately from population related increases in service levels;

(C) Solid waste collection and disposal services including the capability of these facilities to meet projected service levels required due to the proposed industrial facility. Use of facilities by the proposed industrial facility should be asse4ssed separately from population related increases in service levels;

This section describes the location and characteristics of the following five primary municipal services provided to residents of the two-county study area:

- Electricity
- Natural gas
- Water
- Wastewater treatment
- Waste disposal

5.3.7.1 Electricity and Natural Gas

There are four primary suppliers of electricity and three of natural gas in the two-county study area, as shown in Table 5-43.

TABLE 5-43
Electric and Gas Utility Company Service Areas

Company	Counties Served
Electricity	
Rocky Mountain Power	Converse County, Natrona County
High Plains Power	Natrona County
Niobrara Electric	Converse County
Wheatland REA	Converse County
Gas	
Kinder Morgan	Converse County, Natrona County
MGTC Inc.	Converse County
Source Gas	Converse County, Natrona County

Sources: Wyoming Public Service Commission, 2003.

5.3.7.2 Water

The study area contains 24 community water purveyors: five in Converse County and 19 in Natrona County, as shown in Table 5-44. The majority are small community water systems serving a small number of residents. Exceptions are the City of Casper serving 54,000 residents with a use of 9.2 million gallons per day (gpd) and the Town of Douglas serving 5,300 residents with a use of almost 1.4 million gpd.

TABLE 5-44
Community Water Systems in the Study Area

Water System Name	Population Served	Primary Water Source Type	Total Maximum Capacity (gpm)	Average Day Use (gpd)	Peak Day Use (gpd)
		Converse County			
Town of Douglas	5,300	Surface water	3,900	1,395,600	3,760,140
Fairway Estates	100	Groundwater	115	17,000	43,500
Town of Glenrock	2,283	Groundwater	1,700	600,000	1,400,000
Ridgewater Improvement District	143	Purchased surface water	1,500	28,173	74,015
Town of Rolling Hills	440	Groundwater	400	70,349	387,168
		Natrona County			
Air Base Acres	250	Purchased surface water	NA	10,000	13,000

TABLE 5-44
Community Water Systems in the Study Area

Water System Name	Population Served	Primary Water Source Type	Total Maximum Capacity (gpm)	Average Day Use (gpd)	Peak Day Use (gpd)
Alcova Dam Trailer Park	45	Groundwater	NA	NA	NA
Broken Wrench LLC	50	Groundwater	NA	NA	NA
Casper Board of Pub Utilities	54,500	Purchased surface water	36,111	9,200,000	28,000,000
Central WY Regional Water System JPB	25	Groundwater under influence of surface water	NA	NA	NA
Countryside Court	125	Groundwater	NA	NA	NA
Town of Evansville	2,200	Surface water	NA	NA	NA
Lakeview Improvement and Service District	45	Purchased surface water	NA	NA	NA
Town of Mills	3,200	Surface water	3,600	861,750	2,500,000
Natrona County Int'l Airport	312	Purchased surface water	NA	NA	NA
Pioneer Water and Sewer District	450	Purchased surface water	NA	95,000	154,000
Pleasant View Water Company	130	Purchased surface water	NA	NA	NA
Poison Spider Improvement and Services Distr.	100	Purchased surface water	NA	NA	NA
Riverside Trailer Court	155	Groundwater	NA	NA	NA
Sandy Lake Estates- ISD	150	Purchased surface water	NA	NA	NA
South Riverside Acres Water Improvement District	50	Groundwater	40	7,272	NA
Thirty-Three Mile Road I a SD	150	Purchased surface water	NA	NA	NA
Vista West Water Company	1,600	Purchased surface water	NA	NA	NA
Wardwell Water and Sewer Dist.	2,100	Purchased surface water	NA	300,000	416,666

Note: gpm = gallons per minute; gpd = gallons per day.

Source: EPA, 2007b. Wyoming Water Development Commission, 2004.

5.3.7.3 Wastewater

The study area contains six wastewater treatment facilities located, for the most part, in the larger communities as shown in Table 5-45. The facilities range from small wastewater

lagoon systems to complex treatment facilities such as those serving the major population centers of Casper and Douglas.

TABLE 5-45
Wastewater Treatment Facilities Within the Study Area

County	Facility Name
Converse County	
	Glenrock Wastewater Lagoon
	City of Douglas
Natrona County	
	Camp Sacajawea
	City of Casper
	Sam Hobbs Regional Wastewater Facility
	Tribal A Tensleep Battery #1

Source: EPA, 2007b.

5.3.7.4 Non-Hazardous Waste Disposal

Table 5-46 lists the Type I and Type II municipal waste facilities in the study area and their status (active or proposed).

TABLE 5-46
Waste Disposal Facilities Within the Study Area

Facility Name	Facility Type	Facility Status
Converse County		
Douglas San #1	Type I Municipal	Active
Glenrock #1	Type II Municipal	Active
Glenrock #2 - Proposed	Type II Municipal	Proposed
Natrona County		
Casper Balefill	Type I Municipal	Active
Central Wyoming Regional Landfill	Type I Municipal	Proposed
Midwest-Edgerton #2 (10.391)	Type II Municipal	Active

Source: WDEQ, 2008b.

Each county currently has two active disposal facilities and one proposed facility. Community size and activities, such as construction, influence both the quantity and composition of municipal solid waste (MSW). As seen from the information in Table 5-47, Natrona County generates the greater quantity of MSW at 123,440 tons annually as well as the larger per capita generation of 9.7 pounds per person per day. Natrona County daily per capita production of MSW is the highest in the state.

TABLE 5-47
Solid Waste Generation by County

County/Area	Tons of MSW per Year	Pounds of MSW per Person per Day *	Percent of State Total
Converse County	12,752	5.5	2.1
Natrona County	123,440	9.7	2.0
State Total	607,069	6.5	NA

* Based on 2005 population.

NA = Not Applicable

Source: Wyoming Business Council, 2007.

5.3.8 Transportation Facilities

Rule I Section 7(i)(v) – An analysis of transportation facilities containing discussion of roads (surface, type) and railroads (if applicable). An analysis of effects on transportation facilities including effects on service levels of roads, haul routes for materials and supplies, increased rail traffic at grade crossings, and intersection of new access roads with existing roads.

This section identifies major transportation facilities in the study area and their utilization levels and provides a review of transportation plans that identify planned improvements.

5.3.8.1 Identification of Major Facilities

Figure 5-51 shows the major road transportation corridors within the study area.
I-25 extends in an east-west direction through Converse County. Upon reaching Casper in Natrona County, I-25 turns abruptly north. From Douglas in Converse County, State Route (SR) 59 runs directly north into Campbell County. Table 5-48 details the major roads and highways in each of the counties of the study area and their general direction.

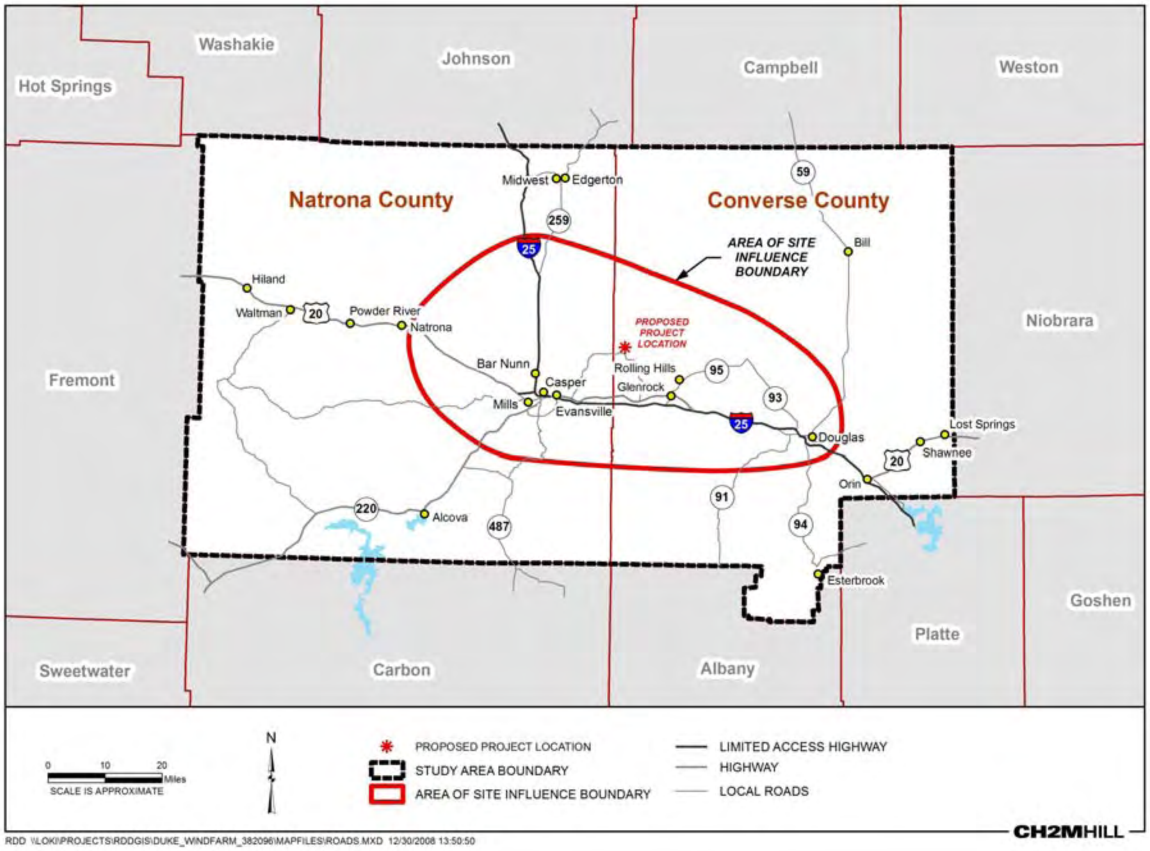

FIGURE 5-51
Major Roads and Highways in the Study Area

TABLE 5-48
Road Systems within the Study Area

County	Road	Type	General Direction
Converse	I-25	Interstate	East-West
Converse	SR 59	State Route	North-South
Natrona	I-25	Interstate	North-South
Natrona	US 87	U.S. Highway	East-West
Natrona	SH 255	State Highway	East-West
Natrona	US 20 and 26 Bus.	U.S. Highway	East-West
Natrona	I-25	Interstate	North-South
Natrona	US 20 and 26	U.S. Highway	East-West
Natrona	SR 220	State Route	North-South
Natrona	SH 487	State Highway	East-West
Natrona	SH 220	State Highway	North-South

Source: CH2M HILL, 2008.

Traffic counts are recorded at a number of locations throughout the state, and those that fall within the two-county study area are shown on Figure 5-52 The highest traffic volumes are generally on I-25, followed by SR 220 just southwest of Casper as can be seen from the information presented in Table 5-49. The highest proportion of trucks (measuring between 20 and 25 percent in places) is recorded on SR 220 just southwest of Casper. Interstate highway segments also have generally high (10 to 15 percent) proportions of truck traffic.

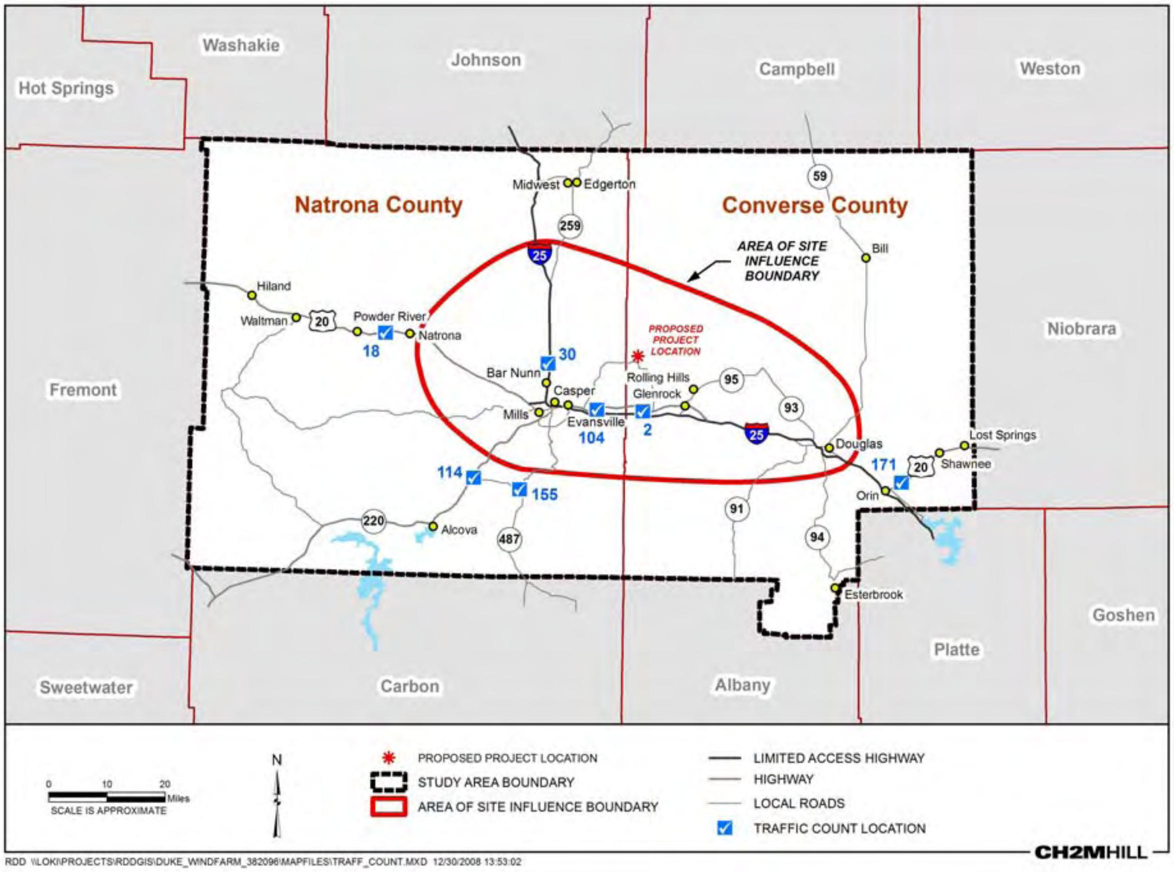

FIGURE 5-52
Traffic Count Locations in the Study Area

TABLE 5-49
Average Annual Daily Traffic (AADT) and Percent Truck Traffic, by Day and Highway

Station No.	Location	Highway	County	Average Annual Daily Traffic (AADT)							Percent Truck Traffic
				Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
2	Casper East	I-25	Converse	6,671	6,906	6,889	7,192	7,361	8,325	7,138	Not Available
171	Orin Station	US 18/20	Converse	2,148	1,845	1,763	1,890	1,972	2,321	2,079	15-20%
18	Powder River East	US 20/26	Natrona	2,362	2,325	2,254	2,276	2,435	2,938	2,425	10-15%
30	Casper North	I-25/US 87	Natrona	4,917	5,103	5,026	5,176	5,406	6,120	5,073	15-20%
104	Casper East	US 20/26	Natrona	1,866	2,606	2,670	2,670	2,670	2,830	2,316	0-5%
114NE	Goose Egg Southwest	SH 220	Natrona	3,798	3,210	3,076	3,235	3,266	3,897	3,976	20-25%
114SE	Goose Egg Southwest	SH 487	Natrona	814	631	578	571	641	946	824	5-10%
114SW	Goose Egg Southwest	SH 220	Natrona	3,185	2,631	2,608	2,778	2,758	3,178	3,332	20-25%
155	Shirley Basin North	SR 487	Natrona	783	571	517	519	576	855	781	5-10%

Source: CH2M HILL, 2008.

Figure 5-53 shows the location of rail infrastructure and freight volumes carried by the major lines. Within the study area, the major lines are operated and maintained by the Union Pacific Railroad and Burlington Northern Railroad. The Union Pacific Railroad operates approximately 880 miles of track in the state of Wyoming and serves the coal-rich Powder River Basin in north central Wyoming with more than 60 coal trains a day traveling to and from the basin. This branch lines passes through Converse County as shown in Figure 5-43. Union Pacific's transcontinental main line across southern Wyoming hosts as many as 65 trains a day. A main line of the Burlington Northern Railroad from Denver (Colorado) passes through Converse County and extends north to the Powder River Basin by using joint trackage beyond Orin in Converse County.

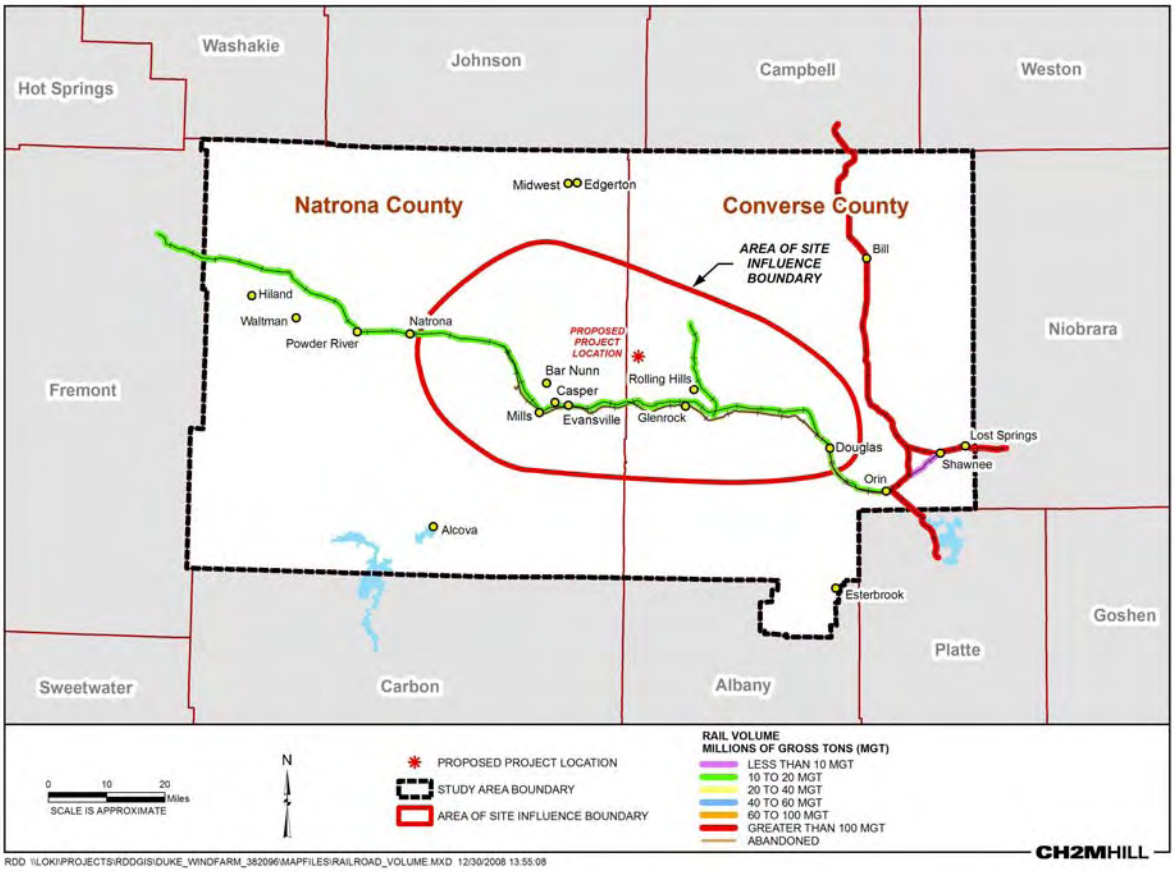

FIGURE 5-53
Rail Volume in the Study Area

5.3.8.2 Adjacent Roadway Facilities

The Project site is located just inside the western boundary of Converse County, but access will be gained by roads in Natrona County. The site is accessed via Cole Creek Road, also known as County Road 701. Cole Creek Road is an extension of WYO 256. This low-volume road currently serves adjacent residential subdivisions and oil-field trucks. WYO 256, a major collector road, intersects US 20/26/87 (also a major collector road) from the north. WYO 253 (a major collector road), also known as Hat Six Road, is the south approach to this intersection; it interchanges with I- 25 at Exit 185. WYO 258 is the next major collector road

west of WYO 253 and interchanges with I-25 at Exit 185. US 20/26/87 interchanges with I-25 at Exit 160 and then parallels the interstate between Glenrock and Casper.

A review of the current WYDOT's 2008 State Transportation Improvement Program indicates that a widening and overlay project is planned in 2008 for a 10-mile section of US 20/26/87 between Glenrock and Casper. Reconstruction and widening is also planned in 2008 for WYO 253 south of US 20/26/87 and also for their intersection. Pavement repair is planned for I-25 around mile post 173 in 2009. There were no planned roadway improvements for WYO 256 or WYO 258 north of I-25 in the near future.

5.3.8.3 Potentially Affected Roads and Highways

US 20/26/87, WYO 253, WYO 256, and WYO 258 are the four highways that may be affected by the project. Personnel traffic from Casper and Glenrock/Rolling Hills will use US 20/26/87 to access WYO 256. Other personnel will use I-25 to access WYO 253 and, ultimately, WYO 256. All oversize truck traffic will exit I-25 east of Glenrock and use US 20/26/87 to access WYO 256. All other trucks will use this exit or Exit 185 on the east side of Casper. Although I-25 will be used during project construction, it is not expected to be affected permanently by the project.

During project construction, roads and highways may be impacted by vehicles hauling materials to and from the site. Contractors will comply with existing federal, state, and county requirements and restrictions to protect the road network and the traveling public. In addition, load limits will be observed at all times to prevent damage to existing paved road surfaces. If necessary, arrangements to transport oversized loads will be coordinated with and approved by WYDOT.

Personnel Access Routes

It is expected that there will be approximately 129 personnel at the site during the peak construction period. These personnel are expected to live in various locations. The analysis assumes that 70 percent of those staying in Casper will travel on I-25 and 30 percent will travel on US 20/26/87. The following lists the number of personnel using each access route:

- Casper /Alcova/Midwest/Edgerton/Douglas – Exit 182 on I-25 to WYO 253/WYO 256 (86 personnel)
- Casper – East on US 20/26/87 to WYO 256 (34 personnel)
- Glenrock/Rolling Hills – West on US 20/26/87 to WYO 256 (9 personnel)

Once construction is complete, the Project will require eleven daily personnel: all assumed to live in the Casper area. As during the construction period, the site will be accessed from WYO 256 and Cole Creek Road. It is assumed that all operations personnel will drive their own vehicles to the project site: 70 percent will use I-25 and 30 percent will use US 20/26/87. The following lists the personnel using each access route:

- Casper - Exit 182 on I-25 to WYO 256 (8 personnel)
- Casper - US 20/26/87 to WYO 256 (3 personnel)

Truck Access Routes

It is expected that the needed construction materials will be trucked to the site. Each turbine delivery requires seven oversize trucks. Other truck deliveries will consist of gravel for the

access road, aggregate and cement for the on-site concrete batch plant, and other equipment and supplies. The construction trucks are expected to access US 20/26/87 at either I-25 Exit 160 or Exit 185, then follow it to WYO 256 and then to Cole Creek Road to access the project site. Heavy trucks are not expected to access the site during the operations period.

Construction Trucks

Approximately 8,240 trucks are expected to make deliveries to the construction site in 2009. Table 5-50 lists the expected delivery schedule and number of trucks per type of delivery. The concrete will be made on site, so the concrete aggregate trucks listed in the table reflect the total number of deliveries of the various concrete components (water will be obtained on site). During a short period of time at the peak of construction in July 2009, approximately five trucks will make deliveries to the site per hour, accounting for an additional ten truck trips on the roadways during morning and evening peak hours. These five trucks per hour account for the possibility that concrete aggregate deliveries may last through July when the turbine trucks begin making deliveries of the turbine components.

TABLE 5-50
Construction Trucks and Routing

Truck Type	Total Number of Trucks	Delivery Schedule	Number of Trucks Per Peak Hour [1]	Number of Truck Trips Per Peak Hour [2]	Routing Per Peak Hour Trips	
					I-25 to exit 160 [3]	I-25 to exit 185 [4]
Turbine	462	Mid July-August	2	4	4	0
Concrete Aggregate	1,477	May-June	3	6	4	2
Batch Plant	9	Mid April	2	4	2	2
Road Aggregate	4,167	April-May	8	16	8	8
Road Aggregate	2,083	April-May	4	8	4	4
T-Line	15	April	1	2	1	0
Civil Construction	25	February	1	2	2	0

[1] Assumes 10 hour work day, 6 days per week, 4.3 weeks per month

[2] Assumes each truck goes to site and back again in same hour, so 2 truck trips per hour for one delivery

[3] I-25 from the south to WB US 20/26/87 through Glenrock, to NB WYO 256 (aka Hat Six Road) to NB Cole Creek Road

[4] I-25 from the north to NB WYO 258 to EB US 20/26/87 to NB WYO 256 (aka Hat Six Road) to NB Cole Creek Road

Source: CH2M HILL, 2008.

The oversize trucks will travel north on I-25 to Exit 160, and then travel west on US 20/26/87 to its intersection with WYO 256 to access the site. All other trucks that come from the south or east will also use this exit. The other trucks that come from the north or west will exit I-25 at Exit 185 and travel north on WYO 258 to access US 20/26/87. From this intersection, they will travel east on US 20/26/87 to WYO 256 to access the site. No trucks will use Hat Six Road, also known as WYO 253, or its interchange with I-25 at Exit 182.

5.4 Socioeconomic Impact Analysis

The socioeconomic impact analysis evaluates the benefits and impacts of the Project to social and economic resources in the study area and within the more restrictive area of site influence. Benefits include those derived from increased tax revenue, direct employment opportunities, and secondary employment benefits.

The analysis of impacts includes effects on the following resources:

- Housing
- Educational facilities
- Public safety and security
- Health resources
- Municipal services
- *Ad valorem* and sales and use taxes
- Transportation systems

The most noticeable impacts to community resources and services would occur during the construction phase of the Project and relate directly to additional workers likely to enter the area. Potential impacts during the operations phase would be minimal because the number of additional direct jobs associated with operations would be only 11 and, in addition, it is likely that a portion of these jobs would be filled by local workers already resident in the area. Thus, potential impacts reported below would be associated with the construction phase.

A summary of potential project-related impacts during the construction phase is presented in Table 5-51. For a number of resource areas a range of potential effects is listed since more than one LOS values can be applied. The level of impact is defined as the percentage that the project effect (e.g., number of jobs generated by implementation of the project) comprises of an appropriate baseline condition (e.g., employment in the study area, also described as the number of jobs). It is evident that impacts are small and exceed one percent for only one resource area: temporary accommodation units, i.e., hotel and motel rooms. Values reported as 0.0 percent are actually greater than zero but less than 0.1 percent. Impacts are presented in detail below for each of the resource areas.

TABLE 5-51
Summary of Project-Related Construction Phase Impacts

	Potential Range of Project Effect		**Study Area Baseline Condition**	**Potential Range of Project Impact**	
	low	***high***		***low***	***high***
Employment (annual FTE)					
Construction Phase					
Direct	75				
Indirect	78				
Induced	38				
Total	191		59,980 [1]	0.3%	
Operations Phase					
Direct	11				
Indirect	22				
Induced	9				
Total	42		59,980 [1]	0.1%	
Population	102		84,618 [2]	0.1%	
Housing					
Single Family Units	0		24,190	0.0%	
Temporary Accommodation Units	77		2,656	2.9%	
Public School					
Students	0.0		13,752	0.0%	
Teachers	0.0		1,008	0.0%	
Fire Protection					
Career Personnel	0.1		202	0.1%	
Law Enforcement					
Officers	0.2	0.3	185	0.1%	0.1%
Index Crimes	2.2	4.9	3,652	0.1%	0.1%
Healthcare					
Physicians (FTE)	0.1	0.2	187	0.1%	0.1%
Emergency Room Visits	34.5	47.2	7,979	0.4%	0.6%
Solid Waste Generation (pounds per month)					
Non-Local Workers	5,131		20,573,333	0.0%	
Taxes					
Ad Valorem (Converse County)	$1,172,000		$131,882,811	0.9%	

[1] 2006

[2] 2007

Source: CH2M HILL, 2008.

5.4.1 Construction Workforce Estimate

Rule I Section 7(h)(i, ii and iii) – The estimated number of employees needed to complete the construction and operation of the facility by the applicant, its contractors, and subcontractors to include job classifications by calendar quarter. The estimate should also include:

(i) Seasonal fluctuations and the peak employment during both construction and operation;
(ii) Annual payroll; and
(iii) Expected benefits, if any, to be provided including housing allowances, transportation allowances, and per diem allowances.

Potential impacts to socioeconomic resources are, in the main, directly and indirectly attributable to (1) the influx of non-local workers and (2) expenditures made in the local economy for equipment, materials, and services required to both construct and operate the project. The estimated number of on-site construction workers by month is shown in Table 5-52 and Figure 5-54. Three Buttes anticipates that the Project on-site construction workforce will ramp up quickly from 20 workers in February of 2009 to 129 workers in the peak month (July of 2009). The on-site workforce will then decline gradually during the following 3 months after which it will decline rapidly to reach 9 in January of 2010. Road construction at the site would occur mainly during the period February through May of 2008 with construction of the WTG foundations mainly during May, June and July. The electrical collection system would be constructed over the period June through November and the WTGs would be erected mainly over the period June through October.

Associated with the Campbell Hill Wind Project, ancillary infrastructure would also be constructed. During the period February through July of 2009 a transmission line would be constructed to connect the wind project to the grid system and between May and August of 2009 a switchyard would be constructed. This activity is not considered a part of the Project for analytical purposes.

TABLE 5-52
Three Buttes Campbell Hill On-Site Construction Workforce Schedule

Month	Three Buttes Construction Support	Contractor Supervision	Road Construction	Foundation Construction	Electric Collection Construction	Erect WTGs	Install Substation	Install O&M Building	Laborers	Turbine Supplier On-site Personnel	Grand Total
Feb-09	0	0	20	0	0	0	0	0	0	0	20
Mar-09	2	6	20	0	0	0	0	0	3	0	30
Apr-09	3	8	20	1	0	0	0	0	5	0	37
May-09	3	12	15	13	6	9	0	0	7	2	67
Jun-09	5	12	6	15	12	39	11	12	9	6	127
Jul-09	5	12	5	12	12	45	12	9	9	8	129
Aug-09	5	12	5	9	12	45	15	0	9	10	122
Sep-09	5	12	5	8	15	45	13	0	9	8	120
Oct-09	5	12	5	3	16	45	7	0	9	8	110
Nov-09	5	9	5	0	11	12	0	0	6	8	56
Dec-09	4	5	5	0	8	0	0	0	3	6	32
Jan-10	2	3	3	0	0	0	0	0	2	0	9

Source: Three Buttes and CH2M HILL, 2008.

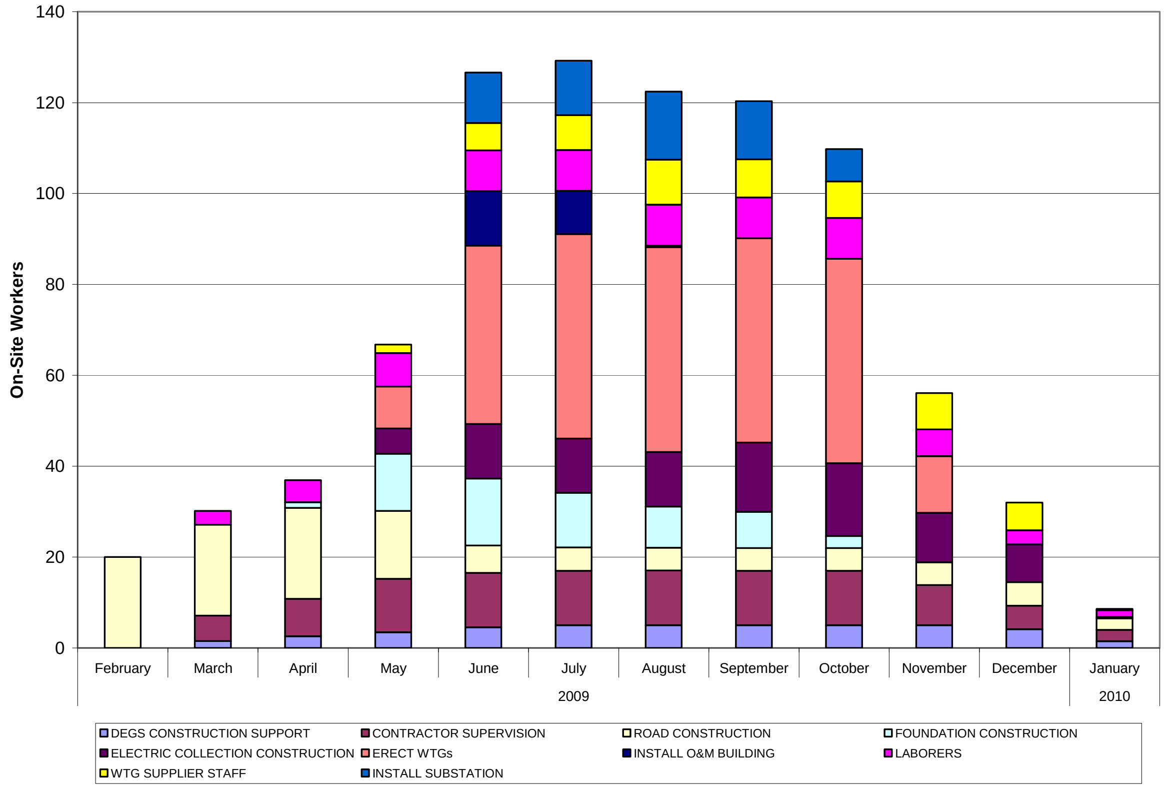

FIGURE 5-54
Construction Phase Workforce (by Month and Activity)

Three Buttes requires its balance of plant contractor to use local workers to the extent practicable, and the contractor will use the local workforce center to screen job applicants for skilled and unskilled labor. However, the results of the socioeconomic impact analysis indicate that there is a shortage of skilled crafts persons and specialized workers in the general study area. Therefore, it is anticipated that the majority of the skilled crafts workers will come from outside the area during the construction phase. The number of local on-site workers is likely to peak at about 28 during June of 2009 as can be seen from the information presented in Figure 5-55.

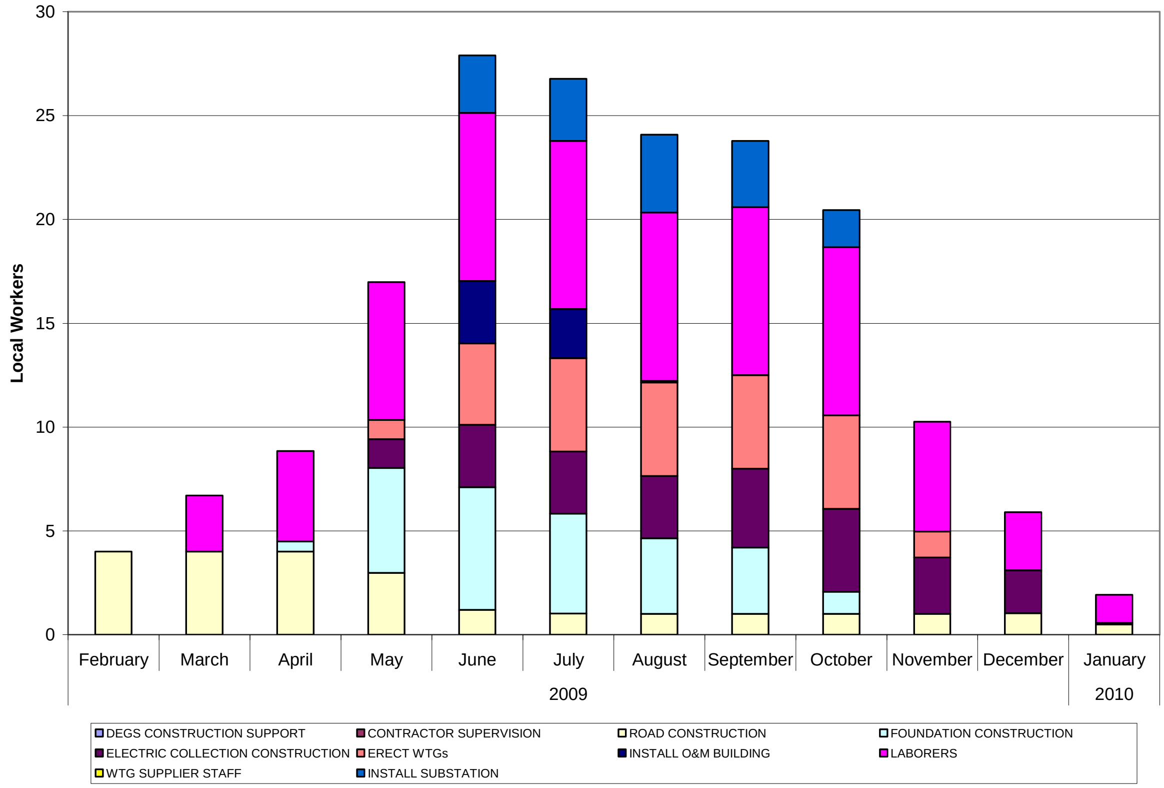

FIGURE 5-55
Local Construction Workforce (by Month and Activity)

5.4.1.1 Single Worker

Based on the type of labor required to complete construction contracts on the wind energy facility, a majority of the workforce is anticipated to be single and male. Because the large majority of the workforce will be relocating without families, Three Buttes has looked to secure motel/hotel rooms and apartments to provide temporary housing for this majority group.

5.4.1.2 Local to Non-local Workforce Ratio

It is assumed that the proportion of local workers filling job openings will vary by trade and skill level. Following are the proportions of local workers for each of the activities: 20 percent for road construction; 40 percent for foundation construction; 25 percent for electric collection construction; 10 percent for WTG tower erection; 25 percent for installation of the sub-station and O&M building; and 90 percent for laborers. No local workers are anticipated for other activities. On a month-to-month basis, the proportion of total on-site jobs held by workers from the local area would range between 18 and 25 percent.

The majority of the workforce would be comprised of non-local construction workers likely to enter the region and require temporary accommodations. This number would peak at 102 in the month of July, 2009 and would vary over the construction period as illustrated in Figure 5-56.

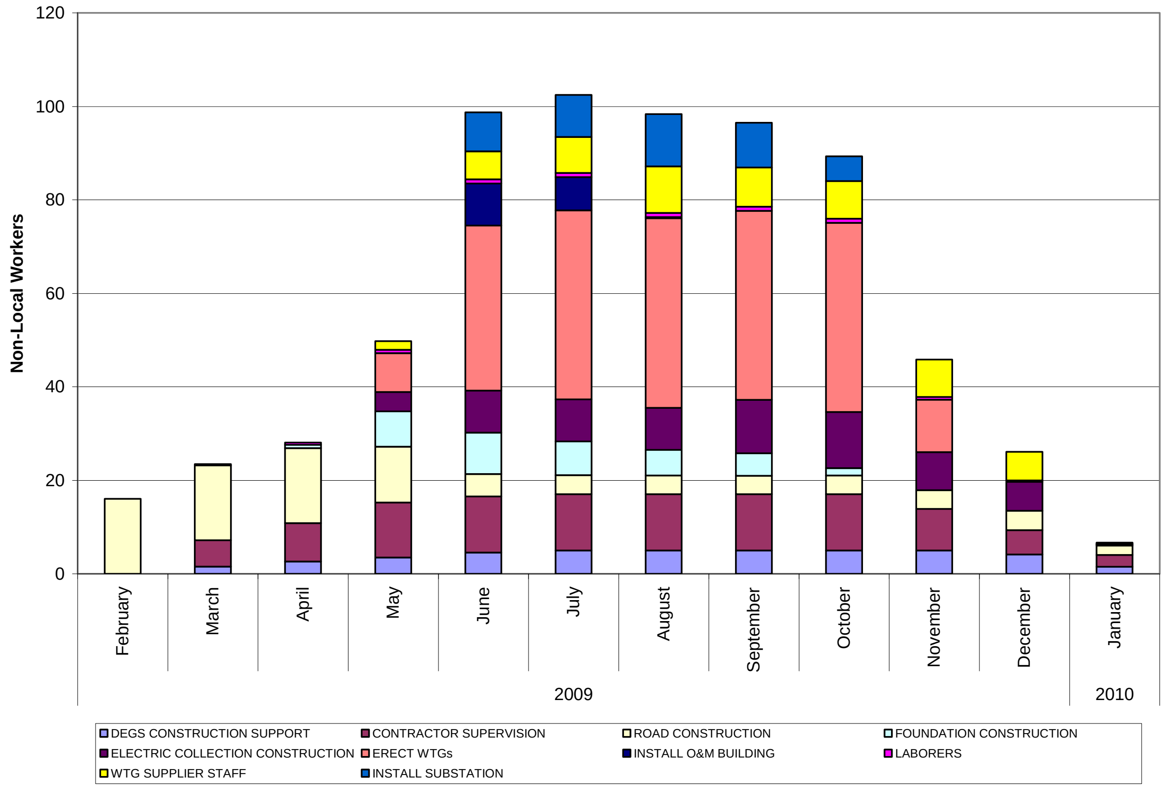

FIGURE 5-56
Non-Local Construction Workforce (by Month and Activity)

5.4.2 Regional Economic Analysis

The economic impacts to a local economy generated by the introduction of new business activity is based primarily on employee compensation, purchases made by the new business, and taxes paid to local governments. The more local businesses are able to supply the needs of the employees and the new business, the greater will be the local economic impact of the new business. Purchases made outside of the local area represent leakages of money out of the local economy. Profits of the new business also leak out of the local economy if the owners or stockholders reside outside the local area. In order to measure local economic impacts, this report focuses on projected wages and salaries, business purchases, and taxes collected by local municipal and county governments.

Economic multipliers are often used to estimate total economic impacts of a project or new business activity. The concept is that employee wages and business purchases have a “ripple effect” in an economy. The new business will purchase some of its required materials, supplies and services in the local economy and those local businesses will hire some new employees, creating what are known as indirect effects. Employees at the new

business or project will likewise spend a portion of their wages at local stores and businesses, creating what are termed induced effects. In this way the economic impact of the new business or project spreads in the local economy like a ripple spreads out across a pond. The portions of employee wages and business purchases that are made outside of the local economy result in leakages out of the local economy. In order to estimate the total economic impacts due to this ripple effect, economic multipliers are used in conjunction with the direct employment, wages, business purchases, and taxes paid. The direct impacts are multiplied by the economic multiplier to yield an estimate of the overall economic impact of the new business or project. Multipliers are generated by economic input-output (I-O) models that account for linkages between sectors in an economy.

I-O analysis estimates the dollar value of change in regional economic activity associated with economic linkages and leakages. The economic system, consisting of producers and consumers, is divided into various sectors that are defined in terms of the resources they require as inputs and what they produce as outputs. The quantities of inputs and outputs for a given period, usually expressed in monetary terms, are entered into an I-O matrix to enable one to analyze what happens within and across various sectors of an economy where growth and decline take place, as well as what effects various policies may have.

A number of regional economic analysis modeling systems (consisting of data and analytical software) are available for use in regional economic analysis. The approach used here for estimating the secondary effects of a project is through an I-O model. There are a number of such models including Impact Analysis for Planning (IMPLAN), Regional Economic Models Inc. (REMI), and Regional Industrial Multiplier System II (RIMS II). These modeling systems all contain computer databases used to create I-O models for any combination of United States counties. For this Project, IMPLAN was used to estimate the indirect and induced impacts associated with implementation of the Project.

5.4.2.1 Impact Analysis for Planning (IMPLAN) Model

IMPLAN was originally developed by the U.S. Forest Service in cooperation with the Federal Emergency Management Agency (FEMA) and the BLM to assist in land and resource management planning. The IMPLAN package includes: (1) estimates of final demands and final payments for counties developed from government data, (2) a national average matrix of technical coefficients, (3) mathematical tools that help the user build the I-O model, and (4) tools that allow the user to change data, conduct impact analysis, and generate reports.

5.4.2.2 Regional Economic Model

The region of influence (ROI) employed in the IMPLAN model is synonymous with the study area, i.e., Converse and Natrona counties, Wyoming. Thus, an IMPLAN I-O model was built for the region comprising these two counties and was used to evaluate the regional economic impacts resulting from the construction and operation of the proposed Project. Because the data in IMPLAN are for 2004 and the input estimates are in 2008 dollars, the model results were adjusted to reflect output in 2008. Thus, all estimates reported in this analysis are in 2008 dollars.

5.4.2.3 Project Construction and Operation Impacts

In addition to providing a stimulus to the local economy in the form of expenditures on materials and supplies (referred to as procurements), the proposed Project would employ construction workers. These construction workers are expected to spend much of their income (referred to as personal consumption expenditures or PCE) in the study area, thus stimulating additional output in the various sectors that provide consumer goods and services. As a result of both Project procurements and PCE by both local and non-local construction workers, the proposed Project is expected to result in a temporary increase in employment and income within the study area during the construction period.

A number of assumptions were used in the IMPLAN model and are addressed here. Expenditures made in the local economy by temporarily re-locating construction workers comprised the following categories: lodging; meals, and incidental expenses; entertainment and recreation; and transportation. For purposes of analysis, per diem amounts for lodging and meals and incidental expenses are those allowed under federal contracts: $85 and $43, respectively. In addition, it is assumed that daily expenditures for recreation and entertainment would total $50. The average daily round trip commute is estimated to be 51 miles. This is a weighted average based on a projected allocation of workers to surrounding places of residence: 88 percent of workers commuting from the Casper area, and 5 percent each from Douglas and Glenrock in Converse County. Commuter vehicle fuel consumption is assumed to be 15 miles per gallon (mpg) with a fuel price of $1.75 per gallon.

5.4.2.4 Direct Benefits

During the construction phase of the Project, it is anticipated that between 18 and 25 percent of the on-site workforce would be comprised of persons already residing in the local area. Over a 5-month period (June through October of 2009), the Project would employ between 20 and 30 local workers. During the operations phase of the Project, local jobs would number 11.

5.4.2.5 Secondary Benefits

Construction of the Project would result in secondary economic impacts (indirect and induced impacts) within the two-county study area. The Project is expected to result in annual indirect and induced employment within the study area of 78 and 38 jobs, respectively, over the 12-month construction period resulting in a short-term increase in total project-related employment of 224 jobs. These additional secondary jobs result from Project-related procurements in the study area as well as local and non-local construction workers PCE, the latter mostly on accommodations, food services, recreation, entertainment, and transportation. A summary of IMPLAN model output values is shown in Table 5-53.

TABLE 5-53
IMPLAN Model Output Values

	Construction Phase: 2009-2010	Operations Phase: 2010 Onwards
Employment (FTE):		
Direct	108	11
Indirect	78	22
Induced	38	9
TOTAL	224	42

Source: CH2M HILL, 2008.

Following completion of the Project, it is anticipated that annual operations and maintenance of the newly installed equipment would require 11 new positions. It is likely that these positions would be filled by local workers already resident in the study area. Much of the maintenance and repair activity would be performed by a local contractor at an annual cost of almost $1.5 million. It is anticipated that the contractor will hire local workers and source materials locally. Secondary employment effects would include the generation of 22 indirect jobs and 9 induced jobs for a total employment effect of 42 jobs within the study area as shown in Table 5-53.

5.4.2.6 Wage and Benefits for Construction and Operations

The Research and Planning section of the Wyoming Department of Employment, in cooperation with the Bureau of Labor Statistics (BLS), conducts an Occupational Employment Statistics (OES) Wage Survey. The OES program estimates occupational employment and wages. Data obtained from polled establishments are used to estimate occupational employment and wage rates for unemployment insurance (UI) covered wage and salary jobs in non-farm establishments. Wages for the OES Wage Survey include base pay rates, cost-of-living allowances, guaranteed pay, hazard pay, incentive pay, commissions, piece rates and production bonuses, length-of-service allowances, on-call pay, and portal-to-portal pay. The hourly wage estimates are calculated using a year-round, full time figure of 2,080 hours per year (52 weeks times 40 hours).

5.4.2.7 Employee Wage Estimates

Based on information compiled in the 2008 Wyoming Wage and Benefit Summary (Wyoming Department of Employment, 2008), hourly wages are presented for skilled labor categories that are expected to be present throughout the construction phase. Table 5-54 provides a breakdown of these hourly wages.

TABLE 5-54
Average Wages per Occupation Classification (in $US) Based on 2006 Occupational Employment Statistics Data

Occupation Classification	Mean Wage	Mean of Lower 1/3	Mean of Upper 2/3	25th Percentile	50th Percentile (median)	75th Percentile
Crane and Tower Operators	20.05	16.17	21.99	17.03	19.05	21.79
Excavating and Loading Machine and Dragline Operators	19.34	14.63	21.69	15.65	18.19	24.05
Industrial Truck and Tractor Operators	17.05	11.47	19.84	12.31	14.58	23.52
Cement Masons	14.59	11.20	16.28	12.14	14.65	16.81
Electricians	21.43	15.19	24.55	17.10	21.27	25.80
Operating Engineers and other Construction Equipment Operators	18.77	13.51	21.41	14.73	17.59	23.22
Structural Iron and Steel Workers	16.01	11.50	18.26	11.96	13.52	20.56
Mining and Geological Engineers	34.75	27.97	38.13	30.33	35.45	40.49
Construction Laborers	12.55	10.02	13.81	10.48	12.03	13.95
1st Line Supervisors/Managers of Construction Trades and Extraction Workers	27.01	17.43	31.81	19.31	24.16	32.61
Industrial Machinery Mechanics	21.45	14.92	24.72	16.74	20.38	26.29

Source: Wyoming DOE, 2007a.

A review of Table 5-54 shows that mean wages for the construction occupations in 2006 dollars ranged from a low of $12.55 per hour for construction laborers to a high of $34.75 for geological engineers. If the 2006 mean wages are extracted over a 2,080-hour work year, annual salaries without benefits would range from $26,100 to $72,300. It is important to note that hourly wage and benefit costs showed considerable variation across Wyoming industries and geographies in 2006. Therefore, these hourly labor wages are solely depicted to show what type of data were reported in the 2008 report and to prepare an estimate of salary for a full year of employment.

5.4.2.8 Project Employee Benefits Estimates

Table 5-55 provides a statewide assessment of relationships of compensation components for all industries, as well as the construction and trade/transportation/utilities sectors in Wyoming.

TABLE 5-55
Percentage of Full- and Part-Time Wyoming Employees Offered Selected Benefits by Industry, 2003-2006

	All Industries		Construction		Trade, Transportation, and Utilities	
	Full-Time Employees	**Part-Time Employees**	**Full-Time Employees**	**Part-Time Employees**	**Full-Time Employees**	**Part-Time Employees**
Child Care	6.0	1.6	5.7	0.2	4.8	0.0
Dental Plan	69.7	11.2	46.2	5.0	67.8	5.5
Dependent Health Insurance	74.9	11.0	55.8	2.7	74.9	5.5
Short-Term Disability	31.0	4.0	16.8	3.4	27.2	2.1
Educational/Tuition Assistance	47.6	20.7	22.4	10.5	34.5	10.3
Flexible Spending Account	47.5	18.8	17.6	1.7	43.6	11.1
Health Insurance	79.2	12.1	60.3	6.1	80.7	7.2
Hiring Bonus	22.5	7.7	5.0	0.7	33.8	8.4
Life Insurance	69.7	8.9	45.3	4.2	67.1	7.4
Long-Term Disability	44.1	6.0	13.2	1.8	34.8	0.7
Paid Holidays	77.7	26.4	52.1	10.0	82.2	24.4
Paid Personal Leave	38.3	13.5	28.5	1.2	36.0	7.7
Paid Sick Leave	47.0	17.5	18.8	0.0	38.8	4.1
Paid Vacation	76.0	21.8	60.9	4.8	74.3	12.5
Retirement Plan	77.8	30.8	56.9	6.4	76.4	19.2
Operate in Shifts	44.5	40.7	6.1	2.3	38.8	33.0
Shift Differentials	49.2	26.3	78.1	33.4	57.5	41.1
Vision Plan	44.3	6.8	22.8	1.4	43.7	4.5

Source: Wyoming Department of Labor, 2008.

According to the Wyoming Department of Employment benefits analysis, 86.3 percent of total compensation in 2006 was wages and salaries followed by insurance contributions (9.1 percent) and retirement plans (4.6 percent). Based on a review of Table 5-55, benefits paid to employees are expected to vary by contractor/subcontractor and status of full-time versus part-time positions.

5.4.3 Housing Impact Analysis

Rule I Section 7(iv) – An analysis of housing facilities by type, including a quantitative evaluation of the number of units in the area and a discussion of vacancy rates, costs, and rental rates of the units. The analysis should include geographic location, including a quantitative evaluation of the number of units in the area required by the construction and operation of the proposed industrial facility and a discussion of the effects of the proposed industrial facility on vacancy rates, costs, and rental rates of the units. Specific housing programs proposed by the applicant should be described in detail.

The construction phase of the Project would be relatively short and span only a 12-month period between February of 2009 and January of 2010. For purposes of this housing analysis, a number of assumptions are made regarding the proportion of workers likely to come from outside the study area. This proportion will vary with the type of activity as shown in Table 5-56. The proportion of non-local workers will vary over the construction period since the mix of labor categories or skills will vary. The percent of the total workforce comprised of non-local workers would vary between 75 and 82 percent on a monthly basis.

TABLE 5-56
Proportion Non-Local Construction Workers by Project Element

Labor Category	Percent of Non-Local Workers
Three Buttes Construction Management	100
Contractor Supervision	100
Road Construction	80
Foundation Construction	60
Electric Collection Construction	75
ERECT WTGS	90
Install Substation	75
Install Transmission Line	75
Install O&M Building	75
Laborers	10
WTG Supplier Staff	100

Source: Three Buttes, 2008.

5.4.3.1 Number of Units Required

Estimates of selected characteristics of the peak-month workforce are shown in Table 5-57. It is estimated that a total of 102 single non-local construction workers would relocate to the area of site influence. Non-local workers are not expected to be accompanied by family members and it is assumed that all workers would secure temporary housing accommodations for the duration of their involvement in the Project.

TABLE 5-57
Estimate of Local and Non-Local Construction Worker Breakdown During Peak Month

Peak Monthly Workforce	129
Local Workers	27
Non-Local Workers	102
Non-local Workers Bringing Families	0
Non-local Single Workers	102
Average Household Size	2.4
Estimated Number of Accompanying Family Members	0
Estimated Number of Children Relocating	0
Total Persons Re-locating at Peak (including families)	102
Housing Requirement:	
Permanent housing units	0
Temporary accommodation units	77

Source: CH2M HILL, 2007.

It is assumed that half of the single non-local workers will share temporary accommodation units (hotel/motel room, apartment, mobile home, or single-family rental house) with the remaining half occupying units singly. The aggregate demand by the non-local construction workers would total 77 units.

5.4.3.2 Construction Workforce Housing Plan

Rule I Section 7(xiii)(F) - Housing. Preliminary evaluations of or plans and proposals for alleviating social or economic environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and proposals shall cover housing.

Three Buttes is committed to making housing plan options available to the temporary construction workers employed during the Projects' period of construction from February 2009 until January 2010. Due to the variety of the housing options and locations within commuting distance of the site, the housing market analysis suggests that there will not be a housing shortage for the non-local work force. Three Buttes is also committed to assisting in the provision of transportation for workers from concentrated work force locations.

To accomplish a successful and implementable housing plan, Three Buttes conducted an extensive temporary housing market analysis of the area of site influence. Housing availability was determined by compiling a listing of temporary housing purveyors in the larger Casper urban area. Individual and follow-up phone calls and emails were conducted in the second half of 2008 to document a number of temporary housing options, variables, negotiated costs, and letters of commitment.

Based on the results of temporary housing market analysis, the Campbell Hill Windpower Project housing plan sought to obtain a variety of housing options at different lease terms

and price points for motels/hotel rooms and apartments. Three Buttes did not attempt to obtain commitments from providers of single-family residential home rentals. In addition, Three Buttes sought to obtain housing options for the peak non-local workforce estimate (as detailed in Section 5.4.1.2 and Table 5-57). Table 5-58 provides a breakdown of the housing options that have secured letters of intent, by location. **Appendix D** provides copies of the obtained letters of commitment to date.

TABLE 5-58
Campbell Hill Housing Plan Depicting Housing Options and Commitments by Location and Type

Housing Option*	Location	Units	Persons per Unit	Persons Accommodated
Hotel/Motel (Courtyard/Marriot)	Casper	40	2	80
Hotel/Motel (La Quinta)	Casper	15	2	30
Hotel/Motel (Shilo Inn)	Casper	15	2	30
Hotel/Motel (Quality Inn)	Casper	20	2	40
Hotel/Motel (Mainstay Suites)	Casper	20	2	40
Hotel/Motel (Comfort Inn)	Casper	20	2	40
Hotel/Motel (Best Western Ramkota)	Casper	15	4	30
Apartment (Casper Village Apartments)	Casper	18	2	36
Total		163		286

* All motel and apartment housing options are assumed to have double occupancy.

Source: Three Buttes, 2008.

The motel and hotel housing plan focused on securing contracts for a set number of beds to provide another proven temporary housing option at a daily rate. A primary tenet of the motel/hotel housing option was to find suitable properties that were at or near a subsistence rate of approximately $40 to $80 per day per bed. In developing the plan, Three Buttes contacted hotels and motels within the Casper urban area to determine availability and owner interest in providing accommodations for the non-local workforce. Viable motels were selected from those offering accommodations, based on an evaluation of quality and cleanliness, daily subsistence rates, and proximity to the construction site, and negotiations were entered by Three Buttes.

Three Buttes has also committed to provide furnished apartments, as needed to meet the main housing needs of the non-local construction tradesmen through the primary workforce peak. For the purposes of this application, a maximum occupancy of one construction worker per bedroom per apartment is assumed. Therefore, a four-bedroom apartment would house up to four construction workers.

5.4.3.3 Effects on Vacancies of Local Motel/Hotels, Recreational Vehicles and Apartments

The supply of temporary accommodations can include hotel and motel rooms, apartments, single-family rental housing units, mobile homes, and RV sites. Taking a conservative approach to estimating the potential supply of available temporary accommodations in the study area, a vacancy rate of 10 percent is assumed for hotel/motel rooms and RV sites. As shown in Table 5-59, it is estimated that there would be about 265 hotel/motel rooms available in Glenrock, Douglas, and Casper in addition to about 54 RV sites for a total of 254 temporary accommodation units. Using temporary housing close to the construction site, the potential supply of temporary accommodation units would be adequate to fulfill the demand.

TABLE 5-59
Potentially Available Hotel and RV Accommodations

City	County	No. of RV Sites	No. Available RV Sites	No. of Hotel Rooms	No. Available Hotel Rooms
Glenrock	Converse	50	5	21	2
Douglas	Converse	87	9	343	34
Casper	Natrona	402	40	2,292	229
TOTAL		**539**	**54**	**2,656**	**265**

Source: CH2M HILL, 2008.

The rental housing natural vacancy rate can vary from place to place and over time; however, a commonly referenced level is 5 percent. The natural vacancy rate can be thought of as the level of rental vacancies needed to accommodate normal turnover rates and search times for rental units in the market. The natural vacancy rate is always greater than zero because factors, such as imperfect information, cause tenants to spend time searching for new units and landlords to hold some units off the market for a period of time. Three Buttes has a commitment for 18 apartment units.

Given (1) the commitments given to Three Buttes regarding available hotel/motel rooms, (2) the commitment regarding apartment units, and (3) the likely availability of hotel/motel accommodations in Converse and Natrona counties, the likely demand for just over 80 accommodation units would be filled.

5.4.4 Public Safety

5.4.4.1 Law Enforcement

Based on a national LOS ratio of 2.3 full-time law enforcement officers per 1,000 residents, the addition of 102 persons to the study area at the peak construction month would have a negligible effect on the LOS provided by existing law enforcement personnel. With an index crime rate of 200 per 10,000 residents in Converse County and 475 per 10,000 residents in Natrona County, the addition of construction workers could account for an increase of between 2 and 5 crimes annually per 10,000 residents.

The proposed Project Site can be accessed from either of two directions via county road WYO 256 (Cole Creek Road). In Natrona County, WYO 256 commences at its intersection with US 20 about 3 miles east of Evansville and proceeds in a generally northeasterly direction providing access to the site after about 15 miles. The first 7-mile segment of this route is comprised of a surfaced, 2-lane road and the remaining 8-mile segment is improved, though unpaved. The roadway provides access to numerous small residential subdivisions located along adjacent unpaved roads, ranches, and oil field facilities. The residences are a mix of conventional stick-built homes, manufactured homes, and mobile homes typically sited on 5-acre lots. The most distant residences are 10 miles from the intersection with US 20 and 3 miles beyond the end of the paved section of highway. The entrance to the Project site is just over 2 miles inside Converse County. In Converse County, WYO 256 commences about 6 miles west of Glenrock and proceeds in a generally northwesterly direction to the Project site entrance after about 11 miles. The highway is unpaved along its entirety and in disrepair in places. The highway provides access to ranches and oil field facilities but there are no residential subdivisions in the area. It is the intention of Three Buttes during the construction and operations phases of the Project to gain access to the site via WYO 256 in Natrona County.

Access to the Project area by the Converse County Sherriff is currently provided via the designated Project access road from Natrona County and via private roads across the property of cooperating landowners. It is the understanding of Three Buttes at this time that enforcement capabilities cannot be provided by Natrona County due to jurisdictional limitations. However, adequate access for Converse County Sheriff personnel will be ensured by Three Buttes during the construction and operation period via WYO 256 (the primary access road in Natrona County). In this manner, potential impacts that could impair the health, safety, or welfare of Project personnel or residents of the area of primary effect would be avoided.

5.4.4.2 Fire Protection

The influx of a peak number of 102 residents associated with the construction phase of the Project would have negligible effect on the existing LOS provided by fire protection agencies.

Access to the Project area is currently provided via the designated Project access road from Natrona County and via private roads across the property of cooperating landowners. Response time via the Project access road will be substantially less for fire crews from Natrona County departing from the Casper area than for Converse County services departing from Glenrock. There is a well-established pattern of cooperation and mutual aid between the counties regarding fire protection services (personal conversations with Jeff Nelson, Glenrock Fire Chief, and Clyde Young, Natrona County Fire District Chief).

Fire emergencies will generally be initiated through 911 calls, alerting the appropriate fire/ambulance crews for dispatch. The Natrona County Fire District Rural Station No. 1 is located at the intersection of US 20/26 and WYO 256 (Cole Creek Road), approximately 15 miles from the Project area. The station houses a full-time, paid fire crew with a staff of 3 EMT-qualified firefighters on duty 24 hrs/day, 7 days/week. Natrona County Fire District Chief, Clyde Young, anticipates serving the fire prevention and response needs of the Project and coordinating with Three Buttes to ensure proper training is received for

addressing fire response issues unique to wind energy projects. The Glenrock Fire Department has a rural fire truck located approximately 6 miles from the Project entrance along Cole Creek Road to the south of the Project. Unsecured access to the Project from this direction is available for fire emergencies via private roads crossing the property of cooperating landowners. Glenrock Fire Department Chief, Jeff Nelson, anticipates serving the fire prevention and response needs of the Project in coordination with Natrona County, and expects to coordinate with Three Buttes to ensure proper training is received for addressing fire response issues unique to wind energy projects.

Due to the remote location of the Project and challenging response time for fire emergencies, it is likely that fire crews from both counties would respond in the cooperative manner typical of rural firefighting scenarios in the region, and the closest, most appropriate crews available at the time would arrive first to address potential fire emergencies. Three Buttes will proactively coordinate with fire departments from both counties to minimize fire safety hazards, coordinate response efforts, and effectively train Three Buttes and subcontracting personnel in fire safety issues.

5.4.5 Health Care and Emergency Medical Services

Converse and Natrona counties have an LOS of 1.38 and 1.67 physicians per 1,000 residents, respectively. For the purposes of this analysis, an estimate for the peak month non-local construction workforce 102 could be responsible for between 35 and 47 emergency room visits annually. This potential increase would have a negligible effect on the provision of physician services.

Access to the Project area is currently provided via the designated Project access road from Natrona County and via private roads across the property of cooperating landowners. Response time for emergency service providers via the Project access road will be substantially less for crews from Natrona County departing from the Casper area than for Converse County services departing from Glenrock. There is a well-established pattern of cooperation and mutual aid between the counties regarding emergency medical response services (personal conversations with Jeff Nelson, Glenrock Fire Chief, and Clyde Young, Natrona County Fire District Chief). Casper Medical Center’s Wyoming Life Flight has also confirmed that 911 calls originating in Converse County are routed to Natrona County when their helicopter service provides the closest and most appropriate response capability.

Currently, unsecured access to the Project area by the Glenrock Fire Department and Natrona County Emergency Medical Services is available via private road across the property of cooperating landowners. In this unique circumstance it is advisable that a formal Intergovernmental Agreement be recorded between the governing bodies of Converse and Natrona County to assure a viable long-term servicing of the Project.

Medical emergencies will be initiated through 911 calls alerting the EMS system. Calls to 911 from the Project area would be received by either the Converse County Sheriff or Natrona County Sherriff and police departments in Glenrock or Casper, respectively, and the appropriate fire/ambulance crews are paged for dispatch. Due to the remote location of the Project and slow overland response time, it is likely that 911 emergency medical incidents would be handled via helicopter service provided by the Wyoming Medical Center’s Life Flight which would transport patients to the Wyoming Medical Center in

Casper. In addition, 3 EMT qualified firefighters are on duty 24 hrs/day, 7 days/week at the Natrona County Fire District Rural Station No. 1 and available to serve the emergency medical needs of the Project via land access. This station is located at the intersection of US HWY 20 and Cole Creek Road, approximately 15 miles from the Project area along the designated access route to the Project.

Three Buttes will proactively coordinate with Wyoming Life Flight to ensure that landing zone requirements are met at all times during construction and operation of the Project for both daytime and nighttime response calls. Also, appropriate Three Buttes and contractor crews will be adequately trained in rescue techniques used while working in turbine tower and nacelle environments. The Wyoming Medical Center is a 205 bed, acute-care regional hospital located in Casper approximately 20 miles from the Project area. This facility would be the most likely provider of both emergency and routine hospital services to the workforce.

All construction and operations personnel working on the turbines will be deployed in pairs. All turbine maintenance staff will be trained in the lowering of injured colleagues to prepare for the possibility of an injury while working in the wind turbine that prevents a worker from climbing down the tower safely. A rescue basket, especially designed for this purpose, will be kept at the operations and maintenance facility and will be available for use by local emergency medical services. Training in its use will also be provided to local EMS and Wyoming Life Flight rescue team personnel.

5.4.6 Municipal Services

It is expected that non-local construction workers would reside in hotel/motels and RVs located at established sites and apartments in the existing housing stock of the area of site influence. The addition of 102 peak-month residents would not increase the number of accommodation units in the area of site influence. The additional temporary population could increase the demand for municipal services such as water, wastewater, and solid waste. However, such a modest increase for this short duration would have negligible effects on the provision of these services.

5.4.6.1 Solid Waste

The EPA publishes information on the generation and disposal of waste in the United States. Total municipal solid waste generation in the U.S. in 2006 was 251 million tons (EPA, 2007b); however, 82 million tons of the materials were recycled, i.e., 32.5 percent. Organic materials were the largest component of the municipal solid waste: specifically, paper and paperboard products accounted for 34 percent, with yard trimmings and food scraps accounting for 12.9 and 12.4 percent, respectively (EPA, 2007b). Plastics comprised 12 percent; metals made up 8 percent; and rubber, leather, and textiles accounted for 7 percent. Wood waste accounted for 6 percent, glass 5 percent, and other miscellaneous wastes made up approximately 3 percent. Based on this information, an average of 4.6 pounds of municipal waste were generated per person per day and 1.5 pounds of individual waste generation were recycled nation-wide in 2006 (EPA, 2007b).

Municipal Solid Waste Materials. For the purposes of this analysis, we assume that workers will be onsite 10 hours a day and seven days a week, and that there will be no yard trimmings or recycling. To calculate potential personal waste volumes generated by the

on-site workforce, the 4.6 pounds of waste per person per day was prorated by dividing the construction person daily hours onsite and multiplying by the average daily waste volume (minus the 12.9 percent attributable to yard trimmings). The resulting assumption is that each non-local construction employee will generate approximately 1.6 pounds of waste per person per day. However, due to the lack of yard waste and other durable and non-durable wastes generated on a daily basis, the 1.6 pounds per person per day likely represents a significant overestimation. In addition, if recycling of plastic and aluminum is implemented, the pounds per day of waste generation would be further reduced.

Based on the 1.6 pounds per person per day of waste generation, at the peak non-local worker employment of 102 onsite workers, the average daily waste volume would be approximately 170 pounds per day. Therefore, during the peak construction month of July, approximately 5,100 pounds of non-compacted municipal solid waste could be generated.

Construction Waste Materials. Construction solid waste materials (e.g., excess construction materials) would be generated during the construction period. Construction wastes primarily would consist of packaging material associated with each WTG. Other potential wastes may include erosion control materials, such as straw bales and silt fencing, and scrap steel. When feasible, these construction wastes will be recycled. Steel scrap will be separated and recycled to the extent feasible. Wood from concrete forms will be reused when possible and then recycled. Estimates of the types and quantities of waste materials generated during the construction period are presented in Table 5-60.

TABLE 5-60
Description of Estimated Construction Waste Materials for Each Wind Turbine Generator

Component	Description	Dimensions	Estimated Volume	Uncompacted Loose Refuse Conversion* (300 – 600 pounds / cubic yard*) in pounds
Down Town Assembly (DTA) Components	Electrical Simplification System (ESS) cabinet will be in a wooden plywood crate with pallet bottom.	8’ x 3.5’ x 8.3”	8.6 cubic yards (if not compacted)	3,870
	ESS cabinet will be wrapped in a Vapor Corrosion Inhibitor (VCI) bag.	8’ x 4’ x 8.2’ ~ .004” thick	9.7 cubic yards (if not compacted)	4,365
	ESS cabinet exhaust fan in a wooden plywood crate with pallet bottom.	2.8’ x 2.7’ x 1.4’	0.40 cubic yards (if not compacted)	180
	ESS platform may be in a wooden plywood crate with pallet bottom.	8’ x 8’ x 2.5’	5.9 cubic yards (if not compacted)	2,655
Towers Sections (Base, Mid, Top)	Each tower section will have tarps on each end. The tarps are handled as “shipping fixtures” and are returned to suppliers.	N/A	No solid waste. Shipping fixtures are returned to suppliers.	N/A
Machine Head	Shipping fixture to be returned to factory.	N/A	No solid waste	N/A
Hub	Hubs are shipped with shrink wrap	0.5 cubic yard when removed.	0.5 cubic yard	225

TABLE 5-60
Description of Estimated Construction Waste Materials for Each Wind Turbine Generator

Component	Description	Dimensions	Estimated Volume	Uncompacted Loose Refuse Conversion* (300 – 600 pounds / cubic yard*) in pounds
Blades	Shipping fixtures to be returned to factory.	N/A	No solid waste	N/A
Parts Shipped Loose	Parts ship loose includes bus bar kits, bolts, etc. In addition, there will be smaller cardboard boxes, plastic wrap and miscellaneous packaging materials on smaller items.	Bolts are in wooden crates 3' x 3' x 2'	0.75 cubic yard (if not compacted).	338

* Assumes average of 450 pounds for calculation conversion (300 + 600 / 2 = 450)

Source: EPA, 2008.

Portable toilets will be provided for onsite sewage handling during construction and will be pumped and cleaned regularly by the construction contractor. No other wastewater will be generated during construction. Lastly, any quantities of solid waste materials generated by activities at the Project site will be disposed of in an appropriate manner at suitable disposal sites.

5.4.6.2 Hazardous Wastes

Any hazardous materials will be used in a manner that is protective of human health and the environment, will comply with all applicable local, state, and federal laws and regulations, and be disposed of in appropriate, licensed facilities. Accidental releases of hazardous materials (e.g., vehicle fuel during construction) will be prevented or minimized through proper containment of these substances during use and transportation to the site. Any oily waste, rags, or dirty or hazardous solid waste will be collected in sealable drums and removed for recycling or disposal by a licensed contractor.

In the unlikely event of an accidental hazardous materials release, any spill or release will be cleaned up and the contaminated soil or other materials disposed of and treated according to applicable regulations. Spill kits, containing items such as absorbent pads, will be located on equipment and in temporary storage facilities onsite to respond to accidental spills, if any were to occur. Employees handling hazardous materials will be instructed in the proper handling and storage of these materials as well as where spill kits are located. The balance of plant general contractor will be responsible for obtaining approval of a spill-prevention and counter-measures control plan.

5.4.7 Transportation

In order to assess the potential traffic impacts associated with the Project, existing and future traffic conditions were analyzed both with and without the Project for three time periods: existing (2008), construction (2009), and operations (2010). The Institute of Transportation Engineers' Trip Generation Manual, the Federal Highway Administration's

Highway Capacity Manual, and the WYDOT planning department were used as resources for this analysis.

The operating conditions, or LOS, provided by the highways and the intersections were assessed using Highway Capacity Manual multi-lane highway (US 20/26/87), two-lane highway (WYO 253, 256, 258), and unsignalized intersection methodologies. LOS is a term used to qualitatively describe operating conditions in a traffic stream and motorists' perceptions of those conditions. Six LOS classifications are given a letter designation from A to F, with A representing the best operating conditions and F the worst. LOS D is typically considered desirable for peak hour operations.

For two-lane highways, LOS is defined in terms of average travel speed and percent time spent following another vehicle. For un-signalized intersections, LOS is defined in terms of average delay per vehicle for the stop-controlled movements. The method incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side street stop-controlled intersections, delay is typically represented in seconds for each movement from the minor approaches and the left turns from the major street.

5.4.7.1 Existing Peak-Hour Levels of Service

Volumes and roadway / intersection geometries are inputs to the analysis methodologies. WYDOT provided 2007 and 2017 average daily traffic volumes and truck percentages for the highways. An annual growth factor was calculated from these two volumes and applied to the 2007 volumes to determine the 2008 existing volumes. The directional distribution is assumed to be a 60 / 40 split per the Highway Capacity Manual default value. Per WYDOT, the peak hour is estimated to be ten percent of the daily volume for US 20/26/87 and WYO 253/258, and 5 percent of the daily volume for WYO 256. Based on this assumption, the peak hour volume on the highways will be the same for both the morning and evening peak hour. Therefore, one peak hour is analyzed.

WYDOT also provided peak hour turning movement counts for three of the four legs of the US 20/26/87 intersections with WYO 253/256 and WYO 258. The counts for the fourth legs were estimated based on the known volumes on the three legs for both of these intersections. In addition, WYDOT provided daily turning movement counts at the US 20/26/87 intersection with WYO 95. Table 5-61 shows the existing highway and intersection volumes and corresponding LOS. The intersection LOS is shown for both morning and evening peak hours.

TABLE 5-61
Existing Peak Hour Operating Conditions (Year 2008)

Facility Highways	Average Daily Volume	Peak Hour Volume	Percent Trucks	Peak Hour LOS
US 20/26/87	5430	540	12	A (West of Glenrock)
US 20/26/87	1420	142	3	A (East of Glenrock)
WYO 253	6310	630	10	C
WYO 256	3040	150	5	B
WYO 258	12,703	1270	4	D

TABLE 5-61
Existing Peak Hour Operating Conditions (Year 2008)

Facility Highways	Average Daily Volume	Peak Hour Volume	Percent Trucks	Peak Hour LOS
Intersections				
US 20/26/87 and WYO 253/256				
Eastbound Left	N/A	5/5	12	A/A
Westbound Left		130/60	12	A/A
Northbound Left		10/170	10	C/C
Northbound Thru/Right		240/210	10	B/B
Southbound Left		5/5	5	C/B
Southbound Thru/Right		85/55	5	C/B
US 20/26/87 and WYO 258				
Eastbound Left	N/A	16/43	12	A/A
Westbound Left		150/185	12	A/A
Northbound Left		40/40	4	C/C
Northbound Thru/Right		207/223	4	B/B
Southbound Left		5/30	2	B/C
Southbound Thru/Right		80/80	2	B/B
US 20/26/87 and WYO 95				
Eastbound Left	N/A	19/19	12	A/A
Southbound Left		37/37	3	B/B
Southbound Right		20/20	3	A/A

Source: CH2M HILL, 2008.

All of the facilities operate at desirable levels of service during the peak hours. On US 20/26/87 and WYO 256, the average travel speed is relatively high and the percent time spent following another vehicle correspondingly low. On WYO 253 and WYO 258, the LOS is acceptable although the travel speeds are slower and the percent time spent following another vehicle is higher. At the WYO 253/ WYO 256 intersection, the cross street movements experience average delays of eleven to eighteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. At the WYO 258 intersection, the cross street movements experience average delays of ten to nineteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. At the US 20/26/87 and WYO 95 intersection, the average delay for the turn movements is less than eleven seconds. Hence, there were no roadways or intersections identified in the vicinity of the project that are presently over capacity.

5.4.7.2 Construction Period Peak Hour Levels of Service

The potentially affected highways and intersections were analyzed with and without the project to determine impacts to the facilities due to the construction project. The construction will take place in the year 2009.

Background Analysis. The highway volumes were grown by the same annual growth rate to obtain 2009 background volumes. It is assumed the truck percentage does not grow. Table 5-62 shows the 2009 background highway and intersection volumes and corresponding LOS. The intersection LOS is shown for both morning and evening peak hours.

TABLE 5-62
Construction Period Peak Hour Background Operating Conditions (Year 2009)

Facility Highways	Average Daily Volume	Peak Hour Volume	Percent Trucks	Peak Hour LOS
US 20/26/87	5,560	560	12	A (West of Glenrock)
US 20/26/87	1,452	145	3	A (East of Glenrock)
WYO 253	6,420	640	10	C
WYO 256	3,090	155	5	B
WYO 258	12,818	1,282	4	D
Intersections				
US 20/26/87 and WYO 253/256				
Eastbound Left	N/A	6/6	12	A/A
Westbound Left		133/62	12	A/A
Northbound Left		12/173	10	C/C
Northbound Thru/Right		244/213	10	B/B
Southbound Left		6/6	5	C/B
Southbound Thru/Right		88/57	5	C/B
US 20/26/87 and WYO 258				
Eastbound Left	N/A	17/44	12	A/A
Westbound Left		151/187	12	A/A
Northbound Left		41/41	4	C/C
Northbound Thru/Right		210/226	4	B/B
Southbound Left		6/31	2	B/C
Southbound Thru/Right		82/82	2	B/B
US 20/26/87 and WYO 95				
Eastbound Left	N/A	20/20	12	A/A
Southbound Left		38/38	3	B/B
Southbound Right		21/21	3	A/A

Source: CH2M HILL, 2008.

All of the facilities operate at desirable levels of service during the peak hours. On US 20/26/87 and WYO 256, the average travel speed is relatively high and the percent time spent following another vehicle correspondingly low. On WYO 253 and WYO 258, the LOS is acceptable although the travel speeds are slower and the percent time spent following

another vehicle is higher. At the WYO 253/ WYO 256 intersection, the minor cross street movements experience average delays of eleven to eighteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. At the WYO 258 intersection, the cross street movements experience average delays of ten to nineteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. At the US 20/26/87 and WYO 95 intersection, the average delay for the turn movements is less than eleven seconds. With very little volume growth over the one year from 2008, there is little change in operating conditions.

Total Analysis. Adding the site generated traffic to the background traffic yields the volumes for the analysis of the construction period with the project. The trip generation and distribution process used the following assumptions to calculate the additional highway and turn movement volumes due to the construction project:

- Construction will occur in one shift during the day.
- The workers all arrive in the morning peak hour and depart in the evening peak hour.
- Personnel will not leave the site during the shift.
- The average vehicle occupancy is 1.3 people per vehicle.
- All truck trips access US 20/26/86 from I-25 at Exits 160 or 185.

These assumptions result in the estimation of 26 additional cars and 1 truck traveling to the US 20/26/87 and WYO 253/256 intersection from the west and 7 cars and 4 trucks from the east per peak hour. An additional 66 cars travel WYO 253 per peak hour to the intersection with US 20/26/87. From this intersection, a total of 99 additional cars and 5 trucks travel on WYO 256 to access the project site in each peak hour.

Table 5-63 shows the 2009 total highway and intersection volumes and corresponding LOS. The truck percentage increases because the highways experience truck travel generated by the construction project. In some cases, the truck percentage varies between the morning and evening peak hours because of the varying background volumes between the two peak hours. The intersections LOS are shown for both morning and evening peak hours.

All of the facilities operate at desirable levels of service during the peak hours. On US 20/26/87 and WYO 256, the average travel speed is relatively high and the percent time spent following another vehicle correspondingly low. On WYO 253 and WYO 258, the LOS is acceptable although the travel speeds are slower and the percent time spent following another vehicle is higher. At the WYO 253/ WYO 256 intersection, the cross street movements experience average delays of fifteen to twenty-four seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. At the WYO 258 intersection, the cross street movements experience average delays of ten to eighteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. At the US 20/26/87 and WYO 95 intersection, the average delay for the turn movements is less than eleven seconds.

TABLE 5-63
Construction Period Peak Hour Total Operating Conditions (Year 2009)

Facility Highways	Average Daily Volume	Peak Hour Volume	Percent Trucks	Peak Hour LOS
US 20/26/87	5,632	588	12	A (West of Glenrock)
US 20/26/87	1,544	159	8	A (East of Glenrock)
WYO 253	6,552	706	9	D
WYO 256	3,388	264	7	B
WYO 258	12,838	1,284	4	D
Intersections				
US 20/26/87 and WYO 253/256				
Eastbound Left	N/A	32/7	6/29	A/A
Westbound Left		133/61	12	A/A
Northbound Left		12/173	10	C/C
Northbound Thru/Right		310/214	7/10	C/B
Southbound Left		10/17	50/59	C/C
Southbound Thru/Right		88/149	6/3	C/C
US 20/26/87 and WYO 258				
Eastbound Left	N/A	17/44	12	A/A
Westbound Left		154/190	12	A/A
Northbound Left		41/41	4	C/C
Northbound Thru/Right		212/227	4	B/B
Southbound Left		6/3	2	B/C
Southbound Thru/Right		82/82	2	B/B
US 20/26/87 and WYO 95				
Eastbound Left	N/A	20/22	12	A/A
Southbound Left		38/38	3	B/B
Southbound Right		23/21	3	A/A

Source: CH2M HILL, 2008.

The only intersection movements that experienced a decrease in LOS due to construction traffic are the southbound movements on WYO 253/256 at the US 20/26/87 intersection. These stop-controlled movement volumes and truck percentages increased because of the traffic generated by the construction. The slight increase in average delay only caused one letter decrease in LOS designation from B to C. The additional cars traveling on WYO 253 generated by the construction project decreased the travel speeds and increased the percent time spent following enough to decrease the LOS designation by one letter from C to D on this highway between I-25 and US 20/26/87. However, these lower LOS ratios

will only last a few months and will still provide acceptable operations during the construction period.

5.4.7.3 Operations Period Peak Hour Levels of Service

The potentially affected highways and intersections were analyzed with and without the project to determine impacts to the facilities due to the operations of the project once construction is complete. The WYO 95 and WYO 258 intersections with US 20/26/87 are not included in this analysis because it is not an access route for the operations personnel. Likewise, US 20/26/87 east of the WYO 256 intersection is not used for truck or personnel access to the site. The operations will begin in 2010, so the analysis year is 2010.

Background Analysis. The highway volumes were grown by the same annual growth rate to obtain 2010 background volumes. It is assumed the truck percentage does not grow. Table 5-64 shows the 2010 background highway and intersection volumes and corresponding LOS. The intersection LOS is shown for both morning and evening peak hours.

TABLE 5-64
Operations Period Peak Hour Background Operating Conditions (Year 2010)

Facility Highways	Average Daily Volume	Peak Hour Volume	Percent Trucks	Peak Hour LOS
Highways				
US 20/26/87	5,680	570	12	A (West of Glenrock)
WYO 253	6,530	650	10	C
WYO 256	3,150	160	5	B
Intersection				
US 20/26/87 and WYO 253/256				
Eastbound Left	N/A	7/7	12	A/A
Westbound Left		136/62	12	A/A
Northbound Left		15/176	10	C/C
Northbound Thru/Right		248/216	10	B/B
Southbound Left		7/7	5	C/B
Southbound Thru/Right		89/59	5	C/B

Source: CH2M HILL, 2008.

The facilities operate at desirable levels of service during the peak hours. On US 20/26/87 and WYO 256, the average travel speed is relatively high and the percent time spent following another vehicle correspondingly low. On WYO 253, the LOS is acceptable although the travel speeds are slower and the percent time spent following another vehicle is higher. At the intersection, the cross street movements experience average delays of eleven to eighteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. The LOS is similar to the

existing and construction background conditions because of the minimal volume growth over the two-year period.

Total Analysis. Adding the site generated traffic to the background traffic yields the volumes for the analysis of the operations period with the project. The trip generation and distribution process used the following assumptions to calculate the additional highway and turn movement volumes due to the operation of the project:

- Work force will operate in one daily shift.
- All personnel will travel in their own vehicles to the project site.
- Personnel will not leave the site during the shift.
- One truck delivery, or two truck trips, per peak hour access the site from Casper.

These assumptions result in the estimation of 8 additional cars and 1 truck traveling on I-25 to the US 20/26/87 and WYO 256 intersection from the west per peak hour. An additional three cars travel on US 20/26/87 from the west to its intersection with WYO 256. From this intersection, a total of 11 additional cars and 1 truck travel on WYO 256 and Cole Creek Road to access the project site per peak hour.

Table 5-65 shows the 2010 total highway and intersection volumes and corresponding LOS. The intersection LOS is shown for both morning and evening peak hours. With the additional truck delivery trips, the percent truck on WYO 256 increased from five percent to six percent; however, these additional truck trips were not enough to increase the truck percentage on WYO 253.

TABLE 5-65
Operations Period Peak Hour Total Operating Conditions (Year 2010)

Facility Highways	Average Daily Volume	Peak Hour Volume	Percent Trucks	Peak Hour LOS
US 20/26/87	5,686	573	12	A (West of Glenrock)
WYO 253	6,550	660	10	C
WYO 256	3,176	173	6	B
Intersections				
US 20/26/87 and WYO 253/256				
Eastbound Left	N/A	10/7	10	A/A
Westbound Left		136/62	12	A/A
Northbound Left		15/176	10	C/C
Northbound Thru/Right		257/217	10	B/B
Southbound Left		7/7	5	C/B
Southbound Thru/Right		90/71	6	C/B

Source: CH2M HILL, 2008.

The facilities operate at desirable levels of service during the peak hours. On US 20/26/87 and WYO 256, the average travel speed is relatively high and the percent time spent following another vehicle correspondingly low. On WYO 253, the LOS is acceptable although the travel speeds are slower and the percent time spent following another vehicle is higher. At the intersection, the cross street movements experience average delays of eleven to eighteen seconds per vehicle whereas the left turn movements from US 20/26/87 experience average delays of less than ten seconds. The additional volume generated by the project operations does not decrease the LOS nor degrade the operational performance of the adjacent roadway facilities.

Conclusion. The additional vehicle and truck trips generated by the construction of the project will have a minimal impact on the operations of the adjacent roadway network. Some of the facilities will experience a temporary decrease in LOS during the peak construction period. However, the resultant increased travel times will not be a permanent condition. The facilities all operate at acceptable levels of service even with these increased travel times and intersection delays. Once the construction peak is over, the facilities will operate at desirable levels of service as they do currently. Thus, no roadway capacity improvements are recommended for the US 20/26/87, WYO 253, WYO 256, and WYO 258 highways. Correspondingly, no roadway improvements are recommended for the US 20/26/87 intersections with WYO 95, WYO 253/WYO 256, or WYO 258.

A Burlington Northern Santa Fe (BNSF) rail crossing intersects the primary project access route near the intersection of US 20/26/87 and WYO 253/256. All Project related traffic must cross the railway to access and depart the Project area. Three Buttes met with Tim Axt, BNSF Road Foreman, via telephone on December 16, 2008 to coordinate Project delivery and workforce schedules with the train crossing schedule at this intersection. The purpose of the conversation was to discuss coordinating train and traffic schedules during construction and operation of the Project to ensure safe crossing and to prevent disruption to vehicular and train traffic during the construction and operation of the Project. Mr. Axt explained that the BNSF crossing at this particular site is random and unscheduled, and requested notification of the delivery schedules for oversized loads, or any unique deliveries that could potentially disrupt train or road traffic and require flagging service. Three Buttes will provide BNSF with the preliminary schedule of deliveries for this railway and road intersection and will notify BNSF of any changes to the proposed schedule.

5.4.8 Taxes

Rule I Section (7)(vii) – A fiscal analysis over the projection period for all local governments and special districts identified by the applicant as primarily affected by the proposed industrial facility, including revenue structure, expenditure levels, mill levies, services provided through public financing, and the problems in providing public services.

The benefits related to the Project from a tax perspective would occur based primarily on the *ad valorem* taxes that would be collected over the life of the Project. In addition, in conjunction with associated ancillary activities, as discussed below, state and local tax revenues would be generated during construction and operation of the proposed facility. Although some of these tax revenues will be distributed on a local level, the state controls such distribution.

5.4.8.1 *Ad Valorem* Taxes

Rule I Section (7)(vii)(B) – An estimate of the cost of components of the industrial facility, which will be included in the assessed value of the industrial facility for purposes of ad valorem taxes for both the construction and operations periods. This estimate should include a breakdown by county if the components of the industrial facility will be located in more than one county.

Ad valorem taxes support a variety of county and municipal operations including airports, fire protection, hospitals, libraries, museums, public health, recreational systems, special districts, and education. Assessed property values are the basis for *ad valorem* taxes. Property values related to the Project are determined annually on a centralized basis by the State Department of Revenue (the Department).

It is the Department's role to estimate the fair market value (FMV) of the improved facility, which includes the value of the land and improvements. It is the owner's responsibility to provide the Department with all necessary information enabling them to make this determination. Developments are taxable prior to their completion and operation, especially in the case of multi-year construction schedules. Under such circumstances, the owner provides the Department with cumulative construction costs that are then incorporated into their appraisal.

After the Department determines the FMV of the industrial development, the assessed value is stated as 11.5 percent of this value. The assessed value is then allocated to the county within which the Project is located which then applies the property tax levy (for the tax district within which each Project is located) to calculate the annual property taxes due.

The proposed site is located in rural Converse County where the 2007 tax levy is 67.28 mills. Thus for every $1,000 of assessed value of real property (land and improvements), Converse County will levy property taxes of $67.28 annually. The property tax revenues received by the county are distributed across a number of taxing entities as shown in Table 5-66 with the majority supporting public education.

TABLE 5-66
Tax Levy Distribution for Rural Glenrock, Converse County

Taxing Entity	Percent of Mileage
State School	12.000
County School	6.000
County General	8.000
County Airport	0.177
County Library	1.199
Hospital	2.184
Health Department	0.294
Parks and Recreation	0.146
Weed and Pest	0.952
Soil Conservation	0.259

TABLE 5-66
Tax Levy Distribution for Rural Glenrock, Converse County

Taxing Entity	Percent of Mileage
Special School	25.000
Co-op Ed	0.500
School Recreation	1.000
Glenrock Solid Waste	2.750
School District # 2 Bond	1.862
School District # 2 Bond Interest	0.237
Glenrock Hospital	3.000
Glenrock Cemetery	1.720
TOTAL LEVIES	67.280

Source: Converse County Deputy Assessor, 2008.

It is estimated that property taxes of approximately $1.2 million would be payable to Converse County in the first year of the project as shown in Table 5-67. For the period 2009 through 2013, the estimated total *ad valorem* tax revenue generated would be approximately $5.7 million, as shown in Table 5-68.

TABLE 5-67
Estimate of *Ad Valorem* Taxes

	Estimation of Assessed Value					Applicable Tax Rates		
County	Capital Investment[1]	Market to Book Ratio[2]	Estimated Fair Market Value (FMV)	Assessment Ratio[3]	Estimated Assessed Value	Tax District #	2007 Tax Levy[4]	Estimated Property Tax
Converse	$192 million	80.0%	$153.6 million	11.5%	$17.7 million	0201	67.280	$ 1,189,000

[1] Level of capital investment reflected in each project's executive summary.
[2] Ratio of the fair market value to net book value.
[3] Statutory assessment ratio applicable to industrial operating property.
[4] 2007 mill levy for the listed taxing district.
Source: CH2M HILL, 2008.

TABLE 5-68
Estimate of *Ad Valorem* Taxes Paid Per Year

2009*	2010	2011**	2012	2013	5-Year Total
$1,177,241	$1,189,132	$1,141,567	$1,095,904	$1,052,068	$5,655,913

* It is estimated that construction will be 99 percent complete in 2009.

** Reduced 4 percent annually

Source: CH2M HILL, 2008.

5.4.8.2 Sales, Use, and Lodging Taxes

Rule I Section 7(vii)(A) – An estimate of the cost of the industrial facility subject to sales and use taxes and expected payments by quarter for the construction period. This estimate should include a breakdown by county if the components of the industrial facility will be located in more than one county.

The State of Wyoming levies a state sales tax of 4 percent on a wide array of goods and services purchased within the state. The use tax is a companion to the sales tax and is imposed upon goods purchased tax-free outside Wyoming for use in Wyoming. Collected taxes are shared between the state (69 percent) and counties (31 percent). Counties can levy additional sales and use taxes: general purpose option tax of 1 percent, specific purpose option tax of 1 percent, and lodging tax of up to 4 percent on hotel and motel room charges.

Subparagraph 39-15-105-(viii)-(N) of the State of Wyoming statutes addresses activities that are exempt from state and local sales and use taxes. The section addresses the sale of equipment used to generate electricity from renewable resources. Renewable resources are defined to include wind generation, solar, biomass, landfill gas, hydro, hydrogen, and geothermal energy. The exemption provided by this subparagraph is limited to the acquisition of equipment used in a project to make it operational up to the point of interconnection with an existing transmission grid including WTGs, generating equipment, control and monitoring systems, power lines, substation equipment, lighting, fencing, pipes, and other equipment for locating power lines and poles. The exemption shall not apply to tools and other equipment used in construction of a new facility, contracted services required for construction, and routine maintenance activities and equipment used or acquired after the project is operational. Based on the above, Project-related expenditures prior to commercial operation are not expected to result in sales and use taxes for either Project.

Local tax revenues would, however, accrue from the sale of goods and services to non-local workers. It is possible that tax revenues totaling almost $85,000 over the construction period would accrue to Converse and Natrona counties combined. The sources of these potential tax revenues are shown in Table 5-69. These estimates are based on the assumption that expenditures by non-local workers are distributed between Converse and Natrona counties in the following proportions: 11 percent and 89 percent, respectively.

TABLE 5-69
Estimate of Tax Revenues Accruing to Local Governments from Non-Local Worker Expenditures

	Quarter					Annual		Aggregate
	Q1 2009	Q2 2009	Q3 2009	Q4 2009	Q1 2010	2009	2010	2009-2010
Converse County:								
State Tax	$137	$634	$1,081	$585	$12	$2,437	$12	$2,449
General Purpose Option	$111	$511	$872	$472	$10	$1,966	$10	$1,975
Specific Purpose Option	$0	$0	$0	$0	$0	$0	$0	$0
Lodging	$285	$1,317	$2,246	$1,215	$25	$5,063	$25	$5,088
Total Local Taxes	**$533**	**$2,462**	**$4,200**	**$2,272**	**$46**	**$9,466**	**$46**	**$9,513**
Natrona County:								
State Tax	$1,083	$5,002	$8,534	$4,616	$94	$19,234	$94	$19,328
General Purpose Option	$873	$4,034	$6,882	$3,722	$76	$15,511	$76	$15,587
Specific Purpose Option	$0	$0	$0	$0	$0	$0	$0	$0
Lodging	$2,249	$10,390	$17,727	$9,588	$196	$39,953	$196	$40,149
Total Local Taxes	**$4,205**	**$19,425**	**$33,143**	**$17,925**	**$367**	**$74,699**	**$367**	**$75,065**
Study Area:								
State Tax	$1,220	$5,636	$9,615	$5,200	$106	$21,671	$106	$21,778
General Purpose Option	$984	$4,545	$7,754	$4,194	$86	$17,477	$86	$17,563
Specific Purpose Option	$0	$0	$0	$0	$0	$0	$0	$0
Lodging	$2,534	$11,707	$19,973	$10,803	$221	$45,016	$221	$45,238
Total Local Taxes	**$4,738**	**$21,887**	**$37,343**	**$20,197**	**$413**	**$84,165**	**$413**	**$84,578**

Source: CH2M HILL, 2008.

Lodging Taxes. Lodging tax revenues could accrue to the counties in which Project-related construction workers temporarily reside. It is not possible to estimate these potential tax revenues by county because (1) the actual distribution of construction workers is not known at this time, and (2) the durations of their stays are not known and lodging taxes are levied only on sleeping accommodations for guests staying less than 30 days.

5.5 Cumulative Impacts

Rule I Section 7(vi)(I) - Problems due to the transition from temporary construction employees to operating workforces should be addressed. Changes in levels of services required as a result of the proposed industrial facility should specifically be addressed. Cumulative impacts of the proposed industrial facility and other developments in the area of site influence should be addressed separately. This assessment should examine increased demands associated with the construction and operational phases of the proposed industrial facility, as well as effects on the level of services as the construction or operational workforces decline.

Cumulative environmental impacts, as defined in the ISA Rules and Regulations, are the combined impacts upon the environment to the social or economic conditions resulting from construction and operation of the proposed industrial facility and from construction and operation of other ongoing or proposed developments in the area of site influence. Proposed developments to be included in cumulative impacts include those developments that are actively planning and have public information available, or may be actively permitting.

According to records of the WDEQ-ISD, the PacifiCorp wind energy projects located approximately 5 miles east of the Campbell Hill Wind Power Project near Glenrock, will be in operation in January 2009. The Dave Johnson power plant retrofit project is not an Industrial Siting project. Additional wind power projects requiring ISA approval may be planned for the region; however, none are actively planning and have public information available for analysis. Thus, no other projects requiring ISA permit approval are expected to overlap the construction schedule of the proposed Project and no cumulative impacts are expected.

However, in order to present potential project-related impacts within a wider context, consideration is given to other large projects likely to occur in the study area and for which detailed information is available. Specific workforce and schedule information is available for a single project proposed for the study area during the time when the proposed project would be under construction. This is the Dave Johnston power plant retrofit project located just east of Douglas in Converse County.

The Dave Johnston Power Plant consists of four steam electric generating units. Unit 3 is a nominal 230 MW pulverized coal unit placed in service in 1964 equipped with a cell-fired boiler and is currently not equipped with any sulphur dioxide (SO_2) removal equipment. An electrostatic precipitator (ESP) for control of particulate matter was installed in 1976. Unit 4 is a nominal 330 MW pulverized coal unit placed in service in 1972 and is equipped with a tangentially fired boiler. A venturi scrubber is currently being used for particulate control, and lime is added to the scrubber for SO_2 control and to prevent scaling. The plant operator proposes to construct air pollution control equipment on Dave Johnston Units 3 and 4 to reduce emissions of SO_2 and particulates. New Dry Flue Gas Desulfurization (DFGD) systems will be utilized for SO_2 emissions reduction, and new fabric filters will result in lower particulate emissions. All equipment installation and site modifications will occur on space located adjacent to Dave Johnston Units 3 and 4. In addition to the new air pollution control equipment, the installation will require connecting ductwork to the existing boilers, a new lime preparation system, and a new concrete stack.

It is anticipated that the Dave Johnston Project would employ about 60 full-time equivalent (FTE) workers during 2008, 275 FTE during 2009, and 65 FTE during 2010. During the operations phase, employment associated directly with the upgrades made to the facility would number 12 jobs.

Construction of the Dave Johnston Project would result in secondary economic impacts (indirect and induced impacts) within the two-county study area. The Dave Johnston Project is expected to result in annual indirect and induced employment within the study area of 35 and 16 jobs, respectively, in 2008; 122 jobs and 56 jobs, respectively, in 2009; and 17 jobs and 16 jobs, respectively, in 2010. These additional jobs result from project-related

procurements in the study area as well as local and non-local construction worker PCE, the latter mostly on accommodations, food services, recreation, and transportation.

Following completion of the Dave Johnston Project, it is anticipated that annual operation and maintenance of the newly installed equipment would require 12 new positions. It is likely that these positions would be filled by local workers already resident in the study area. Of the annual expenditures for materials of over $3 million, only about 5 percent will be sources locally, i.e., about $155,000. Much of the maintenance activity would be performed by a local contractor at an annual cost of almost $1.2 million. It is anticipated that the contractor will hire local workers and source materials locally. Secondary employment effects would include the generation of six indirect jobs and 13 induced jobs for a total employment effect of 31 jobs within the study area.

Cumulative direct and secondary employment, i.e., that attributable to both the proposed Project and the Dave Johnston Project in the study area for the year 2009 is shown in Table 5-70. The duration of construction activity, and the period which would have the largest employment effect, associated with both projects would extend from April of 2009 through December of 2010.

TABLE 5-70
Cumulative FTE Employment (2009)

Employment (Number of Jobs)	Campbell Hill Windpower Project	Dave Johnston Power Plant Retrofit Project	Cumulative
CONSTRUCTION:			
Direct	75	275	350
Indirect	78	122	200
Induced	38	56	94
Total	**191**	**453**	**644**
OPERATIONS:			
Direct	11	12	23
Indirect	22	6	28
Induced	9	13	22
Total	**42**	**31**	**73**

Source: CH2M HILL, 2008.

Direct cumulative on-site employment would peak in September, 2009 at 562 workers and of these, it is estimated that about 435 would originate from outside the study area and, thus, require temporary accommodations. A small proportion of the workers associated with the Dave Johnston Project are projected to be accompanied by family members and the increase in population is estimated at almost 490 persons during the peak month. Estimates of the cumulative direct, on-site workers by month are shown in Figure 5-57 and the number of non-local workers is shown in Figure 5-58.

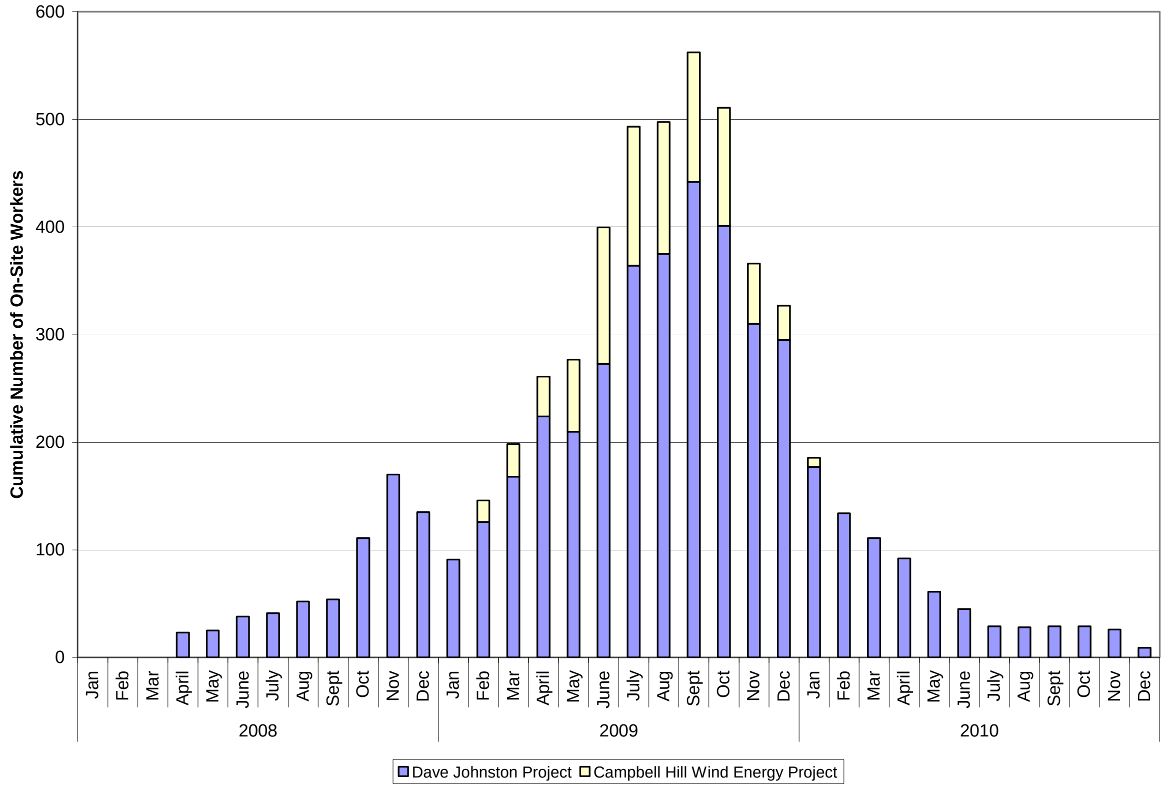

FIGURE 5-57
Cumulative Number of On-Site Worker, by Month

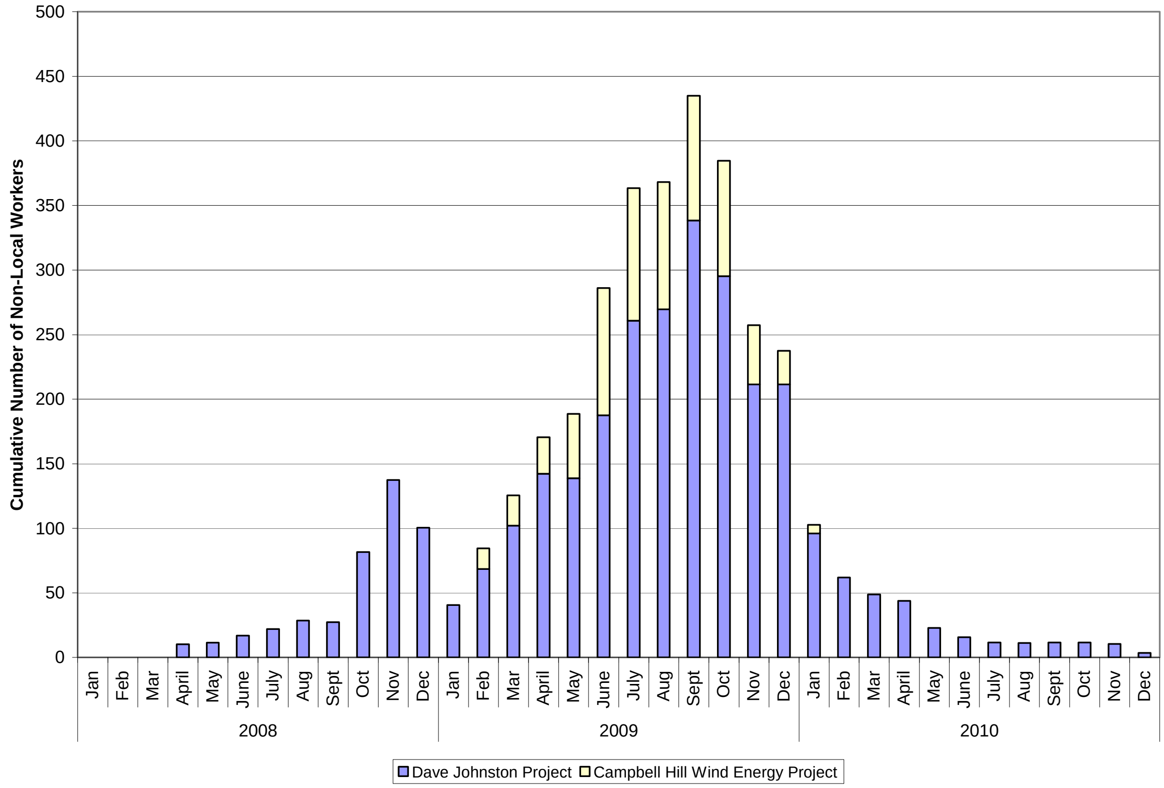

FIGURE 5-58
Cumulative Number of Non-Local workers, by Month

Through the use of LOS ratios, it is possible to estimate the number of additional service provider personnel required to meet a specific increase in demand for services while simultaneously maintaining the current quality of service. A sustained increase in the number of temporary residents of 490 would equate (based on current LOS ratios) to a demand adequate to potentially support 1 additional fire fighter, 1 law enforcement officer, and 1 physician. The additional temporary residents could also increase the number of visits to the emergency rooms of local hospitals by between 150 and 225 annually. These estimates assume that the LOS provided to residents of the service areas would remain constant and that no excess capacity currently exists to meet additional demand for services. Additionally, it is assumed that the peak month effect would continue over the duration of the projects. If one assumed that the increase in demand for services would be associated with the average number of additional persons present in the study area during the overlap time of both projects only, then the population increase would be about 290 persons and the cumulative effects would remain essentially unchanged. Without additional professional personnel, the quality of service for existing residents could decrease.

Other indicators of a potential decline in the quality of life of residents, in the absence of mitigation measures, could include an increase in the frequency of criminal and anti-social behavior. An influx of 490 temporary residents to the study area could increase the number of reported index (Part 1) crimes by between about 11 and 22. The number of arrests for Part 2 crimes could increase by about 40 annually. These estimates are based on current crime rates. A large share of these arrests would be for behavior associated with alcohol and

drug abuse. Additional law enforcement officers would provide added police presence and visibility, act as a deterrent to criminal activity, and increase the likelihood of arrest, thus, preventing an increase in anti-social behavior.

Associated with the Project, ancillary infrastructure would also be constructed. During the period February through July of 2009 a transmission line would be constructed to connect the wind project to the grid system and between May and August of 2009 a switchyard would be constructed.

A substantial share of basic economic activity in Converse County and surrounding counties is related to energy resources. Although no specific information regarding potential workforce requirements for future energy-related projects is available, their presence could create a competing demand for appropriately skilled workers, either from the local labor force or from outside the region. This, in turn, could place increased demand of community facilities and service-providers. Future basic activities are likely to include: oil exploration and extraction; natural gas exploration and extraction; pipeline construction; electric transmission line construction; wind power generation projects; coal gasification; and uranium exploration and extraction. These activities would also support additional service-related businesses and, thus, increase further the level of growth and development.

One such project is a proposal by Chevron Global Power Company. The company has applied for a conditional use permit (CUP) from the Natrona County Planning Commission to allow a commercial wind energy project. The proposed project would consist of 11 wind turbines, each rated at 1.5 megawatt. The wind turbines would be placed on approximately 880 acres north of the Platte River on the northern portion of a 1,400 acre tract near Evansville, formerly the location of the Texaco Casper Refinery. The refinery operated between 1923 and 1982 after which time it was declared a Superfund site and has since been remediated. Chevron Global Power Company has also applied for a CUP to operate a temporary concrete batch plant at the proposed site. According to a conceptual layout, turbines would be sited throughout the northern part of the property, spaced far enough apart, it is anticipated, to mitigate potentially adverse effects on migratory bird and bat populations.

5.6 Trade-Off Analysis

The proposed Project is expected to create significant and ongoing tax benefits and a modest temporary increase in employment throughout the study area and area of site influence. It is anticipated that Project-related impacts, especially on community services, would be minor and distributed throughout the area of site influence with the majority occurring in the Casper area.

Implementation of the Project would create both primary and secondary employment opportunities, contribute modest growth to the local economy including the service sectors, and provide a substantial source of revenues for local governments through the collection of significant *ad valorem* taxes. The potential for short-term impacts associated with implementation of the Project on socioeconomic resources would depend in part on the timing of other construction and mineral extraction activities occurring in the study area.

The major long-term impact of the Project would be the additional revenue collected by the state and distributed to Converse County through increased *ad valorem* taxes. The increased *ad valorem* tax revenues would be distributed by the state and counties for schools, roads, and other community infrastructure. Further expansion of energy-related resources in the region will continue to add jobs to the growing economies and generate additional tax revenues.

5.6.1 Beneficial and Adverse Impacts

The proposed Project is expected to create long-term tax benefits to Converse County and a modest increase in employment. Project-related impacts, especially on community services, would be small and distributed across the communities of the area of site influence. The Project would have the following benefits to the local communities and counties comprising the study area and area of site influence:

- The creation of almost 75 FTE direct jobs over the year of construction. About 25 percent of these jobs would be filled by local workers.
- The creation, during the construction phase of the Project, of about 120 temporary secondary FTE jobs during 2009.
- The creation of a total of 40 jobs annually attributable to operations and maintenance.
- *Ad valorem* (property) taxes accruing to Converse County would increase as a result of an increase in the fair market value (and assessed value) of the real property comprising the site applicable to the Project. *Ad valorem* taxes would be approximately $1.2 million annually.
- Sales tax revenues attributable to the Project could total over $85,000 in 2009 accruing mostly to Natrona County.
- Temporary construction workers are expected to reside in local hotels and motels. It is likely, depending on their length of stay, that Natrona and Converse counties could gain revenues from the lodging tax levied on room expenditures.

5.6.2 Impacts to Community Services

During the construction phase of the Project, the number of non-local workers (and any accompanying family members) entering the area temporarily would peak at 102. Only a small proportion (if any) of these workers would be accompanied by family members or occupy permanent housing. The potential impacts this inflow of persons would have on community services in the area of site influence would be negligible. Their short-term presence would have negligible impacts on law enforcement, fire protection, health care, or municipal services.

The additional vehicle and truck trips generated by the construction of the project will have a minimal impact on the operations of the adjacent roadway network. Some of the facilities will experience a temporary decrease in LOS during the peak construction period. However, the resultant increased travel times will not be a permanent condition. The facilities all operate at acceptable levels of service even with these increased travel times and

intersection delays. Once the construction peak is over, the facilities will operate at desirable levels of service as they do currently.

If hotels are the primary temporary lodging choice, the most noticeable impact would be on the availability of hotel and motel rooms for other visitors, especially tourists during the summer months. However, the demand exerted by the temporary workers would not exhaust the likely available supply of vacant units.

5.7 Mitigation Measures to Offset Adverse Cumulative Impacts to Housing

Housing is a concern of communities throughout the area of site influence. However, it is expected that the majority of non-local workers would choose to stay in hotels and motels and, to this end, the project proponent has acquired letters of commitment from hotels and motels in the Casper area to provide accommodations for these workers at pre-negotiated rates. Letters of intent from local hotels are shown in Appendix D.

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6.0 Evaluation of Environmental Impacts

Rule I Section 7(j) – Evaluation of Environmental Impacts. The items shall be noted and evaluated as they would exist if the proposed facility were built. Each evaluation should be followed by a brief explanation of each impact and the permit issued that regulates the impact. If the impact is not regulated by a state regulatory agency or federal land management agency, the application must including (sic) plans and proposals for alleviating adverse impacts. Cumulative impacts of the proposed industrial facility and other projects in the area of site influence should be addressed separately.

Potential environmental impacts associated with the construction and O&M of the Project are discussed below. Resource data were collected from both existing sources and additional field studies carried out for the Project. Impact analyses were conducted to evaluate the effects of the Project on the natural environment. Methods of mitigating potential impacts will be implemented as part of the Project and are incorporated into the impact analyses and site-specific Wildlife Monitoring Plan. Unless otherwise stated, the area of analysis for the various environmental resources evaluated consisted of the Project area boundary as detailed in Appendix B.

6.1 Physical, Chemical, Biological, and Radiological

Rule I Section 7(ix) – Inventory of estimated discharges including physical, chemical, biological and radiological characteristics.

There are no anticipated chemical, physical, biological, or radiological discharges associated with construction or operation of the Project that would substantially impair the health, safety, or welfare of the present or expected inhabitants in the area of primary effect or Project area. Resource maps for the areas of environmental analysis described below are included in **Appendix E**.

6.2 Air Quality

Rule I Section 7(x) – Inventory of estimated emissions and proposed methods of control.

The Wyoming Department of Environmental Quality – Air Quality Division (AQD) implements adopted air quality standards and regulations.

6.2.1 Regulatory Jurisdiction

Air emissions associated with construction and operation of the wind energy Project will be subject to the WDEQ –AQD Standards and Regulations. Specifically, Chapter 6 of the Standards and Regulations establishes permitting requirements for all sources constructing and/or operating in the State of Wyoming.

6.2.2 Construction Emissions

Particulate matter, consisting primarily of cement dust but including some aggregate and sand dust emissions, is the primary pollutant of concern. In addition, there are emissions of metals that are associated with this particulate matter. All but one of the emission points is fugitive in nature. The only point sources are the transfer of cement and pozzolan material to silos, and these are typically vented to a fabric filter. Fugitive sources include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. The amount of fugitive emissions generated during the transfer of sand and aggregate depends primarily on the surface moisture content of these materials. The extent of fugitive emission control varies widely from plant to plant (EPA, 2008). A permit will be obtained from the WDEQ-AQD, and operation of the batch plant will be in accordance with the permit.

The foundations for the 66 wind turbine towers will each require between 300 to 400 cubic yards of concrete per tower for a total of approximately 30,000 cubic yards, including the concrete needed for substation foundations, transformer pads, and other equipment. The most efficient way to produce this volume of concrete will require setting up a portable concrete batch plant onsite to provide the needed concrete for the foundations. The batch plant will mix the ingredients together and load the resulting concrete into mixer trucks for transit to the WTG locations on the Project site.

Raw materials such as aggregate, sand, and cement will be delivered from an off site location to the mobile batch plant by truck for on site concrete production. These raw materials are staged typically in silos on site and proportionately combined based on the required concrete mix design for each foundation or pad. The concrete is placed in the delivery trucks and continuously mixed on the way to the turbine site where the concrete is poured into the foundation forms.

6.2.3 Operation Emissions

The sources of pollutants during the operations of the Project would be limited to the vehicles and equipment used by maintenance staff. The emissions from these sources would be minor in comparison to the levels of activity that would be required to exceed emissions thresholds; thus, these emissions are not quantified.

No air emissions will be generated from operation of the WTG or from operation of the substation.

6.2.4 Impacts

Rule I Section 7(xii) – The procedures proposed to avoid constituting a public nuisance, endangering the public health and safety, human or animal life, property, wildlife or plant life, or recreational facilities which may be adversely affected by the estimated emissions or discharges.

Use of a portable batch plant on private fee lands for making concrete would be a permitted source (i.e., the plant would have an operating permit, with emissions limitations, issued by the State of Wyoming). Therefore, a WDEQ-AQD permit will be required prior to operation of the concrete batch plant pursuant to Chapter 6, Section 2, of the regulations and standards. The required air permit will be obtained by the batch plant operator.

6.2.4.1 Construction

Particulate emission factors for concrete batching are detailed in Table 6-1 and are expressed in pounds of pollutant per cubic yard of concrete.

TABLE 6-1
Estimated Plant Wide Emissions Per Yard of Truck Mix Concrete

Component	Total dust (lb/yd^3)	Fine dust (lb/yd^3)
Aggregate delivery to ground storage	0.0064	0.0031
Sand delivery to ground storage	0.0015	0.0007
Aggregate transfer to conveyor	0.0064	0.0031
Sand transfer to conveyor	0.0064	0.0031
Aggregate transfer to elevated storage	0.0064	0.0031
Sand transfer to elevated storage	0.0015	0.0007
Cement delivery to silo	0.0002	0.0001
Cement supplement delivery to silo	0.0003	0.0002
Weigh hopper loading	0.0079	0.0038
Mixer truck loading	0.0346	0,096
Total dust emissions estimate per yard of concrete	0.0716	0.0275
Total dust emissions estimate for 300 yards of concrete	22	8.25

Source: EPA, 2008.

A review of Table 6-1 shows that the total emissions for 300 cubic yards of concrete, which will constitute one tower foundation, are estimated at 22 pounds of total dust and 8.25 pounds of fine dust.

The concrete batch plant will include appropriate filtration in accordance with the air quality permit. A fugitive dust control plan, including measures such as applying water or dust suppressants to exposed soil/material piles, will be implemented at the Project site to control and prevent the creation of dust associated with construction activities. The use of water trucks to wet the surface of access roads and other potential work area sources of fugitive particulate matter will be used as appropriate during construction activities. In addition, the selected balance of plant contractor or subcontractor and holder of the issued air quality permit would be responsible for ensuring that the plant is operated in accordance with the issued permit conditions.

The resulting construction emissions will not result in a significant detriment to, or significant impairment of the environment or the social and economic condition of present or expected inhabitants in the area of primary affect.

6.2.4.2 Operation

The operation of the WTGs will have no effect on air quality (visible plumes, fogging, misting, icing, or impairment of visibility and changes in ambient levels caused by emitted

pollutants). Potential fugitive dust from operations staff vehicles traveling within the Project area would be minimal and substantial impairment to the health, safety, or welfare of the present or expected inhabitants in the area of primary affect or Project area is not anticipated.

6.3 Noise

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure.

6.3.1 Regulatory Jurisdiction

ISD regulations state that noise is a resource issue that must be taken into account in the application process; however, numeric limits have not been specified at the state or county level in the Project area.

6.3.2 Fundamentals of Acoustics

It is useful to understand how noise is defined and measured. There are several ways to measure noise, depending on the source of the noise, the receiver, and the reason for the noise measurement. Table 6-2 summarizes the technical noise terms used in this memorandum.

TABLE 6-2
Definitions of Acoustical Terms

Term	Definitions
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the measured pressure to the reference pressure, which is 20 micropascals.
A-weighted sound pressure level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Equivalent Sound Level (L_{eq})	The L_{eq} integrates fluctuating sound levels over a period of time to express them as a steady-state sound level. As an example, if two sounds are measured and one sound has twice the energy but lasts half as long, the two sounds would be characterized as having the same equivalent sound level. Equivalent sound level is considered to be related directly to the effects of sound on people since it expresses the equivalent magnitude of the sound as a function of frequency of occurrence and time.
Day–Night Level (L_{dn} or DNL)	The Day-Night level (L_{dn} or DNL) is a 24-hour average L_{eq} where 10 dBA is added to nighttime levels between 10 p.m. and 7 a.m. For a continuous source that emits the same noise level over a 24-hour period, the L_{dn} will be 6.4 dB greater than the L_{eq}.
Statistical noise level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (for example, L_{50} is the level exceeded 50 percent of the time)

Table 6-3 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 6-3
Typical Sound Levels Measured in the Environment and Industry

Noise Source At a Given Distance	A-Weighted Sound Level in Decibels	Qualitative Description
Carrier Deck Jet Operation	140	
	130	Pain threshold
Jet takeoff (200 ft)	120	
Auto Horn (3 ft)	110	Maximum Vocal Effort
Jet takeoff (2,000 ft) Shout (0.5 ft)	100	
New York Subway Station Heavy Truck (50 ft)	90	Very Annoying Hearing Damage (8-hr, continuous exposure)
Pneumatic drill (50 ft)	80	Annoying
Freight Train (50 ft) Freeway Traffic (50 ft)		
	70	Intrusive Telephone Use Difficult
Air Conditioning Unit (20 ft)	60	
Light auto traffic (50 ft)	50	Quiet
Living Room Bedroom	40	
Library Soft whisper (5 ft)	30	Very Quiet
Broadcasting Studio	20	Recording studio
	10	Just Audible

Source: Adapted from Table E, “Assessing and Mitigating Noise Impacts”, NY DEC, February 2001.

The most common metric is the overall A-weighted, sound-level measurement that has been adopted by regulatory bodies worldwide. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving very good correlation in terms of how to evaluate acceptable and unacceptable sound levels (Figure 6-1).

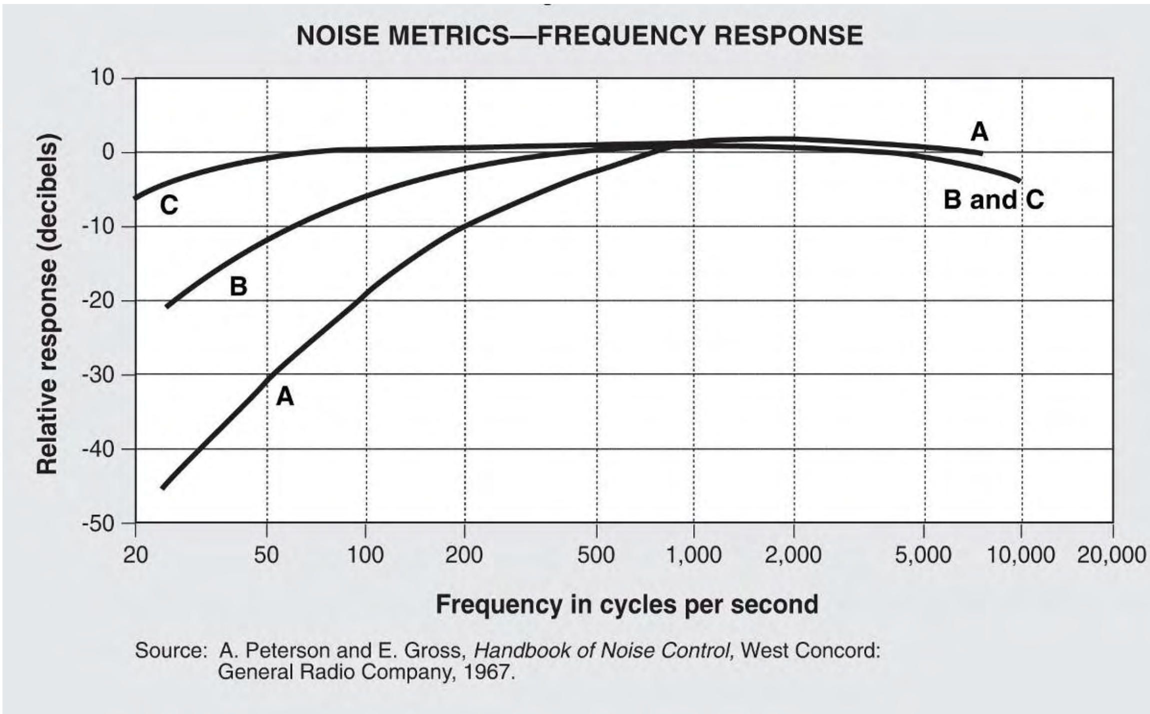

FIGURE 6-1
Noise Metrics – Frequency Response

The measurement of sound is not a simple task. Consider typical sounds in a suburban neighborhood on a normal or "quiet" afternoon. If a short time in history of those sounds is plotted on a graph, it would look very much like Figure 6-2. In this figure, the background, or residential sound level in the absence of any identifiable noise sources, is approximately 45 dB. During roughly three-quarters of the time, the sound level is 50 dB or less. The highest sound level, caused by a nearby sports car, is approximately 70 dB, while an aircraft generates a maximum sound level of about 68 dB. The following provides a discussion of how variable community noise is measured.

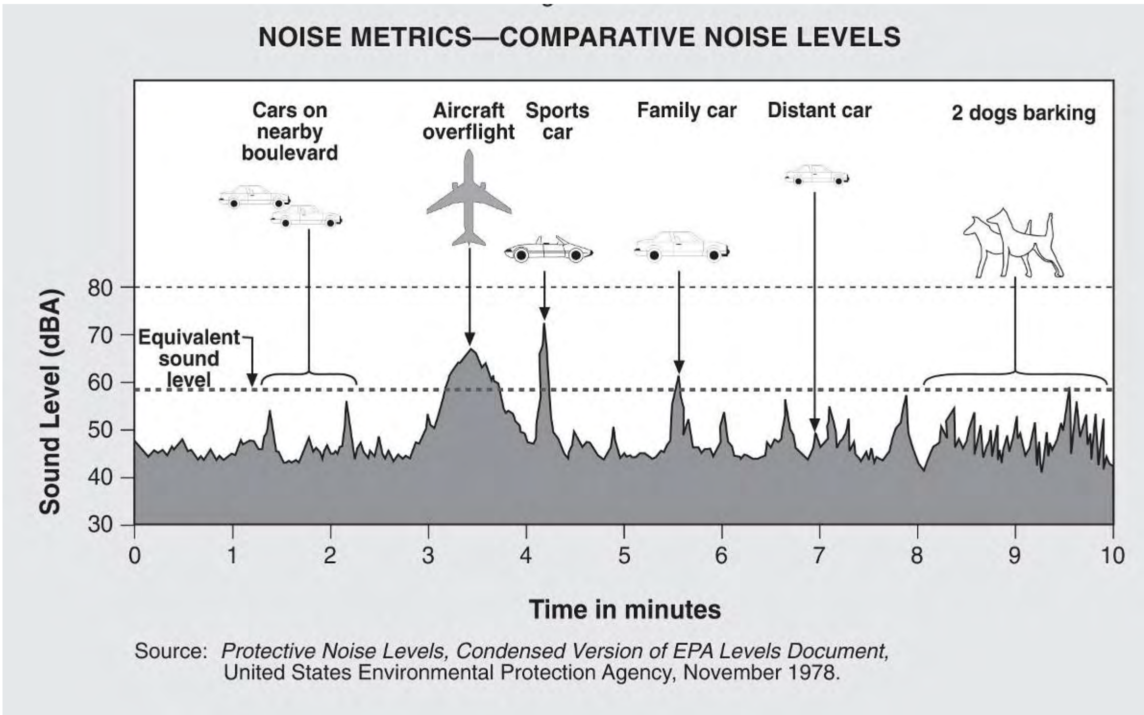

FIGURE 6-2
Noise Metrics – Comparative Noise Levels

Sound power level data are used in acoustic models to predict sound pressure levels. This is because sound power levels take into account the size of the acoustical source and account for the total acoustical energy emitted by the source. For example, the sound pressure level 15 ft from a small radio and a large orchestra may be the same, but the sound power level of the orchestra will be much larger because it emits sound over a much larger area. Similarly, 2-horsepower (hp) and 2,000-hp pumps can both achieve 85 dBA at 3 ft (a common specification) but the 2,000-hp pump will have significantly larger sound power level. Consequently the noise from the 2,000-hp pump will travel farther. A sound power level can be determined from a sound pressure level if the distance from and dimensions of the source are known. Sound power levels will always be greater than sound pressure levels and sound power levels should never be compared to sound pressure levels such as those in Table 6-3.

6.3.3 Construction Noise Impact Assessment

The EPA Office of Noise Abatement and Control studied noise from individual pieces of construction equipment, as well as from construction sites for power plants and other types of facilities (Table 6-4). Because specific information, about types, quantities, and operating schedules of construction equipment is not known at this stage, data from the EPA document for industrial projects of similar size have been used. These data are conservative, because the evolution of construction equipment generally has gravitated toward quieter design. Use of these data is reasonable for estimating noise levels, given that they still are used widely by acoustical professionals.

TABLE 6-4
Average Noise Levels from Common Construction at a Reference Distance of 50 feet (dBA)

Construction Equipment	Typical Average Noise Level at 50 ft, dBA
Air compressor	81
Backhoe	85
Concrete mixer	85
Concrete pump	82
Crane, mobile	83
Dozer	80
Generator	78
Grader	85
Loader	79
Paver	89
Pile driver	101
Pneumatic tool	85
Pump	76
Rock drill	98
Saw	78
Scraper	88
Shovel	82
Truck	91

Source: EPA, 1971.

Table 6-5 shows the total composite noise level at a reference distance of 50 ft, based on the pieces of equipment operating for each construction phase and the typical usage factor for each piece. The noise level at 1,500 ft also is shown. The calculated level at 1,500 ft is probably conservative, because the only attenuating mechanism considered was geometric spreading, which results in an attenuation rate of 6 dBA per doubling of distance; attenuation related to the presence of structures, trees or vegetation, ground effects, and terrain was not considered.

Due to the distances to all residences and the Project's remote location, the noise levels resulting from construction of the Project will not result in a significant detriment to, or significant impairment of the environment or the social and economic condition of present or expected inhabitants in the area of primary affect.

TABLE 6-5
Composite Construction Site Noise Levels

Construction Phase	Composite Equipment Noise Level at 50 feet, dBA	Composite Equipment Noise Level at 1,500 feet, dBA
Clearing	88	58
Excavation	90	60
Foundation	89	59
Erection	84	54
Finishing	89	59

Source: EPA, 1971.

6.3.4 Operation Noise Level Impact Assessment

Standard acoustical engineering methods were used in the noise analysis of the Project. The sound propagation factors used in the model have been adopted from ISO 9613-2, *Acoustics – Sound Attenuation During Propagation Outdoors, Part 2: General Method of Calculation* (ISO, 1993) and VDI 2714, *Outdoor Sound Propagation* (VDI, 1988). Atmospheric absorption for conditions of 10°C and 70 percent relative humidity (conditions that favor propagation) was computed in accordance with ISO 9613-1, *Acoustics – Sound Attenuation During Propagation Outdoors, Part 1: Calculation of the Absorption of Sound by the Atmosphere* (ISO, 1993).

Each wind turbine was considered to be a point source of noise at the hub height with the octave band sound power level of 104 dBA, which is representative of utility scale wind turbines being considered for this Project. These sound power levels represents the maximum turbine noise level determined in accordance with IEC61400-11, *Wind Turbine Generator Systems – Part 11: Acoustic Noise Measurement Techniques* (IEC, 2006).

The sound power level of a WTG measured at hub height will vary between 96 and 104 dB. This will result in a sound pressure level of approximately 55 to 65 dBA at 130 ft (similar in level to a normal conversation). However, based on the noise analysis, the sound levels at the closest sensitive receptors, approximately 3 miles west and upwind of the closest WTG, are predicted to be less than 30 dBA. The Predicted Sound Power Levels are graphically depicted in Appendix E. Sound levels would be considered acceptable at residences. Due to the distances to all residences and the Project's remote location, the noise levels resulting from operation of the Project will not result in a significant detriment to, or significant impairment of the environment or the social and economic condition of present or expected inhabitants in the area of primary affect.

6.4 Soil Resources/Geologic Hazards

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

Soil resources are materials capable of supporting plant life. Soil forms through a variety of soil formation processes, and includes weathered "parent material" combined with dead and living organic matter and air. Soils are vital to all life on Earth because they support the growth of plants, which supply food and oxygen and absorb carbon dioxide and nitrogen. Geologic hazards are naturally occurring or man-made geologic condition that presents a risk or is a potential danger to life and property.

6.4.1 Regulatory Jurisdiction

ISD regulations state that soil resources are geologic hazards are resource issues that must be taken into account in the application process; however, no adopted standards have been specified at the state or county level.

6.4.2 Introduction

Data from the Wyoming State Geological Survey, U. S. Geological Survey (USGS), and the Web Soil Survey provided by the Natural Resources Conservation Service (NRCS) were reviewed for information on geology and soil characteristics and earthquake hazards in the vicinity of the sites. The data are presented in the Soil and Geological Resources maps in Appendix E. A geotechnical investigation was completed to evaluate subsurface conditions in detail for use in micrositing structures. The following section presents an overview of the site geologic setting and soil characteristics, and discusses potential impacts.

6.4.3 Erosion and Landslides

The site overlies the southwestern portion of the Powder River Basin. Bedrock geologic units that underlie the site include the Fort Union and Lance Formations (Sharp and Gibbons, 1964; Denson et al, 1990). The Fort Union Formation is divided into the upper Lebo Member and the lower Tullock Member. The Lebo Member is described as “light- to dark-gray, very fine grained to conglomeratic sandstone interbedded with varying amounts of siltstone, claystone, carbonaceous shale, and coal”. The Tullock Member is described as “interbedded sandstone, siltstone, shale, carbonaceous shale, and thin coal beds.” The Lance Formation is described as “somber shale and drab, massive, lenticular, concretionary sandstone; many thin coal beds in the lower half”. These bedrock units are weakly consolidated and relatively flat-lying, and should provide suitable foundation conditions for turbine foundations.

Surficial geologic units overlie most of the bedrock units at the site (Hallberg et al, 1998; Hallberg et al, 1999; Case et al, 1998). Please refer to the Geological Resources map in Appendix E, which shows a GIS-based surficial geologic map of the site and proposed transmission line alignment. The surficial geologic units include alluvium mixed with terrace deposits, scattered eolian deposits and residuum; eolian deposits (i.e. sand dunes), slopewash mixed with scattered bedrock outcrops and residuum, colluvium, alluvial fan

deposits and eolian deposits; and residuum mixed with slopewash, alluvium, eolian, and alluvial fan deposits. Based on site visit observations and soils information, typically the surficial cover is limited to a few feet in thickness but may be up to 10 ft in some locations. A large sand dune field is present south, west and north of the site. These sand dunes are up to tens of feet thick, and range from active, unvegetated dunes to relatively stable, well-vegetated dunes. The transmission line will cross through this dune field.

Soils present on the site include numerous soil complexes that classify primarily as sandy loam, clay loam, and loam (NRCS, 2008). Please see the Soil Resources map in Appendix E. The most widespread soils in the area that would underlie the proposed turbine and road areas (i.e. areas with the most potential disturbance) include the Worf-Tassel-Shingle complex (2 to 30 percent slopes), Hiland-Bowbac complex (0 to 15 percent slopes), Samday-Shingle-Worf complex (3 to 15 percent slopes). Soils at the site are typically well-drained and are formed in slopes locally as steep as 30 percent (17 degrees) along drainage systems and hillsides. The proposed transmission line alignment crosses primarily through the Theedle-Kishona loams (6 to 15 percent slopes), which has a K factor of 0.37 and a Wind Erodibility Group of 4L. No soils at the site meet the state and federal criteria of prime farmland soils. Wyoming does not maintain a list of soils of statewide concern.

The only soils that exceed the Soil Erodibility (K) factor limit of 0.37 set by the NRCS as a limiting factor for erosion hazard are the Tassel-Shingle complex, with a K factor of 0.49. The Tassel-Shingle complex soils are only found in very small percentage of the site.

Wind erodibility groups of soils range from 3 to 6, on a scale of 1 to 8, with 1 being the most susceptible to wind erosion and 8 being the least susceptible to wind erosion. As with the K factor, the Tassel-Shingle complex has the highest wind erodibility group (3), but constitutes a very small percentage of the Project area. Mitigation for potential soil erosion is discussed later in this report.

No existing landslides have been mapped on the surficial or bedrock geologic maps (Case et al, 1998; Hallberg et al, 1998; Hallberg et al, 1999), and none were observed during the geotechnical site investigation. Given the lack of existing landslides, relatively flat-lying bedrock, low potential for soil saturation in the area, thin surficial cover, and low slope angles; the landslide hazard is expected to be low.

The bedrock at the site consists of soft, weakly consolidated, interbedded shales and sandstones with a thin surficial cover. Some areas of the site underlain by these materials can potentially be subject to rapid erosion, gullying and arroyo formation during occasional thunderstorms.

Sand dunes or eolian sand covers portions of the site, and the transmission lines crosses through a large dune field. These sandy deposits consist of loose, uniformly-grained, cohesionless sand, which exhibits low shear strength and can be mobile. Steep-sided sand dunes are also subject to surficial sloughing of the loose sand. The primary concern with wind turbines or transmission towers being placed in areas underlain by sand dunes is the potential to erode the dunes which can undermine and endanger foundations. However, transmission towers and turbines will be located in order to avoid potentially unstable sand dunes.

6.4.4 Faults

No potentially seismically active faults have been mapped within the Project site boundary. According to the USGS's Quaternary Fault and Fold Database (USGS, 2008a), the closest mapped potentially active fault is the South Granite Mountain Fault, which is approximately 70 miles to the southwest of the site. This fault is described as a 125-km long west-northwest trending, north dipping fault system. This fault is considered a Quaternary-age fault with a slip rate estimated to be less than 0.2 millimeters (mm) per year.

The closest historical seismic activity was located near Casper, where earthquakes with estimated Modified Mercalli intensity scales of V to VII occurred in 1894 and 1897 (USGS, 2008b). Disturbance to people and minor damage was noted in Casper.

The seismic potential for the site is low. For new construction, the facilities and turbine foundations will be designed for the maximum considered earthquake (MCE), according to the International Building Code. Seismic design issues will be addressed in the Geotechnical Data Report.

6.4.5 Construction Impacts

There will be a certain amount of disturbance of surficial soils and minor excavation into weak bedrock associated with construction of the facilities, at WTG locations, and access roads. A stormwater pollution prevention plan (SWPPP) will be developed with the Notice of Intent (NOI) for the required Wyoming Pollution Discharge Elimination System (WYPDES) General Stormwater Construction Permit, and implemented to minimize soil erosion during construction of the Project. Therefore, best management practices (BMPs) will be implemented by the contractor during construction of the Project to ensure that erosion will be minimized and other adverse impacts on area soils will not occur. Other BMPs are discussed in more detail under Section 7.3: *Plans for Alleviating Impacts: Soil Resources and Geologic Hazards.* Lastly, the Project will be designed with proper erosion protection and culverts in order to minimize or eliminate the potential for damage to Project facilities during construction and operation.

No construction impacts associated with geologic hazards such as seismic events, subsidence, or landslides that would substantially impair the health, safety, or welfare are expected to occur as a result of construction of the Project.

6.4.6 Operation Impacts

Operation of the Project will not result in any impacts to soil resources or geologic hazards.

6.5 Cultural Resources

Rule I Section 7(xiii)(C) – Cultural Resources. Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover archaeological and historical resources.

Cultural resources of concern consist of historical or archaeological sites that are listed on or are eligible to be listed on the National Register of Historic Places (NRHP).

6.5.1 Regulatory Jurisdiction

The National Historic Preservation Act (NHPA) is the principal federal law guiding federal actions with respect to the treatment of cultural, archaeological, and historic resources. Section 106 (16 U.S.C. 470f) of the NHPA requires federal agencies, prior to taking action to implement an undertaking, to take into account the effects of their undertaking on historic properties and to give the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Office (SHPO) a reasonable opportunity to comment regarding the undertaking. Historic properties are "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (16 U.S.C. 470w (5)). The criteria used to evaluate the NRHP eligibility of properties affected by federal agency undertakings are contained in 36 CFR 60.4.

The lead federal or state agency that administers the land or minerals or that issues key permits determines the level and scope of cultural resource inventory that will be required for a project.

6.5.1.1 Federal Lands

Development of any area that is predominantly federal surface or federal minerals would require a complete cultural resource inventory in compliance with Section 106 of the NHPA. Consideration of potential effects on cultural resources by actions on federal surface or involving federal permits or funding may be required by National Environmental Policy Act (NEPA) or Section 106 of the NHPA.

6.5.1.2 State Lands

Actions on state surface, involving state minerals, or requiring a state permit such as a surface reclamation permit may also be required to consider potential effects on cultural resources under state antiquities legislation. Dependent upon the action, development of an area that is on state land may require the same level of cultural resource investigations as a federal action.

6.5.1.3 Private Fee Lands

There is no nexus for Section 106 consultation on private fee lands unless a federal action would be triggered.

6.5.2 Survey Results

Cultural Resource Analysts, Inc. (CRAI) conducted a Class I and Class III cultural resources inventory for the Project during summer and fall of 2008. During the survey, CRAI inventoried approximately 3,998 acres. The area inventoried by CRAI during the Class III completed in 2008, and previously completed Class III Cultural Inventories, are shown in the Cultural Resource Inventory Area map in Appendix E. A version of the Class III inventory report, with confidential information redacted, is presented in **Appendix F**.

CRAI recorded 24 sites and 31 new isolated finds. A reevaluation of four prehistoric sites and two historic sites was also conducted, as was a visual assessment for a segment of the Bozeman Trail within 3 miles of the Project. Of the sites discovered and

investigated by CRAI, eight were unevaluated or determined eligible for listing on the NRHP. The remaining sites were recommended as not eligible for NRHP nomination.

6.5.3 Construction Impacts

The mapped 1863 route of the Bozeman Trail intersects the proposed access road into the Project area and the transmission line. At the site where Three Buttes proposes to access the Project, the mapped route of the Bozeman Trail includes an existing improved road. No evidence of the Bozeman Trail is present at this location, or where the transmission line will span the presumptive trail route. CRAI evaluated the Bozeman Trail within 3 miles of the Project area boundary, access road, and proposed transmission line route, and found no segments contributing to the eligibility of the Bozeman Trail. Therefore, CRAI has concluded no direct impact or adverse visual impacts to the Bozeman Trail will result from the Project.

In response to the Class III inventory data, Three Buttes microsited WTGs, roads, and facilities to avoid all cultural resource sites identified as unevaluated or eligible for listing on the NRHP. Modifications to the Project site layout are anticipated to be made throughout the planning and final design stage processes; therefore, the final site design will be in accordance with consideration for identified cultural resources, avoidance of impacts, and appropriate buffers. If during micrositing and final site design, Project features are required to be located outside of the area inventoried for cultural resources, additional surveys will be completed to ensure avoidance of unevaluated or eligible sites, or an archaeological inspector or monitor will be utilized to avoid impacts to potentially eligible sites.

Overall, no adverse impacts to cultural resources are anticipated from construction of the Project, due to siting and subsequent micrositing or monitoring activities by Three Buttes that will avoid impacts that may impair the health, safety, or welfare of the resource or the health, safety, or welfare of the present or expected cultural resources in the area of primary affect.

6.5.4 Operation Impacts

No adverse impacts to cultural resources will result from operation of the Project.

6.6 Rare Vegetation Communities

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

6.6.1 Regulatory Jurisdiction

Rare (plant) vegetation communities are those that are considered rare in the region, support sensitive species of plants and animals, and/or that are subject to regulatory protection through various federal, state, or local policies or regulations. These communities may or may not contain special-status plants. Vegetation communities are presented in the Vegetation Resources map in Appendix E.

6.6.2 Construction Impacts

A review of publicly available data and site surveys completed by Ecology and Environment E&E in 2007 did not identify the occurrence of any rare vegetation communities. Therefore, there are no anticipated Project impacts to rare vegetation communities from either the construction or operation of the Project.

Construction of the Project will not result in any impacts to rare vegetation communities in the area of primary effect.

6.6.3 Operation Impacts

Operation of the Project will not result in anyimpacts to rare vegetation communities in the area of primary effect.

6.7 Surface and Groundwater Resources

W.S. 35-12-108(a) Water Supply Yield and Analysis. Quantity of water available; analysis; public comment; opinions: If an applicant applies for an industrial siting permit, pursuant to W.S. 35-12-106, or for a waiver of the application provisions, pursuant to W.S. 35-12-107, for a facility which requires the use of 800 or more acre-feet per year of waters of the state of Wyoming annually, the applicant shall prepare and submit to the state engineer a water supply and water yield analysis with a request for a preliminary and final opinion as to the quantity of water available for the proposed facility.

Baseline surface and groundwater resources were reviewed and water use calculations were estimated for the Project. The following sections detail the baseline conditions and potential Project impacts.

6.7.1 Regulatory Jurisdiction

Water quality associated with construction and operation of the Project will be subject to the WDEQ – Water Quality Division Standards and Regulations. Specifically, implementing Water Quality Rules and Regulations are found in Chapters 1 to 23, and also in the Wyoming Environmental Quality Act.

6.7.2 Surface Water

The Project lies within the North Platte River Basin, Middle North Platte Sub-Basin watershed (HUC 10180007). The major named streams within the vicinity of the Project area are the North Platte River, Cole Creek, Derrick Draw, and Lone Tree Gulch. Several stock ponds within gullies, draws, and gulches occur throughout the Project area.

The majority of the Project area lies within the drainage system of Cole Creek and its tributaries. Cole creek drains to the North Platte River, which is located approximately 1 mile south of the southern terminus of the transmission line and switching station to be constructed for the interconnect to Pacificorp's existing transmission line. The drainage system near the Project appears to be fed by spring snow melt, summer thunderstorms, and groundwater, and it is generally dry by late summer in most years. Surface water resources are presented in the Surface Water and Wetlands map in Appendix E.

Lone Tree Gulch, a minor ephemeral tributary to Cole Creek, crosses the transmission line-portion of the Project area within Township 35N, Range 76W, Section 32. Lone Tree Gulch feeds a few stock ponds outside of the Project area before connecting with Cole Creek about 3 miles southwest of the Project area.

Derrick Draw is the primary named drainage that crosses the Project area. Derrick Draw originates in the northeast corner of the Project area and meanders southwesterly through the Project area before joining Cole Creek. Derrick Draw crosses the northern end of the Project in Township 35N, Range 77W, Section 1; Township 35N, Range 76W, Section 6; and in Township 36N, Range 76W, Sections 32 - 33.

Cole Creek is ½ mile west of the Project area at its closest point, but it does not cross the Project area. The creek appears to originate over 3 miles northeast of the Project area, and then wraps around the Project area to the west. Cole Creek appears to be an intermittent or ephemeral creek that supports wetlands outside of the Project area. Cole Creek receives stormwater from Lone Tree Gulch and Derrick Draw, and eventually connects to the North Platte River downstream.

Cole Creek is classified by the State of Wyoming as Class 3B water. Class 3B waters are those surface waters shown as not having fish present and are not used for drinking water. These surface waters are protected for the following beneficial uses: other aquatic life (other than fish), recreation, wildlife, agriculture, industry, and scenic value (WYDEQ, 2001). Cole Creek supports designated beneficial uses such as livestock watering (agriculture) from the stock ponds placed within the creek. Lone Tree Gulch and Derrick Draw are not classified by the State of Wyoming, but also support livestock with the several stock ponds within each creek.

The North Platte River is located approximately 1 mile south of the southern terminus of the transmission line. The North Platte River receives runoff from Cole Creek and its tributaries. The North Platte River, along with any adjacent wetlands that may exist, is classified by the State of Wyoming as Class 1 waters. Class 1 waters are those surface waters shown as having fish present and are also used for drinking water. Class 1 surface waters are protected for all beneficial uses, which include: drinking water, game fish, non-game fish, fish consumption, other aquatic life, recreation, wildlife, agriculture, industry, and scenic value (WYDEQ, 2001).

The North Platte River has been identified by the WYDEQ 305B program as water number WYNP101800020000_01, which applies to the stretch of the North Platte River from Sage Creek to the Nebraska state line. Its designated uses through this reach are: Cold Water Fish, and Aquatic Life (WYDEQ, 2008a).

The North Platte River has been listed on the WYDEQ's Section 303(d) list of impaired waters for selenium. None of the other drainages or stock ponds on the Project site is listed as impaired. Extensive studies by the USGS, U.S. Fish and Wildlife Service (USFWS), and U.S. Bureau of Reclamation (USBR) have determined the irrigation return flows containing high levels of selenium have resulted in selenium loading into the North Platte River, as well as other streams and lakes (WYDEQ, 2008a). A Total Maximum Daily Load assessment (TMDL) may be necessary if it is determined that the Project could have an adverse effect on the North Platte River.

According to the Federal Emergency Management Agency (FEMA) flood insurance rate maps (FIRM) map number 5600820520B, a 100-year floodplain exists along the North Platte River floodplain and it coincides with the southern end of the Project area (FIRM, 2008).

6.7.2.1 Construction Impacts

Construction activities are not anticipated to discharge into surface waters. Potential impacts to surface water features from erosion and sedimentation will be minimized and prevented by measures to control runoff during construction and operation of the Project. A SWPPP will be developed with the NOI for the required WYPDES General Stormwater Construction Permit and implemented to minimize impacts on surface water resources during construction of the Project. In addition, the concrete batch plant temporary work area will be covered by the WYPDES General Stormwater Construction Permit and appropriate permits from the WDEQ–WQD.

Fuel storage areas will be managed and controlled in accordance with federal and state regulations to prevent the release of petroleum products to surface waters. Implementation of BMPs such as proper labeling and storage, secondary containment, and inspection as required by the WYPDES General Stormwater Construction Permit SWPPP will reduce the potential for accidental release of hazardous materials to surface water resources. No impacts to surface water resources are anticipated from use of hazardous materials during construction or operation. In addition, Spill Prevention, Control, and Countermeasure Plans (SPCCs), as required by 40CFR Part 112, will be developed and implemented at the site for construction and operations.

Point source discharges are not authorized into Class 1 waters such as the North Platte River unless otherwise permitted by the SWPPP. In addition, water quality may not be degraded further than existing conditions within the North Platte River. The WYDEQ has authority to impose whatever controls and monitoring are necessary on point source discharges to Class 1 waters and their tributaries to ensure that the existing quality and uses of the Class 1 water are protected and maintained. Nonpoint source discharges of pollution to Class 1 waters or tributaries of Class 1 waters shall be controlled by application of BMPs as discussed above. Since discharges to the North Platte River are not expected, the Project will be in compliance with existing TMDLs for 303(d) waters as regulated by the WYDEQ.

Any work within jurisdictional surface waters would be conducted in accordance with Sections 404 and 401 permits of the CWA. Therefore, no adverse or significant impacts to surface water resources are anticipated from Project area stream crossings during construction.

6.7.2.2 Operation Impacts

Operation of the Project will not result in substantial impairment to surface water resources that would impair the health, safety, or welfare of current or expected inhabitants in the area of primary affect.

6.7.3 Groundwater

The North Platte River Basin, Middle North Platte Sub-Basin watershed contains a wide variety of geologic formations and structural elements. The Project area is within the Upper

Cretaceous and Lower Tertiary aquifer systems, as presented in the Groundwater Resources map in Appendix E. The Upper Cretaceous aquifer covers the southern ¾ of the Project area, while the Lower Tertiary aquifer covers the northern ¼ of the Project area. The Upper Cretaceous aquifer is composed mostly of beds of consolidated sandstone. The sandstone is interbedded with shale, siltstone, and occasional thin, lenticular beds of coal (USGS, 1996). The Upper Cretaceous aquifers are downwarped and faulted to depths of several thousand feet in some basins (USGS, 1996). Lower Tertiary aquifers consist mostly of semi- consolidated to consolidated sandstone beds of Oligocene to Paleocene age (USGS, 1996). The water-yielding sandstones of this layer are interbedded with non-water-yielding inclusions of shale, mudstone, siltstone, lignite, coal, and limestone (USGS, 1996).

The majority of groundwater use within the North Platte River Basin, Middle North Platte Sub-Basin watershed is for agricultural, municipal and domestic, industrial, recreational, and environmental purposes (WWDC, 2008). The majority of groundwater use within the Project area is for agricultural and domestic purposes. Groundwater wells within the Project area vary in depth from 40 to 296 ft below ground surface (bgs) with static water levels ranging from 20 to 120 ft bgs (WSEO, 2008).

A water well is proposed at the O&M building site in Section 30 in Township 35N, Range 76W for use in providing water to the batch plant for concrete production. The location of wells recorded by the WSEO are presented in the Groundwater Wells and Aquifer Map in Appendix E.

6.7.3.1 Platte River Recovery Implementation Agreement

In 1997, Colorado, Wyoming, and Nebraska and the Department of Interior came together in a unique partnership to develop a shared approach to managing the Platte River. The result was the Platte River Recovery Implementation Program, a process to better manage the Platte River for the health of the ecosystem and the people who depend on it. The program's three main elements include increasing streamflows in the central Platte River during relevant time periods through re-timing and water conservation/supply projects; enhancing, restoring, and protecting habitat lands for the target bird species; and accommodating certain new water-related activities. Mitigating the adverse impacts of certain new water-related activities will be met through the implementation of state and federal depletion plans.

Construction Impacts

Water uses at the site will include routine low-level activities such as dust control, concrete batch plant (during construction activities), and potable water for drinking. Three Buttes has provided preliminary water balance calculations for both construction and operation of the Project.

Water uses during construction at the Project site will include applications of water for dust control and water additive to the concrete batch plant. Preliminary annual use calculations have been estimated to provide the Projects' required water usage. For purposes of this analysis, during construction activities, daily water use requirements have been estimated. Based on current PacifiCorp wind projects in Wyoming and recent Duke Energy projects, dust control and the concrete batch plant have been estimated to require approximately

5,000 and 30,000 gallons per day, respectively. Table 6-6 provides an estimate of groundwater usage for the Project.

TABLE 6-6
Estimated Project Usage of Groundwater

High Plains		
Estimated Daily Water Usage (gallons per day)[1]	**Construction Period Requiring Water[2]**	**Estimated Acre-Feet per Year[3]**
35,000 (Construction)	180 days (4/1/08 – 10/1/09)	25.8
1,000 (Operation)	365 days	1.1

[1] The estimated daily water usage was based on data collected at Duke Energy Wind Energy Projects.

[2] The estimated construction period that will require water was taken from the detailed Project schedule and includes the site civil work task that is estimated at 180 days.

[3] Acre-feet per year (ac-ft/yr) was calculated by multiplying gallons per day by conversion rate of 3.0688833 x 10-6 by length of the construction and operation periods.

A review of Table 6-6 shows that an estimated 25.8 ac-ft/yr would be required to construct the Project over the 12-month construction period. Based on the estimated construction water balance calculations, the Project will not exceed the 800 ac-ft/yr threshold and will not require a WSEO water supply yield analysis or opinion. Appropriate water rights will be obtained from either the state or existing water rights holders for water use during construction of the facility. Therefore, construction impacts to groundwater will not result in substantial impairment to the groundwater resources or the health, safety, or welfare of the present or expected inhabitants in the area of primary affect.

Operations and Maintenance Impacts

Most of the operational water usage would be associated with potable water needs for the O&M staff. At this time, it is anticipated that the O&M activities will use a local groundwater well to supply for domestic use and discharge to an onsite septic system. Based on an estimated 1,000 gallons per day water balance calculation developed by Three Buttes, the Project will require an estimated or 1.1 ac-ft/yr of groundwater at full operation.

A review of Table 6-6 shows that an estimated 1.1 ac-ft/yr would be required to operate the Project. Based on water balance calculation estimates, the Projects will not exceed the 800 ac-ft/yr threshold and will not require a WSEO water supply yield analysis or opinion. Appropriate water rights will be obtained from either the state or existing water rights holders for water use during the operation of the facility. Therefore, operational impacts to groundwater will not result in substantial impairment to the groundwater resources or the health, safety, or welfare of the present or expected inhabitants in the area of primary affect.

Compliance with Platte River Recovery Implementation Agreement

Water supply needs for the Project will be met with either an existing water right purchase or a new water right allocation (if the water resources in the area have not been fully appropriated). A portion of the transmission line is located within an area determined to be hydrologically connected to the Platte River; however, none of the wind farm is within this zone (see Appendix E map). Areas that are hydrologically connected to the Platte River

would be avoided by the well proposed for the Project. Moreover, the WSEO will regulate surface and groundwater use/supply for the Project to ensure compliance with applicable regulations and the Platte River Implementation Agreement. Therefore, the Project will be constructed and operated in accordance with water use/supply permits and will be consistent with the goals of the Platte River Implementation Agreement.

6.8 Land Use

Rule I Section 7(i)(i) – Land Use. Land use designation of the site location, including whether the use of the land by the industrial facility is consistent with state, intrastate, regional, county, and local land use plans, if any. The analysis shall include the area of land required and ultimate use of land by the industrial facility and reclamation plans for all lands affected by the industrial facility or its dependent components.

The proposed wind farm is located in Converse County, Wyoming. Land surrounding the Project is generally undeveloped and rural in nature; however, Three Buttes also proposes to access the Project from the west via approximately 10 miles of Natrona County maintained road. These lands in and around the Project are generally classified as Agricultural Resources and include grasslands and prairies used as rangeland and livestock grazing. Land for the Project is privately owned and is currently used for livestock grazing. Public and privately owned lands adjacent to the Property are generally used for livestock grazing, mineral development (oil and gas), or recreation and open space where access is available.

6.8.1 Consistency with Land Use Plans

Rule I Section 7(xvi) – Consistency with Land Use Plans. Compatibility of the facility with state or local land use plans, if any.

Local and County land use plans or comprehensive plans are planning and management documents that: (1) define how resources will be managed within a specific planning area or subdivision of a planning area, and (2) establish restrictions on activities to be undertaken in that planning area or subdivision. The land use planning process is the key tool that the local communities and counties use to protect resources and designate uses on local lands that it manages. These plans help ensure that the local lands are managed in accordance with applicable laws and regulations under their adopted principles or resolutions. Land use plans typically are organized according to the resources present in the planning area. For each identified resource, the plan will identify management objectives and management actions. Often the management actions establish restrictions or stipulations regarding the use or development of the given resource.

6.8.1.1 Converse County

Converse County is mostly comprised of rural agricultural lands and public lands, with the majority of residents living around four incorporated communities. Converse County does not have a currently adopted Land Use or Growth Management Plan. However, the county is currently developing the Converse County: Together Now & Tomorrow (CCTNT) plan (CANDO, 2008). The CCTNT will be used as a blueprint to guide how Converse County,

and its incorporated communities, should develop over the next 20 years. Planning for the CCTNT began in the summer of 2008 and is anticipated to be completed by the fall of 2009.

6.8.1.2 Natrona County

Natrona County has an adopted county development plan and zoning ordinance. The Natrona County, Wyoming County Development Plan (Natrona County, 1998) was adopted in 1998, and is used to guide development in the county over a 20 year period.

The Rural Area Plan of the County Development Plan contains a number of Goals and Policies relevant to the Project.

Rural Land Use Goal: *Protect and enhance the historical and traditional economic uses of rural lands from exploitation, premature development and conflicting land uses while maintaining economic productivity and private property rights.*

Policy 2B: Encourage sustainable, multiple use of rural lands including agricultural production, grazing, timber production, mineral production and recreational uses.

Policy 3B: Limit the extension of county roads and services into new rural areas unless tax benefits to pay for services clearly outweigh long term costs.

Policy 4B: Protect historical and traditional economic uses of rural lands from unwanted land use conflicts with new development.

Rural Economics and Tax Base Goal: *Support management of renewable and non-renewable natural resources to provide for economic well being, the custom and culture, of the county, and be open to new land use patterns to allow new economic uses to grow and support the economy.*

Policy 1 B: Continue to encourage multiple uses of public lands in Natrona County.

Rural Services and Facilities Goal: *Provide for cost effective and efficient rural services and facilities.*

Policy 2 B: Consider carefully the development of additional county maintained roads unless absolutely necessary to provide access to existing development or new revenue enhancing mining or industrial development.

Policy 3 B: Rural development should be planned and developed to minimize demand on county services, and development proposals which create additional demand or impact on rural services or facilities shall pay the additional costs prior to expenditure of public funds.

As previously described, the Project only proposes access road improvements in Natrona County. Therefore, no building or construction permits are required from the county. However, the county has indicated that a County Road Maintenance Agreement is required that outlines the maintenance responsibilities for the road improvements.

6.8.1.3 State of Wyoming Lands - Special Use Leases

Special Use Leases are authorized for the use of State of Wyoming lands under Chapter 5, Special Use Leasing of the Board of Land Commissioners Rules and Regulations. Special use means any use of state land other than for grazing, agriculture, the extraction

of minerals, or uses authorized under easements granted pursuant to Chapter 5 of the Rules and Regulations, or hunting, fishing, and general recreational uses pursuant to Chapter 13 of the Rules and Regulations. A special use lease is required for access road construction on lands owned by the State of Wyoming.

6.8.2 Construction Impacts

The proposed Project including necessary infrastructure (access road improvements) will be located on private lands. However, a short segment of the access road improvements will be conducted on lands owned by the State of Wyoming.

Converse County

As noted above, construction of the Project components in Converse County would not require a permit. The Project would not conflict with any adopted land use plan, policy, or regulation.

Natrona County

The Project components in Natrona County would be limited to the necessary access road improvements. Natrona County does not require that the proposed Project be reviewed under a CUP application.

Access road construction will require the use of lands owned by the State of Wyoming. Other than the access road, no wind turbines, electrical towers or other wind energy facility components will be located on State of Wyoming lands. Three Buttes has applied for a Roadway Easement for the State of Wyoming land parcel to be crossed.

6.8.3 Operation Impacts

Operation of the Project will not result in any impacts to federally listed threatened or endangered plant species.

6.9 Recreational Resources

Rule I Section 7(xiii)(B) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover recreational resources.

Recreational resources were identified based on information from the Digital Wyoming Atlas (University of Wyoming, 2007). The atlas shows that recreational resources within and adjacent to the area of primary impact include a mixture of county, state, and federal park lands. Other recreational resources within the area of primary impact include numerous museums and cultural attractions, hiking, big game hunting, and various fishing opportunities. Recreational hunting, camping and off-highway vehicles (OHV) use may occur in the vicinity. These recreational activities typically occur on state and federally owned lands, with some occurring on private land with landowner permission.

6.9.1.1 Local City and County Parks

There are no local or county parks located in the immediate vicinity of the area of primary impact. The anticipated workforce would represent a small percentage of the total population of the area. It is anticipated that a limited number of workers may visit parks in

or near Casper and Glenrock, and would not result in a significant net increase in usage and visitation. Therefore, it is concluded that no significant impacts would occur to local and county recreational resources from the small incremental increase in usage by the workforce.

6.9.1.2 State and National Parks

A variety of state parks operated by the Wyoming State Parks, Historic Sites and Trails occur in the region and may be used by construction personnel. The following provides summary details on the parks in the region.

Edness Kimball Wilkins State Park. Edness Kimball Wilkins State Park is a 315-acre, day-use state park located 2 miles east of the I-25 exit providing access to the primary access road to the Project. The North Platte River provides a natural habitat for a variety of wildlife, and for fishing, canoeing, and rafting. Visitors can use picnic tables, grills, group shelters, playgrounds, and a launching ramp for canoes or rafts. A universally accessible fishing pier is available for anglers. An additional 2.8 miles of accessible hard-surfaced paths provide visitors with an opportunity view some of the area wildlife.

Glendo State Park and Reservoir. The Glendo State Park and Reservoir is located on the North Platte River, 6 miles southeast of the town of Glendo, in Platte County. Access to the park is from I-25 via County Rd. 17 (Glendo Park Road). The Glendo State Park maintains seven campgrounds, six boat ramps, and a marina concession. Available fish species for angling include walleye, yellow perch, and channel catfish. Channel catfish are stocked in the reservoir, and brown trout, rainbow trout, and channel catfish are stocked in the river above the reservoir. Below the dam, the river is stocked with brown, rainbow, and cutthroat trout.

Recreational resources are managed for the Bureau of Reclamation by Wyoming State Parks and Historic Sites. The park contains scenic overlooks and three interpretive nature trails. The Glendo Dam Wetlands Trail, located along the river, just below the dam, features two fishing/observation piers. The Muddy Bay Wetlands Interpretive Nature Trail is located on the east side of Muddy Bay. The Glendo Dam Overlook Trail is located north of Glendo Dam. Across from the Glendo Power Plant and below the dam is a public access boat ramp providing access to the North Platte River.

Pathfinder Dam and Reservoir. The North Platte Project extends 111 miles along the river valley from near Guernsey, Wyoming, to below Bridgeport, Nebraska. Pathfinder Dam and Reservoir are part of this Project. Pathfinder Dam is one of the first constructed by the Reclamation Service (now the Bureau of Reclamation). The dam is in a granite canyon on the North Platte River about 3 miles below its junction with the Sweetwater River.

Recreational resources are managed for the Bureau of Reclamation by the Bureau of Land Management and Natrona County Roads, Bridges, and Parks Department. The reservoir is located on the North Platte River 47 miles southwest of Casper, in Carbon and Natrona Counties. Parts of the reservoir are included in the Pathfinder National Wildlife Refuge. There are three campgrounds and three boat ramps. Available species include brown trout, cutthroat trout, rainbow trout, and walleye. Rainbow and cutthroat trout are stocked annually in the reservoir. The Pathfinder Interpretive Center and 1.7-mile interpretive trail

are located near the dam. The interpretive trail may be accessed across the historic suspension bridge or from the dam.

Pathfinder National Wildlife Refuge. Pathfinder National Wildlife Refuge is in an isolated area 50 miles southwest of Casper and 20 miles from the small community of Alcova, Wyoming. The refuge consists of four small units including Sweetwater Arm, Goose Bay, DeWeese Creek, and Sage Creek totaling 16,807 acres. The refuge is an important waterfowl migration stopover on the western edge of the Central Flyway. Recreational opportunities include hunting, fishing, wildlife observation, and outdoor nature photography. The refuge is managed jointly by the USFWS, USBR, BLM, the Wyoming Game and Fish Department (WGFD), and Natrona County Parks. Grazing and water-level manipulation are the primary tools used by resource managers. A refuge overlook and interpretive site were recently developed in cooperation with Wyoming Audubon.

Medicine Bow-Routt National Forest. The Medicine Bow-Routt National Forests include lands extending from north central Colorado to central Wyoming. The National Forests encompass portions of many mountain ranges including the Gore Range, Flat Tops, Parks Range, Medicine Bow Mountains, Sierra Madre, and Laramie Range. These areas provide year-round recreation opportunities for thousands of people. These lands also provide a number of other important uses including wildlife habitat, timber, livestock grazing, and are a vital source of water for irrigation, domestic use, and industry.

Thunder Basin National Grassland. The Thunder Basin National Grassland is administered by the Douglas Ranger District and is approximately 572,000 acres in size. These lands are located in northeastern Wyoming in the Powder River Basin between the Big Horn Mountains and the Black Hills. This area is intermixed with federal, state, and private lands. The Grassland provides unique opportunities for recreation, including hiking, sightseeing, hunting, and fishing. These areas do not contain any developed campgrounds; however, dispersed camping is allowed.

Ayers Natural Bridge. This geologic formation is approximately 11 miles west of Douglas on I-25. The 50-ft-high natural rock arches over LaPrele Creek. The destination consists of 12 seasonal developed campsites. It is anticipated that a limited number of workers may visit the state park.

6.9.1.3 Impacts

It is anticipated that the Project would result in a temporary population increase in the area of site influence during construction. A limited number of workers are expected to visit the regional recreational resources in the vicinity. It is envisioned that a very small incremental increase in park and refuge visitations would occur during construction. This usage would be limited to periods when employees are not working and would not result in a significant increase in annual visitation. Therefore, the Project is not anticipated to result in impacts from increased visitation to area parks that would substantially impair the health, safety, and welfare of present or expected local inhabitants.

The transportation analysis concluded that the additional vehicle trips generated by the construction and operations of the Project will have a negligible impact on the operations of the adjacent roadway network. Therefore, traffic on state roads and federal interstates is not considered further (see Section 5.4.7).

Based on the assumed number of workforce park visitations, the Project will result in a very slight incremental increase in traffic on Converse and Natrona county roads used to access the area recreational resources. However, the additional traffic volume generated by the Project does not decrease the level of service nor degrade the operational performance of the adjacent roadway facilities and will not result in any significant impacts to Converse and Natrona counties roadways that are used to access these recreation resources. The slight increase in traffic associated with construction and extremely slight increase during operation of the Project is not anticipated to impair substantially the health, safety, or welfare of the present or expected inhabitants in the area of primary affect.

6.10 Wetlands and Waters of the United States

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

A wetland delineation and waters of the U.S. assessment was conducted by CH2M HILL wetland scientists in 2008. 2008. Delineation methodology was conducted in accordance with U.S. Army Corps of Engineers Wetland Delineation Manual (Environmental Laboratory, 1987) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE, 2006).

6.10.1 Regulatory Jurisdiction

The CWA (33 U.S.C. § 1251, et seq.) is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the U.S. The following are jurisdictions within the CWA:

- Section 404—regulates the discharge of dredged and fill material into waters of the United States, including wetlands
- Section 402—National Pollutant Discharge Elimination System (NPDES) permits for discharge of pollutants
- Section 401—State certification of water quality

6.10.2 Wetlands

Jurisdictional wetlands were not identified during the delineation.

6.10.3 Waters of the U.S.

A total of fourteen waters of the U.S. were identified within the Project, which are potentially jurisdictional under the Clean Water Act. All assessments regarding potential jurisdiction of waters are preliminary based on data collected and guidelines established in the *US Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (USACE, 2007). Final determination regarding jurisdiction will be made by a representative of the USACE during a routine jurisdictional determination (JD), and in consultation with the EPA. Table 6-7 describes the delineated potentially jurisdictional waters of the U.S. and estimated acreage impacts based on the preliminary site layout.

TABLE 6-7

Potentially Jurisdictional Waters of the U.S. and Preliminary Estimate of Impacts

ID	Name/Description	Average Channel Width (feet)	Potential OHW Channel Depth (feet)	Average side slope (% grade)	Channel Bottom Characteristics	* Estimated Potential Area of Impact
W1	Cole Creek (appears to contain ephemeral flows)	10	1	1 - 2	Mostly vegetated	0.02
W2	Ephemeral swale	4 – 6	0 - 1	1	Mostly vegetated	0.002
W3	Ephemeral swale	6	0 - 1	0 - 1	Mostly vegetated with silt	0.006
W4	Derrick Draw	6 - 8	0 - 4	4 - 8	Silt, Sand, Gravel	0.006
W5	Ephemeral swale	4 - 6	0 - 3	3 - 5	Silt, Gravel, Vegetation	0.014
W6	Ephemeral swale	8 - 10	0 - 4	4 - 8	Mostly vegetated with silt and sand	0.008
W7	Dry ephemeral swale	1 - 2	0.5	0 - 1	Mostly vegetated	0.016
W8	Lone Tree Gulch	10 - 15	10 - 25	0 - 5	Bare channel with down-cutting	0.006
W9	Dry ephemeral swale)	4 – 5	1	1 - 3	Mostly vegetated	0.004
W10	Dry ephemeral swale	5	0.5	1 - 2	Mostly vegetated	0.001
W11	Ephemeral swale	3 – 4	1	1 - 2	Mostly vegetated with silt	0.004
W12	Ephemeral pond and swale	15 – 20	0 – 4	2 - 3	Pond is mostly vegetated with cattail, swale is mostly bare with silt and gravel base	0.02
W13	Ephemeral swale	5 – 6	0 – 3	6 - 12	Partially vegetated with silt and gravel	0.014
W16	Ephemeral swale	5 – 7	1 – 2	2 – 5	Mostly vegetated with silt, sand, and minor occurrence of gravel	0.05
					Total	0.165**

*Impact estimates are based on an average 40-foot construction right-of-way. Impacts were calculated by using GIS software to determine amounts of cut and fill needed for each individual stream or wetland crossing.

**Estimated potential acreage impact estimates are based on the preliminary site layout and will likely be reduced upon completion of final engineering design of access roads, turbine locations, and collector lines.

6.10.4 Construction Impacts

Preliminary impacts to potentially jurisdictional waters of the U.S. have been calculated to make a determination of potential impacts based on the preliminary layout. Based on the preliminary site layout, a total of 14 potentially jurisdictional waters of the U.S. would be crossed by Project facilities, resulting in a preliminary impact estimate of 0.165 acre of discharges of dredged or fill materials. However,

All impacts to potentially jurisdictional waters of the U.S. are currently associated with the construction of access roads. Therefore, it has been determined that the Project qualifies for use of Nationwide Permit 12 for utility line construction activities and utility line access roads.

Nationwide Permit 12 requires pre-construction notification of the local USACE regulatory office before dredge or fill activities may occur in waters of the U.S. if potential acreage impacts meet or exceed 0.1 acre. Additionally, Nationwide Permit 12 requires a pre-construction notice for projects with 500 linear feet of potential impacts to waters of the U.S. Based on the preliminary site layout, and Three Buttes' commitment to avoid potential waters of the U.S. in future micrositing, any impacts to potential waters of the U.S. would be less than 0.1 acre of discharges of dredged or fill materials. Concurrence with the USACE will be obtained that each crossing is < 0.1 acre and that the agency has no jurisdiction under the de minimis standards.

Based on the Section 404(b)(1) least environmental damaging practical alternative implementing CWA guidelines, Project impacts to waters of the U.S. are to be avoided or minimized to the maximum extent practicable. Modifications to the site layout are anticipated to be made throughout the planning process and will occur during the 30, 60, and 90 percent Project engineering design completion stages. Therefore, the final site layout and final access road and collector line engineering designs will be located to avoid potential impacts to potentially jurisdictional waters of the U.S.

Overall, no adverse impacts to wetland and waterbody resources are anticipated from construction or operation of the Project, due to micrositing activities by Three Buttes that will avoid impacts that may impair the health, safety, or welfare of the resource or the health, safety, or welfare of the present or expected waters of the U.S. resources in the area of primary affect. The Project will be constructed and operated in accordance with the terms and conditions of any issued CWA permit to ensure that that there are no significant impacts to jurisdictional waters of the U.S. and will preclude substantial impairment to health, safety, or welfare of the inhabitants in the area of primary affect.

6.11 Scenic Resources

Rule I Section 7(xiii)(A) – Scenic Resources. Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover scenic resources.

Visual or scenic resources are the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. Visual resource or scenic

impacts are generally defined in terms of a Project's physical characteristics and potential visibility and the extent to which the Project's presence would change the perceived visual character and quality of the environment in which it would be located.

6.11.1 Regulatory Jurisdiction

ISD regulations state that scenic resources are a resource issue that must be taken into account in the application process; however, visual resource standards have not been specified at the state or county level in the Project area.

6.11.2 Introduction

This analysis documents the existing visual conditions on in the area surrounding the site of the proposed Campbell Hill Windpower Project and assesses the extent to which the proposed Project has the potential to affect valued qualities of the area's scenic resources. In this analysis, "Project" refers to the wind farm portion of the Project site, which includes the land on which the turbines are proposed to be constructed. The transmission facilities also proposed are discussed as applicable.

6.11.3 Methodology

The protocols for visual impact assessment that were developed by the Federal Highway Administration (FHWA) were implemented due to agency acceptance. In addition, the assessment protocols suggested in Appendix E of the National Research Council white paper *Environmental Impacts of Wind-Energy Projects* (National Research Council 2007) were implemented to make determinations of potential wind farm visual effects.

6.11.3.1 The Federal Highway Administration Visual Impact Assessment Methodology

This analysis was conducted using the evaluative process set out by the FHWA in *Visual Impact Assessment for Highway Projects* (FHWA, 1988). This analysis approach was developed by a major federal agency that invested considerable resources in its creation, testing, and implementation, and as a result, this approach is robust and is now widely used to provide systematic and objective evaluations of visual change.

The FHWA visual quality and aesthetics assessment method used for this analysis addresses three primary questions:

- What are the visual qualities and characteristics of the existing landscape in the Project area?
- What are the potential effects of the Project's proposed alternatives on the area's visual quality and aesthetics?
- Who would see the Project, and what is their likely level of concern about or reaction to how the Project visually fits within the existing landscape?

Applying the FHWA visual quality assessment method entails six steps:

1. Establish the Project's area of visual influence.
2. Determine who has views of and from the Project ("viewer").

3. Describe and assess the landscape that exists before Project construction (“affected environment”).
4. Assess the response of viewers looking at and from the Project, before and after Project construction (“viewer sensitivity or concern”).
5. Determine and evaluate views of the Project for before and after Project construction (simulations).
6. Describe the potential visible changes to the Project area and its surroundings that would result from the Project.

The first three steps were conducted for the Project, in order to establish the baseline conditions as viewed from specific locations in the surrounding area. The Project’s potential changes to the visible landscape and likely viewer responses to those changes were then assessed and systematically compared against the baseline conditions to determine the nature and degree of potential impacts to visual resources.

6.11.3.2 Specialized Tools and Vocabulary

The FHWA system uses a generally accepted set of tools and well-defined terminology. The following fundamental terminology is used throughout this analysis.

Views are what can be seen from the Project area and what can be seen of the Project area from the surrounding neighborhoods and communities. Because it is not possible to depict every view toward the Project features, representative views have been selected to represent types of views that are available to the general public. The viewpoints from which these representative views are seen are called Key Observation Points (KOPs).

Viewshed is the area surrounding a Project area from which the Project is, or potentially could be, visible to viewers.

Simulations are images depicting views that have been modified by computer modeling to show the proposed Project within the existing landscape.

Viewers are people who have views of the Project. Viewers are usually discussed in terms of general categories of activities (such as residents, workers, recreationists [park users, boaters, or bicyclists], pedestrians, or motorists [both commuters and leisure travelers]) and are referred to as “viewer groups.”

Viewer sensitivity (or level of concern) is a combination of the following factors for a specific view:

- How many people have that view and what types of viewers are they?
- How long can they see the view? Residents and recreationists generally have views of long duration while bicyclists and motorists typically have short-duration views.
- What is their likely level of concern about the appearance, aesthetics, and quality of the view? Level of concern is a subjective response that is affected by factors such as the visual character of the surrounding landscape, the activity a viewer is engaged in, and their values, expectations, and interests. Generally residents and recreationists are

considered to be highly sensitive viewers, and local business staff and commuters are considered to be less sensitive.

Low viewer sensitivity exists when there are few viewers who experience a defined view or they are not particularly concerned about the view. High viewer sensitivity exists when there are many viewers who have a view frequently or for a long duration, as well as viewers (many or few), such as those in a residential neighborhood, who are likely to be very aware of and concerned about the view. Viewer sensitivity or level of concern does not imply support for or opposition to a proposed Project; it is a neutral term that is an important parameter in assessing visual quality.

Visual character is an impartial description of what the landscape consists of and is defined by the relationships between the existing visible natural and built landscape features. These relationships are considered in terms of dominance, scale, diversity, and continuity. Visual character-defining resources and features include:

- Landforms: types, gradients, and scale.
- Vegetation: types, size, maturity, and continuity.
- Land uses: height, bulk, scale, and architectural detail of associated buildings and ancillary site uses.
- Transportation facilities: types, sizes, scale, and directional orientation.
- Overhead utility structures and lighting: types, sizes, and scale.
- Open space: type (e.g., parks, reserves, greenbelts, and undeveloped land), extent, and continuity.
- Viewpoints and views to visual resources.
- Water bodies, historic structures, and downtown skylines.
- Apparent “grain” or texture, such as the size and distribution of structures and unbuilt properties or open spaces of the landscape.
- Apparent upkeep and maintenance.

Viewing distance is the distance between the viewed object and the viewer. The closer the viewer is to a viewed object the more detail can be seen and the greater the potential influence the object has on visual quality. For this analysis, three viewing distances were used. They are (1) immediate foreground (between 0 and approximately 300 ft of the viewers), (2) foreground (between 300 ft and ½ mile), and (3) middleground (between ½ and 4 miles).[1]

Visual quality is an assessment of the composition of the character-defining features for selected views. Under the FHWA visual quality analysis system, the characteristics are evaluated in terms of vividness, intactness, and unity (which are defined below) and are scored for these characteristics. The scores are then averaged for a total visual quality score

[1] This categorization of distance zones is well established among visual resource analysis practitioners and has been adopted by the USFS as part of its Scenery Management System (USFS, 1995).

between 1 and 7, where a low score represents low visual quality and a higher score represents high visual quality. This assessment asks: Is this particular view common or dramatic? Is it a pleasing composition (a mix of elements that seem to belong together) or not (a mix of elements that either do not belong together or are eyesores and contrast with the other elements in the surroundings)?

Visual quality is evaluated and discussed using these terms:

- Vividness is the degree of drama, memorability, or distinctiveness of the landscape components.
- Intactness is a measure of the visual integrity of the natural and human-built landscape and its freedom from encroaching elements. This factor can be present in well-kept urban and rural landscapes, as well as in natural settings. High intactness means that the landscape is free of unattractive features and is not broken up by features and elements that are out of place. Low intactness means that visual elements can be seen in a view that are unattractive and/or detract from the quality of the view.
- Unity is the degree of visual coherence and compositional harmony of the landscape considered as a whole. High unity frequently attests to the careful design of individual components and their relationship in the landscape or an undisturbed natural landscape.

6.11.3.3 Study Procedure

The study process began with a review of maps, on which the Project features had been plotted, and the determination of the Project's viewshed. A viewshed analysis is most commonly a computer-generated graphic that relies upon the maximum elevations of the Project features and surrounding topography to identify locations from which the Project would theoretically be visible via an unobstructed or partial line-of-sight. For the Campbell Hill Project, a viewshed radius of 18 miles was assumed. Results of this analysis indicated the areas from which the turbines associated with the Project have the potential to be visible. Accessible viewpoints were identified within the viewshed. The site was visited in order to document the existing visual conditions in the Project area. Photographs were taken toward the locations of the Project features from representative viewpoints, and from this set of views KOP were selected to use as the basis for the analysis.

As a part of the process of evaluating the visual sensitivity of views, a review was made of the plans, regulations, ordinances, and design standards adopted by each of the jurisdictions through which the Project would pass to identify any provisions that designate specific landscape areas or features as scenic resources deserving of special protection.

For the view from each of the KOPs, a photograph was selected to provide the basis for development of a simulation to depict the view as it would appear with the completed Project in place. The photographs used as the basis for the simulations were all taken with a digital camera set to take photos equivalent to those taken with a 35-mm camera using a 50-mm focal length. Single-frame images were used. For each view, computer modeling and rendering techniques were used to produce the simulated images. Existing topographic and site data provided the basis for developing an initial digital model. Project engineers provided site plans and digital data for the proposed facilities. These were used to create

three-dimensional (3-D) digital models of the turbine, substation and transmission line structures. These models were then combined with the digital site model to produce a complete computer model of the Project.

For each simulation viewpoint, a viewer location was digitized from topographic maps and scaled aerial photographs, using 5 ft as the assumed viewer eye level. Computer “wire frame” perspective plots were then overlaid on the photographs of the views from the simulation viewpoints to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital versions of base photographs. The final “hardcopy” visual simulation images that appear in this document were produced from the digital image files using a color printer.

Comparison of the “before” photographs with the simulations of the Project as it would appear after construction provided the basis for determining Project impacts on views and visual quality. In comparing the pre-construction and post-construction conditions, use was made of the numerical rating sheets that the FHWA has devised as an aid to implementation of its visual impact procedure. Comparison of the FHWA rating scores for the existing views with the FHWA rating scores for the simulations of the views as they would appear with the Project constructed, provided a systematic and consistent basis for evaluating the degree of visual change that would occur as a result of the Project’s development. The numerical rating process and the comparison of the numerical ratings for the before and after views provided the backdrop for the qualitative assessments of visual conditions and visual change presented in this analysis.

The procedure described above provides the basis for identifying the degree of turbine visibility and the degree of change in the view that the presence of the turbines creates. To assess the aesthetic impacts of these changes, visual impact evaluation criteria were applied that were recommended in a recent paper published by the National Research Council (2007). The National Research Council recommends that in evaluating the acceptability of the visual effects of wind power Projects, the questions that are appropriate to address are:

- Is the Project located within an area of identified scenic or cultural significance?
- Would the Project significantly degrade views or scenic resources of statewide significance?
- Is the Project on or close to a natural or cultural landscape feature that is a regional focal point?
- Is the Project in a landscape area that is visually distinct and rare or unique?
- Is the Project unreasonably close (usually less than ½ mile) to many residences that would be severely affected, especially as a result of noise, shadow flicker, or being completely surrounded by wind turbines?

These questions are addressed in Section 6.11.6.5, based on the analysis that follows.

6.11.4 Visual Conditions on the Site and in Its Surroundings

The Project is proposed to be built on an approximately 10,480-acre, privately owned site located in western Converse County. The Project site is approximately 15 miles northeast of Casper, and approximately 10 miles northwest of the town of Glenrock.

6.11.4.1 The Project Site

The Project area is located along the western foothills of Pine Ridge, a north-south trending mountain range that extends from the area east of the Project site north into Natrona and Johnson Counties. Just beyond northern edge of the Project site is Blue Hill, the peak of which is visible from throughout lands to the west and south, and which would be within 1 mile of the northernmost proposed turbine. Cole Creek runs in a generally north-south direction along the western edge of the Project site. The land to the west and south of the proposed turbine locations is open in appearance and characterized by its rolling, sparsely developed terrain. Campbell Hill, approximately 3 miles west of the Project site, is the highest point in the area.

Development is scattered throughout the landscape, and consists mainly of ranches, rural residences, and a number of energy-related uses, including oil fields, wind turbines, a coal-fired power plant, and assorted transmission facilities. The proposed transmission corridor connecting the Project to an existing transmission line owned by PacifiCorp would extend southward through this area to a switching station near the Platte River. The land on which the turbines would be located is inaccessible by public roads.

There are no designated scenic routes (including National Forest Scenic Routes, BLM Scenic Backways, or Wyoming Scenic Loops) within or in the vicinity of the Project site. Converse County has an adopted land use plan, but has not adopted any zoning resolutions. Therefore, the proposed Project would not be subject to any specific height restrictions, design guidelines or other local laws, ordinances and regulations related to aesthetics.

6.11.5 Potential Project Visibility and Selection of Key Observation Points

As described in Section 6.11.3.2, a viewshed analysis was undertaken to determine the potential visibility of the proposed Project in the area extending 18 miles outward from the Project site. This analysis confirmed that because of the location of the tall turbines (up to 262 ft to the hub and up to 389 ft to the tip of the blade) and the open nature of the landscape, the turbines would be readily visible in unobstructed views from much of the immediately surrounding landscape, and would also be visible from much of the surrounding region in views from the northwest, west, southwest, south and southeast. Pine Ridge would serve to obstruct most regional views from the east, northeast and north. Although the turbines have potential to be visible in much of the surrounding area, the role that the turbines would play in the view would be greatly influenced by distance. Studies of the visibility of wind turbine structures suggest that structures in the size range proposed for this Project have the greatest potential to be visually dominant within a radius of about 2 miles from the structures, and that the degree of perceived visual dominance tapers off to a moderate level after about 3.8 miles, and a low level after about 9.3 miles (CPRW, 1999).

Because of the very low level of development in the surrounding region, the numbers of people who have close views of the Project site are relatively small. The closest

concentration of viewers is in the residential subdivision located along North Cole Creek Road, west of Johnson Hill, located approximately 5 miles from the closest planned turbine. There are additional residences along the North Cole Creek Road corridor, further west and north of the Project site. Larger concentrations of viewers are in Casper and Glenrock (15 and 10 miles away from the nearest turbine, respectively), and along I-25, where the nearest turbine would be approximately 10 miles away). This analysis focuses on the views from these nearby areas, which have the greatest potential for being affected by the Project. There are no substantial concentrations of viewers any closer to the Project site than those already described, and access to the site is available only by private road.

Four KOPs located in the area surrounding the Project site were selected for the visual analysis (Figure 6-3). Photographs taken of views from the KOPs toward the Project site were used to characterize existing viewing conditions and to provide the basis for preparing simulations of the views as they would appear with the Project facilities in place.

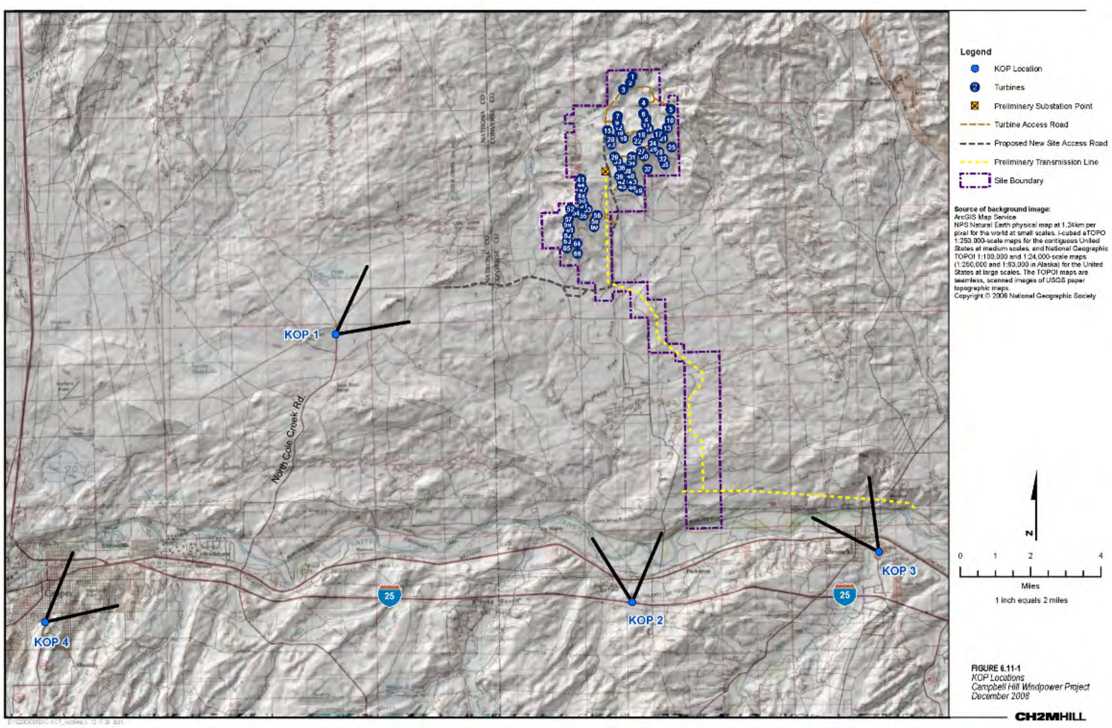

FIGURE 6-3
Campbell Hill Windpower Project and Locations of Key Observation Points

6.11.5.1 View Toward the Project Site from KOP 1

KOP 1 is located at the intersection of North Cole Creek Road and North Park Avenue, an elevated point overlooking a residential subdivision located immediately east of North Cole Creek Road. This viewpoint provides a mostly unobstructed view of the Project site beyond Campbell Hill from approximately 7 miles away.

The existing view from this KOP can be seen in Figure 6-4a. This view is representative of views experienced by motorists driving north on North Cole Creek Road as well as views seen by the residents of the rural residential subdivisions in the area. Although the numbers of viewers are relatively small, the sensitivity of views from this area is high because they represent views seen by residents. The overall visual quality of this view is moderate; landform is a particularly vivid component of the view because of the unobstructed view of the distant ridgeline and hills, extending from Blue Hill in the north to Campbell Hill in the south. The ridgeline in the distance also contributes a primary element of intactness to the view. However, because of the structures present throughout the foreground and middleground, the overall unity of the view is moderate, typical for views of distant ridgelines from within rural residential areas.

Figure 6.11-2a View to the northeast from the residential subdivision along North Cole Creek Road (KOP 1). Blue Hill is visible along the horizon, at the northern extent of the distant ridgeline (visible in the center of the view). Campbell Hill is visible to the right (and in front of) the southern extent of the distant ridgeline.

Figure 6.11-2b View from KOP 1 with project.

FIGURE 6.11-2
Key Observation Point 1
Campbell Hill Windpower Project
December 2008

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FIGURE 6-4
Key Observation Point 1

6.11.5.2 View Toward the Project Site from KOP 2

KOP 2 is located along I-25, at a designated pull-out along the westbound lane, providing a mostly unobstructed view of the Project site from approximately 10 miles away. The existing view from this KOP can be seen in Figure 6-5a. This view is representative of views experienced by motorists driving along I-25 and particularly those who may stop at this designated pull-out. The sensitivity of this view is moderate; the sensitivity of motorists viewing from long distances is typically considered to be low, but the designation of a pull-out location affords the opportunity for longer view durations. The overall visual quality of this view is moderately high to high. While the vividness of the view is moderate, the intactness is rated as being high to very high on account of the uninterrupted horizon in the distant background and mostly uninterrupted riparian zone (indicating the presence of the Platte River) in the middleground. The horizon appears to step up from relatively flat lands in the western (left) portion of the view to hills in the center of the view and to higher ridgelines in the eastern (right) portion of the view. These prominent, horizontal landscape features characterize the view, subordinating the built structures in the foreground, and compose a view that has a high degree of overall unity.

6.11.5.3 View Toward the Project Site from KOP 3

KOP 3 is located within a hilltop residential neighborhood in the southeastern portion of the town of Glenrock, approximately 12 miles away from the Project site. The existing view from this KOP, which is along South Lookout Drive, near South Sunset Road, can be seen in Figure 6-6a. This view is representative of views from the highest parts of Glenrock, the center of which is indicated in the view by the cluster of trees in the western (left) edge of the Figure 6-6a.

From most parts of Glenrock, the Project site is not visible. However, this viewpoint is located in one of several small pockets in Glenrock's hilltop neighborhoods from which the Project could be seen. The sensitivity of this view is high, as it is seen by residential viewers, who are assumed to have a high level of sensitivity to visual change. The overall visual quality of this view is slightly above average. The vividness of the view is somewhat less than that for KOPs 1 and 2, mainly due to the lack of distinctive features, such as prominent ridgelines, in the horizon. The undeveloped horizon line provides a moderately high degree of intactness to the view. The industrial-appearing processing facility visible beyond the town of Glenrock encroaches somewhat upon an otherwise intact view in the middleground. These features of the view, in conjunction with the residential structures and road in the foreground, result in an overall moderate level of unity.

Figure 6.11-3a View to the north from pullout area along the westbound lane of I-25 (KOP 2). Riparian vegetation across the view in the middleground indicates the location of the Platte River.

Figure 6.11-3b View from KOP 2 with project.

FIGURE 6.11-3
Key Observation Point 2
Campbell Hill Windpower Project
December 2008

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FIGURE 6-5
Key Observation Point 2

Figure 6.11-4a View to the north-northeast from State Route 12 (KOP 3). The industrial facility visible in the left-center part of this view is located approximately 1/10 of a mile beyond the Platte River.

Figure 6.11-4b View from KOP 3 with project.

FIGURE 6.11-4
Key Observation Point 3
Campbell Hill Windpower Project
December 2008

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FIGURE 6-6
Key Observation Point 3

6.11.5.4 View Toward the Project Site from KOP 4

KOP 4 is located at the base of the bell tower on the campus of Casper College, located within the foothills of Casper Mountain and overlooking downtown Casper, approximately 18 miles away from the Project site. The existing view from this KOP can be seen in Figure 6-7a. This view is representative of views toward the Project site from Casper's high elevation areas. This view is exceptional in that it provides an unobstructed view of the Project site not typically available in the central portions of the city. The sensitivity of this view is high, as it is from a designated look-out location on the college campus and is also intended to represent views from other areas of Casper, including nearby residential neighborhoods. The vividness of this view is moderately high, given the clear view of the distant ridgeline along the horizon, the slopes visible beyond the campus parking lot, and the presence of vegetation across the entire view in the middleground. The overall visual quality of this view is moderate however, due to the effect of the structure in the foreground on the view's intactness and overall unity.

6.11.6 Project Appearance

6.11.6.1 Project Construction

The on-site activities that will be required as a part of Project construction are described in Section 3.0, Construction and Operations Description. Project construction is expected to take place in a single phase, over a period of approximately 12 months. During that time, large earth moving equipment, trucks, cranes, and other heavy equipment will be in use on the Project site and within the proposed corridors for both the access road and transmission line. At some times, small, localized clouds of dust created by road-building and other grading activities may be visible at the site, though active dust suppression should minimize the frequency of such dust events. Because of the construction-related grading activities, areas of exposed soil and fresh gravel that contrasts with the colors of the surrounding undisturbed landscape may be visible. However, because of the distance between the Project site and the KOPs, it is unlikely that such alterations to the proposed Project site, access road route, or transmission route (which would be as close as approximately 4 miles from KOP 2, the closest viewpoint) would be particularly evident to viewers in the surrounding area. In addition, because the construction activities would take place over a period of only 12 months, any visible construction activities would be relatively short in duration, and would not result in any substantial, permanent impact to visual resources. As such, construction-related impacts are not discussed any further in this analysis.

Figure 6.11-5a View to the northeast from Casper College, located in the foothills of Casper Mountain and overlooking downtown Casper (KOP 4). Blue Hill is visible at the northern extent of the ridgeline visible in the distant horizon, in the center of the view.

Figure 6.11-5b View from KOP 4 with project.

FIGURE 6.11-5
Key Observation Point 4
Campbell Hill Windpower Project
December 2008

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FIGURE 6-7
Key Observation Point 4

6.11.6.2 Project Operation

The Project's major features are described in detail in Section 2.8, Wind Energy Facility Components. The Project's most visible features will be the 66 1.5-MW turbines, which will have a hub height of up to 262 ft, and a height to the rotor tip of up to 389 ft. In addition, two existing meteorological towers, with heights of 164 and 197 ft, will remain as permanent features within the footprint of the Project site. Output from the Project will be delivered to a 34.5/230 kV collector substation, centrally located on the Project site. The substation site will be located within a graveled, fenced area with transformer and switching equipment and an area to park vehicles. A new 230-kV transmission line will deliver the electricity and interconnect to the existing PacifiCorp transmission line.

To respond to the FAA aircraft safety lighting requirements, the Project will be marked in accordance with the FAA rules for lighting wind turbines that were adopted in 2007. These rules do not require daytime lighting if the towers are bright white or off white in color. For nighttime marking, the FAA requires lights that flash red (at 2,000 candela). The exact number of turbines that will require lighting will be specified by the FAA after it has reviewed final Project plans; however, the current rules specify that warning lights be mounted on the first and last turbines of each string, and every ½ mile on the turbines in between. The nighttime warning lights are designed to concentrate the beam in the horizontal plane, thus minimizing light diffusion down toward the ground and up toward the sky. Aside from any required aircraft warning lights, the turbines will not be illuminated at night. The lighting at the Project substation will be the minimum required for safety and security, and all light fixtures will hooded and directed to prevent light from shining into the sky or into areas outside of the substation site.

6.11.6.3 Project Decommissioning

As described in Section 3.10 Site Decommissioning, the Project's operational period is assumed to be 20 years or more. At the time the Project begins to reach the end of its useful life, the Project owner will either make plans to upgrade or replace the equipment to extend the Project's operating life, or make plans to remove the Project. At such time as the Project is decommissioned, all visible Project features will be removed and the surface of the site will be restored. As a consequence, after decommissioning, there will be essentially no lasting visual impact of any consequence.

6.11.7 Project Impacts

Project effects on the visual quality from each KOP are described below. As discussed above, the public does not have ready access to areas that are in close proximity to the site, so as a consequence, the KOPs selected for analysis are located at a substantial distance from the nearest proposed turbine (between approximately 7 miles away for KOP 1 and approximately 18 miles away for KOP 4). This section focuses on impacts from the proposed Project in daytime views. At nighttime, the aviation safety lights will create a highly dispersed array of small red lights that will blink intermittently, all at the same time. Because of the small size of the lights, and their distance from viewers in each of the views, the visual change that they create will not result in a high level of impact and will not be analyzed for each KOP.

6.11.7.1 Impacts on View from KOP 1

The simulated view of the proposed Project site from KOP 1 is depicted in Figure 6-4b. From this location, the entire north-south extent of the proposed Project would be visible, with the northernmost turbines appearing to the right of Blue Hill and the southernmost turbines appearing to the right of Campbell Hill. A number of turbines in the interior of the Project site would be obscured by Campbell Hill and other, more distant hills. The presence of the turbines would alter the character of this view in that the horizon would have a more developed appearance. Turbines would be visible in front of the distant ridgeline, and they would appear above the horizon currently formed by the ridgeline and Campbell Hill. The turbines appearing above the horizon would be particularly visible with only the sky as backdrop. The presence of the turbines would visibly alter the intactness of the horizon, and the overall unity of the view would be somewhat reduced. This noticeable change would result in a moderate decrease in the visual quality of the view. The evaluation of this impact is included in Section 6.11.6.5 below.

6.11.7.2 Impacts on View from KOP 2

The simulated view of the proposed Project site from KOP 2 is depicted in Figure 6-5b. From this location, the entire east-west range of the proposed Project would be visible, appearing to extend into the skyline above the hills that form the horizon in the center of the view. The proposed turbines would be a faint but noticeable addition to views from KOP 2, appearing as a new element in the prevailing landscape pattern in distant views. Because the turbines would be visible above the horizon, the intactness and overall unity of the existing view would be slightly reduced. This would result in a small reduction in the view's visual quality, which would nonetheless remain moderately high with the Project. The view from KOP 2 would also include the new transmission structures that would be added to the view as part of the Project. Though included in the simulation (6-5b), these features are barely detectable and would have essentially no effect on the visual character or quality of the view. Because of the distance from the turbines, and their less than substantial effect on the existing view's visual quality, the impact to visual resources resulting from the Project in views from KOP 2 would be limited. The evaluation of this impact is included in Section 6.11.6.5 below.

6.11.7.3 Impacts on View from KOP 3

The simulated view of the proposed Project site from KOP 3 is depicted in Figure 6-6b. From this location, the entire southeast face of the proposed Project would be visible. At this distance, however, the presence of turbines across the center of the horizon would be only slightly detectable. This addition of the turbines would result in the presence of vertical features along a relatively flat horizon, which would result in a more developed appearance along the horizon. This would constitute a very minor change in the visual character of the view. Compared with the current view of a mostly uninterrupted horizon in the distance, the intactness of the view with the Project would be reduced slightly with the turbines, and would result in a minor reduction in overall visual quality. Under these conditions, the visual quality would remain moderate, however, and the alterations would not result in a substantial impact to visual resources in views from KOP 3.

6.11.7.4 Impacts on View from KOP 4

The simulated view of the proposed Project site from KOP 4 is depicted in Figure 6-7b. From this location, the entire north-south extent of the proposed Project would be visible, and while the distance from the Project would reduce the prominence of the turbines, they are more visible than what might otherwise be expected. This is due to the elevated location of this viewpoint, which enables the turbines to be seen as skylined above the ridgeline. Under clear atmospheric conditions, the turbines would be noticeable from this and other elevated locations within Casper; they would appear as development on an otherwise undeveloped horizon, and would appear with the sky as backdrop, resulting in a change to the existing character of the view. The reduced intactness and overall unity caused by the presence of the turbines along the horizon would result in a diminishment of the overall visual quality of the view. These changes would be noticeable but not substantial. Therefore, the impact to visual resources from the Project in views from KOP 4 would be limited. The evaluation of this impact is included in Section 6.11.6.5 below.

6.11.7.5 Night Lighting

As discussed in Section 6.11.5.2, the Project would create new sources of nighttime lighting: lighting associated with the substation and nighttime marking lights, required for some of the turbines by FAA rules. The lighting at the Project substation will be the minimum required for safety and security, and all light fixtures will hooded and directed to prevent light from shining into the sky or into areas outside of the substation site. Because of the measures taken to shield and direct the light at the substation and because of the substation’s distance from offsite viewers, the substation lighting will not have a substantial effect on nighttime views toward the site.

At present, the Project site and immediately surrounding area are dark at night. The flashing red lights that the FAA requires to be operated at nighttime will introduce a new element into the Project area’s nighttime environment. Because the nighttime aircraft safety lights will be limited in number, red, and highly directional, their potential to create skyglow or backscatter will be minimal. Experience at other wind power sites indicates that the flashing red nighttime aviation safety lights have the greatest potential to be visible in areas within 1 mile of the site. Because there are no publicly accessible areas within 1 mile of the site and because most potential viewers of the site will be located in areas that are 4 miles and considerably further from the turbines, the small points of flashing red light may be detectable to some degree to viewers in the surrounding area, but will not dominate the views. The evaluation of this impact is included in Section 6.11.6.5 below.

6.11.7.6 Evaluation of Impacts

As discussed above, visual impacts resulting from the proposed Project would consist of the alterations to the landscape noticeable in views from KOP 1, KOP 2, and KOP 4. However, these impacts to visual resources would not be substantial. While the turbines would be noticeable additional features along the skyline, their presence in these views would be offset by the distance between the KOPs and the turbines. The turbines would not appear across the entire horizon, and they would not be prominent enough in any view to substantially alter the existing character or substantially reduce the existing visual quality in these views, including nighttime views.

In addition, the Project's impact to visual resources would not be substantial based on application of the criteria established by the National Research Council, as summarized in Section 6.11.2.4. Although the proposed Project would, to varying degrees, be visible from and alter the views from a number of locations that are seen by residents and the traveling public, the impacts will not be substantial based on the following conclusions:

- The Project is not located within an area that has been identified to be of major scenic or cultural significance.
- The Project area would not degrade views or scenic resources of state-wide significance.
- The Project would not visually intrude upon a natural or cultural landscape feature that is a regional focal point.
- The Project is not in a landscape area that is visually distinct and rare or unique.
- All turbines are located ½ mile or more from the nearest residences.

6.12 Wildlife Resources

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

This section identifies wildlife species known to occur or that potentially will occur within the area of the Project. There are no federal wildlife refuges, state wildlife areas, or conservation easements within or adjacent to the sites

6.12.1 Regulatory Jurisdiction

The State of Wyoming has jurisdiction over all wildlife in the state, placing species under management of the WGFD or the state Department of Agriculture. The WGFD is responsible for oversight of big game species, non-game species, and small game species that are non-migratory.

The USFWS has oversight of migratory bird species, whether they are hunted (e.g., waterfowl) or not (e.g., passerine species), and of all federal threatened, endangered, proposed, or candidate plant and animal species. Many of the species groups under USFWS regulations also receive management and protection under state statutes and regulations. WGFD participates in these activities through interagency operating agreements.

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6.12.2 Big Game

Both mule deer (*Odocoileus hemionus)* and American pronghorn (*Antilocapra americana*) use the area in and surrounding the Project area. Available seasonal range maps from WGFD indicate that no crucial winter ranges, parturition areas, or migratory routes for big game coincide with the Project area (WGFD, 2008).

6.12.2.1 Crucial Winter Range for Big Game Animals

One of the more important criteria for federal and state wildlife managers in Wyoming are land areas that are designed as "crucial winter range." This designation is one of six seasonal wildlife range classifications recognized and used by WGFD, the Wyoming State Land Board, BLM, U.S. Forest Service (USFS) Regions 2 and 4, USFWS, and the Natural Resources Conservation Services. Crucial range refers to: *"…any particular range or habitat component (often winter or winter/year long range in Wyoming), but describes that component which is the determining factor in a population's ability to maintain and reproduce itself at a certain level (theoretically at or above WGFD population objectives) over the long-term."* (Wyoming Wildlife Society, 1990) WGFD representatives indicate that crucial winter range areas are significant to sustaining big animal populations throughout the state. WGFD completed the mapping of all seasonal wildlife range areas for big game animals in 1988. Big game range maps are not included with this application because no big game ranges coincide with the Project area (WGFD, 2008).

6.12.2.2 Impacts

The Project site does not include any crucial winter range habitats for big game. Therefore, construction or operation of the Project would not cause a significant reduction in available crucial winter range.

All temporary disturbance areas will be reclaimed upon Project completion to ensure that there is no substantial impairment to the health, safety, or welfare of the present or expected big game populations caused by construction or operation of the Project.

6.12.3 Avian Resources

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

Ecology and Environment (E&E) completed two site assessment visits in April and May 2007 to evaluate the environmental setting and suitability of the Project site for development. E&E then collected avian bird use data on the Project site from September 9 to November 5, 2008. The purpose of the avian fixed point count surveys was to estimate the use and relative abundance of birds, with a focus on raptors. Raptor nest searches were completed during fall 2008 to identify raptor nests and facilitate impact avoidance and mitigation measures by Three Buttes.

6.12.3.1 Regulatory Jurisdiction

Migratory passerine birds and raptor species are protected from take by implementing acts and federal policies. The following details the acts and policies that currently protect migratory birds and raptors.

Migratory Bird Treaty Act. The Migratory Bird Treaty Act (MBTA) offers protection of 836 species of migratory birds (listed in 50 Code of Federal Regulations [CFR] 10.13), including waterfowl, shorebirds, seabirds, wading birds, raptors, and passerines. Generally speaking, the MBTA protects all birds in the United States, except

gallinaceous (upland game) birds, rock pigeons, Eurasian collared doves, European starlings, and house sparrows.

The MBTA implements various treaties and conventions between the United States and Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. Unless permitted by regulation, the MBTA provides that it is unlawful to pursue, hunt, take, capture, or kill; attempt to take, capture, or kill; possess; offer to or sell, barter, purchase, or deliver; or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product, manufactured or not.

According to the MBTA, a person, association, partnership, or corporation that violates the Act or its regulations is guilty of a misdemeanor and subject to a fine of up to $500, jail up to 6 months, or both. Anyone who knowingly takes a migratory bird and intends to, offers to, or actually sells or barters the bird is guilty of a felony, with fines up to $2,000, jail up to 2 years, or both. The USFWS is responsible for implementing the provisions of the MBTA, which is enforced by the USFWS Division of Law Enforcement.

Bald and Golden Eagle Protection Act. In addition to the protections afforded eagles under the MBTA, the Bald and Golden Eagle Protection Act (BGEPA) prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos)* or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing. Under the BGEPA take "includes also pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb" (16 U.S.C. § 668c).

The term "disturb" under the BGEPA has recently been defined as: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior" (72 CFR 31332). In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagles return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits and causes, or is likely to cause, a loss of productivity or nest abandonment.

USFWS Guidance. The USFWS issued Interim Guidance on Avoiding and Minimizing Impacts to Wildlife from Wind Turbines (Interim Guidance) on May 13, 2003. In 2004, the Director issued the Implementation of Service Voluntary Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines (USFWS, 2004) memorandum to attempt to better define the intent of the 2003 Interim Guidance. At this time, no final guidance document has been completed.

In developing mitigation recommendations, the Service is guided by the Fish and Wildlife Service Mitigation Policy (46 CFR 15; January 1981) in evaluating modifications to or loss of habitat caused by development. This policy follows the sequence of steps recommended in the Council on Environmental Quality's Regulations for Implementing

the Procedural Provisions of NEPA in seeking to avoid, minimize, or compensate for negative impacts. Mitigation can involve (1) avoiding the impact of an activity by taking no action; (2) minimizing impacts by limiting the degree of activity; (3) rectifying an impact by repairing, rehabilitating, or restoring an affected environment; (4) reducing or eliminating an impact by conducting activities that preserve and maintain the resources; or (5) compensating for an impact by replacing or providing substitute resources or environments.

6.12.3.2 Avian Species--Waterfowl, Passerine, Shorebirds, Upland Gamebirds, Raptors, and Waterbird Species

Waterbirds, passerines, raptors, upland gamebirds, and other birds have been documented within the Project area. Western Ecosystem's Technology (WEST) analyzed avian point count and raptor nest data collected by E&E during fall 2008. An Avian Use Summary Report detailing their findings is presented in **Appendix G**. Observed species are summarized below.

Avian Species in the Project Area. Thirty species were observed during the 86 point count surveys over 7 visits to the Project area in fall 2008. Over the course of the study, 458 groups comprised of 1,710 individual birds were recorded. Overall mean bird use calculated as (number/plot/survey) was determined to be approximately 12.24 birds/20-min survey for the fall season, with passerines having the highest mean use. Avian richness (defined as a number of species per survey) was 2.37.

Waterbirds. Shorebird observations were not abundant within the Project area. However, a flock of 42 sandhill cranes (*Grus canadensis*) was observed flying over the Project area during one field visit. Mean waterbird use was determined to be approximately 0.50 birds/20-min survey for the fall season, and composed 4.1 percent of the total birds observed. Frequency of occurrence was determined to be 1.2 percent.

Passerines. Horned larks (*Eremophila alpestris*) and western meadowlarks (*Sturnella neglecta*) were the most common passerines observed within the Project area. Passerines were the most abundant type of bird observed within the Project area (10.53 birds/plot/20-min survey). Passerines composed 86.1 percent of the total birds observed, and frequency of occurrence was determined to be 78.6 percent.

Raptors. Raptor species observed during field surveys include: American kestrel (*Falco sparverius*), ferruginous hawk (*Buteo regalis*), golden eagle, northern harrier (*Circus cyaneus*), peregrine falcon (*Falco peregrines*), prairie falcon (*Falco mexicanus*), rough-legged hawk (*Buteo lagopus*), redtail hawk (*Buteo jamaicensis*), and sharp-shinned hawk (*Accipiter striatus*). Golden eagle was the most commonly observed raptor with the Project area. Bald eagles were not observed within the Project area, but they are likely to occur due to available forage in the form of big game carrion and the Project's proximity to the North Platte River.

Raptors were the second most abundant type of bird observed (1.12 raptors/plot/20-min survey). Raptors composed 9.2 percent of the total birds observed, and frequency of occurrence was determined to be 63.9 percent.

Raptor prey species were observed by E&E during field surveys included desert cottontails (*Sylilagus audubonii*), white-tailed jackrabbits (*Lepus townsendii*), and black-tailed jackrabbits (*Lepus californicus*). Black-tailed prairie dog (*Cynomys ludovicianus*) colonies are also present in and near the Project area.

A total of 22 nests were located within the 1-mile survey area surrounding the original turbine locations, the proposed transmission line, and the main access road for the site (WEST, 2008). Ten nests were located within 1 mile of the originally proposed turbine locations, 13 nests were located within 1 mile of the proposed transmission line (nine of these nests were unique to the transmission line), and nine nests were located within 1 mile of the main access road (three of these nests were unique to the main access road). Please refer to the Raptor Nest and Greater Sage-grouse Resource Map in Appendix E. The density of all nests identified (active and inactive) within the raptor nest search area was 0.44 nests/mi^2 (0.17 nests/km^2), which falls within the range of active nest density estimates reported at other wind resource areas (Table 6-8).

TABLE 6-8
Comparison of Raptor Nest Densities Between the Campbell Hill Wind Resource Area and other U.S. Wind Energy Facilities

Location	Raptor Nest Density (#/mi^2)		
	Active Nests	**Inactive Nests**	**All Nests**
Proposed Campbell Hill Site, Wyoming	-	-	0.44
Seven Mile Hill, Wyoming	0.05	0.11	0.16
Foote Creek Rim, Wyoming	0.19	-	-
Simpson Ridge, Wyoming	0.13	-	-
Morton Pass, Wyoming	0.08	-	-
Cedar Creek, Colorado	0.56	0.62	1.19
Ponnequin, Colorado	0.06	-	-
Golden Hills, Oregon	0.25	-	-
Bigelow, Oregon	0.15	-	-
Klondike III, Oregon	0.16	-	-
Leaning Juniper, Oregon	0.41	-	-
Stateline, Oregon-Washington	0.21	-	-
Nine Canyon, Washington	0.03	-	-
Zintel Canyon, Washington	0.08	-	-
Buffalo Ridge, Minnesota	0.15	-	-
Klickitat County, Washington	0.12	-	-
Combine Hills, Oregon	0.24	-	-
Columbia Hills, Washington	0.30	-	-
Hopkins Ridge, Washington	0.43	-	-
Maiden, Washington	0.18	-	-

TABLE 6-8
Comparison of Raptor Nest Densities Between the Campbell Hill Wind Resource Area and other U.S. Wind Energy Facilities

Location	Raptor Nest Density (#/mi²)		
	Active Nests	**Inactive Nests**	**All Nests**
Wild Horse, Washington	0.16	-	-

Source: WEST, 2008.

Upland Birds. Upland game birds, including greater sage-grouse (*Centrocercus urophasianus*), were not observed by E&E during field surveys; however, greater sage-grouse have been recorded within the Project area (Wyoming Natural Diversity Database [WYNDD], 2008). Greater sage-grouse are covered in detail in Section 6.12.3.

Other Birds. Other birds were also recorded during avian use surveys, including mourning dove (*Zenaida macroura)*, hairy woodpecker (*Picoides villosus*), and turkey vulture (*Cathartes aura*). The total mean use of all other birds observed was 0.08 birds/plot/20-min survey). These other birds composed 0.7 percent of the total birds observed, and frequency of occurrence was determined to be 6.0 percent.

6.12.3.3 Impacts

Avian mortality has traditionally been an issue in the siting and operation of wind energy projects. Although avian mortality rates are dramatically lower due to advances in turbine technology and better siting decisions than in the past, avian mortality concerns remain an important issue with the WGFD for wind project permitting in Wyoming. Impacts during operation will be primarily limited to collision risk associated with WTG, whereas impacts during construction will primarily be limited to nesting season disturbance, temporary displacement of birds as a result of increased noise and activity levels, and temporary habitat degradation, and possibly some permanent displacement of individuals due to habitat loss associated with permanently cleared areas for roads, WTGs, and facilities.

Based on data collected by E&E and analysis by WEST, raptor and total bird use of the Project area during fall is similar to most wind resource areas evaluated throughout the western and midwestern United States using similar methods. Based on the results of the avian use studies conducted in 2008, and comparison to the Foote Creek Rim avian mortality data[2], estimated bird mortality at the Project area would likely be similar to that documented at other wind-energy facilities located in the western United States, where observed and documented bird collision mortality has been relatively low. Impacts to raptors and other birds are anticipated to be accordingly low for this Project with no significant population level impacts.

Based on point count and raptor nest data collected for the Project area, observed fall 2008 mean raptor use was 1.12 raptors/plot/20-min survey. Similar studies were conducted at 38 other wind-energy facilities. Mean raptor use for the fall season at these wind-energy

2 The Foote Creek Rim Wind Energy Facility, approximately 80 miles south of the proposed Project area, conducted an avian mortality study for a 3-year period from 1999 to 2002 (Young et al., 2003). Casualty data suggested that migrant and resident birds are susceptible to turbine or met tower collisions. However, in the study, a majority of the total observed avian casualties were passerines, and raptor casualty data was significantly less than predicted mortality estimates.

facilities ranged from 0.10 birds/20-min survey at the San Gorgonio wind-energy facility in California to 3.18 birds/20-min survey at the Diablo Winds facility, also in California (WEST, 2008). The overall mean raptor use during the fall season in the Project area is within the range of other similar wind energy facilities for which fall data could be compared. Additional bird use surveys are being conducted and are proposed to evaluate winter and spring avian use of the Project area.

An analysis of raptor collision mortality was performed by WEST, termed the exposure index. The exposure index analyses may provide insight into what species might be the most likely turbine casualties. The index considers relative probability of exposure based on abundance, proportion of daily activity spent flying, and proportion of flight height of each species within the zone of risk (ZOR), which is the area swept by the turbine blades. The exposure index analysis is based on observations of birds during the daylight period and does not take into consideration behavior other than flight characteristics. It also does not take into consideration habitat selection, seasonal variation in bird activity, the ability to detect and avoid turbines, and other factors that may vary among species and influence likelihood of turbine collision. For these reasons, the actual risk for some species may be lower or higher than indicated by this index. Horned larks had the greatest exposure risk rating. Golden eagles were ranked third and had the highest exposure index for raptors.

Impacts during construction would involve potential displacement of nesting birds due to habitat loss and disturbance associated with construction. These impacts will be minimized by completing ground disturbance activities (e.g., road construction) prior to nesting season to avoid potentially harming ground or shrub nesting birds or their young prior to the nesting season. Additionally, Project infrastructure (roads, WTG's, buildings, and transmission line) have been sited to avoid raptor nest sites where possible. In some areas, impact to raptor nests will be avoided by implementing relocation of nests from areas of high mortality risk to areas of subsequently low risk, greater than 1 mile from the nearest WTG. In other areas, nesting season restrictions prescribed by the WGFD will be adhered to by Three Buttes during construction. Nest avoidance and relocation plans were developed in coordination with the USFWS and WGFD and are presented in **Appendix H.**

Mortality surveys and monitoring of the Project area will occur in accordance with the Wildlife Mitigation and Monitoring Plan (Appendix H). The implementation of the Monitoring Plan will ensure that there is no substantial impairment to bird species and the health, safety, or welfare of the present or expected bird inhabitants in the area of primary affect.

6.12.4 Greater Sage-Grouse

The State of Wyoming and implemented by the Wyoming Game and Fish Department has management authority over the greater sage-grouse within the state's borders.

6.12.4.1 Regulatory Jurisdiction

Between 1999 and 2004, eight petitions to list the greater sage-grouse as threatened or endangered were filed, and a species status review was initiated as a result. In 2005, USFWS status review was completed, and it was determined that the greater sage-grouse was not warranted for listing as endangered or threatened. On December 4, 2007, the Federal District Court of Idaho reversed and remanded the USFWS 2005 12-month "not warranted" listing

decision for the greater sage-grouse as “threatened” or “endangered” under the ESA. Subsequently, on February 26, 2008, the USFWS announced the initiation of a status review for the greater sage-grouse. The USFWS initiated a 90-day review of best available scientific information. A new determination is anticipated in summer 2009 as to whether listing is warranted as threatened or endangered under the ESA.

Wyoming Governor Dave Freudenthal issued Executive Order 2008-02 on August 1, 2008 that directs state agencies to work to maintain and enhance greater sage grouse habitat in Wyoming. The Executive Order does not create any new authority and legally only applies to state agencies, but is a vehicle to at least align the existing authorities of state government to ensure that we move forward under a more unified framework. The recommendations spelled out in the Executive Order originated in the work of the Sage Grouse Implementation Team. Conservation efforts target core breeding areas for sage grouse.

6.12.4.2 Impacts

Greater sage-grouse were not observed by E&E during field surveys. Greater sage-grouse pellet-count transect surveys were completed during fall 2008 to compare pre- and post-construction use by sage grouse. Lek surveys will be conducted during spring 2009 as described in the Wildlife Mitigation and Monitoring Plan (Appendix H).

Greater sage-grouse leks are known from the general vicinity and the sage-grouse core area overlaps with the northern third of the Project area. No known sage grouse leks are located within the Project boundary; however, three sage grouse leks are located within 2 miles of the Project boundary. Two leks (one occupied, one unknown) are along the proposed transmission line; however, suitable nesting habitat is limited to only a few small isolated patches along the proposed transmission line. Another occupied lek is approximately 2 miles northeast of the northernmost WTGs (WGFD, 2008).

Based on a review of the Sage Grouse Core Breeding Areas Version 2 maps issued with Executive Order 2008-02, approximately one-third of the Project area falls within the Greater Sage-Grouse Core Population Area. The Core Population Area map can be seen in the Raptor Nest and Greater Sage-Grouse Resource Map in Appendix E.

To eliminate potential construction impacts to greater sage-grouse during the breeding season, Three Buttes will not conduct ground disturbing activities or place structures within 0.25 mile of known leks. Three Buttes will also avoid potentially suitable nesting habitat within 2 miles of known leks, or mow suitable nesting habitat prior to March 1, 2009, in areas where disturbance cannot be avoided. Sagebrush mowing wass recommended by WGFD and is intended to eliminate adverse impacts to potentially nesting greater sage-grouse.

6.12.5 Bat Resources

6.12.5.1 Regulatory Jurisdiction

Of the 45 species of bats found in the continental United States, six are federally listed as endangered under the ESA and receive incidental take provisions. In addition, BLM sensitive bat species are recognized for their rarity or vulnerability to various causes of

habitat loss or population decline and are generally recognized by federal, state, or other agencies. In Wyoming, both the BLM and USFS maintain sensitive bat species lists[3].

6.12.5.2 Impacts

WEST analyzed acoustical bat survey data collected by E&E from August 2008 through early November 2008 (Appendix G). The objective of the analysis was to estimate the seasonal and spatial use of the study area by bats and evaluate potential mortality risk. All recorded bat calls will be analyzed and broken down by frequencies to determine an overall classification of bats (e.g., calls < 35 kilohertz [kHz] in frequency; big brown bat, hoary bat). The total number of bat passes per detector night was used as an index for bat use in the Project area and were compared to other wind projects in both Wyoming and other western U.S. wind energy facilities.

Bat activity within the Project (mean = 2.03 bat passes per detector-night) was relatively low compared to that observed at facilities in Minnesota and Wyoming, where bat mortality was low, but it was much lower than activity recorded at sites in West Virginia and Tennessee and Iowa, where bat mortality rates were high. Thus, based on the presumed relationship between pre-construction bat activity and post-construction fatalities, WEST expects that expect bat mortality rates at the Project to be similar to the 2.2 bat fatalities/turbine/year reported at Buffalo Ridge, Minnesota, but much lower than the 20.8 fatalities/turbine/year reported at Buffalo Mountain, Tennessee.

Based on consultations with the WGFD, a post-construction avian and bat mortality monitoring program will be implemented to identify potential mortality impacts to bats. Mortality surveys and monitoring of the Project area will occur in accordance with the Wildlife Mitigation and Monitoring Plan (Appendix H). The implementation of the Wildlife Mitigation and Monitoring Plan will ensure that there is no substantial impairment to bat species and the health, safety, or welfare of the present or expected bat inhabitants in the area of primary affect resulting from operation of the Project.

6.13 Federally Listed Wildlife Species

Rule I Section 7(xiii)(P) – Preliminary evaluations of or plans and proposals for alleviating social, economic or environmental impacts upon local government or any special districts which may result from the proposed facility, which evaluations, plans and approvals shall cover other relevant areas.

Threatened and endangered wildlife species are protected under the federal ESA of 1973, as amended.

6.13.1 Regulatory Jurisdiction

Designated threatened and endangered fish and wildlife species are protected from incidental take by implementing acts and federal policies. The following details the ESA and policies that currently protect threatened and endangered species.

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[3] The BLM and USFS sensitive listing does not afford the bat species protection from incidental take provisions. However, federal actions on BLM and USFS lands require the agencies to enact protective measures for those sensitive bat species to ensure that they do not become federally threatened or endangered in the future.

6.13.1.1 Endangered Species Act of 1973

Those species classified as threatened or endangered are protected under the ESA, enforced by USFWS. Threatened or endangered species are considered "federally listed" or "listed" after a final rule has been published in the Federal Register. Federal candidate species, subspecies, or varieties are those plant and animal species being considered for listing as endangered or threatened, but for which a proposed regulation has not yet been published in the Federal Register. Wyoming does not have an endangered species act; therefore, only those species with federal designation are protected under the ESA.

Because the Project is entirely on private land and there is no federal nexus whatsoever, ESA Section 7 consultation is not required; however, Section 9 compliance may be necessary. If the construction or operation of the Project were to result in the take of an endangered species, the applicant would be in violation of the ESA.

Threatened and Endangered Species. Endangered species are those plant and animal species, subspecies, or varieties that are in danger of extinction throughout all or a significant portion of their range. The threatened category comprises plant and animal species, subspecies, or varieties likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

Candidate Species. Federal candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. Candidate species receive no statutory protection under the ESA. However, the USFWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA.

Sensitive Species. On federally administered and owned lands, the regulating federal agency (e.g., BLM, USFS) is required to manage sensitive plant and wildlife species those designated by the implementing Director as "sensitive." A sensitive species is defined by differently by the implementing federal agency; however, generally it is a species that could easily become endangered or extinct in the state or region. The Project will have no impact on federal lands.

6.13.1.2 Endangered Species Act - Plants

A major difference in the ESA is how it establishes broad prohibitions against "taking" endangered or threatened plant species. It is important to note that the "take" prohibition does not extend to plants on federal lands; however, by statute, it is illegal to "remove or reduce to possession" or "maliciously damage or destroy" threatened or endangered plants. Furthermore, protection for listed plants is significantly weaker on private lands where it is illegal to "remove, cut, dig up, or damage or destroy" plants only when it is "in knowing violation of any state law or in the course of any violation of state criminal trespass law." Stated another way, there are no federal prohibitions under the ESA for the take of listed plants on federal or nonfederal lands, unless taking of those plants is in violation of state law.

6.13.2 USFWS Threatened and Endangered Species

A review of the USFWS endangered, threatened, and candidate species for Wyoming (USFWS, 2008a) was conducted to identify species listed under the ESA that have the potential to occur in Converse and Natrona counties. Four species (two mammals and two plants) have the potential to occur within the counties, although none are recorded in or within 5 miles of the Project area with the exception of an historic record of black-footed ferret approximately 5 miles southwest of the Project in 1930 (WYNDD, 2008). Table 6-9 provides the species name, status, habitat, and potential for occurrence within the Project area. Potential for occurrence was determined based on a review of habitat requirements relative to those within the area proposed for disturbance. The greater sage-grouse, which is currently under status review by the USFWS, is discussed in detail in Section 6.12.4.

TABLE 6-9
Listed Threatened and Endangered Species in Converse and Natrona Counties, Wyoming

Species/Listing Name	Scientific Name	Status	Habitat	Potential for Occurrence
Black-footed ferret	*Mustela nigripes*	Endangered	The black-footed ferret is found almost exclusively in prairie dog colonies in basin-prairie shrublands, sagebrush-grasslands, and grasslands. It is dependent on prairie dogs for food and all essential aspects of its habitat, especially prairie dog burrows where it spends most of its life underground. An Experimental population is present in the Shirley Basin, over 60 miles southwest of the Project area.	None. Potentially suitable habitat is not present within the Project area.
Blowout penstemon	*Penstemon haydenii*	Endangered	Blowout penstemon occurs in the Sandhills of Nebraska and isolated areas of Wyoming in sandy, blowout locations with little to no vegetation present. Primarily occurs on sandhills or in valleys/depressions created by wind with shifting sands or lightly cultivated soils.	Possible. Potentially suitable habitat may be present along the transmission line corridor and will be avoided.
Preble's Meadow Jumping Mouse	*Zapus hudsonius preblei*	Threatened, Delisted in Wyoming, July 9, 2008[1]	Heavily vegetated, shrub dominated riparian areas and immediately adjacent upland habitats where available open water exists during their active season.	None. Potentially suitable habitat is not present within the Project area.
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened	Along riparian edges, gravel bars, old oxbows, high flow channels, and most to wet meadows along perennial steams. It typically occurs in stable wetland and seep areas.	None. Potentially suitable habitat is not present within the Project area.

[1] Species delisted in Wyoming July 9, 2008

Source: USFWS, 2008b.

Water depletions and effects to water quality in the Platte River System could affect five additional federally listed species and/or their critical habitats in downstream reaches in other states. Five species (interior least tern [*Sternula antillarum*], pallid sturgeon [*Scaphirhynchus albus*], piping plover [*Charadrius melodus*], western prairie fringed orchid [*Platanthera praeclara*], and whooping crane [*Grus Americana*]), occur downstream; however, water depletions associated with Project activities, described in Section 6.7, are minimal and will have no impact on the Platte River Watershed.

6.13.3 Impacts

No federally listed fish, wildlife, or plant species were observed within the Project area while conducting fall 2008 baseline avian surveys, bat detection surveys, and raptor nest searches, nor have any been documented in or within 4 miles of the Project area (WYNDD, 2008).

Black-footed ferrets. The Project area is within a "block-cleared" area for black-footed ferrets. A "block-clearance" status reflects the negligible likelihood of a wild population of ferrets occurring in an area. It does not mean the area is free of all value to black-footed ferrets. Mapping of prairie dog colonies will be conducted within the Project area and impacts to prairie dog colonies will be avoided and/or minimized to the extent possible.

Blowout penstemon. Blowout penstemon occurs in the Sandhills of Nebraska and isolated areas of Wyoming in sandy, blowout locations with little to no vegetation present, primarily on sandhills or in valleys/depressions created by wind with shifting sands or lightly cultivated soils. Sand dune habitat occurs along portions of the proposed transmission route and potential for small isolated blowout areas may occur; however, no ground disturbance will occur in the blowout areas of these habitats. Identified locations of potential habitat for blowout penstemon, if any, will be avoided by marking them on construction drawings as "no entry" areas and by flagging them in the field if necessary.

Preble's Meadow Jumping Mouse. There is no critical habitat within the Project area and there does not appear to be any potentially suitable habitat within the Project area for Preble's meadow jumping mouse. However, Three Buttes will avoid and/or minimize impacts to any potential Preble's meadow jumping mouse habitat.

Ute ladies'-tresses orchid. Ute ladies'-tresses orchid is a wet/riparian obligate species. Wet areas are isolated and rare in the Project area and will be entirely avoided by construction.

The black-footed ferret, Preble's jumping mouse, and Ute ladies'-tresses will not be impacted by the Project, and measures will be taken by Three Buttes to avoid impacts to potential habitat for blowout penstemon; therefore, no substantial impairment to the health, safety, or welfare of the present or expected federally listed plants and animals potentially occurring in the area of primary affect.

6.14 Cumulative Impacts

Rule I Section 7(j) – Cumulative Impacts. Cumulative impacts of the proposed industrial facility and other projects in the area of site influence should be addressed separately.

Cumulative environmental impacts as defined in the ISA Rules and Regulations means the combined impacts upon the environment to the social or economic conditions resulting from construction and operation of the proposed industrial facility and from construction and operation of other ongoing or proposed developments in the area of site influence. Proposed developments to be included in cumulative impacts include those developments that are actively planning and have public information available, or may be actively permitting.

According to records of the ISD, the PacifiCorp Glenrock wind energy project, located approximately 5.2 miles east of the Project, will be in operation in January 2009. The Dave Johnson Project is not an Industrial Siting project, but is considered in this assessment of cumulative impacts. Similarly, Chevron Global Power Company has applied for a conditional use permit (CUP) from the Natrona County Planning Commission to allow a commercial wind energy project to potentially be constructed during summer 2009. The proposed Chevron project would consist of 11 1.5-MW wind turbines and would be located approximately 15 miles southwest of the Project. Additional windpower projects and other energy development projects may be planned for the region; however, none are actively planning and have public information available for analysis; therefore they are not required to be analyzed under ISA statute. Future activities are likely to include:

- oil exploration and extraction;
- natural gas exploration and extraction;
- pipeline construction;
- electric transmission line construction;
- wind power generation projects;
- coal gasification; and
- uranium exploration and extraction.

6.14.1 Air Quality

Incremental impacts to air quality could result from fugitive dust emissions from truck traffic, together with other sources of particulate emissions associated with the operation of a concrete batch plant would cause particulate concentrations to increase above normal background levels, causing localized dust impacts. However, dust emissions would not contribute to cumulative impacts to regional air quality because they would be localized and temporary, and further controlled to minimize impacts. The Project would avoid cumulative pollutant emissions from fossil-fired facilities that would be necessary to generate equivalent amounts of power.

6.14.2 Noise

Local residents along the Project access road may experience intermittent noise increases from construction vehicle traffic during the daytime period. Noise generated by on site construction activities will not reach the nearest residential areas, and thus will have no cumulative impact on typical background levels in rural areas. Turbines, substations, transmission lines, and maintenance activities during the operational phase would also approach typical background levels for rural areas at distances of 2,000 ft (600 m) or less and, therefore, would not be expected to result in cumulative impacts to local residents.

6.14.3 Soil Resources/Geologic Hazards

There will be localized disturbance of soils associated with construction of facilities at turbine sites and access roads, and along the proposed transmission line alignment. These impacts will be minimized by mitigation measures designed to guard against erosion. The Project will be designed and constructed to avoid or minimize impacts, and mitigation measures will be implemented in order to alleviate potential impacts of construction. No other foreseeable action will contribute to cumulative impacts on soil resources or geologic hazards within the Project site. Cumulative impacts to soil/geologic resources or seismic characteristics from construction or operation of the Project are not expected to be significant. Mitigation for potential impacts is discussed under Section 7.3, *Plans for Alleviating Impacts, Soil Resources and Geologic Hazards.*

6.14.4 Cultural Resources

The Project layout has been designed to avoid impacts to known cultural resources potentially eligible for listing under the NRHP. Additionally, micrositing of Project related features greater than 200 ft from identified NRHP-eligible archaeological sites will result in no adverse impact to cultural resources by the Project. Therefore, cumulative impacts to such cultural resources would not occur. The nearest wind power project is located approximately 5.2 miles east of the Project, thus cumulative impacts to cultural resources with a visual component (i.e., sacred landscapes or important viewsheds) would be minimal or negligible associated with construction and operation of the Project.

6.14.5 Vegetation Resources

No rare or unique vegetative communities are documented within the Project area; therefore, construction or operation of the Project will not contribute to cumulative degradation of these resources. Cumulative impacts on vegetation resources include direct impacts to soil and vegetation from construction of turbines and access roads and potential spread of noxious weeds to new sites. To limit infestations and new populations of noxious weeds, the disturbed sites will be will be actively controlled via an approved control methodology and seedmix prescribed by the Converse County Conservation District of the USDA's NRCS. Impacts from construction and the spread of noxious weeds will be controlled using BMPs.

6.14.6 Surface and Groundwater Resources

No surface water will be used for the Project, and construction activities are not anticipated to discharge into surface waters. Existing and future development, livestock grazing, and transportation corridors all contribute to cumulative impacts on surface water through some level of increased sedimentation. During construction, water is required for mixing of concrete and dust control along access roads and other areas of temporary disturbance around the turbines. This water will be obtained from a well, permitted by the WSEO.

After the Project is operational, minimal quantities of water are needed. Implementation of mitigation measures to control runoff during construction and operation of the Project will prevent significant impacts to surface waters from erosion and sedimentation. In addition, implementation of BMPs for handling, storage, and use of hazardous materials and

adherence to applicable permits during construction and operation of the Project will prevent significant cumulative impacts on surface and groundwater resources.

6.14.7 Land Use and Recreation

Appropriate planning and evaluation to address cumulative impacts is conducted by the State of Wyoming through the Industrial Siting Application to ensure that the proposed Project is compatible with ongoing activities and land uses. The Projects' contributions to cumulative impacts on land use would be small or negligible unless a significant permanent, uncompensated loss of the current productive use of a site occurred or if future uses were precluded. Land in the Project area is used as rangeland for livestock grazing and hunting. The Project would generally be compatible with the aforementioned uses, with the exception of hunting, which will not be allowed in the vicinity of Project infrastructure.

The Project will be constructed and operated in accordance with county land use and building requirements; therefore, the Project will cause no significant cumulative impacts that are detrimental to established uses of the surrounding area. The minimal incremental increase in visitation and use of regional recreational areas during construction of the Project is not anticipated to impact recreational use cumulatively. The small number of workers at the Project area at any one time is not likely to increase cumulative impacts to land use and recreation.

6.14.8 Wetland/Waters of the U.S. Resources

Due to micrositing activities by Three Buttes that will avoid impacts that may impair the health, safety, or welfare of the resource or the health, safety, or welfare of the present or expected waters of the U.S. resources in the area of primary affect, no adverse impacts to wetland and waterbody resources are anticipated from construction or operation of the Project. Based on the preliminary site layout, Project road and power collection line construction activities will result in minimal discharges of dredged or fill materials into potentially jurisdictional wetland and waters of the U.S., and impacts to potential waters of the U.S. will be minimized using BMPs such as culverts. Due to anticipated minimal to no impact of the Project to jurisdictional wetlands and waters of the U.S., cumulative impacts to jurisdictional features will not be significant.

6.14.9 Visual Resources

Because of the rural setting and lack of sensitive receptors both within and adjacent to the permit area, impacts to visual resource concerns should be minimal. The WTGs will not significantly degrade the scenic quality of the area and will contribute minimally to cumulative impacts to the viewshed and aesthetic qualities of the landscape.

6.14.10 Wildlife Resources

Construction of the Project will potentially cause temporary displacement of individuals for some wildlife species that would evacuate the area in response to construction activity. Operation of the wind farm will permanently reduce existing habitat by a finite amount, resulting in potential displacement of wildlife to surrounding habitats that are potentially less suitable and less available. Impacts associated with alteration or destruction of habitats

will be minimized with the use of BMPs, including incorporation of WGFD and USFWS guidance where appropriate.

6.14.11 Avian Resources

The presence of WTGs may also alter the landscape so that avian use patterns are altered, thereby displacing wildlife away from the Project facilities. Reduced avian use near turbines has been attributed to avoidance of turbine noise and maintenance activities and reduced habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Leddy, 1996; Johnson et al., 2000). However, it is unlikely that displacement of birds during construction or operation would result in any population impacts at the Project site due to the abundance of undisturbed native habitat in the region.

A potential impact on avian resources will be the potential for collisions with turbines. Using baseline avian usage survey data and comparing to operational monitoring data collected at existing wind projects, raptor collision mortality at the Project site is estimated to be comparable to other similar size projects in the region. Passerines are likely to make up the largest proportion of fatalities at the Project site based on their abundance. Avian collision deaths for all existing wind energy projects are estimated at 10,000 to 40,000 each year (Erickson et al., 2001). Even as the number of wind turbines in the United States increases, wind turbine-related bird fatalities would still cause no more than a small percentage of all collision deaths related to other non-wind-power related structures (Erickson et al., 2001). Three Buttes will conduct post-construction avian fatality monitoring at the Project area commencing in spring 2010. It is anticipated that the cumulative contribution to potential avian mortality will be similar to those reported for other studies in Wyoming and the Western United States.

6.14.12 Bats

On the basis of bird and bat monitoring studies at existing wind energy projects, the contribution of wind projects to cumulative impacts on bats would likely be minimal in comparison with population declines from other causes (e.g., habitat loss or fragmentation). No impacts to bats are expected during construction; however, to more accurately determine impacts on bats, Three Buttes will conduct post-construction bat fatality monitoring at the Project area commencing in spring 2010. It is anticipated that the cumulative contribution to potential bat mortality will be similar to those reported for other studies in Wyoming and the Western United States.

6.14.13 Federally Listed Wildlife Species

During construction or operation the Project will have no impact to the four federally listed threatened or endangered species with potential to occur in Converse and Natrona Counties. Potential habitat, if present, will be avoided for the blowout penstemon, eliminating the potential for impact to this species. The remaining three species (black-footed ferret, Ute ladies'-tresses, and Preble's meadow jumping mouse), are extremely unlikely to occur within the Project area due to lack of suitable habitats and will not be impacted by the Project. Therefore, cumulative impacts to threatened and endangered species or their critical habitat will not occur as a result of the Project.

7.0 Plans for Alleviating Impacts

Rule I Section 7(k)(i) – Controls and Mitigation Measures. The applicant shall describe the procedures proposed to avoid constituting a public nuisance, endangering the public health and safety, human or animal life, property, wildlife or plant life, or recreational facilities which may be adversely affected by the proposed facility, including impact controls and mitigating measures proposed by the applicant to alleviate adverse environmental, social and economic impacts associated with construction and operation of the proposed industrial facility.

A number of specific mitigation measures will be implemented to alleviate impacts related to construction and operation of the Projects. These mitigation measures are described in the following sections, organized by environmental resource.

7.1 Air Quality

The following mitigation measures will be followed to reduce dust and air emissions from the Project's construction-related activities:

- Construction-related dust disturbance shall be controlled by the periodic application of water or other dust suppressants to all disturbed areas along the right-of-way and access roads.
- Vehicles and other equipment shall be maintained and kept in good repair to minimize emission of exhaust gases.
- Any stationary sources associated with construction activities requiring WDEQ–AQD permits shall be controlled in accordance with relevant regulations and issued conditions.

7.2 Noise

Although no impacts to residents are anticipated, the following mitigation measures will be followed to reduce noise and the potential for annoyance from the Project's construction-related activities:

- Construction and hauling equipment shall be maintained adequately and equipped with appropriate mufflers.
- Noisy construction activities that might result in legitimate complaints, such as blasting or pile driving, shall be limited to daytime hours if feasible.
- Stationary construction equipment (air compressors/concrete batch plant/generators) shall be located away from residences to minimize noise impacts.

7.3 Soil Resources/Geologic Hazards

Erosion control measures and reporting measures will be prescribed in the WYPDES permit and administered through construction specifications and general contractor implementation. Therefore, site-specific erosion control measures will be monitored for effectiveness to minimize the impacts to soils during and after construction.

The following mitigation measures will be followed to reduce soil and geologic hazards impacts from the Project's construction-related activities:

- An erosion control plan shall be prepared as part of the Project's SWPPP that addresses excavation, grading, and placement of erosion control measures during and after construction. On completion of the construction activities, all work areas, except any permanent access roads/trails, shall be regraded, as required, so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion. Revegetation shall be implemented for all areas temporarily disturbed by the Project construction.
- Construction zones and areas to be disturbed shall be well-defined, limited in extent, and managed by onsite inspectors and construction managers.
- Periodic inspection shall be made of erosion control measures and as required after precipitation events. Erosion control measures shall be repaired or replaced, as necessary.
- Berms and other water-channeling measures shall be used to direct stormwater runoff to appropriate detention ponds, where necessary.
- Barriers and other measures including hay bales, silt fences, and straw mulches shall be used to minimize and control soil erosion.
- Side slopes created by grading shall not exceed the soil strength limits, as prescribed by the final road design and turbine layout engineering design. Potentially unstable areas shall be identified and avoided.
- Mitigation for arroyos/gullying includes erosion protection in key areas, properly sized culverts at stream or drainage crossings, and avoiding placing structures or roads in areas that are susceptible to rapid erosion or gullying.
- Transmission poles and turbines shall be located to minimize impact on potentially unstable sand dunes.
- The seismic site class according to the International Building Code (IBC) shall be determined, and structures and turbine foundations shall be designed to withstand appropriate seismic loads.

7.4 Cultural Resources

The following mitigation measures will be followed to reduce cultural resources impacts from the Project's construction-related activities:

- Known cultural resource locations eligible for listing on the NRHP shall be avoided by marking them on construction drawings as "no entry" areas and by flagging them in the field, if necessary. Construction crews will participate in environmental compliance training, including the necessity of avoiding cultural resource sites, to further increase awareness of the site and to prevent accidental damage to known and undiscovered cultural resources. Artifact Finding Instructions for all on-site employees are presented in **Appendix I**.
- Should any previously unknown historic/prehistoric sites or artifacts be encountered during construction, all land-altering activities at that location shall be immediately suspended and the discovery left intact until such time that Three Buttes and the landowner are notified and appropriate measures are taken to ensure compliance with the NHPA and enabling legislation.
- Should any human remains be discovered, the appropriate County Coroner shall be immediately notified.
- If, during micrositing and final site design, Project features are required to be located outside of the area inventoried for cultural resources, additional surveys shall be completed to ensure avoidance of unevaluated or eligible sites, or an archaeological inspector or monitor shall be brought to the site to ensure potentially eligible sites are avoided.

7.5 Vegetation Resources

On completion of the construction activities, all work areas, except any permanent access roads/trails, shall be regraded so that all surfaces drain naturally, blend with the natural terrain, and are left in a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion. Revegetation shall be implemented for all areas temporarily disturbed by the construction of the Project in accordance with the desires of the landowner.

The methods described below are recommended for all areas of temporary ground disturbances throughout the Project area.

7.5.1 Revegetation Plan

A seed mixture was developed for the Project in consultation with the District Conservationist, for the Converse County Conservation District of the U.S. Department of Agriculture Natural Resources Conservation Service. Three Buttes will use the same seed mixtures to revegetate all temporarily disturbed areas inside the Project boundary; however, the respective landowners will have the final authority on the implemented seed mixture. Table 7-1 lists the developed seed mixtures for two soil types and one vegetation type.

Re-seeding and mulching will be done utilizing commercially accepted practices as appropriate for the soil and terrain being restored. Temporary seeding should be done from March to April (for disturbance that occurs during the winter and spring) and/or October to November (for disturbance that occurs in the summer and fall). Permanent seeding should be done from October to November following the onset of winter and spring seasonal rains. Disturbed, unseeded ground may require chemical or mechanical weed control in May or June, before weeds have a chance to go to seed.

TABLE 7-1
Seed Mixture for Campbell Hill Windpower Project

Scientific Name	Variation	Common Name	Pure Live Seed (lbs per acre)
Grasses			
Agropyron dasystachyum	var. Critana	Thickspike Wheatgrass	1.5
Agropyron riparium	var. Sodar	Stream bank wheatgrass	1
Agropyron smithii	var. Rosana	Western wheatgrass	3
Elymus trachycaulus		Slender wheatgrass	2
Agropyron inerme	var. Whitmar	Beardless bluebunch	1
Agropyron spicatum	var. Secar	Bluebunch wheatgrass	2
Schizachyrium scoparium		Little bluestem	0.5
Calamovilfa longifolia	var. Goshen	Prairie sandreed	1
Elymus cinereus	var. Magnar	Great basin wildrye	1.5
Leymus racemosus		Mammoth wildrye	1.5
Bouteloua gracilis		Blue grama	2
Andropogon hallii		Sand bluestem	1
Koeleria cristata	var. Barkoel	Prairie junegrass	1
Poa sanbergii		Sandberg bluegrass	1
Oryzopsis hymenoides	var Rimrock	Indian ricegrass	1
Stipa comata		Needle and thread	1.5
Stipa viridula	var. Lodorm	Green needlegrass	1.5
Forbs			
Achillea millefolium		White yarrow	0.5
Linum lewisii	var. Appar	Blue flax	0.5
Petalostemum purpeum		Purple prairie clover	0.25
Ratibida columnaris		Prairie cone flower	0.75
Shrubs			
Artemisia tridentata	var.Wyomingensis	Big sagebrush	1
Atriplex canescens	high elev	Fourwing saltbush	0.5

Source: NRCS (Tim Schroeder), December 2008.

Erosion control measures may be installed after seeding and may include filter bags, sediment fences, silt curtains, sediment traps, or other similar devices or impervious materials. Erosion control measures will be implemented until soils are stabilized by a vegetation growth from seed planting.

The following mitigation measures will be followed to reduce impacts to native vegetation from construction-related activities:

- Three Buttes and its contractors shall exercise care to preserve the natural landscape and shall conduct construction operations (including all construction-related activities and Three Butte's designated access roads/trails and staging areas) to prevent any unnecessary damage to, or destruction of, natural vegetation features.
- Disturbed soil surfaces shall be stabilized with the appropriate native seed mixture as soon as practicable after construction. Areas of soil disturbance shall be seeded with the referenced seed mixture or as agreed with the landowner.
- Landscape fabric, cellulose, straw mulch, or other suitable erosion control materials shall be used according to manufacturer/supplier specifications for application to ensure adequate temporary erosion control.

7.6 Surface Water and Groundwater Resources

Under Section 402 of the CWA, construction stormwater permitting is required for projects that will disturb more than 5 acres. As previously discussed, the Project will require a WYPDES NOI to be prepared for a general construction permit for stormwater discharges, as well as a SWPPP for the construction phase at the Project site. The construction SWPPP will focus on sedimentation and erosion controls during construction and will set forth a schedule for regular inspections of appropriate controls at the construction site.

Construction activities shall be performed using methods that prevent entrance or accidental spillage of solid matter, contaminant debris, and other objectionable pollutants and wastes into flowing streams or dry water courses, lakes, and underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution. These prevention activities will be detailed in the Project SWPPP.

7.7 Land Use

The following mitigation measures will be followed to reduce land use and recreation impacts from construction-related activities:

- To the extent feasible, the contractor shall limit movement of crews, vehicles, and equipment on the right-of-way and approved access roads to minimize damage to property and disruption of normal land use and recreation activities.

- The contractor shall maintain all fences and gates during the construction period. Any fence or gate damaged during construction shall be repaired immediately by the contractor.
- The contractor shall eliminate, at the earliest opportunity, all construction ruts that are hazardous to agricultural or ranching operations and/or movement of vehicles and equipment. Such ruts shall be leveled, filled, and graded or otherwise eliminated in an approved manner. Damage to ditches, tile drains, culverts, terraces, local roads, and other similar land use features shall be corrected, as necessary, by the contractor. The land and facilities shall be restored as nearly as practicable to their original condition.
- Construction trails not required for maintenance access shall be restored to the original contour and made impassable to vehicular traffic. The surfaces of such construction trails shall be scarified as needed to provide a condition that will facilitate natural revegetation, provide proper drainage, and prevent erosion.

7.8 Wetland/Waters of the United States Resources

As described in Section 7.6, construction stormwater permitting is required under Section 402 of the CWA for projects that will disturb more than 5 acres. The Project will require a WYPDES NOI to be prepared for a general construction permit for stormwater discharges, as well as a SWPPP for the construction phase at the Project site. The construction SWPPP will focus on sedimentation and erosion controls during construction and will set forth a schedule for regular inspections of appropriate controls at the construction site.

Micrositing appurtenant linear features during the final design phase will prevent potential impacts to wetlands or waterbodies. The Project shall be constructed in compliance with the CWA.

7.9 Wildlife Resources

In addition to preconstruction surveys, construction surveys, and post-construction surveys of wildlife, and banding activities to obtain information on the success of mitigation efforts, Three Buttes will determine the final Project layout in response to raptor nest and sage-grouse lek locations.

The following mitigation measures will be followed by Three Buttes to ensure no adverse impacts to wildlife from construction-related activities:

- WTGs, roads, and structures shall be sited a minimum of ½ mile from previously identified raptor nests.
- Three Buttes shall honor WGFD-recommended nesting season restrictions (no disturbance within 1 mile of active ferruginous hawk nests from April 1 to August 1; no disturbance within ½ mile of active golden eagle nests from February 1 to August 1).

- Where avoidance of a raptor nest site is not practical due to other constraints (e.g., wind resource, landownership, or geotechnical considerations), the nest shall be relocated in accordance with the plan developed with the USFWS (Appendix H).
- Artificial nest structures shall be installed to encourage nesting raptors to use sites away from the area of potential impact during construction and operation of the Project in accordance with the plan developed with the USFWS (Appendix H).
- Monitoring of relocated nests and associated birds shall be conducted to determine if additional mitigation activities are needed during operation of the Project.
- The transmission line shall be sited to observe a minimum ¼-mile buffer from greater sage-grouse leks.
- Raptor perch prevention devices recommended by the Avian Power Line Interaction Committee (APLIC) shall be implemented within 2 miles of greater sage-grouse leks.
- Greater sage-grouse nesting habitat will not be disturbed from March 1 through July 15.

7.10 Monitoring Programs

Rule I Section 7(k)(ii) – Monitoring Programs. The applicant shall describe the procedures proposed to avoid constituting a public nuisance, endangering the public health and safety, human or animal life, property, wildlife or plant life, or recreational facilities which may be adversely affected by the proposed facility, including monitoring programs to assess effects of the proposed industrial facility and the overall effectiveness of impact controls and mitigating actions.

Monitoring of the Project will include collection of avian and bat collision mortality data, raptor nesting surveys, greater sage-grouse lek surveys, bird use monitoring, and evaluations of potential displacement of greater sage-grouse through pellet count surveys. The detailed Wildlife Mitigation and Monitoring Plan, developed for the Project in coordination with WGFD and USFWS, is presented in Appendix H.

7.10.1 Avian and Bat Monitoring

Avian and bat fatality monitoring will be conducted during Year 1 of operation of the Project, and if deemed necessary, up to 3 years post construction. The objective of the fatality monitoring study is to estimate the annual number of avian and bat fatalities attributable to wind turbine collisions from Project operations throughout Year 1 of operation. This information will be used to determine whether impact levels for the Project are within acceptable ranges and are consistent with preconstruction mortality estimates and with reported data from other wind projects in the region. The scope and duration of the monitoring program were developed to be consistent and within the range of monitoring programs that have been or will be conducted at other wind projects in Wyoming and the Western United States with features similar to the Project, including other wind energy projects currently owned by Duke Energy.

7.10.2 Raptor Monitoring

Raptor nest surveys will be conducted during the 2009 construction period, during Year 1 of operation of the Project, and if deemed necessary, up to 3 years post construction to identify new or previously undocumented raptor nests and to evaluate use and productivity of known nests in or within 2 miles of the Project area. The objective of the raptor surveys is to determine the success and productivity of nesting raptors within the area and to identify the need for potential adaptive management.

To the extent possible, all ferruginous hawk and golden eagle chicks produced from nests in and near the Project area will be banded prior to fledging. The objective of the banding activity is to provide a means of identifying local ferruginous hawk and golden eagles in the event of a fatality during operation of the Project. Ferruginous hawk and golden eagle chicks will be banded each year, beginning spring 2009, for up to 3 years post construction. Additional species may be banded opportunistically and ancillary to this objective.

7.10.3 Bird Use Monitoring

Surveys of ongoing bird use of the Project area will be conducted during winter 2008/2009 and during the spring 2009 construction period. By utilizing standardized methods, results from these surveys can be compared to other wind energy facilities where similar studies have been conducted and post-construction fatality data are available. If deemed necessary, bird use surveys would be continued for up to 3 years post construction to identify the temporal and spatial use of the study area by birds, particularly raptors. Extended surveys would be used to determine changes in bird use and movement patterns following construction, to evaluate the effectiveness of mitigation measures, and to identify additional mitigation measures, if necessary. The detailed Wildlife Mitigation and Monitoring Plan, developed for the Project in coordination with the USFWS and WGFD, is presented in Appendix H.

7.10.4 Prairie Dog Colony Mapping

The objective of mapping prairie dog colonies is to identify the location of colonies in and near the Project area. Prairie dog colonies represent a potential prey source for raptors, and information on their distribution may be useful in future management decisions.

7.10.5 Greater Sage-Grouse Monitoring

Pellet count surveys of greater sage-grouse will be conducted during the 2009 construction period, during Year 1 of operation of the Project, and if deemed necessary, up to 3 years post construction. The objective of the pellet count studies is to determine the level of displacement impact, if any, from avoidance or reduction in habitat use due to the presence of the operating turbines. Pellet counts for greater sage-grouse will occur at turbines located in habitats dominated by sagebrush, and at comparable areas away from the Project site to serve as a basis for comparison. Data will be compared seasonally and annually to evaluate response to the Project and determine the need for adaptive management, if any.

Lek surveys of greater sage-grouse will be conducted during the 2009 construction period, during Year 1 of operation of the Project, and if deemed necessary, up to 3 years post construction. The objective of the lek count surveys is to contribute to the WGFD

sage-grouse lek database to enhance the agency's ability to estimate and monitor population changes. Greater sage-grouse lek surveys will be conducted from the ground at leks near the Project area to compare with data from leks located outside of the Project area.

7.10.6 Federally Listed Species

Identified locations of blowout penstemon potential habitat locations, if any, will be avoided by marking them on construction drawings as "no entry" areas and by flagging them in the field if necessary. All ground disturbance associated with Project activities will be avoided in areas identified as potential habitat for the species. Construction crews will participate in environmental compliance training to further increase awareness of the site and to prevent accidental damage to potential blowout penstemon habitat or plants.

7.10.7 Technical Advisory Committee

A technical advisory committee (TAC) will review the monitoring protocols, assess study results, and prepare recommendations for Three Buttes at the completion of the Year 1 monitoring studies. The TAC will be composed of representatives from state/federal agencies, state/local government, and resource specialists designated by Three Buttes.

7.10.8 Employee Orientation Program

To reduce employee-wildlife incidents, construction workers will receive information on wildlife awareness during their new employee orientation program. The program will include, at a minimum, the following information:

- Restrictions and/or prohibitions of construction employees' access to sensitive wildlife activity areas.
- Applicable wildlife laws and resident hunting requirements.
- Policies and laws penalizing wildlife harassment and poaching.
- Statement prohibiting the possession of firearms on the Project site except as permitted by agreement with the landowner.
- Reporting procedures and requirements for vehicle collisions with wildlife.

Potential impacts to wildlife through habitat alteration or destruction will be minimized by revegetating disturbed areas where possible and by efforts to minimize and mitigate damage to soils and vegetation as described in Sections 7.3 and 7.5, respectively.

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APPENDIX A

Impact Assistance Calculation

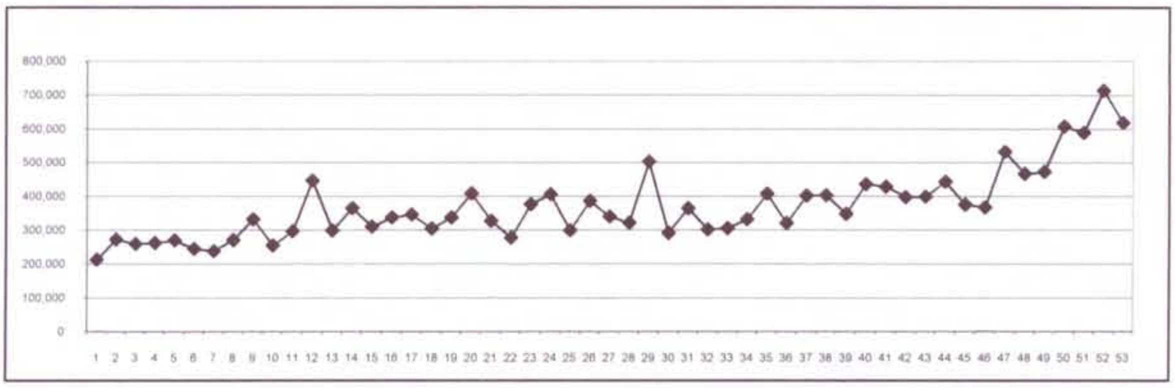
History of State Sales and Use Tax Given to Converse County Governments

		State Share Given			State Share Given to Muni's			Total
Serial	Month	Sales	Use	Total	Sales	Use	Total	
1	July 04	9,013	1,069	10,082	179,819	22,467	202,286	212,368
2	Aug 04	11,747	1,456	13,203	232,371	26,150	258,521	271,724
3	Sep 04	11,858	1,272	13,130	217,584	27,779	245,363	258,493
4	Oct O4	11,730	1,323	13,053	216,870	31,534	248,404	261,457
5	Nov 04	11,874	1,429	13,303	225,314	30,209	255,523	268,826
6	Dec 04	10,906	1,414	12,320	211,474	20,248	231,722	244,042
7	Jan 05	10,205	1,210	11,415	197,055	28,899	225,954	237,369
8	Feb 05	10,801	1,164	11,965	237,083	20,412	257,495	269,460
9	Mar 05	11,722	1,353	13,075	298,119	20,244	318,363	331,438
10	Apr 05	9,633	1,333	10,966	198,027	44,799	242,826	253,792
11	May 05	10,818	1,798	12,616	250,078	33,115	283,193	295,809
12	Jun 05	11,179	1,603	12,782	371,255	61,831	**433,086**	445,868
13	Jul 05	10,850	1,553	12,403	254,645	31,306	285,951	298,354
14	Aug 05	16,058	1,720	17,778	307,790	38,813	346,603	364,381
15	Sep 05	12,303	1,576	13,879	264,299	31,050	295,349	309,228
16	Oct 05	13,709	1,616	15,325	292,779	28,402	321,181	336,506
17	Nov 05	12,372	1,565	13,937	307,171	23,791	330,962	344,899
18	Dec 05	11,859	1,605	13,464	239,603	50,423	290,026	303,490
19	Jan 06	12,164	1,355	13,519	304,252	18,475	322,727	336,246
20	Feb 06	12,941	1,611	14,552	362,942	30,215	393,157	407,709
21	Mar 06	14,205	1,461	15,666	269,566	41,269	310,835	326,501
22	Apr 06	9,970	1,434	11,404	232,365	32,696	265,061	276,465
23	May 06	13,992	2,395	16,387	290,268	68,982	359,250	375,637
24	Jun 06	13,573	2,113	15,686	363,628	25,921	389,549	405,235
25	Jul 06	12,584	1,732	14,316	248,159	35,859	284,018	298,334
26	Aug 06	17,419	2,421	19,840	335,468	30,282	365,750	385,590
27	Sep 06	14,083	2,023	16,106	294,283	28,610	322,893	338,999
28	Oct 06	14,019	2,296	16,315	273,371	30,977	304,348	320,663
29	Nov 06	16,330	2,652	18,982	447,689	35,221	**482,910**	501,892
30	Dec 06	12,899	2,215	15,114	247,261	28,462	275,723	290,837
31	Jan 07	14,353	1,977	16,330	292,607	54,601	347,208	363,538
32	Feb 07	13,590	2,180	15,770	259,118	25,923	285,041	300,811
33	Mar 07	12,859	1,868	14,727	261,358	28,788	290,146	304,873
34	Apr 07	12,036	1,682	13,718	280,800	36,288	317,088	330,806
35	May 07	14,356	2,233	16,589	334,390	56,075	390,465	407,054
36	June 07	12,166	1,885	14,051	257,986	47,482	305,468	319,519
37	July 07	14,474	2,586	17,060	280,622	103,647	384,269	401,329
38	Aug 07	16,596	2,733	19,329	329,573	53,575	383,148	402,477
39	Sept 07	15,044	1,412	16,456	275,542	55,294	330,836	347,292
40	Oct 07	16,268	3,996	20,264	368,606	46,742	415,348	435,612
41	Nov 07	15,305	1,873	17,178	365,852	45,122	410,974	428,152
42	Dec 07	13,505	2,261	15,766	335,036	46,115	381,151	396,917
43	Jan 08	14,361	2,044	16,405	336,033	45,736	381,769	398,174
44	Feb 08	14,925	2,584	17,509	381,161	44,059	425,220	442,729
45	Mar 08	13,334	2,052	15,386	341,118	18,155	359,273	374,659
46	Apr 08	13,189	1,654	14,843	319,621	32,067	351,688	366,531
47	May 08	14,524	2,335	16,859	478,113	36,753	514,866	531,725
48	Jun 08	14,007	1,967	15,974	410,857	39,360	450,217	466,191
49	Jul 08	13,777	1,775	15,552	377,257	79,159	456,416	471,968
50	Aug 08	18,767	2,566	21,333	544,961	40,916	585,877	607,210

Converse
IAP Estimator

History of State Sales and Use Tax Given to Converse County Governments

		State Share Given			State Share Given to Muni's			Total
Serial	Month	Sales	Use	Total	Sales	Use	Total	
51	Sept 08	18,098	2,279	20,377	505,330	63,100	568,430	588,807
52	Oct 08	18,002	2,233	20,235	626,242	67,354	693,596	713,831
53	Nov 08	15,620	2,293	17,913	533,231	67,509	600,740	618,653
						Base period amount:		498,116



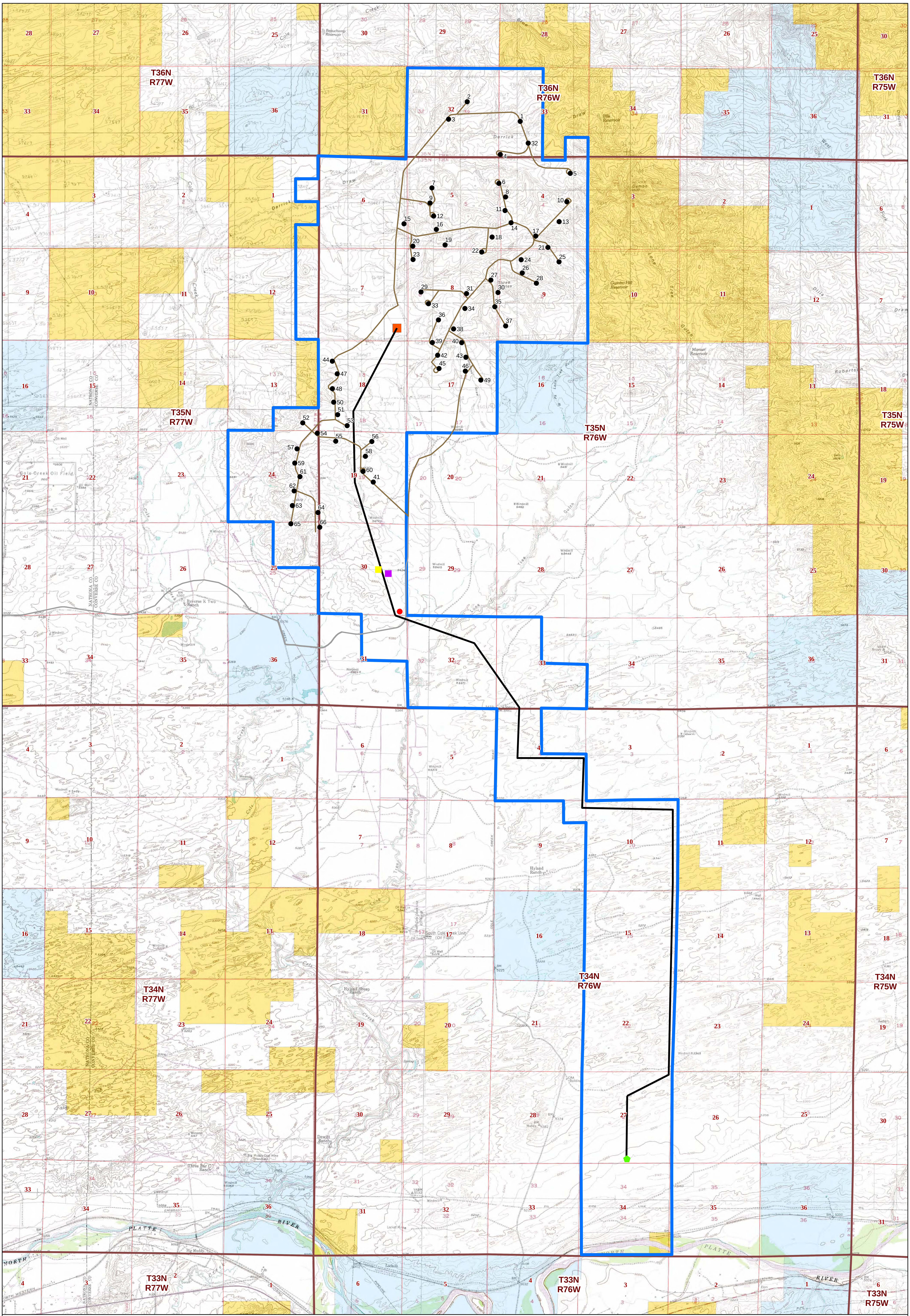
Serial	Month	*SLR*	BasePeriod	**Impact Assistance**
54	Nov 2008	*508,659*	498,116	***10,543***
55	Dec 2008	*513,808*	498,116	***15,692***
56	Jan 2009	*518,958*	498,116	***20,841***
57	Feb 2009	*524,107*	498,116	***25,990***
58	Mar 2009	*529,256*	498,116	***31,140***
59	Apr 2009	*534,405*	498,116	***36,289***
60	May 2009	*539,554*	498,116	***41,438***
61	Jun 2009	*544,703*	498,116	***46,587***
62	Jul 2009	*549,853*	498,116	***51,736***
63	Aug 2009	*555,002*	498,116	***56,885***
64	Sep 2009	*560,151*	498,116	***62,035***
65	Oct 2009	*565,300*	498,116	***67,184***

Average IAP	***38,863***
Total IAP	***466,360***

State shares forecast growth rate = *1.111*

APPENDIX B

Preliminary Site Layout



Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Turbine Access Roads
- Proposed Transmission Line
- Site Access Road
- Substation
- Project Boundary
- Townships
- Sections
- BLM
- Private
- State

N

Preliminary Site Layout
Campbell Hill
Converse County, Wyoming

CH2MHILL

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APPENDIX C

Public Involvement

Campbell Hill Windpower Project Fact Sheet

Project Overview

- Duke Energy will own and operate the Campbell Hill Windpower Project
  - Duke Energy is an emerging leader in wind power delivery projects
  - Duke Energy's 30-megawatt (MW) Happy Jack Windpower Project in Cheyenne, Wyoming was dedicated by Governor David Freudenthal in September 2008
- PacifiCorp will purchase all of the electricity generated for the next 20 years
- The project will be comprised of 66 wind turbines
  - General Electric (G.E.) 1.5 sle turbine model
- The project is planned to be in commercial operation by the end of 2009
- Output is dependent on wind direction and speed
- Based on typical domestic use, the Project will provide power on an annualized basis for 25,000 to 30,000 homes

Project Site

- The Campbell Hill project will be on approximately 10,480 acres of leased private land
- The site is located in an unincorporated portion of Converse County
- The access road is in Natrona County and Converse County
- The transmission corridor is on private fee land in Converse County
- Power will feed into the local grid via an existing transmission line near Dave Johnston Station in Glenrock

Project Safety

- Turbines are designed with multiple, redundant safeguards against lightning, fires, mechanical malfunctions, etc.
- Thousands of G.E. wind turbines currently operating efficiently and safely throughout the U.S.
- Duke Energy monitors its wind farms 24 hours a day, 7 days a week from a centralized operations center

Industrial Siting Act Information

- An Industrial Siting Act Permit is required for this project
  - Under the Wyoming Industrial Development Information and Siting Act, permits are required of all projects with construction costs of $178.9 million or more
  - The permit application involves a review of economic, social and environmental impacts
- Permit application schedule
  - Meetings with public officials - November 2008
  - Town hall meetings - November 2008
  - Application submittal - January 2009
  - Public hearing - March 2009
  - Target date for permit issuance - April 2009

Respect for the Environment

- Duke Energy will work with all appropriate state, county and local agencies to consider potential impacts of construction and windpower operations
- Wind farm operations do not generate greenhouse gas emissions nor do they divert precious water resources for power generation
- Our approach is to identify, avoid, and mitigate impacts on wildlife to the greatest extent possible
- Operational monitoring will take place to ensure that wildlife protection goals are met

Economic Benefits

- Construction costs are estimated at roughly $215 million
- Construction jobs
  - Roughly 30 to 150 people will be employed at various points during the project's construction phase
- Ongoing operational jobs
  - Approximately 8-10 full time employees will be hired to perform ongoing operational duties at the site
- There will be extended economic benefits to the surrounding communities
  - The project will generate business for local hotels, motels, restaurants, gas stations, pharmacies, grocery stores, hardware stores, machine shops, electrical supply companies, repair firms, equipment rental companies

Respect for the Community

- Noise contour map has been developed
  - Nearest residential community is more than five miles away
  - Glenrock is approximately 8-10 miles away (to the southeast)
  - Casper is roughly 15 miles away (to the southwest)
- Landscape
  - A "zone of visual influence" map has been created and photo visualizations are being developed
  - A nation-wide survey of tax assessors in areas with wind power projects found no evidence that wind farms decrease property values*

** Source: ECONorthwest study / Renewable Energy Policy Project*

Questions or comments?
You may submit them by telephone to (512) 480-9119 or via e-mail to windenergyinfo@duke-energy.com

Duke Energy.

Please join us.

We'd like to hear from you

Duke Energy has a strong commitment to the environment and to supporting sustainable energy use. Today, we continue to diversify the mix of fuels we use to generate electricity to meet rising demand by growing our renewable energy portfolio. In support of that effort, we have begun the process of obtaining the necessary approvals and making preparations to construct a new wind energy project in Converse County, Wyoming.

The proposed Campbell Hill Windpower project will consist of 66 wind turbines and is planned to be operational by the end of 2009. The project will generate enough electricity to power approximately 25,000 homes.

We would like you to be well informed of plans for this proposed wind project. To help, Duke Energy will be hosting a Public Open House:

Place: Glenrock Town Hall
219 S. 3rd Street
Glenrock, Wyoming

Date: Monday, Nov. 17, 2008

Time: 6 p.m. – 8 p.m.

We hope to see you there and look forward to working with you as this wind project progresses!

Questions or comments?
Call us at 512-480-9119 or send an e-mail to windenergyinfo@duke-energy.com.

Duke Energy®

Meeting Schedule for Campbell Hill Windpower Project

Date	Time	Attendees	Location
Nov. 17	5:30 PM	Glenrock Town Council, Rolling Hills Town Council	Glenrock Town Hall, 219 S. Third Street, Glenrock, WY
	6-8 PM	Public Town Hall Meeting	Glenrock Town Hall, 219 S. Third Street, Glenrock, WY
Nov. 18	10:10-11 AM	Converse County Commissioners and Douglas Town Council	Courthouse, 107 N. 5th St., Douglas, WY
	2:00 PM	Casper WYDOT	DOT office, 900 Bryan Stock Trail, Casper, WY
	4:30-5:15 PM	Casper City Council	Casper City Hall, 200 N. David Street, Casper, WY
	6-6:45 PM	Natrona County Commissioners, Evansville City Council	County Annex, 120 W. First St., Casper, WY
Nov. 19	10AM - 11AM	WY State offices invited: Q&A will likely extend beyond 11AM.	Herschler Bldng., Room 1699, 122 West 25th St., Cheyenne, WY

Campbell Hill Windpower Project

Meeting Overview

- Duke Energy’s Commitment to Renewable Power
- Campbell Hill Windpower Project Overview
- Industrial Siting Act Information
- Community and Environmental Impacts
- Construction Logistics
- Economic Benefits
- Next Steps
- Questions and Comments

Duke Energy

Duke Energy's Commitment to Renewable Power

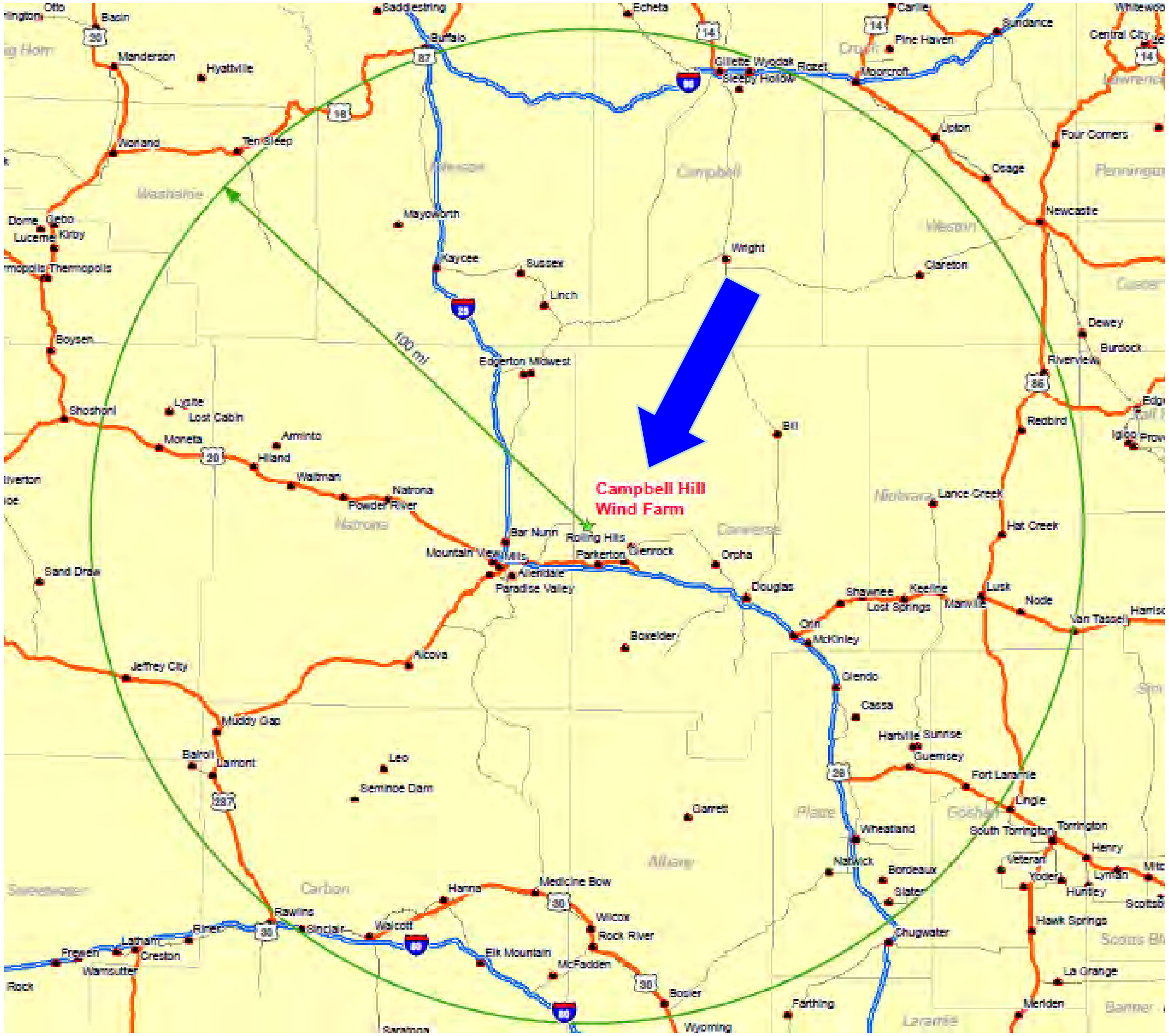
- Duke Energy has nearly 500 megawatts (MW) of wind power projects already in operation
  - The 30 MW Happy Jack Windfarm in Cheyenne was dedicated by Governor David Freudenthal on September 30, 2008

- Duke Energy has an additional 5,000 MW of wind power under development in 12 states

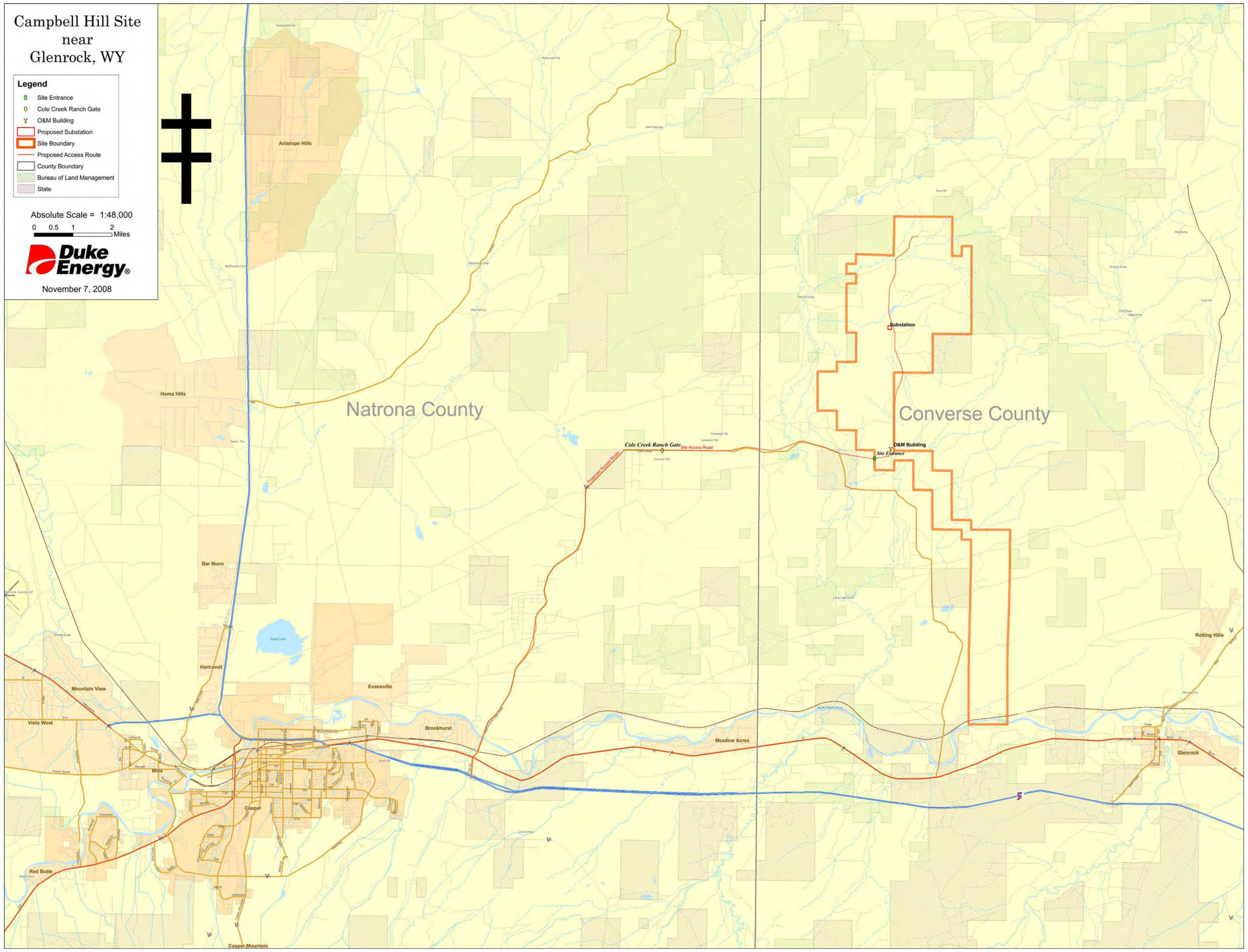
Duke Energy

Project Overview

- Project location



Preliminary Project Site Boundaries



Project Overview

- 66 wind turbines
  - General Electric 1.5 sle turbine model
  - Overall height from ground to top of nacelle will be approximately 275’
- The Project is planned to be in commercial operation by end of 2009

Project Overview

- Power output
  - Assuming a typical residence uses 12,000 kw-hrs per year, the Campbell Hill Project will provide power on an annualized basis for 25,000 to 30,000 homes
  - Power will feed into the local grid via an existing PacifiCorp transmission line near Dave Johnston Station in Glenrock

Project Overview

- Duke Energy will own and operate the Campbell Hill Windpower Project
  - Duke Energy owns Three Buttes LLC which will develop, construct and operate the wind farm
- PacifiCorp has agreed to purchase all of the electricity generated from the Campbell Hill Windpower Project for the next 20 years
  - Duke Energy and PacifiCorp announced a Power Purchase Agreement (PPA) in September 2008

Duke Energy

Industrial Siting Act Information

- Industrial Siting Permit is required for this project
  - Under the Wyoming Industrial Development Information and Siting Act, permits are required of all projects with construction costs of $178.9M or more
- The permit application involves a review of economic, social and environmental impacts
- Duke and its consultants are working with all appropriate federal, state and local agencies and stakeholders

Industrial Siting Act Information

- Permit application schedule
  - November 2008
    - Meetings with public officials
    - Town hall meetings
  - January 2009
    - Application submittal
  - March 2009
    - Public hearing
  - April 2009
    - Target date for permit issuance

Duke Energy

Other Permitting Information

- FAA Notice of Proposed Construction
- Army Corps of Engineers-Waters of the U.S.
- Consultations with U.S. Fish and Wildlife Service
- Consultations with Wyoming Game and Fish Dept
- Consultations with Wyoming State Historic Preservation Office
- Natrona County road-use agreement for portion of access road in the county
- Various construction permits
  - Stormwater permit
  - Batch plant permit
  - Water use approval

Respect for the Community

- Noise contour map has been developed
  - Nearest residential community is more than five miles away
  - Glenrock is approximately 8-10 mi. away (to the southeast)
  - Casper is roughly 15 mi. away (to the southwest)
- Landscape
  - A “zone of visual influence” map has been created and photo visualizations are being developed
  - A nation-wide survey of tax assessors in areas with wind power projects found no evidence wind farms decrease property values*

* Source: ECONorthwest study / Renewable Energy Policy Project

Duke Energy

Respect for the Environment

- Duke Energy is working with all appropriate state, county and local agencies to consider potential impacts of construction and windpower operations
- This includes:
  - Conducting seasonal surveys to determine wildlife impacts
  - Assessing wildlife habitats, nesting areas, greater sage-grouse leks
  - Surveying any potential wetlands and waters of the U.S.
- We will use this information to develop acceptable impact avoidance and mitigation plans

Respect for the Environment

- Duke Energy has already:
  - Commissioned environmental reviews by Ecology & Environment in the spring of 2007
  - Retained CH2M Hill to support the State ISA process
  - Conducted bat surveys, archeological and cultural resource surveys, avian surveys, raptor nest mapping, and prairie dog and burrowing owl assessment
- Additional biological surveys are planned for the fall of 2008 and spring of 2009
- Several years worth of wind and climate data have been collected from three on-site meteorological masts

Duke Energy

Construction Logistics

- Transportation of construction materials will be determined by construction contractors
  - Vehicles are expected to use I-25 and exit onto Cole Creek Road (S.R. 256 / C.R. 701)
  - Road-use agreement with Natrona County is under development
- Minimal amounts of solid waste will be generated at the site
  - A waste management contractor will remove solid waste
- Local workforce and vendors will be used to the extent practicable

Duke Energy

Economic Benefits

- Construction costs are estimated at $215M
- Construction jobs
  - Resource requirements will ramp up from about 30 construction employees in the 1st quarter of 2009 to a peak of approximately 150 during the 2nd and 3rd quarters
- Ongoing operational jobs
  - Approximately 8-10 full time employees will be hired to perform ongoing operational duties at the site

Economic Benefits

- Extended economic benefits to the surrounding communities
  - The project will generate business for local hotels, motels, restaurants, gas stations, pharmacies, grocery stores, hardware stores, machine shops, electrical supply companies, repair firms, and equipment rental companies
- The project will generate clean, reliable, inexhaustible energy for Wyoming

Duke Energy

Next Steps

- Informational meetings (November 2008)
  - Casper City Council
  - Converse County Commissioners
  - Douglas Town Council
  - Evansville City Council
  - Glenrock Town Council
  - Rolling Hills Town Council
  - Glenrock Open House
  - Natrona County Commissioners
  - Natrona County Road & Bridge

Next Steps

- Industrial Siting Permit application submission (January 2009)
- Comment period
  - Regulatory agencies and affected government bodies
- Industrial Siting Council Hearing
- Permit approval
- Commencement of construction

Questions?

In Conclusion

- We're here to answer any questions you may have
- Questions and comments can also be submitted by telephone to (512) 480-9119 and via e-mail to windenergyinfo@duke-energy.com

Thank you for attending today's meeting!

Duke Energy

Industrial Siting Act
Glenrock and Rolling Hills Town Council Meeting

Campbell Hill Windpower Project

November 17, 2008

	Name and Agency or Company	Address	Email	Phone
1	Jon O. Maines Town Rolling Hills	7 S. Coyote Rolling Hills	barryfische@yahoo.com	436-2427
2	Gerry Minton Major Town of Rolling Hills	40 Dunham Rd		258-0994
3	Mike Reitano Town of Rolling Hills	27 S. Badger	mreitano@cnw2k12wy.us	259-5086
4	Shon Lindsey Town of Rolling Hills	58 S. Badger	SPlusLLindsey@aol.com	436-2721
5	Teresa Montgomery Town of Rolling Hills	38 S Badger	townofrollinghills@netcommander.com	436 5348
6	Linda Care Town of Glenrock	Box 926, Glenrock		436-3462
7	Fred Steinbach Glenrock Council	PO 1233	fredsteinbach@hotmail.com	
8	Rosalie Goff Glenrock Town Council	PO Box 1453	rosalie_goff@yahoo.com	436-8845
9	Doug Cooper 7L Livestock Co.	1025 S. Durbin Casper, WY 82601		
10	Wendy Lowe	643 E 3rd St. Casper 82601	wendyhollylowe@aol.com	267-6218
11	Tom Schroeder	DEQ/ISD	tschro@wyo.gov	777-7369
12	Alison Lager	Box 644 Glenrock		436-2729

	Name and Agency or Company	Address	Email	Phone
13	Jim Magee	79 Boxelder Road		307-436-2729
14	Denni Laird, Town of Rolling Hills	PO Box 981, Glenrock	dddddd nwyo@msn.com	436-5438
15	Duce Laird	" "	" "	" "
16	Marty Tillard	PO Box 2285 Glenrock		436 8555
17	Greg Smith (BAR S Inv	3330 I 80	Cheyenne	307-637-8544
18	MARK PELOQUIN	4510 E 18TH	Casper	577-1842
19	BOB KIDD	1139 S. CENTER CASPER, 82601	rkiddwyo@hotmail.com	235-1325
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Industrial Siting Act
Glenrock and Rolling Hills Town Council Meeting

Campbell Hill Windpower Project

November 17, 2008

	Name and Agency or Company	Address	Email	Phone
1	Robert Smith - Glenrock Bird	215 S. 5th Glenrock Wy 82637	robert@theglenrockbird.com	307-436-5447
2	Donna Geko - Glenrock	Box 417 Glenrock, Wy	glenrocktown@aol.com	307-436-9294
3	Mike Collins, Glenrock	Box 417 Glenrock Wy.	MFC 400 @ AOL. Com	307-436-2777
4	Steve Cielinski	Box 417 Glenrock, WY 82637	SKIWY911@aol.com	307-436-9294
5	Scott E. Gilbert	GlenRock PO Box 1112 220 S 5th St.		720 277-2790
6	David Andrews Glenrock Public Works Glenrock Solid Waste Dist	PO Box 417 Glenrock, WY 82637	glenrockpw@sdwinc.com	307-436-9294
7	Bruce Vinnola - Glenrock Town Council	PO Box 128 Glenrock	eracervinn@aol.com	307-436-8138
8	Glen Lam Glenrock	27 Boxelder Road		307-251-6412
9	K.B. Laruce Platte Valley Electric	P.O. Box 520 Torrington, Wy 82240	KR@vocTwy.com	307-532-8658
10	Energy Transportation Inc.	P.O Box 2848	tgosman@wyoming.com	307.251.8995
11	Energy Transportation Inc	"	bbrenton@wyoming.com	307-262-6114
12	Rick Bratton	525 - Badger Rd Rolling Hills Wy 82637		277-8861

	Name and Agency or Company	Address	Email	Phone
13	Steve Elledge Wyoming Business Council	300 S. Wolcott #300 Casper 82601	steve.elledge@wybusiness.org	307 577.6012
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Industrial Siting Act
Glenrock Public Open House

Campbell Hill Windpower Project

November 17, 2008

	Name and Agency or Company	Address	Email	Phone
1	Reiter Machine & Fabrication	P.O. Box 2315 Glenrock WY #2 Brubaker Rd 82637	reitermachine @qwest.com	307-436-7111
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	Name and Agency or Company	Address	Email	Phone
27	Ed Reynolds	743 GRANT BOX 1225 Glenrock		436-2259
28	Rob Boner / Landowner	Box 872 Douglas	robboner@myway.com	358-2609
29	Fred Wake	Box 1331	NONE	NONE
30				
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	Name and Agency or Company	Address	Email	Phone
13	Pam Anderson	92 Running Dutchman Glenrock		436-9618
14	Sen. Jim Anderson	"	jamesday@msn.com	436-9618
15	Doug Scott	2360 Wolff Rd Gillette	dscott_60@vcn.com	307-682-1369
16	JOE HUMES (MES)	~~5201~~ 64 Rush Creek Moorcroft	JHumes@methanelectrical.com	307-299-3904
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	Name and Agency or Company	Address	Email	Phone
1	Forrest Nonerburg City of Douglas	PO Box 1030 Douglas WY 82633	fnonerburg@ cityofdouglas.org	358-2132
2	Bobbe Fitzhugh City of Douglas	PO BOX 1030 Douglas, WY 82633	bfitzhugh@ cityofdouglas.org	307-358-3462
3	Jim Schneider City of Douglas	P.O. Box 1030 Douglas, Wy 82633	jschneider@ cityofdouglas.org	307-358-3939
4	Dave Andrews Town of Glenrock	PO Box 417 Glenrock, WY	glenrockpw@sdwinc.com	3074369294
5	Mike Colling Converse Co Commissioner elect	Po Box 417 Glenrock Wy.	mcc400@aol.com	307-436-2772
6	Tony Lehner Converse Co. Commissioner elect	Box 372 Glenrock	tvlehner@yahoo	307-436-2208
7	QUENTIN RICHARDSON CONVERSE COUNTY ATTORNEY	COUNTY [illegible]	QWRICH@AIL.COM	307-358-5020
8	Karen Hopkins Converse County Library	300 Walnut St Douglas, Wy	khopkins@will. state.wy.us	307-358-3644
9	DENNIS SWITZER KKTY	247 Russell Ave Douglas, WY	KKTY@NETCOMMANDER .com	307-358-3636
10	Tom Schroeder	DEQ/ISD		
11	Cory McMahon Converse County GIS	105 N 5th Douglas	conversegis@yahoo.com	307-358-0175
12	Dixie Huxtable CC Assessor	105 N 5th Dgls	DHUXTABLE@Yahoo.com	307.358.2741

	Name and Agency or Company	Address	Email	Phone
13	PAUL W. MUSSELMAN SPECIAL PROJECTS CONVERSE CTY	DOUGLES WY 82633	specialprojects@ communicomm.com	358-1990
14	John Stuart Douglas Budget			
15	Lucille Taylor			
16	Ed Werner Natr. Commissioners			
17	Mark Cash			
18	Jim Willox			
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	Name and Agency or Company	Address	Email	Phone
1	Stefanie Boster, Casper City Council	1137 W. 22nd St. Casper 82604	sboster@hotmail.com	472-5130
2	Joel Burdess, Casper City Council	1120 S Boxelder Casper, WY 82604	joelburdess@juno.com	277-9299
3	Guy Padgett, Casper City Council	1227 Willow Casper 82604	gvpadgett@gmail.com	259-1446
4	Kenyne Schlager, City Council	1421 Newport Casper 82609	kschlager@cityofcasperwy.com	234-4401
5	Paul Bertoglio "	950 Waterford Casper, WY 82609	paulb@tribcsp.com	307 577-1990
6	Tom Forslund City Manager	200 N David Casper, WY	tforslund@casperwy.gov	307-235-8224
7	Kate Sarosy City Council	918 Oakcrest Ave Casper 82601	ksarosy@cityofcasperwy.com	265-2199
8	Keith Goodenough Council	~~[illegible]~~		
9	MAURY DAUBIN CITY COUNCIL	2362 BRECK CASPER WY. 82604	mdaubin@cityofcasperwy.com	307-265-1099
10	Dr Tom Walsh	136 E 15th Casper, WY 82601	—	—
11	Mark Young Fire Chief	200 N. David St Casper, WY 82601	myoung@cityofcasperwy.com	307-235-8402
12	TOM SCHROEDER	DEQ/ISD		

	Name and Agency or Company	Address	Email	Phone
13	Kimberly Holloway councilwoman-elect	2068 S. Cedar St Casper 82601	hollowaywyo@ peoplepc.com	237-0373
14	Bill Brauer Councilman-Elect	2101 W 40th Casper 82604	MAPABRAUER@ AOL.COM	307-235-1466
15	Gary Clough Casper Public Services Director	200 N. David Casper, Wy 82601	gclough @ cityofcasperwy.com	307-235-8298
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Industrial Siting Act | Campbell Hill Windpower Project | November 18, 2008
Natrona County Commissioners/Evansville City Council Meeting

	Name and Agency or Company	Address	Email	Phone
1	Michelle Botkin			Evansville
2	Phil Hinds			"
3	Cheryl S. Smith	1340 Werrington		Casper
4	Tom Morton	Casper Star-Tribune		266-0592
5	Tom Schroeder	DEQ/ASD		
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Industrial Siting Act
Wyoming State Office Meeting

Campbell Hill Windpower Project

November 19, 2008

	Name and Agency or Company	Address	Email	Phone
1	Chris Wichmann - Wyo. Dept. of Ag	2219 Carey Ave Cheyenne, WY 82002	cwichmann@state.wy.us	307.777-6756
2	Scott Gamo - WY Game + Fish	Bishop Blvd Cheyenne WY 82001	scott.gamo@wgf.state.wy.us	307-777-4509
3	Matt Fry - WY Game + Fish	"	matthew.fry@wgf.state.wy.us	307-777-4510
4	Al Thompson - WY Dept. Envir'l. Quality Solid/Haz. Waste Division	Herschler Bldg. 4-W	athomp2@wyo.gov	307-777-8759
5	Dena Egenhoff - WY DEQ Solid/Haz. waste division	Herschler Bldg 4-W	degenh@wyo.gov	307-777-6291
6	Tom Schroeder	DEQ/ISD		
7	Joe Girardin	EQC	JGirar@state.wy.us	7776454
8	Blair Bales, Wy PSC	Hansen Bldg., 300	bbales@state.wy.us	777-5721
9	Jim Stafford, WSGS	PO Box 1347 Laramie, WY	jstaffor@uwyo.edu	766-2286
10	Butch Parks - Wy State Lands + Investments	Herschler 3-W	cparks@state.wy.us	777-5762
11	Sherry Hughes (Wyoming Business Council) State Energy Office	214 W. 15th, Cheyenne	sherry.hughes@wybusiness.org	777-2824
12	Lisa Osvold - Dept Workforce Services	122 West 25th Herschler 2E	losvol@state.wy.us	777-7185

	Name and Agency or Company	Address	Email	Phone
13	Veronica Pederson	Laramie City Community College	vpederson@lccc.wy.edu	307 778 1356
14	Bruce Hayes WY Dept. of Education	2300 Capitol Ave Cheyenne, WY 82002	bhayes1@educ.state.wy.us	307 777 - 6198
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Duke Energy®

7000 North Mopac
Suite 475
Austin, TX 78731

512 480 9119
512 241 0507 fax

November 3, 2008

Subject: Campbell Hill Windpower Project

Dear Community Leader:

Duke Energy Corporation (Duke Energy) has a strong commitment to clean, reliable, renewable power.

Currently, Duke Energy has approximately 350 megawatts of operating wind power projects and another 5,000 megawatts of wind under development in 12 states. Wyoming is one of the nation's leading states for wind generation potential and Duke Energy looks forward to helping Wyoming diversify its energy generation mix with this renewable resource in Wyoming. Therefore, we are please to announce the Campbell Hill Windpower Project ("Project") to be located in Converse County, approximately 10 miles northwest of Glenrock.

The Project is a 99-MW wind energy generation facility to be developed by Three Buttes Windpower, LLC, a wholly owned subsidiary of Duke Energy. The Project will be built on approximately 12,000 acres of leased, privately-owned lands and utilize 66 GE 1.5 MW SLE model wind turbines. Approximately ten miles of 230-kilovolt (kV) transmission line will be built to interconnect into an existing PacificCorp transmission line located approximately 5.5 miles west of Glenrock.

Duke Energy plans to begin construction in the first quarter of 2009 and have the site operational by the fourth quarter of 2009. An ISA permit application is scheduled for submittal in January 2009. A maximum construction workforce of approximately 150 is anticipated in during the summer of 2009.

The Project will be designed and operated to utilize the natural wind resource of Wyoming, while minimizing impacts to the natural and man-made environment. The Project will undergo reviews by multiple federal, state and local regulatory agencies, and Duke Energy is committed to working with stakeholders and obtaining all necessary permits and approvals for the Project. A major step in this process is the review and approval through the Wyoming Industrial Siting Council. As part of the Industrial Siting Permit application process, we invite you to participate in an informational meeting that will provide an opportunity for you to obtain information about the proposed project, ask questions and provide comments. Meeting details are as follows:

Date:	Monday, November 17, 2008
Time:	6PM – 8PM
Place:	Glenrock Town Hall 219 S. 3rd Street Glenrock, WY

If you cannot attend the meeting, you may provide input by sending an e-mail to windenergyinfo@duke-energy.com, or by faxing your comments to us at 512-241-0507. Please be sure to include your name and address with your comments.

We look forward to working with you on this Project, and hope to see you soon at the introduction meeting.

Sincerely,

Richard Nerzig
VP, Project Development – Wind Energy

7000 North Mopac
Suite 475
Austin, TX 78731

512 480 9119
512 241 0507 fax

November 3, 2008

Subject: Campbell Hill Windpower Project

Dear Wyoming State Agency Official:

Duke Energy Corporation (Duke Energy) has a strong commitment to clean, reliable, renewable power.

Currently, Duke Energy has approximately 350 megawatts of operating wind power projects and another 5,000 megawatts of wind under development in 12 states. Wyoming is one of the nation's leading states for wind generation potential and Duke Energy looks forward to helping Wyoming diversify its energy generation mix with this renewable resource in Wyoming. Therefore, we are please to announce the Campbell Hill Windpower Project ("Project") to be located in Converse County, approximately 10 miles northwest of Glenrock.

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Time: 6PM – 8PM
Place: Glenrock Town Hall
219 S. 3rd Street
Glenrock, WY

If you cannot attend the meeting, you may provide input by sending an e-mail to windenergyinfo@duke-energy.com, or by faxing your comments to us at 512-241-0507. Please be sure to include your name and address with your comments.

We look forward to working with you on this Project, and hope to see you soon at the introduction meeting.

Sincerely,

Richard Nerzig
VP, Project Development – Wind Energy

Invitees to Glenrock Town Hall Meeting (Public Open House)

November 17, 2008

Honor	First Name	Last Name	Title	Address	City	State	Zip Code	County	District
Honorable	Bob	Brechtel	State Representative	3160 Cotton Creek	Casper	WY	82604	Natrona	38
Honorable	Roy	Cohee	State Representative	P.O. Box 50098	Casper	WY	82605	Natrona	35
Honorable	Mary Meyer	Gilmore	State Representative	1992 Chamberlin Road	Casper	WY	82604	Natrona	59
Honorable	Mary	Hales	State Representative	645 South Nebraska	Casper	WY	82609	Natrona	36
Honorable	Steve	Harshman	State Representative	P.O. Box 40136	Casper	WY	82604	Natrona	37
Honorable	Thomas A.	Lockhart	State Representative	770 E. 12th Street	Casper	WY	82601	Natrona	57
Honorable	Lisa	Shepperson	State Representative	31800 Wyoming Highway 259	Casper	WY	82601	Natrona	58
Honorable	Tim	Stubson	State Representative	1645 S. Chestnut	Casper	WY	82602	Natrona	56
Honorable	Deborah	Alden	State Representative	P.O. Box 605	Wheatland	WY	82201	Converse	3
Honorable	Ross	Diercks	State Representative	P.O. Box 1047	Lusk	WY	82225	Converse	2
Honorable	Dave	Edwards	State Representative	P.O. Box 18	Douglas	WY	82633	Converse	6
Honorable	Kit	Jennings	State Senator	P.O. Box 51190	Casper	WY	82605	Natrona	28
Honorable	Bill	Landen	State Senator	2010 Kingsbury	Casper	WY	82609	Natrona	27
Honorable	Drew	Perkins	State Senator	1133 Granada Avenue	Casper	WY	82601	Natrona	29
Honorable	Charles K.	Scott	State Senator	13900 State Highway 487	Casper	WY	82604	Natrona	30
Honorable	Jim	Anderson	State Senator	92 Running Dutchman	Glenrock	WY	82637	Converse	2
Honorable	Charles	Townsend	State Senator	P.O. Box 760	Newcastle	WY	82701	Converse	1

Invitees to Wyoming State Agency Meeting

November 19, 2008

Salutation	First Name	Last Name	Title	Agency	Address	City	State	Zip
Mr.	John	Cox	Director	Department of Transportation	5300 Bishop Avenue	Cheyenne	WY	82009
Mr.	Christopher	Petrie	Chief Counsel	Public Service Commission	2515 Warren Avenue Suite 300	Cheyenne	WY	82002
Mr.	Steve	Ferrell	Director	Game & Fish Department	5400 Bishop Avenue	Cheyenne	WY	82009
Mr.	Brent	Sherard	Director	Department of Health	2300 Capitol Avenue	Cheyenne	WY	82002
Mr.	Jim	McBride	Superintendent	Department of Education	2300 Capitol Avenue	Cheyenne	WY	82002
Mr.	Patrick	Tyrrell	State Engineer	Office of State Engineer	122 West 25 Street, 4E	Cheyenne	WY	82002
Mr.	Alan	Ver Ploeg	State Geologist	Geological Survey	PO Box 1347	Laramie	WY	82073
Mr.	John	Etchepare	Director	Department of Agriculture	2219 Carey Avenue	Cheyenne	WY	82002
Mr.	John	Corra	Director	Department of Environmental Quality	122 West 25 Street, 4W	Cheyenne	WY	82002
Mr.	William	Gern	Vice President, Research	University of Wyoming	PO Box 3355, University Station	Laramie	WY	82071
Mr.	Ed	Schmidt	Director	Department of Revenue	122 West 25 Street, 2E	Cheyenne	WY	82002
Mr.	Robert	Jensen	Chief Executive Officer	Wyoming Business Council	214 West 15 Street	Cheyenne	WY	82002
Ms.	Joan	Evans	Director	Department of Workforce Services	122 West 25 Street, 2E	Cheyenne	WY	82002
Mr.	Joe	Moore	Director	Office of Homeland Security	122 West 25 Street, 1E	Cheyenne	WY	82002
Mr.	Tony	Lewis	Director	Department of Family Services	Hathaway Bldg. 3W	Cheyenne	WY	82002
Mr.	Gary	Child	Director	Department of Employment	1510 East Pershing Blvd.	Cheyenne	WY	82002
Mr.	Mark	Wingate	Engineer	Department of Transportation	5300 Bishop Avenue	Cheyenne	WY	82009
Mr.	Vern	Stelter	Habitat Supvervisor	Game and Fish Department	5400 Bishop Avenue	Cheyenne	WY	82009
Ms.	Mary	Hopkins	Interim State Historic Preservation Officer	State Parks and Cultural Resources	2301 Central Avenue	Cheyenne	WY	82002
Mr.	Richard	Currit	Senior Archaeologist	State Parks and Cultural Resources	2301 Central Avenue	Cheyenne	WY	82002
Ms.	Lisa	Lindemann	Groundwater Administrator	Office of the State Engineer	122 W. 25th St. 4E	Cheyenne	WY	82002
Mr.	Doug	Leonard	Economist	Department of Employment	Research & Planning, PO Box 2760	Casper	WY	82602
Mr.	John	Wagner	Administrator	Water Quality Division	122 West 25 Street, 4W	Cheyenne	WY	82002
Mr.	Dave	Finley	Administrator	Air Quality Division	122 West 25 Street, 4W	Cheyenne	WY	82002
Mr.	LeRoy	Feusner	Administrator	Soild & Hazardous Waste Division	122 West 25 Street, 4W	Cheyenne	WY	82002
Mr.	Don	McKenzie	Administrator	Land Quality Division	122 West 25 Street, 4W	Cheyenne	WY	82002
Mr.	Guy	Hadley	Employment Services-Casper and Douglas	Department of Workforce Services	851 Werner Ct., #120; 126 N. 3rd St., #6 & #7	Casper; Douglas	WY	82601; 82633

APPENDIX D

Housing Plan Letters of Commitment

Three Buttes - Campbell Hill Windpower Project

Summary of Hotel Rooms Available During Construction

Casper

Hotel	Contact	Rates quoted nightly unless noted otherwise	2009 Room Availability	2010 Room Availability	Commitment
Best Western Ramkota	Dave Greth	$85.00	15	15	Email
Casper Village Apartments	Amy Hardesty/Sarah Voss	Rates Vary	18	18	Email
Comfort Inn	Butch Richards-John Groves	$99.57	20	20	Letter
Courtyard Marriott	Tracy Campbell/Erin Beck	Weekdays $109 per night. Weekends $129.00	40	40	Letter
La Quinta	Randy Johnson/ Rusty Thompson	$109.00 or less if stay longer	15	15	Email
Mainstay Suites	Tammy Cardenas-John Groves/ Eleanor Specht	$59.00 based on a length of stay 30 or more nights	20	20	Email
Quality Inn	Rhonda Bougart-John Groves	$97.13	20	20	Email
Shilo Inn	Scott Hartcorn	$67.00 per night	15	15	Email
Holiday Inn Express	Renee Gibson	$129.00 per night	0	0	Potential availability, no commitment
Hilton Garden Inn	Laura Miramontes	Rates Vary	0	0	Potential availability, no commitment
Sleep Inn and Suites	Lavon Hackney-John Groves	$71.99	0	0	Potential availability, no commitment
National 9	Sheri Zimney	$72.25	0	0	Potential availability, no commitment
		TOTAL COMMITTED ROOMS	**163**	**163**	

Karie Enright

From: Karie Enright
Sent: Friday, November 07, 2008 4:35 PM
To: Karie Enright
Subject: Campbell Hill Wind Project-Duke Energy
Attachments: 111.gif

From: Dave Greth [mailto:sales@ramkotacasper.com]
Sent: Friday, November 07, 2008 3:41 PM
To: Karie Enright
Subject: RE: Campbell Hill Wind Project-Duke Energy

In that case, I will do 15 FIRM.......... Singles or (rooms with 1 king bed) at the $85.00 rate.

Dave Greth
Director of Sales
Best Western Ramkota Hotel Casper Wyoming
800 N Poplar • Casper, Wyoming 82601
Phone: (307) 266-6000 ext. 654
Fax: (307) 473-1010
sales@ramkotacasper.com

-------*Original Message*-------

From: Karie Enright
Date: 11/7/2008 2:32:52 PM
To: Dave Greth
Subject: RE: Campbell Hill Wind Project-Duke Energy

At this point, I really don't know what they are willing to do. Once the project is approved project and Duke Energy assigns the worker, they will call Oakwood to place them if they need us. Some of the 150 workers will do their own thing but the majority will be calling my team directly to place in hotels. Let's bet on not doubling up at this time. Once the ball is rolling, I will have more information. Thanks again.

From: Donna Cooper
Sent: Friday, November 14, 2008 11:49 AM
To: Donna Cooper
Subject: FW: Apartments available in March, 2009 from Casper Village Apartments

---

From: Casper Village Apartments [mailto:caspervillage@amcllc.net]
Sent: Monday, October 27, 2008 10:11 AM
To: Amy Hardesty
Subject: Apartments avaliable in March, 2009

Dear Amy-

We are very happy to hear that you are looking for apartments in March of 2009. We would like to help you with that. We have three properties in Casper that will have apartments available. The total amount of apartments we could give you as of right now would be 18 apartments. We can try to furnish at least 4 of those. If you need any additional information please call our office at v(307)266-6548.

Thanks,

Sarah Voss
Resident Manager
Casper Village Apartments
2300 East 18 St. #821
Casper, Wy 82609
(307)266-6548 Phone
(307)473-7737 Fax

Karie Enright

From: Casper Comfort Inn [CasperCI@tharaldson.com]
Sent: Saturday, November 08, 2008 8:23 AM
To: Karie Enright
Subject: RE: Campbell Hill Project-Duke Energy

November 8, 2008

On behalf of the Casper Comfort Inn, I have elected to offer 20 rooms at the $99.57 rate per night for run of the house to Duke Energy beginning in 2009 and ending the first part of 2010.

Thank you in advnace, Butch Richards

Butch Richards / Tawnya King
General Manager / Assistant Manager
Comfort Inn by Choice Hotels--Casper
Tharaldson Lodging
Phone and Fax: (307) 235-3038
casperci@tharaldson.com

COURTYARD
Marriott

October 28, 2008

Karie Enright
Oakwood Worldwide
8804 N. 23rd Ave
Phoenix AZ 85021

Dear Karie,

Thank you for your interest in Courtyard by Marriot Casper for the Campbell Hill Wind Project. We would be happy to extend a special corporate of 40 rooms at $129 per night during the weekdays (Monday thru Thursday) and $109 on the weekends (Friday thru Sunday).

We at the Casper Courtyard by Marriott provide a "Home Away from Home" atmosphere with spacious accommodations, comfortable surroundings and service that will exceed your expectations. That's why Courtyard by Marriott is Casper's and Central Wyoming's first choice for accommodations. You will have peace of mind knowing that your travelers will be well taken care of since Marriott has been providing exceptional quality, value and service for over 75 years.

Please contact me directly when you are ready to set up those individual reservations and I can personally set them up for you. Thank you and I look forward to working with you.

Best regards,

Traci Campbell
Director of Sales and Marketing

Erin Beck
General Manager

Courtyard by Marriott
Casper
4260 Hospitality Lane, Casper, WY 82609
Telephone (307) 473 2600 Facsimile (307) 473 2601
Marriott.com/CPRCY

Karie Enright

From: Karie Enright
Sent: Monday, November 10, 2008 10:36 AM
To: Karie Enright
Subject: Upcoming project rooms and rates

From: Rusty Thompson [mailto:casperlaquinta@yahoo.com]
Sent: Monday, October 27, 2008 2:33 PM
To: Karie Enright
Subject: Re: Upcoming project rooms and rates

Karie:
It was a pleasure speaking with you. I have reviewed your request and can offer you the fallowing 15 rooms @ $109.00 plus tax and those would be at standard rate. If I can be of any other assistance please let me know.

Best Regards
Rusty Thompson
Assistant General Manager
Hampton Inn soon to be La Quinta Inn
When we change to La Quinta in December 2008 our phone # will be 307-265-1200

From: Donna Cooper
Sent: Monday, November 17, 2008 2:33 PM
To: Donna Cooper
Subject: MainSty Suites Commitment Email

From: Eleanor Specht [mailto:elspecht@yahoo.com]
Sent: Friday, November 14, 2008 11:00 AM
To: Karie Enright
Subject: Re: FW: Oakwood on behalf of Duke Energy

Hi Karie

The MainStay Suites will offer 20 rooms for 2009-2010 at the rate of $59.00 based on a 30 night stay.

Eleanor Specht
Director of Sales
MainStay Suites
551 Granite Peak Dr
Casper, WY 82609
(307) 472-7829 ext. 500 work
(307) 267-3573 cell
(307) 472-2022 fax
elspecht@yahoo.com

Karie Enright

From: Quality Inn and Suites [qisuite@tribcsp.com]
Sent: Friday, November 07, 2008 3:09 PM
To: Karie Enright
Subject: Re: Campbell Hill Wind Project-Duke Energy
Attachments: sales sheet no rates.doc

Thank you for the opportunity to service you. We would be glad to offer 20 sleeping rooms for your employee's starting in April 09. If we have available in March we will be glad to have your employee stay with us. Attached are the Quality Inn features. Please let me know if I can block any rooms for you at this time. Casper is very busy during our summer months. Thank you again Rhonda

From: Scott Hartcorn [mailto:scott.hartcorn@shiloinns.com]
Sent: Friday, October 31, 2008 9:13 AM
To: Karie Enright
Cc: 'Tammie Leslie'
Subject: RE: Oakwood Worldewide on behalf of Duke Energy

Hi Karie,

Sorry for the delay in getting back to you. I had taken a couple of days off and Tammie wasn't aware of this. Just to clarify, I work from a remote office and not at the property itself.

We are delighted that you are considering the services of the Shilo Inn Casper/Evansville for your upcoming project.....we are quite familiar with the types of services you require. In case you're not familiar with this location here is a brief description:

The Shilo Inn Casper/Evansville is a full service property with a restaurant, conveniently located off I-25 at Exit #185. Hotel amenities include indoor pool, spa, sauna and steam room and guest laundry. A complimentary expanded Continental Breakfast is provided daily. Fruit, popcorn and coffee are available in the lobby 24 hours a day. Room amenities include first run movies and entertainment, hair dryers, clock radios and free high speed wireless internet access. Complimentary airport shuttle and Motorcoach parking is available. For additional information, including images, please visit this wbsite:
http://www.shiloinns.com/search_results.asp?PI=RCAWY&menu1=&date1=10%2F31%2F2008&date2=11%2F1%2F2008&_NA=1&_NC=0&_QuText=+&_SpcRate=&BS=88888888&x=92&y=11

It's my understanding that the majority of your workers will be in the area from approximately March thru June of 2009, with a smaller number staying on for a period of time after June. I know that you are trying to assess your hotel room options in the area and in that context the Shilo Inn Casper Evansville is pleased to offer your company 15 rooms daily at a rate of $67.00 plus 8% tax, which includes the daily continental breakfast as described above.

Upon review, please let me know if you have any questions or if you need me to issue a company agreement to more formally confirm these arrangements. Thanks again for your consideration.

Regards,

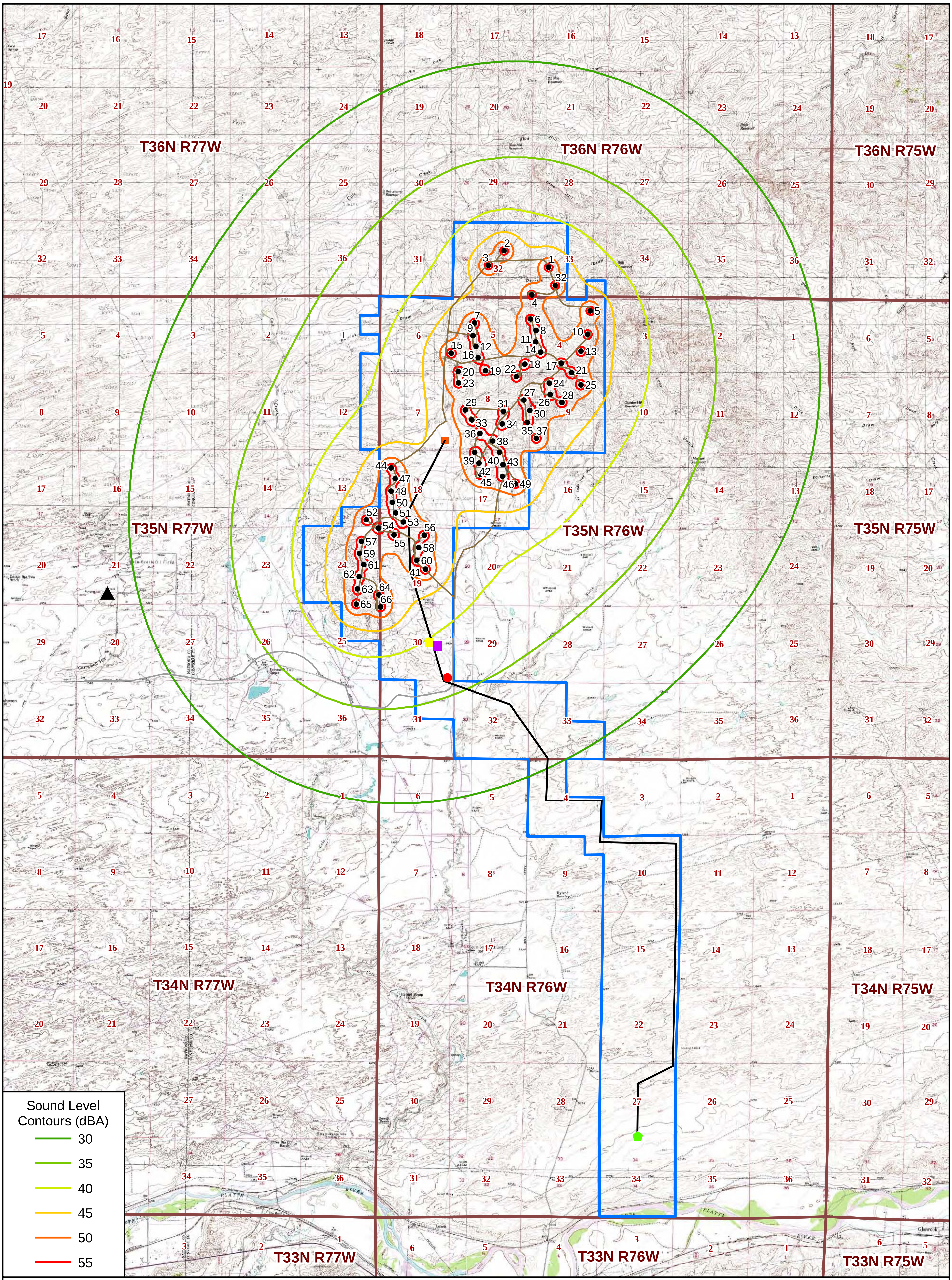
Scott

Scott L. Hartcorn
Director Tour & Travel/
South Region Director of Sales
Shilo Management Corporation
11600 SW Shilo Lane
Portland, OR 97225-5995
503-572-3626 Phone
503-644-0868 Fax
scott.hartcorn@shiloinns.com
http://www.shiloinns.com

Advancing Tourism....Connecting Cultures!

APPENDIX E

Resource Maps



Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Project Boundary
- Substation
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships
- Nearest Residence

Predicted Sound Pressure Levels (dBA) Map Campbell Hill

Converse County, Wyoming

N

1 0.5 0 1 Miles

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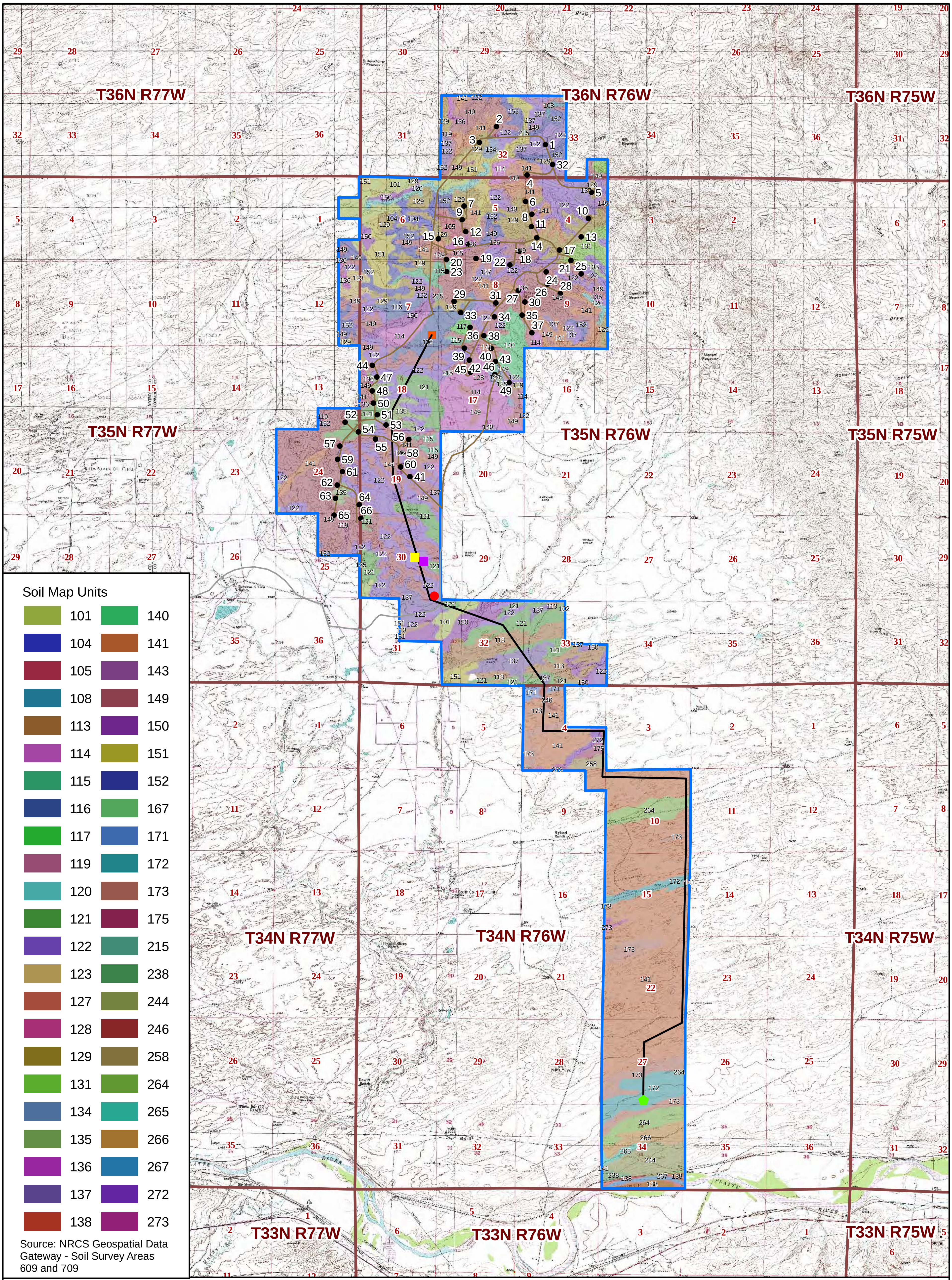

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Substation
- Project Boundary
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships

Soil Map
Campbell Hill
Converse County, Wyoming

N

1 0.5 0 1 Miles

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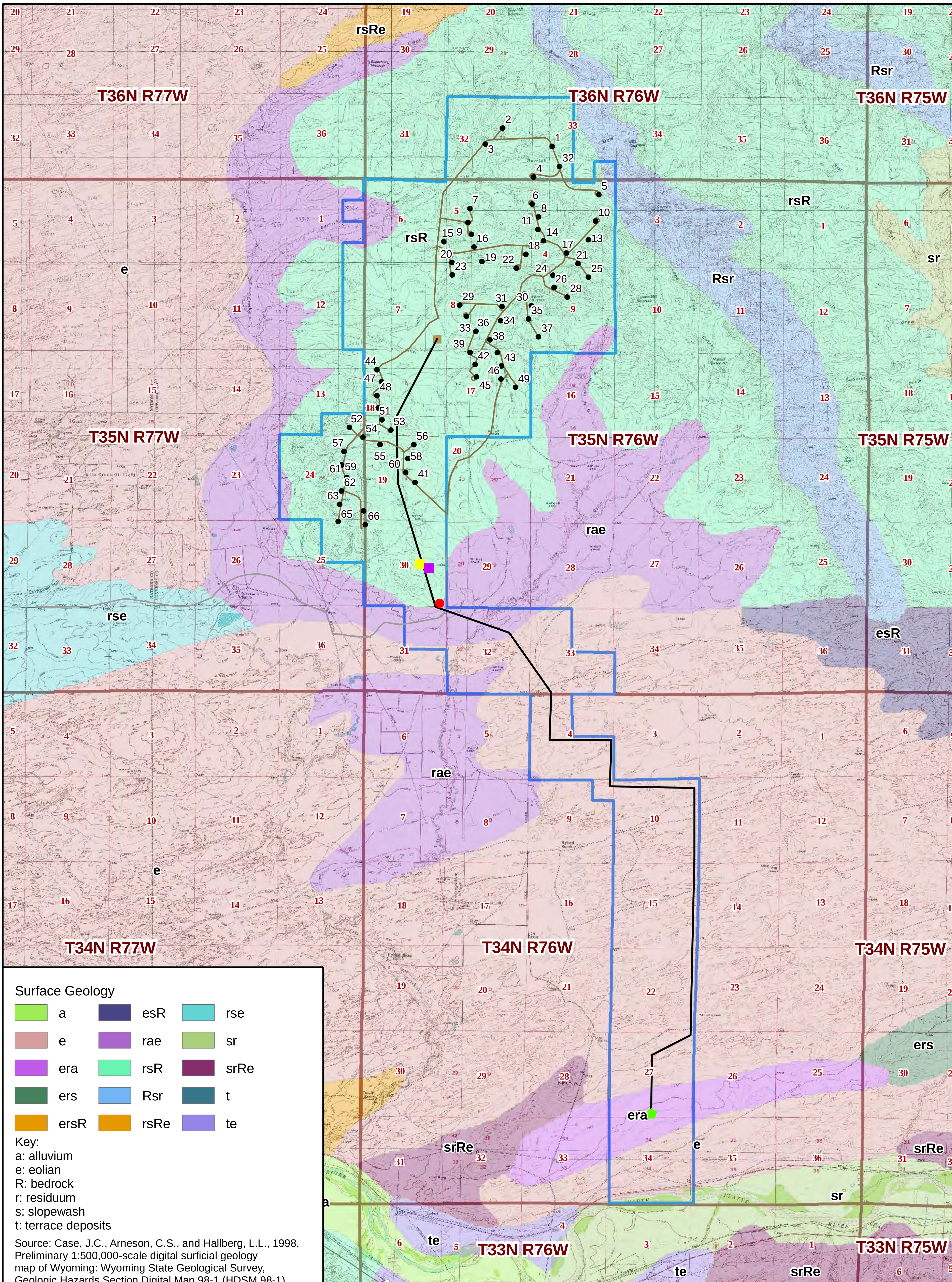

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Substation
- Project Boundary
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships

Surface Geology Map
Campbell Hill
Converse County, Wyoming

N

1 0.5 0 1 Miles

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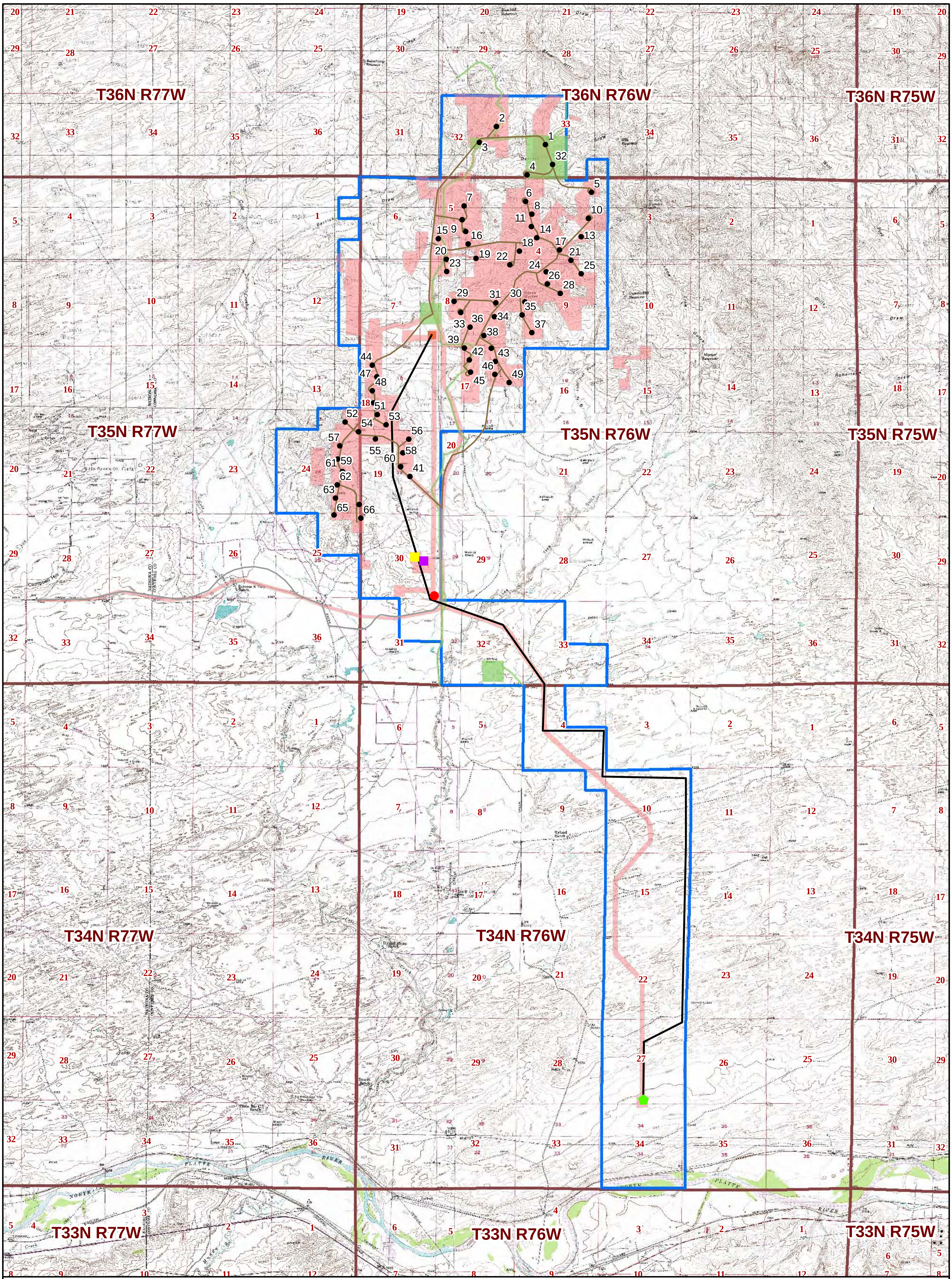

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Project Boundary
- Substation
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships
- Previous Class III
- Class III Inventory Area

Source: Previous Class III - CRAI (2008).
Class III Inventory - CRAI (2008).

Cultural Resource Inventory Area Map Campbell Hill

Converse County, Wyoming

N

1 0.5 0 1 Miles

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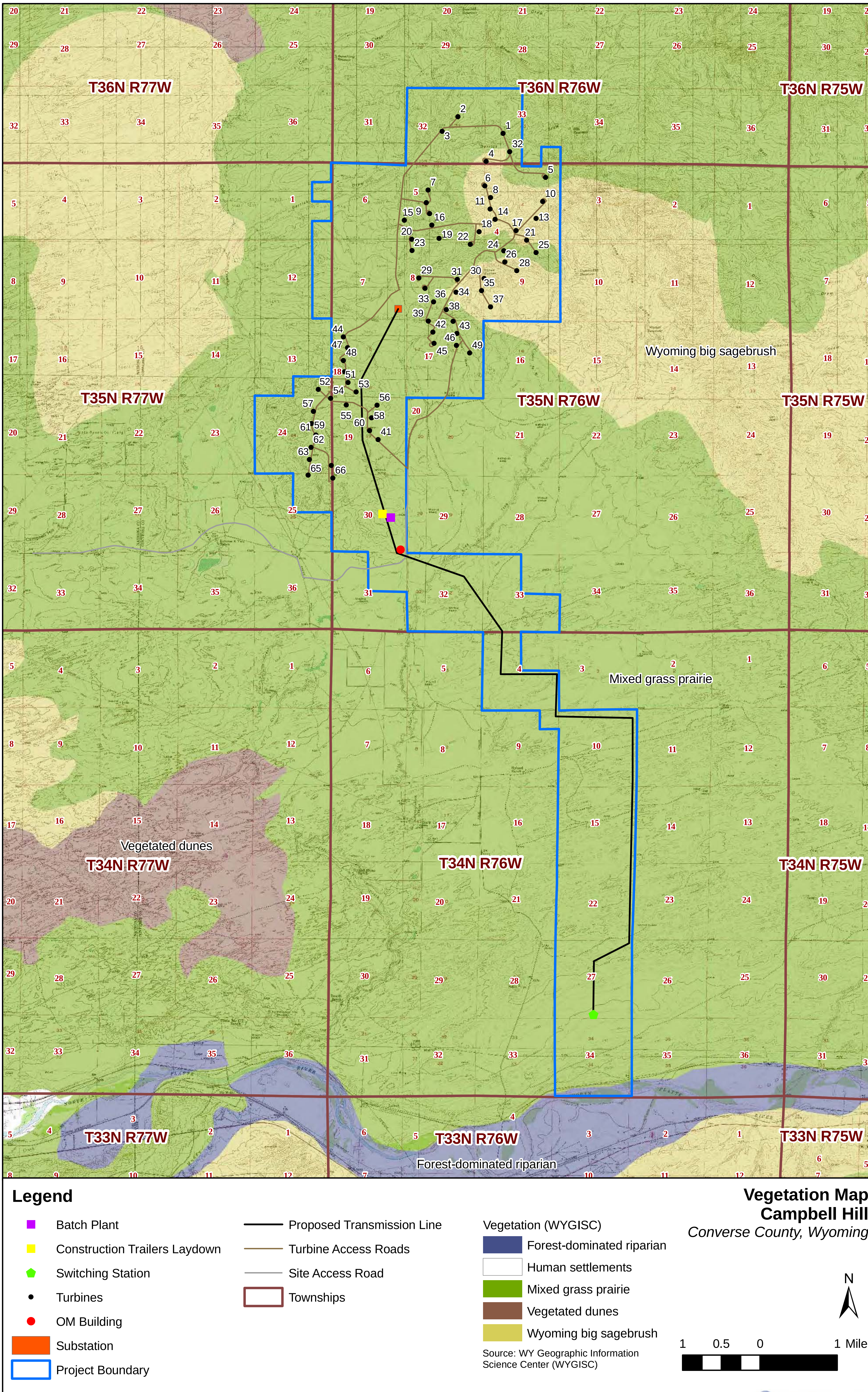

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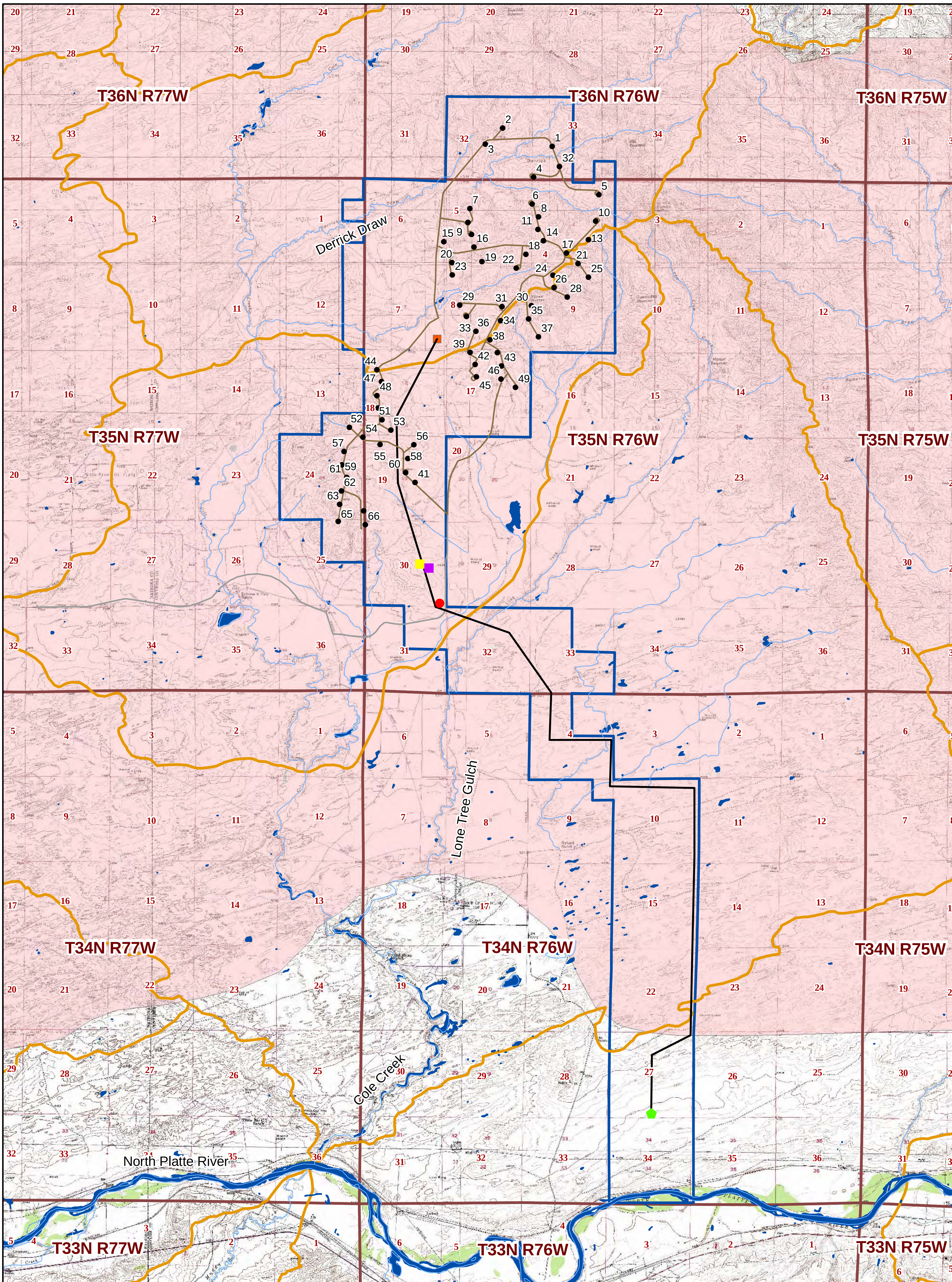

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Substation
- Project Boundary
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships
- Streams (NHD)
- Wetlands (NWI)
- Hydrologic Units
- No Hydrologic Connection to the North Platte River (SEO)

Surface Water and Wetlands Map
Campbell Hill
Converse County, Wyoming

N

1 0.5 0 1 Miles

Sources: National Hydrography Dataset (NHD), National Wetland Inventory (NWI), Wyoming State Engineers Office (SEO)

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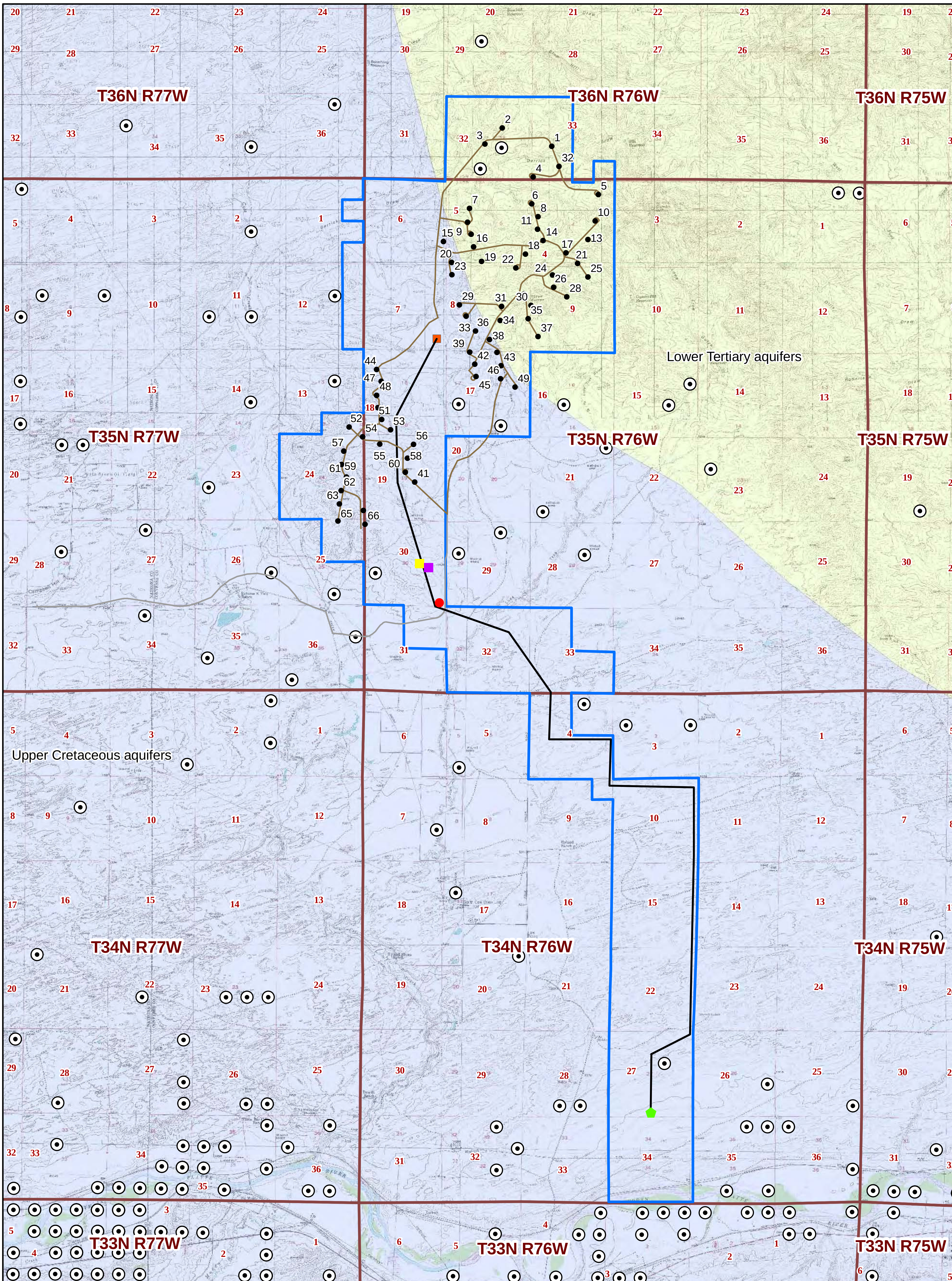

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Substation
- Project Boundary
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships
- Approximate Well Location (SEO)

Principal Aquifers (SEO)

- Lower Tertiary aquifers
- Upper Cretaceous aquifers

Source: Wyoming State Engineers Office (SEO)

Groundwater Wells and Aquifer Map
Campbell Hill
Converse County, Wyoming

N

1 0.5 0 1 Miles

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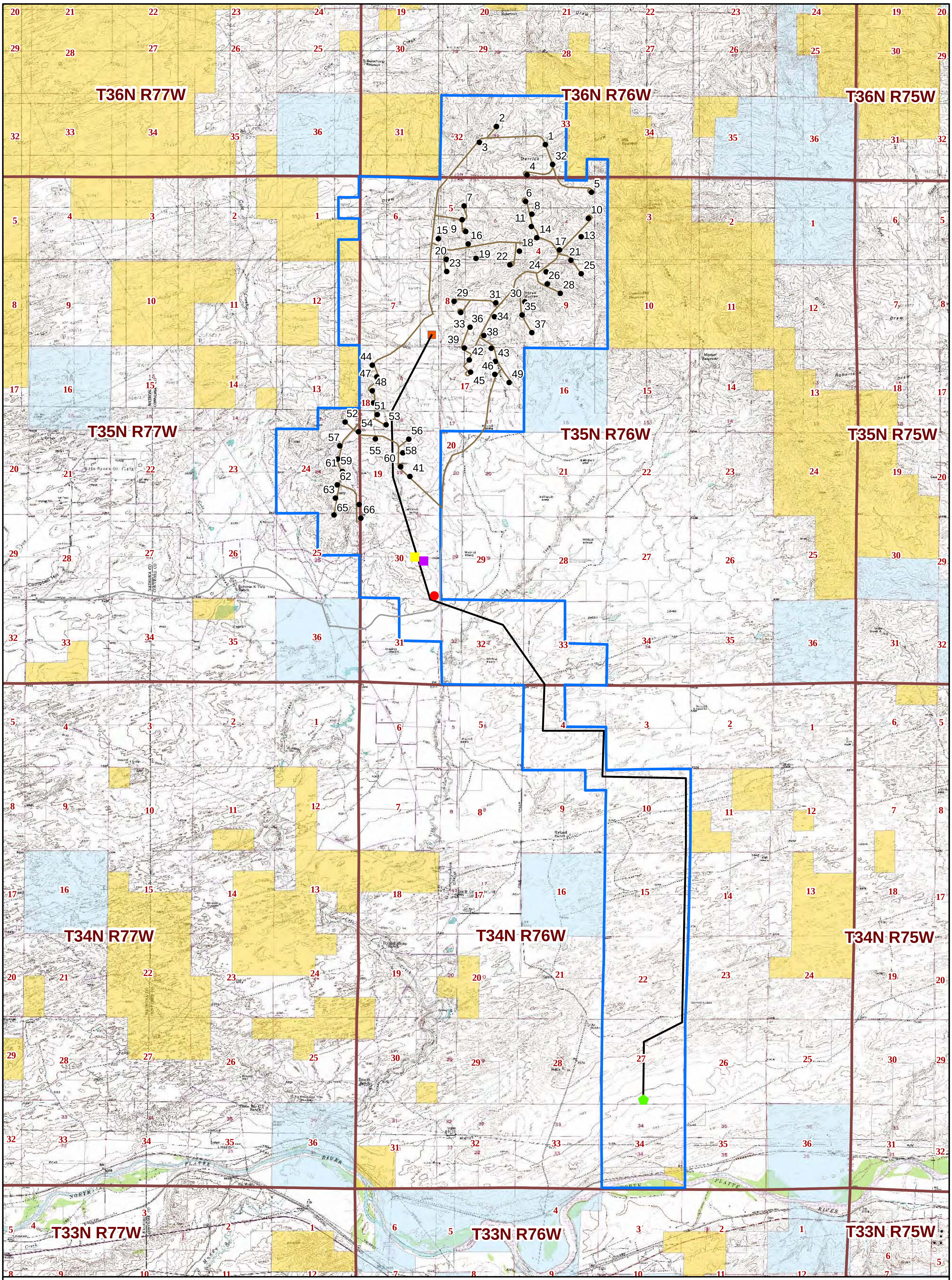

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Substation
- Project Boundary
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships

Land Ownership

- BLM
- Private
- State

Land Ownership Map
Campbell Hill

Converse County, Wyoming

N

1 0.5 0 1 Miles

CH2MHILL

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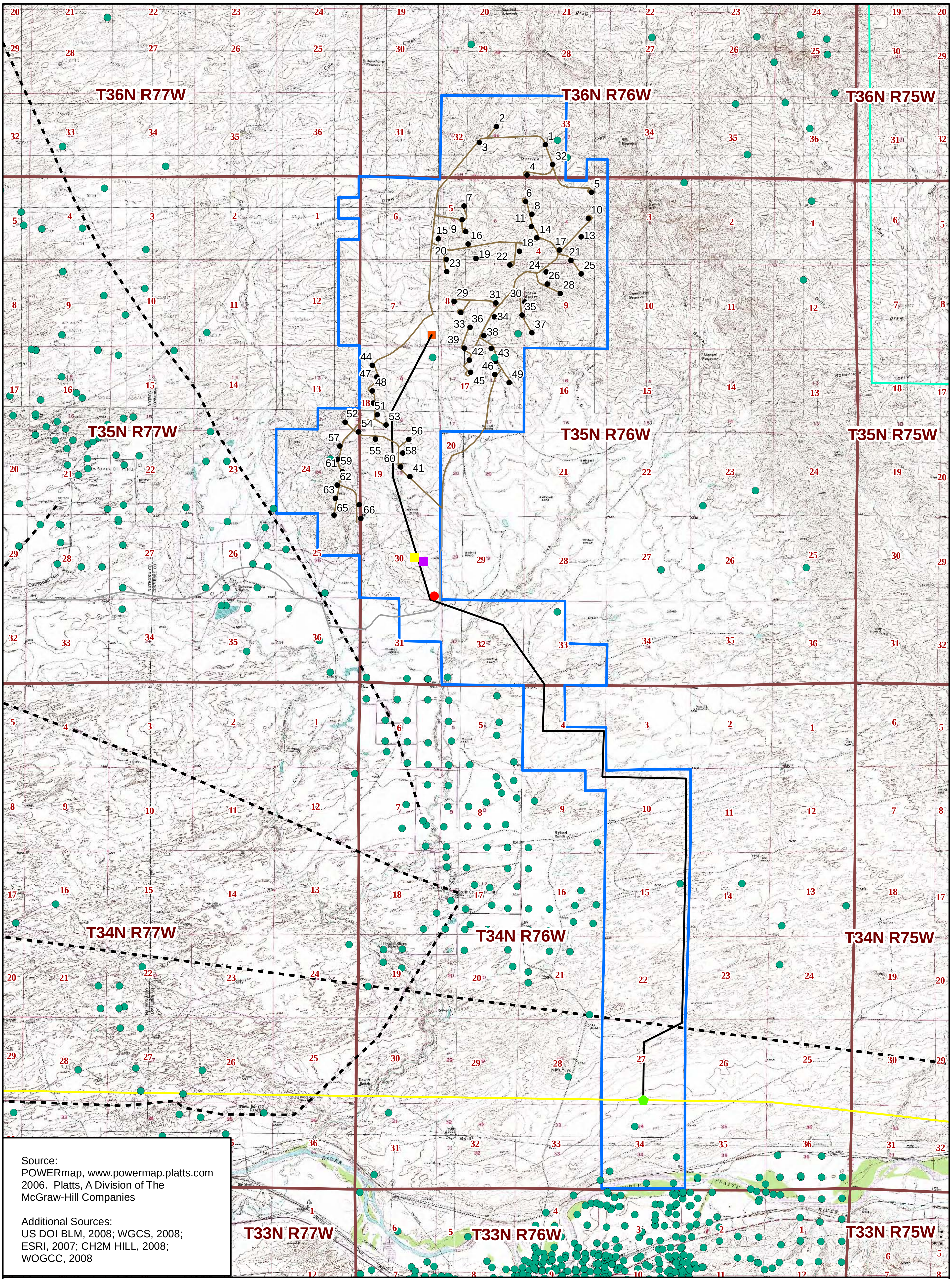

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- WOGCC Wells
- OM Building
- Pipelines
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Substation
- Project Boundary
- Townships

Transmission Lines

- 345kV - 499kV
- 230kV - 344kV
- Below 230kV

Infrastructure Constraints Map
Campbell Hill
Converse County, Wyoming

N

1 0.5 0 1 Miles

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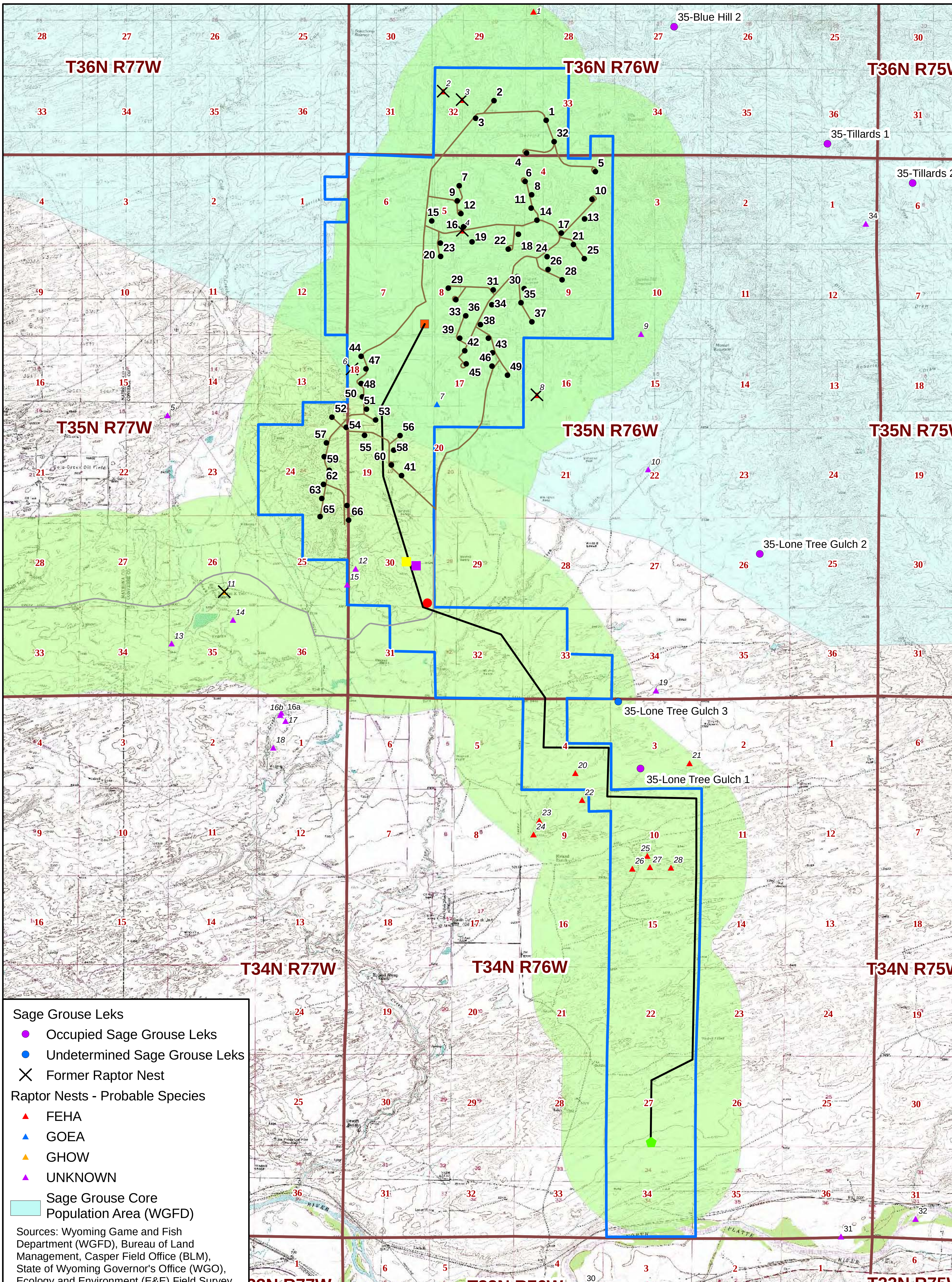

Legend

- Batch Plant
- Construction Trailers Laydown
- Switching Station
- Turbines
- OM Building
- Substation
- Project Boundary
- Proposed Transmission Line
- Turbine Access Roads
- Site Access Road
- Townships
- Survey Area

Raptor Nests and Sage Grouse Leks
Campbell Hill
Converse County, Wyoming

N

1 0.5 0 1 Miles

CH2MHILL

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APPENDIX F

Cultural Resources Report

Contract Publication Series CO 08-15

CLASS III CULTURAL RESOURCES INVENTORY OF THE CAMPBELL HILL WIND FARM PROJECT, CONVERSE AND NATRONA COUNTIES, WYOMING

For Official Use Only: Disclosures of site locations prohibited (43 CFR 7.18)

Cultural Resource Analysts, Inc. – Longmont, Colorado

Contract Publication Series CO 08-15

CLASS III CULTURAL RESOURCES INVENTORY OF THE CAMPBELL HILL WIND FARM PROJECT, CONVERSE AND NATRONA COUNTIES, WYOMING

by

Tosh McKetta,

Weston Bacon-Schulte,

Suzanne Brant,

Christina Kester-Tallman,

Lovella Learned Kennedy,

Danielle Hoefer

and Alexander Cragg

Prepared for

Ecology and Environment, Inc.

700 Third Avenue, Suite 1700

Seattle, Washington 98104

Prepared by

Cultural Resource Analysts, Inc.

421 21st Avenue, Suite 8

Longmont, Colorado 80501

Ted Hoefer III

Principal Investigator

November 26, 2008

EXECUTIVE SUMMARY

Cultural Resource Analysts, Inc. (CRAI) of Longmont, Colorado was contracted by Ecology and Environment, Inc. to conduct a Class III cultural resources inventory of the Duke Energy Campbell Hill Wind Farm Project in Converse and Natrona Counties, Wyoming. The project includes the construction of 66 wind turbines, a new substation, construction facilities, a new transmission line from the proposed substation to an existing substation, and access roads for the turbines

CRAI inventoried 3998 of the 13,008 acres of the project area. This includes 3,167.4 acres in and around the proposed turbine locations, 335.6 acres for the access road corridors not within the area surveyed for the turbines, and 495 acres for the transmission line and site improvements.

During the project, 24 sites and 31 isolated finds were recorded. Of these eight are determined eligible for listing on the National Register of Historic Places (NRHP) or unevaluated. Five of these sites will already be avoided in the current configuration of the project. CRAI recommends that turbines 10 and 47 be relocated since their proposed locations fall within eligible prehistoric sites. CRAI further recommends not using the access roads turbines 26 and 27 and around turbine 47 since other routes are available and the roads as proposed will adversely affect eligible historic sites.

The mapped 1863 route of the Bozeman Trail (48CO2560) crosses the proposed access road into the project area. CRAI did not locate any contributing segments of this trail within three miles of the Project Area boundary.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

Cultural Resource Analysts, Inc. (CRAI) of Longmont, Colorado was contracted under Subcontract Agreement Number 002695.DE07 by Ecology and Environment, Inc. to conduct a Class III cultural resources inventory of the Duke Energy Campbell Hill Wind Farm Project in Converse and Natrona Counties, Wyoming. The field work was conducted on August 13-22, September 4-7, September 24-28, October 13-17, and November 17-18, 2008 under the field direction of Weston Bacon-Schulte and Christina Kester-Tallman. Tosh McKetta served as the assistant field director and Suzanne Brant, Stephanie Crabtree, Alexander Cragg and Lovella Learned Kennedy served as Field Technicians. The CRAI project number is C08B003.

PROJECT DESCRIPTION AND LOCATION

The project includes the construction of 66 wind turbines, a new substation, construction facilities, a new transmission line from the proposed substation to an existing substation, and access roads for the turbines (Figures 1-11). The project area encompasses 13,008 acres. CRAI inventoried 3,998 acres including 3,167.4 acres in and around the proposed turbine locations, 335.6 acres for the access road corridors not within the area surveyed for the turbines, and 495 acres for the transmission line and site improvements. The project area consists of irregularly shaped survey blocks located in Township 36N, Range 76W, Sections 32 and 33; Township 35N, Range 76W, Sections 4, 5, 6, 7, 8, 9, 10, 15, 18, 19, 30, and 33; Township 35N, Range 77W, Sections 1, 12, 13, 24, and 25; Township 34N, Range 76W, Sections 4, 9, 10, 15, 22, and 27. Most of the project area is privately owned. A small portion in Township 35 North, Range 77 West, Section 36 is owned by the State of Wyoming. No specific permits were needed for most of this inventory. A State of Wyoming Office of State Lands and Investments permit was obtained for Section 36 on October 2, 2008.

The purpose of this project was to locate, identify, and record any cultural resources within the project area and evaluate these finds for eligibility to the National Register of Historic Places. No nexus for the National Historic Preservation Act (NHPA) Section 106 (16 U.S.C. 470f) exists for cultural resource consultation on state or private lands unless a federal action is involved. However, as part of the application for permit under the Industrial Siting Council, Title 35 Chapter 12 Section 109 Rule 1 Section 7 (*xiii*) (C), an evaluation of archaeological and historic resources is required. The guidelines set forth in Section 106 of the NHPA on conducting the survey and evaluating historic properties were followed. This report complies with the requirements for Class I and Class III cultural resources inventories and reports of the Wyoming State Historic Preservation Office.

METHODS

A Class III cultural resources inventory was conducted for the Campbell Hill Wind Farm project to identify cultural resources. Of the 13,008 project acres, 3,998 acres were surveyed. To cover the portions of the project that will be impacted by the proposed undertaking, Cultural Resource Analysts, Inc. used GIS modeling to determine survey blocks which would include land that surrounds the proposed turbine locations with a buffer so that, if the turbines need to be relocated, additional surveys will not be needed. The original turbine locations were inventoried and then another inventory was conducted

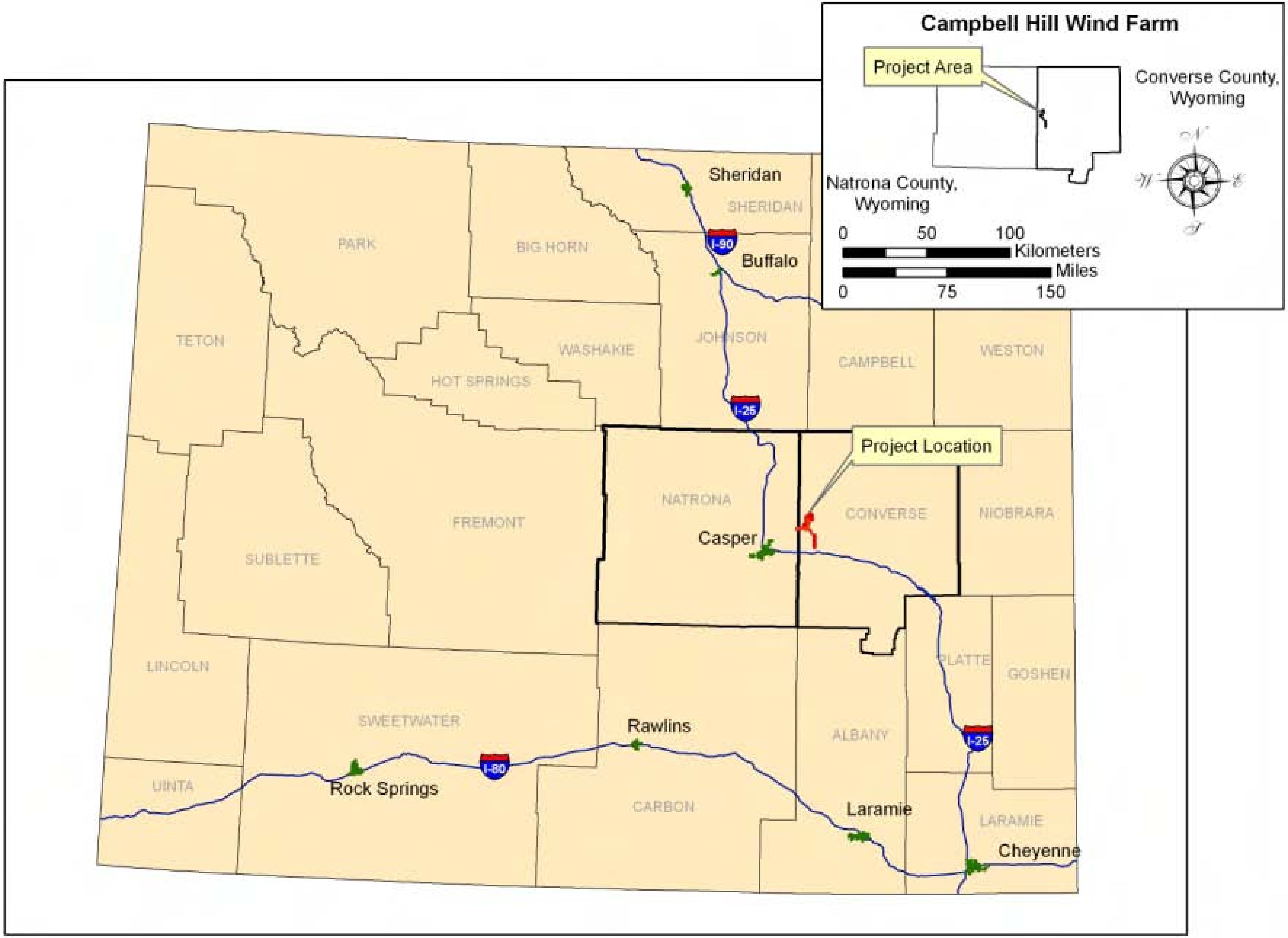

Figure 1. Campbell Hill Wind Farm Project Converse and Natrona Counties, Wyoming

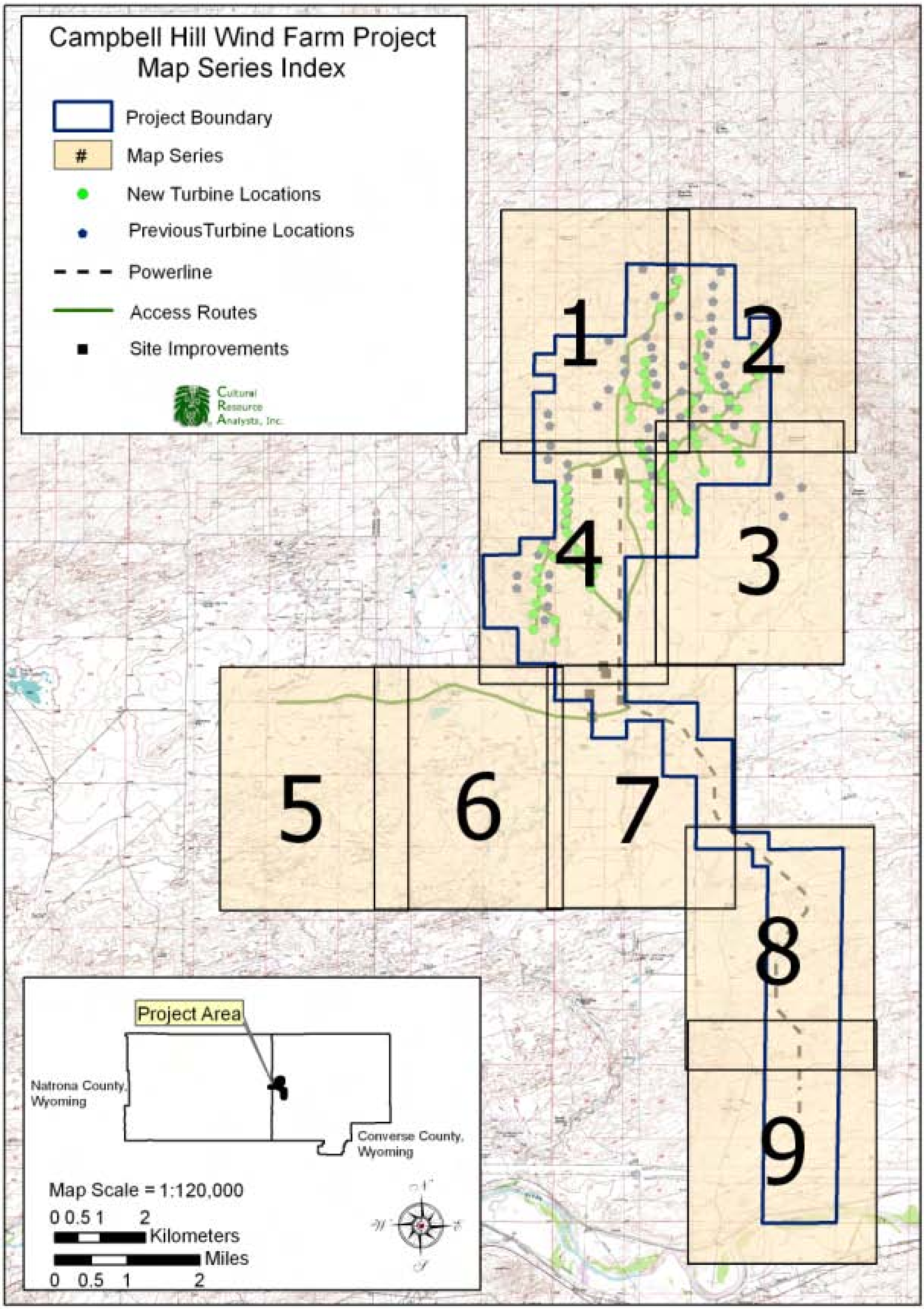

Figure 2. Campbell Hill Wind Farm Map Index

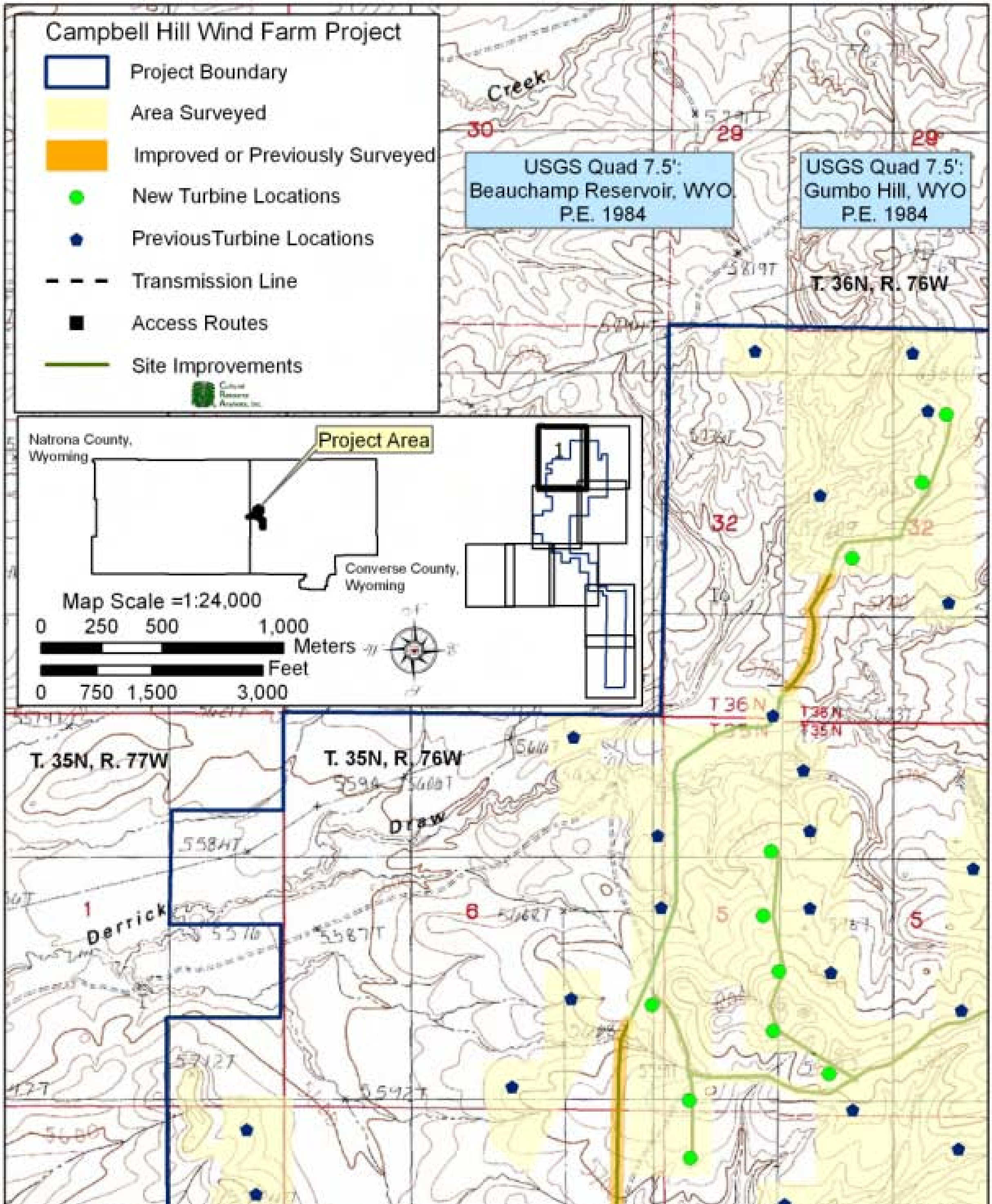

Figure 3. Campbell Hill Wind Farm Project Map - Map 1

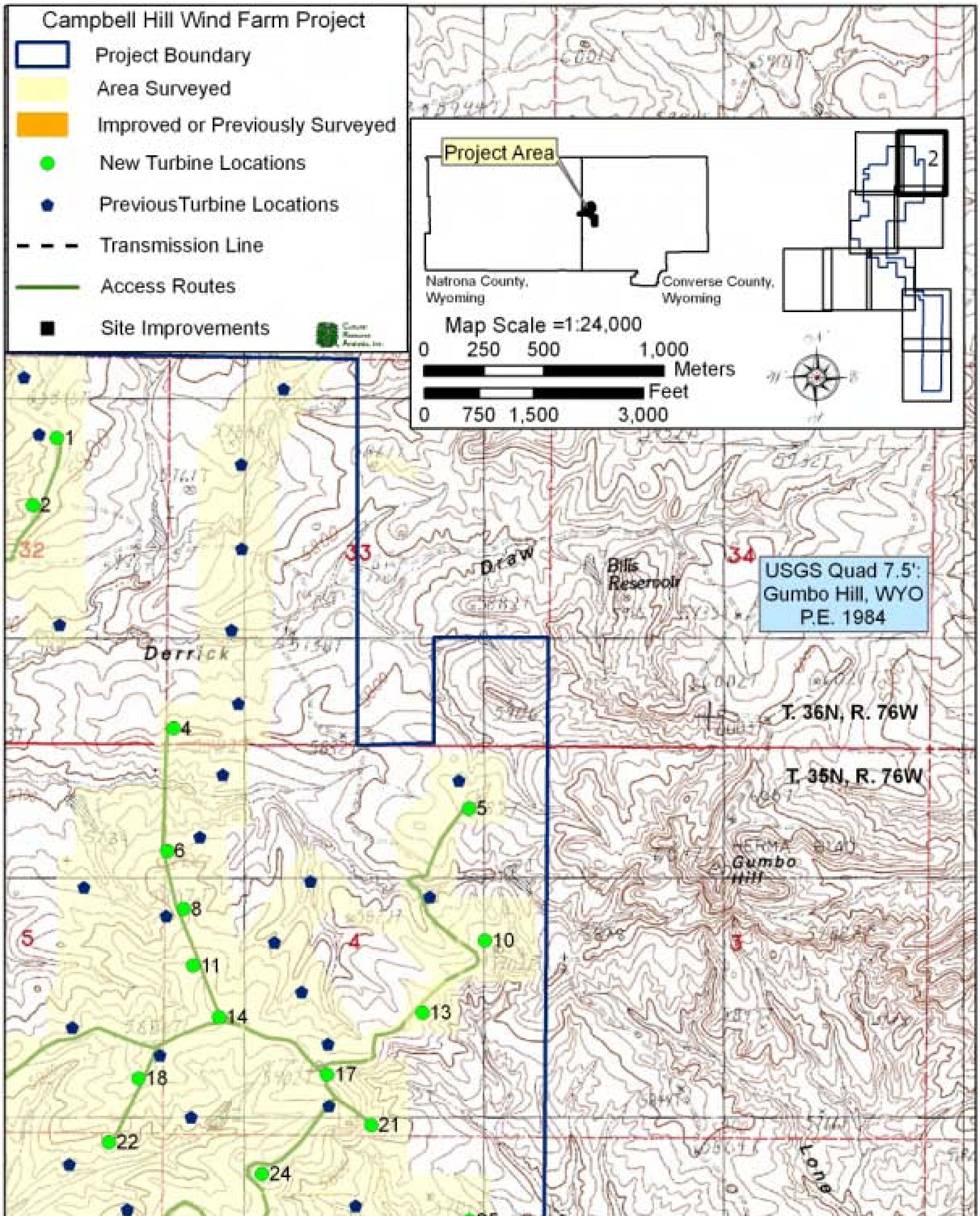

Figure 4. Campbell Hill Wind Farm Project Map - Map 2

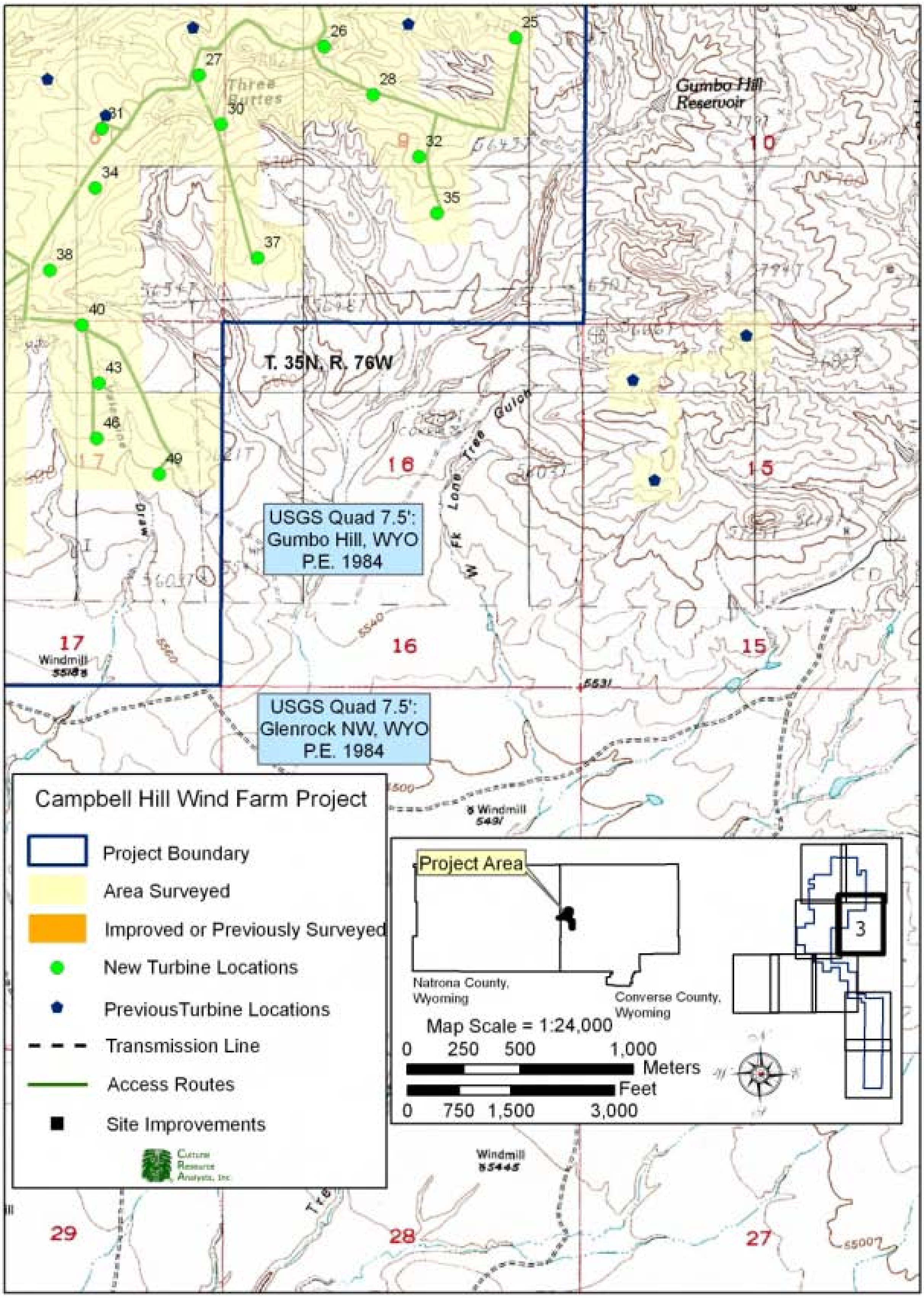

Figure 5. Campbell Hill Wind Farm Project Map - Map 3

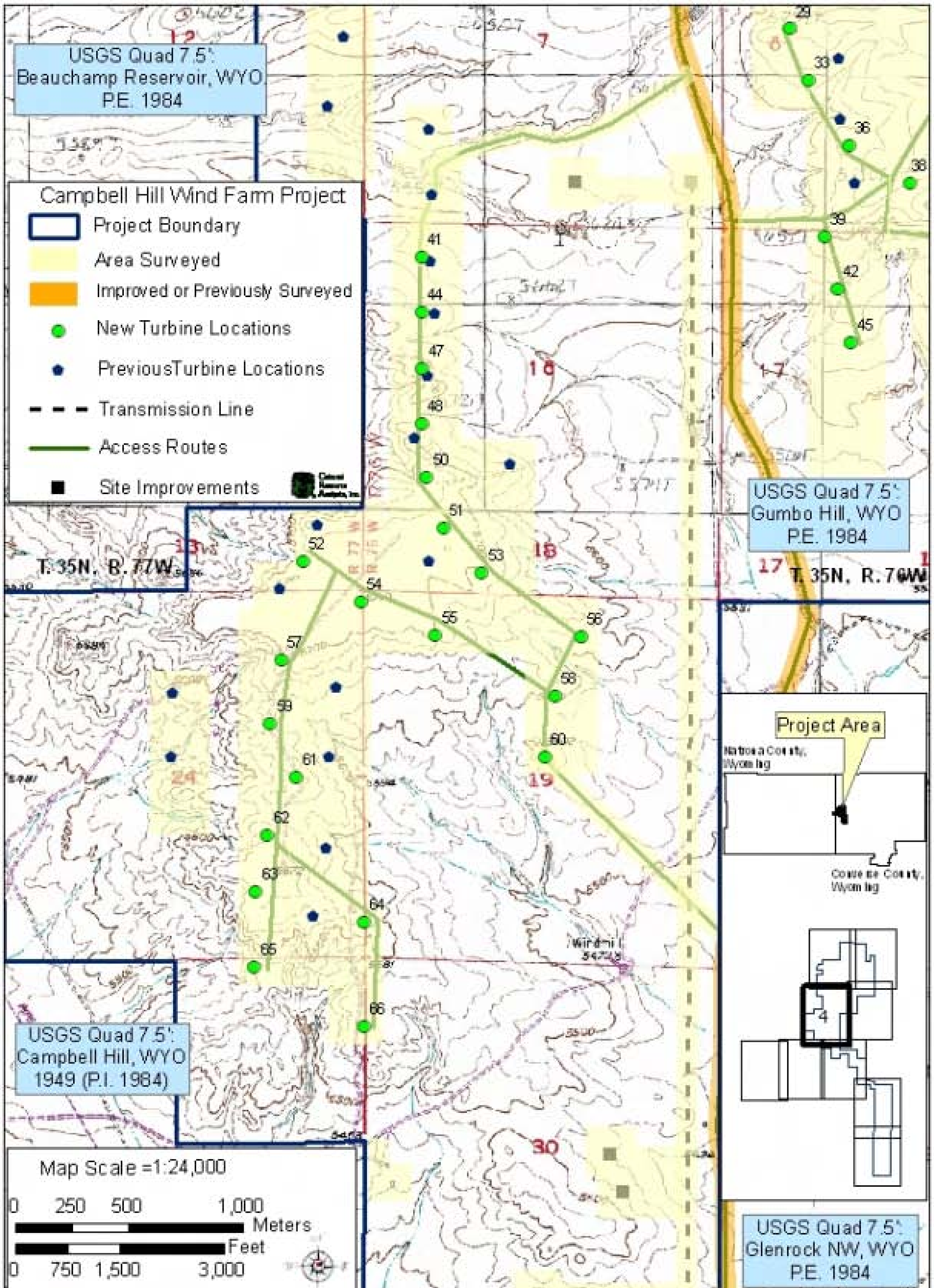

Figure 6. Campbell Hill Wind Farm Project Map - Map 4

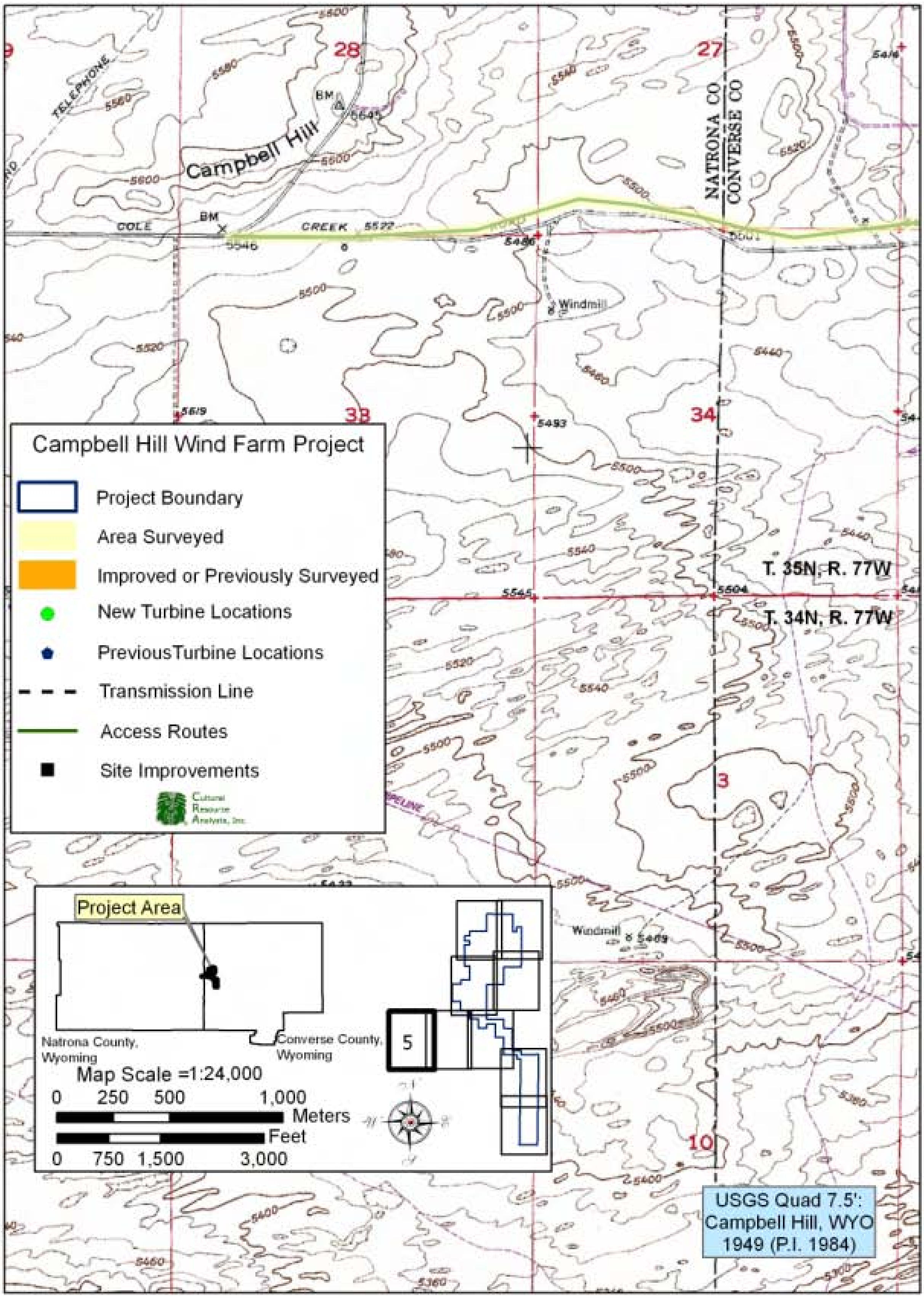

Figure 7. Campbell Hill Wind Farm Project Map - Map 5

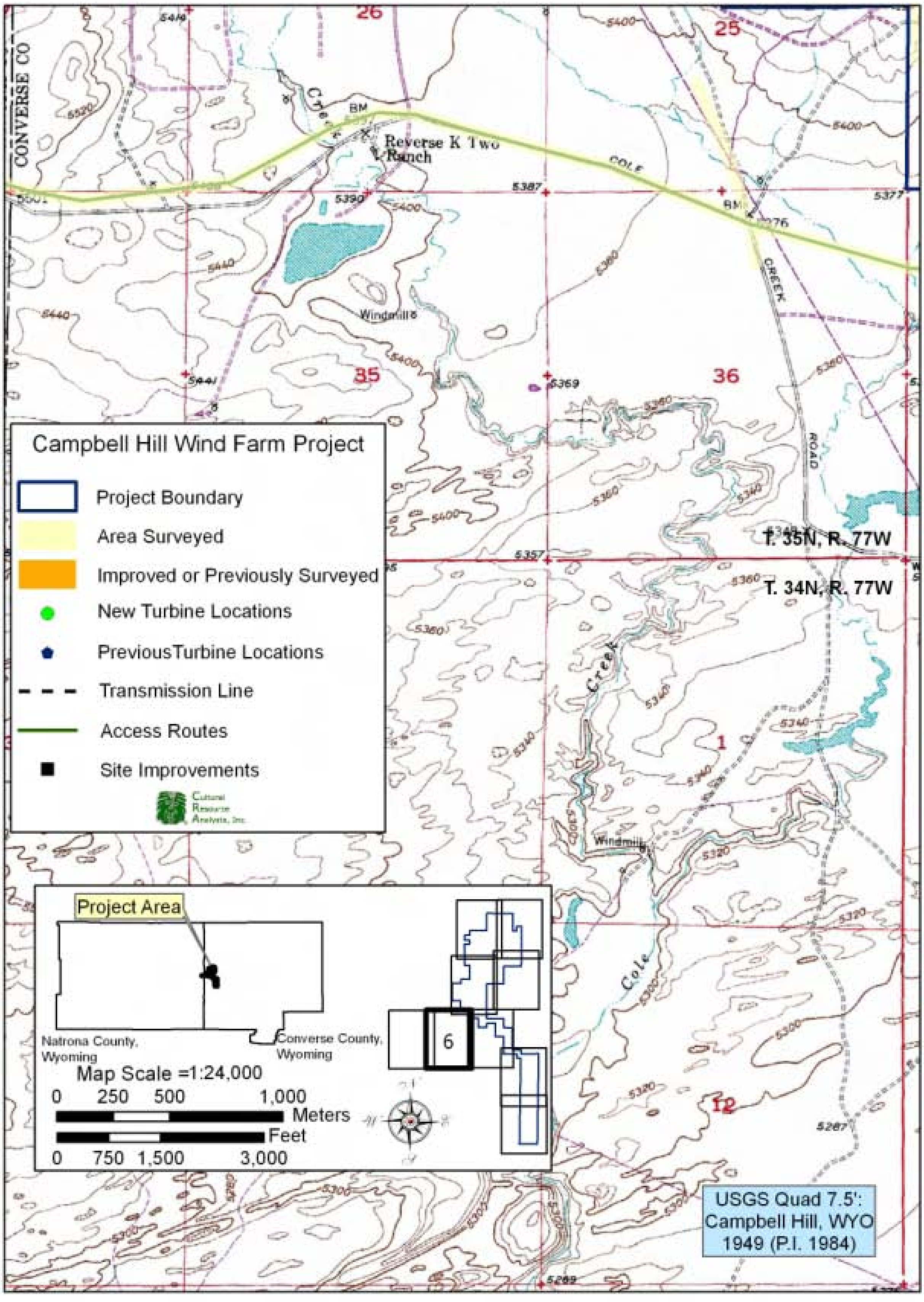

Figure 8. Campbell Hill Wind Farm Project Map - Map 6

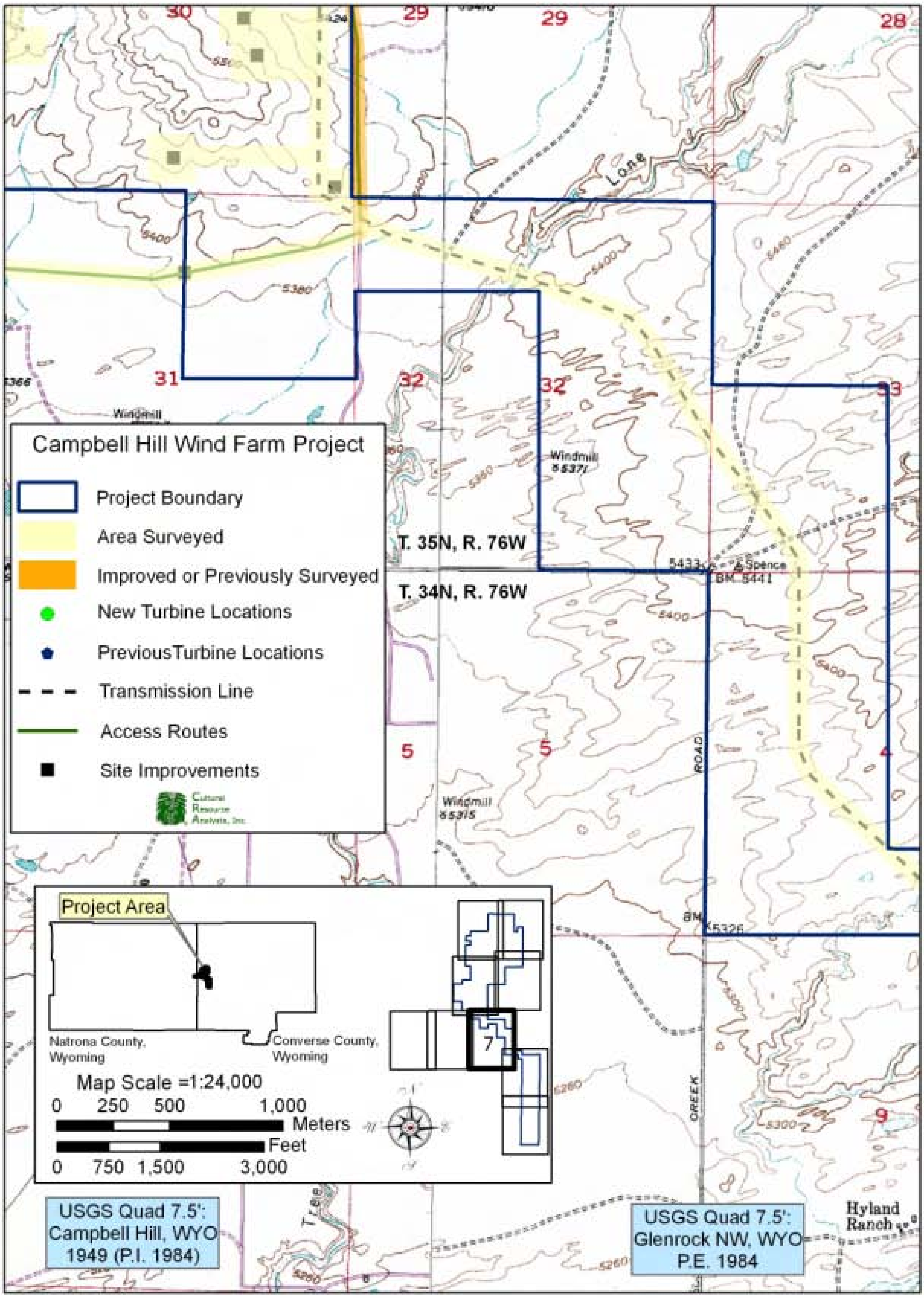

Figure 9. Campbell Hill Wind Farm Project Map - Map 7

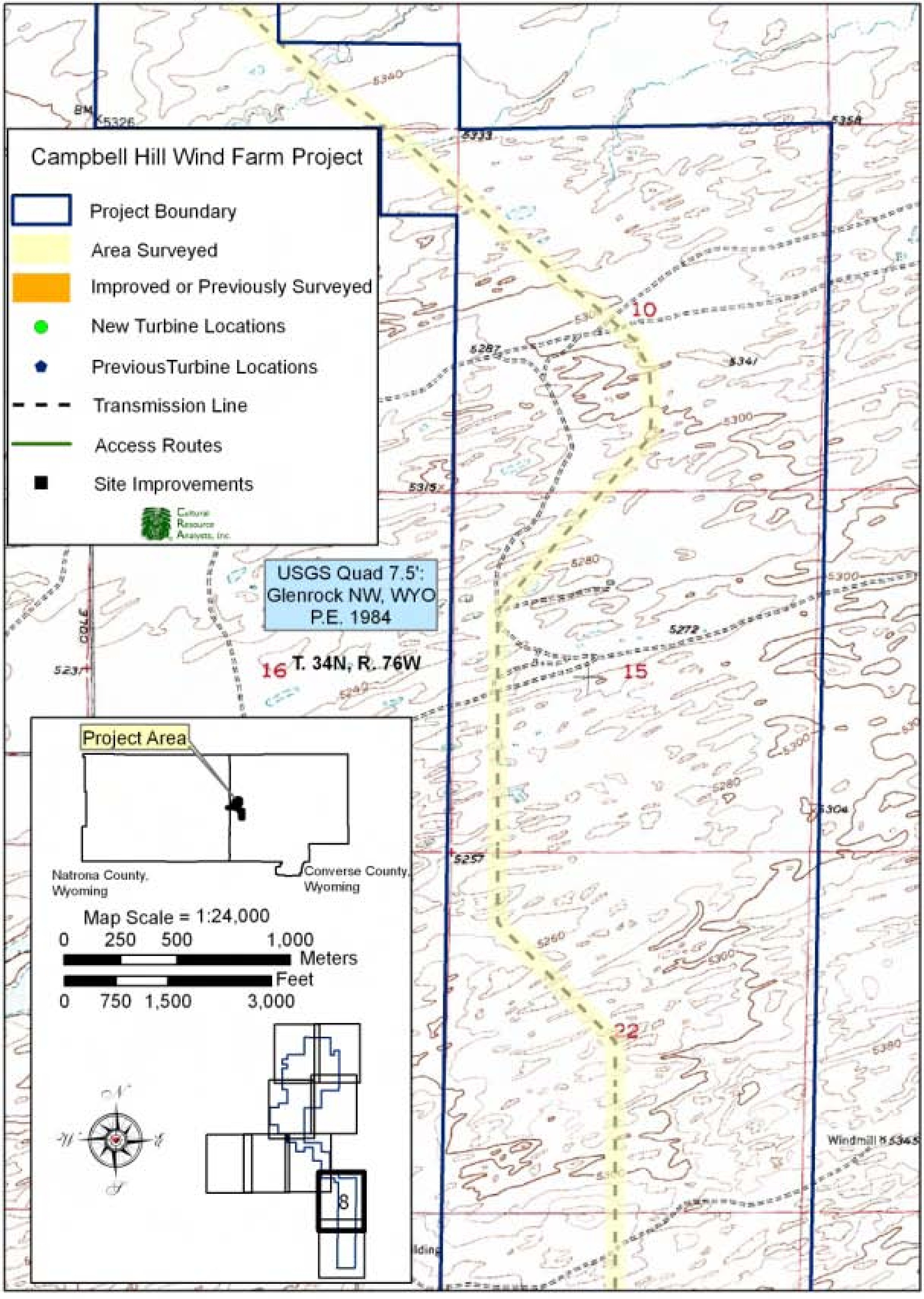

Figure 10. Campbell Hill Wind Farm Project Map - Map 8

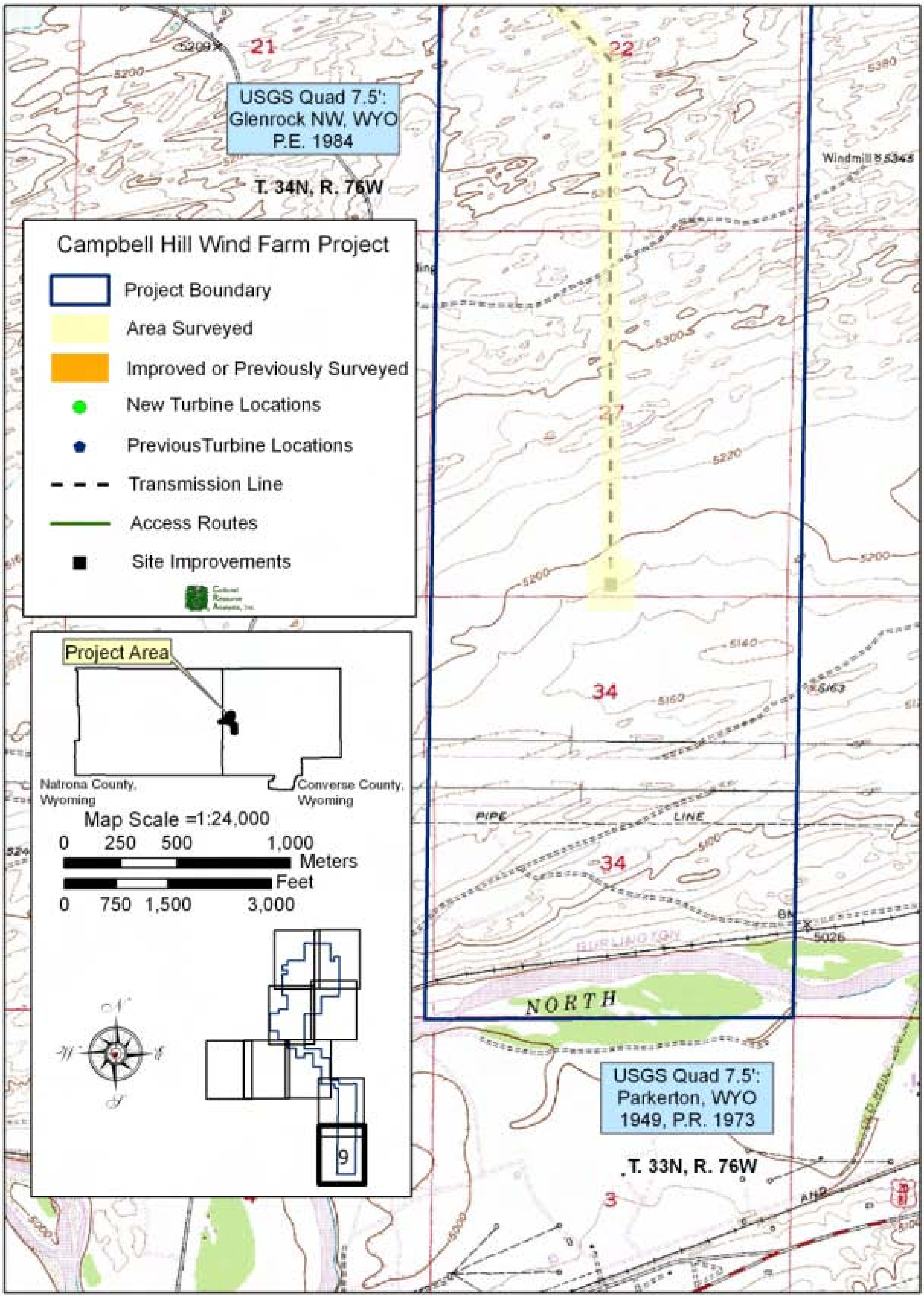

Figure 11. Campbell Hill Wind Farm Project Map - Map 9

when some of the turbine locations were moved out of the original survey areas. These block areas were designed to cover enough area so that most of the access roads to the turbines were inventoried. All linear portions of the project, including the 10.7 mile long transmission line and any access roads not covered by the block survey, were surveyed with a 100-meter (328 feet) corridor.

The inventory was conducted by crewmembers walking zig-zag transects within each survey block. A Trimble GeoXT handheld GPS, and compasses were used for navigation. Spacing between crew members was kept at 30 meters, with closer spaced transects in areas determined by the project director as highly sensitive areas necessitating an increased level of investigation. Ground visibility within the project area ranged from 25 to 90 percent and averaged 75 percent

SITE RECORDING METHODS

The Wyoming State Historic Preservation Officer (SHPO) defines a site as 15 or more spatially associated artifacts within a 30-meter diameter for a prehistoric site and 50 or more associated artifacts within a 30-meter diameter for a historic site. A prehistoric isolated find is 14 or fewer artifacts where no buried cultural materials or features are thought to exist. A historic isolated find is 49 or fewer associated artifacts where no buried cultural material or features exist.

When a site was encountered, the field crews covered the area in 3-5 meter transects until cultural materials were no longer located, indicating that the boundary of the site had been determined. All cultural material on the site was pin flagged to assist in the subsequent recording and assessment of the site. On all sites, a datum was established, consisting of a metal tag with the project name, project number, site number, and date. This tag was affixed to a metal stake and placed in a location that was protected from inadvertent disturbance and accessible for mapping purposes.

The sites were mapped from the datum(s) using hand-held compasses and tape measures or pedestrian pacing. Elements recorded on the maps were the location of the site datum, mapping datum, distributions of artifacts and features, location of diagnostic materials, the site boundary, topographic features, roads and two-tracks, and any other important natural or man-made features as determined by the project director or crew chief.

The sites were described and recorded on the appropriate Wyoming Cultural Resource Survey Forms as required by the nature of the cultural remains. Photographs were taken of the sites, all features and all diagnostic artifacts. Photographs were also taken of the general environment on sites.

Artifact Classification

All artifacts encountered during the project were classified as described below.

Prehistoric: Prehistoric artifacts were divided into the following categories:

<u>Lithic Debitage:</u> Lithic debitage is classified by the amount of dorsal cortex, flake condition (whole, broken, fragment or shatter), size, platform type and heat treatment.

<u>Cores:</u> Cores are nodules or cobbles of raw material from which flakes have been removed.

Utilized Flakes: Flakes which have been used for cutting or other purposes, but have not been otherwise modified. One or more flake margins exhibit use wear.

Retouched Flakes: Flakes which have been intentionally modified by retouching one or more flake margins. This category of tools includes flakes which have been minimally retouched, to flakes that have been retouched on the sides and ends to produce scrapers.

Uniface: A flake or piece of raw material that has been flaked across one face only.

Stage 1 Biface: A flake or piece of raw material that has been flaked on both faces, but is still thick, angular, and irregular in shape. Cortex may be present on one or more faces.

Stage 2 Biface: A flake or piece of raw material that has been flaked on both faces. These artifacts have had the cortex removed and are still thick and blocky. These artifacts have a definable shape, but still retain large platforms for further flake removal.

Stage 3 Biface: A flake or piece of raw material that has been flaked on both faces. These artifacts have a definite shape and have been thinned to such an extent that only a limited number of tool forms can be produced.

Stage 4 Biface: A flake or piece of raw material that has been flaked on both faces. These artifacts have been thinned to such an extent that they have attained a final form, unless broken and subsequently reworked. These artifacts may possess edge retouch and are thin in cross section. The only additional modifications are notching for hafting.

Projectile Point: Also referred to as hafted bifaces. These artifacts are final bifaces that have been notched or otherwise modified for hafting.

Drill: Drills are bifacially reduced artifacts that possess a long, thin distal end. The artifact has been flaked laterally to produce a circular, bevelled, or diamond cross section, as opposed to thinned edges.

Ground Stone: These artifacts include materials that have been modified on one or more faces by smoothing, grinding, pecking, or pounding. This class of artifacts includes manos, metates, ground stone fragments, abraders, and hammer stones.

Historic - Artifacts found on historic sites are placed in classes based on the table below.

Table 1: Historic Artifact Classification System

Category	Group	Class	Examples of Artifact Type[1]
Structural	Building[2]	Glass	Window glass
		Hardware	Nails, hinges
		Materials	Wood, concrete, structural steel
		Utilities	Light bulbs, fuses, faucets
	Structure[3]	Glass	Window glass
		Hardware	Nails, hinges
		Materials	Wood, concrete, structural steel
		Utilities	Light bulbs, fuses, faucets

Category	Group	Class	Examples of Artifact Type[1]
Non-Structural	Domestic	Food Containers	Cans, bottles
		Beverage Containers	Cans, bottles
		Food Preparation	Pots, pans, can openers
		Food Serving	Bowls, plates, utensils
		Food Remains	Butchered bone, seeds
		Medical	Medicine bottles, thermometers, syringes
		Furnishing	Furniture, pictures, mirrors
		Housekeeping	Brooms, clothespins, cleaning fluid, bottles
	Commercial-Industrial	Mining	Picks, candle holders, hardhat
		Tourism	Poker chips, souvenirs
		Ranching/Farming	Hay forks, irrigation boots
	Personal	Personal Items	Combs, eye glasses, pocket knife
	Activities	Games	Baseball, volleyball net
		Domestic Animals	Feeding bowls, tack
	Unclassifiable	Unknown	Classifiable only by material because of fragmentary of deteriorated condition
		Unidentifiable	Artifact cannot currently be identified, but it is possible someone could in the future

[1]-Example of types of artifacts that may be encountered, not a comprehensive list

[2]-Buildings are edifices that are intended for human occupancy, e.g. houses or offices

[3]-Structures are not intended for human occupancy, e.g. bridge, water tower

BACKGROUND INFORMATION

Environment

The proposed Campbell Hill Wind Farm is located in the extreme southwestern corner of the Powder River Basin, using the geographic divisions provided by the Wyoming SHPO, northeast of Casper and north of Glenrock, Wyoming. However, the project area is drained by Cole Creek south into the North Platte River and is in the North Platte hydrologic basin. The entire area is north of both Interstate 25 and the North Platte River in Converse and Natrona counties. This area is in the eastern part of the Middle Rocky Mountain Physiographic Province. Elevations in the project area range from a low of 5160 feet at the southern end of the transmission line corridor to 5902 feet at Three Buttes.

The project area physiography (Figures 12-15) has been greatly defined by the Cole Creek drainage system. To the east, the area is bordered by Lone Tree Gulch running from south to northeast. Derrick Draw borders the northwest and northern regions of the project and Cole

Creek travels from south to north along the western reaches of the area. Derrick Draw and Lone Tree Gulch trend southwest into Cole Creek which flows south into the North Platte River. Many unnamed seasonal drainages dissect the project area, feeding into Lone Tree Gulch and Derrick Draw.

These patterns of fluvial erosion have carved a landscape of ridgelines and valleys. Exposed sandstone bedrock is common along the ridgelines, and there are several prominent knolls/buttes in the central portion of the project area. Important among these are the Three Buttes within the project area, Gumbo Hill to the east and Blue Hill to the north.

The project area is divided into four different geological formations according to the 1985 Geological Map of Wyoming (Love and Christiansen 1985). The project area north of Cole Creek Road is divided into three segments that are oriented northwest to southeast. The furthest west geological formation is identified as the Lance Formation, comprised of brown and gray sandstone and shale. The center is the Fort Union Formation, Tullock Member which is comprised of soft gray sandstone and gray and brown carbonaceous shale. The eastern formations is Fort Union Formation, Lebo Member comprised of dark gray clay shale and concretionary sandstone.

South of Cole Creek Road the project area is predominately Quaternary sand deposits. These sediments are of special note due to their relevance in preserving prehistoric archaeological deposits. The Casper Site, a Paleoindian bison kill site, was preserved in the same Quaternary dune formation approximately 50 kilometers west of the project area. This site proved that parabolic dunes were utilized as bison kill traps (Frison 1978: 172). Frison notes that these dune environments are often stabilized by vegetation in modern times (Frison 1978: 172). There was likely more than one era of sand movement during the Holocene, but the initiation of the sand transportation is not understood (Frison 1978: 172-173).

The project area vegetation is primarily shortgrass prairie community. Dominant species in include threadleaf sedge (*Carex filifolia*), blue grama grass (*Bouteloua gracilis*), buffalo grass (*Buchloë dactyloides*), slender wheatgrass (*Elymus trachycaulus*), and western wheat grass (*Elymus smithii*), with a number of common grassland forbs. Many locations also support relatively large amounts of different ground lichens as well as yucca (*Yucca glauca*) and, in places, large amounts of prickly pear cactus (*Opuntia polyacantha*). Big sagebrush (*Artemisia tridentate* var. *wyomingensis*) occurs as scattered individuals throughout the grassland or in relatively dense shrubland stands (Ecology and Environment 2008: 2).

The project area is home to a variety of fauna, many of which would have been utilized by prehistoric populations. American pronghorn (*Antilocapra americana*) are prevalent in the project area, mule deer (*Odocoileus hemionus)* is also present but in smaller herds and numbers. There are many bird species present including: golden eagles (*Aquila chrysaetos*), horned larks (*Eremophila alpestris*), western meadowlarks (*Sturnella neglecta*), and mourning doves (*Zenaida macroura*). Small body mammals include black-tailed prairie dogs (*Cynomys ludovicianus*), desert cottontails (*Sylvilagus audubonii*), white-tailed jackrabbits (*Lepus townsendii*), and black-tailed jackrabbits (*Lepus californicus*). There are also several predatory species within the project area including: western rattlesnake (*Crotalus viridis*), red foxes (*Vulpes vulpes*), and coyotes (*Canis latrans*) (Ecology and Environment 2008: 3-4).

Figure 12. Photo of sandstone bedrock outcrops and knoll, facing west.

Figure 13. Overview of project area. Grassland in foreground, scrub brush in mid-ground, and buttes in background facing northeast.

Figure 14. Northeast facing overview of riparian growth within a drainage.

Figure 15. Example of devegetated Rocky Ridgelines facing northeast

Currently the project area is utilized by Jon Nicolaysen and his son Kem as ranch land for cattle and sheep. There are several barbed wire fences dividing the property into separate pasture areas and it is not uncommon to encounter livestock support features including: stock ponds, feeding troughs, and irrigation features. There are also several maintained roads crisscrossing the project area. The best are maintained crown and ditch roads with a gravel surface. The majority are simple two-track roads created by repeated use of the same access route. In the project vicinity, but outside of the inventory area is the Cole Creek Oil Field, which was established prior to 1950.

Cultural Context

Paleoindian Period

Although the details for the original populating of the Americas might remain debated, there is no doubt that people had arrived by the end of the Pleistocene. This period is defined in this area by cooler temperatures, a moister climate, a wider distribution of resources and less seasonal variability when compared to modern temperatures and climate.

The Paleoindian Period (11,500-8,000 BP) is generally characterized by high residential mobility and low population density. The high mobility practiced by these populations likely led to a substantial reliance on faunal resources (Kelly and Todd 1988). This reliance is probably due to the difficulty in utilizing floral resources reliably when the lifecycles and properties of these resources were poorly understood. Due to this reliance on fauna and megafauna, including the now extinct mammoth, giant bison, camel, and ground sloth, the peoples of this period are seen as specialized hunters. To a lesser extent, small animal and familiar plant resources were also procured, which Martin and Smith (1999) refer to as the Northwest Plains Pleistocene-Holocene Transition Adaptation. Any archaeological assemblages recorded in the project area are expected to reflect a close relationship to the Plains groups that specialized in big-game procurement; rather than the Foothill-Mountain groups, whose wide ranging resource base included small-game hunting and plant resources (Frison 1992; Pitblado 2003:9). This is supported by the Casper Site (48NA304) a communal hunting bison kill site located along the North Platte River near Casper Wyoming (Frison 1978).

The Clovis Tradition (11,500-10,900 BP) represents the earliest Paleoindian technological complex that has been well established in the United States. The Clovis Tradition is characterized by large well-made fluted points often from high-grade tool-stone. These points are regularly associated with faunal remains, including the extinct mammoth. The Colby site (48WA322) in the Bighorn Basin suggests planned mammoth hunting (Frison and Todd 1986). Other mammal remains were also recovered from this site in much smaller numbers. These include bison, camel, horse, pronghorn and jackrabbit (Frison et. al. 1996:11). It is postulated that the highly mobile lifestyle of Clovis populations and their relatively recent migration into the area were the driving forces behind their reliance on faunal resources (Kelly and Todd 1988).

The Goshen Complex (Frison 1996), which some archaeologists describe as contemporary with Clovis, may represent the beginnings of a transition from a specialized big-game hunting adaptation to a part-time bison-hunting adaptation (Frison et al. 1996; Martin and Smith 1999:41). Goshen Complex sites date to around 11,300-11,000 BP (Frison et al. 1996:12; Martin and Smith 1999:41). This complex was first described at the Hell Gap site in

Wyoming (Frison et. al. 1996:9). Goshen points are very similar to Plainview and Midland points. As a result, it has been suggested that the Goshen Complex should be referred to as Goshen-Plainview when dealing in the Northern Plains because the relationships among Goshen, Folsom, Plainview, and Midland are unclear (Frison et al. 1996).

The Folsom Complex (10,900-10,200 BP) displays functional traits which appear to concentrate on bison hunting and are often seen as changes in the Clovis technological complex through time. Folsom points are the characteristic point of this complex. They are smaller and more finely crafted than the preceding Clovis points. Major Folsom sites are generally located in topographic areas conducive to bison hunting by means of traps and drives (Frison et al. 1996:12). The Hanson Site (48BH329), located in the northeast Bighorn Basin contained both fluted and non-fluted Folsom points (Frison and Bradley 1980). The Midland Complex (10,700-10,400 BP) points are similar to Goshen and Folsom, though Midland points are not fluted. Some non-fluted points have been found in Folsom assemblages, again raising the question of the relationship of the Midland Complex to Goshen, Folsom, and Plainview (Frison et al. 1996:12-13).

The Late Paleoindian Period is characterized by a proliferation of projectile point types and a shift to a broader subsistence base in mountain and foothill contexts (Frison 1992). The Agate Basin Complex (10,500-10,000 BP) is possibly a continuation of the Goshen and Folsom Complexes. The long and narrow Agate Basin points are thought to have been ideal for hunting bison and other large game (Frison and Stanford 1982). Efficient use of arroyo traps is evident during this complex (Frison et. al. 1996). The Hell Gap points (10,000-9,500 BP) probably developed from the Agate Basin Complex (Frison 1991:62). The two types differ only slightly. The Hell Gap points are wider and possess a shoulder (Frison et al. 1996:13). The Late Paleoindian Period is represented near the project area at the Casper Site (48NA304). The points at the Casper site closely resemble the ones recorded from Agate Basin (Frison 1991). There was a Clovis point found at the site, however, it does not seem to be in context as it was found stratigraphically higher than the Agate points associated with the bison bones.

The Foothill-Mountain Paleoindian (8,000-10,000 BP) reflects a dichotomy (Frison 1992; Pitblado 2003:9) between Foothill-Mountain and Plains groups. The Foothill-Mountain groups participated in a broad-spectrum hunting and gathering strategy similar to the Archaic Period. While the plains groups tended toward a more specialized big game, particularly bison, strategy (Frison et al. 1996:54). Frison originally proposed that the dichotomy between the Foothill-Mountain and Plains groups began around 10,000 BP and ended around 8,000 BP (Frison et. al. 1996:16). However, Frison (1991:68) also states that there is enough evidence to suggest that the dichotomy persisted in various degrees throughout the prehistoric.

The project area contains evidence for both Plains group type sites, and Foothill-Mountain group sites. This is indicated by the point types found, Pryor Stemmed and McKean, and with bison procurement at the Casper site and the Glenrock Site. The Pryor Stemmed point is associated with the Foothill-Mountain group (Frison 1991). However, the level of bison use as evidenced by the Casper site and the Glenrock site in the area seems to indicate communal exploitation of bison as a major factor in subsistence.

Sites that provide evidence for the foothills mountains dichotomy in Wyoming include Medicine Lodge Creek (48BH499), Little Canyon Creek Cave (48WA323), and Brush

Shelter (48SW324) (Frison 1991:69-71). These cave and rockshelter sites produced fewer diagnostic points than is common in Plains sites. The points that are present differ from those found in Plains sites (Frison 1991:71). The Foothill-Mountain Paleoindian component at the Medicine Lodge Creek site showed little evidence of bison procurement. Instead, mule deer and mountain sheep were more commonly relied on for subsistence (Frison 1991:334).

Archaic Period

The shift from the Paleoindian Period to the Archaic Period is marked by the change from stemmed and lanceolate points to side-notched varieties and a change in subsistence practices (Francis 1983:49; Frison 1991:79; Larson 1997). There is evidence of an increase in the use of floral resources and a decrease in the overall reliance on communal hunting and bison. This increase could also be produced by a change in the temperature, reducing either the amount or the range of bison, necessitating a broader based subsistence pattern. Whatever the cause, there is a noticeable broadening in the resource base utilized through the Archaic Period. This is supported by the gradual increase in ground stone tools, indicating plant processing, and the increasing use of smaller game and secondary resources. During the Late Archaic, there is a population spike, indicated through the number of datable carbon samples recorded, showing that at least some of the cause for the broadening of the resource base is population pressure and range restriction. Also evident during the Archaic Period is the use of house pits (Shields 1998). House pit use increases through time during this period. This increase could indicate a growing population as well. (Frison 1991) breaks the Archaic Period into three periods: Early, Middle, and Late Plains Archaic.

The Early Plains Archaic (8,000-4,000 BP) is marked by the appearance of side-notched points and an increase in plant resource usage (Frison et al. 1996:18). It was previously thought that during the Altithermal, an arid climactic period of warmer temperatures, the plains would have been unable to support sufficient bison populations for a cooperative bison-hunting subsistence strategy (McNees et al. 1999). Currently it is believed that bison hunting continued on some level throughout the Altithermal although the general bison population was lower (McNees et al. 1999:3-42). Evidence for an increase in plant use can be seen at Leigh Cave (48BH304), a rockshelter with Early and Middle Archaic components. This site showed evidence of plant use including wild onion, buffalo berry, thistle, wild rose, wild rye, and yucca (Frison and Huseas 1968; Frison 1991:338-339).

The Middle Plains Archaic (4,000-3,000 BP) is characterized by the presence of McKean Complex projectile points (Frison 1991) the end of the Altithermal and establishment of the smaller modern subspecies of bison (Frison et al. 1996:20). Stone circles, often called tipi rings, begin to appear in the archaeological record at this time. There was one new stone circle site (48CO3055) recorded in the project area during this investigation and two others (48CO1117 and 48CO1474) were previously recorded in the area. Stone circle sites continue to be a large part of the archaeological record in the area until the Historic period. Fire or roasting pits, slab-lined pits, and grinding stones also became more prevalent. The McKean Complex is defined by the McKean lanceolate point, which has deep to shallow basal notching. There was a McKean series projectile point recorded in the project area at 48CO3058. The McKean Complex appears to represent a variety of distinct settlement and subsistence strategies in a wide geographical area (McNees et al. 1999: 3-42).

The Late Plains Archaic (3,000-1,500 BP) showed an increase in sites and likely population as evidenced by the rise in the number of radiocarbon dates (Frison 1991; Frison et al 1996;

Thompson and Pastor 1995). Projectile point styles of this period include Pelican Lake, Yonkee, and Besant (Frison 1991:103-105). The use of caves and rock shelters like Daugherty Cave (48WA302) was prevalent during this period. The Spring Creek and Daugherty Cave sites yielded basketry fragments, woodworking debris, bark cordage, sinew, hide, feathers, shell, porcupine quills, and wood and elk antler digging tools (Frison 1991:106; Frison et al 1996:22). Both sites show evidence for atlatl and dart manufacturing and use (Frison et al. 1996:22). The digging tools suggest recovery of plant resources such as wild onion, sego lily, bitterroot, and biscuit root (Frison et al. 1996:22). Communal hunting was still viable during this period in the area. Evidence for this is the Glenrock Buffalo Jump (48CO304) site, located just to the south of the project area, where Late Plains Archaic side- and corner-notched points were associated with a bison kill site.

Late Plains Prehistoric Period

The transition between the Late Plains Archaic and the Late Prehistoric appears to represent an overlap of technological traditions complicated by the continuation of a hunting and gathering way of life (Frison et al. 1996:26). The Late Plains Prehistoric period was marked by a change in projectile points related to the adoption of the bow and arrow. There is evidence for some of the corner-notched dart points reducing in size for use with a bow (Frison 1991). Avonlea technology represents the first exclusive use of the bow and arrow (Hall 1998:1). Avonlea sites are typically located in and around buttes (Frison 1991:113) suggestive of either a defensive tactic or a need for greater visibility. Slab-lined pits are common in Avonlea sites (Frison 1991:113).

The use of ceramics (Frison 1991:111) is another marker of the Late Plains Prehistoric period, though ceramics started to appear near the end of the Late Plains Archaic period (Frison 1991:116). Besant Complex sites have Woodland-type ceramics. Sites with Plains side-notched and tri-notched points have Intermountain Tradition ceramics (interpreted as Shoshonean) and Mandan-Hidatsa Tradition (interpreted as Crow) ceramics. These ceramic traditions are often seen as outside groups entering the region. According to McNees et al (1999:44) a number of distinct groups resided in the region by the Late Prehistoric period. The population growth trend along with the increasing diversification of resource utilization continued into the Late Plains Prehistoric Period where it spiked rapidly and then decreased (Thompson and Pastor 1995).

The end of the Late Plains Prehistoric period is the result of contact with Euro-American material culture. The changes resulting from contact, and the subsequent disease and dispossession, affected settlement and subsistence patterns. The Euro-American material culture consisted of trade goods, glass beads, horses (Ewers 1955) and firearms.

Protohistoric Period

Though Euro-American groups did not reach Wyoming until the nineteenth century, their arrival in the Americas affected the Native American cultures significantly earlier. The Protohistoric Period, between AD 1720 and 1800, encompasses the time between the arrival of Euro-American material culture and the arrival of the Euro-Americans. The introduction of the horse via the Spanish in the southwest (Ewers 1955) was likely one of the most significant cultural changes for the populations residing in this area (Frison 1991:122). Many aspects of life changed because of the horse. Subsistence was no longer limited to the needs of humans and finding a place where the horses would survive was a possible concern. Protohistoric sites are rare and characterized by trade goods including; seed beads, glass

trade beads, and metal projectile points. These goods are often found in burial contexts. The horse, the northwest fur trade, the diffusion of European manufactured goods, and the introduction of guns and foreign diseases were all factors in changing and disrupting Native American cultures long before any Euro-American group entered Wyoming.

As result of time that passed after first contact, around 100 – 150 years, it is difficult to discern Protohistoric Period sites from non-Protohistoric sites in the area. Indicators of Protohistoric Native American sites are the presence of both Native American and European artifacts, presence of Native American made copies of European goods, cross-dating sites using Native American artifact classes, and using absolute dating methods (Brown 2008). While it is possible that Protohistoric sites exist within the project area they are poorly represented in the archaeological record. It is conceivable that the iron tools have rusted away from exposure (Frison 1991). Further, many of the European trade goods are part of burials, making it difficult to determine if a site is Protohistoric. Prehistoric/Early Protohistoric groups included Shoshone, Crow, Athapaskans, and Kiowa (McNees et al. 1999:44). The Crow were in the Powder River Basin and Bighorn Mountains as early as A.D. 1400 (McNees et al. 1999:45). The uppermost levels of the Medicine Lodge Creek site (48BH499) yielded European glass trade beads in association with tri-notched projectile points (Frison 1991:123).

Historic Period
The Historic Period in Wyoming is divided into seven chronological periods including the: Protohistoric – AD 1720 to 1800, Early Historic – AD 1800 to 1842, Pre-Territorial – AD 1842 to 1868, Territorial – AD 1868 to 1890, Expansion – AD 1890 to 1920, Depression – AD 1920 to 1939, and Modern – AD 1939 – Present.

Early Historic – AD 1800 to 1842

French explorers Louis-Joseph and François La Vérendrye in 1742 – 1743 (Burpee 1927) were the first Europeans likely to have penetrated into the Powder River Basin. Economic advancement and western expansion were the primary goals outlined by President Jefferson when he ordered Lewis and Clark westward on their mission of discovery beginning in 1804 (Larson 1978). The Lewis and Clark expedition explored the Missouri River north of Wyoming on their trek west, but John Colter and several in the group left the expedition to explore the Three Forks region of the Upper Missouri River. Colter became the first Euro-American to explore the mountains, valleys, and basins of northwestern Wyoming (Skarsten 1964). By the time the trappers arrived in the Wyoming Basins, the local Native Americans had already acquired horses (Ewers 1955) and some European goods. The fur trade in Wyoming expanded after the early part of the eighteenth century, with a number of rendezvous occurring in southern Wyoming (Goetzmann 1966). The fur trade ended in the late 1830's, to be followed a number of years later by emigrants coming from the east, initially for the gold fields of California and Montana, and later to settle the region.

Pre-Territorial – AD 1842 to 1868

During this period Euro-Americans explored and began to establish a knowledge base of the Powder River Basin. By 1851 frontiersmen Kit Carson, Jim Baker, and Cy Iba were involved in the sale of oil from seeps in the Powder River Basin to westward travelers along the Oregon Trail in the Casper area (Roberts 1956). Military and prospecting expeditions were

sent into the area to explore for new settlements and new resources. In 1859-1860 Captain William F. Raynolds led an expedition into the Powder River Basin. This expedition was in part scientific; the other part was intended to assess the possibility for Euro-American settlement. This expedition mapped the Powder River Basin in detail (Fraser 2006). Other military expeditions went through the area looking for potential routes for a transcontinental railroad. Capt. Howard Stansbury in 1849, paralleled the Oregon Trails along the North Platte River surveying and investigating the area.

After the fur trade era, some of the trappers became guides for the emigrant trails that sprang up throughout the area. The Oregon Trail and The Overland Trail both traverse the land to the south of the project area. At present day Casper, Oregon Trail travelers had to cross the North Platte River. Initially a ferry, constructed by Mormon emigrants, was used to cross the river. In 1859 a bridge was constructed at the crossing. A small fort at the crossing called Platte Bridge Station, later called Fort Caspar, housed soldiers to protect mail and telegraph services. An influx of military into the area occurred to protect emigrants after increased hostilities by Native Americans in 1864. In 1867 troops were moved to Fort Fetterman and Fort Caspar was abandoned. The city of Casper was established in 1888. (Massy 1992a).

The original route of the Bozeman Trail taken by John Bozeman in 1863 goes through the project area. During this year, only one wagon train traversed the trail. It was turned around by natives, but Bozeman himself made it through. The next year, on a trail located several miles to the west of the 1863 route, four wagon trains passed. The first train to leave was guided by a wagon-master named Hurlbut; the second was guided by Bozeman. However, Bozeman passed Hurlbut reaching the gold fields of Montana first; thus, the trail was named for Bozeman. The two other trains to travel the trail were led by Townsend and Coffinbury (Doyle 1998). These four wagon trains of settlers are the only recorded trains that used the segment of the Bozeman Trail in the project area. The next year General Connor, as part of the Powder River campaign, took a different easterly route following Dry Fork instead of Salt Creek. This route would become the main route of the Bozeman Trail because it was marginally shorter and Fort Conner was constructed along this route (Doyle 1998). The Bozeman Trail then became a focal point in the increasing militarization of the area. Fort Conner, which would later become Fort Reno, was built at the convergence of the Powder River and Dry Fork. The trail quickly became the main thoroughfare of military traffic and troop deployment in the Plains Indian wars of the 1860’s and 1870’s. The military changed the trail, once again implementing a cutoff connecting Fort Phil Kearny and Fort C.F. Smith (Doyle 1998). After the subjugation of the Powder River Basin Native Americans, the Bozeman Trail was an important regional road that facilitated trade and settlement in the Powder River Basin (Doyle 1998).

Territorial – AD 1868 to 1890

The area was highly contested between the United States Army and the Native Americans. Red Cloud had managed to close the Bozeman Trail through the Powder River Basin and the government agreed to abandon the forts that were in the area. However, it did not take long for Euro-American settlers to once again encroach on the Powder River Basin and the gold fields of Montana, violating the peace treaty signed with Red Cloud. President Ulysses Grant ordered the tribes in the Powder River Basin and Big Horn Mountains to government agencies. When the Native Americans in the area did not comply, General George Crook mounted an expedition intended to force them to their reservations. Increased military

presence in the area led to the subjection of the Native Americans in the Powder River Basin. With the end of hostilities between the two groups and the relocation of the Native Americans to reservations, the area was now open to Euro-American settlement (Doyle 1998; Fraser 2006). In 1877-1879 a telegraph line was erected along the Bozeman Trail from Fort Fetterman to Fort McKinney. In 1878 the United States Post Office began contracting for mail service along the trail between the Union Pacific line and Montana (Fraser 2006). However, neither means of communication were reliable and did not function properly in the early years. Another element aiding the settlement of the area was a regularly scheduled stage line. Known alternately as the Rock Creek Stage Line and the Patrick Brothers Line, this service was initiated in March 1879 (Fraser 2006).

The railroad worked its way westward across Wyoming in 1867 and 1868. Union Pacific's route generally followed the North Platte River and the Oregon and Overland trails. The route crossed southern Wyoming because there were known coal resources in the area and the route avoided the most rugged part of the Rocky Mountains. This route also provided ready water sources for the railroad's locomotives as the North Platte River is in the area (Fraser 2006). The coming of the Union Pacific Railroad marked the beginning of intensive Euro-American movement into this general area. Many towns were established along the route of the railroad. The railroad also allowed farming to compete with ranching in the area as produce could now be transported to market (Cassity 2007). The steam engines needed water to make the steam, so windmills and wells were built along the railroad corridor. This new development and the ability to transport in all the materials needed for the construction of windmills was very important to the settlement of this area. During the 1870's and early 1880's the Powder River Basin was prime target for settlement. The Basin supported abundant farming and ranching, and known oil and coal reserves held the promise of prosperity. However, no railroad would venture north through this area until much later (Fraser 2006).

The Homestead Act of 1862 and subsequent land legislation affected settlement in the Powder River Basin. This act increased the number of small homesteads in the area. To patent the land law required that the settler reside on and cultivate the land for five continuous years then pay a nominal fee (Massey 1992b). After the end of the Civil War in 1865, thousands of Euro-Americans settlers moved onto the Great Plains, into the Rocky Mountains, and the Intermountain West. Homesteads occurred all over the area during the time directly after the end of major hostilities between Native Americans and the Government (Cassity 2007).

Raising cattle became very important in the Powder River Basin and in the general area. The grass growing in the area was thought to be suitable for large herds of cattle. Large ranches, operating on the Texas system for raising cattle came to dominate the smaller homesteads. The Texas system involved turning the cattle loose, letting them graze for most of the year and then rounding them up twice a year (Cassity 2007). However, it was not to last. The winter of 1877 decimated the cattle populations which were not fit to survive the harsh dry conditions of the area without proper care. Ranching then changed into a hands on affair. Ranchers started fencing in the cattle so that they could feed and water them during the harsh winters and sheep started to be included in some ranches. These changes led to the establishment of a series of sustainable smaller local ranches (Cassity 2007). The small farms

continued to grow and the practice of dry farming enabled the parts of the area that were not naturally watered or irrigable to support crop-raising activities.

Expansion – AD 1890 to 1920

While the livestock industry brought only sparse settlement to the central and northern basins of Wyoming, agricultural development of Wyoming's arable lands was necessary to provide the impetus for large population growth. In 1916 the Wyoming Board of Irrigation encouraged the use of dry farming to attract a new wave of homesteaders. Dry farming agricultural techniques increased production; however, it also severely undermined the system of small farm agriculture. The stock raising Act of 1916 allowed for patentees to enlarge their homestead tracts by 640 acres. This law also applied to land suited for grazing and raising forage crops. The residency requirement was cut in half from four to two years. The Act required range improvement but no cultivation. Agriculture boomed as the First World War drove up prices. However, they dropped with the end of the war. In 1919 a drought devastated fields causing dramatic crop losses. As a result, agriculture in the area suffered from a depression a full decade before the economic collapse of 1929 (Cassity 2007; Massey 1992b).

The oil and gas industry was a major influence in the area during this time. The first oil well in the Casper region was drilled in 1889 in the Salt Creek oil field north of Casper (Lageson and Spearing 1988:107) and produced up to ten barrels per day (Bille 1978:6-9; Massey 1992a). In the beginning mule freight teams were used to haul the oil to Casper. The oil was carried in ordinary barrels. While awaiting transport, much of the oil was stored in wood stave tanks or open lakes created by damming intermittent drainages or depressions (Bille 1978).By the 1890s Casper had become a regional petroleum industry center. The first refinery in Casper was built in 1895 (Massey 1992a). The demand for oil peaked in 1917 and shortly afterwards the area was embarrassed by the Teapot Dome scandal, in which the Secretary of the Interior, Albert B. Fall, was convicted of taking a bribe from the Mammoth Oil Company and Harry F. Sinclair attempted to obtain favorable oil leases in the Teapot Dome Naval Oil Reserve (Bille 1978:102). The depressed market for oil, lack of transportation facilities, and legal scandals contributed to the fact that Wyoming was not able to compete with the more established markets for oil. This caused the price of oil per barrel to drop and remain low during the Depression.

Depression – AD 1920 to 1939

The agricultural and energy industries in the state suffered financially during the 1920's. The Depression in the 1930's would serve to further depress the economy. Over 100 banks had failed in Wyoming during the 1920's and 27 more failed during the Depression (Fraser 2006). Conditions were made worse by a severe and prolonged drought that began in 1926 and continued well into the 1930's. During the depression, crude oil prices dropped to as low as ten cents per barrel (Massey 1992b) and the Wyoming petroleum industry went into a lull. By the end of the 1930s, the system of agriculture in the Powder River Basin reflected a general trend towards modernization (Cassity 2007). One of the first relief agencies established by the Roosevelt Administration was the Public Works Administration. Started in 1933 under the National Industrial Recovery Act the (PWA) allocated some $400 million in funds for specific projects that were designed solely to put men to work at predetermined wage rates (Fraser 2006).

The dawning automobile age profoundly affected Wyoming socioeconomic patterns in the 1920's. The road system in Wyoming grew over time, as a reaction to the settlement in each county. To maximize the cost to benefit ratio, the counties situated the roads in locations that limited construction costs and building bridges was avoided whenever possible (Fraser 2006). The first federal highway to cross Wyoming was the Lincoln Highway (1913) in southern Wyoming (Hokanson 1999). By 1924 modern highways had penetrated most of the state of Wyoming. It was during this time that the automobile became the catalyst for development in Wyoming. This can be seen by the amount of money and man-power the Wyoming Department of Highways put into the road system during this time. Automobiles were a stimulus for business. The growing number of out-of-state automobiles traveling to Yellowstone National Park facilitated the growth of support industries in Wyoming. Gas stations, oil depots, garages, tourist locations, campgrounds and other roadside businesses opened. Construction of new highways and the improvement of the old ones also benefited the people of Wyoming during the depression. In 1936 state highway construction projects employed more than 3,000 men. The highway department, through its contract jobs, employed a quarter of the state's total employable relief recipients, more than any other agency operating with federal funding (Fraser 2006).

Modern – AD 1939 – Present

All national and state highway construction was brought to an abrupt halt with America's entry into World War II. Fuel and tires were rationed and automobile production switched to war-time production. No unnecessary bridge construction was undertaken. Bridges that were built during the war used non-critical materials when possible (Fraser 2006). Relatively little defense-related roadwork was undertaken in Wyoming during this time. During the post-war years both the American economy and its population boomed. The Eisenhower administration would begin the construction of the interstate highway system. Modern gas and oil drilling and exploitation have become very economically important in this area. There are many modern period oil well pads and functioning gas and oil rigs and infrastructure. Cattle and sheep continue to be part of the economic system in the area and they are present in the project area.

FILE SEARCH

Class I file searches were conducted through the Wyoming SHPO Cultural Records Office on August 8, 2008, October 6, 2008, and October 10, 2008. The WYCRIS online file search and map system were also accessed to view the locations of sites and previous inventories and to inspect the Henderson Historical map and GLO maps for the project area.

The file search revealed that 33 previous investigations had been conducted in or near the project area (Table 2). The majority of the previous projects were conducted in the 1980's for energy projects, particularly well pads. The remaining and more recent investigations were conducted for seismic, power line, and meteorological projects.

Table 2. Previous investigations within the project area.

SHPO #	Year	Survey Name	Institution
80 1704 0	1980	Cole Creek Field 1	Archaeology Energy Consulting
80 1882 0	1980	Cole Creek Fed 21-28	Powers Elevation

SHPO #	Year	Survey Name	Institution
80 1886 0	1980	Cole Creek Fed 43-28	Powers Elevation
80 1704 0	1980	Cole Creek Field 1 Well Pad and Access	Archaeological Services (ASC)
80 1704 2	1980	Cole Creek Field 1 Access Reroute	Archaeological Services (ASC)
80 1704 3	1980	Cole Creek Field 1 Access Monitor	Archaeological Services (ASC)
81 76 0	1980	Abernathy Fed 1	Archaeological Services (ASC)
81 299 0	1980	Abott Fed 1	Archaeological Services (ASC)
81 75 0	1981	Abner Fed 1 Well Pad and Access	Archaeological Services (ASC)
82 29 0	1982	Class III Survey Well Pad FLWLN Junction at F-32-26G	High Plains Consultants
82 36 0	1982	Flowline to Well F-32-26-G	High Plains Consultants
82 28 0	1982	Flowline Right-of-Way Well 41-27G-Dakota A	High Plains Consultants
82 37 0	1982	Flowline to Well 41-27G	High Plains Consultants
83 637 0	1983	1-32 FED Well Pad and Access Class III Survey	Archaeology Energy Consulting
84 1147 0	1984	1-M tank Battery Area Class III Survey	Pronghorn Archaeological Services
85 187 0	1985	FED 34-28 Class III Survey	Greer Services
85 188 0	1985	FED 12-22 Well Pad and Access Class III Survey	Greer Services
88 35 0	1985	S. Powder River Basin Prospect Line 6	Pronghorn Archaeological Services
87 354 0	1987	Southwest Flank PRB RW524-4 Class III Survey	Greer Services
87 847 0	1987	S. Powder River Basin Prospect Line 7	Pronghorn Archaeological Services
87 317 0	1987	East Casper Arch Line WC-87-05	Greer Services
88 13 0	1988	Meridian Oil 43-7 FED Class III Survey	Llano Consultants
88 15 0	1988	S. Powder River Basin Prospect Line 7	Pronghorn Archaeological Services
89 1081 0	1989	Gumbo Hill Unit 1 Class III Survey	Archaeology Energy Consulting
89 941 0	1989	Gumbo Hill Unit 1 Class III Survey	Archaeology Energy Consulting
90 1206 0	1990	Derrick Draw Seismic Line #KBD1	Frontier Archaeology
91 1146 0	1991	3 Bar C Seismic ZXD-2 and ZXD-3	North Platte Archaeological Service
93 1235 0	1993	Cotrona 23-32 Well Pad Class III Survey	Archaeology Energy Consulting
93 824 0	1993	Cotrona Prospect 93-1	North Platte Archaeological Service

SHPO #	Year	Survey Name	Institution
93 1322 0	1993	Pass Go 23-33 Well and Access	Archaeology Energy Consulting
2 26 0	2002	Cole Creek Unit Powerline	BLM Casper Field Office
4 1800 0	2004	Cole Creek Seismic, Class III Survey	Kail Consulting, Inc.
8 61 0	2008	Meteorological Tower 4	LTA, Inc

Twenty-eight sites and five isolated finds were found by previous investigators in the vicinity of the project (Table 3). These sites range from prehistoric open camps, stone circles, and lithic scatters to historic inscriptions, homesteads, trails and artifact scatters. Seven of these sites are within the area surveyed by CRAI. Prehistoric sites within the current investigations include two stone circle sites (48CO1177 and 48CO1474), a cairn (48CO1922), and a lithic scatter (48CO1474). Historic sites within the current investigations include two early to mid Twentieth Century homesteads (48CO1185 and 48CO1204) and the Bozeman Trail (48CO2560).

Table 3. Previously located cultural resources within and adjacent to the project area.

Site	Type	Eligible	Notes
48CO1023	Prehistoric	Not Eligible	Open Camp
48CO1024	Prehistoric	Not Eligible	Open Camp
48CO1025	Prehistoric	Not Eligible	Open Camp
48CO1026	Prehistoric	Eligible	Open Camp
48CO1027	Prehistoric	Not Eligible	Lithic Scatter
48CO1177	Prehistoric	Eligible	Stone Circle
48CO1185	Historic	Unknown	Ranching/Homestead WM Valentine
48CO1198	Historic	Unknown	Ranching/Homestead, Historic Mining Oil/Gas/Well/Field
48CO1199	Historic	Unknown	Ranching/Homestead
48CO1200	Prehistoric	Unknown	Lithic Scatter
48CO1201	Historic	Unknown	Inscriptions
48CO1204	Historic	Unknown	Ranching/Homestead
48CO1332	Historic	Unknown	Stockherding Camp
48CO1333	Prehistoric	Unknown	Stone Circle
48CO1334	Historic	Unknown	Cairn
48CO1355	Historic	Unknown	Stockherding Camp
48CO1404	Prehistoric	Not Eligible	Lithic Scatter
48CO1472	Prehistoric	Unknown	Open Camp
48CO1473	Prehistoric	Not Eligible	Lithic Scatter
48CO1474	Prehistoric	Not Eligible	Stone Circle
48CO1922	Prehistoric	Unknown	Cairn
48CO1928	Prehistoric	Not Eligible	Lithic Scatter
48CO2004	Historic	Unknown	Cairn
48CO2560	Historic	Eligible	Bozeman Trail
48CO0523	Prehistoric	Not Eligible	Lithic Scatter
48CO0531	Prehistoric	Unknown	Open Camp

Site	Type	Eligible	Notes
Isolated Finds			
48CO IF 89 941 #2	Prehistoric	Not Eligible	Flake
48CO IF 89 941 #3	Prehistoric	Not Eligible	Flake
48CO IF 89 941 #4	Prehistoric	Not Eligible	Middle Archaic Point
48CO IF 89 941 #5	Prehistoric	Not Eligible	Flake
48CO IF 89 941 #1	Prehistoric	Not Eligible	Flake

Given the cultural context of the area and the previously recorded cultural resources, new sites likely to be encountered include prehistoric lithic scatters, open camps, and stone circle sites from a range of cultural periods and historic sites related to ranching or the early energy industry in Wyoming.

RESULTS

During the course of this project CRAI recorded 10 new prehistoric sites, three new historic sites, three multiple component sites, one unassociated cairn, and 31 new isolated finds. A reevaluation of four prehistoric sites and two historic sites was also conducted, as was a visual assessment for a segment of the Bozeman Trail. These sites are presented below in numerical order based on their Smithsonian site number; as a result, the reevaluated sites are presented first. Virtually all eras of human occupation are represented in the project area from Paleoindian to Historic/Modern.

Table 4. Table of Sites Investigated, with NRHP Evaluations.

Site Number	Site Type	NRHP Evaluation
48CO1177	This site is a Prehistoric Stone Circle site of unknown temporal association consisting of six stone circles, three well defined and three that were silted in. The only artifact associated with the stone circles was a large complete quartzite retouched flake with a single facet platform and no dorsal cortex. It has bifacial retouch along one margin.	Eligible
48CO1185	Historic Homestead	Not Eligible
48CO1204	Historic Ranch	Not Eligible
48CO1404	FCR/ Lithic Scatter	Not Eligible
48CO1474	Prehistoric Stone Circles	Not Eligible
48CO1922	Rock Alignment	Unevaluated

48CO2560	Bozeman Trail, route taken in 1863 by John Bozeman. The segment of the Bozeman Trail located within this project, 48CO2560-Segment 1, is recommended as a non-contributing segment. It did not appear on 1883 GLO maps of the area. It also does not appear on the Wyoming Territory Map, U.S. Department of Interior, 1879; or the Wyoming Territory Map, pulled from an atlas, ca. 1881 (Wyoming State Archives 2008). It is known in this area due to the extensive historical documentation of Susan Doyle (1998).	Eligible
48CO3052	Lithic Scatter	Not Eligible
48CO3053	Cairn	Not Eligible
48CO3054	Lithic Scatter	Not Eligible
48CO3055	This site is a multiple component site that covers 7.8 acres. Deposition varies across the site from 0 to greater than 70 centimeters of sediment as verified by auger probes. The sediment is silt loam and vegetation on the site consists of low sage and various grasses. The prehistoric component spans the entire site while the historic component is limited to the western portion. The historic component consists of the remains of a rusted automobile, a lumber scatter, a historic road cut, and an artifact scatter. The prehistoric component consists of 5 stone circles, a cairn, 6 stone tools, and 32 pieces of debitage.	Eligible
48CO3056	This multiple component site is in an aeolian setting with sandy sediments and sparse vegetation consisting of low sagebrush, forbs, and various grasses. The deposition in the upper area of the butte ranges between 10 to 15 centimeters of light brown sandy loam, with many poorly sorted subangular gravels. The northern end of the site was less rocky and consisted of sandy sedimentation. This area was auger tested in three locations. The depth of the deposition in these tests ranged from 30 centimeters to greater than 100 centimeters. The prehistoric component of the site consists of lithic debitage, flaked stone tools, burned bone, ground stone, a rock wall alignment, a possible food storage cache, and a thermally altered rock fragment. The artifacts occur down slope from the highpoint of the butte on both the north and east sides.The historic artifacts found at the site are predominantly on	Eligible

	the eastern side. These artifacts consist of purple glass fragments, crushed cans, and a small handmade shell button. These artifacts add very little to the significance of the site.	
48CO3057	This multi component site consists of a prehistoric lithic scatter with tools, a cairn, and a historic artifact scatter. A small sand shadow is present on the southeast portion of the site. The sediments outside of the sand shadow consist of light brown sandy loam with many poorly sorted subangular gravels. The vegetation is sparse and is comprised of low sagebrush, low shrubs, forbs, and various grasses.	Unevaluated
48CO3058	This prehistoric open lithic site consists of a lithic scatter with a large ratio of tools compared to the debitage. Twelve flaked stone tools were located in contrast to 25 pieces of debitage. The tools consist of one utilized flake, two retouched flakes, two unifaces, three Stage 3 bifaces, two Stage 4 bifaces, one projectile point fragment, and one complete projectile point. The southeastern portion of the site is deflated and actively eroding due to an ephemeral drainage. The ephemeral drainage created a cut bank which indicates at least 30 centimeters of deposition. The vegetation consists of various grasses and low sage.	Eligible
48CO3059	This prehistoric open lithic site is situated on the western side of the ridge and encompasses two smaller finger ridges. The sediments are light brown silt loam. Vegetation consists of various grasses interspersed with low sagebrush and prickly pear. The artifact assemblage consists of a lithic scatter and nine lithic tools. The majority of the artifacts are concentrated on the two finger ridges, and have likely been exposed through years of erosion. Seven tools and many pieces of debitage are on the northern finger ridge, while one tool and many pieces of debitage are located on the southern finger ridge. The main ridgeline, which is significantly less eroded than the two finger ridges, exhibited one tool and only a few pieces of debitage.	Eligible
48CO3060	Historic Scatter, Horse Trailer	Not Eligible
48CO3061	Lithic Scatter	Not Eligible
48CO3062	Lithic Scatter, Historic Cairns	Not Eligible
48CO3063	Lithic Scatter	Not Eligible

48CO3064	Lithic Scatter	Not Eligible
48CO3065	Cairn	Not Eligible
48CO3066	This open lithic scatter site is crescent shaped and 75 meters long by 10 meters wide. The vegetation is predominately sparse sagebrush, and various grasses. The site consists of one projectile point likely a Pryor Stemmed point (Frison 1978: 71-72) and six flakes. No features are associated with this site. Three shovel tests were conducted on the site. Sediments are light brown sandy loam which becomes lighter with depth. Sediment deposition was 42 centimeters on the west side of the site and 60 centimeters on the east side of the site. At the center of the site there is 50 centimeters of deposition. No cultural materials were located in the three shovel tests, but the possibility exists for buried cultural deposits elsewhere on the site.	Eligible
48CO3067	Homestead	Not Eligible
48CO3068	Lithic Scatter	Not Eligible

Isolate Number	**Isolate Type**	**NRHP Evaluation**
CH-IF1	Flake	Not Eligible
CH-IF2	Uniface	Not Eligible
CH-IF3	2 Flakes	Not Eligible
CH-IF4	Possible Cody Complex Point	Not Eligible
CH-IF5	Flake	Not Eligible
CH-IF6	Biface Midsection	Not Eligible
CH-IF7	Biface	Not Eligible
CH-IF8	Uniface, Retouched Flake, and Flake	Not Eligible
CH-IF9	Flake	Not Eligible
CH-IF10	Flake	Not Eligible
CH-IF11	Biface Fragment	Not Eligible
CH-IF12	Small Historic Scatter	Not Eligible
CH-IF13	2 Flakes	Not Eligible
CH-IF14	Biface Tip	Not Eligible
CH-IF15	5 Flakes	Not Eligible
CH-IF16	Retouched Flake	Not Eligible
CH-IF17	2 Flakes	Not Eligible
CH-IF18	Flake	Not Eligible
CH-IF19	Biface Fragment	Not Eligible
CH-IF20	Flake	Not Eligible

CH-IF21	2 Retouched Flakes	Not Eligible
CH-IF22	2 Flakes	Not Eligible
CH-IF23	2 Flakes	Not Eligible
CH-IF24	Biface Fragment	Not Eligible
CH-IF25	Flake	Not Eligible
CH-IF26	Flake	Not Eligible
CH-IF27	Flake	Not Eligible
CH-IF28	Retouched Flake	Not Eligible
CH-IF29	Flake	Not Eligible
CH-IF30	Well Shaft	Not Eligible
CH-IF31	Uniface	Not Eligible

Site Recommendations

48CO1177

This is a previously recorded stone circle site is located on a ridge west-southwest of Gumbo Hill. The center point for Turbine 10 is 25 feet within the site's western boundary. A turbine access road runs to the west of the site. CRAI recommends that turbine 10 be relocated and this site be avoided by wind farm activities to prevent an adverse effect on the historic property.

48CO2560

This site is a noncontributing segment of the 1863 route of the Bozeman Trail. It crosses the project area in two places. On the west side of the project, a proposed access road crosses the mapped location of the trail. The proposed access road follows an existing improved road through a disturbed area. The two-track road to the north of the access road is a less disturbed section of the trail; however, it is noncontributing to the eligibility of the trail and no other contributing segments occur within 3 miles.

The proposed transmission line crosses the mapped location of the trail on the south end of the project area. No evidence of the trail could be found during survey. CRAI recommends that no further work is necessary on this section since there is no verified trail location to protect. The wind farm will be visible from much of this segment of the trail. However, since this segment is non-contributing to the eligibility of the trail and no other contributing segments are within three miles, completion of this project is unlikely to have an adverse effect.

48CO3055

This site consists of five stone circles, a cairn, and a lithic scatter. It encompasses a butte, the flat area to the northwest of the butte, and a small ridge to the west. The proposed access road between Turbines 26 and 27 runs directly through the site. Since there are alternate routes that can be used to access Turbine 26 and the turbines to the east, CRAI recommends that the road through the site be re-routed to prevent adverse effect to the historic property.

48CO3059

This prehistoric open lithic site is located on a prominent ridgeline. The artifact assemblage consists of a lithic scatter and nine tools. In the current project configuration, the center point for Turbine 47 is located within the site boundary. A proposed access road also bisects this site on the eastern side. Both of these features, if constructed, would adversely affect the site. Cultural Resource Analysts recommends adjusting Turbine 47 and the access road to avoid this site.

Sites 48CO3056, 48CO3057, 48CO3058, and 48CO3066 do not require specific avoidance measures. They are located outside of the area of potential effect and will not be impacted by the current configuration of the project. If the project configuration changes it is recommended that these sites be avoided.

General Project Recommendations

It is recommended that all cultural resources eligible or potentially eligible for the NRHP be avoided. A buffer of at least 200 feet from all site boundaries is recommended to avoid inadvertent impacts. Avoidance of these sites is not limited to construction activities the it is recommended for all project activities. Impact from the daily use of the facilities and secondary impacts to the sites must be avoided as well. Secondary impacts include but are not limited to: maintenance, ditches and water bars, avoiding activities that could erode a site (channeling a water bar in the direction of a downhill site), deposition of garbage and litter as well as spoils piles, and parking within the 200-foot buffer zone. All recommendations are based on current project layouts.

Table 5. Table of Sites Investigated, with Their Relationship to the Wind Farm and Management Recommendations.

Site Number	NRHP Evaluation	Relationship to Wind Farm Development	Management Recommendations
48CO1077	Eligible	Turbine 10 is 25 ft Within the Site Boundary	Avoid Site, Buffer 200 Feet
48CO1185	Not Eligible	N/A	No Further Work
48CO1204	Not Eligible	N/A	No Further Work
48CO1404	Not Eligible	N/A	No Further Work
48CO1474	Not Eligible	N/A	No Further Work
48CO1922	Not Eligible	N/A	No Further Work
48CO2560	Eligible	Access Road and Powerline Crosses Trail	No Further Work
48CO3052	Not Eligible	N/A	No Further Work
48CO3053	Not Eligible	N/A	No Further Work
48CO3054	Not Eligible	N/A	No Further Work
48CO3055	Eligible	Turbine 27 is 311 ft South	Avoid Site, Buffer 200 Feet
48CO3056	Eligible	Turbine 41 is 4310 ft South	Avoid Site

48CO3057	Potentially Eligible	Turbine 41 is 3891 ft South	Avoid Site
48CO3058	Eligible	Turbine 19 is 1049 ft Northwest	Avoid Site
48CO3059	Potentially Eligible	Turbine 47 is Within the Site Boundary	Avoid Site, Buffer 200 Feet
48CO3060	Not Eligible	N/A	No Further Work
48CO3061	Not Eligible	N/A	No Further Work
48CO3062	Not Eligible	N/A	No Further Work
48CO3063	Not Eligible	N/A	No Further Work
48CO3064	Not Eligible	N/A	No Further Work
48CO3065	Not Eligible	N/A	No Further Work
48CO3066	Eligible	Turbine 52 is 675 ft South	Avoid Site
48CO3067	Not Eligible	N/A	No Further Work
48CO3068	Not Eligible	N/A	No Further Work
CH-IF1	Not Eligible	N/A	No Further Work
CH-IF2	Not Eligible	N/A	No Further Work
CH-IF3	Not Eligible	N/A	No Further Work
CH-IF4	Not Eligible	N/A	No Further Work
CH-IF5	Not Eligible	N/A	No Further Work
CH-IF6	Not Eligible	N/A	No Further Work
CH-IF7	Not Eligible	N/A	No Further Work
CH-IF8	Not Eligible	N/A	No Further Work
CH-IF9	Not Eligible	N/A	No Further Work
CH-IF10	Not Eligible	N/A	No Further Work
CH-IF11	Not Eligible	N/A	No Further Work
CH-IF12	Not Eligible	N/A	No Further Work
CH-IF13	Not Eligible	N/A	No Further Work
CH-IF14	Not Eligible	N/A	No Further Work
CH-IF15	Not Eligible	N/A	No Further Work
CH-IF16	Not Eligible	N/A	No Further Work
CH-IF17	Not Eligible	N/A	No Further Work
CH-IF18	Not Eligible	N/A	No Further Work
CH-IF19	Not Eligible	N/A	No Further Work
CH-IF20	Not Eligible	N/A	No Further Work
CH-IF21	Not Eligible	N/A	No Further Work
CH-IF22	Not Eligible	N/A	No Further Work
CH-IF23	Not Eligible	N/A	No Further Work

CH-IF24	Not Eligible	N/A	No Further Work
CH-IF25	Not Eligible	N/A	No Further Work
CH-IF26	Not Eligible	N/A	No Further Work
CH-IF27	Not Eligible	N/A	No Further Work
CH-IF28	Not Eligible	N/A	No Further Work
CH-IF29	Not Eligible	N/A	No Further Work
CH-IF30	Not Eligible	N/A	No Further Work
CH-IF31	Not Eligible	N/A	No Further Work

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APPENDIX A – SITE LOCATION MAPS

APPENDIX G

Wildlife Studies for the Campbell Hill Wind Resource Area, Converse and Natrona Counties, Wyoming – Fall Summary Report

Wildlife Studies for the Campbell Hill Wind Resource Area Converse County, Wyoming

Fall Summary Report
September 9 – November 5, 2008

Prepared for:

Three Buttes Windpower, LLC/Duke Energy

Prepared by:

Kenton Taylor, Jeff Gruver and Kimberly Bay
Western **E**co**S**ystems **T**echnology, Inc.
2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

December 30, 2008

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INTRODUCTION

Three Buttes Windpower, LLC (Three Buttes), an indirect and wholly owned subsidiary of Duke Energy Corporation, is pursuing the development of a wind power facility referred to as the Campbell Hill Windpower Project (Project) to be constructed in Converse County, near Glenrock, Wyoming.

The proposed Project is a 99-MW wind energy generation facility to be fully developed by Three Buttes and is presented in Figure 1. The Project and transmission line will be constructed entirely on private land, leased by Three Buttes. The wind farm is comprised of approximately 10,480 acres and the area leased to site the transmission line is approximately 4,400 acres. The Project layout and transmission line will be sited in response to biological and geotechnical considerations in coordination with wind resource potential. Three Buttes plans to use 66 GE 1.5 MW sle model wind turbines for a nameplate capacity of 99 MW. Three Buttes plans to begin construction in the first quarter of 2009 and have the site operational by the fourth quarter of 2009. A maximum construction workforce of approximately 129 is anticipated in July 2009.

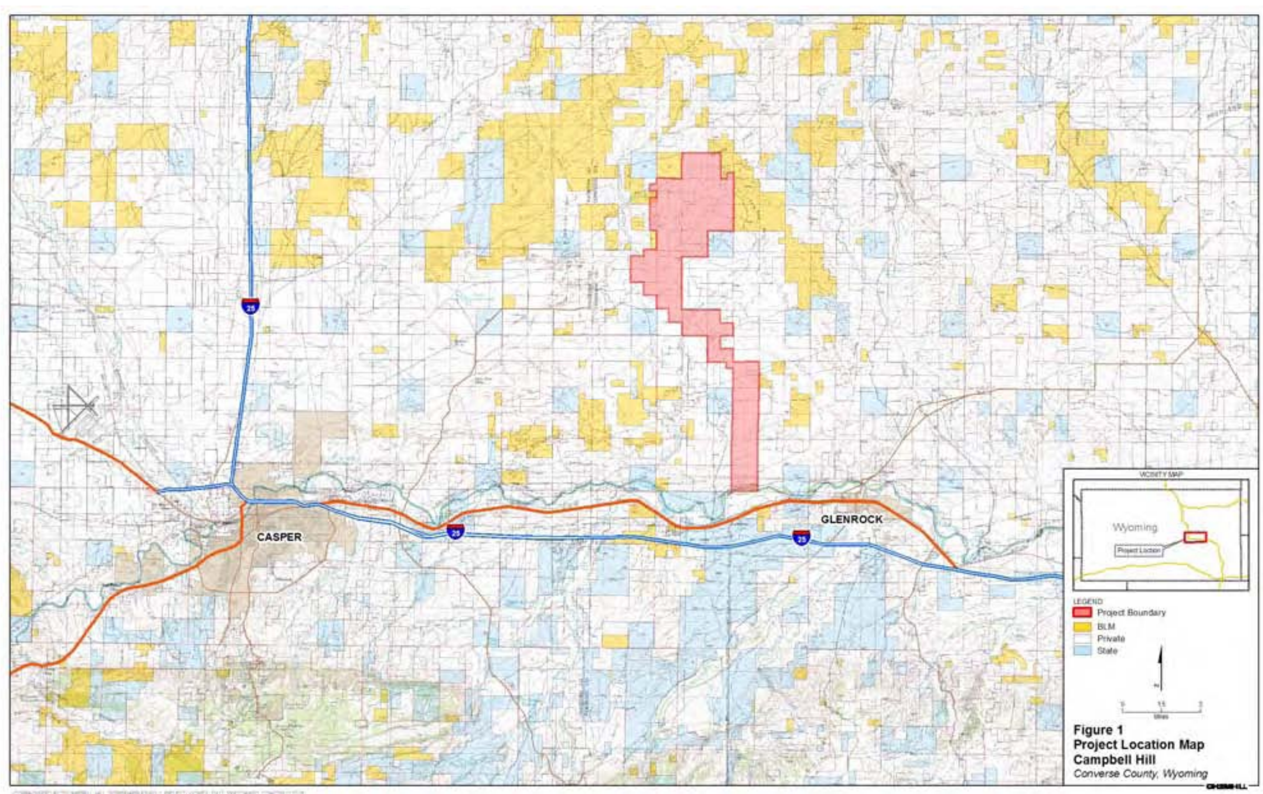


Figure 1
Project Location Map
Campbell Hill
Converse County, Wyoming

CH2M HILL has been contracted by Duke Energy to assist with the permitting process for the Project. Initially, Ecology and Environment (E&E) was contracted to conduct wildlife studies in relation to the Project. In late November of 2008, CH2M HILL and Duke Energy requested that Western EcoSystems Technology, Inc. (WEST) continue the existing and future wildlife studies for the Project.

The following is a summary of the results from studies conducted by E&E during the fall of 2008. The purpose of the report is to bring items of biological interest to Three Buttes/Duke Energies attention, such as seasonal bird use, bat use, raptor nest densities and the presence of sensitive species, and to compare the results of the fall studies conducted at the Project site with other wind projects. The scope of the fall wildlife studies included fixed-point bird use surveys, a raptor nest search, bat acoustical surveys, initiation of a greater sage-grouse displacement study, and prairie dog town mapping. Other wildlife surveys currently planned for the Project include: continued fixed-point bird use surveys, golden eagle observations, continued raptor nest surveys, continuation of the greater sage-grouse displacement study, more intensive prairie dog town mapping, and greater sage-grouse lek counts.

METHODS

Methods for fall 2008 wildlife studies at the Project were provided by E&E.

Fixed-Point Bird Use Surveys

The purpose of the avian fixed point count surveys is to estimate the use and relative abundance of birds, with a focus on raptors. Following methods described by Reynolds et al. (1980), fixed points were sampled. These points were distributed proportionally throughout the Project area in association with proposed turbine locations. All species observed during each 20-minute (min) count period were recorded including any species of concern.

Twelve points were predetermined to provide sufficient sampling across the habitats of the study area. Points were determined by randomly selecting a starting turbine point (of the 66 available) and systematically selecting every sixth subsequent turbine/point. One additional point was selected for a total of 12 points. Each point had a radius of 800 meters (m). All birds observed during the survey period were recorded.

For each 20-min survey the following variables were recorded: date, start/end time, surveyor initials, and weather (including wind speed and direction, percent of cloud cover, and temperature in degrees Fahrenheit [˚F]).

For each bird(s) sighted, recorded data included: time observed, species, number, sex, age class (adult, immature, unknown), distance from observer (center point) at initial sighting, closest observation, approximate height of each detection, behavioral activity (perched, soaring, circle soaring, flapping, other), habitat, and direction of movement.

Sample periods were determined to coincide with typical seasons of peak activity in the Project area. The fall survey period ran from September 8 – November 10, 2008. Each point within that time frame was surveyed every other week, for a total of seven counts. All counts were conducted during seasonal daylight hours.

Raptor Nest Search

The purpose of the raptor nest surveys was to locate all potentially active nests within and adjacent to the Project area that could be subject to disturbance during Project development. The surveys were conducted concurrently during fall point counts, and while driving most accessible roads within and adjacent to the Project area, searching areas of appropriate habitat (trees, rock outcrops, manmade structures, etc.). During the week of November 2, 2008 ground teams of two four skilled avian biologists conducted 13 person-days of field work and searched areas within a one-mile (mi) buffer of all turbines, and within a one-mi buffer of the transmission line. Additionally an aerial survey (3.5 hour [hr]) with a fixed winged aircraft flew north/south transects within a one-mi buffer of the transmission line and a one-mi buffer of the proposed access road west to 106º 4’0” west. For each nest, global positioning system (GPS) coordinates, nest substrate, and current condition were noted.

WEST included E&E’s status determination as comments and identified nest condition if possible based on photographs of the nests. Not all nests had photographs available. WEST visited several nests located near the Project that were previously located via fixed wing aircraft by E&E on December 18, 2008 to confirm their location, condition, and to take photographs.

Acoustical Bat Surveys

The original objectives of the acoustical bat surveys were to provide baseline data for species presence, relative abundance, and assess bat use within the Project that may be affected by the proposed activities. Bats were surveyed using Anabat® SD-1 bat detectors (Titley Electronics Pty Ltd., NSW, Australia). Bat detectors are a recommended method to index and compare habitat use by bats. Surveys were conducted from early August 2008 through early November of 2008.

Two stationary acoustic monitoring locations were established at meteorological (met) towers within the Project area. Two Anabat units were placed at two m above the ground and two Anabat units were placed at 40-45 m above the ground, in order to sample bat activity near the ground and within the rotor swept area. However, noise associated with the pulley mounting system was problematic and the elevated units were moved to nearby high points associated with either a rock outcrop or ridge. Due to modification of the Project layout, some of the data was collected outside of the existing Project area, but the data is still representative of bat use within the surrounding area.

Anabat detectors were protected using Bat-Hats (weather proof housing systems; EME systems, Berkley, California) and either mounted on a met tower approximately two m above ground level or suspended on a pulley system attached to the met tower. The two units that were relocated to high points on the landscape were mounted on fence T-posts with the bat hat approximately one m above ground level. The reflector plates of the Bat-Hats were oriented to provide a horizontal volume of detection. Calls were recorded to a compact flash memory card with large storage capacity. Batteries were kept charged via a solar panel. All units were programmed to turn on each night an approximate half-hour before sunset and turn off an approximate half-hour after sunrise.

WEST analyzed the raw Anabat data in order to estimate the seasonal and spatial use of the Project by bats. The use of bat detectors for calculating an index to bat impacts has been used at several wind-energy facilities (Kunz et al. 2007), and is a primary and economically feasible bat risk assessment tool (Arnett 2007).

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of 8 was used for the study.

The units of activity were number of bat passes (Hayes 1997). A pass was defined as a continuous series of greater than or equal to two call notes produced by an individual bat with no pauses between call notes of less than one second (White and Gehrt 2001, Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights. Bat calls were classified as either high-frequency calls (≥ 35 kHz) that are generally given by small bats (e.g. *Myotis* sp.), but also by eastern red bats (*Lasiurus borealis*) or low-frequency (< 35 kHz) that are generally given by larger bats (e.g. silver-haired bat [*Lasionycteris noctivagans*], big brown bat [*Eptesicus fuscus*], hoary bat [*Lasiurus cinereus*]). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis. To establish which species may have produced the high- and low-frequency calls recorded, a list of species expected to occur in the study area was compiled from range maps (Table 1; Harvey et al. 1999, BCI website).

Table 1. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the Project, sorted by call frequency.

High-frequency (≥ 35 kHz)		Low-frequency (< 35 kHz)	
California bat	*Myotis californicus*	pallid bat	*Antrozous pallidus*
western small-footed bat	*Myotis ciliolabrum*	Townsend's big-eared bat	*Corynorhinus townsendii*
little brown bat†	*Myotis lucifugus*	big brown bat†	*Eptesicus fuscus*
long-legged bat	*Myotis volans*	silver-haired bat*†	*Lasionycteris noctivagans*
eastern red bat†	*Lasiurus borealis*	hoary bat*†	*Lasiurus cinereus*
		western long-eared bat	*Myotis evotis*
		fringed bat	*Myotis thysanodes*
		Big free-tailed bat	*Nyctinimops macrotis*
		Brazilian free-tailed bat†	*Tadarida brasiliensis*

*long-distance migrant; †species known to have been killed at wind-energy facilities

The total number of bat passes per detector night was used as an index for bat use in the Project. Bat pass data represented levels of bat activity rather than the numbers of individuals present because individuals could not be differentiated by their calls. To predict potential for bat mortality (i.e. low, moderate, high), the mean number of bat passes per detector night (averaged across monitoring stations) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

Greater Sage-Grouse Displacement Study

E&E set-up seven plots at each of 10 turbine locations within the WYGFD defined core greater sage-grouse area and suitable habitat (i.e., tall dense sage brush). Seventy plots will be surveyed for greater sage-grouse pellets at turbine locations. At each turbine selected for sampling, the seven plots were established along circular transects using a systematic sample of plots beginning at 40 m from the turbine and a compass direction of zero degrees. Each of the remaining plots was placed 10 m further out from the turbine and at 50 degrees greater than the previous plot. The seventh plot was located at 100 m and 300 degrees. Each plot was marked with a two-foot piece of rebar, and the location was recorded using a GPS.

For reference data, seventy plots were also established at 10 random points located in an area of similar topography and vegetation as the turbines, but at least one mi from the nearest turbine. Methods will be identical to those at the turbine plots.

Prairie Dog Town Mapping

A partial prairie dog town mapping effort was conducted by drawing the boundaries of prairie dog towns on maps in the field. Additionally, a few points were taken in prairie dog towns that were not included in the mapping efforts.

RESULTS

This summary report presents the results of field work conducted by E&E in the fall of 2008 for the Project and subsequent review and analyses by WEST. Results of the data collected by E&E were reviewed and summarized by WEST.

Fixed-Point Bird Use Surveys

Fall bird use surveys at the Project were completed from September 9 to November 5 of 2008 and consisted of 20-min counts at 13 plots (800-m radius circle centered around a fixed point location) (Figure 2). The original number of bird use plots was twelve; however, one plot was moved during the fall surveys. Eleven plots were visited approximately seven times and two plots were visited at least three times for a total of 86 surveys (Table 1).

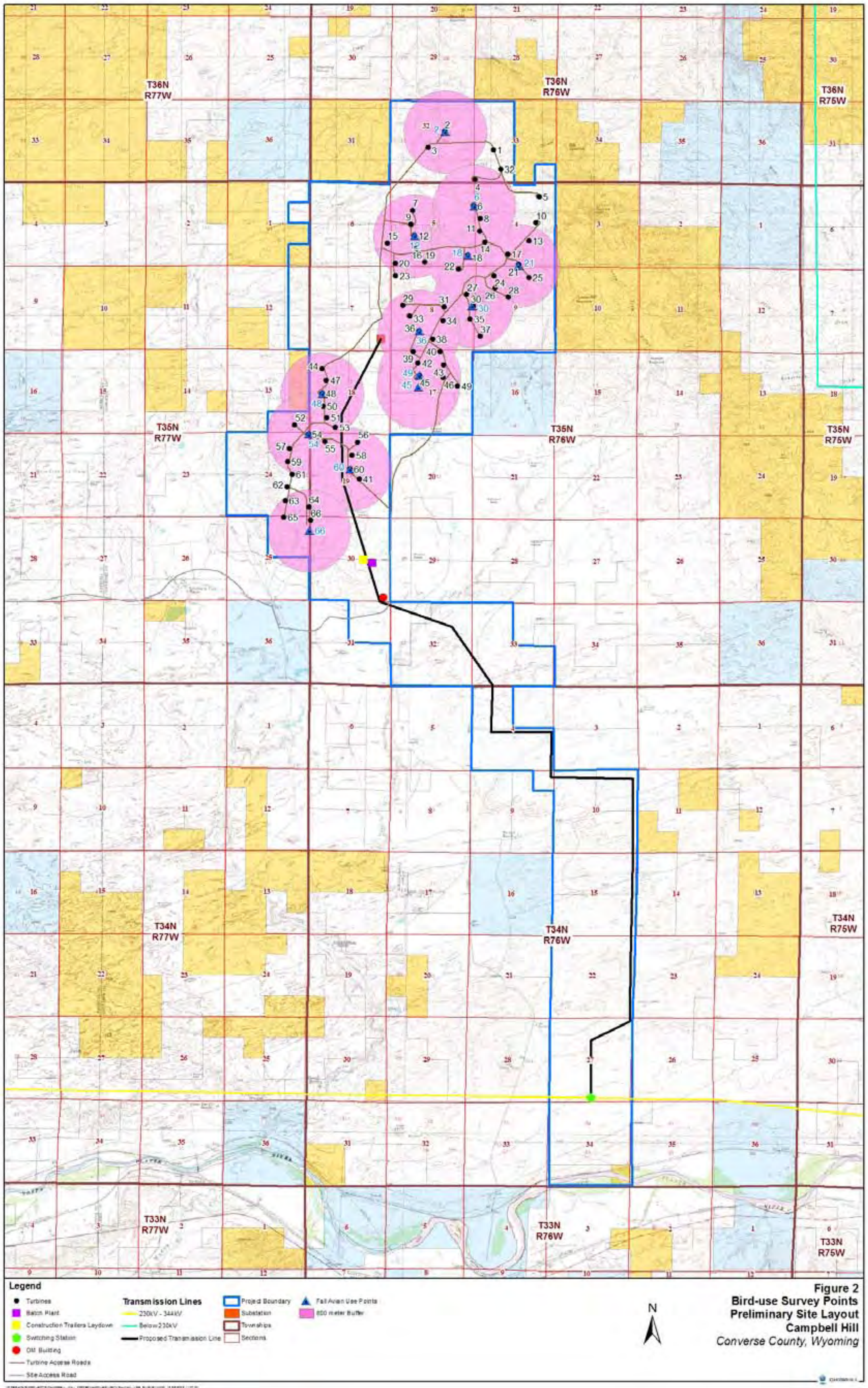


Figure 2
Bird-use Survey Points
Preliminary Site Layout
Campbell Hill
Converse County, Wyoming

Table 1. Summary of bird use, species richness, and sample size during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Season	Number of Visits	Mean Use	# Species/ Survey	# Species	# Surveys Conducted
Fall	7	12.2	2.37	30	86

Bird Use and Species Composition
A total of 30 unique species were observed during the fall bird use surveys (Table 2). Overall mean bird use calculated as (number/plot/survey) was determined to be approximately 12.24 birds/20-min survey for the fall season, with passerines having the highest mean use (10.53). No federally-listed species were observed during any surveys, and Wyoming does not have a state endangered species list.

Table 2. Total number of individuals and groups for each bird type and species during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Species/Type	Scientific Name	# grps	# ind
Waterbirds		**1**	**42**
sandhill crane	*Grus Canadensis*	1	42
Raptors		**95**	**109**
Accipiters		*2*	*2*
sharp-shinned hawk	*Accipter striatus*	2	2
Buteos		*26*	*27*
ferruginous hawk	*Buteo regalis*	5	5
red-tailed hawk	*Buteo jamaicensis*	3	3
rough-legged hawk	*Buteo lagopus*	12	13
unidentified buteo		6	6
Northern Harrier		*11*	*11*
northern harrier	*Circus cyaneus*	11	11
Eagles		*33*	*44*
golden eagle	*Aquila chrysaetos*	33	44
Falcons		*23*	*25*
American kestrel	*Falco sparverius*	5	7
Merlin	*Falco columbarius*	5	5
peregrine falcon	*Falco peregrines*	1	1
prairie falcon	*Falco mexicanus*	9	9
unidentified falcon		3	3
Vultures		**5**	**6**
turkey vulture	*Cathartes aura*	5	6
Doves/Pigeons		**1**	**1**
mourning dove	*Zenaida macroura*	1	1

Table 2 (*continued*). Total number of individuals and groups for each bird type and species during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Species/Type	Scientific Name	# grps	# ind
Passerines		**365**	**1,567**
American crow	*Corvus brachyrhynchos*	1	40
American pipit	*Anthus rubescens*	1	1
barn swallow	*Hirundo rustica*	2	8
black-billed magpie	*Pica pica*	9	13
Brewer's blackbird	*Euphagus cyanocephalus*	2	19
Brewer's sparrow	*Spizella breweri*	3	3
chestnut-collared longspur	*Calcarius ornatus*	5	9
horned lark	*Eremophila alpestris*	256	1,305
Lapland longspur	*Calcarius lapponicus*	5	21
McCown's longspur	*Calcarius mccownii*	12	31
rock wren	*Salpinctes obsoletus*	15	16
sage thrasher	*Oreoscoptes montanus*	3	3
Say's phoebe	*Sayornis saya*	1	1
vesper sparrow	*Pooecetes gramineus*	4	6
western meadowlark	*Sturnella neglecta*	45	90
yellow-rumped warbler	*Dendroica coronate*	1	1
Other Birds		**1**	**1**
hairy woodpecker	*Picoides villosus*	1	1
Overall		**468**	**1,726**

Mean use for raptors was 1.12 birds/20-min survey (Table 3). Other metrics calculated included percent composition (% of total bird use attributable to a bird type or species) and the frequency of occurrence (% of surveys in which a given bird type or species was recorded).

Table 3. Mean bird use, percent composition, and frequency of occurrence for each bird type and species during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Species/Type	Use	% Composition	% Frequency
Waterbirds	**0.50**	**4.1**	**1.2**
sandhill crane	0.50	4.1	1.2
Raptors	**1.12**	**9.2**	**63.9**
Accipiters	*0.02*	*0.2*	*2.4*
sharp-shinned hawk	0.02	0.2	2.4
Buteos	*0.27*	*2.2*	*20.0*
ferruginous hawk	0.06	0.5	6.0
red-tailed hawk	0.04	0.3	3.6
rough-legged hawk	0.14	1.2	10.5
unidentified buteo	0.04	0.3	3.6

Table 3 (*continued*). Mean bird use, percent composition, and frequency of occurrence for each bird type and species during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Species/Type	Use	% Composition	% Frequency
Northern Harrier	*0.14*	*1.1*	*12.7*
northern harrier	0.14	1.1	12.7
Eagles	*0.41*	*3.4*	*31.2*
golden eagle	0.41	3.4	31.2
Falcons	*0.28*	*2.3*	*21.8*
American kestrel	0.06	0.5	3.6
merlin	0.06	0.5	6.0
peregrine falcon	0.01	0.1	1.2
prairie falcon	0.11	0.9	11.1
unidentified falcon	0.04	0.3	3.6
Vultures	**0.06**	**0.5**	**3.6**
turkey vulture	0.06	0.5	3.6
Doves/Pigeons	**0.01**	**0.1**	**1.2**
mourning dove	0.01	0.1	1.2
Passerines	**10.53**	**86.1**	**76.8**
American pipit	0.01	0.1	1.2
barn swallow	0.1	1.8	2.4
black-billed magpie	0.02	0.3	3.6
Brewer's blackbird	0.23	1.5	4.8
Brewer's sparrow	0.04	2.5	10.7
chestnut-collared longspur	0.11	0.8	2.4
horned lark	9.1	0.2	1.2
Lapland longspur	0.18	0.9	3.6
McCown's longspur	0.31	74.3	72.6
rock wren	0.11	0.9	8.3
sage thrasher	0.02	0.2	1.2
vesper sparrow	0.05	0.4	2.4
western meadowlark	0.25	2.0	14.3
yellow-rumped warbler	0.01	0.1	1.2
Other Birds	**0.01**	**0.1**	**1.2**
hairy woodpecker	0.01	0.1	1.2
Overall	**12.24**	**100**	

Spatial Use

For all bird species combined within/near the Project, use was highest at point 45 (35.67 birds/20-min survey) and point 49 (35.25), which are highly overlapping survey areas. Bird use at other points ranged from 2.57 to 19.58. (Figure 3). The high mean use estimate for point 45 was largely due to high passerine use at this point (33.33). High use at point 49 was due in part to high use by passerines (23.25) and waterbirds (10.50). Passerine use at the other points ranged from 1.57 to 18.58 birds/20-min survey and waterbirds were not observed at the points. Raptor

use was highest at point 45, with 2.33 birds/20-min survey. Other points had raptor use ranging from 0.57 to 1.57. Vultures were observed at three points with use at point 36 (0.43), point 18 (0.14), and point 6 (0.14). Doves were only observed at point 36 with use being 0.14. Other birds were only observed at point 54 with use being 0.17.

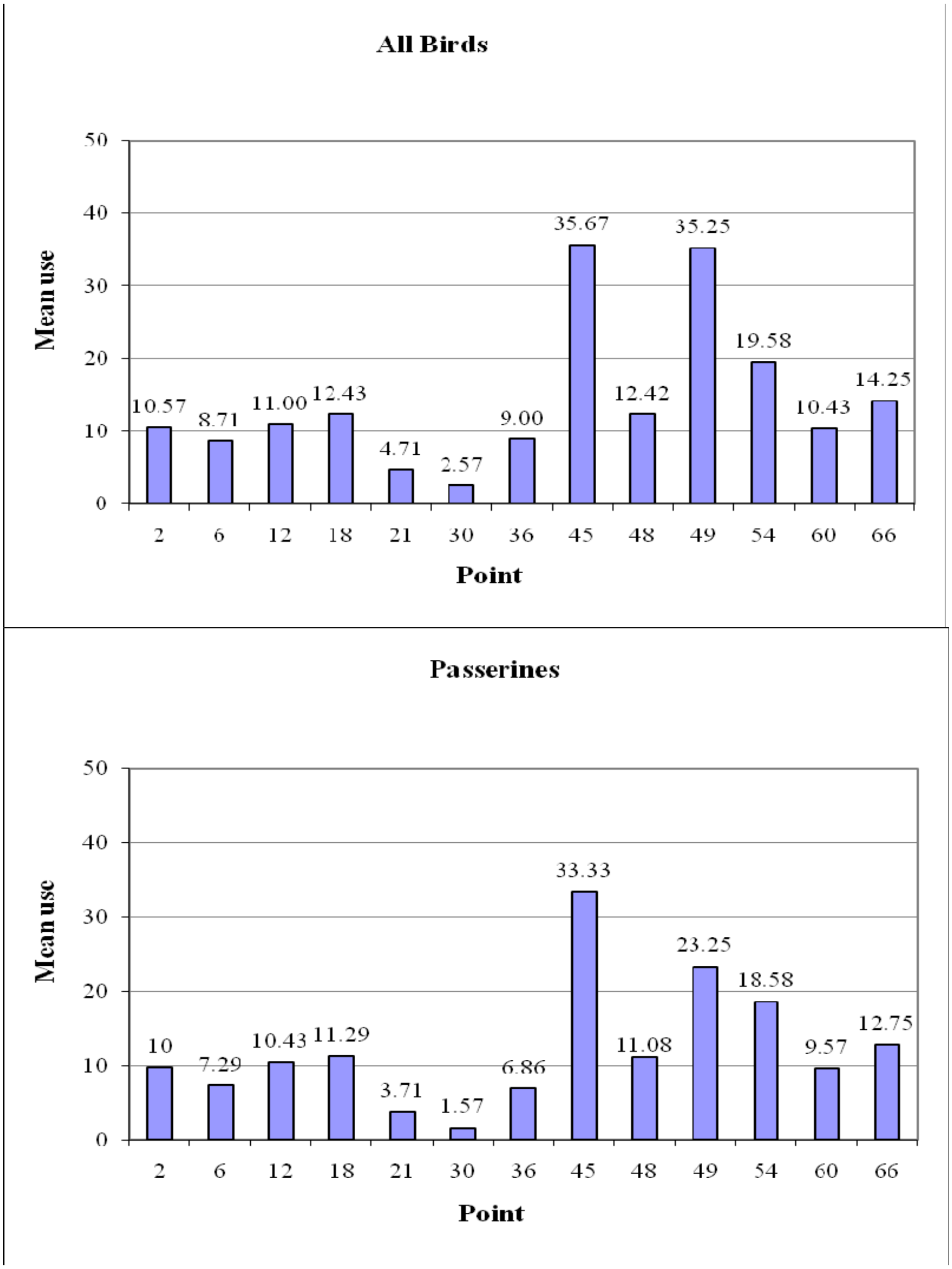
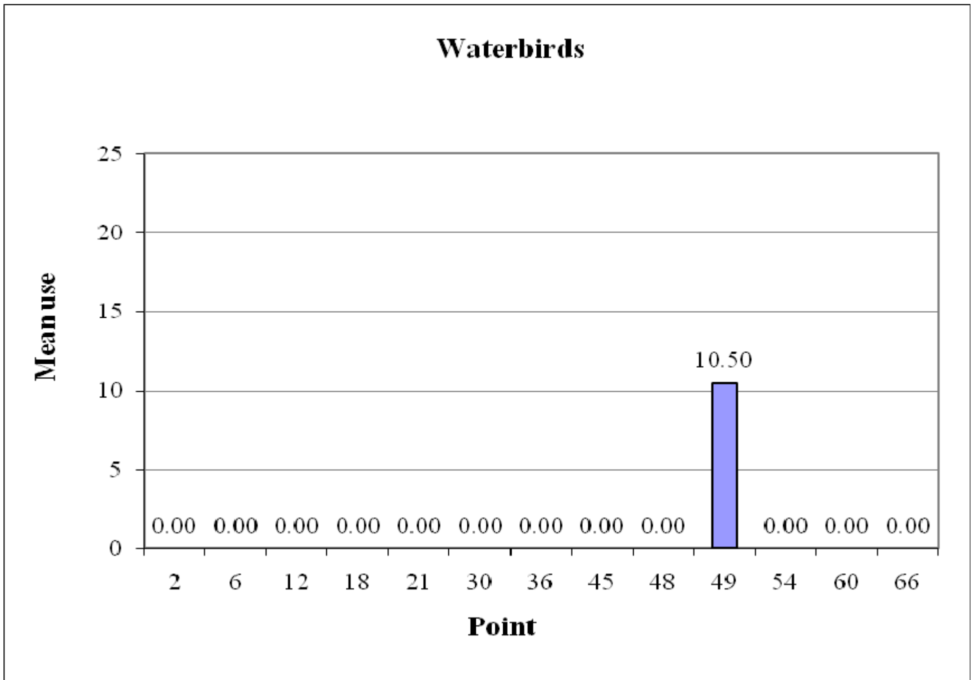


Figure 3. Mean use (birds/20-min survey) at each fixed-point bird use survey point for all major bird types at the Project area.



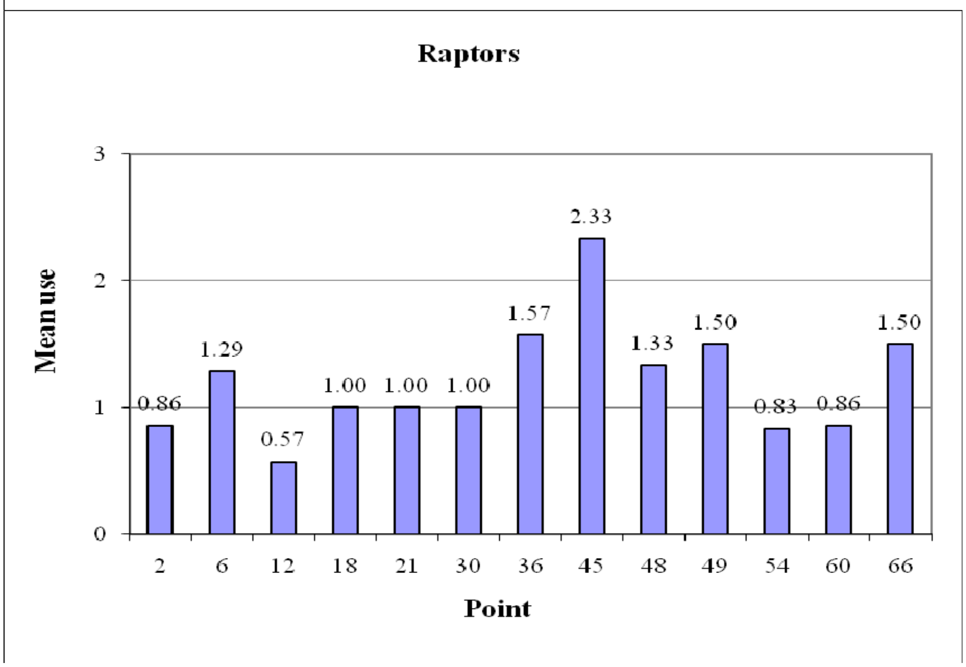
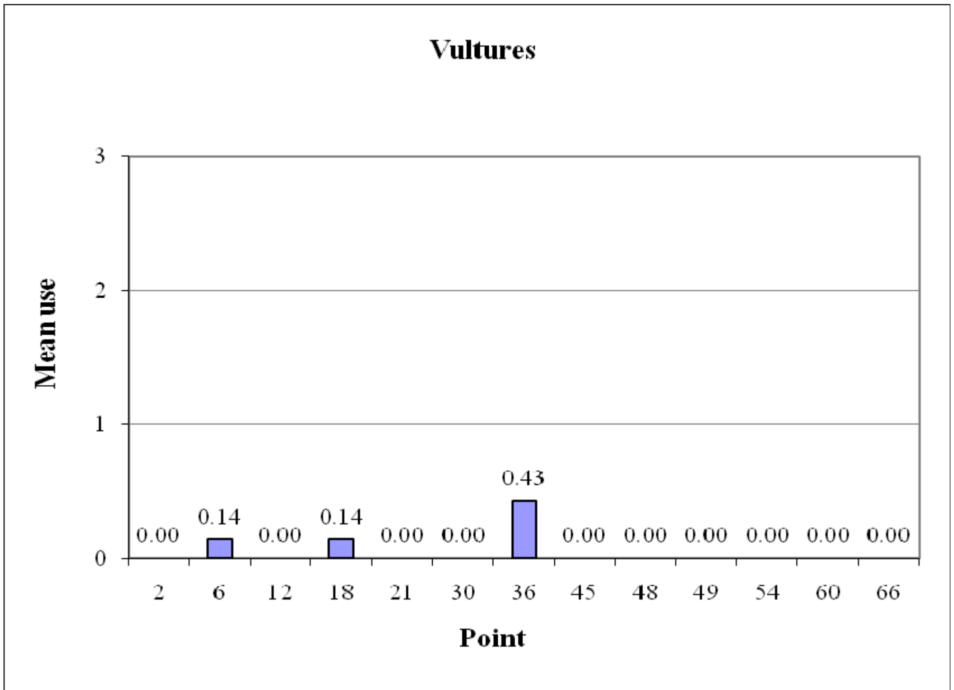


Figure 3 (*continued*). Mean use (birds/20-min survey) at each fixed-point bird use survey point for all major bird types at the Project area.



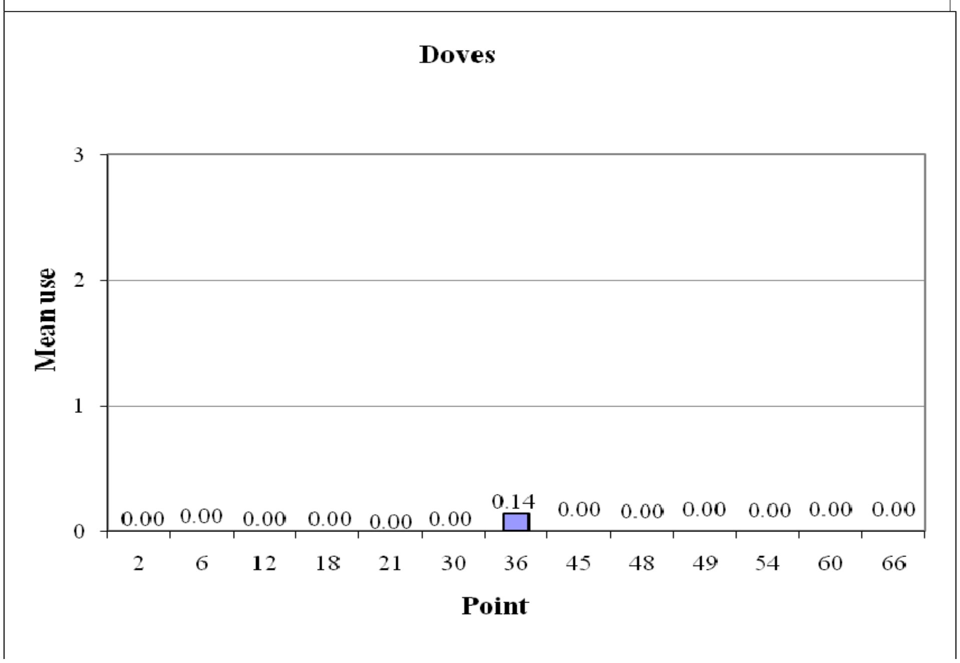


Figure 3 (*continued*). Mean use (birds/20-min survey) at each fixed-point bird use survey point for all major bird types at the Project area.

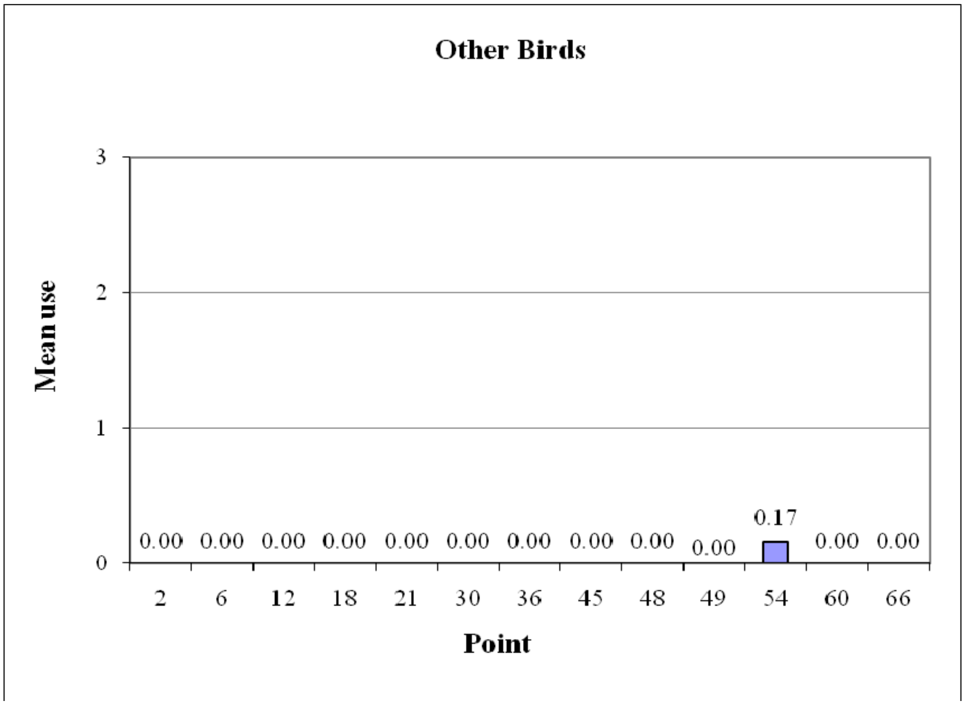


Figure 3 (*continued*). Mean use (birds/20-min survey) at each fixed-point bird use survey point for all major bird types at the Project area.

Within raptors, eagle use was highest at point 49 (1.0) and ranged from 0.00 to 0.86 at other points (Figure 4). Buteo use was highest at point 36 (0.71) and ranged from 0.00 to 0.58 at other points. Falcon use was highest at point 45 (0.67) and ranged from 0.00 to 0.57 at other points. Harriers were observed at five of the 13 points and use was highest at point 45 (0.67) and ranged from 0.00 to 0.50 at other points. Accipiters were only observed at two points, point 49 (0.25) and point 36 (0.14).

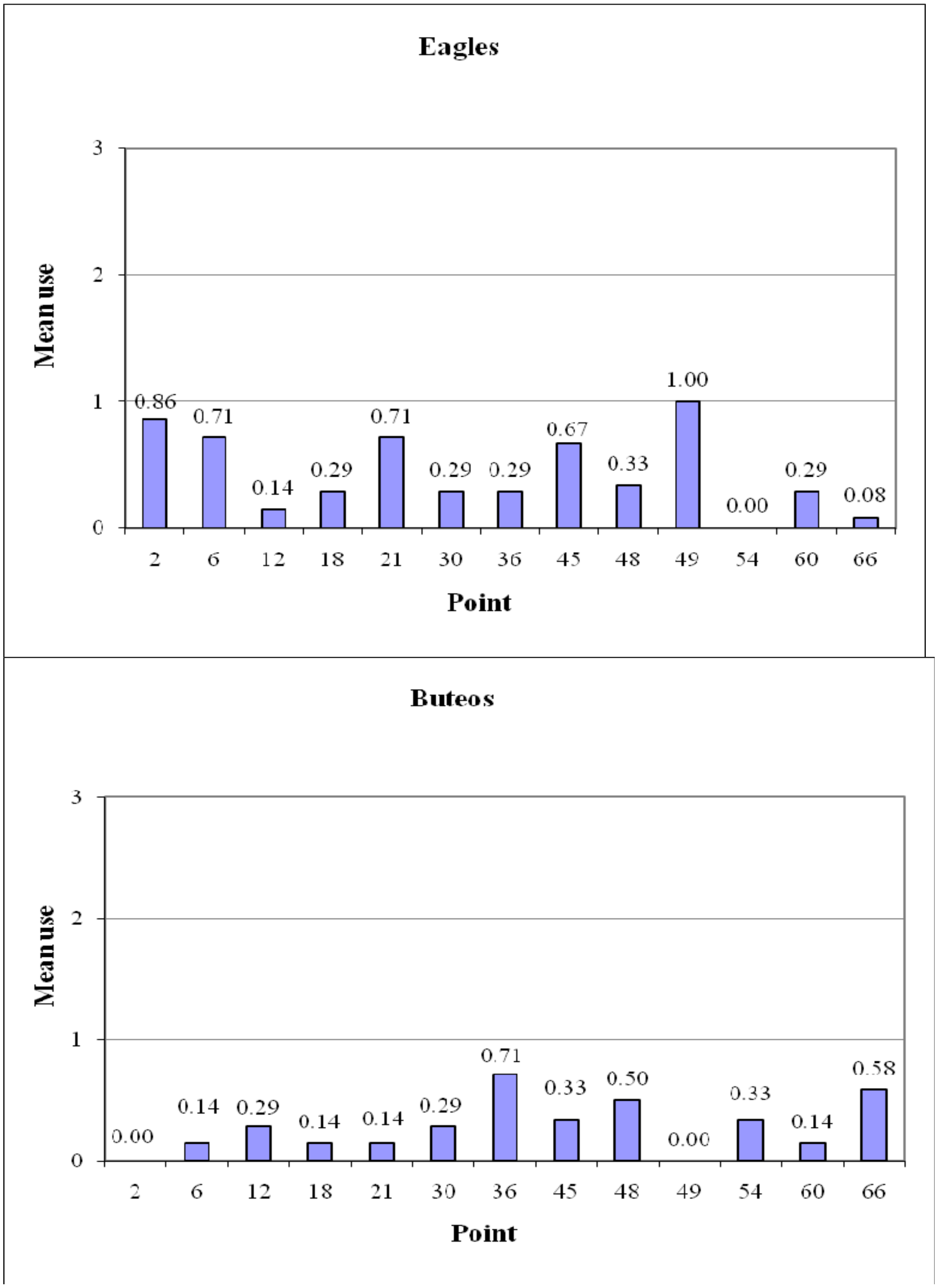


Figure 4. Mean use (birds/20-min survey) at each fixed-point bird use survey point for raptor groups at the Project area.

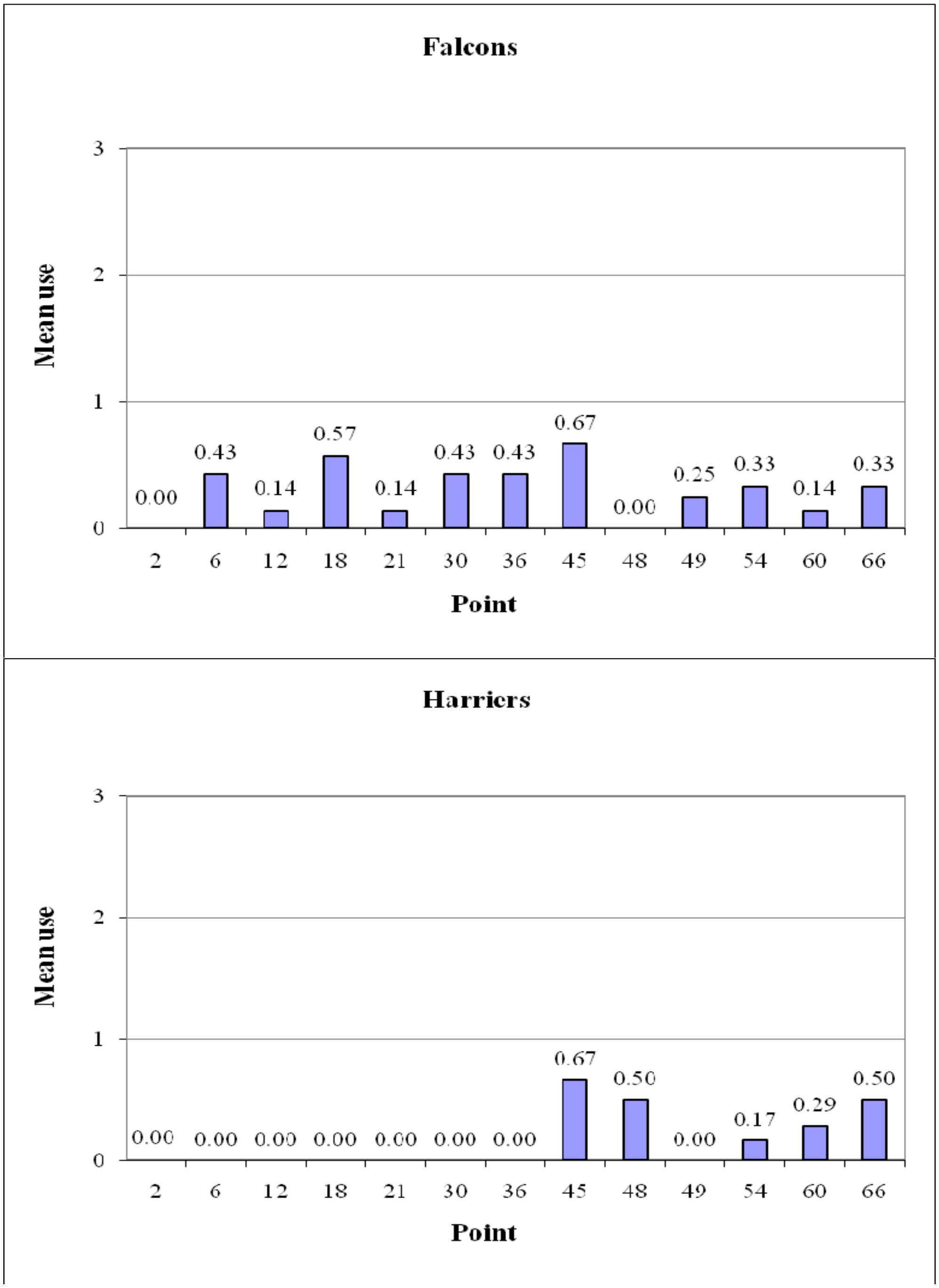


Figure 4 (*continued*). Mean use (birds/20-min survey) at each fixed-point bird use survey point for raptor groups at the Project area.

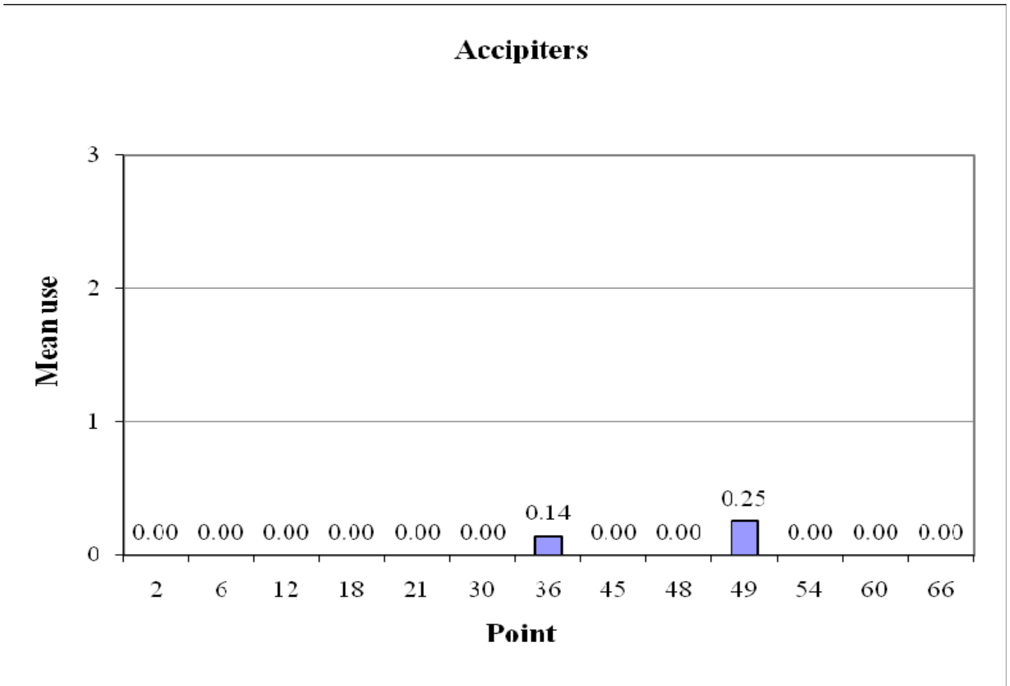


Figure 4 (*continued*). Mean use (birds/20-min survey) at each fixed-point bird use survey point for raptor groups at the Project area.

Raptor Nest Search

Although formal raptor nest surveys were not conducted in 2007, two active raptor nests (one ferruginous hawk and one great horned owl) were identified by E&E during the initial site visits in 2007. Additionally, in 2008 two active raptor nests (the same great horned owl nest and a golden eagle nest) were incidentally observed by E&E while conducting other work within/near the Project (Table 4; Figure 5).

In November of 2008, an aerial and ground search for raptor nest structures was conducted and E&E identified a total of 28 nests during this survey effort (Table 5; Figure 5). Additionally, on December 18, 2008, WEST confirmed the locations of nests #9, #13, #16, and #19 and took notes, photographs, and UTM locations. Two nests were identified in close proximity to the original nest # 16 location. These nests were given unique I.D.'s of nest #16a and nest #16b. The total number of nest structures identified within/near the Project is 29. Of these nests, 22 were located within the one-mi survey area surrounding the original turbine locations, the proposed transmission line, and the main access road for the site. The total area searched for raptor nest structures was approximately 49.86 mi^2 (129.14 km^2). Ten nests were located within one mi of the originally proposed turbine locations, 13 nests were located within one mi of the proposed transmission line (nine of these nests were unique to the transmission line), and nine nests were located within one mi of the main access road (three of these nests were unique to the main access road). Due to the timing of the raptor nest search, the activity of the nests could not be determined. The density of all nests identified (active and inactive) within the raptor nest search area was 0.44 nests/mi^2 (0.17 nests/km^2).

Table 4. Raptor nests within/near the Project area, identified in 2008.

Nest #	Presumed Species	Condition	Nest Substrate	Comments
1	FEHA	Fair	Ground	White wash present
2	FEHA	Fair	Ground	
3	FEHA	Poor/Fair	Ground	Some white wash present
4	FEHA	Good	Rock Outcrop	E&E observed two eggs in nest and a Ferruginous hawk on nest in 2007
5	Unknown	Unknown	Unknown	No Picture
6	FEHA	Fair	Ground	No evidence of recent activity
7	GOEA	Unknown	E& E designated; Tree	No Picture; E&E observed Golden Eagle on nest in 2008
8	FEHA	Good	Windmill	
9	FEHA	Good	Ground	
10	Unknown	Good	Tree	
11	GHOW	Good	Tree	E&E observed Great Horned Owl on nest in 2007 and 2008
12	Unknown	Unknown	Unknown	No picture
13	FEHA	Fair	Ground	Visited by WEST on 12/18/08
14	Unknown	Good	Tree	
15	Unknown	Unknown	Unknown	No Picture
16a	FEHA	Fair/Good	Rock outcrop	Visited by WEST on 12/18/08
16b	FEHA	Fair	Ground	Visited by WEST on 12/18/08
17	Unknown	Unknown	Unknown	No Picture
18	Unknown	Unknown	Unknown	No Picture
19	FEHA	Good	Ground	Visited by WEST on 12/18/08
20	FEHA	Good	Ground	White wash present
21	FEHA	Fair	Ground	White wash present
22	FEHA	Fair	Ground	
23	FEHA	Fair	Ground	Large Nest
24	FEHA	Fair	Ground	
25	FEHA	Good	Ground	Feathers and whitewash present
26	FEHA	Fair	Ground	
27	FHEA	Poor	Ground	
28	FEHA	Poor/Fair	Ground	

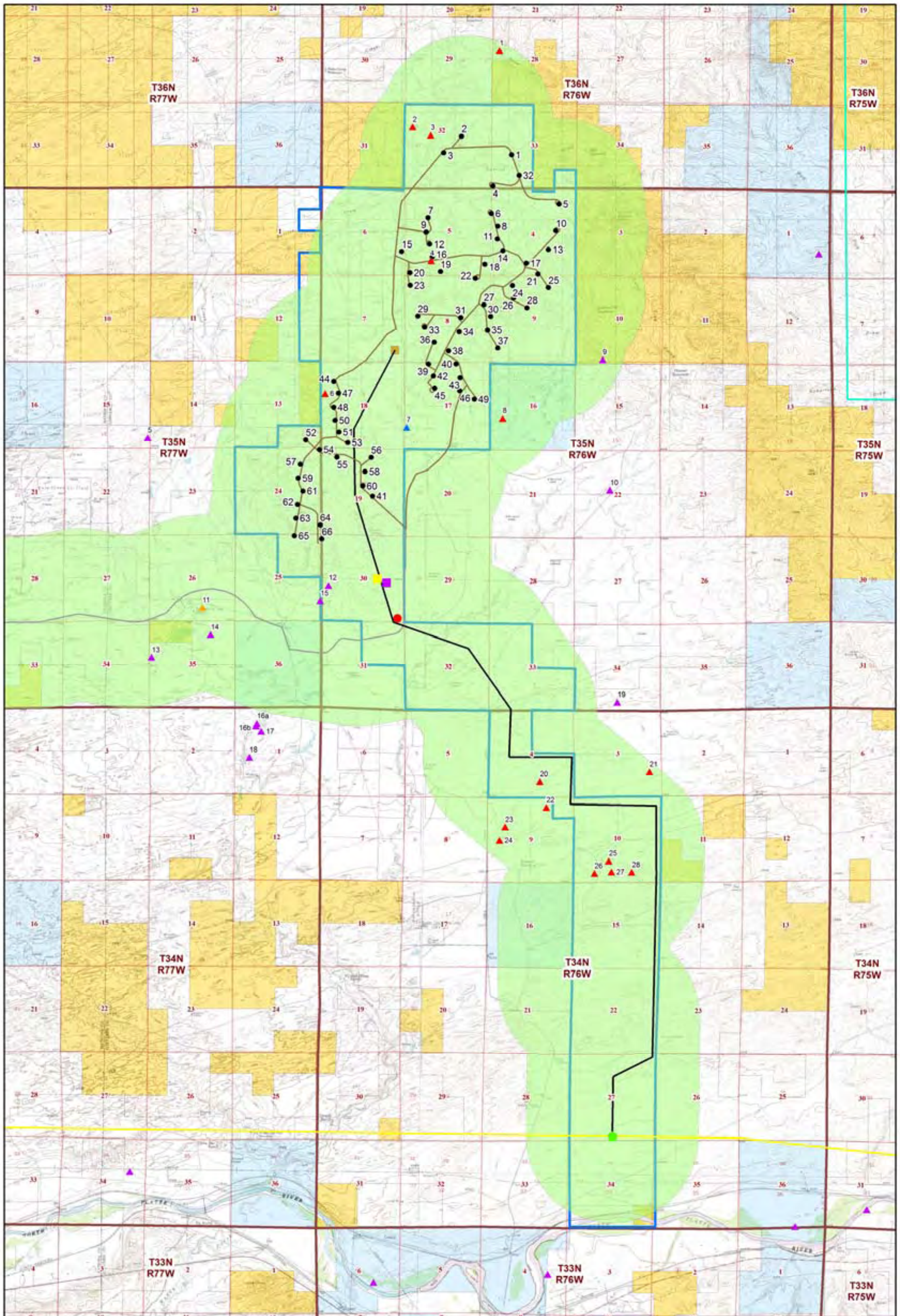


Figure 5
Raptor Nests
Preliminary Site Layout
Campbell Hill
Converse County, Wyoming

Bat Acoustical Surveys

Bat activity was monitored at 6 sampling locations on a total of 88 nights during the period August 8 to November 9, 2008. Anabat units were operable for 61.4% of the sampling period (Figure 6), recording 468 bat passes on 231 detector-nights (Table 5). Levels of wind and insect noise were high on some nights and may have interfered with bat detection. Averaging bat passes per detector-night across locations, we detected a mean of 2.03 bat passes per detector-night. For unknown reasons, no detectors were operable between September 4 and September 9, 2008. Outside this range, a mean of 2.5 detectors (range 1-4) were operable each night of the study.

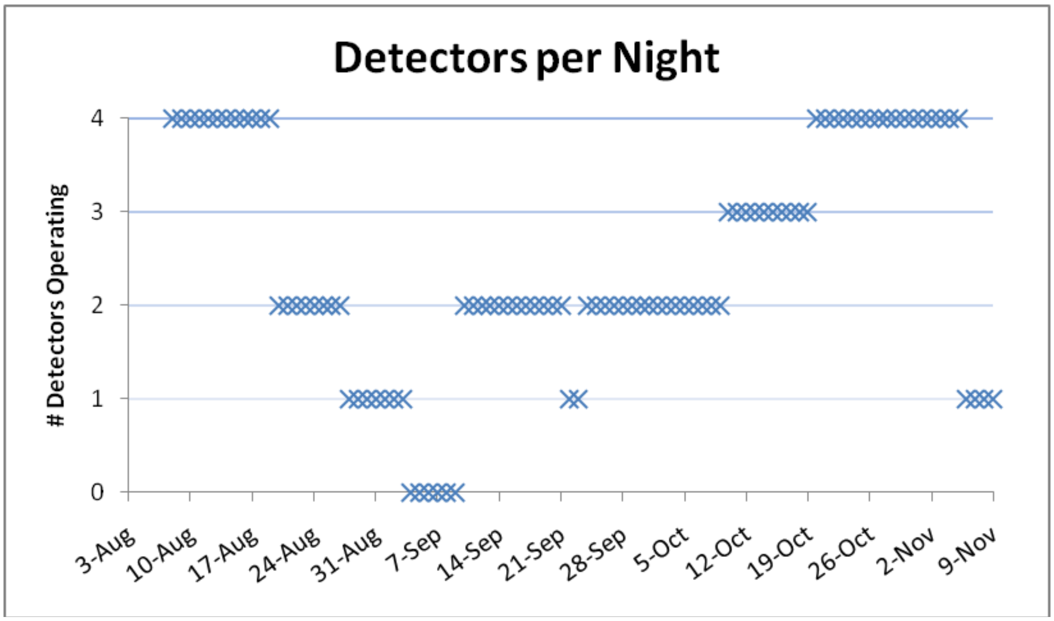


Figure 6. Number of Anabat detectors operating during each night of the study period. A mean of 2.5 Anabat detectors operated each night of the study.

Table 5. Results of bat acoustic surveys conducted at the Project, August 8, 2008 – November 9, 2008

Anabat Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
Rock Outcrop	168	115	0	283	57	4.96
Met 1 Low	19	55	14	74	54	1.37
Met 1 High	0	8	2	8	12	0.67
Met2 Low	12	58	13	70	54	1.30
Met2 High	1	21	14	22	20	1.10
Prairie Ridge	0	11	0	11	34	0.32
Total	**200**	**268**	**43**	**468**	**231**	**2.03**

***Passes by hoary bats included in low-frequency (LF) numbers.**

Spatial Variation
Bat activity varied between the ground-based Anabat units and Anabats located at 45 m (Figure 7). Activity was much higher at ground station SN3941 Rock Outcrop (4.9; 60.5% of all passes) than all other ground or elevated stations.

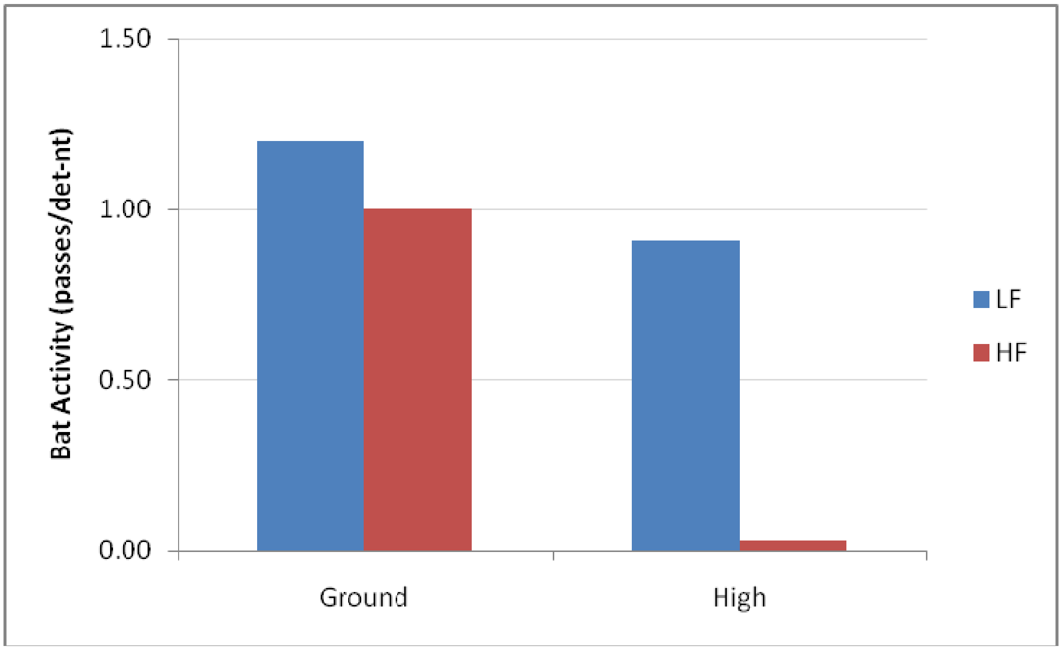


Figure 7. Number of high-frequency (HF) and low-frequency (LF) bat passes per detector-night recorded at paired ground and high Anabat locations. Elevated detectors operated for 12 and 20 nights, and there were no elevated units operating after August 27.

Temporal Variation
Bat activity was highest during September, when a mean of 8.6 passes per night was detected (Figure 8). Bat activity during September was dominated by calls from *Myotis* bat and big brown/silver-haired bats. Peaks of activity occurred on September 14 and September 24 (Figure 9).

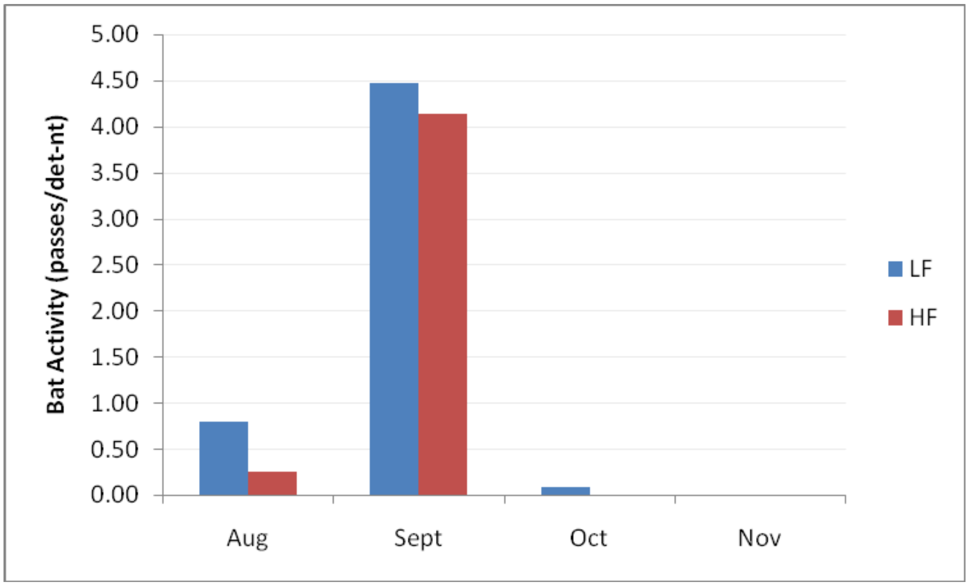


Figure 8. Monthly number of bat passes per detector night by high-frequency (HF) and low-frequency (LF) bats.

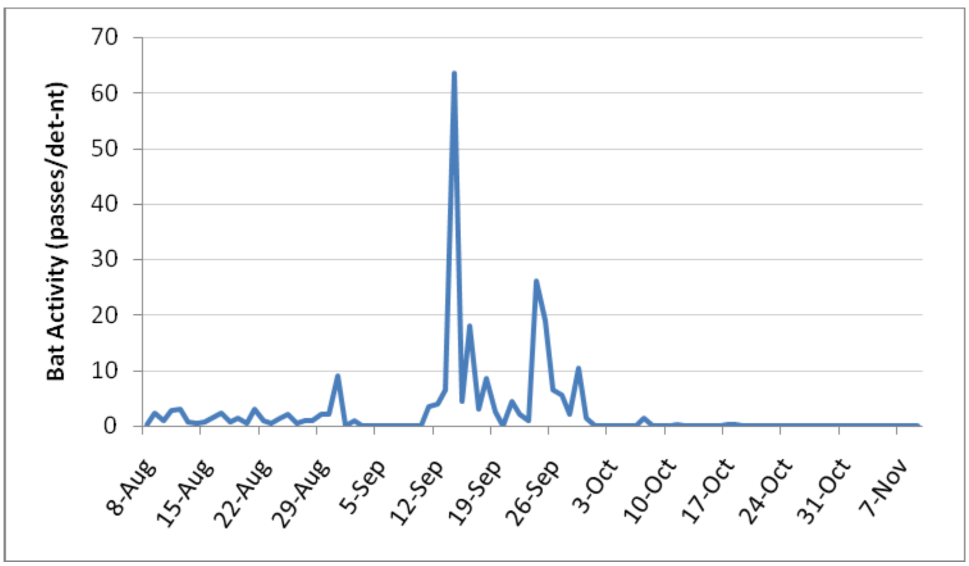


Figure 9. Number of bat passes per detector night through time for all bats. Peaks in activity occurred on September 14 and September 24.

Species Composition

Overall, passes by low-frequency bats (LF; 57%) outnumbered passes by high-frequency bats (HF; 43%). At raised stations, LF bat passes greatly outnumbered HF passes (Figure 7). Patterns of activity for HF and LF bats were similar through time (Figure 8). LF passes outnumbered HF passes during August, but the ratio was more similar during September. Only LF bat passes were

detected in October when overall activity was much lower, and no passes were detected after October 18.

Species identification for specific passes was possible for the hoary bat; therefore, passes by this species could be separated from passes by other low-frequency bats. Hoary bats comprised 9.2% of total passes detected within the study area. Hoary bat activity was not consistent among Anabat stations (Figure 10). In particular, no hoary bat passes were recorded at Prairie Ridge and rock Outcrop stations. However, Prairie Ridge station did not begin collecting data until September 24, after the last recorded hoary bat pass during this study (Figure 11).

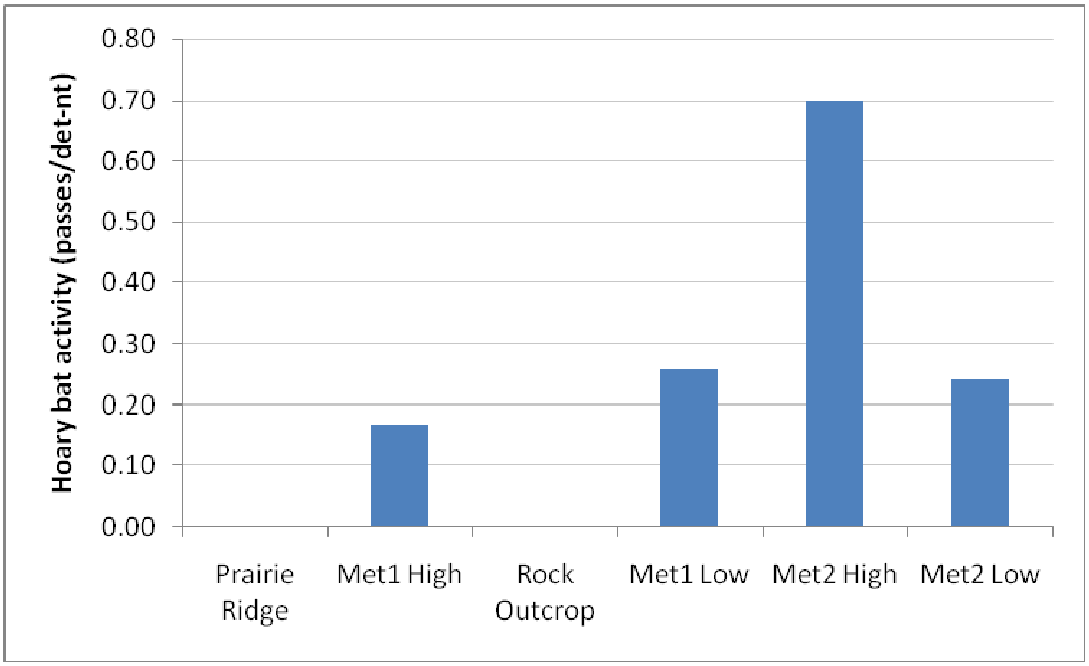


Figure 10. Number of passes per detector–night by hoary bats, by Anabat station.

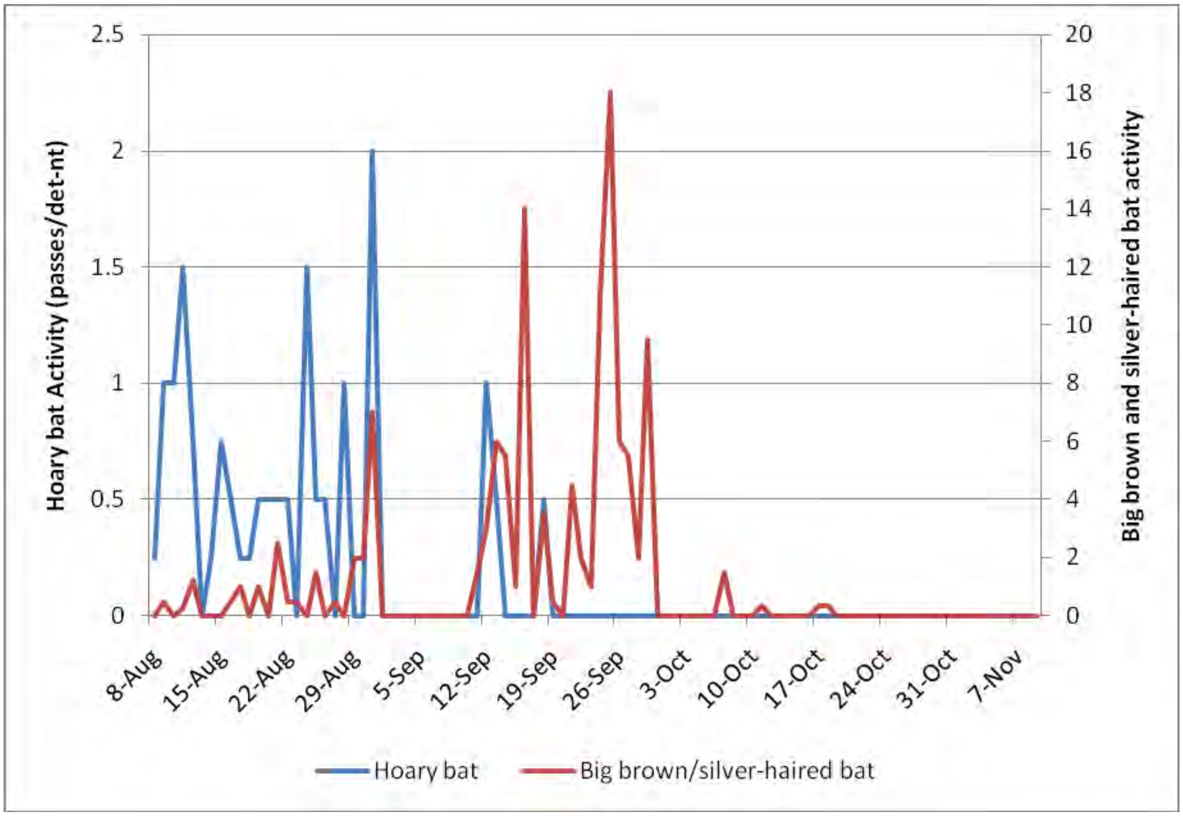


Figure 11. Nightly activity by hoary bats and the big brown/silver-haired bat group.

Greater Sage-Grouse Displacement Study

A total of 140 plots (70 at proposed turbine locations and 70 at the reference area) were set-up during November of 2008. GPS locations were taken of the center point of the plots and the plots were cleared of pellets to initiate the study.

A summary report will be prepared following the fall 2009 survey, which will describe the methods in detail, contain a map showing the locations of all plots, and summarize the mean number of pellet groups per plot for each season.

A before-after control impact analysis will be conducted. Differences in pellet density from the pre-construction period to the post-construction period will be compared between the wind turbine site and the reference site. Statistical comparisons of 95 percent confidence limits of these differences will be used to evaluate potential displacement effects.

Prairie Dog Town Mapping

A partial prairie dog town mapping effort was conducted at the Project by E&E (Figure 6). However, the total area covered is unknown. Additional mapping efforts are planned to adequately map the locations of all prairie dog towns within the Project.

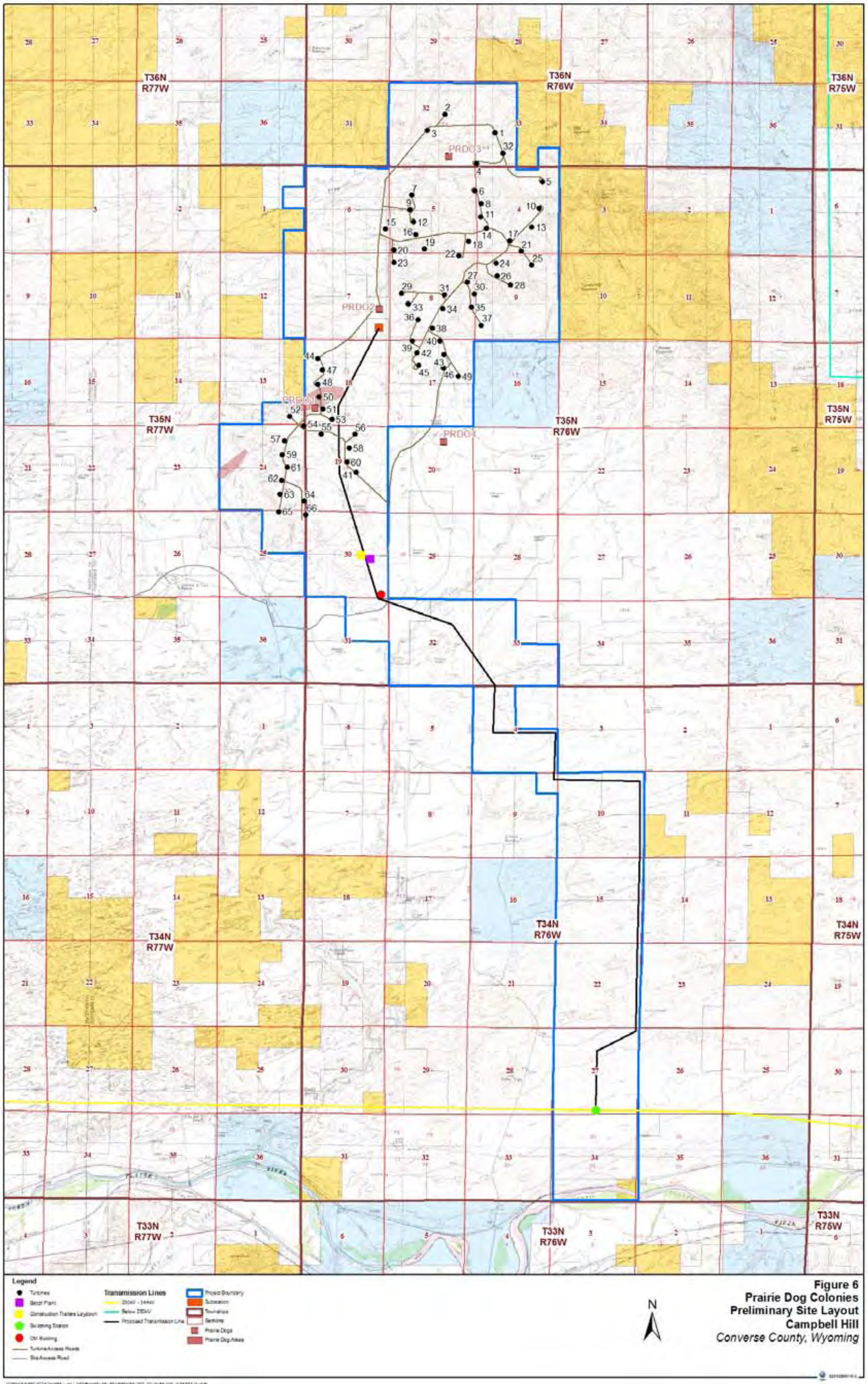


Figure 6
Prairie Dog Colonies
Preliminary Site Layout
Campbell Hill
Converse County, Wyoming

DISCUSSION

Fixed-Point Bird Use Surveys

The results presented above are for the fall season only and additional bird use surveys are being conducted and are proposed. Many of the surveys, such as fixed-point bird use surveys, are designed to be conducted for one full year. Wildlife use may vary greatly by season, thus a wind-energy facility may have low use during one season, but have high use during another. Because of this, rigorous impact assessments are generally based on at least one full year of surveys.

Raptor Use Comparisons
The fall mean raptor use at the Project (1.12 birds/20-min survey) was compared with other wind-energy facilities that implemented similar protocols and had data for the fall season. Similar studies were conducted at 38 other wind-energy facilities. Mean raptor use for the fall season at these wind-energy facilities ranged from 0.10 birds/20-min survey at the San Gorgonio wind-energy facility in California to 3.18 birds/20-min survey at the Diablo Winds facility, also in California (Figure 7). Fall mean raptor use at the Project is within the range of fall raptor use reported for other wind resource areas.

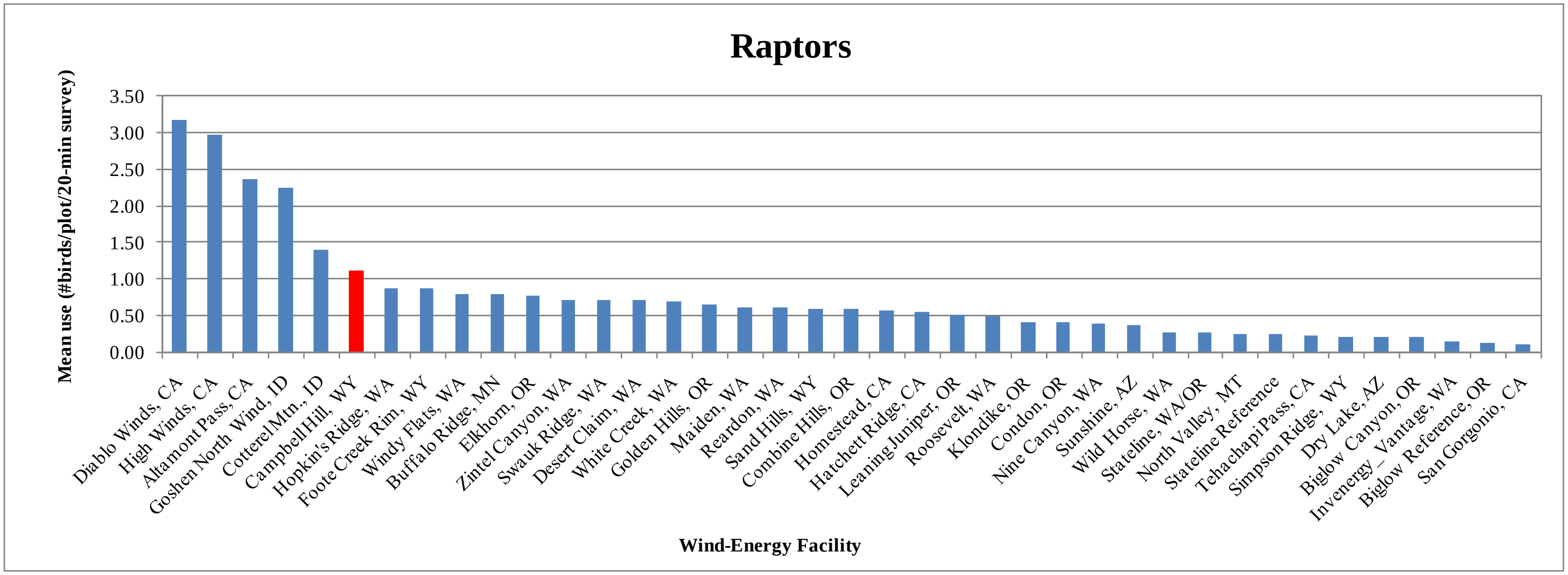


Figure 7. Comparison of fall raptor use annually between the Project area and other US wind-energy facilities.

Data from the following sources:

Campbell Hill, WY	This study.				
Diablo Winds, CA	WEST 2006a	Golden Hills, OR	Jeffrey et al. 2008	Sunshine, AZ	WEST and the CPRS 2006
High Winds, CA	Kerlinger et al. 2005	Maiden, WA	Erickson et al. 2002b	Wild Horse, WA	Erickson et al. 2003b
Altamont Pass, CA	Erickson et al. 2002b	Reardon, WA	WEST 2005b	Stateline, WA/OR	Erickson et al. 2002b
Cotterel Mtn., ID	Cooper et al. 2004	Sand Hills, WY	Johnson et al. 2006	North Valley, MT	WEST 2006c
Hopkin's Ridge, WA	Young et al. 2003a	Combine Hills, OR	Young et al. 2003c	Stateline Reference	URS et al. 2001
Foote Creek Rim, WY	Erickson et al. 2002b	Homestead, CA	WEST et al. 2007	Tehachapi Pass, CA	Erickson et al. 2002b
Windy Flats, WA	Johnson et al. 2007	Hatchet Ridge, CA	Young et al. 2007a	Simpson Ridge, WY	Johnson et al. 2000a
Buffalo Ridge, MN	Erickson et al. 2002b	Leaning Juniper, OR	NWC and WEST 2005b	Dry Lake, AZ	Young et al. 2007b
Elkhorn, OR	WEST 2005a	Roosevelt, WA	NWC and WEST 2004	Biglow Canyon, OR	WEST 2005c
Zintel Canyon, WA	Erickson et al. 2002a	Klondike, OR	Johnson et al. 2002	Invenergy_Vantage, WA	WEST 2007
Swauk Ridge, WA	Erickson et al. 2003a	Condon, OR	Erickson et al. 2002b	Biglow Reference, OR	WEST 2005c
Desert Claim, WA	Young et al. 2003b	Nine Canyon, WA	Erickson et al. 2001	San Gorgonio, CA	Erickson et al. 2002b
White Creek, WA	NWC and WEST 2005a				

Spatial Use

The fall raptor use survey data was evaluated spatially for identification of areas of higher use. While there are several north-south oriented ridgelines in the Project area, no concentrations of raptor use along these ridges were evident from the fall data. The areas of highest raptor use were found near bird use points 45, 49, and 36, which are not located near areas of abrupt topographic change relative to the overall topography of the Project (see Figure 2). Additionally, bird use points 45 and 49 were not visited seven times throughout the fall season (three and four visits, respectively) and as a result, raptor use estimates for these points may be inflated relative to use estimates from the other points. It is suspected that the prevailing winds at the site in relation to the dominant topographic features do not create conditions conducive to concentrating raptor use or movement.

Exposure Indices

Exposure index analyses may provide insight into what species might be the most likely turbine casualties. The index considers relative probability of exposure based on abundance, proportion of daily activity spent flying, and proportion of flight height of each species within the zone of risk for turbines likely to be used at the wind-energy facility. For the Project, the raptor species with the highest exposure index was the golden eagle, which was ranked third out of all species (Table 5). The exposure index analysis is based on observations of birds during the daylight period and does not take into consideration behavior other than flight characteristics. It also does not take into consideration habitat selection, seasonal variation in bird activity, the ability to detect and avoid turbines, and other factors that may vary among species and influence likelihood of turbine collision. For these reasons, the actual risk for some species may be lower or higher than indicated by this index.

Table 5. Relative exposure index and flight characteristics by species during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within ZOR based on initial obs	Exposure Index	% Within ZOR at anytime
horned lark	238	9.10	96.2	36.6	3.21	36.5
McCown's longspur	12	0.31	100	54.8	0.17	54.8
golden eagle	28	0.41	97.1	39.4	0.16	39.4
Brewer's blackbird	2	0.23	100	52.6	0.12	52.6
Lapland longspur	5	0.18	100	52.4	0.10	52.4
turkey vulture	4	0.06	100	100	0.06	100
rough-legged hawk	11	0.14	92.3	41.7	0.05	41.7
northern harrier	10	0.14	90.9	30.0	0.04	30.0
prairie falcon	9	0.11	100	33.3	0.04	22.2
chestnut-collared longspur	5	0.11	100	33.3	0.04	33.3
American kestrel	4	0.06	100	60.0	0.04	60.0
barn swallow	2	0.10	100	25.0	0.02	25.0
ferruginous hawk	5	0.06	100	40.0	0.02	40.0
Merlin	5	0.06	100	40.0	0.02	40.0

Table 5 (*continued*). Relative exposure index and flight characteristics by species during fall fixed-point bird use surveys at the Project area, September 9 – November 5, 2008.

Species	# Groups Flying	Overall Mean Use	% Flying	% Flying within ZOR based on initial obs	Exposure Index	% Within ZOR at anytime
unidentified falcon	3	0.04	100	66.7	0.02	66.7
red-tailed hawk	2	0.04	66.7	50.0	0.01	50.0
peregrine falcon	1	0.01	100	100	0.01	100
sandhill crane	1	0.50	100	0	0	0
western meadowlark	10	0.25	51.1	0	0	0
rock wren	5	0.11	37.5	0	0	0
vesper sparrow	1	0.05	16.7	0	0	0
Brewer's sparrow	1	0.04	33.3	0	0	0
unidentified buteo	3	0.04	100	0	0	0
black-billed magpie	8	0.02	92.3	0	0	0
sage thrasher	0	0.02	0	0	0	0
sharp-shinned hawk	2	0.02	100	0	0	0
American pipit	1	0.01	100	0	0	0
hairy woodpecker	1	0.01	100	0	0	0
mourning dove	1	0.01	100	0	0	0
yellow-rumped warbler	1	0.01	100	0	0	0
American crow	1	0	100	100	0	100
Say's phoebe	1	0	100	0	0	0

Raptor Nest Searches

Raptor Nest Density Comparisons

The estimate of nest density for the Project (0.44 nests/mi^2) was compared to estimates of nest densities from other wind projects where the data is public information (Table 6). However, comparisons are difficult because generally only active nest densities are reported. If it is assumed that all nests at the Project were active, a very unlikely scenario, the estimate of raptor nest density falls within the range of active nest density estimates reported at the other wind resource areas (Table 6).

For the few projects that have density information for all nests, the density at the Project (0.44) is higher than reported for Seven Mile Hill in Wyoming (0.16) but lower than reported for Cedar Creek in Colorado (1.19) and Desert Claim in Washington (0.55). The estimate of active nest density at three projects was approximately equal to or greater than the density estimate of all nests at the Project (Table 6). With the current data for the Project, an active nest density estimate cannot be calculated, but it is extremely unlikely that every nest identified at the Project is active in a given year based on the proximity of nests to one another. It is expected that active

nest density for the Project would be on the low end of the scale of other wind resource areas studied.

Table 6. Comparison of raptor nest densities between the Project area and other US Wind Energy Facilities.

Location	Raptor Nest Density (#/mi^2) Active Nests	Inactive Nests	All Nests
Proposed Campbell Hill Site, Wyoming	-	-	0.44
Seven Mile Hill, Wyoming	0.05	0.11	0.16
Foote Creek Rim, Wyoming	0.19	-	-
Simpson Ridge, Wyoming	0.13	-	-
Morton Pass, Wyoming	0.08	-	-
Cedar Creek, Colorado	0.56	0.62	1.19
Ponnequin, Colorado	0.06	-	-
Golden Hills, Oregon	0.25	-	-
Biglow, Oregon	0.15	-	-
Klondike III, Oregon	0.16	-	-
Leaning Juniper, Oregon	0.41	-	-
Stateline, Oregon-Washington	0.21	-	-
Nine Canyon, Washington	0.03	-	-
Zintel Canyon, Washington	0.08	-	-
Buffalo Ridge, Minnesota	0.15	-	-
Klickitat County, Washington	0.12	-	-
Combine Hills, Oregon	0.24	-	-
Columbia Hills, Washington	0.30	-	-
Hopkins Ridge, Washington	0.43	-	-
Maiden, Washington	0.18	-	-
Wild Horse, Washington	0.16	-	-
Kittitas Valley, Washington	0.09	-	-
Desert Claim, Washington	0.34	0.21	0.55

Data from the following sources:

Seven Mile Hill, WY	Johnson et al. 2008	Klondike III, OR	Mabee et al. 2005	Combine Hills, OR	Young et al. 2003c
Foote Creek Rim, WY	Johnson et al. 2000b	Leaning Juniper, OR	NWC and WEST 2005b	Columbia Hills, WA	BPA 1995
Simpson Ridge, WY	Johnson et al. 2000b	Stateline, OR/WA	Erickson et al. 2002b	Hopkins Ridge, WA	Young et al. 2003a
Morton Pass, WY	Johnson et al. 2000b	Nine Canyon, WA	Erickson et al. 2002b	Maiden, WA	Erickson et al. 2002b
Cedar Creek, CO	WEST 2006b	Zintel Canyon, WA	Erickson et al. 2002a	Wild Horse, WA	Erickson et al. 2003b
Ponnequin, CO	Kerlinger et al. 2000	Buffalo Ridge, MN	Erickson et al. 2002b	Kittitas Valley, WA	Erickson et al. 2003a
Golden Hills, OR	Jeffrey et al. 2008	Klickitat County, WA	Johnson et al. 2003	Desert Claim, WA	Young et al. 2003b
Biglow, OR	WEST 2005c				

Bat Acoustical Surveys

Potential Impacts

Assessing the potential impacts of wind energy development to bats at the Project is complicated by our current lack of understanding of why bats die at wind turbines (Kunz et al. 2007b; Baerwald et al. 2008), combined with the inherent difficulties of monitoring elusive, night-flying

animals (O'Shea et al. 2003). To date, monitoring studies of wind projects suggest that a) migratory tree-roosting species (eastern red, hoary, and silver-haired bats) comprise almost 75% of reported bats killed, b) the majority of fatalities occur during the post-breeding or fall migration season (roughly August and September), and c) the highest reported fatalities occur at wind facilities located along forested ridge tops in the eastern U.S. (Arnett et al. 2008, Gruver 2002, Johnson et al. 2003, Kunz et al. 2007b), although recent studies in agricultural regions of Iowa and Alberta, Canada, report relatively high fatalities as well (Jain 2005, Baerwald 2006).

Some studies of wind projects have recorded both Anabat detections per night and bat mortality (Table 6). The number of bat calls per night as determined from bat detectors shows a rough correlation with bat mortality, but may be misleading because effort, timing of sampling, species recorded, and detector settings (equipment and locations) varies among studies (Kunz et al. 2007*b*). Thus, our best available estimate of mortality levels at a proposed wind project involves evaluation of our on-site bat acoustic data in terms of activity levels, seasonal variation, species composition, and topographic features of the project area.

Table 6. Wind-energy facilities in the U.S. with both pre-construction Anabat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007*b*).

Wind-Energy Facility	Activity (#/detector night)	Mortality (bats/turbine/year)	Reference
Campbell Hill, WY	*2.03*		*This study*
Foote Creek Rim, WY	2.2	1.3	Gruver 2002
Buffalo Ridge, MN	2.1	2.2	Johnson et al 2004
Buffalo Mountain, TN	23.7	20.8	Fiedler 2004
Top of Iowa, IA	34.9	10.2	Koford et al. 2005
Mountaineer, WV	38.3	38	Arnett et al. 2005

Activity

Bat activity within the Project (mean = 2.03 bat passes per detector-night) was relatively low compared to that observed at facilities in Minnesota and Wyoming, where bat mortality was low, but it was much lower than activity recorded at sites in West Virginia and Tennessee and Iowa, where bat mortality rates were high (Table 6). Thus, based on the presumed relationship between pre-construction bat activity and post-construction fatalities, we expect bat mortality rates at the Ptoject to be similar to the 2.2 bat fatalities/turbine/year reported at Buffalo Ridge, Minnesota, but much lower than the 20.8 fatalities/turbine/year reported at Buffalo Mountain, Tennessee.

Spatial Variation

The Project does not contain topographic features that are likely to funnel migrating bats, and is lacking large tracts of forest cover, unlike high-mortality sites in the eastern U.S. However, the relatively large numbers of bat fatalities recently reported in northern Iowa (Jain 2005) and

southwestern Alberta (Baerwald 2006) indicate that an open landscape is no guarantee of low mortality. Based on the topography of the Project, we expect the majority of bat mortalities to be individuals migrating through the area.

Temporal Variation

Activity during August was modest and appears to have contained the bulk of the hoary bat movement (Figure 11). The number of bat calls detected per night at the Project was highest during September, with activity peaks on September 14 and September 24. Activity may represent movement of migrating bats through the area, which may explain the greater number of low-frequency bats at this time. Activity by hoary bats also peaked on August 22, suggesting migration of this species through the area. After September 30, activity was very low, indicating that most bats had left the area for winter hibernacula or warmer climates.

Fatality studies of bats at wind projects in the US have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005; Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007*b*). Based on the available data, it is expected that bat mortality at the Project will be highest in August and September.

Species Composition

Of the 14 species of bat that may occur in the study area, seven are known fatalities at wind-energy facilities (Table 1). Acoustic bat surveys were unable to determine bat species present in the study area (except for hoary bats), but they were able to distinguish high-frequency from low-frequency species. Fifty-seven percent of passes were by high-frequency bats, suggesting higher relative abundance of species such as *Myotis* sp. With the exception of station Rock Outcrop, bat passes by low-frequency species outnumbered those by high-frequency species. At elevated stations, all but one call was from a low-frequency species, which most likely reflects different foraging patterns among species. Many of the low-frequency species likely to be present at the Project (e.g., hoary, silver-haired, and big brown bat) tend to forage at higher altitudes than most high-frequency species due to their wing morphology and echolocation call structure (Norberg and Rayner 1987).

High-frequency species were most abundant in September, whereas low-frequency species were more common in August and October. This change in species composition probably reflects movement of high-frequency species out of the area, traveling to winter hibernacula. The greater proportion of low-frequency species in August may indicate movement of these species through the area at this time. Hoary bats made up 21% of all low-frequency passes, and were most active in late August, suggesting fall migration through the area.

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APPENDIX H

Wildlife Mitigation/Monitoring Plan, Campbell Hill Windpower Project, Converse County, Wyoming

Wildlife Mitigation/Monitoring Plan

Campbell Hill Windpower Project

Converse County, Wyoming

Prepared for:

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Prepared by:

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December 30, 2008

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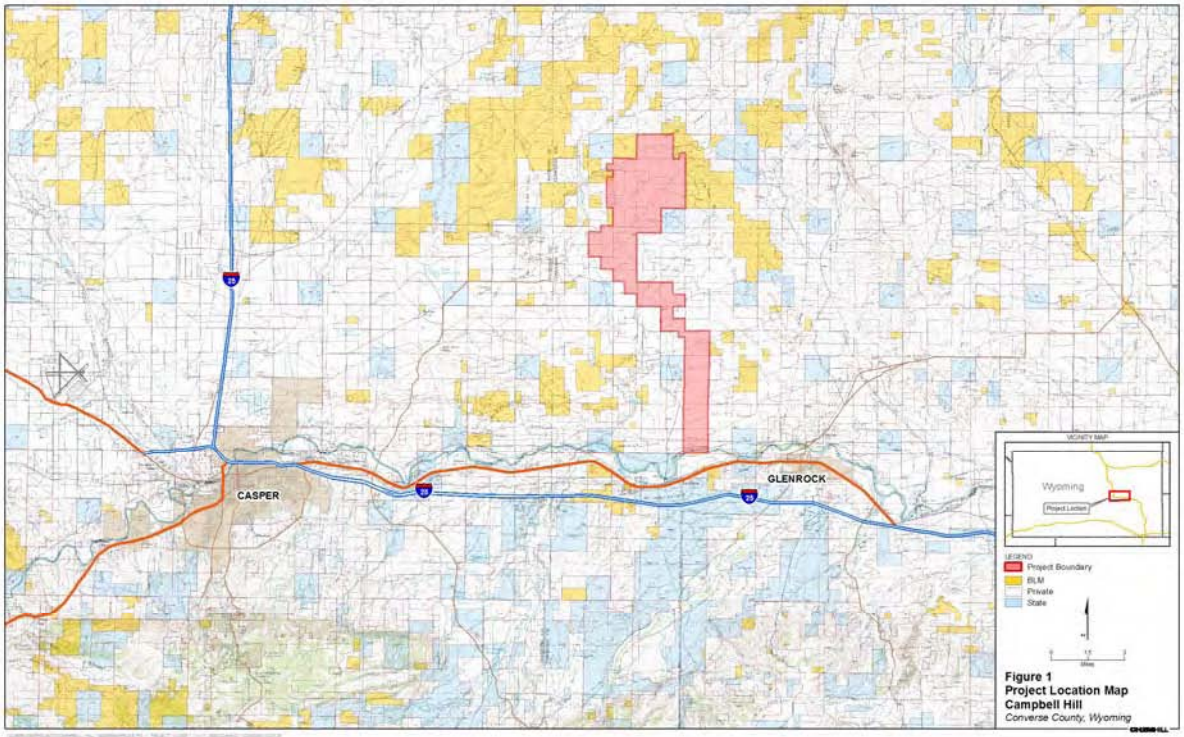
INTRODUCTION AND BACKGROUND

Three Buttes Windpower, LLC, a subsidiary of Duke Energy, is in the process of developing a wind energy facility of 99 megawatts (MW) in Converse County, Wyoming. The Campbell Hill Windpower Project (Project) is located northeast of Casper, Wyoming (Figure 1). This Wildlife Mitigation/Monitoring Plan outlines mitigation measures, the protocols to monitor wildlife impacts and the measures to meet compliance requirements during construction and operation of the Project.

The proposed Project is a 99-MW wind energy generation facility to be fully developed by Three Buttes and is presented in Figure 1. The Project and transmission line will be constructed entirely on private land, leased by Three Buttes. The wind farm is comprised of approximately 10,480 acres and the area leased to site the transmission line is approximately 4,400 acres. The Project layout and transmission line will be sited in response to biological and geotechnical considerations in coordination with wind resource potential. Three Buttes plans to use 66 GE 1.5 MW sle model wind turbines for a nameplate capacity of 99 MW. Three Buttes plans to begin construction in the first quarter of 2009 and have the site operational by the fourth quarter of 2009. A maximum construction workforce of approximately 129 is anticipated in July 2009.

Migratory birds, specifically raptors, were identified as a resource of concern in relation to the Project. Three Buttes, in coordination with the U.S. Fish and Wildlife Service (USFWS), developed a mitigation plan to address migratory bird concerns related to the proposed Project. The raptor nest mitigation plan includes setbacks from nests, nesting season timing restrictions for construction activities, nest relocations, and construction of artificial nest platforms.

Monitoring of the Project includes estimating avian use and movements, golden eagle observations, raptor nest surveys, active raptor nest monitoring, avian and bat collision mortality, estimating displacement of greater sage-grouse, greater sage-grouse lek counts, prairie dog town mapping, and incidental wildlife observations. The protocol focuses on the year of construction and post construction periods. The scope and duration of the monitoring program were developed to be consistent and within the range of monitoring programs that have or will be conducted at other wind projects in the western United States.



RAPTOR NEST MITIGATION PLAN

Three Buttes is committed to working with the USFWS to minimize impacts to wildlife resources in and near the Project area. Biologists from Three Buttes, ICF Jones & Stokes (J&S; formerly Thunderbird Wildlife Consulting) and Western EcoSystems Technologies, Inc. (WEST) have developed the following mitigation plan to avoid, minimize, or mitigate impacts to nesting raptors in and near the Project. The following plan incorporates input from the USFWS.

Three Buttes is committed to minimizing impacts to wildlife and plans to implement the following raptor nest mitigation plan for the proposed Project. All efforts will be made not to destroy any of the identified raptor nests (USFWS Migratory Bird Permit Memorandum [USFWS 2003]), but at the same time it is Three Buttes intent to minimize overall risk and exposure of nesting raptors to the proposed Project by facilitating movement of nesting raptors away from the immediate Project.

The raptor nest mitigation plan includes setbacks of project infrastructure and construction activities from nests, nesting season timing restrictions for construction activities, nest relocations, and construction of artificial nest platforms. Proposed mitigation responses described below were developed in conjunction with an on-site visit and a viewshed analysis, which were used to maximize line-of-sight between original and new nest locations and minimize line-of-sight between nests and planned disturbance and infrastructure. Each species' biology is considered and proposed relocations are based on the successful implementation of similar proposals developed for numerous raptor mitigation projects dealing with the same species in similar habitats for energy projects occurring in northeast Wyoming.

To minimize potential impacts to known nest sites, Three Buttes proposes to honor a minimum setback for wind turbine generators (WTG) of 0.5 mile (mi) from all known raptor nests with the exception of those nests proposed for replacement or relocation in this document. Nest relocation sites will be > 1 mi from all WTGs and appurtenant Project structures. Construction activities near existing and new or previously undocumented nests that are not relocated will occur in accordance with the nesting season restrictions presented in Table 1, with the exception of one nest that is out of line of sight of construction activities.

Table 1. Proposed disturbance-free dates and buffers for raptors[1].

Species	Disturbance-Free Days	Disturbance-Free Buffer
Ferruginous Hawk	April 1-July 31	1.0 mi
Golden Eagle	February 15-August 15	0.5 mi

[1]Adapted from Wyoming Game and Fish (Appendix A)

A total of 28 nests (Table 2, Figure 2) were documented in and near the Project area during 2007 and 2008 by Ecology and Environment (E&E). During ground surveys conducted on December 18, 2008, WEST confirmed the location of several nests that were originally identified during fixed-wing aerial searches by E&E on November 18, 2008. During this effort, an additional nest was identified near nest #16, now identified as nest #16a and #16b bringing the total number of nests identified to 29. Four ferruginous hawk nests (Nests 2, 3, 4, and 6) that are currently known to be near or among the turbine arrays are proposed for replacement or relocation in ground settings similar to their original sites, but beyond the buffer distances recommended by the USFWS. One additional great horned owl nest (Nest 11), located approximately 0.25 mi from the primary access road leading to the Project, is proposed for relocation to an artificial nest structure approximately 0.9 mi from the current nest site. The installation of artificial nest structures (ANS) near an existing nest (Nest 7) and a former nest site (Nest 8) is proposed. All other nests will be left in place, with relocation of the proposed infrastructure to achieve the recommended spatial buffers near nest sites.

Gwyn McKee, with J&S, has applied for the necessary federal and state permits to relocate nests 2, 3, 4, 6, and 11, and will supervise the nest relocations. If permits are obtained prior to the initiation of nesting activity at a given site the nests and/or nest material will be relocated. However, if permits cannot be obtained prior to nest initiation, or biologically appropriate dates, the nests will be destroyed and new nests will be constructed, as described in detail below.

Table 2 identifies the nests discovered in and near the Project, and presents Three Buttes' response to avoid impact to each nest. Figure 2 presents a visual representation of the mitigation response for each nest. All response activities proposed by Three Buttes will be in association with increased monitoring activities to evaluate raptor response. The USFWS will be contacted immediately for guidance if any of the proposed mitigation measures for active nest sites appear to be ineffective, or if any issues of concern are identified during the 2009 monitoring efforts.

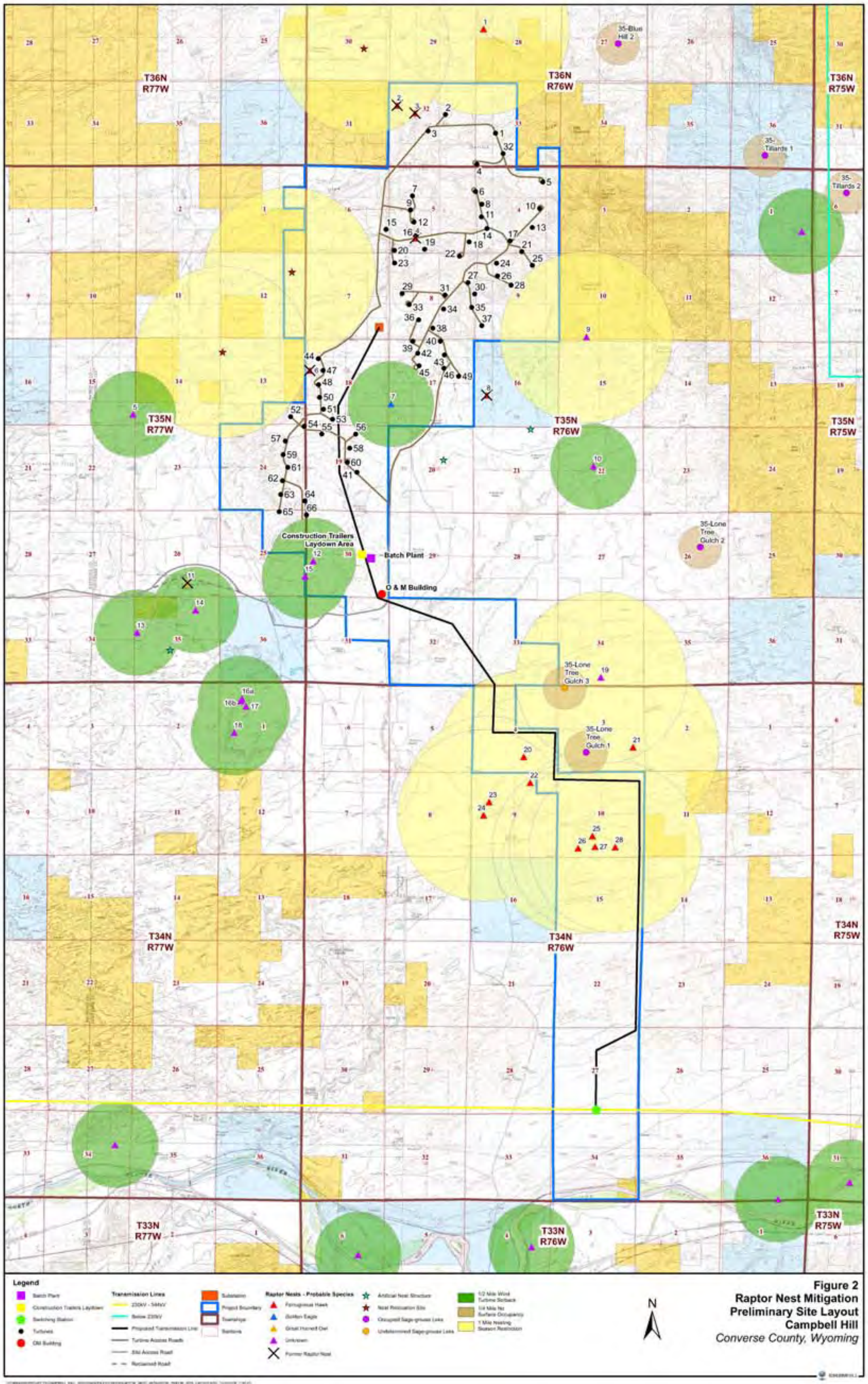
Table 2. Proposed mitigation/avoidance response for raptor nests in and near the Campbell Hill Windpower Project.

Nest #	Presumed Species	Condition	Nest Substrate	Mitigation/Avoidance Response
1	FEHA[1]	Fair	Ground	Remove WTG 1 to maintain 1.0 mi buffer
2	FEHA	Fair	Ground	Relocate nest > 1.0 mi from WTG, combining nest materials with Nest 3
3	FEHA	Poor/Fair	Ground	Relocate to Nest 2 relocation site > 1.0 mi from WTG, combining nest materials with Nest 2
4	FEHA	Good	Rock Outcrop	Relocate > 1.0 mi away from WTG
5	Unknown	Unknown	Unknown	No Impact
6	FEHA	Fair	Ground	Relocate > 1.0 mi away from WTG
7	GOEA[2]	Unknown	E&E designated Tree	Reroute road outside 0.5-mi buffer. Reroute T-line outside 0.5-mi buffer. Install platform SE of nest tree to provide alternate long-term nest site farther from WTG and within line-of-sight (LOS)
8	FEHA	Good	Windmill	Nest gone. Install ANS > 1.0 mi from WTGs
9	FEHA	Fair/Good	Ground	Relocate WTGs 25, 32, and 35 to maintain 1.0 mi buffer
10	Unknown	Good	Tree	No Impact
11	GHOW[3]	Good	Tree	-Install ANS 0.5 mi from new road -Remove nest in January of 2009, prior to nesting -Reroute road north of this nest tree and reclaim existing road
12	Unknown	Unknown	Tree	Relocate WTG 66 outside 0.5 mi buffer
13	FEHA	Fair	Ground	No impact. Nest is 0.45 mi from access road and out of LOS
14	Unknown	Good	Tree	Reroute road 0.5 mi from nest
15	Unknown	Unknown	Utility Pole	Reroute road 0.5 mi from nest
16a	FEHA	Fair/Good	Rock Outcrop	No Impact
16b	FEHA	Fair	Ground	No Impact
17	Unknown	Unknown	Unknown	No Impact
18	Unknown	Unknown	Unknown	No Impact
19	FEHA	Good	Ground	No Impact
20	FEHA	Good	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active

Table 2 (*continued*). Proposed mitigation/avoidance response for raptor nests in and near the Campbell Hill Wind Resource Area.

Nest #	Presumed Species	Condition	Nest Substrate	Response
21	FEHA	Fair	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active
22	FEHA	Fair	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active
23	FEHA	Fair	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active.
24	FEHA	Fair	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active
25	FEHA	Good	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active.
26	FEHA	Fair	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active.
27	FEHA	Poor	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active.
28	FEHA	Poor/Fair	Ground	Reroute T-line to maximize distance to nest; honor nesting season restriction if active.

[1]FEHA (ferruginous hawk)
[2]GOEA (golden eagle)
[3]GHOW (great-horned owl)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T33N
R75W
Construction Trailers
Laydown Area
Batch Plant
O & M Building
35-Blue Hill 2
35-Tillards 1
35-Tillards 2
35-Lone Tree Gulch 2
35-Lone Tree Gulch 3
35-Lone Tree Gulch 1
Legend
N
Figure 2
Raptor Nest Mitigation
Preliminary Site Layout
Campbell Hill
Converse County, Wyoming

Four ferruginous hawk nests are proposed for relocation to achieve the USFWS and WGFD recommended one-mi setback for No Surface Occupancy (NSO) and Disturbance Free areas for the WTGs. If approved, a USFWS Depredation Permit will be obtained for these efforts. These nests will be removed from their current locations prior to initiation of nesting activity. If relocation is not approved for these nest sites, the nest material will be destroyed and new nests will be constructed at alternate sites described below and presented in Figure 2. All four nests can be relocated or replaced again at a later date in response to data collected to understand activity patterns and territorial boundaries of nesting pairs.

Ferruginous Hawk (FEHA) Nests #2 and 3

These nests were classified as Poor to Fair condition in 2008 (Table 2), with little or no evidence (whitewash, feathers, prey remains, etc.) of recent use at either site.

- Material from both nest sites will be removed.
- If permitted, that material will be combined and placed at a single location on a knoll similar to their current settings (Figure 2).
- If not permitted, a single new nest will be constructed and placed on a knoll, as above.
- The single new location will be approximately 0.6-1.0 mi from, and potentially within view of one or both of the current nest sites.
- The proposed location will maintain a spatial buffer from Nest #1, in case that nest is in a different territory than Nests #2 and 3.
- The new location will be at least one mi from the nearest turbine to provide the USFWS recommended spatial buffer, should the site be active during construction.

FEHA Nest #4

Ferruginous hawks likely nested at this site in 2007, and the nest remains in good condition.

- Material from this nest site will be removed.
- If permitted, the nest material will be relocated to a prominent rocky knob approximately 1.25 mi southwest, and in view of the current nest site (Figure 2).
- If not permitted, a single new nest will be constructed and placed, as above.
- The new site will provide substrate similar to the current nest site.

FEHA Nest #6

This nest was in fair condition in 2008, with no evidence of recent use.

- Material from this nest site will be removed.
- If permitted, the nest material will be relocated to a knoll approximately one mi to the northwest (Figure 2).
- If not permitted, a single new nest will be constructed and placed, as above.
- The entire ridgeline in that direction maintains visibility between the current and proposed nest sites, while also providing a 1-mi buffer between the nest and Project infrastructure.

FEHA Nest #8

This nest was located on a dilapidated windmill, but the landowner recently removed the windmill due to its lack of use. The nest was in good condition and was classified as a ferruginous hawk nest based on the composition and structure of the nest material, and the apparent dominance of that species as far as raptor nesting efforts in the area.

- Three Buttes proposes to create an alternate ANS prior to initiation of nesting activities. The ANS would be located approximately 0.6 mi southeast and in view of the former nest site. The new location will provide a minimum buffer of one mi from all planned infrastructure (roads, turbines), while also maintaining buffers between other nests of unknown species in the area.

FEHA Nests # 20-28

Nine ferruginous hawk ground nests (#20-28) have been identified along the southern portion of the proposed transmission line corridor (Figure 2). Their 2008 conditions ranged from poor to good. Based on this species' nesting habitats in similar settings elsewhere in Wyoming, all nine nests could be in the same territory.

None of the nine nests will be physically impacted by construction due to the narrow (40 foot) ROW typically used for these structures. However, all nine nests are within one mi of the current ROW alignment, and several will be extremely close to, and in view of, the ROW.

The following plan has been developed for the nests in this group.

- Three Buttes has developed a ROW alignment that maximizes the distance to all nests in order to minimize potential impacts to nesting raptors and two nearby greater sage-grouse leks.
- The timing of construction within one mi of active nest site(s) will occur during the non-breeding season (prior to nest initiation or after fledging of young (approximately April 1 through July 31)).
- 2009 nest status will be determined with a monitor, and construction activity will be suspended within 1 mi of potentially active nesting pairs.
- If all nests within the one-mi buffer are inactive in 2009, no timing restrictions will apply during construction of the transmission line.

Golden Eagle Nest #7

Three Buttes has relocated all Project infrastructure outside the 0.5-mi setback for Nest #7, and will also create an alternate platform nest site prior to February 1 located approximately 0.75 mi southeast and in view of the current nest site. Both the existing nest and proposed ANS locations are within the same linear, active prairie dog colony, though the colony has not yet been fully mapped. The new location will provide an alternate nest site that will increase the distance from all construction activity and infrastructure while maintaining access to the current active prey base. Should golden eagles use the ANS after any new road construction has been completed in that proximity (i.e., during the 2010 breeding season or beyond) they would do so with existing infrastructure and regular disturbance in place, and no state or federal permits should be required for use of the road during operation of the wind farm.

GHOW 11, Unknown Species Nests 12, 13, 14, and 15

GHOW #11 is in good condition and is located approximately 10 meters south, and in view of an existing private road that was proposed as the primary access route for the Project area. Nest #12 is in good condition and approximately 0.6 mi north of the existing road. Nest #13 is in fair condition and is located nearly 0.5 mi south and out of line of sight of the road. Nest #14 is in good condition and is located approximately 0.4 mi from the existing road. Nest #15 is in good condition and is located approximately 0.5 mi north of the existing road. Nests 12 and 15 are in a draw that provides a partial visual barrier between the nest sites and the existing access road.

- Three Buttes modified their access road alignment to create a permanent 0.5-mi buffer between road traffic and Nests #12, 14, and 15 (Figure 2).
- The realigned road would remain within 0.25 mi of GHOW Nest #11; therefore, Three Buttes proposes to relocate GHOW Nest #11 in January of 2009 to an ANS located approximately 0.5 mi south of the nest site, out of LOS of the road.
- The original road segment near nest #11 will be closed and reclaimed to ensure one access road to the Project.
- Nest #13 is out of LOS of the road and no adverse impacts are anticipated..

Additional Nests

Numerous additional nests are also present in the Project area (Figure 2). Three Buttes proposes to follow USFWS disturbance-free dates and buffers (Table 1; Appendix A) for any raptor nests determined to be active in 2009 including those currently known, as well as those newly discovered during 2009 surveys.

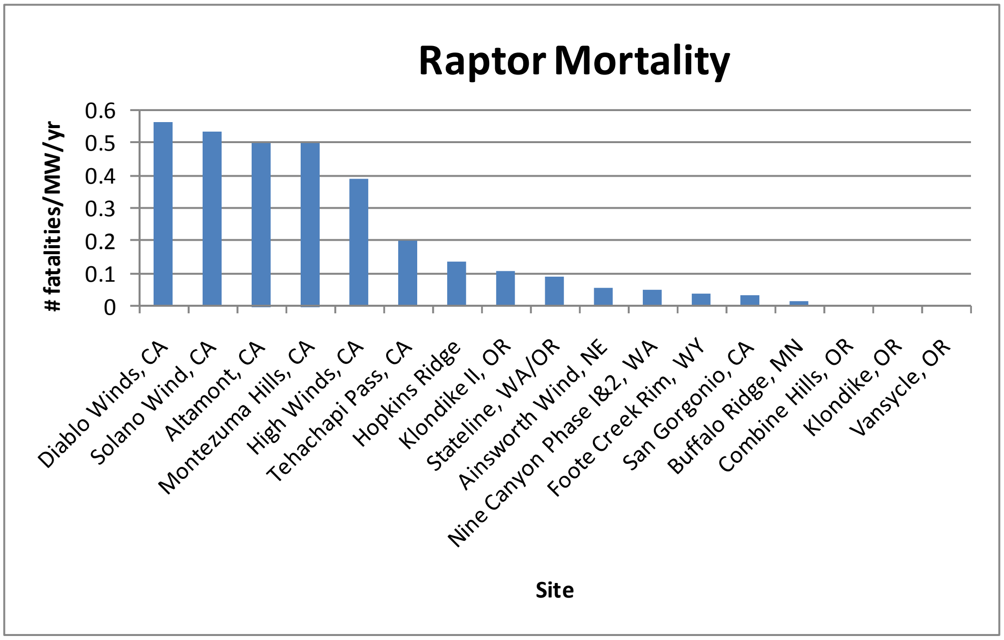
WEST will search for new nests and monitor all known raptor nest sites within the Project area during the 2009 breeding season (see monitoring plan) to enhance the database for those nests. This will allow for better Project management decisions and will contribute greatly to future mitigation needs if appropriate.

WILDLIFE MONITORING PLAN

Monitoring of the Project includes estimating avian use and movements, raptor nest surveys, active raptor nest monitoring, avian and bat collision mortality, estimating displacement of greater sage-grouse, greater sage-grouse lek surveys, prairie dog town mapping, and incidental observations. The protocol includes both the construction and operation periods. It should be considered flexible in responding as issues arise that may benefit from a change in sampling or study design based on review of findings by an established Technical Advisory Committee (TAC), an advisory group composed of representatives from state/federal agencies and representatives designated by Three Buttes. The scope and duration of the monitoring program were developed to be consistent and within the range of monitoring programs that have or will be conducted at other wind projects in the western United States.

The scope and need for further monitoring beyond Year 1 of operation of the Project will be based on a review by the TAC of the results of the first year of monitoring, results from other

regional projects, and other relevant information. For example, if the overall raptor fatality rates are within the range of mortality observed at projects considered relatively low and not at levels of concern, limited or no additional fatality monitoring may be recommended by the TAC and implemented by Three Buttes (Figure 3). If mortality of a sensitive species is considered high, the TAC may recommend additional studies to evaluate mortality during a specific season based on the results of the first year study and from other relevant information. The TAC will evaluate results and recommend adjustments to the monitoring strategy to ensure impacts are properly avoided or mitigated.



Data from the following sources:

Diablo Winds, CA	WEST 2006	Hopkins Ridge, WA	Young et al. 2007	San Gorgonio, CA	Anderson et al. 2005
Solano Wind, CA	Orloff and Flannery 1992	Klondike II, OR	NWC and WEST 2007	Buffalo Ridge, MN	Erickson et al. 2002
Altamont, CA	Orloff and Flannery 1992	Stateline, WA/OR	Erickson et al. 2004	Combine Hills, OR	Young et al. 2005
Montezuma Hills, CA	Howell and Noone 1992	Ainsworth Wind, NE	Derby et al. 2005	Klondike, OR	Johnson et al. 2003
High Winds, CA	Kerlinger et al. 2006	Nine Canyon Phases, WA	Erickson et al. 2005	Vansycle, OR	Erickson et al. 2000
Tehachapi Pass, CA	Anderson et al. 2005	Foote Creek Rim, WY	Erickson et al. 2002		

As part of the overall Project monitoring effort, wildlife casualties (fatalities or injured wildlife) found incidental to the monitoring study by wind Project personnel or others will be handled under the Wildlife Incident Reporting and Handling System (WIRHS) protocol described in this protocol (Appendix B). Casualties found by all personnel will be included in the overall dataset, and a fatality incident monitoring program will be ongoing for the life of the Project.

Monitoring Scope

The scope of the Wildlife Monitoring Plan includes:

- Fixed-Point Avian Use Monitoring – Monitoring of avian use and movement patterns will identify the seasonal and spatial use of the study area by birds, particularly raptors. The fixed-point avian use monitoring will be conducted during the year of construction and if necessary during subsequent years of operation of the Project, up to three years

post construction. This information will be used to describe avian use and movement patterns and will help to evaluate the effectiveness of mitigation measures and may facilitate identification of additional mitigation measures if necessary.

- Golden Eagle Observations – Monitoring of the golden eagle nest site #7 will provide additional information on the use and movements of golden eagles at this location. Two hour observation periods will occur on the same schedule as avian use surveys during the year of construction and subsequent years if deemed necessary, up to three years post construction. The information will be used to describe golden eagle use and movements, will be used to guide mitigation plans, will help to evaluate the effectiveness of mitigation measures and may identify additional mitigation measures, if necessary.

- Raptor Nest Monitoring – This monitoring effort will estimate the density, success, and productivity of active raptor nests during the year of construction and following construction of the Project. Active raptor nest densities will be estimated for the Project area and a two-mi buffer surrounding the Project area. Raptor nest success and productivity will be estimated for the Project area and two-mi buffer surrounding the Project. Monitoring will be conducted during the year of construction and Year 1 operation of the Project, and if deemed necessary, up to three years post construction. This information will be used to estimate raptor nest density, success, and productivity during the year of construction and following construction, will help to evaluate the effectiveness of mitigation measures, and may help identify additional mitigation measures if necessary.

  Another component to the raptor nest monitoring will be to band local raptors. Banding will provide a means of identifying local raptors in the event of a fatality due to operation of the Project. To the extent possible, all ferruginous hawk and golden eagle chicks within the Project area and two-mi buffer will be banded prior to fledging with coordination from the USFWS and WGFD. Banding will be conducted during the year of construction and Year 1 operation of the Project, and if deemed necessary, up to three years post construction.

- Avian and Bat Fatality Monitoring – The monitoring study will estimate the annual number of avian and bat fatalities attributable to wind turbine collisions from Project operations throughout the Year 1 operation of the Project, and if deemed necessary, up to three years post construction. This information will be used to determine whether projected impact levels for the Project are within acceptable ranges and are consistent with reported data from other wind projects in the region. The proposed monitoring study conforms to industry standard in the western U.S. and provides the WGFD and USFWS with good baseline data on avian and bat fatality rates at wind energy facilities in Wyoming.

- Greater Sage-grouse Displacement Studies – This monitoring effort will focus on determining whether turbines displace greater sage-grouse by comparing greater sage-grouse pellet densities near turbines with a suitable reference area before and after construction of the Project as well as conducting greater sage-grouse lek counts

according to WGFD recommendations. The greater sage-grouse pellet study will be conducted during the year of construction and Year 1 operation of the Project, and if deemed necessary, up to three years post construction. Only those turbines within suitable greater sage-grouse habitat (i.e., big sagebrush) will be sampled.

- Greater sage-grouse lek counts – These counts will focus on counts of leks in or within two mi of the Project during the year of construction and Year 1 of operation of the Project, and if deemed necessary, up to three years post construction. The survey focuses on visiting known leks from the ground and making count observations during the spring activity period.

- Prairie Dog Town Mapping – This effort will identify the location of prairie dog towns within/near the Project since prairie dog towns represent a potential prey source for raptors. The mapping effort will be conducted in the Winter/Spring of 2009. In addition to mapping, the status of prairie dog towns will be determined (i.e., active vs. inactive). The information will be used to identify potential prey sources for raptors and help guide mitigation plans and may identify additional mitigation measures, if necessary.

- Incidental Wildlife Observations – Incidental observations will provide use and occurrence information on wildlife species observed outside of specific surveys. The information may be used to identify additional monitoring or mitigation measures, if necessary.

- Technical Advisory Committee – A TAC consisting of USFWS, Wyoming Game and Fish Department (WGFD), and Three Buttes representatives will meet annually to review the technical approach to the monitoring studies and assess the results. Team members will work collaboratively to make recommendations if issues of concern are identified to ensure that they are adequately addressed. Meetings will be held each year after annual monitoring reports have been provided. Additional meetings will be scheduled as needed.

Fixed-Point Avian Use Monitoring

The objective of the fixed-point avian use monitoring is to estimate the temporal and spatial use of the general Project area by birds, and in particular raptors. Avian use survey data will consist of counts of birds observed within circular plots around fixed observation points following standard methods (Reynolds et al. 1980). Surveys will be conducted during the year of construction and if necessary during subsequent years of operation of the Project, up to three years post construction. Surveys will be conducted twice a month during January 2009 and then weekly for the rest of the winter season (February 1 to March 15, 2009). Surveys will also be conducted weekly during the spring season (March 16 to May 31, 2009). The date of surveys will need to be flexible in response to inclement weather. The total number of bird use survey visits proposed through spring of 2009 at the Project is 28 visits (including the visits already conducted in the fall and winter of 2008). The increase in visits from February 1 to March 15, 2009 may be used to help guide upcoming mitigation and construction plans.

If necessary per TAC recommendations, additional surveys will be conducted weekly during the fall and spring seasons and twice a month during the winter and summer seasons. The following seasons are defined for the fixed-point avian use monitoring: spring (March 15-May 31), summer (June 1 –August 31), fall (September 1 – November 15), and winter (November 16 – March 14). The date of surveys will need to be flexible in response to inclement weather.

A minimum of 12 survey plots will be surveyed that allow for comparison to the fall surveys conducted by E&E in 2008. Plots will also be placed near all raptor nest relocation sites and artificial nest structure (ANS) sites. Additional plots may be included to ensure that a variety of habitats and topography representative of the Project and the turbine locations will be sampled. Also, plots may be added to increase survey coverage outside of the proposed Project boundary to allow for experimental comparisons with “control” sites. Plots may need to be adjusted in the field in order to maximize viewsheds and to account for potential changes in land access. Efforts will be made to place the plots in areas containing maximum visibility. To the extent possible, all of the plots will be surveyed during each survey period.

Plots will be surveyed for 20 minutes (min) each survey day. All birds seen during each survey will be recorded and the estimated distance to each bird observed will be recorded to the nearest meter (~three feet [ft]; one meter [m]). An equal effort will be used for all plots. Perch locations and flight paths of large birds and other species of interest will be mapped on US Geological Survey (USGS) 1:24,000 topographic maps and given corresponding observation numbers. Detailed mapping of all ferruginous hawk and golden eagle observations will be conducted to help describe use by these species.

The behavior of each raptor/large bird observed and the habitat in which or over which the bird occurred will be recorded. Behavior categories recognized include perched (PE), soaring (SO), flapping (FL), flushed (FH), circle soaring (CS), hunting (HU), gliding (GL), and other (OT, noted in comments). Vegetation types within which or over which observations are made will also be recorded. Flight tracks and vegetation types (at first observation) will be uniquely identified on the data sheet. The flight direction of observed birds will also be recorded on the data sheet map. Approximate flight height above ground level (AGL) at first observation will be recorded to the nearest three ft (one m); the approximate lowest and highest flight heights observed will also be recorded. Any comments or unusual observations will be noted in the comments section. Locations of raptors, other large birds, and any species of interest seen will be recorded on the field maps, by observation number. The field maps will be prepared as portions of the USGS quadrangle, which include the survey plot.

Weather information, including temperature, wind speed, wind direction and cloud cover, will be recorded for each survey point. The date, start, and end time of observation period, plot number, species or best possible identification, number of individuals, sex and age class if possible, distance from plot center when first observed, closest distance, height (AGL), activity, and vegetation type(s) will be recorded.

Bird use surveys will be scheduled to cover all daylight hours. During a set of surveys, each plot will be visited once. To the extent practicable, each plot will be surveyed during a different time of day from the previous week to vary the time of day during which plots are surveyed and

distribute observations over all daylight periods throughout the study period. The survey schedule will require flexibility in response to adverse weather conditions and logistics.

By utilizing standardized methods, results from the Project can be compared to other wind-energy facilities where similar studies have been conducted and post-construction fatality data are available. The results of the surveys may also be used to identify broad scale changes in bird use and movements patterns following construction/operation of the Project and will help to evaluate the effectiveness of mitigation measures and may identify additional mitigation measures if necessary. However, the ability to detect changes in avian use patterns and movement may be limited by the amount of pre construction data available.

Golden Eagle Observations

The objective of the golden eagle observations is to better understand the spatial extent and use of the area surrounding golden eagle nest #7 (Figure 2), two hour observations will be made from a vantage point allowing maximum visibility surrounding the nest. Observations will occur following the same schedule proposed for avian use surveys. Observations will occur during the year of construction and subsequent years if deemed necessary, up to three years post construction. Observers will record detailed notes describing the activities of eagles (and other raptors) and will map perch locations and flight paths on USGS 1:24,000 scale topographic maps. This information will be used to describe golden eagle use and movements, may be used to guide mitigation plans, will help to evaluate the effectiveness of mitigation measures and may identify additional mitigation measures, if necessary.

Raptor Nest Monitoring

The objective of the raptor nest monitoring is to estimate active raptor nest densities, success and productivity within and near the Project. A secondary objective is to identify if any potential raptor mortality is from local birds. The raptor nest monitoring effort includes two annual active raptor nest searches, ground visits to determine the number of young fledged when possible, and banding of local raptors.

Raptor Nest Search

The objective of the raptor nest searches is to identify the distribution of nests and the number of active nests/nesting pairs in the area. Aerial raptor nest searches will be conducted within the Project area and a two-mi buffer. The reference area will be used in a before/after study and as a reference to nesting density for comparison post construction.

One survey for active nests will be conducted during late March, and a second survey will be conducted in late April. The initial set of surveys will be conducted the year of construction with an additional set of surveys conducted Year 1 of operation of the Project, and if deemed necessary, up to three years post construction. If a nest structure is observed, nest status, condition, and species of each nest will be recorded and coordinates will be obtained using a GPS unit. The number of occupied nests within the study area will be used to estimate relative

use of nesting species potentially affected by turbines. To the extent possible, active nests within two mi of the Project will be revisited to determine the number of young fledged.

Productivity estimates will be calculated as the total number of young fledged per active nest checked. The TAC will review the findings and address recommendations on additional monitoring or mitigation.

Banding of Local Raptors

The objective of banding raptors is to provide a means of identifying local ferruginous hawks and golden eagles in the event of a fatality. If possible, all ferruginous hawk and golden eagle chicks within the Project area and surrounding two-mi buffer will be banded prior to fledging with coordination from the USFWS and WGFD. Ferruginous hawk and golden eagle chicks will be banded the year of construction and Year 1 operation of the Project, and if deemed necessary, up to three years post construction. Additional species may be banded opportunistically and ancillary to other objectives.

Avian and Bat Fatality Study

The primary objective of the fatality monitoring study is to estimate avian and bat mortality at the Project and determine whether the estimated mortality is lower, similar, or higher than the average mortality observed at other regional projects. The monitoring study will begin after all the turbines in each phase are fully operational. The study will be conducted for one year followed by a TAC review of findings and recommendations on additional monitoring.

Wind Industry Standards for Avian and Bat Mortality Monitoring

Several states have written guidelines regarding the recommended level of effort for post-construction fatality monitoring. In California's recently released statewide guidelines, two years of fatality monitoring with a search interval of 14 days have been recommended. In Washington, one year of fatality monitoring is recommended, but the search intervals have not been explicitly determined. However, most studies conducted to date in Washington used 14 to 28-day search intervals at a sample of turbines for a period of one year. In Arizona's guidelines, three years of post-construction monitoring is recommended, but details regarding search interval and sample sizes are not given. In Michigan, it is recommended that an analysis be conducted to indicate "whether a post construction wildlife mortality study will be conducted and, if not, the reasons why such a study does not need to be conducted." In Pennsylvania, it is recommended that daily searches be conducted at a minimum of 10 turbines from April 1 to November 15 for two years. In Vermont's draft guidelines, it is recommended a minimum of three years of rigorous post-construction bird and bat mortality surveys be conducted, but the guidelines do not specify sample sizes or search intervals.

In some other cases where there are no guidelines, state permitting agencies have typically required a certain level of monitoring. For example, in all projects permitted under the Oregon Energy Facility Siting Council, and most permitted at the County level, one to two years of standardized fatality monitoring have been required, at a sample of anywhere from 25 percent to 100 percent of the turbines, depending on project size, with search intervals typically in the 14-

to 28-day range. In most guidelines, there is a qualifier that reduced effort may be justified if there is sufficient existing information from nearby projects to justify the reduction.

Wyoming currently does not have established, state-specific guidelines or rules specifically addressing post-construction avian and wildlife mortality monitoring at wind energy facilities. However, if a project is under the statutory jurisdiction of the Wyoming Industrial Siting and Information Act (ISA), the Wyoming Game and Fish Department is allowed to provide comment on the ISA application. The scope and duration of this monitoring program was developed to be consistent and within the range of monitoring programs that have or will be conducted at other wind projects in the western United States.

The methods for estimating avian and bat mortality from the Project conforms with industry standard in the western U.S., provides much more accurate and less variable estimates of avian and bat mortality, especially during migration seasons, due to increased frequency of surveys, and will provide the WGFD and USFWS with good baseline data on avian and bat fatality rates at wind energy facilities in Wyoming.

Definitions and Field Methods

All casualties located within areas surveyed, regardless of species, will be recorded and a cause of death determined, if possible, based on field inspection of the carcass. Total number of avian and bat carcasses will be estimated by adjusting for search frequency, removal bias (length of stay in the field), and searcher efficiency bias (percent found). For carcasses where the cause of death is not apparent, the assumption that the fatality is a wind turbine or met tower collision casualty will be made for the analysis. This approach may lead to an overestimate of the true number of wind farm-related fatalities. Most wind farm monitoring studies have used this conservative approach because of the relative high costs associated with obtaining accurate estimates of natural or reference mortality (Johnson et al. 2000). A second low-range estimate will be calculated by eliminating fatalities where cause of death is not considered trauma due to collision.

Seasons

Seasons will be based roughly on the calendar seasons. For analysis purposes and to help with categorizing impacts (e.g., migratory birds) a spring and fall migration period and summer breeding season are also defined.

The following dates will be used for defining seasons in the study:

Season	Dates
Spring	March 16 – June 15
Spring Migration	March 16 – May 15
Summer	June 16 - September 15
Breeding Season	May 16 – August 15
Fall	September 15 – December 15
Fall Migration	August 1 - October 31
Winter	December 16 - March 15

These dates are used for analysis purposes only and may not cover all potential migrants or breeding residents in the Project area. The dates of fatality monitoring seasons differ from avian use seasons to encompass the expected increase in bat use and migration timing at the Project.

Search Plot and Sample Size

The site is proposed to have 66 turbines and two permanent met towers. One-third (22) of the turbines and all met towers will be sampled during the study. The 22 turbines will be searched once every 28 days throughout the year, and every seven days during the spring and fall migration seasons, although reduced effort may be justified. Turbines will be selected for sampling using a systematic design with a random start. In this fashion, the search effort is spread throughout the entire Project.

Turbine search plots will be 160 m on a side (80 m from the turbine) and centered on the turbine. The survey plot of the met towers will be 120 m on a side (60 m from the tower), also roughly equivalent to the height of the tower.

Scheduling/Timing

Standardized searches of 22 selected turbines and the met towers will be conducted once every 4-week (28 day) period. During the spring and fall migration periods, the search effort will be increased to once a week. There will be 28 searches for the 22 turbine plots (plus 2 met towers), although reduced effort may be justified.

Standardized Carcass Searches

The objective of the standardized carcasses searches is to search the wind Project systematically for avian and bat casualties that are attributable to collision with Project facilities. Personnel trained in proper search techniques will conduct the carcass searches. A searcher will walk at a rate of approximately 45 to 60 m a minute along each transect. Transects will be spaced 6 to 10 m apart, and searchers will scan the area on both sides to approximately 3 to 5 m for casualties as they walk each transect. Search area and speed may be adjusted after evaluation of the first searcher efficiency trial.

The condition of each carcass found will be recorded using the following categories:

- Intact - a carcass that is completely intact, is not badly decomposed, and shows no sign of being fed upon by a predator or scavenger.
- Scavenged - an entire carcass that shows signs of being fed upon by a predator or scavenger, or a portion(s) of a carcass in one location (e.g., wings, skeletal remains, portion of a carcass, etc.), or a carcass that has been heavily infested by insects.
- Feather Spot - 10 or more feathers at one location indicating predation or scavenging.

In addition to carcasses, all injured bats and birds observed in search plots will be recorded and treated as a fatality. All carcasses found will be labeled with a unique number and bagged and frozen for future reference and possible necropsy. A copy of the data sheet for each carcass will be maintained, bagged, and frozen with the carcass at all times. For all casualties found, data recorded will include species, sex and age when possible, date and time collected, global positioning system (GPS) location, condition (intact, scavenged, feather spot), and any comments that may indicate cause of death. All casualties located will be photographed as found

and plotted on a detailed map of the study area showing the location of the wind turbines and associated facilities such as overhead power lines and met towers.

Casualties found outside the formal search area by carcass searchers will be treated following the above protocol as closely as possible. Casualties found in non-search areas (e.g., near a turbine not included in the search area) will be coded as incidental discoveries and will be documented in a similar fashion as those found during standard searches.

Any injured native birds found during standard searches will be carefully captured by the observer and transported to the nearest wildlife rehabilitation center or veterinary clinic before close of business that day. Appropriate wildlife salvage/collection permits will be obtained from the WGFD and the USFWS. Dissemination of data (e.g., to the USFWS Special Agent and other agency representatives) is discussed in the Disposition of Data section below.

Searcher Efficiency Trials

The objective of the searcher efficiency trials is to estimate the percentage of casualties which are found by searchers. Searcher efficiency trials will be conducted in the same areas carcass searches occur. Trials will be conducted by season. Searcher efficiency will be estimated by major habitat type (e.g., cultivated agriculture, grassland), size of carcass, and season. Estimates of searcher efficiency will be used to adjust the total number of carcasses found for those missed by searchers, correcting for detection bias.

Searcher efficiency trials will begin when carcass search studies begin. Personnel conducting carcass searches will not know when trials are conducted or the location of the detection carcasses. During each season and within each major habitat types, approximately 25 carcasses of birds of two different size classes will be placed in the search area during the search period, for a total of approximately 100 searcher efficiency trial carcasses for the entire year. Carcasses will consist of non-native/non-protected or commercially available species such as house sparrows, European starlings, rock pigeons, bobwhite quail, and hen mallards or hen pheasants. Other salvaged birds may be used if they are collected under a valid salvage permit. A minimum of two dates will be used each season for a minimum total of eight trial dates. An attempt will be made to use several small brown birds (house sparrows) during the late summer and fall seasons to simulate bat carcasses. Legally obtained bat carcasses will also be used, if available.

All carcasses will be placed at random locations within areas being searched prior to the carcass search on the same day. Carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (tossed randomly to one side), 2) hidden to simulate a crippled bird, and 3) partially hidden.

Each trial carcass will be discreetly marked so that it can be identified as a study carcass after it is found. The number and location of the detection carcasses found during the carcass search will be recorded. The number of carcasses available for detection during each trial will be determined immediately after the trial by the person responsible for distributing the carcasses.

Carcass Removal Trials

The objective of carcass removal trials is to estimate the likelihood a carcass is removed by scavengers as a function of the day since the trial carcasses are placed in the field. Carcass removal includes removal by predation or scavenging. Carcass removal studies will be conducted during each season near the carcass search plots (e.g., near a turbine that is not included in the standard search plots). Estimates of carcass removal will be used to adjust the total number of carcasses found for those removed from the study area, correcting for removal bias.

Carcass removal trials will begin when carcass search studies begin. During each season and within major habitat types, approximately 25 carcasses of birds of two different size classes (same as searcher efficiency birds) will be placed in the study plots, for a total of approximately 100 removal trial carcasses for the entire year. Legally obtained fresh carcasses that have never been frozen, such as waterfowl from game farms or raptors obtained from rehabilitation centers or agencies, will be used if available. Carcasses will be placed on a minimum of three dates during each season for a minimum total of 12 trial initiation dates, spreading the trials throughout the year to incorporate the effects of varying weather, climatic conditions, and scavenger densities. Legally obtained fresh bat carcasses will also be used, if available.

Removal trial birds will not be placed in the standardized search plots to minimize the chance of confusing a trial bird with a true casualty. Turbines not included in the standardized searches will be randomly selected for inclusion in the removal trials and trial carcasses will be randomly located in a similar-sized plot as used to search turbines. Trial carcasses will be placed in a variety of postures to simulate a range of conditions. For example, birds will be: 1) placed in an exposed posture (tossed randomly to one side), 2) hidden to simulate a crippled bird (e.g., placed beneath a shrub or bunch grass), and 3) partially hidden.

Personnel conducting carcass searches will monitor the trial birds over a 40-day period according to the following schedule as closely as possible. Carcasses will be checked every day for the first 4 days, and then on day seven, day 10, day 14, day 20, day 30, and day 40. This schedule may vary depending on weather and coordination with the other survey work. Experimental carcasses will be marked discreetly (for example with dark electrical tape around one or both legs) for recognition by searchers and other personnel. Experimental carcasses will be left at the location until the end of the carcass removal trial. At the end of the 40-day period any evidence of the carcasses that remains will be removed.

Statistical Methods for Fatality Estimates
Estimates of facility-related fatalities are based on:

(1) Observed number of carcasses found during standardized searches during the monitoring year for which the cause of death is either unknown or is probably facility-related.
(2) Non-removal rates expressed as the estimated average probability a carcass is expected to remain in the study area and be available for detection by the searchers during removal trials.
(3) Searcher efficiency expressed as the proportion of planted carcasses found by searchers during searcher efficiency trials.

Fatality estimates will be provided for six categories: 1) all birds, 2) small birds, 3) large birds, 4) raptors, 5) likely nocturnal migrants, and 6) bats. The number of avian and bat fatalities attributable to operation of the facility based on the number of avian and bat fatalities found at the facility site whose death appears related to facility operation will be reported. All carcasses located within areas surveyed, regardless of species, will be recorded and, if possible, a cause of death determined based on a cursory field necropsy. Total number of avian and bat carcasses will be estimated by adjusting for removal and searcher efficiency bias. If the cause of death is not apparent, a worst-case estimate will be made by attributing the mortality to facility operation.

Definition of Variables
The following variables are used in the equations below:

c_i the number of carcasses detected at plot *i* for the study period of interest (e.g., one monitoring year) for which the cause of death is either unknown or is attributed to the facility
n the number of search plots
k the number of turbines searched (including the turbines centered within each search plot)
$\bar{c}$ the average number of carcasses observed per turbine per monitoring year
s the number of carcasses used in removal trials
s_c the number of carcasses in removal trials that remain in the study area after 30 days
se standard error (square of the sample variance of the mean)
t_i the time (in days) a carcass remains in the study area before it is removed, as determined by the removal trials
$\bar{t}$ the average time (in days) a carcass remains in the study area before it is removed, as determined by the removal trials
d the total number of carcasses placed in searcher efficiency trials
p the estimated proportion of detectable carcasses found by searchers, as determined by the searcher efficiency trials
I the average interval between standardized carcass searches, in days
A proportion of the search area of a turbine actually searched

$\hat{\pi}$ the estimated probability that a carcass is both available to be found during a search and is found, as determined by the removal trials and the searcher efficiency trials

m the estimated annual average number of fatalities per turbine per year, adjusted for removal and searcher efficiency bias

Observed Number of Carcasses

The estimated average number of carcasses ($\bar{c}$) observed per turbine per monitoring year is:

$$\bar{c} = \frac{\sum_{i=1}^{n} c_i}{k \cdot A} \qquad (1)$$

Estimation of Carcass Non-Removal Rates

Estimates of carcass non-removal rates are used to adjust carcass counts for removal bias. Mean carcass removal time ($\bar{t}$) is the average length of time a carcass remains in the study area before it is removed:

$$\bar{t} = \frac{\sum_{i=1}^{s} t_i}{s - s_c} \qquad (2)$$

Estimation of Searcher Efficiency Rates

Searcher efficiency rates are expressed as p, the proportion of trial carcasses that are detected by searchers in the searcher efficiency trials. These rates will be estimated by carcass size and season.

Estimation of Facility-Related Fatality Rates

The estimated per turbine annual fatality rate (m) is calculated by:

$$m = \frac{\bar{c}}{\hat{\pi}} \qquad (3)$$

where $\hat{\pi}$ includes adjustments for both carcass removal (from scavenging and other means) and searcher efficiency bias. Data for carcass removal and searcher efficiency bias will be pooled across the study to estimate $\hat{\pi}$.

$\hat{\pi}$ is calculated as follows:

$$\hat{\pi} = \frac{\bar{t} \cdot p}{I} \cdot \left[\frac{\exp\left({}^{I}\!/_{\bar{t}} \right) - 1}{\exp\left({}^{I}\!/_{\bar{t}} \right) - 1 + p} \right].$$

This formula has been independently verified by Shoenfeld (2004). The final reported estimates of m and associated standard errors and 90 percent confidence intervals will be calculated using bootstrapping (Manly 1997).

Bootstrapping is a computer simulation technique that is useful for calculating point estimates, variances, and confidence intervals for complicated test statistics. For each bootstrap sample, $\bar{c}$,

$\bar{t}$, p, $\hat{\pi}$, and m are calculated. A total of 5,000 bootstrap samples will be used. The reported estimates are the mathematical means of the 5,000 bootstrap estimates. The standard deviation of the bootstrap estimates is the estimated standard error. The lower 5^{th} and upper 95^{th} percentiles of the 5,000 bootstrap estimates are estimates of the lower limit and upper limit of 90 percent confidence intervals.

Greater Sage-grouse Displacement Studies

The objective of the displacement studies for greater sage-grouse is to determine the level of impact from avoidance or reduction in habitat use due to the presence of the operating turbines. The displacement studies include pellet counts and lek surveys.

Pellet Counts

The displacement studies include pellet counts for greater sage-grouse. Pellet counts for greater sage-grouse will occur at a minimum of 10 turbines located in habitats dominated by sagebrush. The 10 turbines to be sampled for sage-grouse pellets were identified and plots were set up in the fall of 2008 by E&E.

The pellet count study consists of counting pellets at seven plots at each of the 10 turbines previously set up by E&E. Seventy plots will be surveyed for greater sage-grouse pellets. At each turbine selected for sampling, the seven plots were established along circular transects using a systematic sample of plots beginning at 40 meters from the turbine and a compass direction of zero degrees. Each of the remaining plots was placed 10 meters further out from the turbine and at 50 degrees greater than the previous plot. The seventh plot was located at 100 meters and 300 degrees. Each plot was marked with a two-foot piece of rebar, and the location was recorded using a GPS. All pellet groups within a 2-m radius of each point will be enumerated and then removed from the plot. Surveys will be conducted twice each year, once in the spring and again in the fall. Surveys in spring will document the previous winter’s use of the site by greater sage-grouse, while surveys in fall will document the previous summer’s use of the site. The initial clearing survey was conducted in November 2008. The first pre construction survey will be conducted in the spring of 2009. Surveys will be conducted during the year of construction and Year 1 of operation of the Project, and if deemed necessary, up to three years post construction.

For reference data, seventy plots were also established at 10 random points located in an area of similar topography and vegetation as the turbines, but at least one mi from the nearest turbine. Methods will be identical to those at the turbine plots.

A summary report will be prepared following the fall 2009 survey, which will describe the methods in detail, contain a map showing the locations of all plots, and summarize the mean number of pellet groups per plot for each season.

A before-after control impact analysis will be conducted. Differences in pellet density from the post-construction period to the pre-construction period will be compared between the wind turbine site and the reference site. Statistical comparisons of 95 percent confidence limits of

these differences will be used to determine displacement effects. The TAC will review the findings and address recommendations on additional monitoring or mitigation.

Greater Sage-grouse Lek Surveys

All known greater sage-grouse leks occurring within two mi of turbines will be monitored the year of construction and Year 1 of operation of the Project, and if deemed necessary, up to three years post construction. Each lek will be visited three times during the month of April, with each visit separated by at least seven days. Counts will be conducted per WGFD count lek protocol within one hour of daylight. Repeated counts of all birds on the lek will be made, with each sex identified and tabulated separately. The maximum number of greater sage-grouse counted by sex will be recorded and provided to WGFD for their sage-grouse population monitoring. Weather information will be recorded during each visit.

Prairie Dog Town Mapping

The objective of the prairie dog town mapping effort is to identify the location of prairie dog towns within/near the Project since prairie dog towns represent a potential prey source for raptors. Prairie dog towns within the Project and surrounding one-mi buffer will be mapped in the winter/spring of 2009. The boundaries of prairie dog towns will be mapped in the field using aerial photographs or USGS 1:24000 scale topographic maps. If there is not adequate visual coverage of the study area during winter, towns will be mapped in the spring of 2009. Additionally, the status of towns (either active or inactive) will be determined in the spring of 2009.

Incidental Wildlife Observations

The objective of the incidental wildlife observations is to provide use and occurrence information about wildlife seen outside of the standardized surveys. All raptors, unusual or unique birds, sensitive species, mammals, reptiles, and amphibians will be recorded in a similar fashion to standardized surveys. The observation number, date, time, species, number of individuals, sex/age class, distance from observer, activity, height above ground (for bird species), habitat, and, in the case of sensitive species, the location will be recorded by UTM or GPS.

TECHNICAL ADVISORY COMMITTEE

- This monitoring plan is designed as a dynamic process that uses an accumulation of data to detect impacts and to direct further study. Three Buttes is proposing to form a TAC to review the wildlife post-construction monitoring studies for the Project. The TAC membership may include WGFD, USFWS, and Three Buttes representatives.

The TAC will act as an advisory group on the wildlife post-construction monitoring studies. The TAC will review the technical procedures of the monitoring studies, assess the scientific findings, and recommend various practices or measures, as necessary, to Three Buttes. The TAC's responsibilities include the following:

- Reviewing and commenting on the avian use and movements monitoring study.
- Reviewing and commenting on the raptor nest study.
- Reviewing and commenting on the avian and bat fatality monitoring study.
- Reviewing greater sage-grouse displacement study (pellet count findings).
- Reviewing and commenting on the sage grouse lek surveys
- Providing input to Three Buttes on monitoring and mitigation, based on the post-construction monitoring results and final fatality estimates.

The TAC will use a collaborative process to reach understanding and consensus on reviews and recommendations. The TAC does not replace regulatory authority or responsibility of the various agencies or groups. A third-party coordinator may assist Three Buttes with planning and arrangements for meetings and with briefing and reporting to TAC members.

WEST will submit progress reports to the TAC every six months for up to three years post construction. In addition, an annual report of findings will be prepared at the end of the first year of monitoring and will be distributed to the members of the TAC at least two weeks prior to the annual meeting. The TAC will meet after the first monitoring report is submitted to discuss the results. The need for further study or changes to the current protocol will be based on reasonable criteria proposed by the TAC. A final report on study results will be submitted to the TAC as appropriate for review and subsequent discussion on mitigation recommendations.

Draft meeting minutes will be completed within two weeks of each meeting. Minutes will be forwarded to TAC members for review and comment. Minutes will be approved and finalized at the subsequent meeting. Depending on the group's preferences, meetings may be in person or by conference call. Monitoring findings (summarized per season or semi-annually) and other pertinent information (unusual findings or events) will be transmitted via hard copy, e-mail, or phone call, as necessary.

DISPOSITION OF DATA AND REPORTING STANDARDS

This monitoring study will provide information associated with development of the Project including: avian use and movements, raptor nest monitoring, fatalities and total mortality, lek counts, and the potential displacement effects of turbines on greater sage-grouse. The data will be used to evaluate the overall impacts of the Project on wildlife. The final disposition of data from the study will be with Three Buttes, the Project owner, and will include the data forms and electronic data files. During the study, the raw data forms will be housed with the contractor conducting the study, and individual carcasses collected during the study will be housed in a freezer. Individual carcasses will be maintained until after the final analysis and report are prepared in case questions about identity or cause of death should arise. The final disposition of individual casualties will be based on direction from the appropriate salvage permits (WGFD and USFWS), the legal status of individual casualties, and direction of the USFWS Law Enforcement Agent in Charge. It is anticipated that bird carcasses will be donated to a local museum or disposed of by burying except for raptors and any threatened or endangered species found. Bat carcass will also be donated to a local museum or disposed of by burying unless their

condition is intact and fresh in which case they may be saved for future searcher efficiency and carcass removal trials.

Interim progress reports will be prepared every six months to provide an update about the Project and results to date. A first year annual report will include data pertaining to avian and bat fatalities discovered during the study, as well as other information relevant to monitoring the Project. The USFWS will be notified (email and phone) within 24 hours if any eagles or federally threatened or endangered species are discovered. All reports will be distributed to TAC representatives for review and comment.

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Appendix A. Wyoming Game and Fish Department Recommended Diurnal Raptor Survey Dates and Disturbance Free-Dates and Buffers for Raptors

WGFD RECOMMENDED DIURNAL RAPTOR SURVEY DATES

SPECIES	MARCH 1 15 31	APRIL 1 15 30	MAY 1 15 31	JUNE 1 15 30	JULY 1 15 31	AUGUST 1 15 30
American Kestrel		XXXXXXXXXX		XXXXXXXXXX		
Bald Eagle	XXXXXXXXXXXXXX--------------------------------XXXXXXXXXX					
Cooper's Hawk		XXXXXXXXX		XXXXXXXXXXXXX		
Ferruginous Hawk	XXXXXXXX---------------------------XXXXXXXX					
Golden Eagle	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX					
Merlin		XXXXXXXXXX		XXXXXXXXXX		
Northern Goshawk	XXXXXXXXXXXX				XXXXXXXXX	
Northern Harrier		XXXXXXXXX-------------------------XXXXXXXXXX				
Osprey		XXXXXXXXXX----------------------XXXXXXXXX				
Peregrine Falcon		XXXXXXXXXX		XXXXXXXXXXXX		
Prairie Falcon	XXXXXXXXX				XXXXXXXXXXXXX	
Red-tailed Hawk		XXXXXXX----------------XXXXXXXX				
Sharp-shinned Hawk		XXXXXXXX		XXXXXXXXXXX		
Swainson's Hawk		XXXXXXXXX-------------------XXXXXXXXXXXXX				

XXXXX: Indicates best times to detect birds in courtship (early dates) or with young in the nest when adults will be conspicuous (later dates). For accipiters, Merlins, and Peregrine Falcons, detectability during courtship is variable, with some pairs almost impossible to detect.

-----: Indicates periods for species with conspicuous nests during which surveys can also be conducted effectively.

Note: Dates may vary slightly by latitude, altitude or other factors affecting phonology and should be adjusted depending on field conditions.

WGFD DISTURBANCE-FREE DATES AND BUFFERS FOR RAPTORS

SPECIES	DISTURBANCE-FREE DATES	DISTURBANCE-FREE BUFFER
Bald Eagle	February 15 – August 15	½ mile
Ferruginous Hawk	April 1 – July 31	1 mile
Golden Eagle	February 1 – July 31	½ mile
Merlin	April 1 – August 15	½ mile
Northern Goshawk	April 1 – August 15	½ mile
Peregrine Falcon	March 15 – August 15	½ mile
Prairie Falcon	March 1 – August 15	½ mile

Note: Disturbance-free dates include territory establishment through fledging.

Note: Additional considerations include line of sight, visibility, type of disturbance activity, location of disturbance above or below the occupied nest, and specific situations.

Appendix B. Wildlife Incident Reporting and Handling System

Three Buttes Windpower, LLC
CAMPBELL HILL WINDPOWER PROJECT

WILDLIFE INCIDENT
REPORTING AND HANDLING SYSTEM

December 2008

BACKGROUND AND INTRODUCTION

The US Fish and Wildlife Service (USFWS) requests that casualties of birds protected under the Bald and Golden Eagle Protection Act, the Endangered Species Act, and the Migratory Bird Treaty Act be reported. Three Buttes Windpower, LCC (Three Buttes) intends to report all dead birds found in the Campbell Hill Windpower Project (Project) over the entire life of the project as part of the project operations and monitoring efforts. The purpose of this Wildlife Incident Reporting and Handling System (WIRHS) manual is to standardize and describe the actions taken by Campbell Hill Wind Farm personnel in response to wildlife incidents found in the Project. The manual is intended to be working directions for personnel encountering a wildlife incident to fulfill the obligations of Three Buttes in reporting bird incidents. Note that avian-specific sections of this manual may be supplemented or replaced by standard Duke Energy Corporation Avian Protection Plan components associated with avian incident reporting and handling requirements.

Three Buttes POLICY

Employees or subcontractors of Three Buttes have a responsibility to comply with all environmental laws and regulations. Most birds that occur in the Project are protected by the federal Migratory Bird Treaty Act and eagles are further protected by the Bald and Golden Eagle Protection Act. Under these federal statutes it is illegal to take or collect birds that may be found in the Project.

Migratory Bird Treaty Act
The Migratory Bird Treaty Act of 1918 (MBTA) (16 USC 703-712) is the cornerstone of migratory bird conservation and protection in the United States. The MBTA implements four treaties that provide for international protection of migratory birds. It is a strict liability statute wherein proof of intent is not an element of a "taking" violation. Wording is clear that most actions resulting in a taking or possession (permanent or temporary) of a protected species can be a violation regardless of intent.

Statutory Prohibition:

> Specifically, the MBTA states: “Unless and except as permitted by regulations...it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess…any migratory bird, any part, nest, or egg of any such bird…(The Act) prohibits the taking, killing possession, transportation, and importation of migratory birds, their eggs, parts, and nests, expect when specifically authorized by the Department of the Interior." The word "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect."

The MBTA offers protection of 836 species of migratory birds (listed in 50 CFR 10.13), including waterfowl, shorebirds, seabirds, wading birds, raptors, and passerines. Generally speaking, the

MBTA protects all birds in the U.S. except gallinaceous (upland game) birds, rock pigeons, Eurasian collared doves, European starlings, and house sparrows.

Bald and Golden Eagle Protection Act
In June 1940, Congress signed into law the Bald and Golden Eagle Protection Act (BGEPA) (16 USC 668-688d). This law afforded additional protection to the bald and golden eagle. Penalties for violations of the BGEPA are up to $250,000 and/or 2 years imprisonment for a felony (violations are defined as a felony), with fines doubled for organizations.

Statutory Prohibition:

> Specifically, the BGEPA states: "Whoever, with the United States or any place subject to the jurisdiction thereof, without being permitted to do so as provided…shall knowingly or with wanton disregard for the consequences of his act take, possess, transport…at any time or in any manner, any bald or golden eagle, alive or dead, or any part, nest or egg thereof shall be fined…that the commission of each taking or other act prohibited by this section, with respect to a bald or golden eagle, shall constitute a separate violation of this section."

Endangered Species Act
In 1973 the Endangered Species Act (ESA) (16 USC 1513-1543) was passed to protect endangered and threatened species and to provide a means to conserve their ecosystems. Under the ESA, Federal agencies are directed to utilize their authorities to conserve listed species, as well as "Candidate" species that may be listed in the near future, and make sure that federal agencies' actions do not jeopardize the continued existence of these species. As with the MBTA and the BGEPA, the ESA as amended prohibits the taking of species listed under the act as threatened or endangered.

Three Buttes WIRHS will be active for the life of the Project. It is recognized that bats are generally not protected by federal law unless listed as a threatened or endangered species; however, it is the policy of Three Buttes to treat bat incidences the same as avian incidences and include them in the WIRHS. Further, it is the policy of Three Buttes to comply with all conditions of the Industrial Siting Council permit for the Project including implementing a monitoring study of the wind project and convening a Technical Advisory Committee (TAC) that will oversee the monitoring study. The objective of this policy is to insure that the best available information about avian and bat incidents found in the wind project is recorded and the proper authorities are notified.

Three Buttes is committed to providing a secure environment for all natural inhabitants of the Project site. The possession, transfer or tampering with any avian or bat species (alive or dead) at any time is strictly prohibited. The WIRHS is designed to provide a means of recording and collecting avian and bat species found in the Project to increase the understanding of wind turbine and wildlife interactions. Three Buttes maintains an ongoing commitment to investigate wildlife incidents involving company facilities and to work cooperatively with federal and state agencies in an effort to prevent and mitigate future bird and wildlife fatalities. It is the responsibility of Three Buttes employees and subcontractors to report all avian and wildlife incidents to your immediate supervisor.

WILDLIFE INCIDENT REPORTING
WIND PROJECT PERSONNEL PROCEDURES

The following procedures are to be followed when Project personnel or others discover an avian or bat fatality or injury while on site. These procedures are intended to be in place for the life of the Project and are independent of any monitoring studies. Implementation of this WIRHS will be part of the Project staff training program.

WHEN TO USE THE WIRHS - WHAT CONSTITUTES A REPORTABLE INCIDENT?

For the purposes of this reporting system, *incident* is a general term that refers to any bird or bat, or evidence thereof, that is found either dead or injured within the wind project. Note that an incident may include an injured animal and does not necessary indicate death as in a carcass or fatality.

An intact carcass, carcass parts, bones, or scattered feathers or an injured bird or bat are all considered reportable incidences. Report all such discoveries even if you are uncertain if the carcass or parts are associated with a wind project structure.

A *fatality* is any find where death occurred, such as a carcass, carcass parts, bones, or feather spot. An *injury* or injured animal is any bird or bat with an apparent injury, or that exhibits signs of distress to the point where it can not move under normal means or does not display normal escape or defense behavior.

Prior to assuming a bird or bat is injured, it should be observed to determine if it can not or does not display normal behaviors. For example, raptors will occasionally walk on the ground, especially if they have captured a prey item. Raptors also "mantle" or hold their wings out and down covering a prey item. These types of behaviors may make the wings appear broken or the animal injured. Identification of specific behaviors typical to bird life cycles and distress behaviors will be part of the Project staff training program.

Note: Any incident involving a threatened or endangered species or a bald or golden eagle must be reported to USFWS within 24 hours of identification. See project personnel listing for contact information.

MATERIALS NEEDED TO RECOVER/REPORT AN INCIDENT

The supplies needed for this WIRHS will be contained in a “run-kit” available on site at the Operations and Maintenance Office. The run-kit includes the following items:

- A copy of this WIRHS
- Wildlife Incident Report Forms
- Project Personnel Listing and Contact Information
- Sharpie, Pencils, Pens
- 3x5 cards
- Ziploc freezer storage bags – quart size, gallon size
- Zip ties

Garbage bags
Disposable gloves
Camera
Large forceps
Flagging
Dark cloth bag or towel
Leather gloves for handling injured large birds
Animal carrier suitable for transporting injured birds
Shoebox with a soft cloth and air holes punched for transporting injured bats

INCIDENT RECOVERY AND REPORTING PROCEDURES:

If an animal is found or if you determine a bird/bat is injured, the following procedures should be followed:

1. If the incident discovered is an injured bird, initially move to a distance far enough away that it is not visibly disturbed or uneasy due to your presence. Follow the procedures for reporting and care of injured wildlife found below.

   If the incident discovered is a fatality or injured bat the following procedures apply.

2. Initially, leave the subject animal in place. A flag may be used to mark it's location for easy finding while specific data are being recorded. If it is a fatality, it is best to leave the subject animal in place until all the data are recorded. It is recommended that any flagging be marked with the date, time and initials of the recorder.

3. Prepare a Wildlife Incident Report Form. The form and instructions for filling out the form are provided below.

4. Prepare a 3x5 card label that includes the exact date and time of the find and the observer's initials that are recorded on the Wildlife Incident Report Form. Use a Sharpie to record information on the label and write in large letters. This label is critical to correlating the carcass and photographs back to the data forms in the future and will be bagged and stored with the carcass.

5. Photograph the incident as it was found in the field. Take at least two pictures: a close up shot of the animal as it lays in the field and a broader view of the animal (marked by a flag) with the road, turbines, or other local features in the view. For the close up picture lay the 3x5 card label marked with the date, time and initials of the recorder facing up next to the carcass so that it appears in the picture.

6. Following completion of the report form and photographs, the fatality should be collected. In the case of a scavenged mortality or feather spot it is important to collect all parts so that it is not encountered and counted again at a later date. The fatality or parts should be bagged in a Ziploc freezer bag or garbage bag in the case of large birds. The 3x5 card label should be included in a second Ziploc bag with the bag holding the actual

animal (double bagged). It is advisable to use plastic disposable gloves to collect casualties for hygiene and potential disease considerations.

Injured bats (that can not fly) are also to be collected. Due to disease considerations and safety, injured bats should be collected with long forceps using disposable gloves. Confine the injured bat in a shoebox with a lid, punched air holds, and a soft cloth. The monitoring study Field Coordinator (see list of contacts) should be notified immediately and will be responsible for euthanizing injured bats.

7. Report the find to the Project Environmental Program Manager or in their absence the monitoring study Field Coordinator within 24 hours. As soon as possible after the fatality is collected it should be stored in the site freezer and an entry completed in the freezer log book. Follow the instructions on the freezer log book for logging fatalities into the freezer. Include the 3x5 card label double bagged with the fatality in the freezer.

   Any incident involving a State or Federally listed threatened or endangered species or a bald or golden eagle must be reported to the USFWS within 24 hours of identification. These finds will be reported to the agency verbally by the Program Manager or the Three Buttes Avian Protection Manager. See project personnel listing for contact information.

WILDLIFE INCIDENT REPORT FORM INSTRUCTIONS

SECTION 1 – DISCOVERY DATA

Date and Time: Record the date and time when the incident was found and the report is completed.

Name(s): Record the name(s) of the person(s) who made the discovery and filled out the report form.

SECTION 2 – INCIDENT INFORMATION & OBSERVATIONAL DATA

Fatality/Injury: Circle the appropriate choice.

Condition: Circle appropriate description. *Complete* is an intact carcass or carcass that appears complete with no obvious signs of scavenging. *Dismembered* is a carcass with appendages missing or amputated from body. *Feathers* is an incident where only feathers were found, a feather spot.

Field Notes and Physical condition: This section is for recording any field notes or observations specific to the incident. For example, describe observations about the incident at the time it was found. Some good observations to include are whether the carcass appears fresh or is old and desiccated, whether it was infested with insects, whether maggots were present, the condition of the eyes – dried and sunken versus moist and round, whether all appendages were present or if one or more were missing (e.g., missing right wing). Notes recorded in this section are helpful in estimating the time since death.

Estimated Time Since Death: Indicate the approximate number of days since the time of death based on your best judgment. Very fresh carcasses which may be only a few hours old will generally have no insect infestations and eyes may be round and wet appearing. Insect infestations can occur relatively quickly, especially in warm weather, and even carcasses less than 24 hours old may have flies or beetles on them. The presence of fly larvae (maggots) would indicate a carcass is a few days (generally >24 hours) to a week old. A dried carcass with all the flesh removed is likely to be greater than 14 days and if bones are visible it could be over 30 days old. In cold weather, carcasses will appear fresh for longer time periods and may not experience insect scavenging.

SECTION 3 – WILDLIFE IDENTIFICATION

Species: If known, record the species. If unknown, record "unidentified" or "unknown".

Field Marks used: Include in this section any notes or information such as identification marks that helped you determine the species of the bird or bat. If the species was unknown but you have an educated guess, or you know the bird was a raptor for example but don't know the

species, include it here.

Photos: Indicate whether photos were taken and if so how many.

SECTION 4 – LOCATION OF FIND

Structure: Record the nearest turbine or met tower number. If no wind project facility is nearby indicate that the incident was found on site and the approximate location.

Distance from Structure: Record the approximate distance to the structure from where the incident was found. Pacing is a good means of estimating distance.

Direction from Structure: Record the general direction such as N (north), NE (northeast), E (east) etc. from the structure to where the incident was found. If the direction is unknown indicate in the Location Remarks (below) if the incident was on the road side or non-road side from the turbine.

Location Remarks: Include in this section any other information about the incident location that might be helpful such as found on the road, found on the turbine pad, found directly under guy wires, power lines overhead, etc.

SECTION 5 – DISPOSITION AND PERSONNEL CONTACT

Disposition of the Incident: For this study, incidences located by Project personnel are to be collected. The disposition of the find in most cases will be that it is stored in the site freezer. In cases of injured birds (see procedure below) the disposition may be the wildlife rehabilitator or if an eagle or threatened or endangered species is found, the incident will be turned over to the USFWS.

Name of Field Personnel/Manager Notified: Record the name, date and time that the Project Environmental Program Manager or the monitoring study Field Coordinator was notified about the find.

WILDLIFE INCIDENT REPORT FORM

SECTION 1 - DISCOVERY DATA

Date: ______________ Time: _______________
Name(s): ____

SECTION 2 - INCIDENT INFORMATION & OBSERVATIONAL DATA

Fatality / Injury Condition: Complete / Dismembered / Feathers

Field Notes and physical condition of the incident at time of discovery:
____
____
____

Estimated Time Since Death or Injury (days): _________ (<1, <4, <7, <14, <30, >30)

SECTION 3 - WILDLIFE IDENTIFICATION

Species: ____________________ Field marks used:_____________________________________
____

Photos: _____________

SECTION 4 - LOCATION OF FIND

Structure: _____________

Approximate Distance from Structure: ______________
Approximate Direction from Structure: _____________ (N, NE, E, SE, etc.)

Location Remarks**:**
____
____
____

SECTION 5 - DISPOSITION AND PERSONNEL CONTACT

Disposition of the Incident: ____

Name of Field Personnel/Manager(s) notified: _______________________
Date and Time of Call: ____________________

INJURED WILDLIFE –
PROCEDURES FOR REPORTING AND CARE

The following procedures apply to injured birds:

Fill out a Wildlife Incident Report Form as for a fatality, but first, the primary objective is to provide immediate care for the injured animal. Capture the injured bird by placing a dark cloth or towel over the animal. By removing its ability to see, birds generally calm down and are more easily handled. Place the bird in a box that has a towel or other material for the animal to hide under or grasp on to.

While capturing the animal, assess the injury so you'll know what to report to the Program Manager or a Project Biologist or the wildlife rehabilitator – TBA (see contact list below). As soon as possible after capture, contact the Project Environmental Program Manager or the Three Buttes Avian Protection Manager (see contact list) about the find and for further instruction.

Minimize additional stress to the animal by keeping it cool if it is a hot day or keeping it slightly warm if it is a cool day. Placing the box in a darkened room with closed doors may be helpful in minimizing stress while the appropriate arrangements are made for care.

If the injured bird is a Federally listed species, the Project Environmental Program Manager or Three Buttes Avian Protection Program Manager will notify the appropriate U.S. Fish and Wildlife representative (see contact list). If the injured animal is found after normal weekday office hours, leave a message (if possible) and report it again the next available working day.

If you can't reach the Program Manager or a project biologist, phone the wildlife rehabilitator and request further instruction (see contact list). The rehabilitation center is required to report any injured raptor to the USFWS within 24 hours. If the injured bird is an eagle or has been gun shot, it should also be reported to the Wyoming Game and Fish Department and U.S. Fish & Wildlife Service law enforcement. Describe the injury to the rehabilitation center and they will determine if it should go directly to a veterinary clinic.

Deliver the animal to the specified location. If applicable, request that the veterinary clinic make arrangements to deliver the bird to the designated rehabilitation center following treatment. Three Buttes will pay for all veterinary bills.

PROJECT PERSONNEL LISTING AND CONTACT INFORMATION

Three Buttes Program Manager - TBA

Project Manager – Monitoring Studies
Kenton Taylor, WEST, Inc., 2003 Central Avenue, Cheyenne, WY 82001

ph: 307-634-1756; email kentontaylor@west-inc.com

Three Buttes Avian Protection Manager - TBA

WEST Project Biologists - TBA

WEST Field Coordinator – Monitoring Studies
TBA

Wildlife Rehabilitation Center
TBA

Agencies

U.S. Fish and Wildlife Service

Dominic Domenici, Resident Agent in Charge
P.O. Box 113
Casper, WY 82602
Phone: 307-261-6365

Wyoming Game and Fish Department
3030 Energy Lane, Suite 100
Casper, WY 82604
Phone: 307-473-3400

APPENDIX I

Artifact Finding Instructions

Artifact Finding at Campbell Hill Site

In the past, people have found certain artifacts and fossils in the area where they are working, so there is a remote possibility of finding artifacts or fossils on this construction site. You need to be informed and prepared to take the necessary measures if these items are discovered on site. Known cultural resource locations eligible for listing on the National Register of Historic Places (NHRP) at this site should be already marked on construction drawings as “no entry” areas and be flagged in the field, if necessary.

If you are to come across anything that you may believe to be an artifact or fossil you should immediately stop what you are doing and notify your supervisor. The items should not be disturbed or tampered with until Project Management has been informed of the find. After the proper people have been informed and they have provided their evaluation of the situation, then the proper actions can be taken.

A few different items that you may come across on the site are arrowheads, pottery, pottery fragments, fossils, coins and clothing, and/or human remains. These items may have significant historical value and may warrant preservation for the state heritage and cultural histories, or in the case of human remains, may be associated with criminal activity.

Take these steps in case an artifact is found:

1. Stop what you are doing.
2. Notify your supervisor.
3. Supervisor will notify Duke Project Management.
4. In the case of human remains being discovered, the appropriate County Coroner’s office will be notified: Natrona County: (307) 235-9458, Converse County: (307) TBD.
5. Duke will inform the Coroner of where and what was found.
6. Actions to be taken by Duke and subcontractors will be determined based on recommendations by the Coroner.

I have read and understand the material presented before me,

Name: ___________________________

Company: ________________________

Date: ____________________________