DOE/EA-1763

Environmental Assessment
Geothermal Expansion to Boise State University
Boise, Idaho

December 2010

U.S. Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401

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ACRONYMS AND ABBREVIATIONS

ACHD	Ada County Highway District
APE	Area of Potential Effect
APZ	Accident Potential Zone
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
BSU	Boise State University
CFR	Code of Federal Regulations
CGP	Construction General Permit
COBE	College of Business and Economics
Corps	U.S. Army Corps of Engineers
CZ	Clear Zone
°F	degrees Fahrenheit
DOE	U.S. Department of Energy
EA	Environmental Assessment
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FTA	Federal Transit Administration
gpm	gallons per minute
HUD	U.S. Department of Housing and Urban Development
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IDWR	Idaho Department of Water Resources
IGS	Idaho Geological Survey
ITD	Idaho Transportation Department
MG	million gallons
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PCE	perchloroethylene
ppm	parts per million
RPZ	Runway Protection Zone
SHPO	State Historical Preservation Office
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Loads

ug/L	micrograms per liter
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USHHS	U.S. Department of Health and Human Services

1.0 INTRODUCTION

Through Congressional action in 2009 and 2010, grants were awarded to the City of Boise (City) for extension of the City's geothermal system to Boise State University (BSU). One grant, through the U.S. Department of Energy (DOE), was designated as "Boise City Geothermal System Expansion, Carbon Disclosure Project 31.09." It was funded as a part of the *Omnibus Appropriations Act, 2009* ($1.4 million) and the *Energy and Water Development Act, 2010* ($1.0 million).

A second grant, through the U.S. Department of Housing and Urban Development (HUD), was designated as an Economic Development Initiative - Special Project titled, "City of Boise, ID for Design and Construction of the City of Boise's Geothermal System Expansion, B-09-SP-ID-0091." It was funded through the *Department of Housing and Urban Development Appropriations Act, 2009* ($665,000). The goal is to bring geothermal energy to an economically depressed area of the City.

DOE and HUD are proposing to authorize the expenditure of Federal funding to design, permit, and extend the existing geothermal system to the BSU campus. DOE has authorized the City to use a percentage of its Federal funding for preliminary activities, which include: costs associated with the Environmental Assessment (EA) preparation, preliminary design, and research. The activities are associated with the Proposed Project and do not significantly impact the environment nor represent an irreversible or irretrievable commitment by DOE or HUD in advance of the conclusion of the EA for the Proposed Project. The Proposed Project involves the design and construction of an extension of the City's geothermal system to the BSU campus. The project would extend the existing geothermal system on Capitol Boulevard to the western portion of the BSU campus; it would continue the geothermal pipelines to the eastern portion of the campus and across the Boise River along Broadway Avenue to reconnect into the existing system. These two delivery routes across the Boise River would enhance service reliability and provide opportunities to serve the entire BSU campus, including buildings under construction and future development cited in the BSU Campus Master Plan. A project location map is presented in Figure 1-1.

Federal funding of projects requires compliance with the *National Environmental Policy Act of 1969* (NEPA) (42 U.S.C. 4321 et. seq.). In accordance with NEPA implementing regulations, DOE and HUD are required to evaluate the potential environmental impacts of Federal related funding decisions. Thus, preparation of this EA addresses NEPA compliance and the related environmental consequences of the Proposed Action. For this project, DOE is the lead Federal agency in implementing the NEPA process.

The City, as the HUD grant recipient, is the Responsible Entity and it assumes the responsibility for environmental review, decision-making, and action that would otherwise apply to HUD under NEPA and other provisions of law that further the purposes of NEPA, as specified in Title 24 Code of Federal Regulations (CFR) Part 58.5. The Responsible Entity is defined as the unit of general local government when it is the recipient under the program. If the HUD grant is to a non-profit or other entity, the Responsible Entity is the unit of general local government within which the project is located that exercises land use responsibility (24 CFR 58.2).

This EA is organized as follows:

- A list of acronyms and abbreviations used in this document is located after the Table of Contents
- Section 2 describes the Proposed Action and the Proposed Project
- Section 3 describes the affected environment and identifies the environmental consequences of the Proposed Project
- Section 4 assesses the cumulative effects of the Proposed Project
- Section 5 discusses the commitment of resources
- Section 6 lists references cited

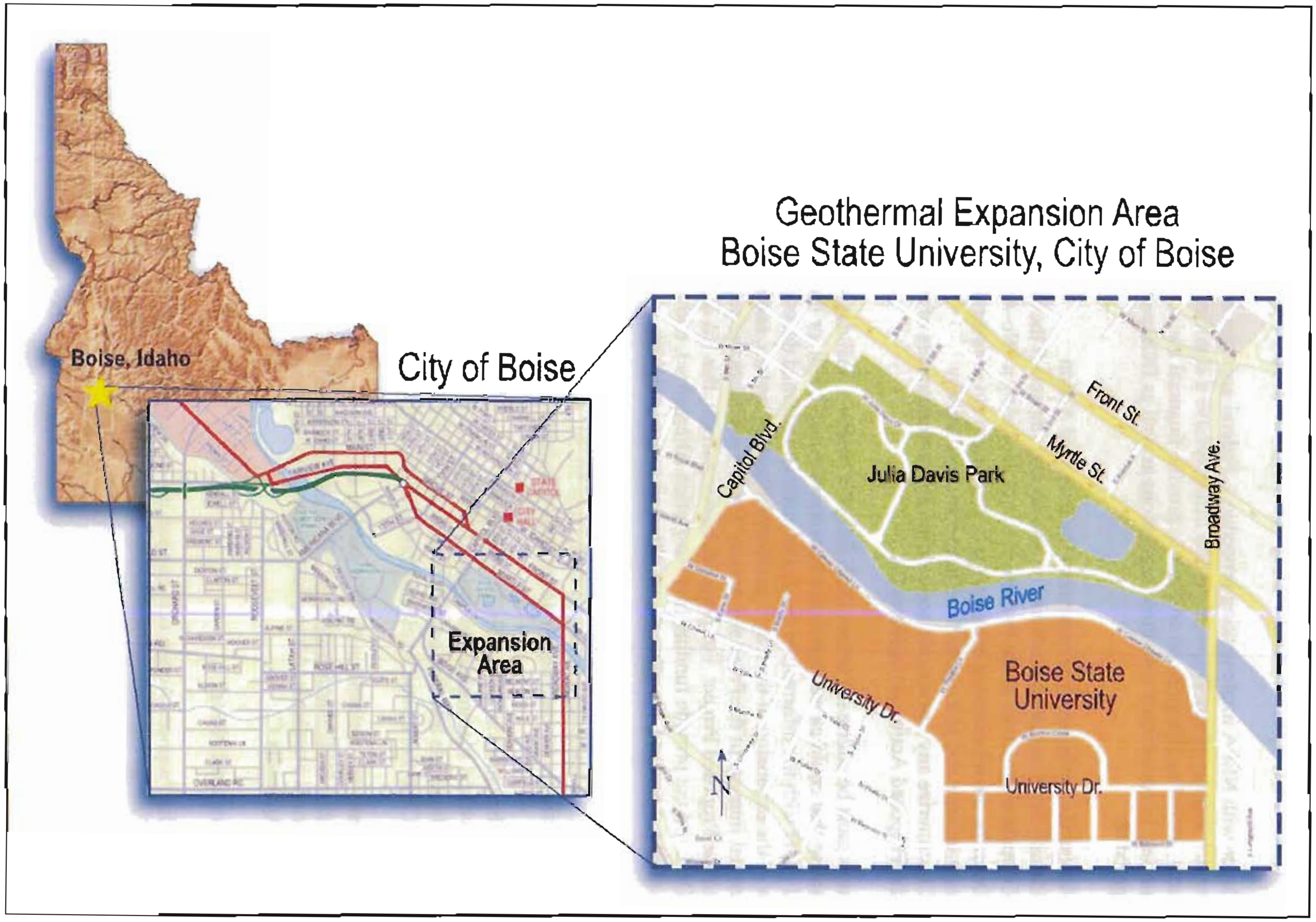

Figure 1-1. Project Location Map

- Three appendices provide information pertaining to requirements of the NEPA process:
  - o Appendix A – Notice of Scoping Letter and Comments
  - o Appendix B – Archaeological and Historical Survey Report
  - o Appendix C – HUD Environmental Requirements

1.1 National Environmental Policy Act and Related Procedures

In accordance with NEPA implementing procedures, Federal agencies must evaluate the potential environmental impacts of any Proposed Action that may have a significant impact on human health and the environment, including decisions on whether to provide financial assistance to government agencies and private entities. In compliance with these regulations as well as DOE and HUD procedures, this EA has been prepared to:

- Assess the environmental impacts of the Proposed Action
- Identify any unavoidable adverse environmental impacts if the Proposed Action is implemented
- Evaluate alternatives to the Proposed Action, including a "No-Action Alternative"
- Describe the relationship between local, short-term environmental impacts of the project, and the maintenance and enhancement of long-term productivity
- Characterize any irreversible and irretrievable commitments of resources that would be involved if the Proposed Action is implemented

These issues must be addressed before DOE and HUD make a final decision to proceed with any proposed Federal action that could cause significant impacts to human health or the environment. This EA provides DOE and HUD with the information needed to make an informed decision about the construction and operation of the expansion of the City's geothermal heating system, and informs the public of the potential environmental impacts of the Proposed Action. The EA evaluates the potential individual and cumulative impacts of the Proposed Project. For purposes of comparison, this EA also evaluates the impacts that could occur if DOE did not provide funding (the No-Action Alternative), under which DOE assumes that the project would not proceed. No other action alternatives are analyzed.

HUD-issued environmental regulations determine the scope and content requirements in NEPA documents for actions receiving HUD assistance (24 CFR Parts 50, 51, 55, 58 and 36 CFR Part 800). The HUD authority requirements for meeting environmental standards in Idaho include:

- Noise Abatement and Control (24 CFR 51B)
- Explosive and Flammable Operations (24 CFR 51C)
- Toxic Chemicals and Radioactive Materials [24 CFR 58.5(i)(2)]
- Airport Clear Zones and Accident Potential Zones (24 CFR 51D)

These requirements are outlined on HUD's website at:
http://www.hud.gov/local/shared/working/r10/environment/idaho.cfm?state=id#hes under the heading HUD Environmental Standards. All applicable requirements are outlined as part of this EA and summarized in Appendix C.

1.2 Purpose and Need

The purpose of the Proposed Action is to support the mission of the DOE Department of Energy Efficiency and Renewable Energy Geothermal Technologies Program by demonstrating the conversion of existing buildings on the BSU campus to the use of geothermal for space heating. The Proposed Action would also support DOE's mission to encourage renewable energy resources and reduce dependency on fossil fuels. Geothermal heat is considered a renewable source of energy and does not rely on fossil fuels, nuclear power, mining or river damming, and has zero emissions into the atmosphere.

Furthermore, the Proposed Action supports the HUD Economic Development Initiative by extending the geothermal system as a desirable source of heat to an economically depressed area of Boise City. By providing Federal funding for this project, these agencies are supporting the development of alternative energy resources that provide important environmental benefits and provide a potential for economic development. The Proposed Action would help Idaho and the United States reach their goals to increase renewable energy sources that reduce greenhouse gas emissions and provide economic benefits to the community.

1.3 Scoping

NEPA provisions require public participation in the environmental review process. To maximize public consultation and input during preparation of this EA, DOE sent a Notice of Scoping letter to 40 stakeholders, including local and state governmental agencies, natural resource agencies, landowners and other interested individuals and organizations on June 10, 2010. The scoping letter described the geothermal project, benefits, proposed activities, the NEPA process, and solicited comments as part of the development of the EA. An announcement of the Notice of Scoping letter was also printed in the *Idaho Statesmen* newspaper on June 15, 2010, and posted on the City of Boise's website and on DOE's Golden Field Office Public Reading Room website. City of Boise news releases are posted on its website at: http://www.cityofboise.org/Departments/Public_Works/Services/Geothermal/index.aspx. DOE's Golden Field Office Reading Room is located at: http://www.go.doe.gov/reading_room.aspx. Newspaper articles were posted in the Idaho Statesman regarding the geothermal extension to BSU on June 15, 2010 and July 7, 2010.

During the 15-day comment period (ending June 29, 2010), two responses were received: a letter from the Idaho Department of Environmental Quality (IDEQ) and an email from the U.S. Fish and Wildlife Service (USFWS). The comments provided were neither in favor of nor against the Proposed Project. Additional consultation occurred with the State Historic Preservation Office (SHPO). Section 3.5 further discusses cultural resources and consultation with SHPO. Letters were sent to local Indian tribes, but no responses were received. A list of the stakeholders for the project is included in Appendix A.

The outreach process for project stakeholders included:

- Notice of Scoping Letter sent to key stakeholders, placed on the City's website and in media announcements
- Stakeholder access to project updates via the project website
- City staff (and Consultant if requested) were available to respond to questions and meet with stakeholders as needed throughout the project
- Announcement updates that publicize the availability of the Draft EA for public comment
- Meetings, phone calls, or emails on a per-request (as-needed) basis

Appendix A presents the Notice of Scoping letter, a list of letter recipients, and the responses received. Table 1-1 provides a summary of the scoping activities that occurred for the project.

Table 1-1. Scoping Summary

Agency / Affiliation	Date of Agency Comments	Summary of Comments	Summary of Response
IDEQ	06/25/2010	Provided reference to permits and regulations that may be required by project. Reference was provided to regulations for: • Air quality • Wastewater and reuse • Drinking water • Surface water • Hazardous waste and contamination	All permits noted that are applicable to the project have been verified and obtained as appropriate; it was verified that a Construction in Navigable Waters Permit would not be required.
USFWS	Email dated 07/01/2010	Provided Idaho's threatened, endangered and candidate species list. Explained the process and regulatory obligations of mandated biological assessment.	Updated species list was used for the biological assessment for this project.
SHPO	07/06/2010	Verified National Register of Historic Places listing of Capitol Boulevard bridge and eligibility of listing for Broadway Avenue bridge. Requested additional information about project including approximate dimensions of pipeline, installation locations on bridge, and physical impact description.	Additional information provided in submitted Final Cultural Resources Report.
SHPO	08/30/2010	Provided concurrence with no effect on historic properties findings from the Final Cultural Resource Report.	No response required.

1.3.1. The Public Comment Response Process

DOE issued the Draft EA for comment on November 16, 2010, and posted it on the Golden Reading Room website (http://www.eere.energy.gov/golden/Reading_Room.aspx). The Notice of Availability (NOA) for the Draft EA was sent to interested individuals and organizations associated with the project. The NOA was also published in the *Idaho Statesman* newspaper. The announcement of the availability of the Draft EA was posted for a 15-day comment period. The comment period for the Draft EA ended on December 1, 2010. No comments were received on the Draft EA.

2.0 DOE AND HUD'S PROPOSED ACTION AND ALTERNATIVES

This section describes DOE's and HUD's Proposed Action (Section 2.1), the Proposed Project (Section 2.1), and the No-Action Alternative (Section 3.0).

2.1 DOE and HUD's Proposed Action

DOE and HUD are proposing to authorize the expenditure of Federal funding to design, permit, and extend the existing geothermal system to the BSU campus. DOE has authorized the City to use a percentage of its Federal funding for preliminary activities, which include: costs associated with the EA preparation, preliminary design, and research. The activities are associated with the Proposed Project and do not significantly impact the environment nor represent an irreversible or irretrievable commitment by DOE or HUD in advance of the conclusion of the EA for the Proposed Project.

2.2 The City's Proposed Project

The Proposed Project would include design, permitting, and construction of the geothermal system expansion. The buildings slated for geothermal conversion are identified in BSU's 2008 Campus Master Plan (Table 2-1). Connection to these facilities would require design and construction of a geothermal system "loop" to provide adequate geothermal redundancy and capacity. The Proposed Project would serve existing and future campus buildings that would be converted and constructed to accommodate geothermal heating infrastructure.

The project consists of the extension of geothermal supply and collection main lines from immediately north of the Boise River near Capital Boulevard, to the BSU Student Union Building on University Drive, to the eastern portion of the BSU campus to Broadway Avenue, across the Boise River at the Broadway Avenue Bridge, and would connect to the City's existing geothermal loop near the Idaho Water Center Building at Broadway Avenue and Front Street (Figure 2-1). This project includes 10,100 lineal feet of pipeline to nine BSU buildings. The project would provide geothermal connections for up to 11 university buildings for conversion to geothermal heating and future construction (Table 2-1). The map in Figure 2-2 shows the existing geothermal system and well locations and the proposed geothermal system extension and associated buildings.

The City has owned and operated the geothermal district heating system since 1983. The system currently serves many buildings in the downtown area, including Boise City Hall, the Ada County Courthouse, Boise High School, and the Federal Building. The City's existing geothermal system operates north of the Boise River. The BSU campus is on the south side of the Boise River between the main thoroughfares of Capitol Boulevard and Broadway Avenue (Figure 1-1). The closest geothermal supply and collection lines to the BSU campus end at Capitol Boulevard near Julia Davis Park (western campus boundary) and at Front Street near the intersection with Broadway Avenue (eastern campus boundary) (Figure 2-2).

The system includes three geothermal production wells located about 1,000 feet east of Mountain Cove Road and 1,000 feet north of Reserve Street that supply 200 million gallons (MG) annually. The wells have a combined pumping capacity of approximately 4,000 gallons per minute (gpm). The main production wells – No. 2 and No. 4 – are equipped with variable frequency drives and have a combined pumping capacity of about 2,000 gpm. The City has rarely used production Well No. 3 which can produce an additional 2,000 gpm. Well No. 1 is a water level monitoring well.

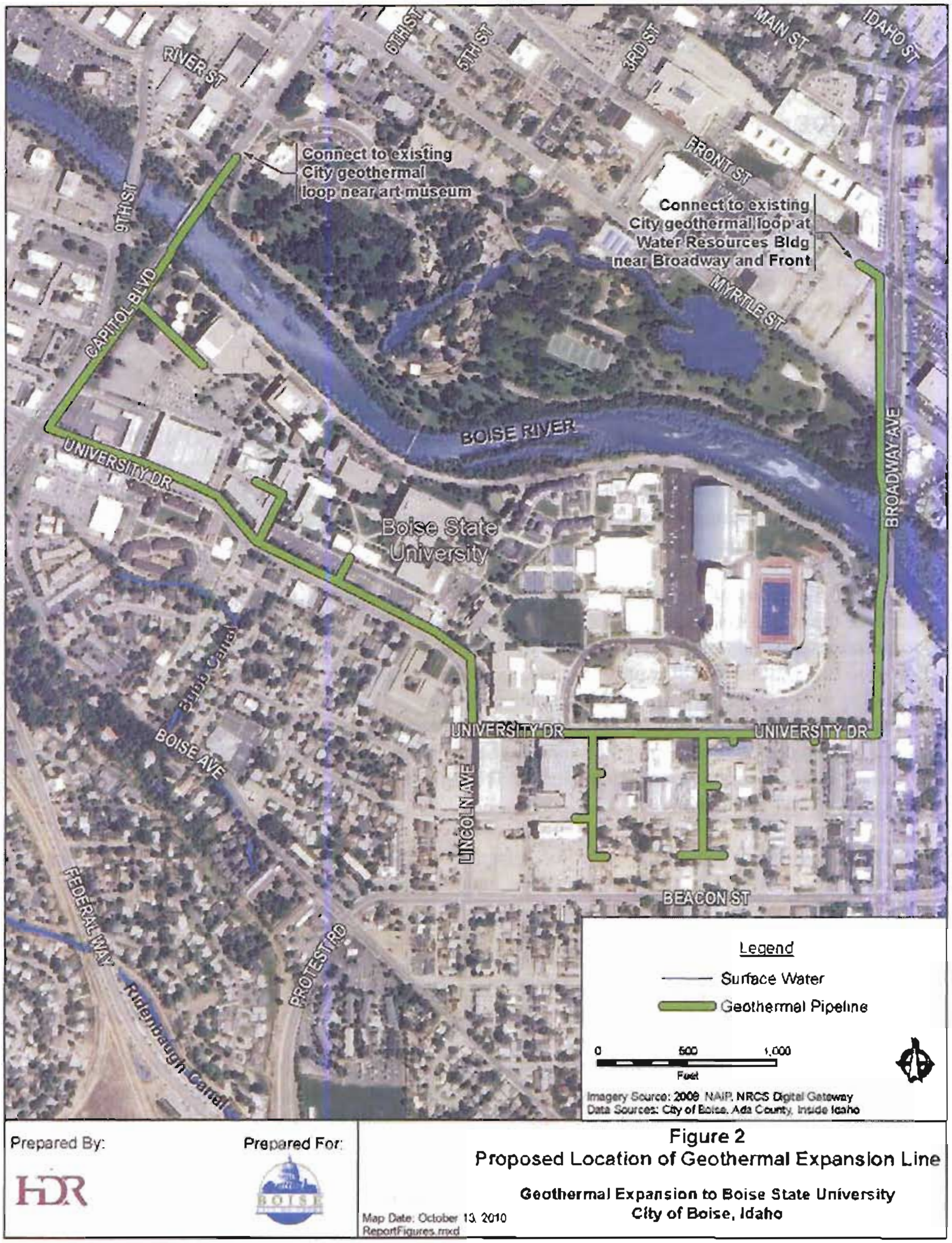

Figure 2-1. Proposed Location of Geothermal Expansion

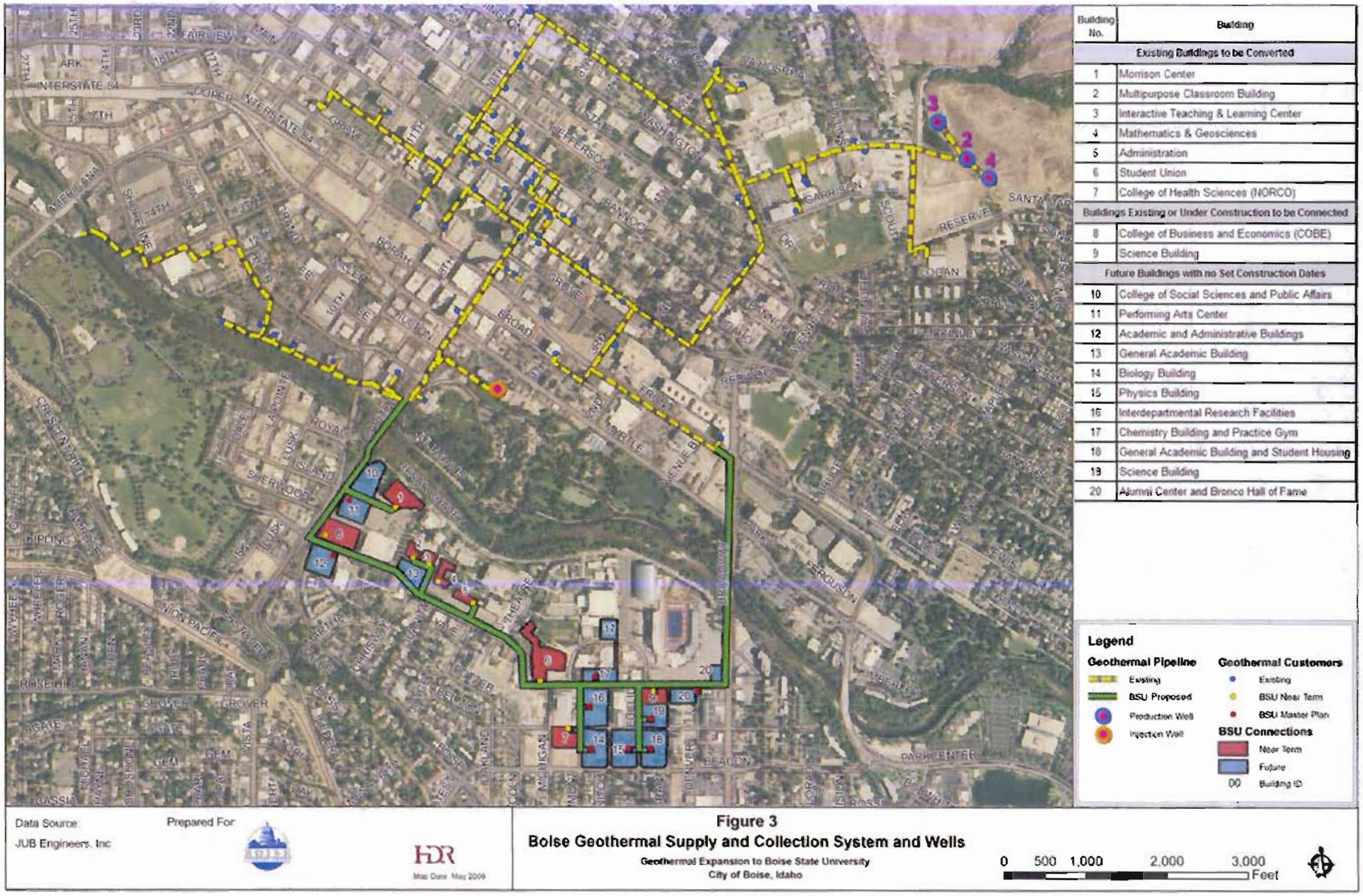

Figure 2-2. Boise Geothermal Supply and Collection System and Wells

Table 2-1. Existing and Future BSU Buildings to be Converted to or Constructed with Geothermal Heating		
Building No.	**Building**	**Square Feet**
Existing Buildings to be Converted		
1	Morrison Center	170,000
2	Multipurpose Classroom Building	63,235
3	Interactive Teaching & Learning Center	59,500
4	Mathematics & Geosciences	58,000
5	Administration	40,000
6	Student Union	66,000
7	College of Health Sciences (NORCO)	100,000
	Total	**556,735**
Buildings Existing or Under Construction to be Connected (square feet are approximate)		
8	College of Business and Economics(COBE)	113,000
9	Science Building	93,000
	Total	**206,000**
Future Buildings with no Set Construction Dates (square feet are approximate)		
10	College of Social Sciences and Public Affairs	100,000
11	Performing Arts Center	200,000
12	Academic and Administrative Buildings	200,000
13	General Academic Building	100,000
14	Biology Building	100,000
15	Physics Building	100,000
16	Interdepartmental Research Facilities	200,000
17	Chemistry Building and Practice Gym	100,000
18	General Academic Building and Student Housing	100,000
19	Science Building	120,000
20	Alumni Center and Bronco Hall of Fame	75,000
	Total	**1,395,000**

The wells pump naturally heated geothermal water from the aquifer (approximately 176°Fahrenheit) through a pipeline grid system. The geothermal grid system consists of two parallel pipelines – a supply pipeline and a collection pipeline ranging from 6 to 14 inches in diameter. Pipeline materials include asbestos-cement and filament wound epoxy resin fiberglass.

The water is delivered to buildings via the supply pipelines, returned to the collection pipelines, and then discharged into an injection well just south of Myrtle Street, near the west end of Julia Davis Park (Figure 2-2). The production and injection wells are controlled to provide constant pressure in the supply and collection pipelines under varying customer demand. The 2,000-gpm injection well, completed in February1999, pumps spent geothermal water back into the ground to recharge the geothermal aquifer. The injection well has sufficient capacity to accept spent geothermal water from the BSU expansion. Prior to construction of the injection well, the geothermal water was discharged to the Boise River.

The City is authorized to extract and use groundwater for geothermal purposes under the Idaho Department of Water Resources (IDWR) Permit Nos. 63-9138 and 63-9139, which have a priority date of April 17, 1979. Under these two water right permits, IDWR authorized an increase in the maximum annual pumping volume from 200 MG per year to 230 MG in 2002. Recent pumping records indicate that the system uses approximately 194 MG a year, leaving capacity available for the proposed expansion to BSU.

The City prepared a preliminary engineering report for the geothermal expansion project in July 2009 (JUB Engineers 2009). This report reviewed design parameters and evaluated potential routing alternatives, equipment conversion issues and costs of extending geothermal heating infrastructure to six BSU buildings. The report also recommended ways to coordinate issues with BSU and various permitting and approval agencies, and developed other design considerations for subsequent field surveys and preliminary design. Information from the preliminary engineering report is evaluated in this EA.

2.2.1. River Crossing Considerations

The proposed geothermal pipelines would cross the Boise River to connect the existing system to the BSU campus. The two bridges on each side of the campus would provide the primary routes for the utility river crossings. Directional drilling as well as open cut installation beneath the river were considered as options but were eliminated because of maintenance difficulty (no maintenance access to pipes beneath the river), potential impacts on the river bed while drilling or excavating (would also require excavation points on both sides of the river in forested wetland areas), and related expenses. Suspension of the geothermal pipelines from beneath the decking of the existing bridges is consistent with other Boise River utility crossings (e.g., water).

Suspending the geothermal pipelines underneath the Capitol Boulevard Bridge was identified as the most feasible option to serve the west end of the campus since the existing geothermal system stubs out north of the river on Capitol Boulevard. Suspending geothermal pipelines underneath the Broadway Avenue Bridge is the most feasible option for connecting the east end of the campus because the existing system stubs out near Broadway Avenue and Front Street. Providing both connections across the Boise River would enhance geothermal system redundancy and connectivity.

2.2.2. Construction and Installation

The Proposed Project would occur in utility right-of-way and City or state owned land under the jurisdictions of:

- Ada County Highway District (ACHD) – local public roadways including Capitol Boulevard and University Drive
- State of Idaho – BSU campus
- City of Boise – Julia Davis Park and Greenbelt
- Idaho Transportation Department (ITD) – Broadway Avenue (US 20/26) and Front Street (US 20/26)

Geothermal pipelines are included in ACHD's and ITD's corridor designations and an easement does not need to be granted to locate it underground in existing right-of-way. However, Idaho classifies geothermal pipelines as non-potable which requires applicable separation from potable water lines. Construction of geothermal pipelines in locations outside roadway rights-of-way on the BSU campus may require utility easements from BSU (State of Idaho).

Pipelines would be installed using standard construction practices, including open cut trenching with a backhoe or trackhoe, laying bedding material, installing pipe, backfilling, and repaving (or re-landscaping). Excavation depths are expected to range from 3 to 6 feet below the ground surface, typically with 4 to 8 foot trench widths. Removed topsoil would be salvaged in accordance with best management practices (BMPs) and impacted areas would be reclaimed. The stockpiling, reuse, and seeding of topsoil would minimize adverse effects of construction-related disturbances. Upon completion of the construction phase, disturbed areas would be stabilized, re-vegetated, or reconstructed.

For the pipeline installation beneath the bridge, as much work as possible would be done from bridge decks with a bridge inspection truck which has hydraulic arms that maneuver a man lift or working platform from the bridge deck. Remaining portions of the pipeline would be installed using equipment (e.g., front-end loader) positioned beneath the bridge which would require equipment to access the Boise River. To minimize impacts to the river, equipment access would occur during the lowest flow periods in the winter months. Construction equipment access into the river would occur from the south side (left bank) of each bridge. Several left bank ingress/egress areas have been identified that have sparse vegetation so equipment access would cause minimal impacts to riparian areas.

Any work conducted in the riverbed would require a U.S. Army Corps of Engineers (USACE) permit (Section 404), which would be filed jointly with IDWR and would require water quality certification from IDEQ. The 404 permit would list requirements for site preparation, construction operation, and restoration requirements. Any river bank, bed, or wetland disturbance would be treated as directed by the 404 permit. The USACE has permitted in-river access of heavy equipment for bridge construction and maintenance activities similar to those being proposed for this project.

In addition to a 404 permit, a stormwater construction general permit under the National Discharge Elimination System (NPDES) from the U.S. Environmental Protection Agency (USEPA) would be required. Also an Erosion and Sediment Control permit would be required under ACHD jurisdiction for construction activities that take place in ACHD public right-of-way. A Stormwater Pollution Prevention Plan (SWPPP) would also be developed for the project. With implementation of stormwater BMPs, including filtering of sediment, direct impacts to water quality (surface water and groundwater) would be minimized for the Proposed Project.

To address potential spills of petroleum products or other pollutants during construction activities, the contractor would be required to have an emergency response program for accidental releases. If hazardous materials are encountered during construction, the following measures would be implemented:

- Project design would include spill prevention, control, and specific plans, such as countermeasure plans, sediment and erosion control plans, and plans for handling and disposal of known and unanticipated contamination.

- Contractors would be made aware of the existing perchloroethylene (PCE) plume within the BSU campus. Groundwater that is encountered during construction activities or shallow groundwater that is pumped for other uses would be required to be sampled for PCE and may require treatment prior to discharge.

- Buildings and structures built prior to 1985 that would be retrofitted to accommodate geothermal heating would be inspected for asbestos-containing materials and lead-based paint. Any asbestos-containing materials and/or lead-based paint that could be disturbed would be removed in compliance with state and Federal standards and disposed of in an approved facility for asbestos prior to building demolition.

- An emergency spill response plan to address hazardous materials handling and storage during construction activities would be prepared and implemented.

- If the contractor stores fuel in bulk storage containers in excess of 1,320 gallons on the job site, a Spill Prevention Control Countermeasures and Containment Plan would be prepared and followed for management of fuels and used in response to accidental petroleum releases. A specific area would be designated for equipment repair and fuel storage.

- The contractor would immediately notify the State and the City if an underground storage tank, buried drum, contaminated soil, or hazardous materials or debris, is discovered during construction.

- If a hazardous material spill occurs as part of the construction process or in the construction area, the contractor would immediately notify the City. If necessary, the City would call the Idaho State Communication Public Health Paging System to activate the emergency response system. At minimum, the contractor would be required to ensure the spill is contained immediately. If hazardous material enters a stormwater conveyance (ditch, culvert, and basin) with the potential to reach surface waters, that conveyance system would be blocked, dammed, or diked.

- Contractors would be required to comply with the Idaho Hazardous Waste Management Regulations.

2.3 No-Action Alternative

Under the No-Action Alternative, DOE and HUD would not authorize the City to expend Federal funding for the Proposed Project. As a result, the expansion of the geothermal system would be delayed until the City could identify other funding sources. The project could also be abandoned if other funding sources could not be obtained. If the project were abandoned, reductions in fossil fuel use and improvements in energy efficiency would not occur and DOE's ability to achieve its objectives for renewable energy and energy efficiency would be impaired. Additionally, if the Proposed Project did not proceed, the potential impacts to the issue areas discussed below would not occur.

If the project did proceed without DOE and HUD's financial assistance, the potential impacts would be essentially identical to those under DOE's Proposed Action (that is, providing assistance that allows the project to proceed). In order to allow a comparison between the potential impacts of a project as implemented and the impacts of not proceeding with a project, DOE assumes that if it decided to withhold assistance from this project, final design and construction of the City's Proposed Project would not proceed.

3.0 AFFECTED ENVIRONMENT & ENVIRONMENTAL CONSEQUENCES

This section of the EA describes the existing environmental, social, cultural, and economic conditions found in the project area as well as the anticipated effects to these resources that could result from implementation of the Proposed Project and the No-Action Alternative. The project area boundaries are approximately from Front Street in the north to University Drive to the south, and Capitol Boulevard to the west to Broadway Avenue to the east (Figure 2-1). Some of the characteristics described may extend beyond these perimeters in order to capture corresponding impacts.

3.1 Environmental Resources Evaluated and Dismissed from Further Analysis

This section of the EA examines the potential environmental impacts of the Proposed Project and the No-Action Alternative for the following resource areas:

- Land Use
- Geology and Soils
- Water Resources
- Cultural Resources
- Biological Resources
- Hazardous Materials and Waste

In an effort to streamline the NEPA process, this EA did not examine the following resource and subject areas at the same level of detail as the resource areas listed above. The EA focused on those activities or actions that would require new or revised permits, those with potential for adverse environmental impacts, or those with potential for controversy. DOE concludes that the City's Proposed Project would result in no impacts or minor impacts to the following resource areas, and the detailed description and analyses of these resources are not carried forward:

- <u>Transportation and Traffic</u> – The Proposed Project would not require modification to any roadways. Traffic control would be performed by the contractor during construction and would follow ACHD and ITD requirements. The contractor would be required to obtain any necessary permits from ACHD and ITD (i.e., right-of-way encroachment, lane closure permit, etc.). Because the construction would be temporary and follow ACHD and ITD guidelines, the impact to the public traveling along these roadways would be minimal.

- <u>Noise</u> – During construction activities, noise levels would temporarily increase in the project area. This temporary increase in noise levels would cease upon completion of construction activities. The anticipated noise levels for a geothermal pipeline are not subject to noise impact requirements outlined by HUD. This increase would be due to the use of heavy machinery, and electrical, battery or gas powered tools. Contractor vehicles and hand held tools may also be used. Noise from construction equipment that is likely to be used on this project (e.g., tractors, trucks, graders, etc.) could reach up to about 95 dBA when measured from a distance of 50 feet. Similar noise levels are often experienced in loud urban daytime environments. Construction activities are expected to move through the corridor and would not remain in one location for an extended period of time. Construction-related noise emissions would be temporary, and would be subject to local construction noise ordinances.

- <u>Aesthetics</u> –The geothermal pipelines would be buried underground or located beneath bridge decks and would not create a visual impact other than during construction when the ground would be temporarily disturbed. Because the pipelines would be buried in existing rights-of–way and disturbed surfaces would be returned to pre-construction conditions, visual impacts would be minimal. The pipes along the Capitol Boulevard and Broadway Avenue bridges would be placed beneath the bridge deck and would not be readily visible to motorists on adjacent roadways or to pedestrians on sidewalks, on the BSU campus or at Julia Davis Park. Pedestrians and bicyclists accessing the Boise River Greenbelt that runs beneath the bridges as well as river recreationalists (e.g., persons in rafts and inner tubes) would see the pipeline attached to the bridge decks; however, there are existing pipelines beneath the decks and such a view would not be obstructive and is considered to be a minimal impact.

- Socioeconomics – The Proposed Project would create construction jobs as well as provide long-term energy related cost savings to BSU by using geothermal energy for heating compared to conventional heating resources, such as natural gas and electric. The project would not displace any residences or businesses, though construction activities may cause some temporary disruptions to businesses, commuters, and to BSU campus activities. Such disruptions would be minimized through traffic control plans, coordination of construction schedule with area activities (e.g., avoiding lane closures during BSU football games) and advance notice of construction activities to area businesses, residents, students, faculty and the public.

- Environmental Justice – The evaluation of impacts to environmental justice depends on demonstrating that significant, adverse impacts from the Proposed Project are not disproportionately borne by any low-income or minority groups in the affected community. Information for this project was obtained from the U.S. Census Bureau, and census tracts 1, 9, and 10 were evaluated to obtain information for the project area. At the time of the 2000 Census, the minority population in the project area was approximately 10.8 percent (Bureau of the Census 2000) compared to 7.8 percent for the entire City. In terms of low income households, 19.7 percent of the population in the project area was below the poverty line in 2000. It is not expected that any major changes in the minority or low-income population have taken place since the 2000 Census. This relatively high poverty rate is attributed to the census tract, including the central and surrounding areas of the BSU campus, which includes a large number of university students. Studies have cited that students often comprise a portion of the U.S. Census definition of poverty since they do not live with a family above the poverty level or they often make less than $10,000 per year in income (Ball State University 2008). For the Proposed Project, no adverse impacts would occur to any residents of the communities in or near the project area. Therefore, there would be no adverse and disproportional impacts to minority or low-income populations.

3.2 Land Use

3.2.1. Existing and Future Conditions

The project area is comprised of business and retail commercial establishments, Julia Davis Park, BSU and some residences. Most of the residential development in the project area is student housing associated with BSU, especially on the south side of the Boise River. Also, most of the newer development near the city center is considered mixed-use due to the combined commercial and residential nature of the development.

The project is within the Boise City limits and would be guided by the City of Boise Comprehensive Plan (City of Boise, 1997) and local zoning regulations, which are administered by the City of Boise Planning and Development Services. BSU has conducted a detailed campus planning effort as part of the BSU Campus Master Plan.

The City of Boise Comprehensive Plan recognizes continued and increased use of the City's geothermal resource by identifying goals and objectives to: "provide continued and increased use of existing geothermal systems, for building heating or other similar purposes" and "to protect the geothermal resource and ensure that new development incorporates the geothermal system where appropriate" (City of Boise, 1997).

The City of Boise Comprehensive Plan future land use map identifies land use near Capitol Boulevard towards the downtown area as mixed-use, with commercial use at the fringe of the BSU campus, and medium and high-density residential land use throughout the campus. Future land use along Broadway Avenue is represented as commercial use adjacent to the transportation corridor, with medium and high density residential in the surrounding areas.

The BSU Campus Master Plan outlines campus growth, including future buildings, land uses, and projected associated infrastructure for the campus over the long-term. The plan also identifies key utility corridors on campus. As part of the Campus Master Plan utility framework for the BSU campus, critical streets and pathways for the location of wet and dry utilities are identified.

The campus facilities component of the Master Plan identifies the BSU facility improvements that are projected through 2015 and beyond. The future facilities identified in the plan help to project the need for future heating and energy capacity on the campus. Specifically, these building locations direct the appropriate location for the geothermal pipeline. Maintaining proximity to existing and planned geothermal-heated campus buildings would limit the length of the local distribution pipelines that are needed to directly access campus buildings. Identifying an appropriate route that minimizes the need for excessive local distribution pipelines was a goal of this project.

Future development on the BSU campus is not contingent upon the geothermal system expansion. The BSU Campus Master Plan, including the Future Facilities Map, cited planning for future facilities and buildings prior to available funding for the geothermal system expansion.

3.2.2. Airport Zoning

Airport zoning designations are often coordinated by local land use planning agencies and influence regional development near an airport. According to HUD environmental standard requirements, designated primary and commercial service airports and all military airports covered by 24 CFR Part 51(D) and 32 CFR, under 24 CFR Part 51(D) should be considered in an environmental impact assessment. The HUD requirements for Clear Zones (CZ), Accident Potential Zones (APZ), and Runway Protection Zone (RPZ) were evaluated.

The Boise Air Terminal and Gowen Field in Boise, Idaho, is a joint civil-military, commercial and general aviation airport that is located approximately 4 miles south of downtown Boise. The Gowen Field Air National Guard Base portion of the airport is used by the Idaho Air National Guard. The location of the Gowen Field airport runway is approximately 12,400 feet from the nearest portion of the Proposed Project. According to HUD's website, projects subject to HUD requirements include properties located within 2,500 feet of the end of a civil airport runway or 8,000 feet of the end of a military airfield runway as shown here: http://www.hud.gov/offices/cpd/environment/review/airport.cfm. This section of HUD's website provides different separation distances than those identified in the HUD Clear Zone and Accident Potential Zone checklist, which is also available online at: http://www.hud.gov/local/shared/working/r10/environment/clearzone.pdf. Regardless of the exact separation distance, the project is not located in CZ, APZ or RPZ areas, and additional airport zoning impact findings are not required for the project. Supporting documentation to meet HUD airport requirements is provided in Appendix C.

3.2.3. Discussion of Impacts

Proposed Action

Expansion of the geothermal pipeline would serve the future growth of both the City and BSU.. Growth of the geothermal system is anticipated and encouraged as part of the City's future growth as outlined in the City of Boise Comprehensive Plan. Extending the pipeline south of the Boise River would provide the potential to serve additional future City and BSU growth in this area. Future land use plans outlined in the City of Boise's Comprehensive Plan suggest continued commercial growth in areas surrounding the BSU campus. Connecting new growth to the geothermal pipeline would support the City's objectives for ongoing incorporation of the geothermal system.

Existing and future campus facilities and associated infrastructure are identified in the BSU Campus Master Plan. Extending the City's geothermal system to accommodate existing and future campus buildings would also coincide with the ongoing energy needs of the BSU campus.

Construction and operation of the proposed geothermal pipeline extension would not interfere with existing or planned future land uses and would not require a change in land use designation. The construction of the Proposed Project would be in compliance with Idaho utility permitting requirements. It would also follow preferred utility corridors identified in the BSU Master Plan. No impacts to airport CZ, APZ or RPZ would occur from this project.

The Proposed Project is consistent with local and regional planning documents. DOE anticipates that any impacts to land use from expansion of the geothermal system would be short-term and minimal. Land use adjacent to the project would not be impacted, and post-construction grades along the geothermal pipeline route would be returned to pre-construction conditions. Due to the land use coordination that has occurred with the City and BSU for this project, impacts to land use in the project area are expected to be minimal.

No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to the City for the Proposed Project, and DOE assumes for the purposes of this EA that the project would not proceed without this assistance. There would be no impacts to land use; however there would not be a reduction in greenhouse gas emissions or improved access to renewable geothermal energy.

3.3 Geology and Soils

3.3.1. Existing Conditions

Geology

The City is located in the western portion of the Snake River Plain and within the Boise River drainage area (Treasure Valley). The Snake River Plain is a prominent depression across southern Idaho, extending 400 miles in an east-west direction. It is arc-shaped with the concave side to the north. The western portion of the Snake River Plain, which includes Treasure Valley, is about 30 miles wide from north to south. It is a fault-bounded basin with both the land surface and the rock layers dipping toward the axis of the plain. The basin is filled by interbedded volcanic rocks and lake bed sediments of Tertiary and Quaternary age (Squires et al. 1992).

Within the Treasure Valley, geologic features include foothills, floodplains, step-like terrace sand faults at the base of the foothills and at depth in terraces. These geologic features are the result of a complex history of valley-floor subsidence, glacial episodes, and volcanism. The Treasure Valley foothills (starting approximately 1 to 2 miles north of the project area) are composed of granite, basalt, and consolidated sedimentary rocks. Floodplains and most terrace sediments are the result of weathering from nearby foothills and mountains. These sediments are composed primarily of varying thicknesses of soil overlying beds and lenses of clay, sand, and gravel. Although these types of sediments are similar in all terraces, the distribution of beds and lenses of sediments is heterogeneous and erratic within each terrace, and probably discontinuous from one terrace to another (USGS 1998). Basalt is exposed at land surface or interbedded at certain depths in older terrace sediments. Older regional sedimentary and volcanic rocks underlie floodplain and terrace sediments.

Seismicity

According to the Idaho Geological Survey (IGS), the historic record of seismicity in Idaho reveals at least a moderate threat from earthquakes (IGS 2010). The largest recorded earthquake within a 125 mile radius of the project area was a 7.0 magnitude event that occurred on October 28, 1983, in Custer County, Idaho. The earthquake, centered at Borah Peak approximately 110 miles from Boise, caused damage to the cities of Challis and Mackay. Numerous other earthquakes have occurred near the Challis area. The project is not located within a centralized seismically active region. Small earthquakes occurred in the City of Boise in 1916 and 1945, but limited damage was cited from these instances.

Soils and Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for other uses, such as cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, according to acceptable farming methods. Table 3-1 summarizes soils in the project area and soil ratings for prime farmland suitability. Figure 3-1 depicts the locations of these soils.

The Natural Resource Conservation Service (NRCS) soil survey shows urban land, Moulton fine sandy loam, Notus soils, Sebree silty clay loam, and water throughout the project area. Four of these soils are rated "Prime Farmland if Irrigated." Land use in the project area is urbanized and while prime farmland soils exist, the area is not classified as prime farmland because of urban development.

Table 3-1. Natural Resource Conservation Service Soils Mapped in Project Area

Soil Survey Area Map Unit Symbol	Map Unit Name	Rating
25	Chance fine sandy loam	Not Prime Farmland
47	Drax Goose Creek, urban land complex	Not Prime Farmland
56	Falk Moulton, urban land complex	Not Prime Farmland
111	Moulton fine sandy loam	Not Prime Farmland
112	Notus soils	Not Prime Farmland
123	Pits, Gravel	Not Prime Farmland
147	Purdam-Power, urban land complex, 0 to 2 percent slopes	Prime Farmland if Irrigated
156	Ridenbaugh-Sebree silty clay loams, 2 to 4 percent slopes	Prime Farmland if Irrigated
195	Urban land	Prime Farmland if Irrigated
198	Xerollic Haplargids, very steep	Prime Farmland if Irrigated
201	Water	Not Prime Farmland

Source: Natural Resource Conservation Service Web-Based Soil Survey Data, July 2010. See Table 3-1 for soil number identification and series name.

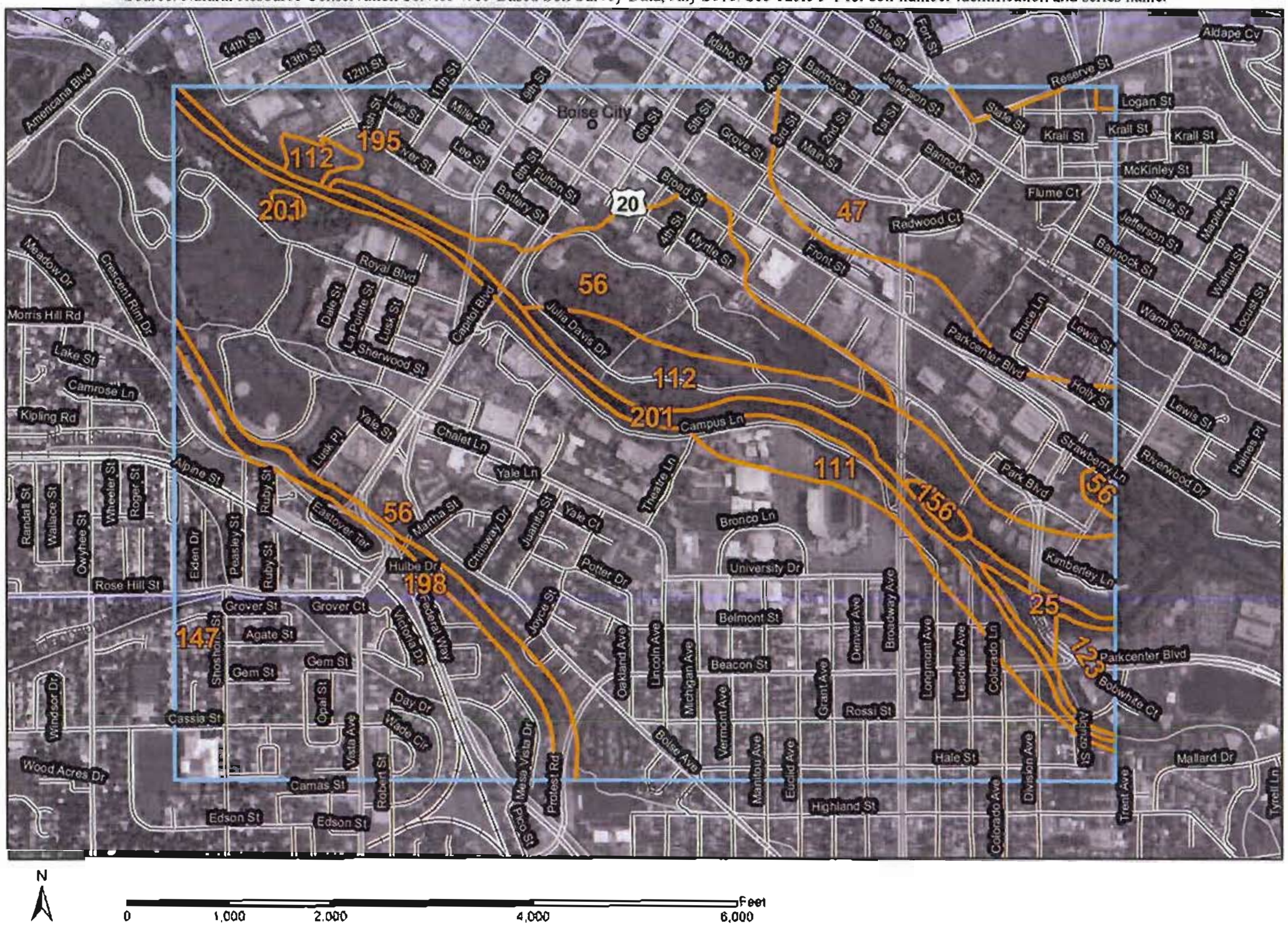

Figure 3-1. Natural Resource Conservation Service Soils Mapped in the Project Area

3.3.2. Discussion of Impacts

Proposed Action

The majority of the soils along the proposed pipeline corridor have been disturbed by construction of the existing roadways and placement of existing utilities. The prevalent soil series found along the transmission pipeline corridor is Falk Moulton, urban land complex (Table 3-1). According to the NRCS soil survey other soil types within the transmission pipeline corridor include Notus soils, Sebree silty clay loam, and water. These soils are minor in extent compared to Falk Moulton, urban land complex. The majority of soils along the corridor have been disturbed by roadway and sidewalk construction, landscaping, and underground utilities. The Proposed Project would not result in the permanent loss of any soils which are cultivated and no loss of prime or unique farmlands would occur as a result of this project.

Pipeline construction associated with the Proposed Action would result in ground disturbance of approximately 2.1 acres. Ground disturbance for the Proposed Project would not encounter bedrock and the project is not anticipated to affect tectonics or geology in the project area. Limited seismic activity has historically occurred in the Boise region, and seismic impacts to the project are unlikely. In undeveloped or landscaped areas, topsoil would be salvaged in accordance with BMPs and impacted areas would be reclaimed. The stockpiling, reuse, and seeding of topsoil would minimize any adverse effects of construction-related disturbances. Upon completion of the construction phase, disturbed areas would be stabilized, re-vegetated, or reconstructed. The Proposed Action would not result in the permanent loss of any existing landscaped areas and no impacts to geology or tectonics are anticipated by the project.

No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to the City for the Proposed Project, and DOE assumes for the purposes of this EA that the project would not proceed without this assistance. There would be no change to existing geology and soils, nor would there be a reduction in greenhouse gas emissions or improved access to renewable geothermal energy.

3.4 Water Resources

3.4.1. Existing Conditions

Wetlands, Rivers, and Canals

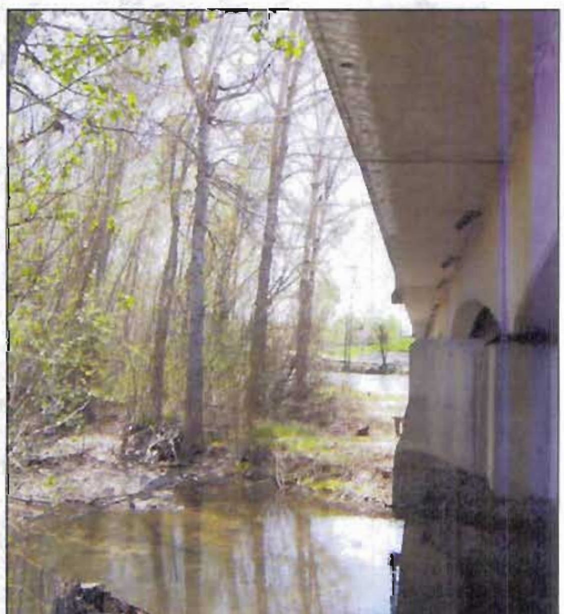

Figure 3-2. Forested Wetlands Adjacent to Capitol Boulevard Bridge. Photo March 25, 2010

The USACE, through Section 404 of the *Clean Water Act*, has regulatory authority over waters of the U.S., including wetlands and the Boise River. This authority empowers the USACE to identify wetland/upland boundaries and to regulate the placement of fill material into jurisdictional wetlands and waters. Wetlands in the project area were identified through the USFWS National Wetland Inventory (NWI) and site reviews, using the USACE Wetlands Delineation Manual (USACE 1987).

In addition to Section 404, Executive Order 11990 requires that all Federal agencies, to the extent permitted by law, avoid undertaking or providing assistance for new construction located in wetlands (both jurisdictional and non-jurisdictional wetlands), unless the agency finds (1) that there is no practicable alternative to such construction, and (2) that the Proposed Project includes all practicable measures to minimize harm to wetlands, which may result from such use.

The plant associations found along the Boise River in the project area include: (1) forested wetland, dominated by black cottonwood (*Populustrichocarpa*) with Wood's rose (*Rosa woodsii*) understory; (2) scrub-shrub wetland, dominated by willows (*Salix spp.*); and (3) some emergent wetlands along the banks dominated by common rush (*Juncuseffusus*) and/or reed canary grass (*Phalarisarundinacea*) communities. An example of forested wetland habitat adjacent to the Capitol Boulevard Bridge in the Boise River is shown in Figure 3-2. Benefits provided by such wetlands include groundwater recharge and discharge, flood storage, shoreline anchoring, sediment trapping, nutrient retention and removal, food chain support, and habitat for fish and wildlife.

Flow in the lower Boise River is controlled by the Lucky Peak Dam located approximately 9 miles upstream of the project area. This dam is one of three Federal dams on the upper Boise River, which are operated as a system by the USACE and the U.S. Bureau of Reclamation. Two dams, Arrowrock and Anderson Ranch, complete the series of three large reservoirs on the Boise River upstream of Boise. While originally built for different purposes, the three dams operate as an integrated system for congressionally authorized purposes, including flood control, irrigation, hydropower and recreation. Irrigation flows, diverted into canals early in the year, often complement the flood control operation by allowing higher flows to be released from Lucky Peak Dam. The most significant of these diversions on the lower Boise River is the New York Canal. Generally, river flows are greatest in the spring and lowest during the winter months. The Boise River is a water of the U.S. and all wetlands hydraulically connected to the river are also waters of the U.S.

A map showing the waters and wetlands in the project area, as identified in the NWI, is shown in Figure 3-3.

Groundwater Conditions

The Boise geothermal aquifer resides in a complex series of igneous rocks and interbedded sediments. Geothermal wells are deep (880 to 2,000 feet below the ground surface) and penetrate through a shallow alluvial aquifer and a deeper confined or semi-confined basalt aquifer before encountering the geothermal water. Geothermal water occurs along faults at the base of the Boise foothills. The City has located its geothermal wells in these faults (see Figure 2-3 above). Recent upgrades to the City's geothermal system allow for 100 percent re-injection of the geothermal water back into the geothermal aquifer. By re-injecting geothermal water after it has been used for heating, the City helps to stabilize geothermal aquifer pressure and properly manage high fluoride (approximately 15 parts per million) water (Liberty 1996). The fluoride is a naturally occurring element in the geothermal aquifer system and is at a higher concentration than found in the shallow and deep aquifers and in the Boise River. The geothermal water is non-contact water in that it is contained in a closed loop system and does not come into contact with other waters or chemicals. Thus, the water that is re-injected has the same chemical and physical properties as the originally pumped geothermal water except that the water has dropped in temperature by 40 to 50 degrees.

In 2003, the City conducted the Investigation of Hydrogeologic Conditions and Groundwater Flow in the Boise Front Geothermal Aquifer to assess geothermal aquifer impacts posed by a geothermal system expansion (Petrich 2003). The study conducted model simulations to determine if increased re-injections of spent geothermal water would affect temperatures or water levels at other geothermal wells. Results of the model simulations suggest that the hydraulic impact of increased pumping/injection would be minimal, even with a 100 percent increase in current pumping rates. However, the model simulations also indicated a possibility of long-term temperature decreases of up to 6°F over the life of the system (approximately 30 years) with the injection well hydrologically downstream of the pumping wells. Therefore, the City is

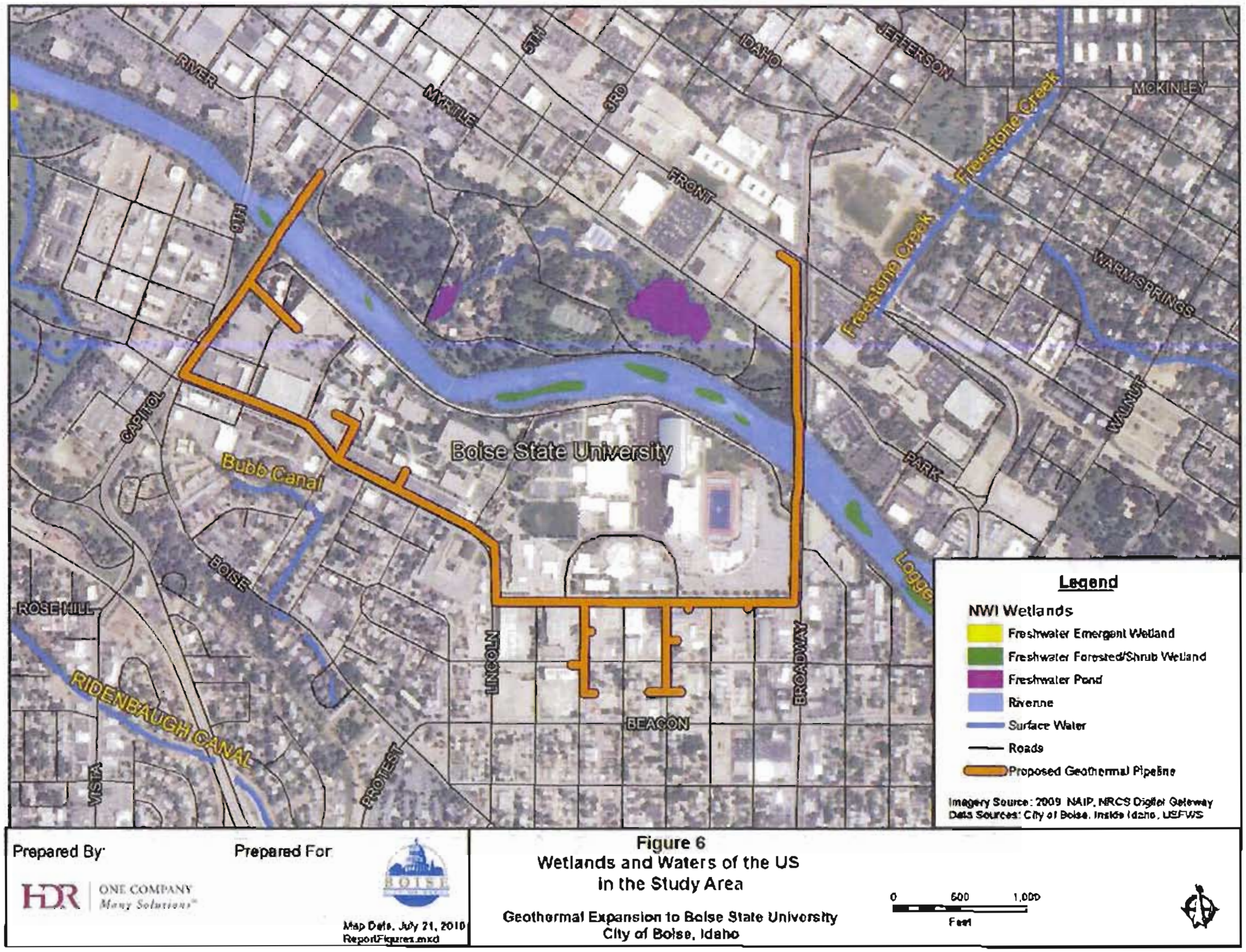

Figure 3-3. Wetlands and Waters in the Study Area

conducting ongoing monitoring and reporting of water levels, temperatures, pressures and flow rates to better track current and future geothermal withdrawals and re-injections.

Shallow groundwater in the area is comprised of unconsolidated, alluvial deposits of clay, silt, sand, and gravel, and exists under both water table and artesian conditions. Recharge to the shallow aquifer in Treasure Valley is mainly from irrigation canal leaks and laterals and from percolation of irrigation water applied in excess of crop (or landscape vegetation) requirements. Lesser amounts of recharge are supplied by infiltration of precipitation and surface water, upward leakage of water from the deep aquifer, natural inflow of groundwater from upgradient locations, and seepage from rural domestic septic systems. Seasonal changes in direction of groundwater movement are common, however, shallow groundwater generally flows toward or parallel to the Boise River. Groundwater studies conducted on the BSU campus (refer to Section 3.7 for details) indicate that shallow groundwater in the area ranges from 5 to 20 feet deep. Groundwater is present at varying depths in floodplain and terrace sediments. Groundwater is the primary source of private and public drinking water in the Treasure Valley (USGS 1998) and is used for domestic, irrigation, stock, commercial, and industrial consumption.

Floodplains

Executive Order 11998, "Floodplain Management" (May 24, 1977) directs each Federal agency to issue or amend existing regulations and procedures to ensure that the potential effects of any action it may take in a floodplain are evaluated and that its planning programs and budget requests reflect consideration of flood hazards and floodplain management.

The Code of Federal Regulations, Parts 1021 and 1022, establish environmental review requirements for DOE for floodplains and wetlands. These regulations establish policy and procedures for achieving DOE's responsibilities under Executive Orders 11990 and 11998, including:

- policy regarding the consideration of floodplain and wetland factors in DOE planning and decision-making; and

- procedures for identifying proposed actions location in a floodplain or wetland, providing opportunity for early public review of such proposed actions, preparing floodplain or wetland assessments, and issuing statements of findings for actions in the floodplain.

Per these regulations, DOE is required to prepare a floodplain assessment for any proposed floodplain action in the base floodplain and a wetland assessment for any proposed wetland action. The assessments are required to include a project description, a discussion of floodplain or wetland impacts, and an evaluation of alternatives, which are provided in this EA. The results of these assessments are further outlined in the Discussion of Impacts section below.

A review of Federal Emergency Management Agency (FEMA) flood insurance rate maps for the area show that the Boise River is the primary floodway through the City. Most of the project area is located within a 500 year floodplain zone. A small segment of the project area is located within the 100 year floodplain on the north side of the crossing at Capitol Boulevard (Figure 3-4).

Stormwater and Water Quality

Construction activities (including soil disturbing activities, such as clearing, grading, excavating, and stockpiling, etc.) that disturb one or more acres of land are regulated under the NPDES stormwater program. Operators of regulated construction sites are required to develop a SWPPP; implement sediment, erosion, and pollution prevention control measures; and obtain coverage under a USEPA's Construction General Permit (CGP). The USEPA is the permitting authority in Idaho under the NPDES program. The CGP outlines a set of provisions that construction operators must follow to comply with the requirements of the NPDES stormwater regulations. In addition, construction activities in ACHD right-of-way must obtain an Erosion and Sediment Control permit from ACHD. This permit is in addition to the USEPA CGP. Construction that occurs on BSU campus property is covered by the CGP permit only.

The IDEQ determines the sources of pollutants and sets Total Maximum Daily Loads (TMDLs), or the maximum amount of pollutants that each source can discharge to a water body. A TMDL report was produced for the lower Boise River from Lucky Peak Dam to the Snake River (IDEQ 1999). The report identifies that the beneficial uses of the lower Boise River such as cold-water biota, salmonid spawning, recreation, and agricultural water supply (except for agricultural water supply) have been impaired due to sediment loading and the presence of high levels of bacteria in the river. As such, an implementation plan for the Boise River TMDL was developed in 2003. The plan outlines BMPs for reducing sediment and bacteria from point and non-point sources, and establishes a schedule for implementing the BMPs.

Boise Municipal Code, Chapter 11-16, the Boise River System Ordinance, protects floodplains and riparian resources, as these lands and waters provide valuable recognized natural resource habitats for wildlife and fisheries, as well as public recreation and public access. Under this ordinance, the Boise River corridor and associated floodway and riparian forest are considered Class A lands and waters. Class A lands and waters are classified as areas which provide extremely important habitats for fish and wildlife and for flood control and protection. As such, construction in and around the Boise River would be required to be conducted in accordance with this ordinance. The pipeline river crossings would be considered a use of Class A lands and would be subject to a Boise River System Development Permit.

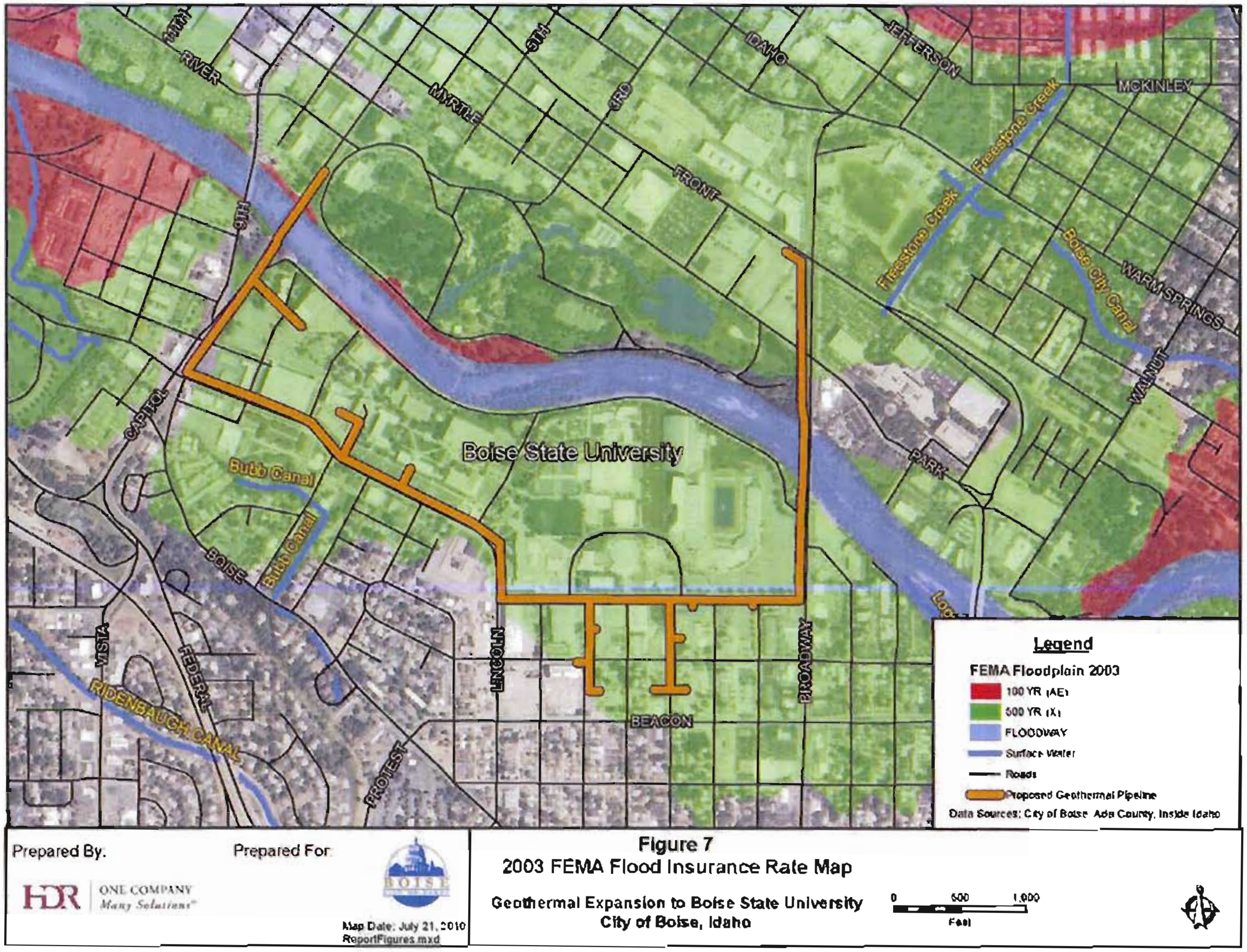

Figure 3-4. 2003 FEMA Flood Insurance Rate Map

3.4.2. Discussion of Impacts

Proposed Action

The geothermal pipeline would be suspended above the Boise River waterway (beneath the bridge deck) and is not anticipated to encroach upon Boise River wetlands or the floodway in the project area. A portion of the pipe and supporting structure would be placed in the 100-year floodplain on the north end of the Capitol Boulevard Bridge (Figure 3-4). Since final construction would match current conditions (e.g. the project area would be restored to existing conditions), drainage patterns and surface elevations would not be altered.

Excavation activities near surface water bodies would have the potential to impact water quality. Uncovered or otherwise uncontained soils may erode into surface waters, increasing suspended sediment. As such, the project would obtain stormwater permits and develop and implement a SWPPP and an Erosion and Sediment Control Plan. With implementation of stormwater BMPs, including filtering of sediment, direct impacts to water quality (surface water and groundwater) can be minimized for the Proposed Project. To mitigate potential spills of petroleum products or other pollutants, the contractor would be required to have an emergency response program for accidental releases.

Although some work can be done from the bridge deck, construction equipment (e.g., track hoe and front-end loader) would need to enter the Boise River in order to support the placement of piping and support structures beneath the bridge decks of the Capitol Boulevard and Broadway Avenue bridges. Construction equipment in the river could potentially create a temporary disturbance to river bed dynamics. A short-term change in river dynamics can temporarily influence water quality, for example, increasing sediment in the river. A USACE Section 404 permit would be required for equipment access to the river. The Section 404 permit would be filed jointly with IDWR and would require water quality certification from IDEQ, The permit would list requirements for site preparation, construction operation, and restoration requirements. In-river access would be restricted to periods of low flows. Any river bank, bed, or wetland disturbance would be treated as directed by the 404 permit. The USACE has previously allowed in-river access of heavy equipment for bridge construction and repair, including a 2002 ACHD-obtained permit for in-river work for pier repair at the Capitol Boulevard Bridge that included the construction of a temporary coffer dam.

During normal operations, the pipeline would have no impact to surface water unless the pipe leaked or ruptured resulting in the release of geothermal water to the environment. The City's geothermal system is equipped with pressure sensors, and if a rupture occurred in the pipeline beneath the Boise River bridges, it would be quickly identified and repaired. However, a leak of geothermal water into the Boise River may have temporary temperature impacts since geothermal water generally passes through the pipe at common temperatures of between 150 and 160 degrees. As described in Section 2.0, prior to construction of the injection well, geothermal water was directly discharged to the Boise River. The injection well was constructed in response to temperature concerns in the Boise River as a water quality limited parameter. In addition to temperature, the geothermal water has natural fluoride concentrations at higher levels compared to the shallow groundwater and Boise River levels. A release of geothermal water from a leaking or ruptured pipe could result in localized elevated fluoride concentrations in surface water compared to ambient conditions. Such impacts would be temporary and would not alter the water quality. This statement is supported by historic monitoring of the Boise River when the geothermal system was directly discharged to the river and downgradient fluoride concentrations were near or at ambient concentrations.

Buried pipeline would be equipped with cathotic protection to prevent corrosion, further reducing the risk of leaks. Some portions of the pipeline would be contained within existing utility vaults on the BSU campus, providing an additional barrier between the pipeline and groundwater.

Natural wetlands with high functional values are present along the Boise River and within the Proposed Project area. During construction, impacts to these areas would be limited by selecting in-river equipment routes that do not disturb these wetlands. It is anticipated that construction equipment would access the bridges from the left bank (south bank) of the Boise River in close proximity to each bridge. Heavy equipment (e.g., trackhoe and frontend loader) would enter the left bank of the river and travel toward the bridge on top of river gravels. During low flow conditions, the active river channel is near the right bank (north bank); the middle portion of the river and the left bank are dry. Several left bank ingress/egress areas have been identified that have sparse vegetation and equipment access in these locations would cause minimal impacts to riparian areas.

No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to the City for the Proposed Project, and DOE assumes for the purposes of this EA that the project would not proceed without this assistance. There would be no change to existing water resources, nor would there be a reduction in greenhouse gas emissions or improved access to renewable geothermal energy.

3.5 Cultural Resources

3.5.1. Existing Conditions

The *National Historic Preservation Act*, Section 106, requires that Federally funded, licensed, or permitted projects be reviewed for their potential impact on historic properties. Authorized under the *National Historic Preservation Act of 1966*, the National Register of Historic Places (NRHP) houses the repository of information pertaining to historic structures and districts worth preservation. The NRHP lists properties according to four National Register criteria. Each criterion outlines a specific category of historic value. The NRHP criteria include:

- **Criterion A** (Event Category) – the property contributes to some event or pattern of American history
- **Criterion B** (Person Category) – the property is associated with significant people of American history
- **Criterion C** (Design/Construction Category) – the property represents distinctive characteristics of a building through notable construction and architectural mastery
- **Criterion D** (Information Potential Category) – the property yields or has potential to yield information that is important to history

A cultural resources survey for this project was conducted to locate, record, and assess any prehistoric and historic or cultural resources visible in the study area as identified by the NRHP and through research (TAG 2010). Appendix C contains the Archaeological and Historical Survey Report completed in August 2010 for the project.

The Area of Potential Effect (APE) is defined as the pipeline corridor (Figure 2-1). Cultural resource sites identified within or adjacent to the APE are listed in Table 3-2 and described below.

- The Capitol Boulevard Bridge/Structure was built in 1931 using Federal aid funds and was located on the Old Oregon Trail highway. It was listed on the NRHP in 1990. In 1991, ACHD widened it, repaired the ornamental railing, and located memorials on the bridge. The Proposed Project involves the placement of the pipeline beneath the bridge deck.

- The Broadway Avenue Bridge/Structure was built in 1956 to replace the original bridge constructed in 1892. It is a concrete continuous stringer/girder bridge. It is eligible for NRHP listing under Criterion C as a unique example of a stringer bridge. The Proposed Action involves the placement of pipeline beneath the bridge deck.

Table 3-2. Cultural Resource Sites Recorded and Pre-Recorded in/abutting the Project Area

Site No.	Site/Feature Type	NRHP Eligibility	Distance to APE
01-15906	Capitol Boulevard Bridge/Structure	Listed	Within
01-21782	Broadway Bridge/Structure	Eligible	Within
01-1012	Christ Chapel/Building	Listed	Adjacent
GEO011	Administration Bldg	Listed	Adjacent
GEO012	Public Affairs and Arts West	Eligible	Adjacent
GEO013	Heating Plant	Eligible	Adjacent
GEO014	Math/Geology (Science Building)	Eligible	Adjacent

- The Christ Chapel Episcopal Church was constructed in 1866 as Saint Michael's Episcopal Church at the corner of Seventh and Bannock streets in Boise. The building was moved to Fifteenth and Ridenbaugh streets, and then to the BSU campus near the end of the Broadway Avenue Bridge, where it was renamed Christ Chapel. It was listed on the NRHP in 1974. This building is approximately 75 feet west of the proposed geothermal pipeline alignment.

- The BSU campus Administrative Building was one of the original buildings constructed on campus in 1940 and is listed on the NRHP as part of the Tourtellotte and Hummel Architects Thematic group. The Proposed Action would involve retrofitting this facility to the geothermal system.

- The Public Affairs and Arts West building was constructed in 1953 as Campus School. The Campus School building is eligible for NRHP listing under Criterion A for its association with the BSU campus as a cultural and social site, as well as under Criterion C, because it represents the work of a known architectural firm in Boise. This building is not identified for retrofitting to geothermal heating.

- The Heating Plant is located east of the BSU Administrative Building and is eligible for NRHP listing under Criterion A for its association with the BSU campus as a cultural and social site, as well as under Criterion C, because it represents the work of a known architectural firm in Boise. This building is not identified for retrofitting to geothermal heating.

- The Math and Geology Building is located between the Campus School building and the Administrative Building. The Science Building is eligible for NRHP listing under Criterion A for its association with the BSU campus as a cultural and social site, as well as under Criterion C, because it represents the work of a known architectural firm in Boise. The Proposed Action would involve retrofitting this facility to the geothermal system.

In addition to the historic structures described above, the Boise River was the site of Native American settlement for at least several thousand years prior to contact with Euro-Americans; prehistoric sites may be located along the Boise River.

In a July 6, 2010 letter to DOE, the SHPO confirmed the NRHP listing of the Capitol Boulevard Bridge and the NRHP eligibility listing of the Broadway Avenue Bridge. Although SHPO does not anticipate that the installation of pipeline beneath the bridge decks would be an adverse effect, the agency requested more information on pipeline construction and design. Additional information was provided to SHPO to receive concurrence with the Proposed Project.

3.5.2. Discussion of Impacts

Proposed Action

The geothermal pipelines would be placed underneath the decks where current piping from other utilities exists. The new pipes are expected to be the same size as the existing pipes and would not be highly visible from anywhere but underneath the bridge. A concurrence letter from the SHPO states "We believe that affixing the pipelines to the Broadway Avenue and Capitol Boulevard bridges will not affect the historic integrity of the bridges" (Pengilly 2010).

The Christ Chapel Church is adjacent to the APE and would not be affected by the Proposed Action. Construction work associated with the geothermal piping would take place in the right-of-way near the Public Affairs and Arts West Building and the Heating Plant and would not impact these buildings. Geothermal connections are planned for the Administration Building and the Math and Geology Building. The connections to these buildings would be located through existing utility vaults and would have no adverse effect to these historic properties. The SHPO concurrence letter verified that, "no other historic properties will be affected in the project area" (Pengilly 2010).

It is not likely that prehistoric sites would be found adjacent to or within the current APE due to the development of the area. If archaeological or paleontological resources or artifacts are observed during construction activity, work would cease immediately and additional cultural evaluations conducted. All necessary Federal mandates and objectives to protect and conserve cultural and paleontological resources would be supported. The Idaho SHPO would be contacted if archeological resources are encountered during construction of the Proposed Project.

As verified by the SHPO concurrence letter that was received on August 30, 2010, "the project will have *no effect* on historic properties" (Pengilly 2010). As a result, DOE concludes that the Geothermal Expansion to Boise State University Project would not affect any historic properties, nor would it constitute an adverse effect on cultural resources.

No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to the City for the Proposed Project, and DOE assumes for the purposes of this EA that the project would not proceed without this assistance. There would be no change to existing cultural resources, nor would there be a reduction in greenhouse gas emissions or improved access to renewable geothermal energy.

3.6 Biological Resources

3.6.1. Existing Conditions

Vegetation

Natural habitat in the project area is limited to the Boise River riparian zone (river bank area). This zone contains a variety of wetland plants (see Figure 3-2 for a photograph of the riparian area and Section 3.4.1 for a description of wetland plants). The remaining areas along the proposed alignment are covered by impervious surfaces (e.g., asphalt and concrete), irrigated turf, and irrigated landscaping. Many large landscaping trees, bushes and flowers are located within the BSU campus, as well as in Julia Davis Park, which is in the project area (Figure 1-1).

Wildlife

Wildlife species present in the project area are those commonly associated with the Boise River, Julia Davis Park, and the BSU campus. The Boise River provides habitat for songbirds, deer, fox, raccoons, rodents, rabbits, beaver, muskrats, and snakes. Several birds of prey, including bald eagles and osprey have been observed in the project area. Eagles winter along the Boise River. In the project area, bald eagles have been observed perching in cottonwood trees and hunting in and along the Boise River. Numerous waterfowl species use the Boise River, especially during winter months. Birds may be found in the area as either seasonal residents or as migrants. Table 3-3 lists the major game and non-game species as well as aquatic species found in the project area.

Table 3-3. Game and Non-Game Wildlife Species in the Project Area

Description	Common Name	Scientific Name
Reptiles	Western skink	*Eumecesskiltonianus*
	Western terrestrial garter snake	*Thamnophiselegans*
	Common garter snake	*Thamnophissirtalis*
Amphibians	Western toad	*Bufoboreas*
	Pacific tree frog	*Hylaregilla*
	Great Basin spadefoot	*Scaphiopusintermontanus*
	Striped chorus frog	*Hylatriseriata*
	Northern leopard frog	*Ranapipiens*
	Spotted frog	*Ranapretiosa*
Mammals	Vagrant shrew	*Sorexvarans*
	Western pipistrelle	*Pipistrellushesperus*
	Nutall's cottontail	*Sylvilagusnutallii*
	Beaver	*Castor Canadensis*
	Deer mouse	*Peromyscusmaniculatus*
	Muskrat	*Ondatrazibethica*
	Western jumping mouse	*Zapusprinceps*
	Porcupine	*Erethizondorsatum*
	Raccoon	*Pricyonlotor*
	Ermine	*Mustelaermine*
	Striped skunk	*Mephitis mephitis*
	Red fox	*Vulpesvulpes*
	Mule deer	*Odocoileushemionus*
	White tailed deer	*Odocoileusvirginianus*
	Coyote	*Canislatrans*
	Skunk	*Mephitis mephitis*
Birds	Great Blue heron	*ArdeaHerodias*
	Double-crested cormorant	*Phalacrocoraxauritus*
	Osprey	*Pandionhaliaetus*
	Wood duck	*Aix sponsa*
	Bald eagle	*Haliaeetusleucocephalus*
	Golden eagle	*Aquila chrysaetos*
	Other migratory birds (geese, neotropical birds, songbirds, and owls)	
Fish	Rainbow trout	*Oncorhynchusmykiss*
	Brown trout	*Salmotrutta*
	Mountain whitefish	*Prosopiumwilliamsoni*
	Suckers	*Catostomusmacrochielus*
	Chiselmouth chub	*Arocheilusalutaceus*
	Northern squawfish	*Ptychocheilusoregonensis*

Source: IDFG 2010.

Bald Eagle and Migratory Bird Species

The bald eagle was removed from the Federal List of Endangered and Threatened Wildlife and Plants on August 9, 2007. However, the bald eagle remains protected under the *Bald and Golden Eagle Protection Act* (BGEPA). Disturbance of bald and golden eagles is prohibited under the BGEPA. The USFWS developed the National Bald Eagle Management Guidelines to provide landowners, land managers and others general recommendations for land management practices that uphold the provisions of the BGEPA.

Bald eagles are common on the Boise River during winter months and have been observed near the project area. Bald eagles winter in the Barber Pool area (Barber Pool Communal Roost, located approximately 4 miles upstream of the study area) and can travel down the Boise River to perch or forage during the day (Kaltenecker et al. 1994). Based on information gathered in other environmental studies along the Boise River near the project area, the Idaho Department of Fish and Game (IDFG) concluded that eagles observed perching along the river can overnight in the general vicinity during the winter but do not form communal roosting areas (ACHD 2007). The wintering period along the Boise River is generally from November 15 to March 15, with peak usage from December 15 through February 15 (Kaltenecker et al. 1994).

Threatened, Endangered, and Candidate Species

The *Endangered Species Act of 1973*, as amended, protects endangered species and the ecosystems upon which they depend. Endangered species are defined as: "any species which is in danger of extinction throughout all or a significant portion of its range," and is listed as endangered under the Endangered Species Act. A threatened species is "any species which is likely to become endangered in the foreseeable future throughout all or a significant portion of its range" and is listed as threatened under the Endangered Species Act. Candidate species are those which are eligible for listing as endangered or threatened. Candidate species have no protection under the Act, but are often considered for planning purposes.

Currently, the USFWS has listed six species as threatened, endangered, or candidate species in Ada County (Table 3-4). None of these species are known to occur in the project area.

Table 3-4. Threatened, Endangered and Candidate Species in Ada County, Idaho

Species	Status	Occurrences in Project Area
Yellow-billed Cuckoo (*Coccyzusamericanus*)	Candidate	No known occurrence; unlikely to be found in project area.
Greater Sage Grouse (*Centrocercusurophasiunus*)	Candidate	Does not occur. No habitat present.
Gray Wolf (*Canis lupus*)	Experimental Nonessential	Does not occur. No habitat present.
Bull Trout (*Salvelinusconfluentus*)	Threatened and Proposed Critical Habitat	Does not occur. No habitat present.
Slickspot Peppergrass (*LepidiumPapilliferum)*	Threatened	Does not occur. No habitat present.
Snake river Physa Snail *(Haitia (physa)natricinia)*	Endangered	Does not occur. No habitat present.

Source: USFWS, Updated September 29, 2010

3.6.2. Discussion of Impacts

Proposed Action

The project area does not have habitat to support threatened, endangered or candidate species listed in Table 3-4. The yellow-billed cuckoo is thought to be extirpated in Idaho. A 2003 survey of previously identified yellow-billed cuckoo nesting sites revealed no cuckoos in southwestern Idaho (Reynolds and

Hinckley 2005). A yellow-billed cuckoo could be present in the riparian habitats along the river corridor, but it would be a rare occurrence.

The Sage Grouse generally utilizes sage-steppe habitats throughout the West, primarily in areas dominated by sagebrush, forbs, and grasses. This habitat does not exist in the Boise River corridor near the project area. As a result, the project site and adjacent lands do not provide suitable sage grouse habitat based on canopy cover and site development conditions.

On August 5, 2010, the gray wolf was re-listed on the Federal List of Endangered and Threatened Wildlife and Plants. However, due to the urban nature of the project area, wolf habitat is not suitable in this area.

The Anderson Ranch and Lucky Peak Dams prevent Bull trout (which exist farther upstream in the Boise River system, for example, in the South Fork of the Boise River), from reaching the lower Boise River watershed. Because the dams act as physical barriers, there is no suitable habitat for bull trout in the project area. As a result, the Proposed Project would have no effect to bull trout.

According to USFWS literature, slickspot peppergrass typically grows in "slickspots," which are small areas within larger sagebrush habitat. This habitat is not present in the Proposed Project area. As such, the Proposed Project would have no effect on this species.

The Snake River physa snail requires cold, clean, well-oxygenated flowing water of low turbidity. This species is found only in the free-flowing mainstem of the Snake River and is not located in the project area. The project area does not encompass the Snake River; therefore, no habitat for the Snake River physa snail is present and the proposed project would have no effect on this species.

Habitat for bald eagle, a protected migratory bird species, exists along the Boise River. According to the 1994 *Boise River Wintering Bald Eagle Study, Boise River Corridor by* Kaltenecker, et al., the presence of human disturbance is not as disturbing in eagle perching and foraging habitats than in roosting habitats. The project area is located within perching and foraging habitat for bald eagles.

Construction activities associated with placement of the pipeline beneath the bridge decks could result in some disturbance to bald eagles. Disturbances include construction noise and vibrations associated with machinery operation and human activity by construction workers, which can cause flushing of perching eagles. A detailed literature review and field surveys of the Boise River were conducted to understand bald eagle disturbances by human activity (Kaltenecker et al. 1994). Findings of this study include:

- In perching and foraging areas, automobile traffic is one of the least disturbing human activities to which eagles are exposed. Wintering eagles commonly perch in trees close to highways and roads, provided the vehicles using the roads are continually moving. Perched eagles are more likely to be disturbed by automobile traffic when vehicles stop or make loud or sudden noises.

- Pedestrian disturbances pose the most serious threat to wintering bald eagles. Nevertheless, eagles on higher perches tend to tolerate human presence.

- Bald eagles along the Boise River are more sensitive to walkers than bicyclists, followed by fisherman. Bicyclists flush eagles less than walkers; however, eagles responded at greater distances to bicyclists than to walkers. Eagles flushed at distances of 150 to 500 feet and were least tolerant of humans who approached slowly and focused their attention on them.

- Construction activities appear to have variable impacts on wintering bald eagles. A Boise City sewer extension project along the Boise River conducted during the 1992-1993 winter was monitored by the USFWS for adverse impacts to wintering eagles. It was concluded that the project had no long-term impacts on wintering bald eagle habitat, but did displace individual eagles during construction activities.

The two river crossing areas for the Proposed Project currently experience high traffic volumes of pedestrians and bicyclists along the Boise River Greenbelt which parallels both sides of the river. In addition, there is a high volume of pedestrians, bicyclists, and automobiles that cross both bridges. Because of this daily traffic, the bridge areas are not well-suited for perching eagles. Project construction activities along the Boise River would be temporary and limited to the bridge crossing areas. Since these areas currently experience a high degree of pedestrian and bicycle traffic, the incremental increase of disturbances to eagles associated with construction activities would constitute a short-term and minor effect.

No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to the City for the Proposed Project, and DOE assumes for the purposes of this EA that the project would not proceed without this assistance. There would be no change in biological resources, nor would there be a reduction in greenhouse gas emissions or improved access to renewable geothermal energy.

3.7 Hazardous Materials

3.7.1. Existing Conditions

Perchloroethylene (PCE Plume)

The shallow aquifer beneath most of the BSU campus is impacted with the solvent PCE, a common dry cleaning solvent. The source of the contamination is attributed to the Broadway Center Laundry, located at 1217 Broadway Avenue, approximately one-quarter of a mile south of the BSU campus. The source area soils have been remediated, but PCE remains in the groundwater. The groundwater PCE plume is migrating from the dry cleaners in a northwest direction and flows beneath the central and western portions of the campus. PCE groundwater concentrations beneath the BSU campus generally fall below 20 micrograms per liter (ug/L), but above the groundwater quality standard of 5 ug/L. As such, IDEQ requires that BSU treat any pumped groundwater (e.g., groundwater dewatering during building construction projects) that exceeds 10 ug/L PCE. Drinking water on campus is provided by United Water Inc. and comes from the deep (non-impacted) regional aquifer.

The U.S. Department of Health and Human Services (USHHS) in cooperation with the Idaho Department of Health and Welfare and the Idaho Division of Health conducted an indoor air evaluation at the BSU campus in response to the PCE groundwater plume. The goal of the study was to assess if PCE in groundwater was volatilizing into campus buildings and if the vapor was presenting a health risk to workers, students, and campus residents. Based on a thorough examination of the air monitoring results, USHHS determined that the indoor PCE levels pose no apparent public health hazard to students, staff, or others at BSU. USHHS concluded that although there is PCE contamination in the groundwater and detectable PCE in the air of a few BSU buildings, the levels are low enough that if someone were to be exposed 40 hours per week (a typical work week) for 25 years, this exposure would not be expected to cause harmful health effects (USHHS 2007).

Other Hazardous Materials

The majority of the project area is comprised of commercial development, BSU campus buildings and some residential development. Buildings in the project area constructed prior to 1985 have the potential to contain asbestos and lead paint. In addition, some buildings may have or have had underground heating oil tanks. Hazardous material storage, use, or discharge to the environment by business is recorded in the IDEQ and Federal databases.

Database Search

A Federal and state environmental database search was conducted for the project area to help identify the occurrence of known solid waste landfills, hazardous waste sites, leaking underground storage tanks and superfund sites near the project area.

The sites located within an estimated 0.10 of a mile from the proposed geothermal alignment are presented in Table 3-5. The approximate location of the sites in relation to the proposed location of the pipeline is identified in the far right column.

Table 3-5. Potential Contaminated Sites Identified in the Study Area

No	Site Name	Address	Approx. Distance from Site (mi)	Contamination/ Substance	Status	Location from Pipeline
1	Jackson's Fueling Station	1005 Broadway Boise, ID 83706	0.02	Gasoline/ Tank	Currently in use	South of Boise River. Across University Drive at the corner of Broadway Avenue.
2	Car Performance Center	1265 S Capitol Blvd Boise, ID 83706	0.03	Potential Brownfield – Not classified	No attached deeds	South of Boise River. Across Capitol Boulevard.
3	Drake Mechanical	1029 Manitou Boise, ID 83706	0.04	Gasoline/ Tank	Permanently out of use	South of Boise River. Across University Drive at south end of block.
4	Boise Forestry Sciences lab	316 E Myrtle St Boise, ID 83702	0.05	Gasoline/ Tank. Potential Brownfield- Geo-located 2008 per USEPA grant inventory	Permanently out of use	Abuts Myrtle Street near Broadway Avenue.
5	City of Boise	705 S 8th St Boise, ID 83702	0.09	Brownfield	No attached deeds	North of Boise River.
6	Glass Works/Neon Rocket	530 E Myrtle Street Boise, ID 83702	0.10	Potential Brownfield- Geo-located 2008 per USEPA grant inventory	No attached deeds	North of Boise River.

Toxic Chemicals& Explosive Materials

Environmental review requirements specific to HUD-funded projects include a review of the following:

- 24 CFR Part 51 Subpart C, Siting of HUD-Assisted Projects Near Hazardous Operations Handling Conventional Fuels or Chemicals of an Explosive or Flammable Nature
- Explosive and Flammable Operations

According to HUD policy 24 CFR 50.3(i), all property proposed for use in HUD programs should be free of hazardous materials, contamination, toxic chemicals and gasses, and radioactive substances, where a hazard could affect the health and safety of occupants or conflict with the intended use of the property. All of the sites identified in Table 3-5 are free from the substances in 25 CFR 50.3(i). As stated by HUD policy, sites known or suspected to be contaminated by toxic chemicals or radioactive materials include:

sites that are listed on an USEPA Superfund National Priorities or *Comprehensive Environmental Response and Compensation Liability Act* list, or equivalent state list; sites located within 3,000 feet of a toxic or solid waste landfill site; a site that has an underground storage tank; or a site that is known to be contaminated by toxic or radioactive materials. All sites in the project vicinity that are permanently out of use must undergo site remediation and have been monitored and approved by the IDEQ for compliance with Federal contamination regulations. Sites currently in use continue to undergo compliance monitoring by IDEQ. While PCE has been identified in the groundwater aquifer of the BSU campus, based on IDEQ and Bureau of Community and Environmental Health review of the site, the PCE does not present a hazard to health or safety of occupants nor restrict the intended use of the campus.

HUD has created a series of tools, calculators and checklists to help ensure that a project meets compliance responsibilities for environmental review associated with hazardous, toxic and explosive substances. The Acceptable Separation Distance Assessment tool is an electronic application of the existing regulation 24 CFR Part 51 Subpart C and the Guidebook Siting of HUD – Assisted Projects near Hazardous Facilities available online at: http://www.hud.gov/offices/cpd/environment/asdcalculator.cfm. According to these HUD standards, buried tanks are not considered to be a hazard. As no other known aboveground storage tanks exist in the project area, no additional evaluation of previous site uses or levels of contamination are needed to meet HUD environmental review requirements. The database search that was conducted for underground and aboveground storage of toxic chemical sites is provided in Appendix C.

3.7.2. Discussion of Impacts

Proposed Action

The Proposed Project does not involve displacement of residences or the removal of structures. However, later stages of the project would involve retrofitting building heating, ventilating, and air conditioning systems to accommodate geothermal heating. Therefore, if asbestos or lead paint is encountered during retrofitting, asbestos and lead paint containing materials would be disposed of in accordance with Federal, State, and local laws during construction.

Discovery of contamination would halt project construction until the contamination is defined and appropriate management steps are determined. This is important so as not to make any contamination worse by spreading the material to non-impacted areas. In addition, project BMPs would be implemented, such as secondary containment around fuel tanks and other stored chemicals at the job site to ensure that hazardous material releases are avoided. According to HUD standards, no toxic or explosive materials are anticipated to impact the project.

Nonetheless, the following measures would be implemented if hazardous materials are encountered during construction:

- Project design would include spill prevention, control, and specific plans, such as countermeasure plans, sediment and erosion control plans, and plans for handling and disposal of known and unanticipated contamination.

- Contractors would be made aware of the existing PCE plume within the BSU campus. Groundwater that is encountered during construction activities or shallow groundwater that is pumped for other uses would be sampled for PCE and would be treated as required prior to discharge.

- Buildings and structures built prior to 1985 that would be retrofitted to accommodate geothermal heating would be inspected for asbestos-containing materials and lead-based paint. Any asbestos-containing materials and/or lead-based paint that could be disturbed would be removed in compliance with state and Federal standards and disposed of in an approved facility for asbestos prior to building demolition.

- An emergency spill response plan to address hazardous materials handling and storage during construction activities would be prepared and implemented.
- If the contractor stores fuel in bulk storage containers in excess of 1,320 gallons on the job site, a Spill Prevention Control Countermeasures and Containment Plan would be prepared and followed for management of fuels and used in response to accidental petroleum releases. A specific area would be designated for equipment repair and fuel storage.
- The contractor would immediately notify the State and the City if an underground storage tank, buried drum, contaminated soil, or hazardous materials or debris, is discovered during construction.
- If a hazardous material spill occurs as part of the construction process or in the construction area, the contractor would immediately notify the City. If necessary, the City would call the Idaho State Communication Public Health Paging System to activate the emergency response system. At minimum, the contractor would be required to ensure the spill is contained immediately. If hazardous material enters a stormwater conveyance (ditch, culvert, and basin) with the potential to reach surface waters, that conveyance system would be blocked, dammed, or diked.
- Contractors would be required to comply with the Idaho Hazardous Waste Management Regulations.

No-Action Alternative

Under the No-Action Alternative, DOE would not provide funding to the City for the Proposed Project, and DOE assumes for the purposes of this EA that the project would not proceed without this assistance. There would be no change or impacts to existing hazardous materials nor would there be a reduction in greenhouse gas emissions or improved access to renewable geothermal energy.

4.0 CUMULATIVE EFFECTS

The NEPA of 1969, as amended, defines cumulative effects as, "The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR 1508.7)."

This section defines the area considered in the cumulative effects analysis, provides an overview of relevant past and present actions in the project vicinity, presents the reasonably foreseeable actions in the area of consideration, and concludes with the cumulative effects analysis.

4.1 Area of Evaluation

As described in Section 2.0, the project consists of the extension of geothermal supply and collection main lines from immediately north of the Boise River near Capital Boulevard, to the BSU Student Union Building on University Drive, to the eastern portion of the BSU campus to Broadway Avenue, across the Boise River at the Broadway Avenue Bridge, and would connect to the City's existing geothermal loop near the Idaho Water Center Building at Broadway Avenue and Front Street (Figure 2-1). Past, present, and future projects along this route were considered for cumulative impact analysis.

4.2 Past and Present Actions

Past and present actions in the project area consist primarily of urban development activities, and dispersed recreation activities associated with the park, the Boise River Greenbelt, and the Boise River. Past infrastructure activities including communication cables and towers, water, natural gas, sewer, transportation corridors, pedestrian walkways and bike paths, and the local road network have contributed to an integrated arrangement of social, business, residential, and economic uses in an urbanized environment in the project area.

The Boise River is maintained as a natural waterway, but has been disturbed by previous construction activities (e.g., bridges), as well as impacts from ongoing water and stormwater infiltration activities. Furthermore, the Boise River is a regulated river in that flows are controlled by a series of upstream dams and reservoirs. Thus, frequency of flooding has decreased compared to pre-dam conditions. The flood control efforts have resulted in a redefined floodplain resulting in buildings, parks, bike and pedestrian paths, and infrastructure closer to the river banks than would have occurred if there were no upstream flood control.

The City has been conducting ongoing geothermal development activities for its geothermal system infrastructure to monitor pressure levels, and geothermal liquid re-injection temperatures. By acknowledging concurrent regional infrastructure improvement activities, construction of the geothermal pipeline can be coordinated more successfully. Within the area of the proposed geothermal alignment, other present and near future activities include:

- Continued expansion of BSU campus, including construction of buildings, open spaces, and infrastructure, as outlined in the BSU Campus Master Plan (ongoing)
- Bridge repair or replacement of the Broadway Bridge by ITD in 2015
- Roadway overlay project of University Avenue from Capitol Boulevard to Lincoln Avenue in 2011 by ACHD

5.0 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section includes an analysis of irreversible and irretrievable commitment of resources. A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource or limit those factors that are renewable only over long periods of time. Examples of nonrenewable resources are minerals, including petroleum. An irretrievable commitment of resources refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations. Examples of irretrievable resources are the loss of a recreational use of an area. While an action may result in the loss of a resource that is irretrievable, the action may be reversible. Irreversible and irretrievable commitments of resources are primarily related to construction activities.

These resource impacts are considered impacts to non-renewable resources. For the Proposed Project, most resource commitments are neither irreversible nor irretrievable and are considered short-term and temporary.

Specifically, resources consumed during construction of the project, including fossil fuels and construction materials, would be committed for the life of the project. Non-renewable fossil fuels would be irretrievably lost through the use of gasoline and diesel powered construction equipment during construction. Moreover, the use of geothermal water and heat also represents an irretrievable impact to the geothermal resource. However, recent estimates suggest that the geothermal resource's heat production potential likely exceeds the proposed use of the resource. Also, the same amount of geothermal fluid used would be re-injected and both the geothermal fluid and heat would likely recover soon afterwards. Lastly, retrofitting BSU campus buildings to accommodate geothermal heating would require the irreversible and irretrievable commitment of building materials.

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Appendix A

Notice of Scoping Letter and Comments and Responses

Appendix B

Archaeological Historical Survey Report

Appendix C

HUD Environmental Requirements