DOE/EA-2171

Final Environmental Assessment and Wetlands Assessment

Flatirons Campus Water System Project Jefferson County, Colorado

U.S. Department of Energy
Office of Energy Efficiency and Renewable Energy
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15013 Denver West Parkway
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June 2022

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SUMMARY

DOE Proposed Action: Under the Proposed Action, the U.S. Department of Energy (DOE) would construct and operate the proposed water pipeline and other related actions on the Flatirons Campus (FC). Construction activities are expected to begin in the summer of 2022 and be completed by approximately the summer of 2024. Operations would begin immediately after construction is completed. The water pipeline would provide approximately 3.3 million gallons of code-compliant water to FC annually, which would support future expansion of FC missions.

Type of Document: Final Environmental Assessment and Wetlands Assessment

Lead Agency: U.S. Department of Energy

Cooperating Agencies: None

Project Location: Jefferson County, Colorado

Comment Opportunities: Comments were accepted through April 1, 2022.

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Summary: This environmental assessment (EA) provides DOE and other decision-makers with environmental impact information needed to make an informed decision about the proposed project to provide code-compliant water systems to the FC, including domestic water, fire suppression water, and wastewater systems. This EA also evaluates the impacts that could occur if DOE did not proceed with the project (No-Action Alternative). DOE has also prepared a wetlands assessment (Appendix A) concurrently with this EA in accordance with Title 10 of the *Code of Federal Regulations* (CFR) Part 1022, "Compliance with Floodplain and Wetlands Environmental Review Requirements." That assessment fulfills DOE's responsibilities under Executive Order 11990, "Protection of Wetlands."

ACRONYMS AND ABBREVIATIONS

AHD	American Hospital Directory
Alliance	Alliance for Sustainable Energy, LLC
ANSI	American National Standards Institute
APCD	Air Pollution Control Division (CDPHE)
APEN	Air Pollution Emissions Notice
AST	aboveground storage tanks
AWWA	American Water Works Association
BCC	birds of conservation concern (USFWS 2021)
BEA	Bureau of Economic Analysis (U.S. Department of Commerce)
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
CCF	Control Center Facility
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CGP	Construction General Permit
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
CPW	Colorado Parks and Wildlife
DART	days away from work, job restriction, or transfer
dB	decibels
DOE	U.S. Department of Energy
DOLA	Colorado Department of Local Affairs
EA	environmental assessment
EDE	effective dose equivalent
EIS	environmental impact statement
EJ IWG NEPA	Interagency Working Group on Environmental Justice & NEPA Committee
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FC	Flatirons Campus
FEMA	Federal Emergency Management Agency
FR	*Federal Register*
GHG	greenhouse gas
HAP	hazardous air pollutant
IESS	Integrated Electrical Systems at Scale
JeffCo	Jefferson County, Colorado
kV	kilovolt
LSA	LSA Associates, Inc.
MOVES3	EPA MOtor Vehicle Emission Simulator, Version 3
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration

NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NREL	National Renewable Energy Laboratory
OSHA	Occupational Safety and Health Administration
PAC	protective action criteria
PEM	palustrine emergent (wetland)
PGA	peak ground acceleration
PM_{10}	coarse particulate matter (≤10 microns)
$PM_{2.5}$	fine particulate matter (≤ 2.5 microns)
PSS	palustrine scrub-shrub
PV	photovoltaic
RCRA	Resource Conservation and Recovery Act
Refuge	Rocky Flats National Wildlife Refuge
RFETS	Rocky Flats Environmental Technology Site
RICE	reciprocating internal combustion engine
ROI	region-of-influence
ROW	right-of-way
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCC	spill prevention, control, and countermeasure
SWPPP	Stormwater Pollution Prevention Plan
TNC	The Nature Conservancy
TRC	total recordable cases
U.S.	United States
U.S.C.	United States Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VRM	Visual Resource Management
WAPA	Western Area Power Administration

TABLE OF CONTENTS

1 INTRODUCTION 1
1.1 Background 1
1.2 DOE's Proposed Action 4
1.3 Purpose and Need for Action 4
1.4 Scope of This Environmental Assessment and Organization 5
1.5 Public Involvement 5
1.6 Public Agency Coordination and Consultations 6
2 PROPOSED PROJECT, NO-ACTION ALTERNATIVE, AND OTHER REASONABLY FORESEEABLE ACTIVITIES 12
2.1 Proposed Project 12
2.1.1 Offsite Construction at Refuge/Reservoir: Pump Station 12
2.1.2 Offsite Construction between Reservoir and the Flatirons Campus: Water Pipeline 13
2.1.3 Onsite Construction at the Flatirons Campus: Water Pipeline 16
2.1.4 Onsite Construction at Flatirons Campus: Facilities and Infrastructure 16
2.1.5 Construction Details for the Proposed Action 18
2.1.6 Operations for the Proposed Action 18
2.2 Alternatives Considered During Initial Project Planning 19
2.3 No-Action Alternative 20
2.4 Other Reasonably Foreseeable Activities 20
2.5 Permitting and Authorization Summary 21
3 AFFECTED ENVIRONMENT AND IMPACTS ANALYSIS 22
3.1 Background 22
3.2 Land Use 23
3.2.1 Affected Environment 23
3.2.2 Proposed Action Impacts 26
3.2.3 No-Action Alternative Impacts 27
3.3 Visual Resources 27
3.3.1 Affected Environment 27
3.3.2 Proposed Action Impacts 30
3.3.3 No-Action Alternative Impacts 31
3.4 Geology and Soils 32
3.4.1 Affected Environment 32
3.4.1.1 Geology 32

3.4.1.2 Soils 33
3.4.2 Proposed Action Impacts 35
3.4.3 No-Action Alternative Impacts 36
3.5 Water Resources 36
3.5.1 Affected Environment 37
3.5.1.1 Surface Water 37
3.5.1.2 Stormwater 42
3.5.1.3 Groundwater 43
3.5.1.4 Water Use 43
3.5.2 Proposed Action Impacts 43
3.5.2.1 Impacts to Surface Water and Stormwater 44
3.5.2.2 Impacts to Groundwater 46
3.5.2.3 Impacts to Water Use 48
3.5.3 No-Action Alternative Impacts 48
3.6 Meteorology, Air Quality, and Noise 48
3.6.1 Affected Environment 48
3.6.1.1 Meteorology and Air Quality 48
3.6.1.2 Noise 49
3.6.2 Proposed Action Impacts 49
3.6.2.1 Meteorology and Air Quality 49
3.6.2.2 Noise 51
3.6.3 No-Action Alternative Impacts 52
3.6.3.1 Meteorology and Air Quality 52
3.6.3.2 Noise 52
3.7 Biological Resources 52
3.7.1 Affected Environment 52
3.7.1.1 Common Species 53
3.7.1.2 Federally Listed Threatened, Endangered, or Candidate Species 54
3.7.1.3 State-Listed and Other At-Risk Species 59
3.7.1.4 USFWS Birds of Conservation Concern 60
3.7.2 Proposed Action Impacts 60
3.7.2.1 Common Species 60
3.7.2.2 Federally Listed, Candidate, and Other Protected Species 61
3.7.2.3 State-Listed and Other At-Risk Species 62
3.7.2.4 USFWS Birds of Conservation Concern 62

3.7.3 No-Action Alternative Impacts 62
3.8 Cultural and Paleontological Resources 62
3.8.1 Affected Environment 62
3.8.1.1 Regulatory and Compliance Setting 63
3.8.1.2 Cultural Resources Management on the Flatirons Campus 64
3.8.1.3 Cultural Resources on the Flatirons Campus 64
3.8.1.4 Cultural Resources on the Offsite Project Area 64
3.8.2 Proposed Action Impacts 65
3.8.3 No-Action Alternative Impacts 66
3.9 Socioeconomics and Environmental Justice 66
3.9.1 Affected Environment 66
3.9.1.1 Socioeconomics 66
3.9.1.2 Environmental Justice 67
3.9.2 Proposed Action Impacts 68
3.9.2.1 Socioeconomics 68
3.9.2.2 Environmental Justice 69
3.9.3 No-Action Alternative Impacts 70
3.10 Waste Management 71
3.10.1 Affected Environment 71
3.10.1.1 Hazardous Materials 71
3.10.1.2 Waste Management 72
3.10.2 Proposed Action Impacts 73
3.10.2.1 Hazardous Materials 73
3.10.2.2 Waste Management 73
3.10.3 No-Action Alternative 74
3.11 Human Health and Safety 74
3.11.1 Affected Environment 74
3.11.2 Proposed Action Impacts 75
3.11.2.1 Human Health and Accidents 75
3.11.2.2 Intentional Destructive Acts 76
3.11.3 No-Action Alternative Impacts 76
3.12 Transportation 77
3.12.1 Affected Environment 77
3.12.2 Proposed Action Impacts 79
3.12.3 No-Action Alternative Impacts 80

3.13 Infrastructure 80
3.13.1 Affected Environment 80
3.13.2 Proposed Action Impacts 83
3.13.3 No-Action Alternative Impacts 84
3.14 Relationship of Short-Term Uses and Long-Term Productivity 84
3.15 Cumulative Impacts 85
4 REFERENCES 87
5 LIST OF PREPARERS 98

Appendix A: Wetlands Assessment

Appendix B: Comment Documents Received on the Draft Environmental Assessment

1 INTRODUCTION

1.1 Background

The National Renewable Energy Laboratory (NREL) is a national laboratory of the U.S. Department of Energy (DOE) Office of Energy Efficiency and Renewable Energy and is dedicated to the research, development, and deployment of renewable energy and energy efficiency technologies. The Flatirons Campus (FC), formerly known as the National Wind Technology Center, is NREL's primary facility for the research and development of wind energy, waterpower, and grid integration technologies and supports collaboration with industry to further these technologies and to accelerate their commercialization in the marketplace. The FC is located on U.S. Highway 93 about 25 miles north of Golden, Colorado, and about 5 miles south of Boulder, Colorado (Figure 1-1). The Alliance for Sustainable Energy, LLC, operates the FC on behalf of DOE's Golden Field Office.

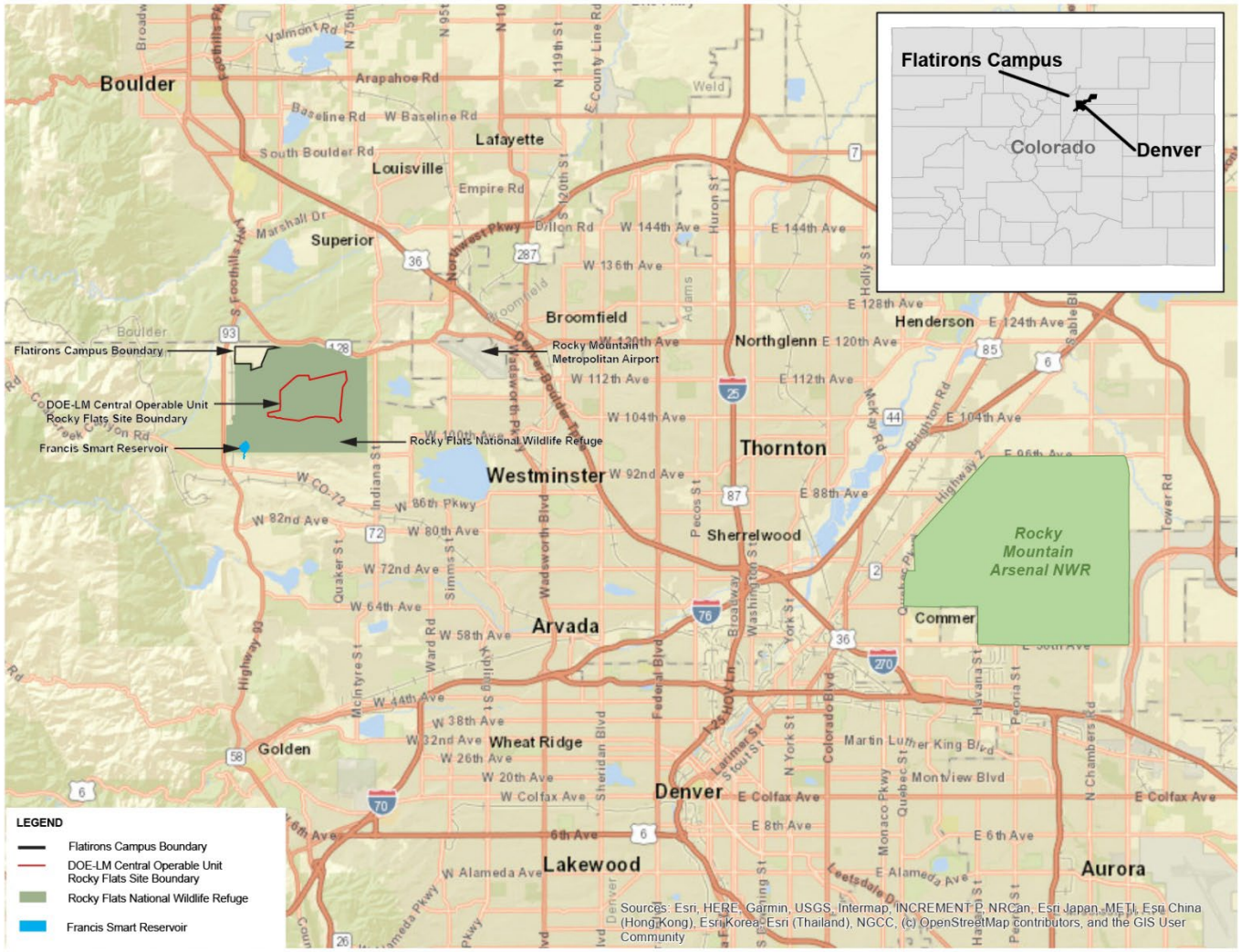
In recent years, the FC's research mission has greatly expanded and is anticipated to continue to expand in the future. The future growth of the FC, which involves both increasing the number of staff and the construction of new and/or upgraded research facilities, is directly dependent on obtaining more robust water utility services. Consequently, DOE is proposing to construct and operate a water pipeline from the Francis Smart Reservoir (Smart Reservoir) located in the southwest corner of the Rocky Flats National Wildlife Refuge (Refuge), adjacent to the FC, to a new water treatment facility on the FC. The water pipeline would traverse about 2.3 miles from the Smart Reservoir to the southwest corner of the FC (Figure 1-2). The proposed project would provide code-compliant water to the FC for use in domestic water, fire suppression water, and wastewater systems. The wastewater system would service a new building, the Control Center Facility (CCF), that would be constructed on the FC. The existing wastewater treatment systems at the FC are currently at capacity; as such, a new wastewater treatment system would be needed to support the CCF. The CCF would provide operational control and monitoring of research projects in support of DOE's Integrated Electrical Systems at Scale (IESS) initiative.

In accordance with the Council on Environmental Quality (CEQ) regulations at Title 40 of the *Code of Federal Regulations* (CFR) Parts 1500−1508[1] and the DOE implementing procedures for the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et seq.) at 10 CFR Part 1021, DOE has prepared this environmental assessment (EA) to analyze the potential environmental impacts associated with the proposed pipeline and other related actions on the FC. Because this Proposed Action would involve activities in a wetland, DOE has also prepared a wetlands assessment (Appendix A; Alliance 2021) concurrently with this EA in accordance with 10 CFR Part 1022, "Compliance with Floodplain and Wetlands Environmental Review Requirements." That assessment fulfills DOE's responsibilities under Executive Order 11990, "Protection of Wetlands."

Environmental Assessment

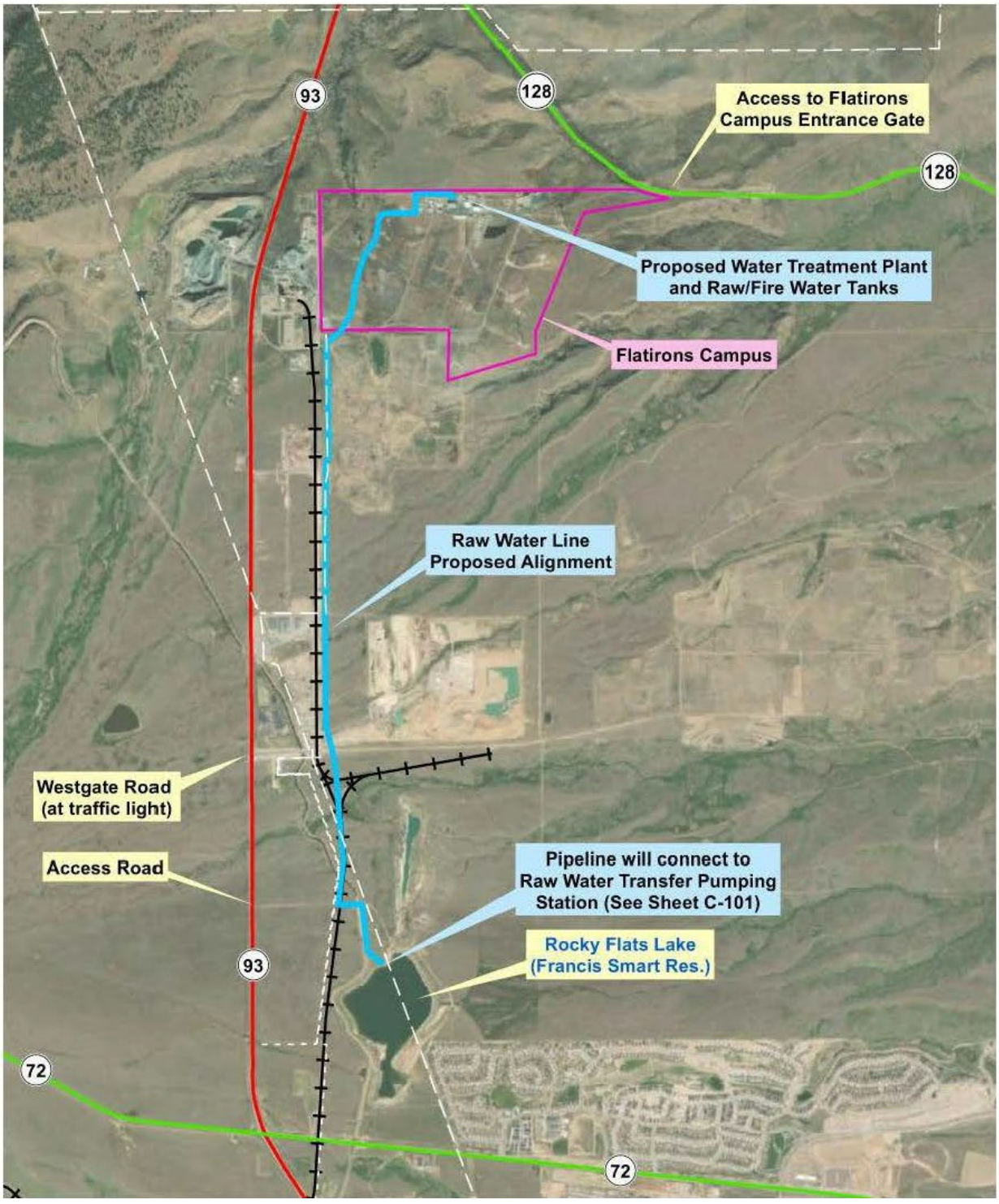
A primary purpose of an EA is to determine if a Proposed Action would have significant environmental impacts. If there would be none, no further NEPA documentation is required. If there would be significant environmental impacts, DOE would prepare an environmental impact statement.

[1] On July 16, 2020, the CEQ issued a final rule to update its regulations for federal agencies to implement NEPA (Volume 85 of the *Federal Register* [FR], page 43304 (85 FR 43304)). On October 7, 2021, the CEQ proposed to modify certain aspects of its NEPA regulations to generally restore regulatory provisions that were in effect for decades before being modified in 2020 (86 FR 55757). This EA has been prepared in accordance with the current CEQ regulations and DOE's NEPA regulations at 10 CFR Part 1021.



Source: DOE 2014a, as modified.

Figure 1-1. Location of the FC



Source: DOE 2022b.

Figure 1-2. Proposed Water Pipeline Route from Smart Reservoir to the FC

Depending on the results of this EA, DOE could (1) determine that the potential environmental impacts of the Proposed Action would be significant to human health and the environment, in which case DOE would prepare an environmental impact statement (EIS), or (2) determine that a finding of no significant impact is appropriate, in which case DOE could proceed with the Proposed Action with no additional NEPA documentation**.**

1.2 DOE's Proposed Action

DOE's Proposed Action is to construct and operate the proposed water pipeline and other related actions on the FC (see Section 2 for a detailed description of the Proposed Action). Construction activities are expected to begin in the summer of 2022 and be completed by approximately the summer of 2024. Operations would begin immediately after construction is completed. The water pipeline would provide up to approximately 3.3 million gallons (10 acre-feet) of code-compliant water to FC annually, which would support future expansion of FC missions.

1.3 Purpose and Need for Action

Since its establishment in the late 1970's, the FC has never been serviced by municipal domestic water, fire water, or sanitary sewer water utilities; as such, a variety of sources—including delivered and stored water and onsite wastewater treatment systems—are used to meet the water needs of the NREL staff and research activities located at the FC. The predominant source of water for the FC is via delivery trucks. Approximately three deliveries, totaling approximately 9,500 gallons, are made to the FC weekly. The water is used for domestic water, fire suppression water, and wastewater systems. In addition, the 75,000 gallons of water currently stored for fire suppression is below the amount required by the National Fire Protection Association and the quantity considered adequate for commercial buildings or facilities intended to meet the highly protective risk criteria, as is dictated by DOE Orders and Standards (Tetra Tech 2018).

Water delivery via truck is inefficient, costly, cannot be reasonably scaled up, and, thus, would not reasonably support future mission expansions at the FC. Consequently, DOE is proposing to construct and operate a water pipeline from the Smart Reservoir to a new water treatment facility on the FC. In addition to the new water pipeline, DOE is proposing to construct a water treatment system, construct fire and domestic water tanks, and upgrade the FC fire suppression system. The Proposed Action would also provide additional FC site upgrades, including electrical, access roadways, wastewater, and fire/domestic water distribution to accommodate project needs and planned growth. The wastewater system that would be installed would service the CCF, a new building that would be constructed on the FC to provide operational control and monitoring of research projects in support of DOE's IESS initiative.

The FC missions are indispensable to the successful development and growth of wind energy and distributed generation technologies. The future growth of the FC, which involves both increasing the number of staff and the construction of new and/or upgraded research facilities, is directly dependent on obtaining more robust water utility services. Constructing and operating the proposed water pipeline would provide an efficient, cost-effective, and timely supply of code-compliant water to support future mission expansions at the FC.

1.4 Scope of This Environmental Assessment and Organization

In accordance with the CEQ regulations at 40 CFR Parts 1500−1508 and DOE NEPA implementing procedures at 10 CFR Part 1021, DOE has prepared this EA to analyze the potential environmental impacts of the Proposed Action, other reasonable alternatives, and the No-Action Alternative. This EA presents reasonably foreseeable impacts that would have a reasonably close causal relationship to the Proposed Action or alternatives. These include (1) direct impacts that would occur as a direct result of the Proposed Action, (2) indirect impacts that would be caused by the Proposed Action but would occur later in time and/or farther away in distance, perhaps outside of the study area, and (3) cumulative impacts that could result when the incremental impacts on resources from the Proposed Action are added to impacts that have occurred or could occur to that resource from other actions, including other reasonably foreseeable actions.

This EA is organized as follows:

- an introduction and background discussion of the Proposed Action and the purpose and need for the DOE action (Section 1)
- a description of the Proposed Action, alternatives considered but eliminated from detailed analysis, and the No-Action Alternative (Section 2)
- a description of the existing environment relevant to potential impacts of the Proposed Action and the No-Action Alternative (Section 3)
- an analysis of the potential impacts that could result from the Proposed Action and the No-Action Alternative (Section 3)
- identification and characterization of the impacts that could result from the implementation of the Proposed Action in relation to other reasonably foreseeable actions within the surrounding area (Section 3)
- a listing of the references cited in this EA (Section 4)
- a list of the preparers of this EA (Section 5)
- wetlands assessment (Appendix A)

1.5 Public Involvement

In accordance with 10 CFR 1021.301(d), DOE provided notification to the host state and host Tribes of DOE's intent to prepare the EA. In November 2021, DOE distributed a public notice (DOE 2021b) that this EA would be prepared and solicited public comments on the EA scope. The comment period lasted from November 9, 2021, until November 26, 2021. No comments on the scope of the EA were received, and one request for additional information was received from the State Historic Preservation Officer (SHPO) (Colorado 2021).

In February 2022, DOE published the Draft EA on the DOE NEPA web page (https://www.energy.gov/nepa/public-comment-opportunities). DOE announced the availability of the Draft EA on a project web site (https://www.energy.gov/node/4814534) and provided an email address and postal address where comments could be submitted. The comment period on the Draft EA lasted through April 1; DOE opted not to conduct a public hearing. Three comment documents— two from the

U.S. Fish and Wildlife Service (USFWS) and one from the U.S. Environmental Protection Agency (EPA)—were received (see Appendix B for copies of these documents) and considered in preparing the Final EA. Table 1-1 shows the comments from the USFWS and EPA as well as DOE's responses. DOE revised the Draft EA to reflect the comments received and minor project design changes. The Final EA has been made available for public viewing through the DOE NEPA web page for this project (https://www.energy.gov/nepa/doeea-2171-flatirons-campus-water-system-project-jefferson-county-colorado).

1.6 Public Agency Coordination and Consultations

DOE has determined that providing funding for the proposed project constitutes an undertaking subject to Section 106 of the National Historic Preservation Act (NHPA), and that the proposed project activities constitute activities that have the potential to affect historic properties. In November 2021, DOE initiated NHPA consultations with potentially affected Tribes for the FC Water System Project; no responses were received. In November 2021, the SHPO requested additional information about the proposed project (Colorado 2021), and DOE provided the requested information in February 2022 (DOE 2022a). The SHPO agreed with DOE's finding of no adverse effect to historic properties for this undertaking (Colorado 2022).

To date, DOE has communicated with USFWS regarding a right-of-way (ROW) permit that will be required for portions of the proposed pipeline that are on USFWS lands and that are not located within the existing authorized ROW. Following completion of the EA, DOE intends to apply for a ROW permit from USFWS. This EA is intended to support that ROW application.

Following completion of this EA, DOE would also be required to obtain an easement from the DOE Office of Legacy Management to run the water pipeline across West Gate Road and one electrical distribution line along it. Title to that land is held by the Office of Legacy Management. This EA is intended to support the granting of that easement.

Table 1-1. Comments and Responses for the Draft EA

Document	Comment	Responses
USFWS (Document 1)	We have reviewed the EA and it looks good, overall. The only question that we have is whether using straw for restoration planting would work properly or if it would blow away.	DOE is planning to use straw mulch during restoration but will monitor its effectiveness and use a heavier mulch if necessary.
USFWS (Document 2)	In Figure 3.2-3, the designations seem to be overly generalized and the scale appears to be off. Can we get a more specific map of the land use designations and double-check the scale of the map to make sure that it is correct?	The land use designations in Figure 3.2-3 were pulled directly from the Jefferson County GIS. The map scale has been verified to be correct.
USFWS (Document 2) (cont.)	USFWS provided some updates pertaining to endangered species. Specifically, the Ute ladies'-tresses orchid (threatened species) was observed in the area, but at this time the exact location is not known and the observation has not been confirmed.	The Final EA has been updated to reflect this information.
EPA	The Draft EA states that two ditches, Church Ditch and McKay Ditch, which would be crossed by the proposed pipeline, are not waters of the U.S. because they are manmade features. Some manmade ditches can be jurisdictional under the Clean Water Act; therefore, we recommend consulting with the Corps to confirm the jurisdictional status of all water-containing features that would be crossed by the pipeline.	During construction and restoration of the water pipeline, the irrigation ditches would be treated as jurisdictional waterbody features. They would be crossed using the dry-ditch open cut method and would be subject to the requirements of the site-specific Stormwater Pollution Prevention Plan (SWPPP). During restoration, the irrigation ditches would be restored to preconstruction conditions, which includes restoration of the bank and bottom contours. No permanent impacts would be expected. Jurisdictional status of all water-containing features will be confirmed during Section 404 permitting.
EPA (cont.)	Table 2-3, which lists the permits that will be required for the project, does not include a Clean Water Act Section 404 permit. Coverage under Section 404 would be provided by Nationwide Permit 58 (Utility Line Activities for Water and Other Substances) and so the conditions of this permit will be needed to be followed for any crossings of waters of the U.S., including wetlands, by the pipeline.	Table 2-3 has been revised to include Clean Water Act Section 404, Nationwide Permit 58 (Utility Line Activities for Water and Other Substances).

Document	Comment	Responses
EPA (cont.)	Pre-construction notification to the Corps is required if for any reason more than 1/10 acre of jurisdictional waters would be lost by a crossing. A jurisdictional determination from the Corps would confirm any impact assumptions.	Less than 0.1 acre of wetland disturbance is anticipated from project work, and no permanent loss of wetland is expected.
EPA (cont.)	For Segment 3, explain how any culvert will be crossed and assess any impacts that could occur to the wetlands fed by the culvert.	The culvert would likely be crossed using standard open-cut trench construction. It is anticipated that the culvert would be removed during installation of the pipeline. Immediately after pipeline installation, the culvert would be replaced or re-installed, and the grading would be restored to match preconstruction conditions, to re-establish preconstruction hydrology. Completing construction during a dry period would minimize the potential to impact downgradient wetlands with sediment. In general, potential impacts from erosion would be minimized through the development and implementation of the site-specific SWPPP required for the Construction General Permit, implementation of erosion and sediment control measures during construction, and implementation of a revegetation plan for areas disturbed by construction.
EPA (cont.)	For Segment 4, explain how the pipeline crossing could alter the wetland type, the likelihood of this happening in the area to be crossed, and the impacts of such an alteration to wetland functions and values.	As stated in the EA, "Construction of the Proposed Action may temporarily impact wetlands within Segment 4. Within the permanent FC Waterline ROW, the construction activity and pipeline centerline would be positioned to avoid wetlands to the extent possible. Less than 0.1 acre of wetland disturbance is expected during construction." Text has been added to Section 3.5.2.1 to clarify that the project is not expected to alter the wetland type, function, or value because preconstruction hydrology and contours will be re-established to match preconstruction conditions, as part of the final restoration process. Alteration of wetland type would be associated with extensive wetland disturbance and improper restoration (such as alteration of grading or failure to re-establish native vegetation with preconstruction native wetland vegetation).

Document	Comment	Responses
EPA (cont.)	The Draft EA states that wetlands that may be disturbed by the pipeline are in Segment 3; however, Section 3.5 and Appendix A of the Draft EA indicate these wetlands are in Segment 4. We recommend correcting this in the Final EA.	Text in Section 2.1.2 has been corrected. Wetlands that may be disturbed by the pipeline are in Segment 4.
EPA (cont.)	We recommend including in the Final EA information on pipeline testing and treatment procedures and potential discharges from these tests and/or treatments. Where these discharges potentially could flow into waters of the U.S., or infiltrate to shallow aquifers, the EA should evaluate whether on-site containment and removal for treatment may be needed to protect these waters, or whether a National Pollutant Discharge Elimination System (NPDES) permit is needed	The 6-inch raw water line and other underground piping exterior to the Water Treatment Plant building will be flushed and hydrostatically tested using water from the Smart Reservoir. The flushing water and water from the hydrostatic testing will not include disinfectant and will be discharged through a sediment bag to local drainage areas along the pipe route. The 6-inch pipeline flushing and testing will be done in segments along the length of pipeline. Segment length and points of water discharge will be determined by the general contractor prior to construction. In areas where the 6-inch pipeline is not proximal to drainage areas, the water will be containerized and transported to an appropriate discharge location selected and approved by DOE/NREL. Because raw water from Smart Reservoir will be used in the flushing and testing operation, then collected and discharged through sediment bags, no water quality concerns are identified. Potable water lines will be hydrostatically tested and disinfected in accordance with American National Standards Institute (ANSI)/American Water Works Association (AWWA) C651-14 (ANSI/AWWA 2014). Water from these procedures will be flushed into existing firewater tanks or the proposed firewater tanks and not discharged into waters of the United States.

EPA (cont.)	We recommend discussing how wastewater from the drinking water system, such as filter backwash water, will be managed. We also recommend including a discussion on the disposal of residual solids.	Residuals management is an important consideration for operations and maintenance of any water treatment facility. The water treatment plant has been designed to minimize residuals generation and off-site waste disposal. Approximately 29,700 gallons of wastewater per year will be generated for offsite disposal. This waste will be composed of neutralized clean-in-place and maintenance wash wastewater. An estimated 37,000 to 84,000 gallons per year of backwash waste from the ultrafiltration system and 4,000 gallons per year of backwash waste from the granular activated carbon system will be recovered and recycled to the front of the treatment plant. The FC does not have a wastewater treatment system and sewer disposal is not an option. No residuals will be disposed of the septic system. The primary residuals generated by the water treatment plant and their management are summarized below: • Ultrafiltration Backwash Waste: Backwash waste will be routed to the building sump and then backwash waste tank; settled supernatant will be recycled to the head of the plant for treatment; and settled sludge will be disposed of at a nonhazardous landfill. • Clean-in-Place/maintenance wash Waste: Clean-in-place/maintenance wash waste will be neutralized and pumped to the waste storage tank for offsite disposal. • Ozone Degas: Degas will pass through an ozone destructor before discharge to the atmosphere. • Spent Granular Activated Carbon: Spent granular activated carbon will be handled through nonhazardous landfill disposal or regeneration. • Granular Activated Carbon Backwash Waste: Backwash waste will be routed to the building sump and then backwash waste tank; settled supernatant will be recycled to the head of the plant for treatment; and settled sludge will be disposed of at a nonhazardous landfill. • Building Sump: The waste in the building sump will be pumped to the waste storage tank for offsite disposal.

Document	Comment	Responses
EPA (cont.)	We recommend disclosing whether anything other than human waste will be discharged to the proposed septic tank and leach field.	Only human waste (from sanitary systems, bathroom sinks, etc.) would be discharged to the septic tank and leach field. No laboratory systems would be connected to them.
EPA (cont.)	The Draft EA (p. 29) states that soil samples on the FC were collected in 1994 and that the analytical results for the majority of these samples were below detection limits, and therefore, below regulatory thresholds for all analyzed chemicals and radionuclides. We recommend also disclosing the results for the remaining minority of samples and whether there were any results of concern.	Information about baseline soil conditions and laboratory test results was sourced from DOE/EA-1914, "Final Site-Wide Environmental Assessment: Department of Energy's National Wind Technology Center Golden, Colorado at the National Renewable Energy Laboratory," issued May 2014 (DOE 2014a). The 1994 data set does not appear to be available.
EPA (cont.)	Based on such soil samples as well as modeling of the potential effects of wind erosion of soils with residual radionuclide contamination from the Rocky Flats Plant, the Draft EA (p. 29) concludes that wind erosion of soils or construction disturbances at the FC would not result in movement of contaminated soil. We recommend clarifying if the same conclusion can be made about soil disturbance along the proposed water pipeline route, and if so, the basis for that conclusion.	The soils within the project area consist largely of cobbly sandy loam and gravel, with a predominant clay subsoil that occurs between 13 and 47 inches below the surface, and have only slight to moderate potential for wind erosion. Overall, the wind erosion hazard for soils within the project area is slight. However, any excavated soils stored over the long term would be graded to minimize the loss of soil through wind and water erosion. As part of the NREL stormwater program, stockpiled soils are routinely covered to reduce wind and water erosion. With respect to soil contamination, the baseline assessment of site soils conducted in 1993 and 1994 established that the project area is not contaminated with respect to chemicals and radionuclides. Therefore, any airborne soil transport from the site would not be an expected source of contamination.
EPA (cont.)	The Draft EA (pp. 30-31) states that building codes applicable for the area would ensure avoidance or mitigation of any hazards associated with high shrink-swell capacity soils that may be encountered. Since the Draft EA earlier detailed concerns with dipping bedrock and expansions thereof, it is not clear if this is also referring to Jefferson County's guidance for construction in the dipping bedrock area. Therefore, we recommend clarifying it this guidance will also be followed.	Section 3.4.2 has been revised as follows: "Building codes applicable for the area, including Jefferson County's guidance for construction in the dipping bedrock area, would also ensure that construction techniques are used to avoid or mitigate any hazards associated with high shrink-swell capacity soils that may be encountered at the site."

2 PROPOSED PROJECT, NO-ACTION ALTERNATIVE, AND OTHER REASONABLY FORESEEABLE ACTIVITIES

2.1 Proposed Project

DOE's Proposed Action is to construct and operate a water pipeline from the Smart Reservoir to a new water treatment facility on the FC. The pipeline would be located on federal lands. In addition to the new water pipeline, DOE is proposing to construct a water treatment system, construct fire and domestic water tanks, and upgrade the FC fire suppression system. The Proposed Action would provide additional FC site upgrades, including electrical, access roadways, wastewater, and fire/domestic water distribution to accommodate project needs and planned growth. The wastewater system would service a new building, the CCF, that would be constructed on the FC. Because actions are proposed to occur both off and on the FC site, this EA describes the Proposed Action for each of those elements (i.e., offsite and onsite), as shown below. Where applicable, it also identifies and describes alternatives.

The project currently has the following schedule, subject to change:

- Design Complete July 2022
- NEPA Process Complete second quarter fiscal year 2022
- ROW Procurement third quarter fiscal year 2022
- Construction Contract Award fourth quarter fiscal year 2022
- Project Complete summer 2024

2.1.1 Offsite Construction at Refuge/Reservoir: Pump Station

DOE would install a new pump station at the Smart Reservoir to pump water from the reservoir to the FC. The pump station would be a low-profile "vault-design" facility approximately 160 square feet (10 feet by 16 feet) in size, located on the northwest edge of the reservoir (Figure 2-1). An overhead power line up to approximately 2,500 feet in length would be installed to provide power from existing power sources to the pump station. The power line would originate from an existing distribution line that is located on the southwest edge of the reservoir. From the existing line, the new line would proceed to the north and parallel to an existing dirt road on the west side of the reservoir and ultimately tie into the new pump station. As many as 10 utility poles would be required for the new power line. The power line would be installed by Xcel Energy. The pump station would house two electric pumps. A mobile backup generator would be used in the event of a power outage (DOE 2021a).

The Smart Reservoir is owned jointly by Consolidated Mutual (majority interest) and Mountain Plains Industrial (Charlie McKay, minority interest). The owners are the only users that draw water from the reservoir. The reservoir has an elevation of 6,184 feet with a capacity of 920 acre-feet (approximately 300 million gallons). The reservoir is approximately 35 feet deep in the main bowl (Tetra Tech 2018). Consolidated Mutual has indicated that up to 10 acre-feet (approximately 3.3 million gallons) of water per year would be available for FC use. Water quality sampling of the Smart Reservoir has been conducted on three separate occasions. Preliminary water quality results reveal that there are no contaminant concerns (radiological or non-radiological) with the water in the Smart Reservoir (DOE 2021a).

2.1.2 Offsite Construction between Reservoir and the Flatirons Campus: Water Pipeline

A new underground water pipeline, approximately 6 inches in diameter, would be constructed to connect the pump station to the FC water infrastructure. The pipeline would supply up to approximately 3.3 million gallons (10 acre-feet) of water per year. Of this, approximately 1 million gallons would be domestic potable water to support staff growth at the FC from 150 to 300 people. Approximately 550,000 gallons would be used for fire water storage and additional storage capacity for daily water demands and system resiliency. The current annual water demand at the FC is approximately 614,000 gallons of potable water for staff and 75,000 gallons for fire protection (DOE 2021a).

The 2.3 mile-long pipeline would be located as shown in Figure 2-1. For purposes of this EA, the offsite portion of the pipeline is described in four segments:

Segment 1: After leaving the pump station, the underground pipeline would traverse north, following an existing dirt road. The pipeline would cross over the Denver Water Ditch,[2] cross under railroad tracks,[3] and meet up with an existing (abandoned) 10-inch water pipe. The new pipeline would be "sleeved" inside the existing pipe. This segment of the pipeline (approximately 0.3 mile long) would require a ROW permit (referred to in this EA as the FC Waterline ROW) from USFWS. DOE is currently evaluating two options for siting the pump station. The two options are approximately 50 yards apart and are covered by the "Pump Station Installation Area" shown in Figure 2-1.

Segment 2: This pipeline segment, approximately 0.5 mile in length, would reuse the existing (abandoned) cast iron water pipeline that once served the Rocky Flats Plant. NREL recently inspected the full length of that pipeline using fiber optics and determined that it was in good condition (DOE 2021a). A ROW permit from USFWS would not be required for this segment because the existing pipeline would be reused. This segment would terminate just south of West Gate Road.

Segment 3: This pipeline segment, also approximately 0.5 mile in length, would continue traversing north from West Gate Road, following existing dirt roads on the Refuge. A distribution line that would be installed to provide power to an existing shed for the USFWS would also be located along West Gate Road. This distribution line segment would be approximately 0.5 mile and would require no more than 20 poles. Because this segment is located south of the utility ROW analyzed in the USFWS Utility Corridor ROW EA (USFWS 2019b), a ROW permit from USFWS would be required. As discussed in Section 1.6, DOE would also be required to obtain an easement from the DOE Office of Legacy Management to run the water pipeline across West Gate Road and one electrical distribution line along it.

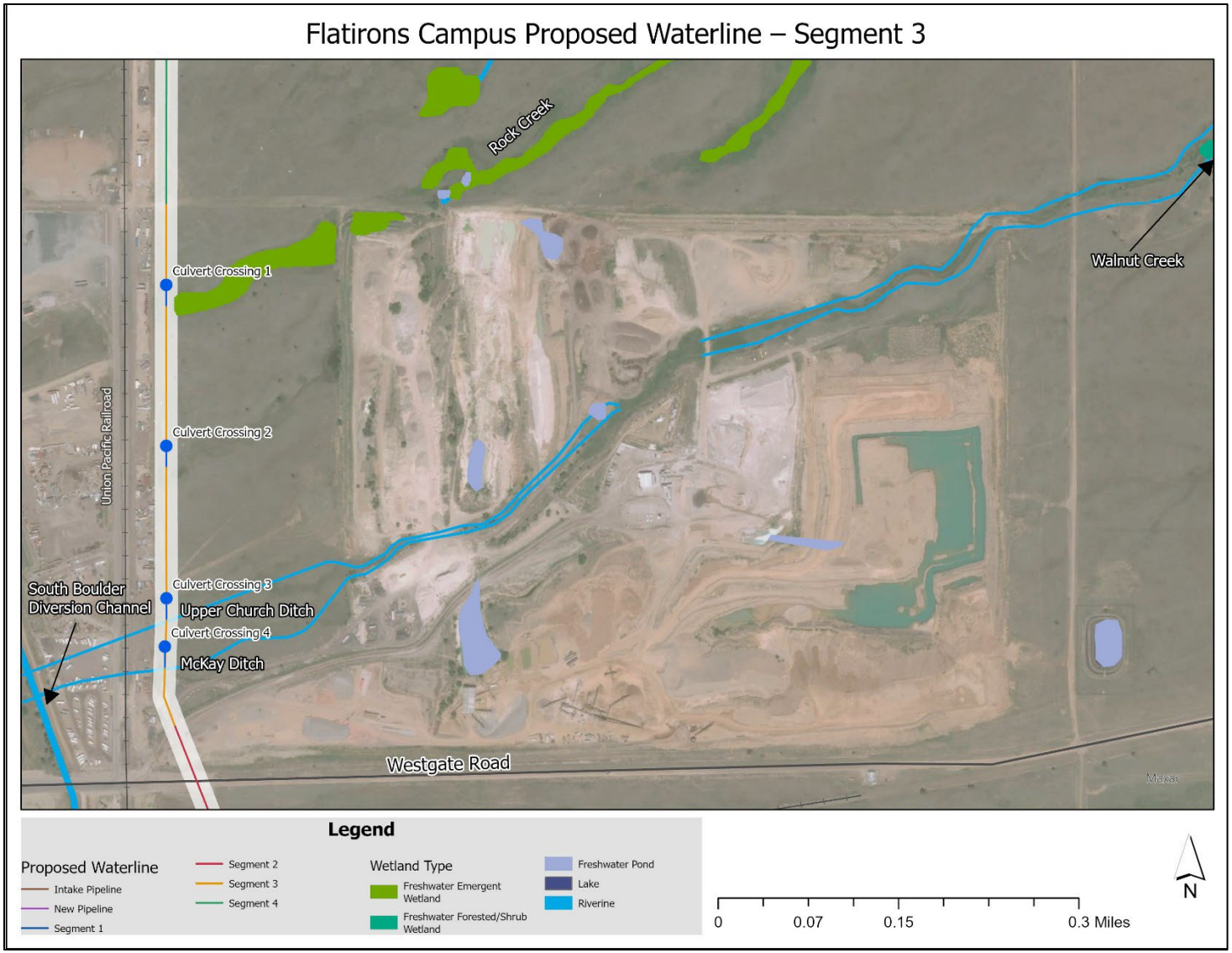
Segment 4: The final offsite pipeline segment, approximately 1 mile in length, would be installed within the existing USFWS Utility Corridor ROW on the Refuge that was evaluated in the USFWS Utility Corridor ROW EA (USFWS 2019b). As shown on Figure 2-2, wetlands within this segment could be disturbed by the installation of the pipeline in several locations (three to six locations, depending on the method of installation). However, no more than 0.1 acre of wetlands would be expected to be disturbed (see Appendix A). The pipeline would enter the FC at the southwest corner of the site.

[2] The Denver Water Ditch is about 20 feet below ground level; therefore, the pipeline, which would be installed by the typical trenching method, would not impact the ditch.

[3] The pipeline would be installed under the existing railroad tracks via the horizontal boring method, which would preclude any impacts to the railbed or tracks.

Source: Adapted from DOE 2022b.

Figure 2-1. Water Pipeline Route and Segments



Source: Adapted from DOE 2021a.

Figure 2-2. Potential Wetlands along Segment 3 of the Proposed Pipeline

2.1.3 Onsite Construction at the Flatirons Campus: Water Pipeline

The water pipeline would enter the FC at the southwest corner of the site, near the existing substation, and would terminate at the proposed new fire water tanks and new water treatment facility. This onsite pipeline segment would be approximately 0.7 mile in length. The route follows an existing dirt road on the FC and is the same route used for other FC utilities (DOE 2021a).

2.1.4 Onsite Construction at Flatirons Campus: Facilities and Infrastructure

New facilities and infrastructure planned on the FC are shown on Figure 2-3 and include the following:

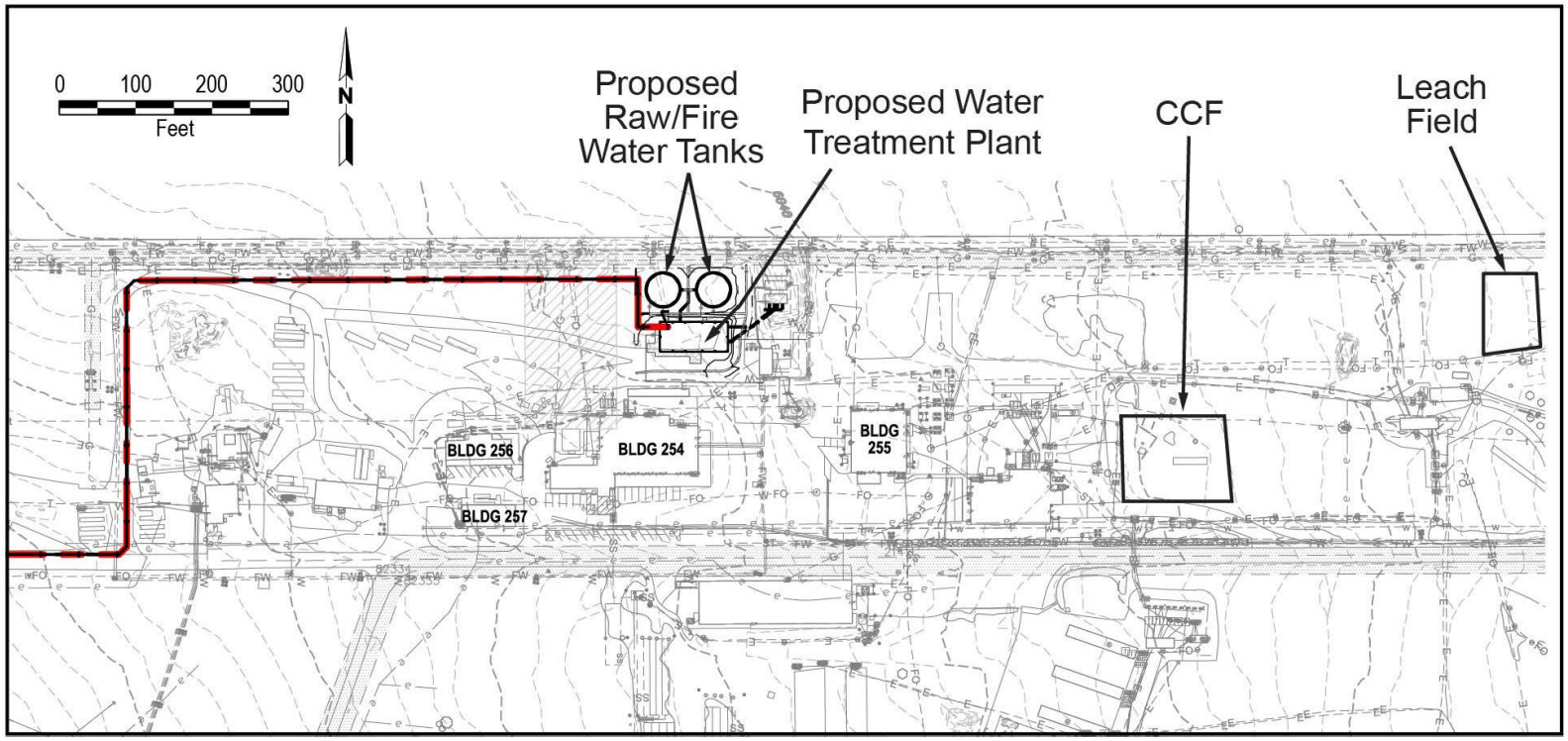
- A water treatment facility would be constructed to process the raw water from the Smart Reservoir for domestic potable uses. The treatment facility would be located inside a metal butler building approximately 1,000 square feet in size. The only chemical expected to be used for treatment would be chlorine. Minor improvements to the FC domestic potable water infrastructure are planned to enhance water service to FC facilities. In addition, new water pumps would be installed to support domestic and fire water uses.

- A new domestic water storage tank of 25,000 gallons would be constructed. New fire water tanks capable of storing approximately 550,000 gallons of raw water for fire suppression purposes would also be constructed. The tanks would be low-profile tanks less than approximately 20 feet in height. The infrastructure supporting the fire water system would include fire pump and distribution system upgrades as required by code to support existing and planned fire suppression systems. The generator currently used for the existing tanks and water treatment building would be reused for the water treatment facility and pumps.

- A gravel access road (560 feet long by 24 feet wide) would be constructed to provide access to the tanks, pumps, and the treatment facility. To the extent practicable, existing graveled areas would be used and graded/graveled until the desired access is achieved.

- A new wastewater treatment system (sanitary leach field with a capacity of 1,999 gallons per day, settling tanks, and sump pump) would be located near the CCF. The disturbed area for that wastewater treatment system would be approximately 120 feet by 80 feet (9,600 square feet) (DOE 2021a).

- The new wastewater treatment system would support the CCF, a new building which would be constructed east of Building 258 (the 5-megawatt Dynamometer). The CCF would provide computing and data visualization capabilities to support research data acquisition, analysis, and visualization as integrated real-time experiments are conducted across multiple sites. The CCF is expected to be a two-story building of about 8,000 square feet with control rooms, a data center, conference rooms, a two-dimensional visualization room, and support spaces. The total CCF project footprint is estimated to be 38,000–49,000 square feet (0.87 to 1.12 acres), which would include the structure, parking, sidewalks, and landscaping, in addition to temporary construction laydown and parking areas.



Note: The figure presents a nominal layout of onsite facilities. Variations in the layout could occur as a result of detailed design but would not affect the analysis in this EA.
Source: Adapted from DOE 2022b.

Figure 2-3. New Facilities and Infrastructure on the FC

2.1.5 Construction Details for the Proposed Action

Construction is anticipated to begin in summer 2022 and would last approximately 2 years. Table 2-1 shows the construction parameters for the Proposed Action.

Table 2-1. Construction Parameters for the Proposed Action

Requirements	Consumption/Use
Total land disturbance (acres)[a]	8.3–15.7[b]
• Offsite facility land disturbance (acres)	<0.1 (includes laydown area)
• Offsite pipeline land disturbance (acres)	5.6–11.2[b]
• Onsite facilities, supporting infrastructure, laydown areas, and parking land disturbance (acres)	1.1
• Onsite pipeline land disturbance (acres)	1.7–3.4[b]
Total construction employment (worker-years)	100
Peak construction employment (workers)	50
Construction period (years)	2

a. All land disturbance would occur on previously disturbed land.
b. Land disturbance range reflects differences in ROW width (20 feet versus 40 feet).
Source: DOE 2021a.

2.1.6 Operations for the Proposed Action

Operations are expected to begin in summer 2024. Once operational, the pipeline would supply up to approximately 3.3 million gallons (10 acre-feet) of water per year to the FC. Of this, approximately 1 million gallons would be domestic potable water to support staff growth at the FC from 150 to 300 people. Approximately 550,000 gallons would be used for fire water storage and additional storage capacity for daily water demands and system resiliency (DOE 2022b).

There would be no notable air emissions during normal operation, as water would be moved through the pipeline and distribution system using electric pumps with no emissions. It is assumed that a diesel standby generator of about 150 kilowatts could be needed. Such a standby generator would be limited by Colorado regulation to no more than 500 hours of operation per year. A recent emissions evaluation of a similarly sized generator for NREL research use indicates that it would likely be exempt from Colorado Air Pollution Control Division permit requirements regarding Air Pollutant Emissions Notice if an EPA Tier 4-certified generator were used (DOE 2021a).

Water would be treated by filtration to remove sediment and particulate and disinfected with chlorine to normal Colorado drinking water standards. It is assumed that small amounts of fugitive chlorine emissions would result from off-gassing of chlorine during storage of treated water. Filters and filtrate would be disposed of as solid nonhazardous waste (DOE 2021a).

DOE has estimated the operational requirements for the Proposed Action as shown in Table 2-2.

Table 2-2. Operational Requirements for the Proposed Action

Requirements	Consumption/Use
Increase in operational workers (number of workers)[a]	150
Increase in annual electricity use (kilowatt-hours)[b]	206,100
Increase in potable water use (gallons/year)[c]	540,000
Increase in natural gas use (cubic feet/year)[d]	219,840
Increase in sanitary wastewater (gallons/year)[e]	360,000
Increase in nonhazardous waste (pounds/year)[f]	5,000
Increase in hazardous waste (pounds/year)[f]	550

a. The Proposed Action would not cause the FC employment to increase from 150 to 300 persons; however, because that increase is reasonably foreseeable to occur, this EA addresses the impacts of that increase.
b. Based on 22.5 kilowatt-hours/square foot/year. The amount of new facilities is approximately 9,160 square feet.[4] Electricity would be used to power pumps, equipment, and lighting and provide heating.
c. Based on potable water use of 15 gallons/day/person for 240 days per year.
d. Based on 24 cubic feet/square foot/year. The amount of new facilities is approximately 9,160 square feet. Conservative estimates for natural gas are based on heating buildings and water. If electricity is used to heat buildings, less natural gas would be used.
e. Based on wastewater generation of 10 gallons/person/day for 240 days per year.
f. Based on 5-year average waste generation for operations with 150 persons.

Source: DOE 2021a, DOE 2022b, Tetra Tech 2018.

2.2 Alternatives Considered During Initial Project Planning

Prior to initiating the Proposed Action in this EA, DOE considered alternatives that could have met the need, including (1) the purchase of water from municipalities and (2) the use of groundwater. As discussed below, those alternatives were eliminated from detailed analysis.

Municipal Water Sources. In 2018 and 2021, DOE evaluated four water suppliers: (1) City of Arvada, (2) Town of Superior, (3) City of Broomfield, and (4) Denver Water (Tetra Tech 2018, DOE 2021a). DOE met with and consulted with each of these suppliers. Obtaining water from these sources was considered an unreasonable alternative for the following reasons:

- Legal, engineering, and political implications/issues of providing water outside of the sources' service boundaries led to uncertainty in achieving success.
- Lengthy and costly studies would be required, with no assurance of success.
- Other viable options for potable or raw water are closer to the FC (Tetra Tech 2018).

Groundwater. DOE has the right to use groundwater that underlies its property, but DOE is subject to the state's maximum annual withdrawal rate of 1 percent of the estimated aquifer capacity under the site. Due to uncertainties associated with the potential yield of the aquifer(s) beneath the FC, as well as the potentially high costs/uncertainties associated with implementing this alternative in a timely manner, DOE determined that it was unreasonable (Tetra Tech 2018).

[4] 160 square foot pump station (Section 2.1.1) + 1,000 square foot water treatment facility (Section 2.1.4) + 8,000 square foot CCF (Section 2.1.4) = 9,160 square feet in new facilities from the Proposed Action.

2.3 No-Action Alternative

The FC is not serviced by a municipal drinking water line. Water is purchased from the City of Boulder and trucked to the site by a licensed contractor. To accommodate a potential growth in staff at the FC of up to 300 people, the projected annual water demand would increase to approximately 1 million gallons. Currently, one onsite domestic water storage tank with a capacity of 15,000 gallons supplies drinking water to the site. The onsite drinking water distribution system consists of a 2-inch polyvinyl chloride pipe that connects via underground piping to two buildings (Buildings 251 and 254). NREL personnel and certified contractors maintain the system and collect drinking water samples for offsite analysis. The distribution system is in working condition (Tetra Tech 2018).

Under the No-Action Alternative, DOE would not proceed with the Proposed Action; instead, DOE would continue to provide water to the FC using existing means (i.e., delivered and stored water and existing onsite wastewater treatment systems) to meet the water needs of the NREL staff and the FC research activities. Currently, approximately three water deliveries are made weekly (approximately 160 deliveries per year). To support future growth at the FC, DOE would need to increase water deliveries by approximately 100 percent (from three deliveries per week to six deliveries per week).

2.4 Other Reasonably Foreseeable Activities

As discussed in Section 1.1, the FC is NREL's primary facility for the research and development of wind energy, waterpower, and grid integration technologies and supports collaboration with industry to further these technologies and to accelerate their commercialization in the marketplace. As such, in any given year, many projects are likely to be initiated at the FC. The following projects are illustrative of the types of projects that may occur at the FC over the next few years:

- installation of two small new wind power turbines
- installation of a new fiber optic network
- installation of a Controllable Grid Interface infrastructure to expand current research capabilities that test grid integration of utility scale renewable energy and storage technologies
- removal of the existing Northern Power Systems turbine and installation of a new turbine from Eocycle America Corporation
- installation of a Power Electronic Grid Interface Platform infrastructure to evaluate the integration, operation, control, protection, stability, and general requirements of power grids containing large shares of power electronics-based generators such as wind, solar photovoltaic, and energy storage systems
- installation of a hydrogen electrolyzer system to explore the potential for wide-scale hydrogen production and utilization

These illustrative examples are not meant to be a comprehensive list of future projects. Prior to approval of any new project, DOE would prepare a NEPA determination. That could result in: (1) application of a Categorical Exclusion (e.g., determination that the project fits within a class of actions listed in Appendix A or B to 10 CFR Part 1021, Subpart D, and would not cause significant impacts); (2) determination that the project is bounded by the environmental impact analysis contained in the existing FC site-wide EA

(DOE 2014a), in which no further NEPA review is required; or (3) determination to prepare a project-specific NEPA document, such as an EA or an EIS.

2.5 Permitting and Authorization Summary

Table 2-3 summarizes the permits/authorizations required for the Proposed Action.

Table 2-3. Municipal, State, and Federal Permits and Authorizations

Permit or Authorization	Agency	Project Element	Status
Construction General Permit (CGP) and Construction Stormwater National Pollutant Discharge Elimination System (NPDES) Permit	EPA	Project Construction, Operation	To be applied for after EA completion
Record of Approved Waterworks	CDPHE	Project Construction, Operation	To be applied for after EA completion
Colorado Discharge Permit System, General Permit for Domestic Wastewater Treatment Works with Land Disposal of Effluent	Jefferson County	Project Construction, Operation	To be applied for after EA completion
Various building permits, including grading, stormwater, FC Waterline ROW, and zoning (DOE 2021a)	Various	Project Construction	To be applied for after EA completion
Air Pollutant Emission Notice	CDPHE APCD	Project Construction, Operation	To be applied for after EA completion
General Construction Permit for Land Development Projects	CDPHE APCD	Project Construction	To be applied for after EA completion
General Construction Permit for Diesel Fuel-Fired Reciprocating Internal Combustion Engines	CDPHE APCD	Project Operation	To be applied for after EA completion
Grading Permit	Jefferson County Planning & Zoning	Project Construction	To be applied for after EA completion
ROW Permit	USFWS	Project Construction	To be applied for after EA completion
Clean Water Act Section 404, Nationwide Permit 58 (Utility Line Activities for Water and Other Substances)	U.S. Army Corps of Engineers	Project Construction	To be applied for after EA completion
Easement	DOE	Project Construction, Operation	To be applied for after EA completion

3 AFFECTED ENVIRONMENT AND IMPACTS ANALYSIS

3.1 Background

The purpose of this EA is to enable DOE to determine whether the potential environmental impacts of the Proposed Action would be significant to human health and the environment. This chapter includes an analysis of the potential environmental consequences or impacts that could result from the Proposed Action and the No-Action Alternative. The affected or existing environment is the result of past and present activities at the proposed site and provides the baseline from which to compare impacts from the Proposed Action and the No-Action Alternative, as well as the baseline to which reasonably foreseeable future actions and the incremental impact of the Proposed Action are added for the cumulative impacts analysis presented in Section 3.15.

Certain aspects of the Proposed Action have a greater potential for creating adverse environmental impacts than others. For this reason, CEQ regulations (40 CFR 1502.1 and 1502.2) recommend a "sliding-scale" approach so that those actions with greater potential effect can be discussed in greater detail in NEPA documents than those that have little potential for impact. Preparation of this EA was guided by that sliding-scale approach.

As discussed in Section 1.4, this EA presents the reasonably foreseeable impacts that would have a reasonably close causal relationship to the Proposed Action. Sections 3.2 through 3.13 present the affected environment and potential environmental consequences for each of the resource areas analyzed in detail. This EA evaluates the environmental impacts of the alternatives within a defined region of influence (ROI), as described for each resource below. The ROIs encompass geographic areas within which any notable impact would be expected to occur. The level of detail in the description of each resource varies with the likelihood of a potential impact to the resource. The following resources are described/evaluated in this chapter:

- **Land use:** land uses, land ownership information, and land disturbances. The ROI for land use is the FC and land along the pipeline route to the Smart Reservoir.
- **Visual resources:** visual resources in terms of land formations, vegetation, and the occurrence of unique natural views. The ROI for visual resources is the FC and areas along the pipeline route to the Smart Reservoir.
- **Geology and soils:** the geologic characteristics of the area at and below the ground surface, the frequency and severity of seismic activity, and the kinds and qualities of soils. The ROI for geology and soils is the FC and areas along the pipeline route to the Smart Reservoir.
- **Water resources:** surface water and groundwater features, water quality, and water use. The ROI for water resources is the FC, areas along the pipeline route to the Smart Reservoir, and any adjacent surface water bodies and groundwater.
- **Meteorology, air quality, and noise:** climatic conditions such as temperature and precipitation, the quality of the air, and greenhouse gas emissions; baseline noise environment for the FC. The ROI for meteorology, air quality, and noise is the FC and areas along the pipeline route to the Smart Reservoir and nearby offsite areas within Jefferson County where air quality or noise impacts could potentially occur.

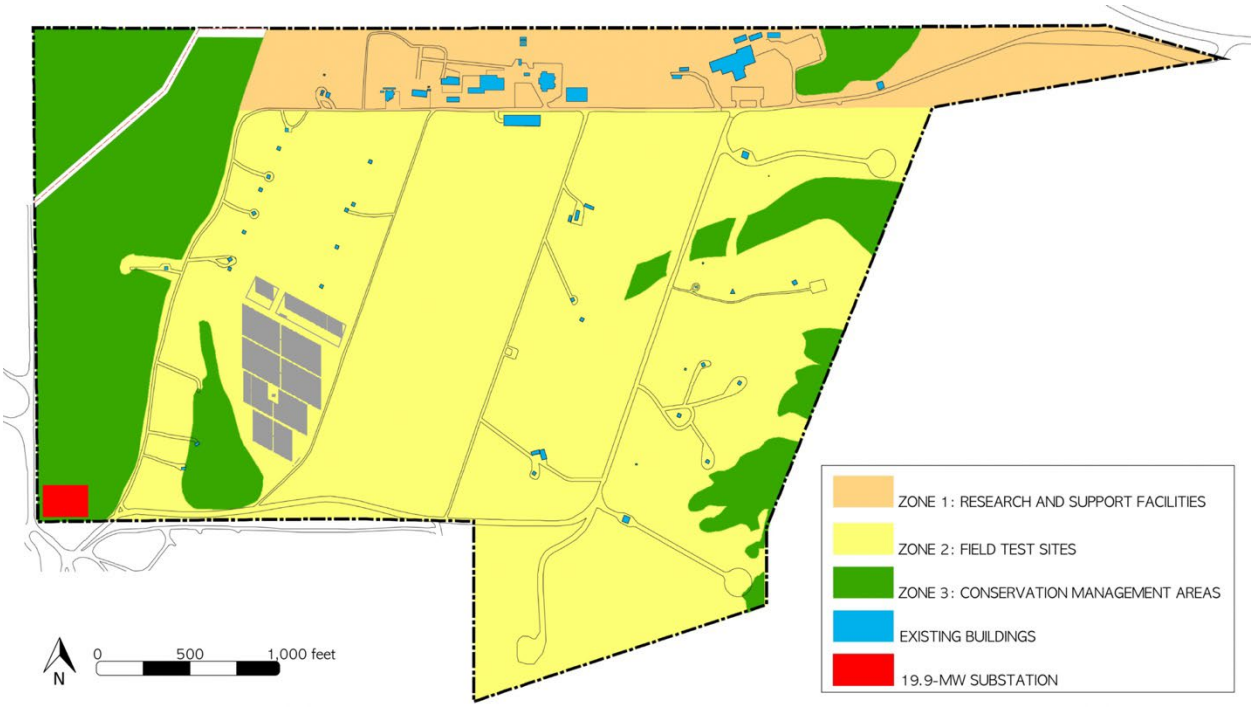
- **Biological resources:** plants and animals that live in the area, including aquatic life in the surrounding surface waters, and the occurrence of threatened or endangered species. The ROI for ecological resources is the FC and areas along the pipeline route to the Smart Reservoir.
- **Cultural and paleontological resources:** historic, archaeological, and tribal resources of the area and the importance of those resources. The ROI for cultural resources is the FC and land along the pipeline route to the Smart Reservoir.
- **Socioeconomics and environmental justice:** the labor market, population, housing, some public services, and personal income; location of low-income and minority populations in the vicinity of the project location. The socioeconomics ROI is Jefferson County, where a majority of the FC workforce resides.
- **Waste management:** solid waste generation and management practices. The ROI for waste management is the FC and offsite locations where recycling and waste management activities could occur.
- **Human health and safety:** the existing public and occupational safety conditions and baseline conditions to support analysis of impacts to health and potential accident scenarios. The human health and safety analysis focuses on impacts to workers and offsite members of the public near the FC.
- **Transportation:** the existing transportation systems in the area to facilitate analysis of impacts locally. The ROI for transportation is the FC and adjacent areas where transportation could occur.
- **Infrastructure:** utilities, energy, and site services, including capacities and demands in the immediate area of the proposed site. The ROI for infrastructure is the FC and adjacent areas.

3.2 Land Use

3.2.1 Affected Environment

The affected environment section summarizes existing onsite and surrounding land uses at the FC as well as adopted land use designations of the surrounding areas. It also describes local land use plans and programs. The area affected by the Proposed Action lies entirely within Jefferson County and stretches south from the FC across the Refuge to the Smart Reservoir.

Flatirons Campus. The FC is a 305-acre research facility on Jefferson County's northern border with Boulder County in Colorado. It is located near the intersection of US Highway 93 and Colorado State Highway 128, between Boulder and Golden, just east of the foothills of Colorado's Front Range. This location offers abundant wind resources, critical for the site's sustainable energy research.



Source: Adapted from Figure 1.2 in DOE 2014a.

Figure 3.2-1. FC Map with Zones

As shown in Figure 3.2-1, the FC is divided into three zones. Zone 1, located between the north property boundary and the primary access road (West 119th Avenue), contains the Research and Support Facilities and includes offices, laboratories, and associated support infrastructure. Zone 2 is generally located south of the Research and Support Facilities and contains the field test sites that perform research and analysis of wind turbine components and prototypes ranging from small, home-scale devices (less than 1 kilowatt) to large commercial utility-scale turbines capable of generating up to three megawatts of electricity. The field test sites also allow fundamental research to be conducted on aerodynamic and mechanical behavior of turbines, turbine interaction with atmospheric conditions, and distributed generation power components and systems. Zone 2 activities also include research in other energy-related areas (e.g., electrical grid integration, solar energy, energy storage, and hydrogen energy). Zone 3, located along the western boundary with other smaller areas interspersed across the site, contains conservation management areas.

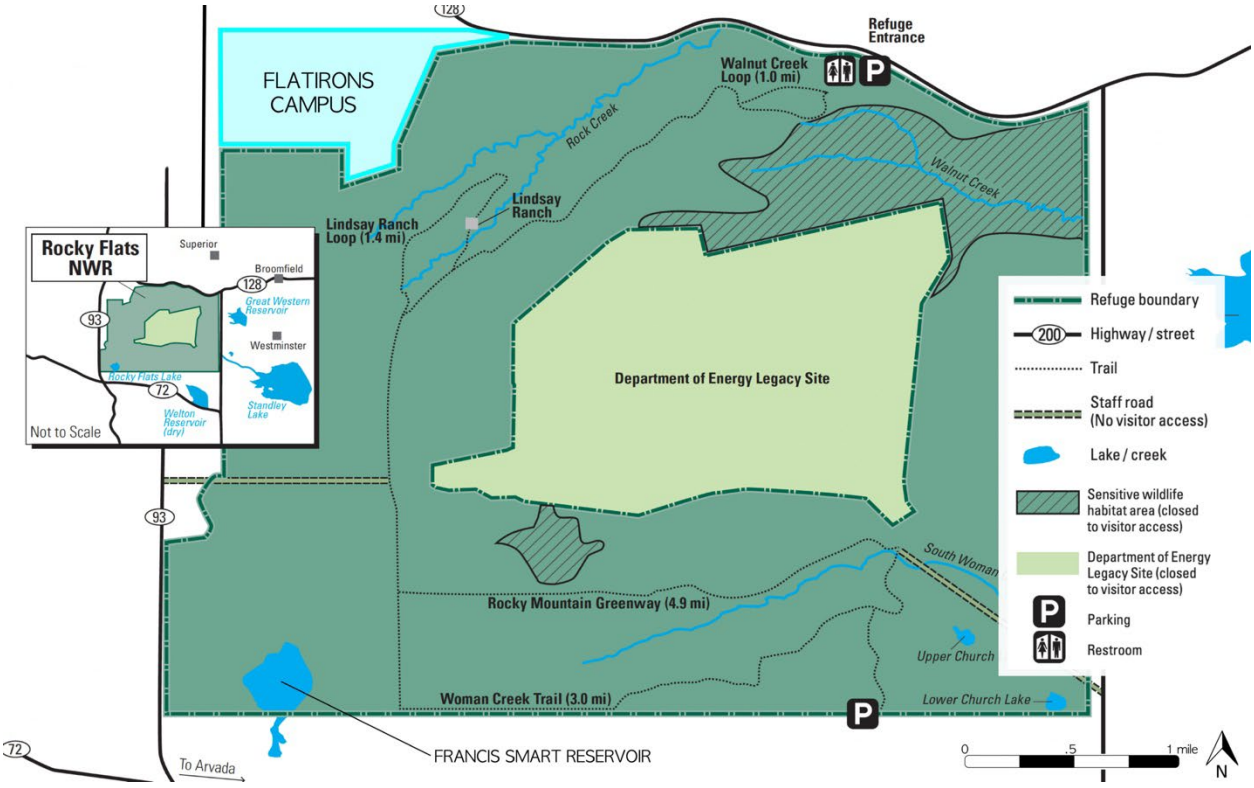
Rocky Flats National Wildlife Refuge. Located to the south and east of the FC in Golden, Colorado, is the 5,237-acre Rocky Flats National Wildlife Refuge, which is managed by the USFWS. It is approximately 16 miles northwest of Denver and is north of the city of Arvada. The Refuge is bordered by Boulder, Broomfield, and Jefferson counties, on the site of a former DOE nuclear weapons production facility.

The Refuge was formally the Rocky Flats Plant, which produced plutonium pits for the nuclear weapons stockpile from 1952 to 1989. In December 1989, pit production at the Rocky Flats Plant ceased and DOE decided not to restart production at the facility. The site was added to EPA's National Priorities List (NPL) (i.e., Superfund list) in 1989.

In 2001, Congress authorized the creation of the Refuge, and it was officially established in 2007. Under the Rocky Flats National Wildlife Refuge Act of 2001 (115 Stat. 1379), most of the 6,240-acre site

(specifically the "no activity zone" or buffer area around the site where manufacturing and activities involving nuclear materials were prohibited) became the Rocky Flats National Wildlife Refuge, following EPA certification that cleanup and closure had been completed. Because of ongoing monitoring requirements, the Central Operable Unit ("Legacy Site" on Figure 3.2-2) in the center of the refuge remains under DOE jurisdiction. EPA does not consider the FC to have been a part of the Rocky Flats NPL site (EPA 2003).

The Refuge's enduring mission is to preserve and restore native ecosystems, provide habitat for native plants and wildlife, conserve threatened and endangered species, and provide opportunities for scientific research. As such, the site has been restored to native prairie grasslands with no permanent structures. The Refuge is open for public use. Figure 3.2-2 shows the location of the 920-acre-foot (approximately 300-million-gallon) Smart Reservoir (see Section 3.5.1.1), the relation of the Refuge to the FC, the DOE Legacy Site, and the location of the 11-mile trail system (open to public year-round) (USFWS 2018).

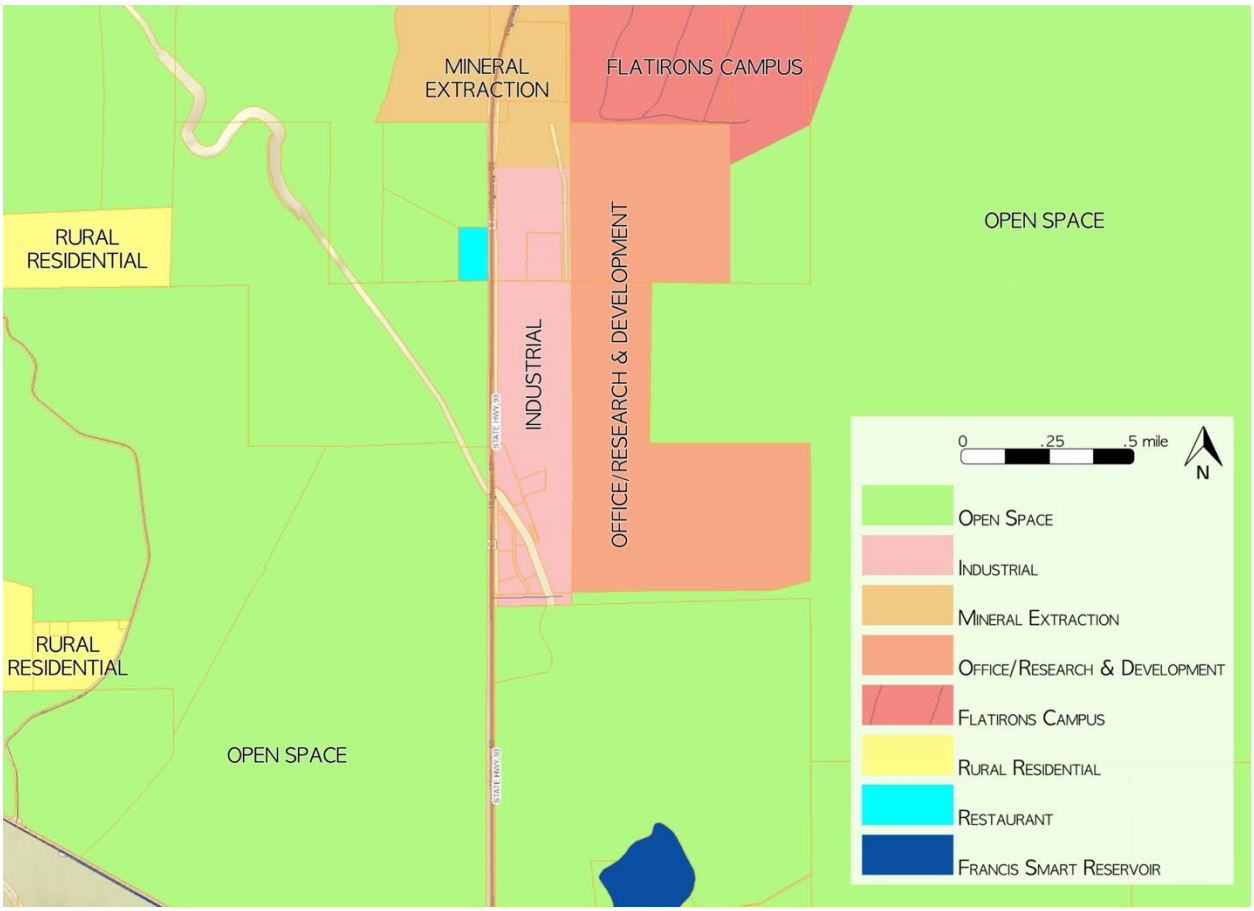


Source: USFWS 2018.

Figure 3.2-2. Rocky Flats National Wildlife Refuge

Surrounding Areas and Land Use: Figure 3.2-3 shows the land use designations in Jefferson County. The immediate area is largely rural and industrial with few residences and businesses. The FC is surrounded by open space, grazing, mining, and industrial land uses. Open space, including the Refuge, makes up the bulk of the land use in the immediate vicinity, with industrial and heavy commercial uses as the next most prominent. Nearby businesses and industrial uses include a restored sand and gravel mine, expanded shale and clay lightweight aggregate production, a small propellant fracturing installation, a landscape supply store, a boutique lumber yard, and a restaurant along US Highway 93. A portion of the

region was used for the excavation of limestone for cement manufacture and sand and gravel mining. The City of Boulder owns open space bordering the FC to the north; Colorado State Highway 128 lies north of that open space.



Source: Created from Jefferson County Colorado GIS: https://gis.jeffco.us/webmaps/jmap/index.html.

Figure 3.2-3. Jefferson County Land Use Designations

3.2.2 Proposed Action Impacts

Under the Proposed Action, total land disturbance would either be 8.3 acres (total disturbance with a 20-foot ROW) or 15.7 acres (total disturbance with a 40-foot ROW).[5] For determining land use impacts, 15.7 acres was used as a basis for analysis as it represents the highest foreseeable amount of land disturbance. The estimate of 15.7 acres disturbed represents 11.2 acres of offsite pipeline disturbance, 3.4 acres of onsite pipeline disturbance, 1.1 acres of onsite facilities and associated infrastructure, and less than 0.1 acre of offsite facilities (i.e., the pump station at the Smart Reservoir). The entire land disturbance area would occur on previously disturbed land.

[5] The land disturbance figures presented throughout this EA reflect the entire pipeline length, irrespective of the use of the existing, abandoned water pipe that would be reused in Segment 2 of the pipeline. Reuse of that water pipe would further reduce the area of land disturbance presented in this EA.

Pipeline construction presents the largest source of land disturbance; it would temporarily disturb 14.6 acres of previously disturbed land. The pipeline would start at the Smart Reservoir and cross the Refuge, entering the southern border of the FC. The offsite portion is 2.3 miles long and would require new ROW permits from USFWS for 1.8 miles; an abandoned 0.5-mile pipeline would be reused to limit construction impacts. Construction would require trenching for all new pipeline sections except for the boring under the railroad tracks. Once the pipeline enters the FC, it would travel north to the developed portion of the campus in Zone 1. After construction of the pipeline, all disturbed land would be regraded and restored to existing conditions. The sole permanent impact offsite would be the reservoir pump station. The two electric pumps would be housed in a small, 160-square-foot, low-profile, "vault design" pump station.

Onsite, permanent facilities and infrastructure would disturb less than 1.1 acres after laydown areas are restored. New facilities at the FC would consist of infrastructure to treat, store, and distribute potable and fire water throughout the site, and a new building (the CCF). The new improvements would be co-located with existing development in Zone 1 on Figure 3.2-1 and represent a negligible amount of the total FC land area (0.4 percent). The Proposed Action would have minimal impacts on land use both onsite and offsite.

3.2.3 No-Action Alternative Impacts

Under the No-Action Alternative, the pipeline would not be built, and the FC would continue to bring in water by truck multiple times a week. Land use would remain unchanged when compared to existing conditions; thus, there would be no land use impacts from this alternative.

3.3 Visual Resources

Visual resources are natural and human-made features that give a particular "landscape" (visible features of an area of land) or "viewshed" (view on an area from a vantage point) its character and aesthetic quality.

3.3.1 Affected Environment

The Bureau of Land Management's (BLM) Visual Resource Management (VRM) classification system was used to rate the scenic quality of the FC, Refuge, and surrounding areas. Although designed for undeveloped and open land managed by BLM, VRM is one of the only systems of its kind available for the analysis of visual resource management and planning. It was selected as the basis for this analysis because it is a proven and established means for determining visual values. Table 3.3-1 outlines the objectives of the four VRM classes.

Table 3.3-1. BLM VRM Class Objectives

Class	Objective	Change allowed (relative level)	Relationship to the casual observer
I	Preserves the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity.	Very Low	Activities should not be visible and *must not attract attention.*
II	Retains the existing character of the landscape. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.	Low	Activities may be visible but *should not attract attention.*
III	Partially retains the existing character of the landscape. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.	Moderate	Activities *may attract attention* but *should not dominate* the view.
IV	Provides for management activities that require major modification of the existing character of the landscape. These activities may dominate the view and be the major focus of viewer attention. Every attempt should be made, however, to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.	High	Activities *may attract attention and may dominate* the view but are still mitigated.

Source*:* BLM 1986.

The degree to which development affects the aesthetic quality of a landscape depends on the contrast created between the project elements and the existing landscape. Table 3.3-2 lists the degree of contrast criteria used in this section to assess the level of contrast between the proposed or existing element and the landscape in which it sits. The four levels of contrast—none, weak, moderate, and strong—correspond with VRM Class Objectives I, II, III, and IV, respectively. For example, a "moderate" contrast rating is generally acceptable in a Class III area but might also meet the VRM objectives for a Class IV area when there are compounding elements.

Table 3.3-2. BLM Degree of Contrast Criteria

Degree of contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Source*:* BLM 1986.

Currently, there are no BLM classifications for the project sites associated with the Proposed Action. The VRM class designations were assigned using the methods and criteria described above.

Flatirons Campus. The FC lies in the Colorado Piedmont physiographic province in the foothills of the Southern Rocky Mountains. The topographic relief is generally flat with a base elevation of approximately 6,000 feet. The immediate area is characterized by open grassland and ephemeral streams. No visually sensitive locations have been identified on the FC. Figure 3.3-1 shows a bird's eye view of the existing conditions in the northern, developed portion of the site and mountains to the far west.

Figure 3.3-1. FC View to the Northwest

The FC was founded nearly 50 years ago to support scientific research into wind turbines and other sustainable energy technologies. As such, the site is developed to support the construction, maintenance, and study of those renewable energy systems. A traditional mix of office buildings, research facilities, laboratories, and supporting infrastructure (utilities, roads, parking) is concentrated in the northern portion of the site (Zone 1 on Figure 3.2-1), opening the rest of the site for renewable energy technology installations. Zone 2 features the wind, solar, and battery installations at the field test sites, while Zone 3 features the conservation management areas.

The FC is in open, treeless areas, and the wind turbines are generally visible at a distance. While the location is intentionally rural to allow for future growth and ensure a limited amount of public interaction, the open setting leaves the facilities visible from public viewpoints. The developed area in the north (Zone 1) presents a high level of contrast between the surrounding landscape and the physical improvements to the land at the FC. Zone 2 houses the turbines, a dominate feature on the landscape. Zone 3 is undeveloped, characterized by conservation areas with extremely limited maintenance and no contrast to the abutting open areas. Despite the strong degree of contrast in Zone 1 and the wind turbines in Zone 2, the FC was assigned a VRM Class III rating. The overall landscape of the FC is characterized by large expanses of grasslands and natural areas, preserving the existing character of the landscape, and while the noted development attracts attention, it does not dominate the viewshed.

Rocky Flats National Wildlife Refuge. Located due south and adjacent to the FC, the Refuge sits on the site of a former DOE nuclear weapons production facility. As shown on Figure 3.2-2, the Refuge (in dark

green) surrounds, but does not include, the central portion of the site where nuclear manufacturing activities took place. Today, the Refuge is characterized by tall grasses, abundant wildlife, vestiges of historic homesteads, and 11 miles of designated hiking trails. The closest hiking trail to the FC and proposed project site is the 1.4-mile Lindsay Ranch loop. Views from the trails within the Refuge include development activities in the FC, rolling grassland, streams, and, in the distance, the Front Range. The remnants of the DOE production site are invisible to the casual viewer today as all the legacy buildings, equipment, and infrastructure were removed during the cleanup (completed in 2005) (DOE 2005). The Refuge was assigned a VRM Class I rating, as the existing landscape was preserved with very limited ongoing management activities.

3.3.2 Proposed Action Impacts

The Proposed Action includes the construction of an underground water pipeline: 1.8 miles of an underground pipeline on the Refuge, 0.7 mile on the FC, and putting back into service an existing 0.5-mile section of abandoned pipeline on the Refuge for a total of 3.0 miles of pipeline. The pipeline route would follow existing roads (Figures 2-1 and 3.3-2). The degree of contrast would be moderate during the construction phase. Construction activity would be visible to recreational users of the Refuge as construction vehicles and equipment install each section of pipeline, resulting in short-term minor adverse effects. No long-term effects would result from the pipeline construction or operations, as the pipeline would be underground. Disturbed land would be reseeded and eventually disappear into the broader landscape and be imperceptible to the viewer. Because the pipeline would be underground, it would not be assigned a VRM class rating. Figure 3.3-2 shows the visual conditions for the Proposed Action.

The non-pipeline infrastructure offsite would consist of an overhead powerline (with up to 10 poles) and the pump station at the Reservoir, and an additional overhead powerline along West Gate Road to provide power to an existing shed for the USFWS. Visually, the powerlines that would be installed would be consistent with existing powerlines in the area. The pump station would have a low profile (less than 10 feet in height) and a 10-foot by 16-foot footprint. It would sit on the northwest bank of the Reservoir as shown on Figure 2-1. Figure 3.3-2 includes a photograph of the proposed location. Although it would be a new human-made feature of utilitarian design on the Refuge, it would be of small stature and prominence, offsetting its visual impact. The enduring effects of the pump station and the pipeline represent a negligible change to the visual landscape of the Refuge, which would maintain its VRM Class I rating.

Non-pipeline infrastructure and structures on the FC would be located in the northern, developed portion of the site, in Zone 1 as shown in Figure 3.3-2. The Proposed Action includes the construction of the following:

- new water treatment facility to be located inside a 1,000-square-foot metal butler building
- two new 275,000-gallon fire water tanks of raw water for fire suppression purposes
- new 25,000-gallon domestic water storage tank
- new 120-foot by 80-foot septic field
- new gravel access road
- new 8,000-square-foot facility (CCF)

Figure 3.3-2. Visual Conditions of Four Sites of the Proposed Action

Development of these features would be driven by function and purpose. They would be similar in visual appearance to the existing industrial facilities in Zone 1. Construction would result in short-term visual impacts due to the presence of construction equipment, new buildings in various stages of construction and demolition, and possibly increased dust. These activities would not be out of character for an industrial site such as the FC. Site visitors and employees observing construction would find these activities similar to the past construction activities at the FC.

After construction of the supporting infrastructure and structures is complete, cranes and temporary construction office trailers (if any) would be removed and construction laydown areas would be restored. Once the pipeline and supporting projects are operational, the visual landscape as described in Section 3.3.1 would not change appreciably due to the already developed nature of Zone 1. The facilities proposed would occur within a context of similar development and would mirror the improvements that have historically occurred onsite. These facilities would occur within the designated built portion of the site and would not be out of character for the FC. The Proposed Action does not include any enduring visual changes to Zones 2 or 3 on the FC; as such, there would be no change to the existing VRM Class III rating for the FC.

3.3.3 No-Action Alternative Impacts

Under the No-Action Alternative, the pipeline would not be built, and the FC would continue to bring in water by truck multiple times a week to support its mission. No additional buildings or infrastructure would be built beyond current and planned activities independent of the Proposed Action. No additional

impacts to visual resources would occur at the FC, and conditions would remain unchanged when compared to the existing environment.

3.4 Geology and Soils

Geological and soil resources include the topography, geology, soils, mineral resources, and geological hazards of a given area. Topography refers to the elevation, slope, aspect, and surface features found within a given area. The geology of an area includes bedrock materials, mineral deposits, and any unique geological features. Bedrock refers to consolidated earthen materials that may be made up of either interlocking crystals (igneous and metamorphic rocks) or fragments of other rocks compressed and cemented together over time by pressure and dissolved minerals that have hardened in place (sedimentary rocks). Soil lies above bedrock and usually consists of weathered bedrock fragments and decomposed organic matter from plants, bacteria, fungi, and other living things. Mineral resources are metallic or nonmetallic earth materials that can be extracted for a useful purpose, such as iron ore that can be refined to make steel, or gravel that can be used to build roads. The principal geologic hazard that could affect human-made structures is soil stability (for example, landslide potential or soils that shrink and swell and could crack foundations) (DOE 2014a).

3.4.1 Affected Environment

3.4.1.1 Geology

Regional Geology

The project area is located on the gently sloping terrain of the Rocky Mountain Front Range between the Southern Rocky Mountain Province to the west and the Great Plains Province to the east. The Front Range trends north-south at elevations of approximately 9,800 feet, with elevations increasing to 14,000 feet along the Continental Divide, approximately 16 miles west of the site. The elevation of the FC is approximately 6,000 feet above sea level. The site area consists of a broad, eastward sloping pediment surface developed on coalescing alluvial fans at the mouth of Eldorado Canyon (DOE 2014a).

Site-Specific Geology

Geologic units beneath the project area consist of unconsolidated Quaternary age (approximately 3 million years ago to the present time) alluvial surface materials that lie atop the Cretaceous (approximately 144 to 65 million years ago) claystone bedrock of the Laramie Formation. The upper member of the Laramie Formation consists of horizontally interbedded siltstone, sandstone, and claystone layers ranging from 300 to 550 feet thick. The lower member is composed of sandstone layers containing coal seams and is approximately 250 feet thick beneath the project area. The Rocky Flats Alluvium dominates the surface of the project area and is composed of dense, poorly stratified clayey gravels and cobbles with some interbedded hard clays and clayey sands. The alluvium-bedrock contact occurs at approximately 40 feet below the surface at the FC (DOE 2014a).

The project area is located in a Jefferson County "Designated Dipping Bedrock Area," where steeply dipping beds of expansive claystone bedrock are found near the ground surface. When exposed to water, layers of bedrock display different potentials for expansion, resulting in damage to roads and lightly loaded structures. The Jefferson County Designated Dipping Bedrock Area Guide (JeffCo 2008) identifies special requirements and recommendations for construction within the area, including minimum soil or overburden thickness, minimum foundation design requirements, and design requirements for

infrastructure systems. Natural alluvial deposits may reduce the heaving potential of the bedrock at the site. Landslides and other mass earth movements can be present as shallow features where slopes are steep; however, because the slope of the surface at the site averages about 2 percent, landslides are not characteristic or expected within the project area (DOE 2014a).

The project area is located near the western edge of the Colorado Piedmont section of the Great Plains physiographic province, adjacent to the eastern foothills of the Front Range. Several faults are located in the vicinity of the FC, but no faults have been identified under the site itself. The northwest-trending Eggleston fault lies approximately 1 mile east of the site's northeast corner (DOE 2014a, USGS 2021a, USGS 2021b).

The greatest amount of recent earthquake activity in the region occurred as a result of the deep injection of fluid at the Rocky Mountain Arsenal near Commerce City, located east of Denver. Approximately 1,800 earthquakes occurred between 1962 and 1972 as a result of the injection, with a maximum magnitude event of 5.2 on the Richter scale occurring in 1967 after injection was discontinued (DOE 2014a). From 1973 to present, 24 earthquakes have occurred within 62 miles of the site, with the largest event having a magnitude of 4.3 and an epicenter located approximately 14 miles east of the project area (USGS 2021c).

U.S. Geological Survey (USGS) data indicate that an earthquake with a 2-percent likelihood of occurring in the next 50 years would have a peak ground acceleration (PGA) of 0.13g (0.13 times the acceleration of gravity), and an earthquake with a 10-percent likelihood of occurring in the next 50 years would have a PGA of 0.04g (USGS 2021d). Earthquakes of this magnitude would be unlikely to cause damage (FEMA 2020).

Mineral Resources

Known mineral resources in the immediate vicinity of the project area include sand and gravel, clay, rock for concrete aggregate and riprap, and coal. DOE owns the surface rights at the FC. The mineral rights for the western 160 acres of the FC were historically owned by Rocky Mountain Fuel, but they were transferred to NRC-CO, LLC (a private entity), in 2008. Those mineral rights apply to the extraction of coal, shale, oil, and natural gas (DOE 2014a).

3.4.1.2 Soils

The soils within the project area consist largely of cobbly sandy loam and gravel, with a predominant clay subsoil that occurs between 13 and 47 inches below the surface. The clay has a moderate shrink-swell potential. Borings taken at the Refuge, south of the FC, indicate that groundwater is sometimes perched on top of clay in the alluvium, and that this perched layer may occur at depths as shallow as approximately 3.5 to 8 feet below the surface, although groundwater at such shallow depths is not common at the Refuge or the FC (DOE 2014a, USDA 2021).

The Flatirons very cobbly sandy loam is found on slopes of 0 to 3 percent and is appropriate mainly for grazing and wildlife habitat. Each of the soils found at the FC exhibits only a slight wind erosion hazard except for the Valmont clay loam, which exhibits a moderate wind erosion hazard that may be readily controlled by the use of plant cover (DOE 2014a, USDA 2021).

Two areas of ancient soils have been identified along the eastern edge of the FC. These soils are important because they have remained geologically undisturbed for nearly 2 million years, and they are associated with native vegetation representing two biomes (the central plains of North America and the

Rocky Mountains). This assemblage of vegetation and ancient soils has unique qualities such as exceptional stability and resistance to weed invasion (DOE 2014a, USDA 2021).

Environmental Soil Sampling

The results of a 1994 geotechnical investigation for FC facility expansion indicated that the onsite soils are capable of supporting structures, including new site buildings. However, foundations could be at risk of heaving caused by wetting and subsequent swelling of the clay portion of the underlying soils. Additional geotechnical borings were performed and percolation tests were conducted in 1995 to determine subsurface conditions at the FC in preparation for construction. The results indicated that subsurface soils at the FC exhibited variable swell potentials that could be compensated for by using specified engineering excavation and construction techniques for foundations (DOE 2014a).

Soil samples for laboratory analysis were collected from the FC in 1993. The objective of this sampling program was to determine the existing characteristics of site soil prior to the construction of a leach field. The soils were analyzed for volatile organic compounds, petroleum hydrocarbons, polychlorinated biphenyls, and radionuclides. Analytical results indicated that detectable quantities did not exceed State of Colorado regulatory limits and were representative of environmental background concentrations (DOE 2014a).

Additional samples for laboratory analysis were subsequently collected in 1994 in order to develop a more thorough baseline assessment of site soils. The analytical results for the majority of these samples were below method detection limits and, therefore, below regulatory thresholds for all analyzed chemicals and radionuclides (DOE 2014a).

Airborne radionuclide soil contamination was historically transported to the east and southeast of the Central Operable Unit and the 903 Pad of the former Rocky Flats Plant (note: the Rocky Flats Plant was renamed the "Rocky Flats Environmental Technology Site," [RFETS] during cleanup) where radionuclide soil contamination was detected. Soil from the Central Operable Unit, or "active area" at the former Rocky Flats Plant, would tend to be eroded and deposited east of the site.

The potential effects of wind erosion of soils with residual radionuclide contamination from the Rocky Flats Plant were modeled to estimate the effective dose equivalents (EDEs) to RFETS workers and the public (DOE 2006a). Scenarios were modeled, including soil disturbance (such as might be expected at construction sites) and post-fire erosion at the former 903 Pad (the area with the highest soil contamination contributing to airborne radionuclides at RFETS). The maximum EDE for plutonium-239/240 was found to be 0.80 millirem per year, and the doses from other radionuclides were found to be much lower than that. The estimated EDE of 0.80 millirem per year is below the EDE of 10 millirem per year established by EPA to protect the public.

Plutonium in soil samples was generally below background or human health-based preliminary remediation goals in the northwestern portion of the RFETS study area (DOE 2006a). In general, little or no dose from radionuclides is expected to the northwest of RFETS where the FC is located, because prevailing winds are generally from the northwest to southeast, blowing from Eldorado Canyon across the FC towards the RFETS area. Because soils at the FC were not contaminated by Rocky Flats Plant activities, wind erosion of soil or construction disturbances at the FC would not result in movement of contaminated soil. In addition, the characteristics of the specific soils at the FC result in only slight to moderate potential for wind erosion (USDA 2021).

3.4.2 Proposed Action Impacts

This analysis considers the potential for adverse effects on geological and soil resources if any of the following were to occur:

- permanent or long-term loss of mineral resources
- permanent or long-term loss of soil resources, or reduction in productivity or suitability of soils for use
- increases in soil erosion through increased susceptibility to water or wind erosion during or after construction activities, or through a large increase of impervious surface area that would increase the amount of surface water runoff during rain or snow events
- initiation of seismic activities by facility activities

The analysis also considers the potential for geologic and soil resources to have adverse effects on the Proposed Action in the following ways:

- Seismic activity of sufficient magnitude could result in damage to proposed structures, potentially with resultant injuries or loss of life, unless structures are designed and built to withstand reasonably foreseeable seismic events.
- Soil properties such as high shrink-swell capacity could result in damage to structure foundations unless measures are taken to mitigate the effects.
- Severe erosion of soil could result in damage to foundations, roads, or other structures.

However, these conditions are not likely to occur if the Proposed Action is implemented, as described in further detail below.

The construction of new facilities and infrastructure would affect approximately 15 acres of land by the placement of new buildings, water tanks, the leach field, waterline ROW, and access road. Up to 4.5 acres of land would be disturbed within the FC (represents about 0.4 percent of the total area at the FC), and up to 11 acres of land would be disturbed for the offsite water pipeline (see Table 2-2).

The Proposed Action would have no adverse impacts on mineral resources within the project area. Constructing new buildings, structures, and the FC Waterline ROW would limit surface access in a few locations, representing a very small proportion of the area available for future mineral extraction.

Resources such as concrete aggregate, crushed rock, and asphalt would be required during facility construction. These materials are readily available through local commercial sources.

Construction or operational activities under the Proposed Action would not cause seismic activity in the vicinity of the site since there would be no deep injection of fluids. Excavation for new structures would not occur below the alluvial surface deposits (approximately 40 feet deep), eliminating or minimizing the need to blast for construction purposes.

The relatively low seismic hazard for the project area indicates that new construction would not be adversely affected by seismic events, provided all applicable building code requirements for seismic design are met. Building codes applicable for the area, including Jefferson County's guidance for construction in the dipping bedrock area, would also ensure that construction techniques are used to avoid

or mitigate any hazards associated with high shrink-swell capacity soils that may be encountered at the site. Meanwhile, the relatively flat terrain at the site would not promote the occurrence of landslides on areas temporarily disturbed during construction activities.

In general, potential impacts from erosion would be minimized through the development and implementation of a site-specific SWPPP, implementation of erosion and sediment control measures during construction, and implementation of a revegetation plan for areas disturbed by construction. Although the site soils are not classified as prime farmland, site topsoil could be stripped and conserved prior to grading activities and reapplied after construction to facilitate revegetation. Soils in areas used to stage equipment and materials have the potential to be compacted; such areas could be mechanically decompacted prior to the revegetation phase of the project to facilitate regrowth. The wind erosion hazard for soils within the project area is slight. However, any excavated soils stored over the long term would be graded to minimize the loss of soil through wind and water erosion. As part of the NREL stormwater program, stockpiled soils are routinely covered to reduce wind and water erosion.

During restoration, soils disturbed during construction would be properly restored and revegetated. This would apply to open areas around facility buildings, temporary workspaces, and the FC Waterline ROW. Workspace disturbed during construction would be restored in the following manner: the area would be decompacted, the topsoil would be spread, a seed bed would be prepared, and seed and straw mulch would be applied. Although erosion from stormwater runoff and wind action would occur occasionally during operation, it is anticipated to be minimal. The increased impervious surface could result in a slight increase in surface water runoff during rain and snowmelt events. However, it is unlikely that this small increase would result in increased soil erosion, particularly when applicable standards for landscaping and erosion control are used.

As a result, no long-term adverse impacts to geological and soil resources, as identified, are likely from implementation of the Proposed Action.

3.4.3 No-Action Alternative Impacts

The No-Action Alternative would result in no additional impacts to geological resources. Minor impacts to soil resources from ongoing site activities would be expected.

3.5 Water Resources

Water resources include surface water, stormwater, and groundwater. Surface water includes streams, creeks, ponds, and standing water. Section 3.5.1.1 describes surface water resources within the project area. Stormwater is the water the site receives from precipitation and includes sheeting and runoff associated with high precipitation events. Stormwater may also include surface runoff from snow-melt if large quantities of snow melt rapidly. Section 3.5.1.2 describes stormwater within the project area. Groundwater is the water residing in aquifers and the subsurface strata. It may be deep below the ground surface or very near (within a few feet of) the surface. Section 3.5.1.3 describes groundwater resources for the project area, and Section 3.5.1.4 describes water use.

3.5.1 Affected Environment

3.5.1.1 Surface Water

Regional Drainage

The project area is located within the South Platte River Basin. The area surrounding the project area is drained by five streams: Rock Creek, North Walnut Creek, South Walnut Creek, Woman Creek, and Coal Creek. Rock Creek flows eastward and is located southeast of the FC. North Walnut Creek and South Walnut Creek flow eastward into Great Western Reservoir. Woman Creek drains eastward into Standley Lake (Figure 3.5-1). The drainage pattern has a relatively flat headwater area and steep gullies and channels to the east of the project area where it cuts below the Rocky Flats Alluvium into bedrock formations. Surface water generally originates from precipitation and shallow groundwater discharge. Stream levels fluctuate depending on the season and amount of precipitation. Most streamflow is controlled by groundwater discharge; streamflow is higher when groundwater levels are higher, such as in the spring. According to the Colorado Department of Public Health and Environment (CDPHE), Rock Creek and Woman Creek are impaired waterways under Section 303(d) of the Clean Water Act (33 U.S.C. 1251–1387), with recreational use limits for Escherichia coli (E. coli) and aquatic life use limits for dissolved selenium (Rock Creek) and total iron (Woman Creek) (USFWS 2019b, CDPHE 2020a).

Flatirons Campus

The FC has no substantial permanent surface water resources, and no perennial creeks or streams cross the property. Coal Creek flows in a northeasterly direction across the open space north of the FC. The majority of the FC site drains into a tributary to Rock Creek. Some of the northern portions of the site drain into Coal Creek or its tributaries (Figure 3.5-1). There are no surface water withdrawals at the FC (DOE 2014a).

Wetland areas totaling 1 acre have been identified at the FC, but no floodplains have been identified within the FC. Approximately 69 acres of land within the FC boundary are managed as conservation areas, including onsite seeps and ephemeral drainages (i.e., only present after precipitation) and standing water resulting from rain or snow events. Storms and other seasonal precipitation events may cause water to temporarily flow from seeps and collect in these ephemeral drainages and ponds. Two areas of groundwater seep wetlands are located on the FC. The first is located in the northwestern portion of the site along the northern fence line. The second occurs over a very small area on the banks of the northern drainage (DOE 2014a). There are no wetlands within the project's construction footprint within the FC (Figure 3.5-2) (DOE 2014a).

The FC has two ephemeral drainages. Both drainages occur in the northeastern portion of the site, one flowing east and one flowing north. Both show evidence of intermittent surface flow. The northern-most drainage is a tributary of Coal Creek, and the second drainage is a tributary to Rock Creek. A seasonal pond occurs at the northwestern corner of the site (DOE 2014a).

Right-of-Way Corridor

Wetland and waterbody features are located within the proposed FC Waterline ROW, south of the FC. A ponded depression, which ranges from wet to dry seasonally, was mapped within the ROW corridor. Additionally, two wetland complexes were delineated in the ROW corridor (Figure 3.5-3). Both wetland complexes are palustrine emergent (PEM) wetlands dominated by the same herbaceous species and share

the same hydrology (i.e., rainwater and stormwater run-off). The wetlands are grouped in complexes based on topography and location in the project area.

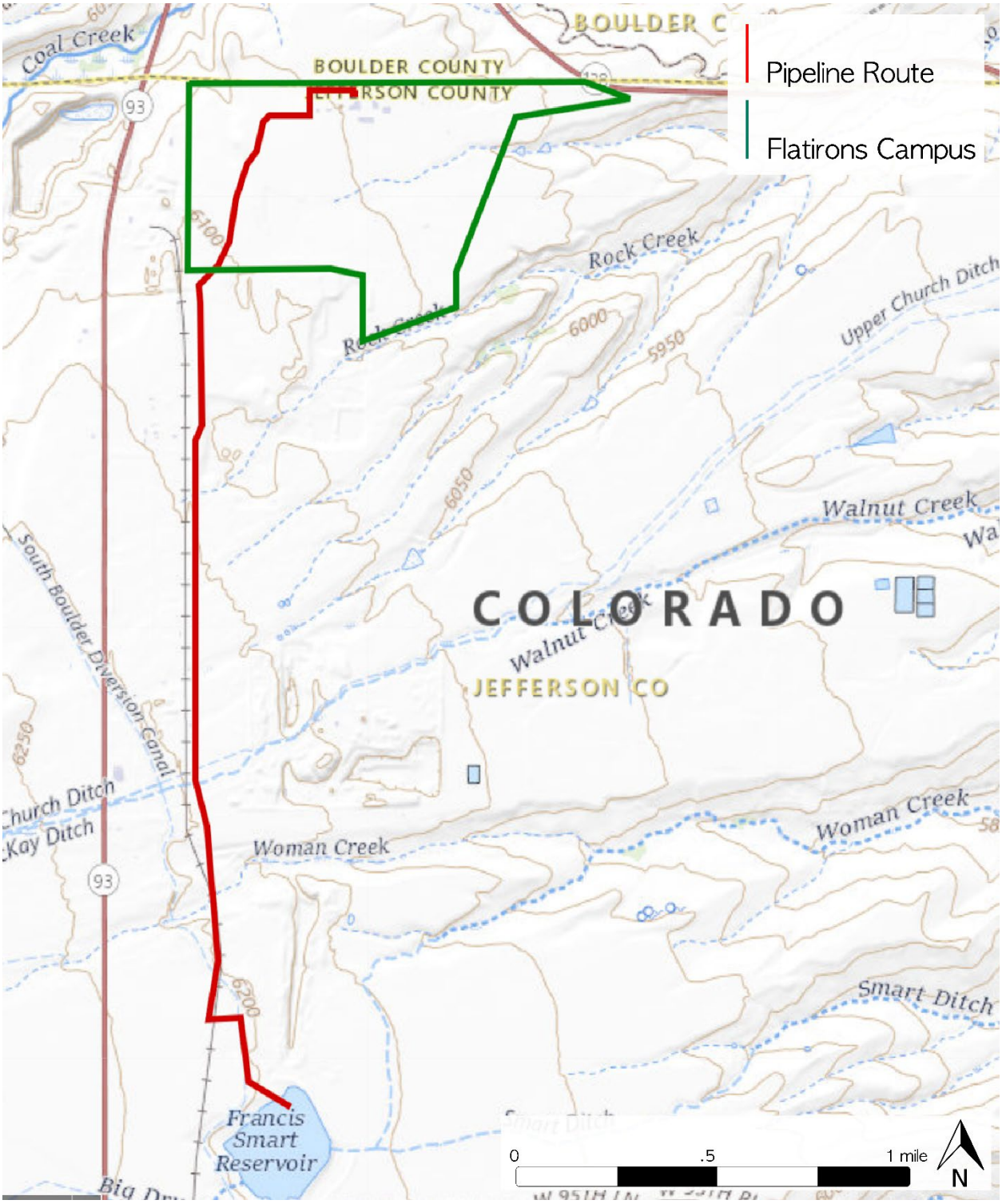
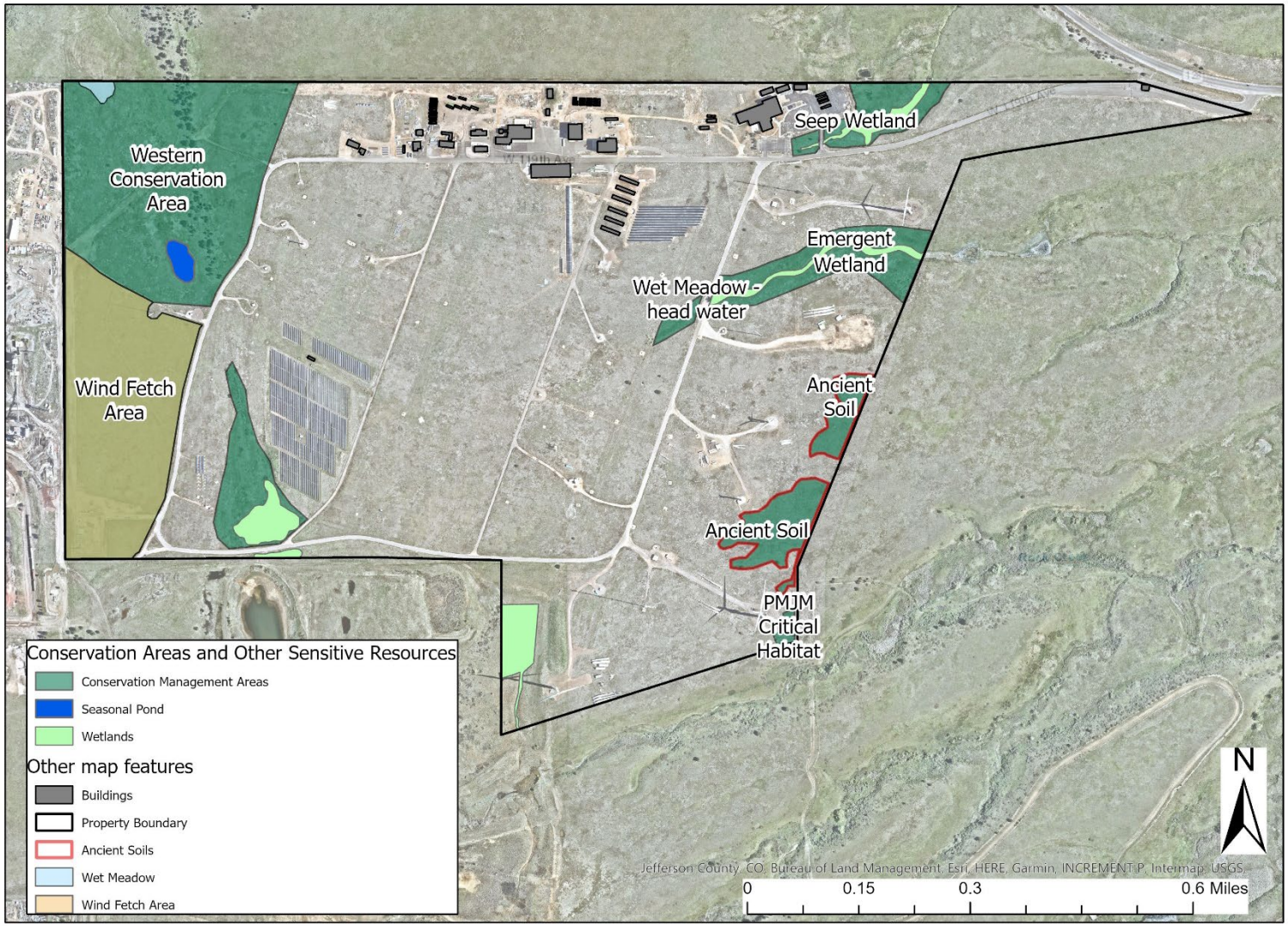


Figure 3.5-1. Streams in Vicinity of the Project Area



Source: DOE 2021a.

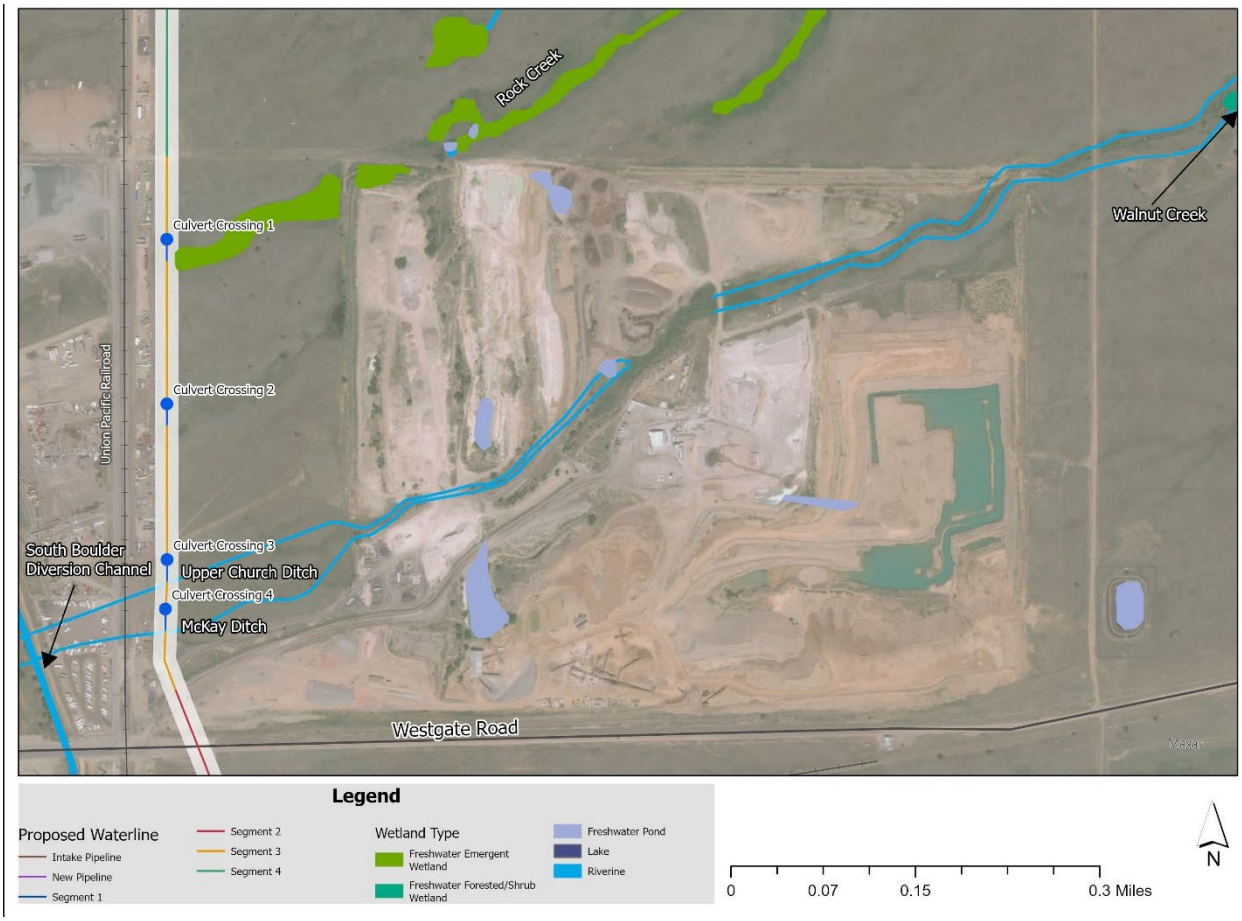
Figure 3.5-2. Wetlands within the FC

Source: Alliance 2021.

Figure 3.5-3. Wetlands within the ROW Corridor

The portion of the proposed waterline located just south of the Flatirons Campus (Segment 4) was reviewed in 2018 (Pinyon 2018). Based on that review, two wetland complexes (WL-1 and WL-2) and an intermittent stream (tributary to Rock Creek) were identified within this portion of the study area (see Figure 3.5-3 in this section and Figure 4 in Appendix A). The Wetland 1 (WL-1) complex is generally associated with the ponded depression (OW-1) and includes all wetlands north of the ponded depression, while the Wetland 2 (WL-2) complex is generally associated with Rock Creek drainage and includes WL-2a and WL-2b and all wetlands south and north of Rock Creek drainage (WL-2c through WL-2f) (USFWS 2019b).

Proceeding south of the wetland complex, the pipeline corridor crosses two culverts and two human-made drainage ditches (Church Ditch and McKay Ditch) (Segment 3) (Figure 3.5-4). Because these are human-made features, they are not considered to be waters of the United States. The culvert crossing in the northern portion of Segment 3 provides hydrology to a PEM wetland system located outside of the ROW corridor. The second culvert, which is located approximately 700 feet south of the first, does not have a direct hydrologic connection to any wetland or other stream system. Both culvert areas have no hydrophytic vegetation or hydric soils, and the areas do not possess a defined bed or bank. Therefore, the culvert areas are not considered to be waters of the United States and do not contain wetlands. South of the two culverts, the irrigation ditches (Church Ditch and McKay Ditch) are human-made features and therefore are also not considered to be waters of the United States (Alliance 2021).



Source: Alliance 2021.

Figure 3.5-4. Waterbody Features within the ROW Corridor

NREL conducted a review of the southern portion of the proposed waterline corridor (Segments 1 and 2) in June and December 2021. Based on a review of the National Wetlands Inventory map, a wetland and an associated stream system (Woman Creek) are depicted as originating from the west and extending linearly to the east, through the proposed waterline corridor. The Denver Ditch, a human-made irrigation ditch, is located to the west of the corridor study area, then conveys flows south-southeast where it crosses the proposed waterline. Based on the field investigation, an area that was identified as a PEM/palustrine scrub-shrub (PSS) wetland includes an intermittent stream channel that transects the system. The PEM/PSS system is located just west of the proposed waterline corridor, and the stream channel provides hydrology to the wetland system. The intermittent stream channel flows to the east through the proposed waterline corridor approximately 48 linear feet and transitions into a perennial stream (Woman Creek). Because this portion of the project corridor contains an existing 10-inch waterline that would be reused for the project, there would be no impacts to the intermittent stream channel stream (Alliance 2021).

Off-Site Surface Water

A number of surface water ponds are located within the vicinity of the project area. The reclaimed mine land area about 900 feet to the east of the northern portions of the ROW corridor contains a pond, as does the mined area along the southern portion of the ROW corridor. A small impoundment exists about 700 feet to the west of the mid portion of the pipeline corridor (Figure 3.5-3) (USFWS 2019b).

3.5.1.2 Stormwater

The receiving waters for stormwater runoff from the FC are Coal Creek and Rock Creek. The general slope of the site is toward the southeast, directing stormwater toward Rock Creek via the natural drainages on the east side of the site. Stormwater runoff from the northwestern corner of the site and stormwater reaching the drainage east of Building 251 discharge toward Coal Creek to the northeast (DOE 2014a). Although some tributaries may be subject to periodic flooding, the Federal Emergency Management Agency (FEMA) has not delineated any special flood hazard areas within the project area (FEMA 2021).

The recent focus of NREL's water quality protection program has been to manage construction site runoff due to the active construction sites at the FC. EPA is the regulating authority for stormwater at federal facilities. For construction sites that disturb areas greater than 1 acre, a Notice of Intent must be filed with EPA under the CGP and a site-specific SWPPP must be prepared. At NREL, the SWPPP implements both the requirements of EPA's CGP and NREL-specific requirements. For construction sites less than 1 acre, NREL requires subcontractors to comply with the basic elements of stormwater pollution prevention, including preparing an abbreviated SWPPP to document basic contract, project, and best management practices information, as well as a site-specific erosion and sediment control plan showing the locations of key site characteristics and best management practices (DOE 2014a). The project is expected to disturb approximately 15 acres of land, and therefore a CGP and SWPPP would be necessary.

For areas that are not under construction, the goals of NREL's water quality protection program are to minimize erosion, facilitate infiltration of rainwater and snowmelt, and prevent contamination of stormwater with hazardous materials. NREL implements practices that include preventing erosion through the use of vegetation; covering dumpsters; storing hazardous materials indoors or in covered areas; and immediately cleaning up outdoor spills of fuels, hydraulic fluids, and other materials (DOE 2014a).

3.5.1.3 Groundwater

The project area is located at the western edge of the Denver Basin aquifer system that supplies water to users along the Front Range of the Rocky Mountains in northeastern Colorado. The Denver Basin includes the Dawson, Denver, Arapahoe, and Laramie-Fox Hills aquifers. The shallowest aquifer is the Dawson formation, which is located between 60 and 100 feet below ground surface (bgs) and extends to approximately 1,000 feet bgs. This is followed by the Denver aquifer, the Arapahoe aquifer, and, finally the deepest aquifer, the Laramie-Fox Hills aquifer, which extends from approximately 2,270 to 2,970 feet bgs (DOE 2014a). There are currently no sole source aquifers designated in Colorado (EPA 2021a).

The hydrogeology at the project area is characterized by three distinct units: the upper alluvial aquifer, lower aquitard, and the Laramie-Fox Hills aquifer (USFWS 2019b). The upper alluvial aquifer, the Rocky Flats Alluvium, comprises the unconsolidated materials that can be as much as 100 feet thick in the western portions of Rocky Flats. This aquifer is generally recharged from precipitation or surface water (USFWS 2019b).

Several springs have emerged in areas where the contact of the upper aquifer and the lower aquitard is exposed at the surface. Recharge of the lower aquitard occurs from downward flow through the upper aquifer, or directly through precipitation in areas where the bedrock is exposed. Beneath the aquitard lies the regional Laramie-Fox Hills aquifer. Groundwater levels in the bedrock aquifers are generally greater than 100 feet. Unconfined groundwater flows toward the east/southeast in the Rocky Flats Alluvium. Precipitation, snowmelt, and water infiltrating from the drainages, seeps, and ponds located on and near the study area are the primary sources of groundwater in the Rocky Flats Alluvium, and small perched zones are common. Confined groundwater occurs in the deeper Arapahoe and Laramie-Fox Hills aquifers, flowing in a general east/southeast direction below the FC (USFWS 2019b).

The FC currently has no open or active groundwater wells. The State of Colorado regulates the installation of groundwater wells through the Office of State Engineers, which requires a permit for drinking water, groundwater monitoring, or geothermal installations. If activities were to be conducted that could impact groundwater, a groundwater monitoring program would be implemented at the FC in accordance with state regulations and NREL procedures (DOE 2014a).

3.5.1.4 Water Use

The FC is not located within the bounds of a municipal public water supply distribution system; instead, at the present time, treated water is purchased from the City of Boulder and transported by truck to the campus for the employees. The treated water originates in large part from the Boulder Creek watershed and, to a lesser degree, some watersheds on the western slope of Colorado. The trucked water is transferred to either a domestic water holding tank with a capacity of 15,000 gallons or the fire suppression tanks. Water is pumped from the holding tank to a 2,000-gallon day tank, where chlorine is added to boost disinfectant levels before the water is distributed to campus buildings (NREL 2021a). A total of 1,474,200 gallons of potable water was trucked to the FC in 2019 (DOE 2021a).

3.5.2 Proposed Action Impacts

The analysis evaluates the potential for impacts to water resources that could include degradation of the quality of surface water and groundwater, changes in stormwater runoff, or effects on water supplies. The types of adverse impacts considered in the analysis include, but are not necessarily limited to, the following:

- increased concentrations of contaminant chemicals in surface water or stormwater
- increased concentrations of sediment in surface water or stormwater
- increased or initiated soil erosion due to increased surface water or stormwater flows or changes in surface water flow patterns; soil erosion could contribute to increased sediment in surface water
- increased concentrations of contaminant chemicals in groundwater through direct discharge of contaminants
- rising levels of shallow groundwater resources resulting from increased infiltration of surface water; rising water tables can affect utilities and structures if close to the surface
- lowering of local groundwater levels through decreased recharge because of reduced permeable surface area

However, these conditions are not likely to occur if the Proposed Action is implemented, as described in further detail below.

3.5.2.1 Impacts to Surface Water and Stormwater

Flatirons Campus

The Proposed Action would be implemented in accordance with all federal and state water quality, wetlands, and floodplains statutes and regulations, as well as NREL's water quality protection program, which focuses on protecting the water quality of the receiving waters (Coal Creek and Rock Creek) by managing stormwater runoff from construction sites and impervious surface areas. Construction activity associated with the Proposed Action would not occur within the wetlands, seeps, and ephemeral drainages and ponds on the FC.

Prior to the start of construction, it would be necessary to obtain a construction stormwater National Pollutant Discharge Elimination System (NPDES) permit for discharges of stormwater associated with construction activities (greater than 1 acre of land disturbance). As part of the NPDES permit, the development and implementation of a site-specific SWPPP would be required to help minimize any pollution that might leave the site by stormwater. The SWPPP would contain a detailed site plan and schematics for the installation of stormwater and erosion control devices to effectively manage the site during construction. In addition, NREL implements standard procedures and practices to minimize potential impacts of stormwater runoff, not only from construction sites but also from areas that are not under construction.

There would be a small increase in impervious surface areas (approximately 1.1 acre or less than 0.4 percent of the FC area) if the Proposed Action was implemented due to the construction of new permanent facilities (including water treatment facility, wastewater treatment facility, CCF, fire and domestic water tanks, and parking). However, Section 438 of the Energy Independence and Security Act specifically calls for federal development that has a footprint that exceeds 5,000 square feet to maintain or restore predevelopment hydrology. As such, the facility design would incorporate permanent controls for the proper management of stormwater. In addition, NREL's water quality protection program would be implemented to reduce stormwater runoff and protect receiving waters by minimizing erosion, detaining stormwater runoff with detention basins, and preventing contamination of stormwater from release of hazardous materials.

The proposed water pipeline would enter the FC at the southwest corner of the site, near the existing substation, and would terminate at the new fire water tanks and new water treatment facility. This onsite pipeline segment would be approximately 0.7 mile in length. The route follows an existing dirt road on the FC and is the same route used for other FC utilities. During construction, the SWPPP would be implemented in conjunction with NREL's water quality protection program to protect stormwater runoff by minimizing off-ROW transport of sediment during construction. Once installed, the FC Waterline ROW contours would be restored to be preconstruction conditions, and the ROW would be revegetated. There are no wetland or waterbody features within or near the waterline ROW.

These procedures and practices ensure minimal impacts from stormwater runoff on surface water during construction and site operation at the FC. Therefore, impacts to receiving waters are expected to be negligible during implementation of the Proposed Action.

Offsite Right-of-Way Corridor

During construction, the SWPPP would be implemented in conjunction with NREL's water quality protection program to protect stormwater runoff by minimizing off-ROW transport of sediment during construction. Once installed, the FC Waterline ROW contours would be restored to be preconstruction conditions, and the ROW would be revegetated.

Wetland and waterbody features are located within the proposed FC Waterline ROW, south of the FC. Within Segment 4, two PEM wetland complexes were delineated (totaling about 1.65 acres in extent) as well as a tributary to Rock Creek (Figure 3.5-3). Within Segment 3, the proposed route would cross two culverts; in addition, within the southern portion of Segment 3, the route would cross two human-made irrigation ditches, Church Ditch and McKay Ditch. The culvert areas and drainage ditches do not contain wetlands within the ROW corridor and are not considered to be waters of the United States (Figure 3.5-4). Segment 2 would use an existing portion of an abandoned waterline and therefore would not disturb any wetland or waterbody features. Lastly, Segment 1 would cross the Denver Water Ditch, which is about 20 feet below ground level, and therefore the proposed water pipeline would not impact the ditch.

Construction of the Proposed Action may temporarily impact wetlands within Segment 4. Within the permanent FC Waterline ROW, the construction activity and pipeline centerline would be positioned to avoid wetlands to the extent possible. Less than 0.1 acre of wetland disturbance is expected during construction. The pipeline would be constructed using standard pipeline construction procedures in wetlands with firm soils or without standing water. Non-saturated topsoil over the trench would be segregated to preserve the natural seedstock and encourage the growth of native plant species during restoration. Conversely, if soils were saturated at the time of construction, equipment mats would be used to support construction equipment to avoid rutting and subsurface mixing of soils. Erosion control devices would be installed at these workspaces such as silt fence, straw/hay bales, or earthen berms to prevent transport of sediment into wetlands and waterbodies. The primary impacts of construction on wetlands would be the alteration of wetland type and impacts on water quality within wetlands because of sediment loading or inadvertent spills of hazardous materials. The Proposed Action would result in no net loss of wetlands. DOE has prepared a wetlands assessment (Appendix A) concurrently with this EA in accordance with 10 CFR Part 1022. That assessment fulfills DOE's responsibilities under Executive Order 11990. The project is not expected to alter the wetland type, function, or value because preconstruction hydrology and contours will be re-established to match preconstruction conditions, as part of the final restoration process. Alteration of wetland type that would occur would be associated with extensive wetland disturbance and improper restoration (such as alteration of grading or failure to re-

establish native vegetation with preconstruction native wetland vegetation). However, the project will not cause extensive wetland disturbance (less than 0.1 acre), and any disturbance would undergo restoration.

Within Segment 4, waterbody features exhibiting flow during construction would be crossed using the dry-ditch open cut method. The greatest impacts associated with dry-ditch open-cut crossings would be during the installation and removal of in-waterbody dams and water diversion structures. These impacts include increases in local sediment loading and turbidity from in-waterbody construction activities, or construction adjacent to waterbody channels. Clearing and grading of waterbody banks and in-waterbody construction could result in temporary alteration of aquatic habitat and decreased dissolved oxygen concentration. In addition, backfilling and settling of the streambed trench over time could result in altered contours that lead to minor changes in waterbody flow patterns and velocity. These changes could further result in waterbody bed scouring and/or deposition in new areas.

Temporary equipment bridges may be needed to cross waterbodies, which would allow construction equipment and personnel to cross the waterbodies and avoid direct impacts. In general, impacts would be limited to the in-waterbody construction period and immediately thereafter. Crossing of minor and intermediate waterbodies would be performed as expeditiously as possible (in 24 to 48 hours, where practicable). The bed and bank contours would be restored to preconstruction conditions immediately after pipeline installation. Conditions are expected to return to normal after waterbody restoration activities.

The SWPPP, NREL water quality protection program, and standard procedures for pipeline construction in wetlands and waterbodies would mitigate potential impacts from stormwater runoff on surface water and to wetland and waterbody crossings during construction. Final restoration of the FC Waterline ROW to preconstruction conditions would ensure that impacts during operation would be minimal.

3.5.2.2 Impacts to Groundwater

Flatirons Campus

The Proposed Action would be implemented in accordance with all federal and state water quality, wetlands, and floodplains statutes and regulations. There are no open or active groundwater wells at the FC. If activities were to be conducted that could impact groundwater, a groundwater monitoring program would be implemented by NREL at the FC in accordance with state regulations.

For the unconfined groundwater that occurs in the Rocky Flats Alluvium beneath the FC, development from the Proposed Action would increase the amount of impervious surface on the site, thereby limiting infiltration of precipitation. However, through implementation of Section 438 of the Energy Independence and Security Act and NREL's general efforts in preventing erosion, facilitating infiltration, and incorporating low-impact design elements, the impacts on recharge or groundwater availability beneath the FC would be negligible. NREL follows both county and federal requirements to implement stormwater management practices that enhance groundwater infiltration.

Groundwater could be encountered during excavation of the alluvium for foundation and building construction, depending on seasonally and geographically fluctuating groundwater levels. It is expected that most of the construction activities would be unlikely to disturb groundwater. If the water table is encountered, water would be pumped out of the excavation into a settling tank or designated area (to reduce suspended sediment) and then onto the ground and returned to the alluvium via seepage through the soil. All proposed activities would be performed in accordance with the NREL management program procedures for stormwater and groundwater that specify steps to be taken during construction and

operation of facilities to protect water resources. The impact to the unconfined groundwater from this water removal and subsequent discharge would be short term and would be negligible in the long term.

Wastewater output would increase as the site population at the FC is anticipated to increase. The increase would be handled by an additional septic system and leach field. Settling tanks and leach field size would be based on projected loads from maximum anticipated staffing levels and soil characteristics. The proposed wastewater treatment system (sanitary leach field with a capacity of 1,999 gallons per day, settling tanks, and sump pump) would be located near the CCF. The disturbed area for the wastewater treatment system would be approximately 120 feet by 80 feet (9,600 square feet) (DOE 2021a). The adequacy of the systems would be verified by Jefferson County through its permitting process. Compliance with the state and county standards ensures that septic systems and leach fields are adequate to meet the needs of the proposed wastewater output. Consequently, impacts to groundwater would be negligible.

A major administrative improvement for groundwater protection was made in 2011 when NREL amended its procedure for managing aboveground storage tanks (ASTs) and revised spill prevention, control, and countermeasure (SPCC) plans for sites such as the FC. The SPCC plans describe in detail all areas where petroleum oil products are stored, potential pathways should there be a release, and the immediate actions to be taken in such an event. SPCC training is required annually for all staff who manage fuel storage tanks; that training is tracked electronically. The training was revised to include an updated spill history and associated response activities and to emphasize spill prevention and immediate response requirements (NREL 2021a). Careful planning and preparation for events such as spills from ASTs minimize impacts from environmental releases.

Offsite Right-of-Way Corridor

Groundwater could be encountered during trenching for pipeline installation, depending on seasonally and geographically fluctuating groundwater levels. It is expected that most of the construction activities would be unlikely to disturb groundwater. If the water table is encountered, water would be pumped out of the excavation into a settling tank or designated area (to reduce suspended sediment) and then onto the ground and returned to the alluvium via seepage through the soil. All proposed activities would be performed in accordance with the NREL management program procedures for stormwater and groundwater that specify steps to be taken during construction and operation of facilities to protect water resources. The impact to the unconfined groundwater from this water removal and subsequent discharge would be short term and would be negligible in the long term.

Construction of the pipeline would involve shallow, temporary, and localized excavation, far above the depth at which potable water is obtained from wells. While excavation itself would not result in contamination of groundwater resources, it could temporarily disturb the typical recharge patterns of the surficial aquifer, cause temporary increases in turbidity, and disrupt overland flow characteristics. Surficial aquifers generally exhibit rapid recharge and are greatly influenced by short-term rain events. Therefore, once the pipeline construction is complete and the trench backfilled, baseline conditions are expected to return preconstruction state within a few weeks to months following establishment of vegetation on the FC Waterline ROW.

Inadvertent spills or leaks of fuels, lubricants, or coolant from construction equipment could adversely affect groundwater. The impacts of such releases are typically minor because of the low frequency and small volumes of spills and leaks. NREL's SPCC plan would be implemented to prevent spills of any material that may contaminate groundwater, and to ensure that inadvertent spills are contained, cleaned up, and disposed of in an appropriate manner.

3.5.2.3 Impacts to Water Use

The Smart Reservoir is owned jointly by Consolidated Mutual (majority interest) and Mountain Plains Industrial (Charlie McKay, minority interest). The owners are the only users that draw water from the reservoir. The reservoir has an elevation of 6,184 feet with a capacity of 920 acre-feet (approximately 300 million gallons). The reservoir is approximately 35 feet deep in the main bowl (Tetra Tech 2018). Consolidated Mutual, a water supply company, has indicated that DOE may purchase up to 10 acre-feet (approximately 3.3 million gallons) of water per year. DOE would purchase these shares for use at the FC. The 10 acre-feet of water per year would account for less than 1 percent of the Smart Reservoir capacity and would not impact other users.

3.5.3 No-Action Alternative Impacts

The No Action Alternative would have no impacts to surface water or groundwater resources beyond those resulting from the continued operation of currently existing facilities.

3.6 Meteorology, Air Quality, and Noise

3.6.1 Affected Environment

3.6.1.1 Meteorology and Air Quality

The FC is located entirely within Jefferson County, Colorado, which is part of the Metropolitan Denver Intrastate Air Quality Control Region. EPA designated this region as a serious ozone nonattainment area for the 2008 ozone National Ambient Air Quality Standard (NAAQS) on December 26, 2019, with an effective date of January 27, 2020 (84 FR 70897). The FC is also located in a part of Jefferson County that is considered a marginal ozone nonattainment area for the 2015 ozone NAAQS and an attainment/maintenance area for the 1987 coarse particulate matter (PM_{10}) NAAQS and the 1971 carbon monoxide (CO) NAAQS. Jefferson County is considered an attainment area for all other NAAQS. Colorado has no separate ambient air quality standards and references the NAAQS for designating ambient air quality within a county (EPA 2021b).

In the Köppen-Geiger climate classification system, the climate for the area including the FC is classified as BSk: semiarid, typified by limited precipitation, low relative humidity, and large daily and seasonal temperature variations (Köppen-Geiger 2017). This area experiences an average annual rainfall of less than 20 inches, with almost half of the annual precipitation total occurring from March to June and winter being the driest season with less than 10 percent of the annual precipitation. The highest average snowfall typically occurs in March, with at least one snowstorm of 6–10 inches (NREL 2021a).

Air pollution and greenhouse gas (GHG) emissions are regulated by EPA and the CDPHE Air Pollution Control Division (APCD). CDPHE APCD enforces state air pollution and GHG regulations, issues air pollution construction and operating permits, and is delegated by EPA to enforce federal air pollution control regulations. EPA and CDPHE APCD both have reporting requirements for large emitters of GHG; neither of these regulations apply to existing activities at NREL or the Proposed Action.

The study area is bounded to the west by US Highway 93 and to the north by Colorado State Highway 128. Both highways are existing sources of vehicle emissions and other air pollutants related to the combustion of fossil fuels. A lightweight aggregate kiln and shale mine are located to the south and west. Both sites are sources of fugitive dust, vehicle emissions, and other air pollutants related to the

combustion of fossil fuels. Site air quality is impacted primarily by PM_{10} generated by these activities and wind-blown fugitive dust associated with these activities. The water trucks currently servicing the FC also contribute a small amount of air pollutant and GHG emissions at the site. The Refuge is located south and east of the study area and is expected to be similarly affected by nearby sources of vehicle emissions and fugitive dust, including current air pollutant and GHG emissions from water trucks servicing the FC.

3.6.1.2 Noise

As noted above, the FC is located in an area bounded to the west by US Highway 93 and to the north by Colorado State Highway 128. A shale pit mine and associated lightweight aggregate kiln are located to the west of the FC. Two clay pit mines are located south of the Flatirons campus and east of the project study area. In addition to air emissions, all of these activities contribute to the ambient noise levels within the study area. Also, the trucks delivering water to the site each week add a small amount of noise to the environment for FC staff nearby.

A 2012 study of environmental noise from Colorado highways determined the average ambient noise levels from both cars and heavy trucks on multiple Colorado highways from 2006–2011 to be 78 decibels (dB), measured at a height of 5 feet, 50 feet from the center of the outside lane (CDOT 2012). For the aggregate pit mine, excavation equipment and heavy truck transportation are expected to generate noise levels of 87.4 dB at 50 feet, while the kiln and associated processing equipment are expected to generate noise levels of 90.9 dB at 50 feet (LSA 2006). Excavation equipment and truck transportation at the clay pit mine are expected to generate similar noise levels to the aggregate pit mine, as they use similar equipment.

Jefferson County has adopted a noise abatement policy that states that sound from a non-vehicular source located in a residential zone or undeveloped area adjacent to a residential zone shall not exceed 55 dB from 7:00 AM to 7:00 PM and 50 dB from 7:00 PM to 7:00 AM. For construction projects in a residential zone or undeveloped area adjacent to a residential zone, the allowable sound level is 80 dB from 7:00 AM to 7:00 PM and 75 dB from 7:00 PM to 7:00 AM; an alternate time and noise limit may be specified by the county in an issued construction permit for land disturbance (JeffCo 2007).

3.6.2 Proposed Action Impacts

3.6.2.1 Meteorology and Air Quality

Air quality and climate impacts of the Proposed Action are limited to a short-term increase in emissions of air pollution and GHG during construction for the duration of the project and longer-term emissions from operation of the emergency generator for the pump station, which are expected to continue for as long as NREL occupies the site. Air pollution would be generated by fossil fuel-fired equipment and transportation vehicles (including vehicle emissions) and fugitive emissions of PM_{10} during construction activities. Fugitive dust would be generated from construction equipment disturbing the soil and movement of workers, construction equipment, and wind on unpaved roadways. These PM_{10} emissions are temporary and would have a minor impact on the air quality of the study area.

Table 3.6-1 gives estimates of air pollutant and GHG emissions from construction and associated transportation activities, while Table 3.6-2 summarizes anticipated fugitive dust emissions. These estimates were developed based on assumptions about the types of transport and construction vehicles and total land disturbance involved with the project, with calculations using EPA air pollutant emissions

factors for stationary sources (EPA 1997). For mobile sources, estimates were calculated using GHG emissions factors for fuel consumption (40 CFR Part 98, Subpart C), EPA exhaust and crankcase emissions factors for nonroad engines (EPA 2010), and the EPA MOtor Vehicle Emission Simulator (MOVES3) (EPA 2020).

Table 3.6-1. Estimates of Construction and Transportation Emissions (tons per year)

Emitter	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP	CO_2e
Transportation Vehicles: Diesel	0.07	0.18	0.01	0.01	<0.01	0.01	<0.01	11.10
Transportation Vehicles: Gas	0.09	0.01	<0.01	<0.01	<0.01	0.01	<0.01	4.49
Construction Equipment	0.18	0.94	0.03	0.03	<0.01	0.07	<0.01	124.66
Total	0.34	1.13	0.04	0.04	<0.01	0.09	<0.01	140.25

CO: carbon monoxide; NOx: nitrogen oxides; PM_{10}: coarse particulate matter (≤10 microns); $PM_{2.5}$: fine particulate matter (≤ 2.5 microns); SO_2: sulfur dioxide; VOC: volatile organic compounds; HAP: hazardous air pollutants; CO_2e: carbon dioxide equivalents

Table 3.6-2. Estimates of Fugitive Dust Emissions During Construction (tons per year)

Pollutant	Traffic	Trenching	Filling	Grading	Wind Erosion	Total
PM_{10}	0.78	0.13	0.01	0.01	1.38	2.31
$PM_{2.5}$	0.09	0.10	0.01	<0.01	0.21	0.41

An emergency generator would be used to generate electrical power to ensure continued operation of the water pump at the Smart Reservoir and the water/wastewater treatment system at the FC during an electrical power outage. Table 3.6-3 gives an annual estimate of the air pollutant and GHG emissions from typical operation of the emergency generators. These estimates assume 500 hours of operation of a 150-kilowatt, diesel-fired compression-ignition engine per year, including emergency operation and 1 hour of operation per month and 24 hours of operation for an endurance test every 18 months (DOE 2000). The analysis used air pollutant and GHG emissions factors developed by EPA (EPA 1997; 40 CFR Part 60, Subpart III; and 40 CFR Part 98, Subpart C). These occasional emissions would have a negligible impact on air quality and are expected to continue for as long as NREL occupies the site.

Table 3.6-3. Annual Estimate of Emergency Generator Emissions (tons per year)

Emitter	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP	CO_2e
Emergency Pump Operation	0.15	0.23	0.01	0.01	<0.01	0.01	<0.01	50.04
Emergency Treatment Operation	0.15	0.23	0.01	0.01	<0.01	0.01	<0.01	50.04
Total	0.30	0.46	0.02	0.02	<0.01	0.02	<0.01	100.08

The short-term and long-term impacts from the Proposed Action are anticipated to have only minor, short-term effects and negligible long-term effects on local air quality and climate. Air pollutant emissions of NO_X and VOC are below the *de minimis* thresholds for a general conformity analysis. In addition, during operation, a slight decrease in emissions would occur because trucks would no longer be delivering water to the site.

A general conformity review (40 CFR Parts 51 and 93) is not required for the Proposed Action, as the estimated emissions from the project would not exceed the *de minimis* thresholds in 40 CFR 93.153(b)(1) of 50 tons per year of VOC or NO_X in serious ozone nonattainment areas and 100 tons per year of PM_{10} and CO in attainment/maintenance areas.

CDPHE requires appropriate mitigation measures for any land disturbance to minimize the release of fugitive dust (PM_{10}) from the site. The mitigation measures specified by CDPHE include the following:

- Unpaved roadways and disturbed surface areas must be watered as necessary to prevent off-property transport of visible fugitive emissions.
- Vehicle speed on all unpaved roadways is limited to 30 miles per hour and signs must be posted.
- No earthwork activities can be performed if the windspeed exceeds 30 miles per hour.
- Disturbed surface areas must be re-vegetated within one year of project completion.
- Gravel entryways must be used to prevent mud and dirt carryout onto paved surfaces.
- Mud and dirt carryout must be cleaned up daily.

A permit is not required unless land development activities exceed either 25 contiguous acres or six months of duration; CDPHE has developed General Construction Permit GP03 for land development projects that require a permit (CDPHE 2020b).

CDPHE requires an Air Pollutant Emissions Notice (APEN) and a separate construction and operating permit for certain reciprocating internal combustion engines (RICE) fired by fossil fuels, landfill gas, or digester gas. An APEN is required for any RICE that emits more than one ton per year of any air pollutant (except hazardous air pollutants) in a nonattainment area. An air permit is required for any RICE that generates emergency power that operates for 250 hours per year or more. If these applicability criteria are satisfied, an APEN or an air permit would be required for emergency RICE. CDPHE has developed a general permit (GP06) for diesel fuel-fired RICE (CDPHE 2020c); RICE using other fuels would have to apply for a process-specific construction permit.

3.6.2.2 Noise

Noise impacts of the Proposed Action are limited to a short-term increase in local noise for construction activities associated with the project and a long-term increase in temporary noise from the emergency generator for the pump station, which is expected to continue for as long as NREL occupies the site. The water trucks would no longer need to deliver to the site each week, so their noise would no longer impact FC staff nearby.

Noise would be generated by excavation and construction equipment associated with pipeline and pump station construction activities. The noise levels from the construction equipment operating near the Smart Reservoir are not expected to exceed the 80 dB allowable sound level in the Jefferson County noise abatement policy for construction equipment and activities (JeffCo 2007). The expected noise at 25 feet from the nearest residential property line from the pump area is estimated to be 65 dB, based on the amount of noise generated by various pieces of construction equipment as established in LSA Associates, Inc. (LSA) (2006). Noises associated with these construction activities are expected to be temporary, lasting only until the pipeline and pump station are constructed.

Noise levels from operations at the pump station would not be perceptible at residences. To ensure an uninterrupted supply of water, NREL is expected to store and maintain a mobile emergency generator at the FC. During power outages, the generator would be deployed at the pump station to ensure uninterrupted water supply. The diesel engine serving the emergency generator or water pump would operate during periods of electrical power curtailment, endurance testing, and monthly operating tests.

The engine would generate noise during operation, impacting the residential neighborhood to the south of the Smart Reservoir. Engines are equipped with decibel ratings detailing their noise production at full load, usually measured at 23 feet. If the diesel engine serving the emergency generator or water pump is rated higher than 79 dB, NREL would need to implement acoustic mitigation measures to reduce engine operation noise below the 50 dB allowable sound level from 7:00 PM to 7:00 AM in the Jefferson County noise abatement policy for non-vehicular sources (JeffCo 2007). Potential acoustic mitigation measures include any of the following: exhaust muffler; vibration insulators; enclosure within a building; or vegetation, earthen berms, or walls made of acoustically absorptive materials.

3.6.3 No-Action Alternative Impacts

3.6.3.1 Meteorology and Air Quality

Under the No-Action Alternative, NREL would continue to transport water to the site from the City of Boulder. The planned increase in staff would result in doubling the amount of water needed at the site and hence the number of trucks visiting the site. This would result in a small increase in air pollutant and GHG emissions related to the transport of water. Table 3.6-4 gives an estimate of these emissions. The analysis used air pollutant and GHG emissions factors developed by EPA in MOVES3 (EPA 2020).

Table 3.6-4. Annual Estimate of Current Water Transport Activities (tons per year)

Activity	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAP	CO_2e
Current water transport	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	1.31
Additional water transport	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	1.31
Total	0.02	0.04	<0.01	<0.01	<0.01	0.01	<0.01	2.62

3.6.3.2 Noise

Under the No-Action Alternative, there would be no expected change to ambient noise levels and no impacts from generator noise on nearby residences. Ambient noise levels at the FC would increase as water deliveries would occur more frequently, although the noise level from an individual water delivery truck would remain the same.

3.7 Biological Resources

3.7.1 Affected Environment

The FC lies at the northern boundary of Jefferson County, at the intersection of the Southern Rocky Mountain and Central Shortgrass Prairie ecoregions as defined by The Nature Conservancy (TNC 1997, in Sovell et al. 2012). The Rocky Flats National Wildlife Refuge is located in the High Plains bioregion, with extensive grasslands bisected by riparian shrublands and occasional wet meadows. The Colorado Natural Heritage Program designated parts of the Refuge as Potential Conservation Areas with Very High Biodiversity Significance (B2, in Sovell et al. 2012). However, the USFWS Utility Corridor ROW exists mainly in industrial and nonnative grassland and degraded grassland habitats. Historically, the area was grazed and use for mineral extraction and is fairly disturbed. Within the existing utility ROW, vegetation has been altered from native conditions from the construction of earthen berms and an improved road, presumably a mining haul road (USFWS 2019b).

3.7.1.1 Common Species

General Vegetation

The nonnative grassland community type at the southwestern portion of the FC is dominated by introduced pasture grasses, including smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), and Canada bluegrass (*Poa compressa*). The degraded grassland community has been heavily influenced by human disturbance and is dominated by downy brome (cheatgrass, *Bromus tectorum*, a List C Noxious Weed in Colorado) and intermediate wheatgrass (*Thinopyrum intermedium*), among others (ERO Resources 2018a).

Other species in the degraded grasslands include crested wheatgrass (*Agropyron cristatum*), western wheatgrass (*Pascopyrum smithii*), orchard grass (*Dactylis glomerata*), arnica (*Arnica spp*.), and alissum (*Thlaspi spp.).* Noxious weeds observed during surveys for the USFWS Utility Corridor ROW in 2019 include diffuse knapweed (*Centaurea diffusa*), Canada thistle (*Cirsium arvense*), common mullein (*Verbascum thapsus*), moth mullein (*Verbascum blattaria*), Russian thistle (*Salsola iberica*), Dalmatian toadflax (*Linaria dalmatica*), chicory (*Cichorium intybus*), and Russian olive (*Elaeagnus angustifolia*) (USFWS 2019b).

A few trees, notably, ponderosa pine (*Pinus ponderosa*) and plains cottonwood (*Populus deltoides*), are found within the study area. Only two shrubs were noted within the study area, hawthorn (*Crataegus spp*.) and chokecherry (*Prunus virginiana*). The northern portion of the study area, which was mined for gravel, contains much more open ground and a wide variety of invasive and pioneer plant species, many of which are the noxious weeds listed above. In contrast, the southern portion of the study area contains a higher density of native grasses and herbaceous plants. However, noxious weeds, especially diffuse knapweed and chicory, are present throughout the southern portion of the study area and have spread east beyond the study area (ERO Resources 2018a).

Mammals

On the FC, mammal presence was evaluated using camera traps in 2015 and 2016 and small mammal trapping was carried out along six transects (ERO Resources 2018a). Although there are a few shrubs and trees scattered about the study area, it is predominately a xeric mixed grassland, and given past disturbances is degraded habitat for most mammals. Over the past several years of surveys (2003, 2011, 2015, 2016, and 2017), at least 23 mammals have been observed or recorded on the FC (NREL 2021a). Large mammals, including ungulates such as elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), and white-tailed deer (*Odocoileus virginianus*), and mammalian carnivores, including coyote (*Canis latrans*), mountain lion (*Puma concolor*), bobcat (*Lynx rufus*), black bear (*Ursus americanus*), and badger (*Taxidea taxus*), traverse the study area. The region may represent an important local travel corridor for large mammals and mammalian carnivores given the remoteness of the Refuge and the open terrain to the west. Additionally, small mammals such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and weasels (*Mustela spp*.) frequent the area.

Bats have been studied for decades on the FC and Refuge using mist-netting and acoustic surveys (ERO Resources 2018a). Seven species of bats have been observed or acoustically recorded at the FC and the Refuge from surveys in 2003, 2011, 2015, 2016, and 2017: western small-footed myotis (*Myotis ciliolabrum*), little brown myotis (*Myotis lucifugus*), fringed myotis (*Myotis thysanodes*), long-legged myotis (*Myotis volans*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), silver-haired bat (*Lasionycteris noctivagans*), and big brown bat (*Eptesicus fuscus*). The habitat within the utility ROW is open and is likely limited to commuting and foraging habitat for bats.

Rodents and lagomorphs are well documented within the region. Xeric grasslands within the study area support up to eight species of rodents and three species of lagomorphs, including deer mouse (*Peromyscus maniculatus*) and prairie vole (*Microtus ochrogaster*) as the majority rodent species. Pocket mouse (*Perognathus spp*.), harvest mouse (*Reithrodontomys spp*), thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), desert cottontail rabbit (*Sylvilagus audubonii*), and jackrabbit (*Lepus spp*.) have also been identified within the Refuge and the FC (ERO Resources 2018a).

Reptiles and Amphibians

Reptiles within the xeric grasslands of the Refuge include the prairie rattlesnake (*Crotalus viridis*), eastern yellow-bellied racer (*Coluber constrictor flaviventris*), plains garter snake (*Thamnophis radix*), prairie lizard (*Sceloporus consobrinus*), and short horned lizard (*Phrynosoma douglassii*) (ERO Resources 2018a). Western chorus frogs (*Pseudacris triseriata*) were identified at the LaFarge pond east of the study area and in surrounding seasonal standing water within the FC. Woodhouse's toads (*Anaxyrus woodhousii*) were also observed in xeric grasslands of the Refuge (ERO Resources 2018a). Northern leopard frogs (*Lithobates pipiens*) were heard calling from two ponds in the FC in 2016 and were previously unknown at the site (ERO Resources 2018a). In Colorado, northern leopard frogs are listed as Tier 1 Species of Greatest Conservation Need (CPW 2015) (see Section 3.7.1.3). One salamander species, the tiger salamander (*Ambystoma tigrinum*), was documented in the larval stage in a pond at the FC (ERO Resources 2018a).

Migratory Birds

Under the Migratory Bird Treaty Act of 1918 (16 U.S.C. 703–712), it is illegal to take (kill, capture, sell, trade, and transport) protected migratory bird species without prior authorization by USFWS. Over several years of bird surveys (2003, 2011, and 2016) on the FC (ERO Resources 2018a), a total of 79 bird species have been observed during and incidental to the surveys (ERO Resources 2018a, NREL 2021a).

Birds of concern and associated habitat that are likely to occur with the study area include the prairie falcon (*Falco mexicanus*), peregrine falcon (*Falco peregrinus*), ferruginous hawk (*Buteo regalis*), Swainson's hawk (*Buteo swainsoni*), grasshopper sparrow (*Ammodramus savannarum*), and loggerhead shrike (*Lanius ludovicianus*) (ERO Resources 2018a, NREL 2021a). Bald eagle (*Haliaeetus leucocephalus*) and golden eagle (*Aquila chrysaetos*) are likely to occur intermittently in the study area. Raptors are important indicators of ecological health due to their position at the top of the food chain; therefore, although common, red-tailed hawk (*Buteo jamaicensis*) and American kestrel (*Falco sparvarius*) are important to monitor. Both are resident raptors that frequent the FC, Refuge, and the utility ROW and are typically the most common raptors along Colorado's Front Range (ERO Resources 2018a).

Additionally, USFWS (2021) predicted that a total of nine bird species that are USFWS Birds of Conservation Concern (BCC) could exist in the project area (Table 3.7-3); however, only two of these, ferruginous hawk (*Buteo regalus)* and red-headed woodpecker (*Melanerpes erythrocephalus*), have been reported in the FC or Refuge area, and none in the utility ROW, where their required habitat is absent (NREL 2021a).

3.7.1.2 Federally Listed Threatened, Endangered, or Candidate Species

A total of eight threatened, endangered, or candidate species are potentially present, according to the USFWS Colorado Ecological Services Field Office (USFWS 2021), pursuant to Section 7 of the Endangered Species Act (ESA) (16 U.S.C. Ch. 35 Section 1531 et seq.). Specifically, USFWS has

identified two birds, one fish, two plants, one invertebrate, and two mammal species federally classified as threatened, endangered, proposed, or candidate species under the ESA that could potentially occur in Jefferson County (USFWS 2021). Note that four of these species, the western prairie fringed orchid (*Platanthera praeclara)*, pallid sturgeon (*Scaphirhynchus albus)*, piping plover (*Charadrius melodus*), and whooping crane (*Grus americana*), should be considered only under certain conditions that do not apply to the project area. The other four species are discussed below: Preble's meadow jumping mouse (*Zapus hudsonius preblei*), Canada lynx (*Lynx canadensis*), monarch butterfly (*Danaus plexippus*), and Ute ladies'-tresses (*Spiranthes diluvialis*).

Species from this list that have the potential to occur at the FC Waterline ROW are identified in Table 3.7-1 along with species originally identified by the FWS in 2013 as potentially existing in the utility ROW (DOE 2014a). Note that seven species originally identified as potentially existing at the FC location in 2013 (DOE 2014a) were no longer identified in the USFWS species list in 2021 (USFWS 2021): Colorado butterfly plant (*Gaura neomexicana ssp. Coloradensis)*, Pawnee montane skipper (*Hesperia leonardus montana)*, greenback cutthroat trout (*Oncorhynchus clarki stomias)*, least tern (*Sternula antillarum)*, Mexican spotted owl (*Strix occidentalis lucida)*, Gunnison's prairie dog (*Cynomys gunnisoni)*, and North American wolverine (*Gulo luscus*). Gunnison's prairie dogs and wolverines are no longer candidate species for listing (USFWS 2021), and the Colorado butterfly plant has been delisted since USFWS generated the species list in 2013 for the 2014 NREL Sitewide EA (DOE 2014a).

In addition, bald and golden eagles have been identified with the potential to occur at least transiently in the project area. These species are protected under the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 et seq.). Bald eagles migrate through Colorado during the spring and fall, but they also nest in the state. Bald eagles are typically attracted to large open-water bodies, and due to the current lack of suitable habitat in the study area, any occurrences would likely involve transient or hunting individuals. Two nesting sites are known in the general area of the project at Coal Creek, approximately 3.5 miles northeast of the FC in Boulder County, and Standley Lake, located 5 miles from the FC in Jefferson County (NREL 2021b).

Golden eagles use a wide range of habitats, including pinyon-juniper woodlands, sagebrush, and grasslands, usually in higher elevations of the western United States. Although golden eagles breed primarily in mountainous habitats in Colorado, some limited breeding occurs in the northeastern portion of the state. In winter, golden eagles range widely and occur commonly throughout Colorado. A known golden eagle nest is located in El Dorado Canyon approximately 3.2 miles from the utility ROW (USFWS 2019b).

The potential for bald and golden eagles in the study area is possible but only intermittently. If prairie dog colonies increase in close proximity to the study area, however, occurrence of these eagle species may increase (USFWS 2019b).

Ute ladies'-tresses orchid, a federally threatened species, is a perennial herb found in Jefferson County. It occurs in seasonally moist soils and wet meadows near springs, lakes, or perennial streams and their associated floodplains at elevations between 4,300 and 7,000 feet, seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels and valleys, and lakeshores. Habitat can also include most areas within human-modified features such as along canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, and reservoirs. No Ute ladies'-tresses orchids have been discovered during surveys of robust habitat within the Refuge, nor were they or any associated species found during site visits on May 16 and August 15, 2018, for the original USFWS consultation for the utility ROW EA (USFWS 2019b). Site visits of May 20, 2021, and August 25, 2021, again yielded no

Ute ladies'-tresses orchids and none of the associated species (NREL 2021b). After reviewing the Draft EA, the USFWS stated that the Ute ladies'-tresses orchid was observed in the general area of the Refuge, but at this time the exact location is not known and the observation has not been confirmed.

Table 3.7-1. Federally Listed Threatened or Endangered of Candidate Species That Could Occur in the Project Area

Type of Organism	Common Name	Scientific Name	Status	Potential to Occur at the FC	Source
Plant	Ute ladies'-tresses	*Spiranthes diluvialis*	FT	Yes	DOE 2014a, USFWS 2021
Plant	Colorado butterfly plant	*Gaura neomexicana ssp. Coloradensis*	Delisted	Yes (2013, N/A 2021)	DOE 2014a
Plant	Western prairie fringed orchid	*Platanthera praeclara*	FT	No	DOE 2014a, USFWS 2021
Invertebrate	Monarch butterfly	*Danaus plexippus*	FC	Yes	USFWS 2021
Invertebrate	Pawnee montane skipper	*Hesperia leonardus montana*	FT	Yes	DOE 2014a
Fish	Greenback cutthroat trout	*Oncorhynchus clarki stomias*	FT	No (locally extirpated)	DOE 2014a
Fish	Pallid sturgeon	*Scaphirhynchus albus*	FE	No	DOE 2014a, USFWS 2021
Bird	Least tern	*Sternula antillarum*	FE	No	DOE 2014a
Bird	Mexican spotted owl	*Strix occidentalis lucida*	FT	No	DOE 2014a
Bird	Piping plover	*Charadrius melodus*	FT	No	DOE 2014a, USFWS 2021
Bird	Whooping crane	*Grus americana*	FE	No	DOE 2014a, USFWS 2021
Bird	Bald eagle	*Haliaeetus leucocephalus*	BGEPA	Yes	DOE 2014a, USFWS 2021
Bird	Golden eagle	*Aquila chrysaetos*	BGEPA, FSOC	Yes	DOE 2014a, USFWS 2021
Mammal	Preble's meadow jumping mouse	*Zapus hudsonius preblei*	FT	No	DOE 2014a, USFWS 2021
Mammal	Canada lynx	*Lynx canadensis*	FT	Yes	DOE 2014a, USFWS 2021
Mammal	Gunnison's prairie dog	*Cynomys gunnisoni*	Formerly FC	No	DOE 2014a
Mammal	North American wolverine	*Gulo luscus*	Formerly PT	No	DOE 2014a

Sources: DOE 2014a, USFWS 2021

Status Codes:
BGEPA = Bald and Golden Eagle Protection Act; FC = Federal Candidate; FE = Federally Listed Endangered; FSOC = Federal Species of Concern; FT = Federally Listed Threatened; PT = Proposed Threatened

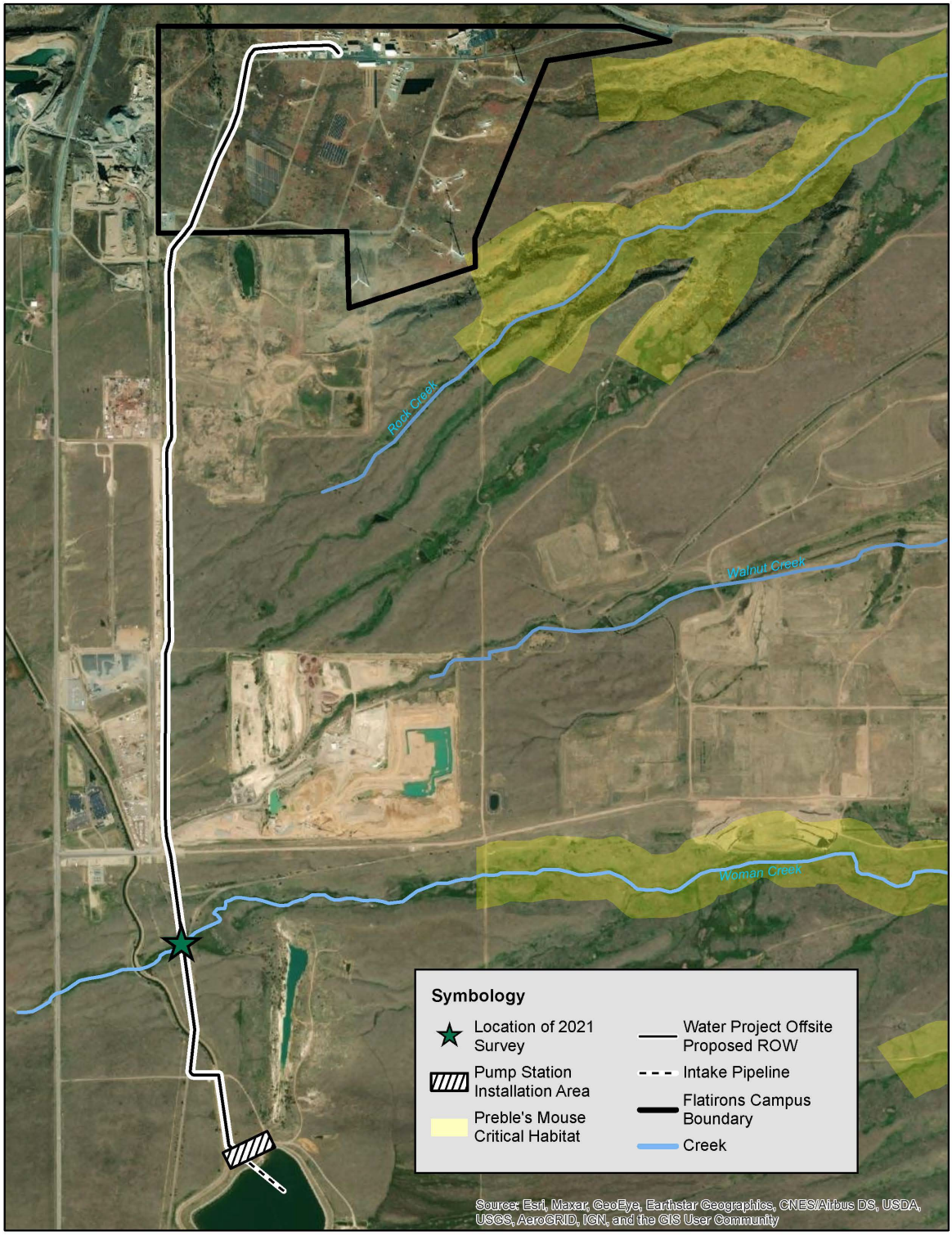
Ute ladies'-tresses, monarch butterfly, bald eagle, golden eagle, and Preble's meadow jumping mouse are species from USFWS (2021) with potential to occur in the FC Waterline Row.

The monarch butterfly is a Candidate Species for listing under the federal ESA (USFWS 2020). Habitat for monarch butterflies within the FC Waterline ROW could occur wherever milkweed and other nectar-producing plans occur (NREL 2021b); however, common invertebrates identified on the FC included 15 other butterfly species, but no monarchs (Walsh 2011, ERO Resources 2018a).

Critical habitat for the Preble's meadow jumping mouse was designated by USFWS in 2010 (USFWS 2010) in the southeastern portion of the FC as part of Unit 6, which includes Rock Creek and Woman Creek, as shown in Figure 3.7-1. The habitat includes the stream width plus 394 feet on either side (DOE 2014a). However, there is no critical habitat in the FC Waterline ROW (USFWS 2021), and the closest critical habitat is located on the Refuge approximately 1 mile east along Rock Creek (USFWS 2019b). Though the Preble's mouse has not been captured or detected on the FC, it does have the potential to occur on one of the two headwater wetlands areas on the eastern portion of the FC, the tributaries of the Coal Creek, and Rock Creek (DOE 2014a). There is Preble's mouse habitat within the FC Waterline ROW area according to field surveys conducted on May 20 and August 25, 2021 (NREL 2021c). Based on these surveys, sandbar willow was the dominant overstory and mesic grasses, carex, rush, and forbs were the dominant understory vegetation in the floodplain and riparian areas of Woman Creek, which could host Preble's mouse, though no trapping surveys were completed. The draw in the conservation management area on the west side of the FC may also contain habitat for this species, especially during wet years. These creeks are known to be inhabited by the Preble's mouse, but only in reaches farther downstream offsite, on the adjacent Refuge and along Coal Creek in Boulder County.

USFWS (2021) noted that Canada lynx could exist within the project area based on the USFWS designation of "Wherever Found in Contiguous U.S." in terms of their range and critical habitat. Although lynx could be found temporarily within the project area given their ability for wide-ranging dispersal (Devineau et al. 2010), they would likely avoid the project area specifically. Although lynx may be present in Jefferson County, their habitat in the southern Rockies is found within the subalpine and upper montane forest zones. None of this habitat exists within the project area and in fact is only found at considerably higher elevations. Nevertheless, lynx could roam through the project area as they disperse from their mothers' territories in efforts to establish their own. Lynx have been found to roam into adjoining states such as Kansas and Nebraska (Shenk 2008).

Any activity proposed on lands managed by the National Wildlife Refuge System must undergo a "Compatibility Determination" conducted by the Refuge. DOE would cooperate with USFWS to ensure compliance with 50 CFR 26.41 for determining that the use of the FC waterline is compatible with the Refuge. DOE would present to USFWS a compatibility assessment plan for the determination as part of the comprehensive conservation plan process for individual uses of the Proposed Action and related uses as described in the plan. Based on the initial impact analysis conducted in this EA, it is evident that the anticipated small impacts of the use of the FC waterline would not interfere with or impede the current Refuge's purposes and the National Wildlife Refuge System mission.



Note: The "star" indicates the area of overlap with Woman Creek and the FC Waterline ROW; it is the location of the survey described in NREL 2021b.

Figure 3.7-1. Preble's Meadow Jumping Mouse Critical Habitat (as designated by USFWS in 2010)

3.7.1.3 State-Listed and Other At-Risk Species

The State of Colorado Parks and Wildlife (CPW) lists an additional amphibian, two bird, and one mammal species that are protected at the state level as State Special Concern or Threatened. The state-listed species that could occur at the FC are northern leopard frog, burrowing owl (*Athene cunicularia*), peregrine falcon, and black-tailed prairie dog (*Cynomys ludovicianus*) (DOE 2014a). Table 3.7-2 shows additional at-risk species with the potential to be found on the FC.

Table 3.7-2 State-Listed or Other At-Risk Species Potentially Found in the Project Area

Type of Organism	Common Name	Scientific Name	Potential to Occur at the FC or Refuge	Federal Status	State Status
Amphibian	Northern leopard frog	*Lithobates pipiens*	2016 on FC**	BLM/FS	SC
Bird	Northern goshawk	*Accipiter gentilis*	2010 in county*	BLM/FS	
Bird	American peregrine falcon	*Falco peregrines anatum*	2011 on FC**	FS	SC
Bird	Bald eagle	*Haliaeetus leucocephalus*	2011 on FC**	BLM/FS	ST
Bird	Lewis's woodpecker	*Melanerpes lewis*	2011 in county*	FS	
Bird	Burrowing owl	*Athene cunicularia*	2014 on City of Boulder Open Space and Mountain Parks grasslands**	BCC	ST
Invertebrate	Ottoe skipper	*Hesperia ottoe*	2010 in county*	FS	
Mammal	Black-tailed prairie dog	*Cynomys ludovicianus*	2018 on Refuge	BLM/FS	SC
Mammal	Preble's meadow jumping mouse	*Zapus hudsonius preblei*	2018 on Refuge	FT	ST
Plant	Golden columbine	*Aquilegia chrysantha var. rydbergii*	2011 in county*	BLM/FS	S1
Plant	American yellow lady's slipper	*Cypripedium calceolus ssp. Parvaiflorum*	2011 in county*	FS	G5
Plant	White adder's mouth	*Malaxis monophyllos ssp. Brachypoda*	2011 in county*	FS	G4G5Q

Sources: *Sovell et al. 2012, DOE 2014a
**NREL 2021a

BLM = BLM Sensitive Species; FS = Forest Service Sensitive Species; SC = State Special Concern; ST = State Threatened; FT = Federally Threatened

S1 = State Critically Imperiled; G5 = Secure Globally, though it may be quite rare in parts of its range, especially at periphery; G4G5Q = Apparently Secure Globally, though it may be quite rare in parts of its range, especially at periphery and taxonomic status questionable

Burrowing owls are usually found in grasslands and mountain parks, but they also use well-drained steppes, deserts, prairies, and agricultural lands. Burrowing owls are a state-listed threatened species and protected species under the Migratory Bird Treaty Act. Although historically documented in the Refuge, the burrowing owl has not been observed at the FC or the utility ROW. As recently as 2018, a burrowing owl was observed at a prairie dog colony on the Refuge. Given the lack of prairie dog colonies within the utility ROW area, there is little suitable habitat for burrowing owls, and none has been identified in the study area (USWFS 2019).

While they may have been documented within Jefferson County or nearby on the Refuge or FC, the species listed in Table 3.7-2 are unlikely to exist in the FC Waterline ROW, given habitat limitations, other than the avian species flying though the area occasionally.

3.7.1.4 USFWS Birds of Conservation Concern

The birds listed in Table 3.7-3 are of particular concern because they occur on the USFWS BCC list or warrant special attention in the project location according to the USFWS Section 7 consultation (USFWS 2021). Species from this list that have been observed at the FC are noted.

Table 3.7-3. USFWS BCC That Could Occur in the Project Area

Common Name	Scientific Name	Observed at the FC	Breeding Season	Status
Chestnut-collared longspur*	*Calcarius ornatus*	No	May 1–Aug 10	BCC
Clark's grebe*	*Aechmophorus clarkia*	No	Jun 1–Aug 21	BCC
Ferruginous hawk*	*Buteo regalus*	Yes** (2003, 2011)	Mar 15–Aug 15	BCC, SC
Lewis's woodpecker*	*Melanerpes lewis*	No	Apr 20–Sep 30	BCC
Long-eared owl*	*Asio otus*	No	Mar 1–Jul 15	BCC
McCown's longspur*	*Calcarius mccownii*	No	May 1–Aug 15	BCC
Pinyon jay*	*Gymnorhinus cyanocephalus*	No	Feb 15–Jul 15	BCC
Red-headed woodpecker*	*Melanerpes erythrocephalus*	Yes** (2011)	May 10–Sep 10	BCC
Sprague's pipit*	*Anthus spragueii*	No	Breeds elsewhere, possible fall visitor	BCC

Source: USFWS 2021*, NREL 2021a**.

BCC = birds of conservation concern (USFWS 2021)

SC = state listed as conservation concern

Ferruginous hawk and red-headed woodpecker are species from USFWS (2021) with potential to occur in the FC Waterline ROW.

3.7.2 Proposed Action Impacts

3.7.2.1 Common Species

General Vegetation

The project area extends from the FC through the existing utility ROW, which follows the western boundary of a reclaimed aggregate mine and mining haul road (USFWS 2019b), to proposed extension of the ROW for the waterline, which also follows this road. The current vegetation conditions indicate past disturbance, and extensive invasive vegetation exists along this corridor. During construction, short-term removal of vegetation would be necessary, and there is the potential for minor soil erosion. Given that the focus of NREL's vegetation management program is to strive to replace disturbed vegetation with native species, the short-term disturbance caused by vegetation removal for construction purposes would be followed by likely long-term improvement of vegetation (NREL 2020). Revegetation techniques include reseeding with a mix of grass and forb seeds that are native to the area.

Mammals

There would be short-term and localized effects on wildlife use of the project area due to construction and increased human activities. There may be minor disruptions to the migratory pathways of large mammals such as ungulates and large carnivores that may avoid the construction area, but disturbance would be short term. Similarly, bats would not experience impacts, due to lack of roosting habitat in the project area and foraging over the construction area may be temporarily disrupted. Once installed, the areas disturbed for pipeline construction would be restored to preconstruction conditions, and the areas would be revegetated with native species so habitat for small and large mammals would not be impacted long term.

Reptiles and Amphibians

Disturbance to amphibian habitats, including wetlands, would be minimal and short term during construction. The known populations of amphibians are not within the areas to be disturbed; they are farther north and east on the FC and the Refuge. Construction near and across minor waterbodies and wetlands would be done using best practices, and those areas would be restored to preconstruction conditions immediately after pipeline installation. Similarly, disturbance to snakes and lizards identified on or near the project area would be short term, and habitat would be restored to conditions equal to or improved over those before construction.

Migratory Birds

NREL carries out environmentally responsible construction practices, including performing nesting bird surveys before carrying out earth-disturbing activities. For example, NREL conducts ground-nesting-bird surveys before annual mowing, weed control operations, and various research projects on the FC in compliance with the Migratory Bird Treaty Act (NREL 2020). Similarly, NREL would use ground-nesting bird surveys and appropriate seasonal construction activities to seek to eliminate impacts to birds. Impacts to hunting raptors and other migratory birds would be limited to possible short-term avoidance of the construction area. Because of these policies and the limited habitat quality for nesting birds in the project area, construction and operation of the Proposed Action would have no long-term impacts on migratory birds.

3.7.2.2 Federally Listed, Candidate, and Other Protected Species

According to the USFWS, western prairie fringed orchid (*Platanthera praeclara*), pallid sturgeon (*Scaphirhynchus albus*), piping plover (*Charadrius melodus*), and whooping cranes (*Grus americana*) should be considered only if the project includes water-related activities and/or use in the North Platte, South Platte, and Laramie River Basins, which may affect listed species in Nebraska (USFWS 2021). Consolidated Mutual participates in the South Platte Water-Related Activities Program, and participation in this program supports the Platte River Recovery Implementation Program. The Proposed Action would not deplete water supplies in the Platte River system, so these species would not be impacted.

Federally listed or candidate species that have the potential to occur in the project area according to USFWS Section 7 consultation (USFWS 2021) include Ute ladies'-tresses, monarch butterfly, Canada lynx, and Preble's meadow jumping mouse. There have been no Ute ladies'-tresses orchids found in past surveys of the project area (NREL 2021b), nor have they been found nearby on the Refuge where robust habitat exists. However, 2021 surveys by others in the general vicinity of the Refuge have reported the Ute ladies'-tresses orchid, but the exact location is unknown at this time. Monarch butterfly habitat could exist in the project area, but none has been found and no impacts to this species would occur based on the

short-term nature of disturbance. Although USFWS (2021) noted the potential for Canada lynx to be present, the animal has not been reported in any mammal surveys for the FC (ERO Resources 2018a). Lynx are wide-ranging carnivores with large home ranges, and the most likely occurrence in the project area of Canada lynx would be transitory. Lynx would likely avoid the project area during construction, and long-term effects on this species are not likely.

There is possible Preble's meadow jumping mouse habitat within the FC Waterline ROW area according to field surveys conducted on May 20 and August 25, 2021 (NREL 2021b); however, no Preble's mouse critical habitat exists within the Waterline ROW. The project plans to refurbish an existing 10-inch waterline that crosses Woman Creek. By using this line, the project will avoid any impacts to Preble's mouse habitat.

Bald and golden eagles may pass through the area when migrating, hunting, and nesting nearby. However, construction impacts would only mean possible short-term avoidance of the area for hunting; the habitat would be restored once construction is complete so there would be no effects on eagles. Other avian species of concern include burrowing owls, but none have been documented in the project area, and the lack of prairie dog colonies in the project area indicate that burrowing owl impacts are unlikely.

There is no effect on federally listed or candidate species or other species of conservation concern under this alternative.

3.7.2.3 State-Listed and Other At-Risk Species

Although historically documented in the Refuge, the burrowing owl has not been observed at the FC or the utility ROW. Given the lack of prairie dog colonies within the utility ROW area, there is little suitable habitat for burrowing owls and none has been identified in the study area (USWFS 2019). While they may have been documented within Jefferson County or nearby on the Refuge or FC, the species listed in Table 3.7-2 are unlikely to exist in the FC Waterline ROW, given habitat limitations, other than the avian species flying though the area occasionally.

3.7.2.4 USFWS Birds of Conservation Concern

Although the birds listed in Table 3.7-3 have been observed at the FC, they are not likely to be impacted by construction activities due to previous disturbances of these areas and the transient nature of the identified species.

3.7.3 No-Action Alternative Impacts

The No-Action Alternative would result in no change to wildlife and fisheries. Potential improvements to vegetation after project construction would not occur, as there would be no restoration of native plants to an area that was originally disturbed and degraded with invasive species.

3.8 Cultural and Paleontological Resources

3.8.1 Affected Environment

Cultural resources are physical manifestations of culture, specifically archaeological sites, architectural properties, ethnographic resources, and other historical resources relating to human activities, society, and cultural institutions that define communities and link them to their surroundings. They include

expressions of human culture and history in the physical environment, such as prehistoric and historic archaeological sites, buildings, structures, objects, and districts, which are considered important to a culture or community. Cultural resources also include locations of important historic events and aspects of the natural environment, such as natural features of the land or biota, which are part of traditional lifeways and practices.

The National Register of Historic Places (National Register) is a listing maintained by the federal government of prehistoric, historic, and ethnographic buildings, structures, sites, districts, and objects that are considered significant at a national, state, or local level. Listed resources can have significance in the areas of history, archaeology, architecture, engineering, or culture. Cultural resources listed on the National Register, or determined eligible for listing, have been documented and evaluated according to uniform standards, found in 36 CFR 60.4, and have been found to meet criteria of significance and integrity. Resources evaluated for eligibility are generally 50 years old or older, though there are exceptions to this standard, particularly resources associated with the Cold War era. Cultural resources that meet the criteria for listing on the National Register, regardless of age, are called historic properties. Resources that have undetermined eligibility are treated as historic properties until a determination otherwise is made.

3.8.1.1 Regulatory and Compliance Setting

A number of federal laws, regulations, and executive orders address cultural resources and federal responsibilities regarding them and are applicable to the FC. Foremost among these statutory provisions, and most relevant to the current analysis, is the NHPA (54 U.S.C. 300101 et seq.). Section 106 of the NHPA requires federal agencies to consider the effects of their undertakings on historic properties and ensures that federal agency decisions concerning the treatment of these properties result from meaningful consideration of cultural and historical values, and identification of options available to protect the properties. As part of the Section 106 process, agencies are required to consult with the SHPO on their determinations and decisions. Coordination with the SHPO in Colorado occurs via the State Historic Preservation Office, which is operated by History Colorado.

Other prominent cultural resource laws pertinent to the FC include the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470aa–mm), which makes it a federal offense to excavate, remove, damage, alter, or otherwise deface archaeological resources on federal lands without a permit or authorization. The Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. 3001 et seq.) establishes a process for agencies to return human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony discovered on federal lands to federally recognized Indian Tribes.

As a federal agency, DOE has a trust responsibility to Indian Tribes to protect tribal cultural resources and to consult with Tribes on a government-to-government basis regarding those resources. Section 101(d)(6) of the NHPA mandates that federal agencies consult with Tribes and other Native American groups who either historically occupied the project area or may attach religious or cultural significance to historic properties in the region. The NEPA implementing regulations link to the NHPA, as well as to the American Indian Religious Freedom Act (42 U.S.C. 1996); Executive Order 13007, “Indian Sacred Sites”; Executive Order 13175, “Consultation and Coordination with Indian Tribal Governments”; and the Executive Memorandum on Government-to-Government Relations with Native American Tribal Governments (59 FR 22951). These requirements require federal agencies to consult with tribal leaders and others knowledgeable about cultural resources important to them.

3.8.1.2 Cultural Resources Management on the Flatirons Campus

DOE Policy 141.1, "Department of Energy Management of Cultural Resources" (DOE 2001), ensures that DOE programs integrate cultural resource management into their missions and activities. It also raises the awareness of the importance of the Department's cultural resource-related legal and trust responsibilities. The policy directs that all DOE programs and missions be implemented in a manner consistent with federal laws, regulations, orders, DOE Orders, and implementation guidance protecting cultural resources. DOE follows NREL Operating Procedure/Program OPP 850-2, "Cultural Resource Management" (NREL 2019a), to meet its obligations regarding cultural resources management on the FC.

In November 2009, DOE updated its American Indian and Alaska Native Tribal Government Policy (DOE Order 144.1, Administrative Change 1) (DOE 2009), which provides guidance for consulting and coordinating with tribal governments in compliance with federal statutes and regulations. The policy sets forth the principles DOE follows to ensure effective implementation of a government-to-government relationship with Tribes. It directs all DOE officials, staff, and contractors regarding fulfilling trust obligations and responsibilities arising from Departmental actions that may potentially affect tribal traditional, cultural, and religious values and practices; natural resources; and treaties and other federally recognized and reserved rights. DOE currently consults with the Oglala Sioux, Ute Indian Tribe, Ute Mountain Ute, and Southern Ute under NEPA and the NHPA by notifying them of major planned actions at the FC and requesting comments or concerns.

3.8.1.3 Cultural Resources on the Flatirons Campus

Multiple surveys for cultural resources on the FC between 1989 and 2017 have resulted in 100 percent of the campus being surveyed to professional standards (NREL 2019a). Those surveys identified three historic sites—the ruins of a stone masonry spring house, a possible corral, and a concrete foundation. Two isolated finds were also discovered, both of barbed wire. DOE determined that none of these five resources are eligible for the National Register. Although one of the earlier surveys (Labat-Anderson 1995) identified a 6.5-acre area in the northwest portion of the FC as having a higher potential for buried prehistoric archaeological resources, the 2017 survey evaluated that area as unlikely to contain buried resources due to the thin layer of aeolian silt overlaying Cretaceous-age bedrock (ERO Resources 2017).

The FC was established in the 1970s, and all current FC structures and buildings have been constructed since then. Currently, none of the buildings have been determined to be of significance and eligible for listing in the National Register (DOE 2014a).

To date, traditional cultural properties have not been identified at the FC. Section 106 of the NHPA requires consultation with any Tribe that attaches religious or cultural significance to historic properties that may be affected by a proposed undertaking. In November 2021, DOE transmitted letters about the Proposed Action to the Ute Mountain Ute Tribe, Ute Indian Tribe, Southern Ute Tribe, and the Oglala Sioux Tribe initiating the Section 106 consultation process. To date, DOE has not received a response indicating concerns for cultural resources of tribal significance located in the project area.

3.8.1.4 Cultural Resources on the Offsite Project Area

Cultural resource surveys of the offsite pipeline corridor were previously conducted in 2018. The 2018 surveys were for a power transmission line, fiber optic line, and a switchyard and overlapped portions of the proposed pipeline corridor (ERO Resources 2018b; ERO Resources 2018c). No historic properties were identified during those surveys.

In 2021 and 2022, cultural resources surveys were conducted of the proposed pipeline corridor, pump station, and electrical transmission line (ERO Resources 2022). These surveys identified nine cultural resources overlapping the survey area (Table 3.8-1). Four of the resources are considered not eligible for listing on the National Register. Four of the linear resources, which are segments of larger resources, are not considered to contribute to the eligibility of the larger resources of which they are a part. The remaining resource, the Rocky Spur segment of the Denver & Rio Grande Western Railroad grade, is recommended as contributing to the National Register eligibility of that railroad.

Table 3.8-1. Cultural Resources Identified Along the Proposed Pipeline Corridor

Smithsonian Site Number	Resource Type/Name	National Register Eligibility
5JF318.16	South Boulder Diversion Canal (segment)	Eligible/non-supporting
5JF512.6	Upper Church Ditch (segment)	Eligible/non-supporting
5JF513.6	McKay Ditch (segment)	Eligible/non-supporting
5JF514.4	Smart Ditch (segment)	Eligible/non-supporting
5JF742.2	Denver, Utah & Pacific Railroad (segment)	Not eligible
5JF2346.16	Rocky Spur of the Denver & Rio Grande Western Railroad (segment)	Eligible/supporting
5JF7615	Caprock Mine	Not eligible
5JF7902	Rocky Flats Lake/Francis Smart Reservoir	Not eligible
5JF7904.1	Plainview to Plastic 115-kV transmission line (segment)	Not eligible

Source: ERO 2022.

3.8.2 Proposed Action Impacts

The entire project area that would be used for construction and operations under the Proposed Action has undergone a cultural resource survey. There is only one notable property within the project area, the Rocky Spur of the Denver & Rio Grande Western Railroad grade, which crosses the pipeline corridor in multiple locations. At all but one of the locations, NREL is using the existing cast iron pipeline for the proposed waterline, thereby avoiding affecting the railroad grade. At the one location, the new pipeline would be constructed using directional boring to go under the railroad grade, thereby avoiding any direct impacts to the railroad grade.

Potential visual impacts on historic properties located outside of the FC from the onsite components of the Proposed Action (water treatment facility, domestic and fire water tanks, CCF, and wastewater treatment system) would be minimized because they would be located adjacent to existing FC buildings and other development. Therefore, the new facilities would be consistent with the existing visual setting and would not introduce a new visual element. The introduction of these new components would not diminish the integrity of any nearby historic properties or affect their eligibility for listing in the National Register.

DOE has initiated consultation with potentially interested Tribes to identify any concerns they have for impacts from the Proposed Action on cultural resources of religious or cultural significance. To date, no responses have been received and no known cultural resources of tribal significance would be impacted by the Proposed Action.

3.8.3 No-Action Alternative Impacts

Under the No-Action Alternative, no new utilities or facilities would be constructed. Water deliveries would be increased from three times per week to six times per week. There would be no impacts to cultural resources under this alternative.

3.9 Socioeconomics and Environmental Justice

Socioeconomics. Socioeconomics considers the attributes of human social and economic interactions associated with the Proposed Action. Socioeconomic areas of discussion in Section 3.9.1.1 include the regional and local economy, local demographics, local housing, and community services. Socioeconomic impacts, described in Section 3.9.1.2, may be defined as the environmental consequences of the Proposed Action in terms of potential demographic and economic changes.

Environmental Justice (including protection of children). Under Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," federal agencies are responsible for identifying and addressing the possibility of disproportionately high and adverse human health or environmental effects from its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands. In January 2021, President Biden issued Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad." The order formalizes President Biden's commitment to make environmental justice a part of the mission of federal agencies to develop programs, policies, and activities to address the disproportionate health, environmental, economic, and climate impacts on disadvantaged communities and requires federal agencies to "make achieving environmental justice part of their missions."

Executive Order 13045, "Protection of Children from Environmental Health Risks and Safety Risks," states that each federal agency "(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." Section 3.9.1.2 describes environmental justice populations in the vicinity of the Proposed Action and protection of children, while Section 3.9.2.2 evaluates the environmental justice impacts.

3.9.1 Affected Environment

3.9.1.1 Socioeconomics

The socioeconomic ROI encompasses the area likely to be affected by the Proposed Action. The location, character, and scale of a project are considered when measuring impacts on existing population, the services, and economy of an area. The Proposed Action is to construct and operate the proposed water pipeline and other related actions on the FC. For the purpose of this analysis, the ROI for the Proposed Action would consist of Jefferson County, Colorado, because this is where most of the impacts are likely to occur.

From 2010 through 2019, the labor force in Jefferson County increased 10.2 percent to 334,092 persons (BLS 2010, 2019). During the same time period, employment in the ROI increased by 17.8 percent to 325,907 persons, and the number of unemployed decreased by 69.2 percent, reflecting economic recovery after the recession of 2008–2010. Over that same period, the unemployment rate declined from

8.8 percent to 2.4 percent. Colorado experienced similar trends in unemployment rates, decreasing from 9.2 percent to 2.7 percent in 2019 (BLS 2010, 2019). Table 3.9-1 presents the employment profiles in the Jefferson County and Colorado for 2019.

Table 3.9-1. ROI Employment Profile (2019)

Area	Civilian Labor Force	Employed	Unemployed	Average Annual Unemployment Rate (%)
Colorado	3,126,120	3,043,108	83,012	2.7%
Jefferson County	334,092	325,907	8,185	2.4%

Source: BLS 2019.

In 2019, Jefferson County had a per capita personal income of $66,017, ranking 11th in the state and reflecting an increase of 4.3 percent from 2018 (BEA 2020). In 2009, the per capita personal income was $44,500 (BEA 2020). The median income for households in Jefferson County was $82,986 in 2019 (USCB 2019b). Educational services, and health care and social assistance (20.5 percent); professional, scientific, and management, and administrative and waste management services (15.7 percent); and retail trade (10.7 percent) employed the greatest percentage of workers in Jefferson County (USCB 2019b). Colorado generally exhibited the same characteristics (USCB 2019b).

In 2019, the population in Jefferson County was estimated to be 574,798 (USCB 2019a). From 2010 to 2019, the total population in Jefferson County increased 7.5 percent, which was lower than the growth rate in Colorado (USCB 2010, 2019a). Between 2019 and 2024, the population of Jefferson County is projected to steadily increase (DOLA 2021). In 2024 the population in Jefferson County is projected to be 593,620 (DOLA 2021). Table 3.9-2 presents the historic and projected population of Jefferson County and Colorado.

Table 3.9-2. County and State Historic and Projected Population

State/County	2010	2019	2020	2022	2024
Colorado	5,029,196	5,610,349	5,782,915	5,892,723	6,035,249
Jefferson County	534,543	574,798	582,782	586,503	593,620

Source: USCB 2010, 2019a; DOLA 2021.

As of 2019, Jefferson County had 240,956 housing units, of which 8,672 units were vacant (USCB 2019c). Of the vacant units, 2,342 were estimated to be available for rent (USCB 2019d), or 1 percent of the housing stock. Temporary housing is available in the form of daily, weekly, and monthly rentals in motels, hotels, campgrounds, and recreational vehicle parks. The demand for temporary housing in the project area is generally greatest during the summer months when tourism is at its highest.

Community services within the ROI include public schools, hospitals, and public safety. Jefferson County has one school district with a total of 155 schools serving a student population of 80,088 during the 2020–2021 school year (JeffCo 2021). There are four hospitals with approximately 699 beds (AHD 2021). Jefferson County has 69 fire departments and fire stations made up of career and volunteer firefighters (FireDepartment.net 2021). The Jefferson County Sheriff's Office and 10 police departments provide police protection services in cooperation with the Colorado State Patrol (USACops 2021).

3.9.1.2 Environmental Justice

To identify environmental justice populations, the ROI for minority and low-income populations includes census block groups crossed by the water pipeline and intersected by a 1-mile radius around the FC. The ROI includes five block groups (two block groups in Boulder County and three in Jefferson County).

Table 3.9-3 provides an overview of the racial and economic characteristics of the population in the environmental justice ROI. Jefferson County has a total population of 574,798, of which 21.9 percent are minority. The minority population is composed of 15.4 percent Hispanic or Latino, 2.8 percent Asian, and 2 percent identifying as two or more races. The percentage of individuals under the age of 18 is similar in Boulder and Jefferson counties when compared to the State of Colorado. Children under the age of 18 made up 19.4 percent of the population in Boulder County and 20 percent in Jefferson County.

Table 3.9-3. Minority and Low-Income Characteristics (percent)

State/County	Under 18 Years of Age	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some Other Race	Two or more races	Hispanic or Latino	Total Racial Minority	% Below Poverty Level
Colorado	22.5%	68.1%	3.9%	0.5%	3.1%	0.1%	0.2%	2.5%	21.5%	**31.9%**	**10.2%**
Boulder County	19.4%	77.6%	0.8%	0.3%	4.7%	0.1%	0.2%	2.5%	13.9%	**22.4%**	**11.5%**
Block Group 080130125104	12.8%	68.0%	0.0%	0.0%	0.0%	0.8%	0.0%	1.2%	0.0%	**2.0%**	**6.6%**
Block Group 080130606001	19.1%	71.9%	0.0%	1.2%	15.0%	0.0%	0.0%	0.0%	11.8%	**28.1%**	**5.6%**
Jefferson County	20.0%	78.1%	1.1%	0.4%	2.8%	0.1%	0.2%	2.0%	15.4%	**21.9%**	**7.1%**
Block Group 080590098082	10.1%	89.2%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	3.7%	**10.8%**	**4.1%**
Block Group 080590098372	32.1%	79.5%	0.0%	0.2%	3.3%	0.0%	0.0%	2.9%	14.1%	**20.5%**	**0.0%**
Block Group 080590605003	29.5%	82.5%	0.0%	0.0%	4.7%	0.0%	0.0%	1.7%	11.2%	**17.5%**	**1.2%**

Source: USCB 2019e–g.

3.9.2 Proposed Action Impacts

Socioeconomics. This section addresses the potential for direct and indirect impacts that the Proposed Action could have on local or regional socioeconomics. Impacts on local or regional socioeconomics are evaluated according to their potential to stimulate the economy through the purchase of goods or services and increase in employment and population.

Environmental Justice (including protection of children). Ethnic and poverty data are examined for a ROI crossed by the water pipeline and intersected by a 1-mile radius around the FC to determine whether minority or low-income populations could be disproportionately affected by the Proposed Action.

3.9.2.1 Socioeconomics

It is anticipated that construction of the water pipeline would take approximately 2 years. In terms of employment, it is estimated that the peak of construction would require 50 workers, with a total of 100 workers needed over the course of the construction period (DOE 2021a). It is anticipated that some portion of construction materials would be purchased locally. Payroll and materials expenditures would have a positive impact on the local economies. Estimated direct construction jobs may result in additional indirect jobs providing increased local revenue. Most construction materials and temporary construction workers would likely come from the local community. Therefore, permanent increases in population

would not occur, and housing and community services would not be permanently impacted. Because the peak construction workforce (50 persons) would be negligible compared to the projected population in in Jefferson County, socioeconomic impacts during construction, although beneficial, are expected to be negligible. The increase in economic activity would be temporary and would subside when construction is completed.

Future operations would have a positive impact on regional economics. Although pipeline operation itself would not involve additional workers, the pipeline would support staff growth at the FC from 150 to 300 people. In terms of other operational impacts:

- Population. Based on the estimated number of new direct jobs and the assumption that local workers would fill direct jobs and indirect jobs, impacts to population would be negligible.
- Housing. Based on the estimated number of jobs and the assumption that local workers would fill most direct jobs and indirect jobs, there would be no need for additional housing. Local personnel would not require temporary housing and, thus, would have neither adverse nor beneficial impacts on temporary housing. If there was a need for temporary housing, the current market would be able to meet that need.
- Community Services. Based on the number of estimated jobs created and the assumption that local workers would fill most direct jobs and indirect jobs, no impact to public schools, law enforcement, or firefighting capabilities is anticipated.

3.9.2.2 Environmental Justice

The threshold used for identifying minority populations surrounding specific sites was developed consistent with CEQ guidance (CEQ 1997) for identifying minority populations using either the 50-percent threshold or another percentage deemed "meaningfully greater" than the percentage of minority individuals in the general population. CEQ guidance does not provide a numerical definition of the term "meaningfully greater." CEQ guidance was supplemented using the "Community Guide to Environmental Justice and NEPA Methods" (EJ IWG NEPA 2019), which provides guidance on using "meaningfully greater" analysis.

According to federal guidelines, an area where the minority population exceeds 50 percent of the total population, or where the minority population percentage is "meaningfully greater" than the minority population of an appropriate unit of geographic analysis (reference population), is determined to be an environmental justice population (CEQ 1997). For this analysis, the reference population is the county.

The poverty threshold is calculated as a percentage of those for whom the poverty ratio was known, as reported by the U.S. Census Bureau (USCB). In 2020, the federally defined poverty threshold for an individual under age 65 is $13,465 (USCB 2020). Unlike federal guidance on minority populations, there is no quantitative definition of what proportion of low-income populations constitutes an environmental justice population. Guidelines suggest using an appropriate poverty threshold and comparing the low-income population in an affected area to a reference population (EJ IWG 2016).

To identify environmental justice populations, the ROI for minority and low-income populations includes census block groups crossed by the water pipeline and intersected by a 1-mile radius around the FC. For this analysis, if a census block group meets either of the following significance thresholds, that census block group is considered an environmental justice population:

- The minority population that resides in the census block group exceeds 50 percent of the total population for that census block group or 25 percent of the total population for low-income populations.
- The minority or low-income population of the census block group is meaningfully greater than the minority or low-income population of the reference population.

This analysis defines "meaningfully greater" as 10-percent higher than the minority or low-income population of the county. Table 3.9-4 presents the "meaningfully greater" thresholds for Jefferson and Boulder counties.

Table 3.9-4. "Meaningfully Greater" Thresholds for Identification of Minority and Low-Income Populations

County	Minority Threshold	Low-Income Threshold
Boulder	24.7%	12.7%
Jefferson	24.1%	7.8%

This assessment identified one block group (080130606001) with minority populations that were meaningfully greater than the county minority population. Block group 080130606001 in Boulder County is within a 1-mile radius of the FC. This block group does not contain any project facilities. This block group has a total population of 1,216 persons, of which 28.1 percent are minority. The minority population is composed of 15 percent Asian and 11.8 percent Hispanic or Latino.

No block groups within the ROI have minority populations that exceed 50 percent of the population. No census block groups were identified with low-income populations that exceed 25 percent of the population or that were meaningfully greater than the county low-income population. No environmental justice populations were identified in block groups containing the water pipeline or FC.

Environmental impacts from most projects tend to be highly concentrated at the actual project site and tend to decrease as distance from the project site increases. Construction activities would occur in Jefferson County onsite in industrial areas of the FC and offsite along the proposed water pipe route. During construction and operation-related activities, it is anticipated that environmental, health, and occupational safety impacts would be minimal, temporary, and confined to the FC and areas adjacent to the water pipeline (see Section 3.11). Based on the impacts analysis for all resource areas, no notable adverse effects are expected from construction and operation activities of the water pipeline. For impacts that would occur, impacts are expected to affect all populations in the area equally. There would be no discernable adverse impacts to any populations, land uses, visual resources, noise, water, air quality, geology and soils, biological resources, socioeconomic resources, or cultural resources. No adverse impacts would disproportionately affect minority, low-income, or youth populations during construction and operation activities.

3.9.3 No-Action Alternative Impacts

Under the No-Action Alternative, DOE would not proceed with the Proposed Action; instead, DOE would continue to provide water to the FC using existing means (i.e., delivered and stored water and existing onsite wastewater treatment systems) to meet the water needs of the NREL staff and FC research activities. There would be no additional socioeconomic or environmental justice impacts.

3.10 Waste Management

3.10.1 Affected Environment

Current activities at the FC involve the use of hazardous materials and the generation of nonhazardous, hazardous, and universal wastes. The terms "hazardous materials" and "hazardous waste" refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S.C. 9601 et seq.) and the Solid Waste Disposal Act of 1965, as amended by the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901 et seq.). Hazardous wastes that are regulated under RCRA are defined as any solid, liquid, contained gaseous, or semisolid waste or any combination of wastes that exhibits one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity or is listed as a hazardous waste under 40 CFR Part 261. In general, hazardous materials include substances that, because of their quantity; concentration; or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment or otherwise improperly managed.

EPA defines solid waste as garbage, refuse, sludge, or other discarded material (including solids, semisolids, liquids, and contained gaseous materials). Solid waste is defined as hazardous waste by EPA if it is specifically named on one of four hazardous wastes lists (F, K, P, or U) or exhibits one of four characteristics specified in 40 CFR Part 261. Universal waste is a federally designated subset of hazardous waste that includes batteries, pesticides, mercury-containing equipment, and bulbs (lamps).

At the FC, management programs for hazardous materials and wastes are aimed at reducing impacts to human health and the environment by using environmentally friendly products to the greatest extent possible, minimizing the use of chemicals that contain hazardous materials, and minimizing the amount of hazardous waste generated. The subsections below summarize the management of hazardous materials and waste generation and disposition at the FC.

3.10.1.1 Hazardous Materials

All hazardous materials at the FC are managed through a network of integrated programs centrally administered by NREL. These materials are handled, stored, and disposed of responsibly and in accordance with regulatory requirements to minimize the potential for health and environmental impacts that could result from a release or improper disposal. A cornerstone of NREL's hazardous material management program is its laboratory-wide chemical management system. The system serves as a centralized chemical inventory and is a valuable tool for managing and reporting chemicals used at the laboratory. Using an electronic barcoding system, the chemical management system tracks chemicals from point of receipt through end use and disposal. The system also contains technical data and reporting information for many of the chemicals in the chemical management system's database. Key functions of the system include the following:

- providing current inventories by room, building, and campus
- improving research efficiency and minimizing hazardous waste generation by allowing staff to determine whether needed chemicals are already available onsite before purchasing them
- providing quick access to chemical inventories and hazard information during emergency responses

- facilitating accurate and efficient reporting to external agencies (e.g., fire districts, state and local emergency response agencies, EPA, and DOE)

NREL has no underground storage tanks at the FC. There are currently five ASTs at the FC for emergency generator and research use. The ASTs can store a total of 1,289 gallons of diesel fuel. NREL's tank management program includes safeguards that prevent accidental releases, structural controls, and operational and inspection procedures. None of the tanks are registered ASTs with the State of Colorado as all are below the 660-gallon threshold (NREL 2021a).

Several important mechanical and procedural safeguards have been incorporated into NREL's AST management program to prevent an accidental release from the storage tanks. Mechanical safeguards include overfill and spill protection, double-walled tanks equipped with sensors and alarms, and secondary containment for single-walled tanks. Procedural safeguards include written operating and tankfilling procedures, monthly and annual inspections (ASTs greater than 60 gallons are visually inspected monthly, and all double-walled ASTs are inspected annually to confirm the absences of the interstitial liquid), and recordkeeping of inspection results.

Spills are tracked in a spill-tracking log. The FC has comprehensive SPCC plans in place to reduce spills and limit impacts to the environment when spills do occur. Emergency response plans are also in place in the event of a spill or release of a hazardous material; these plans are coordinated with state and local emergency planning and response agencies and first responders such as West Metro Fire Rescue, Mountain View Fire Rescue, and the Jefferson County Local Emergency Planning Committee.

3.10.1.2 Waste Management

NREL Laboratory-Level Procedure PROC 600-41, "Waste Management and Minimization," dated February 7, 2021 (NREL 2021d), addresses waste management at the FC. Research and development activities and sitewide facility operations at the FC create a variety of waste streams, some of which contain toxic chemicals or metals. The FC recycles as much of these wastes as possible. In fiscal year 2020, 45 percent of waste (excluding construction and demolition debris) and 96 percent of construction and demolition debris waste were diverted from municipal landfills. NREL would continue to work at achieving near-zero waste on its campuses, with a targeted goal of a 90-percent waste diversion rate in 10 years. In fiscal year 2021, NREL added a polystyrene recycling container to the construction demolition waste program at the FC (NREL 2021a). This allows NREL to not only capture polystyrene waste in a centralized area but also measure and monitor it.

The types of hazardous wastes generated at the FC are corrosive, ignitable, or toxic. The FC is a conditionally exempt small quantity generator, which means that the facility generates less than 100 kilograms of hazardous waste and less 1 kilogram of acutely hazardous waste per month. The site EPA identification number, issued by the CDPHE Hazardous Materials and Waste Management Division, is COD983802448. Hazardous and nonhazardous wastes are generated, characterized, and stored onsite in accordance with applicable EPA and CDPHE hazardous wastes regulations until it is packaged. It is then shipped for disposal in accordance with U.S. Department of Transportation (USDOT) regulations to a fully permitted treatment storage disposal facility as NREL does no disposal onsite. Table 3.10-1 shows the amounts of hazardous and nonhazardous wastes generated (in pounds per year) at the FC.

Table 3.10-1. Waste Generation at the FC

Year	2016	2017	2018	2019	2020	Average (2016-2020)
Hazardous Waste (lbs/yr)	10	886	713	282	806	540
Nonhazardous Waste (lbs/yr)	8,405	6,375	3,540	5,370	2,969	5,330

Source: DOE 2021a.

Nonhazardous waste at the FC consists of used oil, used hydraulic fluids, some absorbents, and occasional petroleum-impacted soils from small spills. Nonhazardous municipal solid waste generated at the FC is managed by NREL's Site Operations Center and deposited in local landfills through contracts with solid waste handling companies. In 2020, 100 percent of electronics were reused or recycled (NREL 2021a).

3.10.2 Proposed Action Impacts

3.10.2.1 Hazardous Materials

Trenching would be required to install the proposed water pipeline. Construction is not anticipated to unearth any hazardous materials as the pipeline route is located well outside the DOE Legacy Site (see Figure 3.2-2) where past plutonium pit production occurred. Due to the low risk of potential hazardous material concerns along the pipeline corridor, intrusive hazardous material investigations are not warranted for the proposed route. Additionally, no standing structures are located within the proposed pipeline route; therefore, asbestos or lead-based paints are not anticipated to be discovered or impacted by the Proposed Action. Asbestos and lead-based paint inspections, specifications, notification, abatement, and disposal would not be applicable for the Proposed Action.

On the FC, the Proposed Action includes 0.7 mile of pipeline as well as the construction of supporting infrastructure, including water storage and a water treatment facility. As the FC has no history of legacy radiological contamination issues associated with past nuclear weapons production or research, no material hazards are anticipated to be discovered during construction. During operations, chlorine would be used for water treatment, and diesel fuel would be stored to power backup generators. Both materials would be tracked and managed under NREL's existing chemical management system as described in Section 3.11.1. The Proposed Action is not expected to have any adverse effects with respect to hazardous materials at the FC.

3.10.2.2 Waste Management

Any hazardous materials generated during construction would be disposed of as required by the construction plans and permits. The FC already has an established spill response plan and best management practices to reduce the amount of waste.

Construction waste would be expected to include items such as packaging from building materials and equipment installation, as well as residues from consumables (e.g., food and supplies) brought in by the workforce. Sanitary waste generated during construction would not be expected to be unique in nature or otherwise require special handling or management. NREL would require construction contractors to either manage the disposal on their own or direct them to the appropriate onsite receptacles. This waste would be removed by the existing FC waste collection system. Waste quantities would not be expected to overwhelm the existing FC waste collection system or the operating capacity of area landfills.

Once operational, there would be increases in sanitary wastewater, nonhazardous waste, and hazardous waste as a result of increases in the operational workforce and activities at the FC (see Table 2-2). Although these increases would occur independently of the Proposed Action, the potential impacts are addressed in this EA. Sanitary wastewater would increase by approximately 360,000 gallons/year but would be handled by the existing sanitary leach fields and the proposed leach field that would be constructed in support of the CCF. The new leach field would have a capacity of 1,999 gallons per day (approximately 730,000 gallons/year). Nonhazardous waste would increase by approximately 5,000 pounds/year, which would nearly double nonhazardous waste at the FC. This increase would not notably impact the operating capacity of area landfills. Hazardous waste would increase by approximately 550 pounds/year, which would double hazardous waste at the FC. The hazardous waste would be shipped for disposal to a fully permitted treatment, storage, and disposal facility.

3.10.3 No-Action Alternative

Under the No-Action Alternative, the pipeline would not be built, and the FC would continue to bring in water by truck multiple times a week. There would be no impacts and material and waste management would remain unchanged when compared to existing conditions.

3.11 Human Health and Safety

3.11.1 Affected Environment

NREL has defined workplace standards that are compliant with DOE expectations and applicable Occupational Safety and Health Administration (OSHA) standards. NREL also has a comprehensive safety management system that establishes policies and programs to identify, analyze, and mitigate occupational health and safety risks. All activities are evaluated prior to conducting work to establish a safe working environment and implement proactive measures to monitor the effectiveness of workplace controls. Worker qualification, safe workplace design, access control, process oversight, and periodic reviews are some of the tools used to protect the health and well-being of workers, visitors, and the public. NREL also integrates emergency planning to respond to off-normal events and has established mechanisms to analyze, correct, and prevent accidents. Plans are in place to minimize injuries to people and damage to the environment. NREL has distributed the plans to its organization and to public emergency responders, including the Jefferson County Sheriff and West Metro Fire Protection District.

Table 3.11-1 summarizes NREL injury/illness data. The table presents two classes of injuries/illnesses: total recordable cases (TRC) and days away from work, job restriction, or transfer (DART). TRCs are all new, work-related non-fatal injuries/illnesses that meet one or more OSHA general recording criteria (29 CFR 1904.7). DART injuries/illnesses are of a more serious nature, resulting in the employee being unable to perform the duties normally connected with his/her assigned job.

Reports of injury/illness at NREL are below the DOE average. For example, for all DOE sites, the 2020 TRC and DART rates were 0.89 and 0.55 per 200,000 workhours, respectively (CAIRS 2021). There have been no fatalities at NREL since its inception in 1977 (DOE 2012).

Table 3.11-1. Injury/Illness Reporting Information for NREL from 2016–2020

Reporting Period (Calendar Year)	TRC Injury/Illness Rate (per 200,000 workhours)	DART Injury/Illness Rate (per 200,000 workhours)
2020	0.18	0.04
2019	0.59	0.04
2018	0.83	0.23
2017	0.78	0.25
2016	0.71	0.30

Source: CAIRS 2021.

The most likely accident to occur at NREL is a release of hazardous material or a petroleum spill. Records for 2016–2020 (NREL 2017, 2018, 2019b, 2020, 2021) do not indicate that any releases of hazardous materials or petroleum spills during that period required reporting to either EPA or the State of Colorado. On occasion (i.e., several times a year), a minor spill (i.e., below reporting quantities) of diesel, lubricant, coolant, and hydraulic fluids occurs, usually from vehicles and mobile equipment on to paved surfaces. Each spill receives immediate remedial action to minimize any potential impact to the environment.

3.11.2 Proposed Action Impacts

3.11.2.1 Human Health and Accidents

Under the Proposed Action, there would likely be no accidents that would result in harm to the environment, workers, or the public from a waterline failure. A failure of the waterline would release reservoir water to the environment until the system was shut down. Since the reservoir water contains no hazardous impurities, such a release would have little potential to cause harm to human health. The NREL Emergency Management Manual incorporates emergency information and building-specific emergency preparedness plans that would be used in response to an emergency at the water treatment system. These documents are revised periodically to address changing circumstances, modified operations, or new information.

The Proposed Action would treat reservoir water to drinking water standards using sodium hypochlorite. Sodium hypochlorite is currently being used at the FC to treat trucked-in water. Although the quantity of sodium hypochlorite stored onsite would increase under the Proposed Action, the exact amount of the increase would not be determined until later in the design. Nonetheless, the ALOHA computer code (NOAA 2013) was used to analyze double the quantity of sodium hypochlorite (i.e., 10 gallons). It was found that, in the event of a spill of the entire amount, the concentration at the site boundary would be too small to be reported by ALOHA. The probably of such a sodium hypochlorite accident in the future is believed to be extremely unlikely (i.e., $<1\times10^{-4}$ per year, or once in 10,000 years).

During installation of the waterline, standard industrial accidents could occur. Construction risks could result in injuries to the general public and construction workers, including the potential for collisions with construction vehicles, equipment, and materials; and falls from structures or falls into open excavations. Public access to construction areas would be limited; therefore, the potential risk to the general public would be low. The potential risk of construction-related injuries to workers would be minimized through safety training, use of appropriate safety equipment, and development and adherence to health and safety plans.

3.11.2.2 Intentional Destructive Acts

DOE considers intentional destructive acts (i.e., acts of sabotage or terrorism) in all its EAs and EISs. Each EA or EIS should explicitly consider whether the accident scenarios adequately bound intentional destructive acts. DOE applies a sliding scale in considering the potential impacts of intentional destructive acts such that a more detailed threat analysis would be appropriate for a nuclear facility or a non-nuclear facility with large amounts of hazardous or explosive material onsite (DOE 2006b).

NREL (and the FC) is a non-nuclear facility. No work activities at NREL involve nuclear material, and there are no legacy radiological contamination issues. The installation and operation of the proposed waterline (i.e., the Proposed Action) would not involve the transportation, storage, or use of radioactive or explosive materials. Nor would the Proposed Action offer any credible targets of opportunity for terrorists or saboteurs to inflict major adverse impacts to human life, health, or safety. Consequently, it is highly unlikely that any element of the Proposed Action would be viewed as a potential target by saboteurs or terrorists, nor would the Proposed Action render the NREL site as a whole any more susceptible to such acts. However, should an intentional destructive act occur at NREL, the impacts would be those resulting from the act itself and would not be magnified by any aspect of the Proposed Action.

3.11.3 No-Action Alternative Impacts

Under the No Action Alternative, there would likely be no accidents that would result in harm to the environment, workers, or the public from a waterline failure. A failure of the current onsite domestic water storage tank would release stored water to the environment. Since the stored water contains no hazardous impurities, such a release would have little potential to cause harm. Additionally, the site has emergency procedures to respond to any type of onsite accident, including emergency response plans and procedures for the current water treatment system.

Sodium hypochlorite is used for dichlorination of the water before it is used. A small surplus (not to exceed 5 gallons) is stored in the existing FC Pump House (Building No. 152), which is approximately 200 feet from the northern site boundary. The ALOHA computer code (NOAA 2013) was used to analyze a hypothetical release of 5 gallons of sodium hypochlorite. It was assumed that the entire 5 gallons would spill onto the ground into a 0.39-inch-thick puddle, and the sodium hypochlorite would evaporate. The ALOHA results indicate that under conservative meteorological conditions (i.e., stability class 5 and 3.3 feet per second wind speed), the sodium hypochlorite concentrations at 200 feet were not only be below the PAC-1[6] level of 2 milligrams per cubic meter but were too small to be reported by ALOHA. Since NREL has never had a chlorine spill, the probability of such an accident in the future is believed to be extremely unlikely (i.e., $<1\times10^{-4}$ per year).

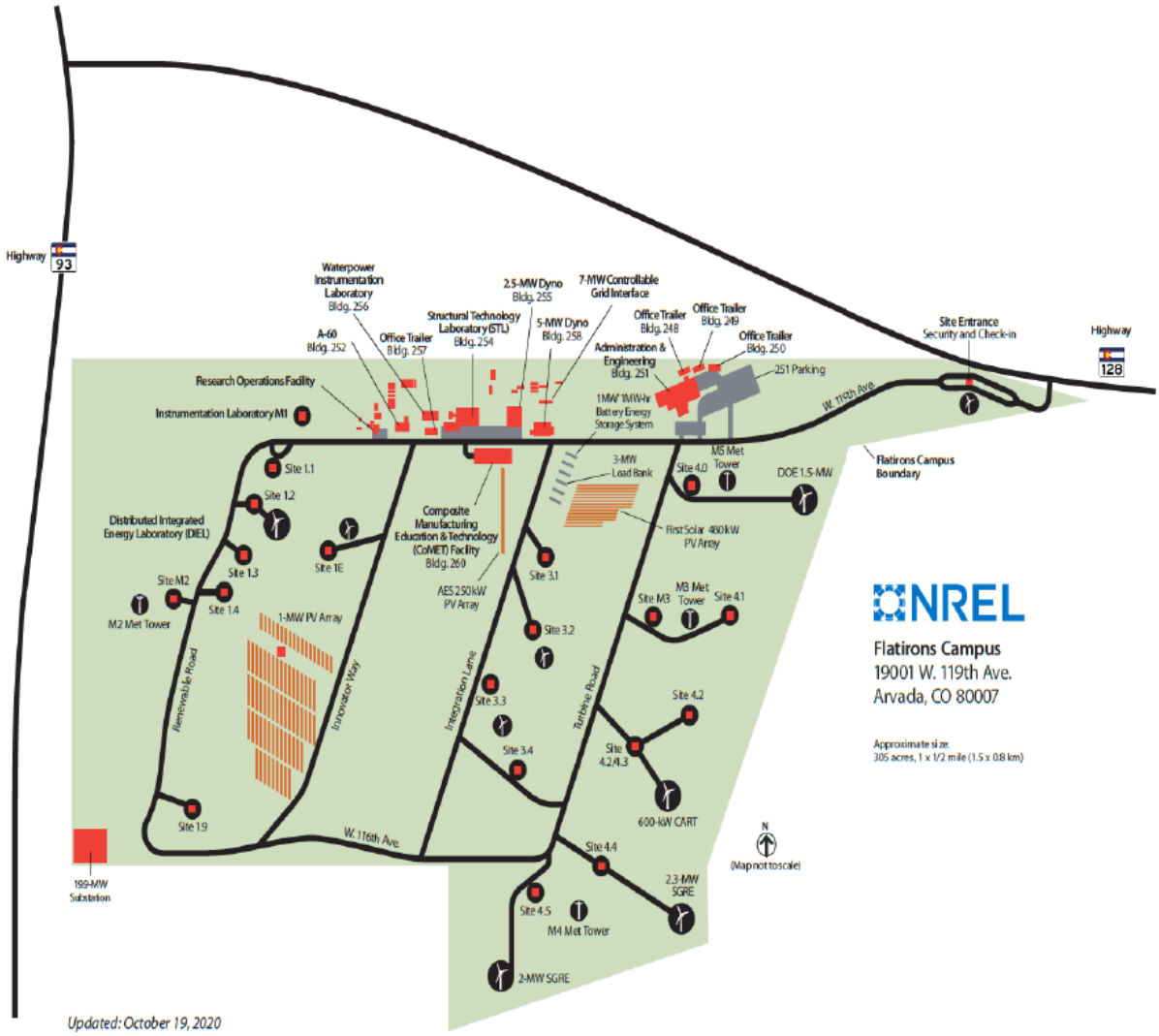
[6] This evaluation us protective action criteria (PAC) to quantify the significance of a sodium hypochlorite accident, as recommended by DOE Order 151.1D Chg 1, "Comprehensive Emergency Management System" (DOE 2019), and DOE-STD-3009, "Preparation of Nonreactor Nuclear Facility Documented Safety Analysis" (DOE 2014b). The following are the three PAC levels:

PAC-1	Mild, transient health effects.
PAC-2	Irreversible or other serious health effects that could impair the ability to take protective action.
PAC-3	Life-threatening health effects.

3.12 Transportation

3.12.1 Affected Environment

The FC is located near the intersection of US Highway 93 and Colorado State Highway 128, between Boulder and Golden, approximately 15 miles north of NREL's South Table Mountain Campus. Primary roadway entry/egress to and from the FC occurs through the secured access gate location at the northeastern corner of the site just south of Colorado State Highway 128 (see Figure 3.12-1). This is the principal location through which the majority of motor-vehicle traffic either enters or exits the site.

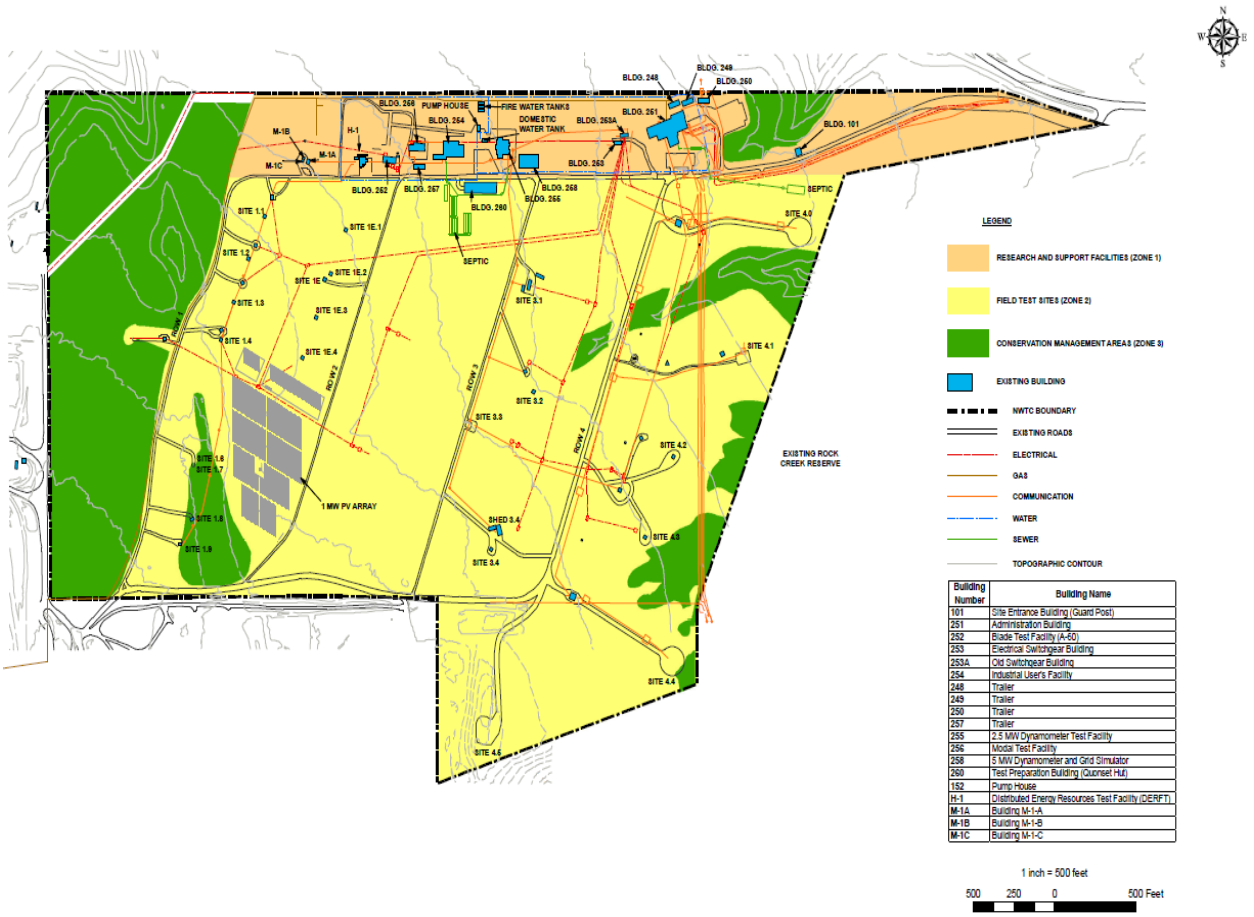


Source: https://www.nrel.gov/about/assets/pdfs/flatirons-site-map.pdf.

Figure 3.12-1. FC General Roadway Layout Map

A secondary, small-scale site access point is located at the southwest corner of the site adjacent to the 19.9-megawatt electrical substation. In contrast to the main site entrance off Highway 128, this access point typically has a low frequency of traffic entering or exiting the site and is not authorized or

designated for general use. Figure 3.12-2 depicts both access/exit locations at the points where the abutting offsite roads connect directly (i.e., flow) into those roads across the site boundary line.



Source: Figure 1-2 from DOE 2014a.

Figure 3.12-2. FC Existing Roadways, Site Access, and Facility Locations (Higher Resolution)

US Highway 93 is mostly a two-lane north-south rural/suburban arterial that connects Boulder with Golden; its northern segment within (and directly south of) the Boulder city area, however, primarily consists of a four-lane formation. Colorado State Highway 128 is an east-west rural/suburban arterial that connects US Highway 93 with Interstate 25 in the northern Denver suburb of Northglenn. Its rural segment (where the primary FC entrance is located) comprises two lanes, with several intersections, interchanges, and merge ramps along its route. As the route continues eastward toward Interstate 25, it expands into a six-lane formation. Based on data for calendar year 2020 from the Colorado Department of Transportation (CDOT), the daily traffic count along Colorado State Highway 128 (all vehicles) ranged from 4,100 (western rural end where the FC entrance is located) to 19,000 (eastern suburban end). Approximately 6.1 percent (i.e., 250) of the 4,100 estimated vehicles that traverse the primary FC entrance location daily is estimated to be truck traffic. Cargo trucks that regularly enter into the FC in direct support of NREL missions, or that are related to regular support functions and supplies, are likewise only a small percentage of the 250 trucks that pass the primary entrance location on a daily basis via Colorado State Highway 128.

Approximately 150 employees commute to the FC; since early 2020, however, the number of physically onsite (and hence commuting) employees has decreased from this value due to enacted COVID-19 remote-telework policies. In general, NREL is still presently encouraging a "flexible" work and commuting posture whereby employees are encouraged (on a situational basis) to telecommute or take alternative transportation to their respective assigned work locations. However, no public transportation options (e.g., city/regional buses) are presently available to travel to the FC.

As noted in Section 1.3, the FC is not located within the bounds of a municipal public water supply distribution system; instead, treated water is presently purchased from the City of Boulder and transported by truck to the FC for onsite employees. The treated water originates in large part from the Boulder Creek watershed and, to a lesser degree, some watersheds on the western slope of Colorado. The water is then shipped via truck to the FC (about three times per week) and then transferred to an onsite holding tank.

The FC is designated/recognized as a "very small waste quantity generator" under the USDOT's categorical scheme for hazardous waste transport. Moreover, during the 2020 calendar year, there were eight separately documented vehicular and/or powered industrial truck leaks/spills, which totaled 8.3 gallons of spilled material.

3.12.2 Proposed Action Impacts

As discussed above in Section 3.12.1, the primary roadway for FC entry/egress is through the secured access gate location at the northeastern corner of the site just south of Colorado State Highway 128, which is the principal location where all motor-vehicle traffic enters or exits the site. This is not expected to change appreciably under the Proposed Action. No new alternate road access/exit routes (or significantly expanded use of the existing southwest secondary entrance) for the FC are planned in support of construction- or operational-related activities under this alternative.

NREL estimates that about 50 construction workers would be in the project area regularly during the construction phase of the Proposed Action, which includes fabrication/installation of a domestic waterline, a water treatment system, fire and domestic water tanks, fire-suppression-system upgrades, the CCF, and an associated new onsite wastewater treatment system. Accordingly, a small increase in motor-vehicle traffic (including cargo transportation vehicles (i.e., semi-trucks/tractor-trailers), commercial delivery vehicles, waste/excavation transport vehicles, heavy-machinery transport vehicles, and commuter vehicles) that either directly support construction activities or personally belong to visiting construction workers would predominantly be expected to pass through the main site gate during the entire duration of the Proposed Action construction period. Similarly, additional traffic within the offsite ROI due to construction workforce presence and material transit requirements would add *de minimis* quantities to those discussed in Section 3.12.1 for Colorado State Highway 128 as well as Highway 93.

Onsite access to the southern portion of the pipeline would be via an existing dirt/gravel road. Access to the central portion of the pipeline would be via West Gate Road and through McKay property. Access to the northern portion of the pipeline would be through the FC proper. All pipeline access points are serviced by existing roads. Parking areas and laydown areas would be adjacent to work areas (e.g., West Gate Road) or on the FC proper in previously disturbed areas. Equipment would be staged on the FC as much as possible; where not possible, it would be staged on previously disturbed areas. Once operational, an increase in the FC workforce (from 150 to 300 workers) would have a negligible effect on traffic on area roads.

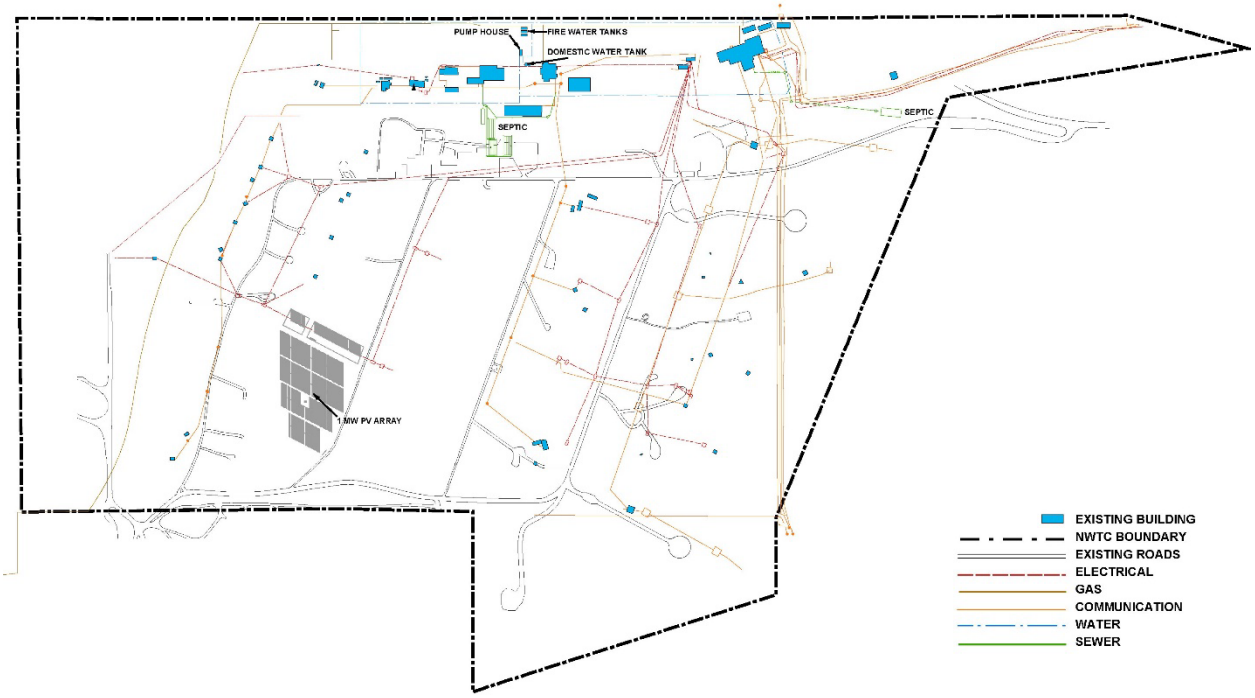
3.12.3 No-Action Alternative Impacts

Under the No-Action Alternative, DOE would not proceed with the Proposed Action; instead, DOE would continue to provide water to the FC using existing means (i.e., delivered and stored water and existing onsite wastewater treatment systems) to meet the water needs of the NREL staff and the FC research activities. Currently, approximately three water deliveries are made weekly (approximately 160 deliveries per year). To support future growth at the FC, DOE would need to increase water deliveries by approximately 100 percent (from three deliveries per week to six deliveries per week). As discussed for the Proposed Action, an increase in the FC workforce (from 150 to 300 workers) would have a negligible effect on traffic on area roads.

3.13 Infrastructure

3.13.1 Affected Environment

Site infrastructure includes those basic resources and services required to support the construction and operation of the FC. These systems are wholly human made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as urban or developed. For the purposes of this EA, infrastructure is defined as electricity, natural gas, water, wastewater, stormwater drainage, and communications. Figure 3.13-1 shows the existing infrastructure on the FC (as defined above).



Source: Modified from Figure 1-2 in DOE 2014a.

Figure 3.13-1. FC Existing Infrastructure

Metering. The FC campus has installed additional metering throughout the installation to better track energy and water usage. By the end of 2020—

- 94 percent of relevant buildings have potable water meters (28 percent are advanced meters)
- 94 percent of relevant buildings have natural gas meters
- 91 percent of relevant buildings have advanced electricity meters
- 75 percent of relevant buildings have advanced chilled water meters
- 75 percent of relevant buildings have advanced hot water meters (NREL 2021a)

Electrical Power. Electrical power is provided to and from the FC via overhead lines from Xcel Energy operating at a distribution-level voltage of 13.2 kilovolts. Xcel Energy is a natural gas and electric company based in Minneapolis, Minnesota, and operating in eight states. In July 2020, the FC completed an electrical service upgrade to a transmission interconnection. As a result, the existing 10-megawatt limit on simultaneous connected generation capacity at the FC was increased to 19.9 megawatts. Because the General Electric turbine and Controls Advanced Research Turbine are no longer subject to curtailment under the connected generation capacity limit, their use and associated production in future years is anticipated to increase (NREL 2021c).

As shown on Figure 3.13-1, the property easement (20 feet wide) for electric power enters the FC at its western boundary. Upon entering FC property, the electrical line is owned by DOE. The power line drops underground and then runs diagonally northeast to a junction parallel with the northern boundary. From there, it runs eastward to a pad-mounted switch west of Building 251. Adjacent to this pad-mounted switch is a switchgear building that contains additional electrical control equipment such as switches, fuses, and circuit breakers that are used to further distribute electrical power to other buildings, turbine field test sites, and test-site support structures across the FC. Also, in the switchgear building, the electrical service is split into two electrical buses (circuits)—one for the turbine side (turbine bus) and one for the building side (building bus). Energy for each circuit is metered via two master meters from Xcel Energy. The turbine bus transmits power generated from the onsite turbines. The building bus serves the FC site with Xcel-generated power and with power generated onsite from a 1.08-megawatt SunEdison photovoltaic array described below (DOE 2014a).

SunEdison installed and currently owns and operates an eight-acre photovoltaic (PV) solar array on an easement provided by DOE on the western portion of the FC. The 1.08-megawatt PV solar array provides power to the building bus of the FC's electrical system circuit. The PV array is net metered, and the power produced offsets a portion of the FC's energy consumption. SunEdison and DOE Western Area Power Administration (WAPA) established a 20-year solar power and services agreement on December 31, 2008. Through this agreement, WAPA purchases power generated from the PV array. WAPA then sells the power to the DOE Golden Field Office for use at the FC, through a 30-year intra-agency agreement that was executed on December 29, 2008. Figure 3.13-1 shows the location of the SunEdison array in the bottom left quadrant.

Natural Gas. Natural gas is provided to the site via an Xcel Energy natural gas pipeline that enters the southwestern corner of the FC from a pipeline along the east side of US Highway 93. In December 2003, DOE granted a 20-foot easement to Public Service Company of Colorado (now Xcel Energy) for an onsite natural gas line (DOE 2014a). The natural gas line runs approximately 6,800 feet from the southwestern corner of the FC, parallels the access road for Row 1 to the northern boundary, then runs east along the northern boundary to Building 251. Figure 3.13-1 includes the natural gas line.

Domestic Water. Since its opening in the late 1970s, the FC has never been served by municipal domestic water, fire water, or sanitary sewer services. Over the past four decades, the campus has used a mixture of well water, delivered and stored water, and onsite wastewater treatment systems to meet the water utility needs of the NREL staff and research activities located on the campus.

Water is purchased from the City of Boulder and trucked to the site. The treated water originates in large part from the Boulder Creek watershed and, to a lesser degree, some watersheds on the western slope of Colorado. The trucked water is transferred to a 15,000-gallon holding tank. Water is pumped from the holding tank to a 2,000-gallon day tank, where chlorine is added to boost disinfectant levels before the water is distributed to campus buildings. The drinking water distribution system onsite consists of a 2-inch polyvinyl chloride pipe that connects via underground piping to Buildings 251 and 254.

The annual onsite demand for domestic water was approximately 375,046 gallons in 2020 (NREL 2021a). This represents a decrease of approximately 137,000 gallons from 2019. This reduction in usage is due to a decrease site population because of the COVID-19 pandemic. The FC does not use industrial, landscaping, or agricultural non-potable freshwater.

Wastewater. The FC is not serviced by a municipal sewer line. Wastewater disposal is provided by two onsite septic systems that include tanks and leach fields for wastewater treatment, connected to facilities at Buildings 251 and 254. In 2020, the FC installed a new onsite wastewater treatment system (Figure 3.13-2) to replace the original system. The new system has a capacity of 1,999 gallons per person per day and is expected to accommodate the anticipated increase in staff and research efforts at the site. The system was permitted through the Jefferson County Public Health Department. A preventative maintenance and inspection program is in place to confirm proper system function. Figure 3.13-1 depicts septic system locations and relative sizes.

Figure 3.13-2. New Wastewater Treatment System at the FC

Stormwater Drainage. The stormwater drainage system at the FC consists of a series of culverts, swales, and ditches that convey stormwater into receiving surface waters. Stormwater systems convey precipitation away from developed sites to appropriate receiving surface waters. Stormwater at the FC drains into two streams: Rock Creek and Coal Creek. The portion of the site from approximately 119th Avenue to the southern border (Zone 2 and most of Zone 3) drains into Rock Creek; everything in the northern, developed portion of the site drains into Coal Creek.

Telecommunications. Site telecommunications distribution is served by CenturyLink voice and fiber optic services. These services enter on the northeast side of the site near Building 251 and are distributed throughout the FC's buildings and turbines as shown on Figure 3.13-1.

3.13.2 Proposed Action Impacts

Electrical Power. Electrical power installations and upgrades associated with the Proposed Action include the supply of power to the offsite pump station at the Smart Reservoir and the onsite water treatment facility and pump/distribution systems for domestic and fire water. A new overhead powerline (up to 2,500 feet in length with up to 10 utility poles) would be installed to service the Smart Reservoir pump station. It would tie into the existing overhead power lines, which have sufficient capacity to support the pump station. Onsite, existing electrical infrastructure would be used and has adequate capacity to support the development of the pipeline, treatment facility, storage tank, and pump station.

After construction and during operations, annual electrical demand is anticipated to increase by 206 megawatt hours annually.[7] The recent electrical upgrade to a transmission interconnection service and the new 19.9-megawatt capacity limit on simultaneous connected generation would be more than sufficient to meet the new demand.

Natural Gas. Proposed construction activities would have no effect on natural gas use onsite or offsite. After construction and during operations, annual natural gas demand at the FC is anticipated to increase by 219,840 cubic feet per year, if natural gas is used to heat buildings. This reflects the 9,160 square feet of new facilities and would be met with existing infrastructure.

Domestic Water. The Proposed Action would draw water from the 920-acre-foot (300-million-gallon) Smart Reservoir and deliver up to approximately 3.3 million gallons (10 acre-feet) of raw water to the FC annually. A 160-square-foot pump station at the reservoir would house two electric pumps and deliver water to the FC via a 6-inch pipeline.

The offsite section of the pipeline is 2.3 miles long and the onsite portion is 0.7 miles in length, for a total of 3.0 miles of pipeline. Of the 3.0 miles, 2.5 miles would be new pipe and the remaining 0.5 mile would reuse an abandoned cast iron pipeline that previously served the Rocky Flats Plant.

Onsite, the pipeline would terminate in the northern portion of the FC at the location of the new fire water tanks and water treatment facility. The following onsite water infrastructure is proposed to support the new waterline:

- new water treatment facility to be located inside a 1,000-square-foot metal butler building
- two new 275,000-gallon fire water tanks of raw water for fire suppression purposes
- new 25,000-gallon domestic water storage tank

The pipeline and supporting infrastructure identified above would ensure a reliable supply of water to the FC. Water demand would not increase because of a change in the supply of water, but a predictable supply of raw water would ultimately allow the FC to increase personnel onsite from 150 to 300 persons. During operations, annual potable water use is anticipated to be 540,000 gallons.

[7] Based on using electricity to heat buildings. If natural gas is used, less electricity would be used.

Wastewater. Wastewater would continue to be treated and managed onsite. In anticipation of the foreseeable increase in employment, the Proposed Action includes the construction of a new wastewater treatment system. This would supplement the two existing septic fields described above and shown on Figure 3.13-1 and allow the FC to serve more personnel. The new system would be located near the CCF with settling tanks and a sump pump, with a capacity of 1,999 gallons per day.

Stormwater Drainage. Construction and operations activities related to the Proposed Action would have negligible effects on onsite stormwater drainage. The proposed new permanent structures (new facilities, supporting infrastructure, and parking) would result in minor (approximately 1.1 acres or 0.4 percent) increases in impervious surfaces. Stormwater would continue to drain as described in Section 3.131.

Telecommunications. Proposed construction activities and ongoing operations would have no effect on the existing telecommunications infrastructure onsite or offsite. The existing infrastructure has adequate capacity to support the mission and planned growth of the FC.

3.13.3 No-Action Alternative Impacts

Under the No-Action Alternative, the pipeline would not be built, and the FC would continue to transport water to the FC by truck multiple times a week. Infrastructure would remain unchanged when compared to existing conditions; as such, there would be no impacts from this alternative. Independent of this Proposed Action, DOE would evaluate the need to construct a new wastewater treatment system to accommodate the increase in FC staff from 150 to 300 workers.

3.14 Relationship of Short-Term Uses and Long-Term Productivity

Sections 3.2 through 3.13 of this EA discuss potential impacts that could occur under the Proposed Action. DOE reviewed these potential impacts and determined that land use and water use warranted discussion regarding short-term uses of the environment and the maintenance and enhancement of long-term productivity. As such, this section discusses the relationship between short-term land and water use versus the maintenance and enhancement of long-term productivity.

Land Use. Construction activities would re-disturb approximately 8.3–15.7 acres of previously disturbed land. This represents a negligible amount of the total FC land area (0.4 percent), and an even smaller area of land in the project area outside the FC. The Proposed Action would have minimal impacts on land use both onsite and offsite, and land use would be compatible with existing land use in the area. The land use would not adversely affect the long-term productivity of the area because most disturbances would be associated with an underground water pipeline. Short-term disturbances of previously disturbed land are not expected to cause long-term reductions in the productivity of the area as a whole. Within the FC, the proposed land use would be consistent with, and compatible with, FC missions and would support long-term growth initiatives at the FC.

Water Use. The future growth of the FC, which involves both increasing the number of staff and the construction of new and/or upgraded research facilities, is directly dependent on obtaining more robust water utility services. Use of water from the Smart Reservoir would allow DOE to stop water deliveries to the FC while also supporting long-term mission growth. The up to 10 acre-feet (approximately 3.3 million gallons) of water that would be used by the FC annually would represent less than 1 percent of the capacity of the reservoir and would not impact other users or the long-term productivity of the area in terms of water needs.

3.15 Cumulative Impacts

This section discusses the potential cumulative impacts resulting from the Proposed Action. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Thus, the cumulative impacts of an action can be viewed as the total effects on a resource (e.g., land, air, water, soil), ecosystem, or human community of that action and all other activities affecting that resource no matter what entity (federal, non-federal, or private) is taking the actions. It is possible that a potential impact that may be small by itself could result in a moderate or large cumulative impact when considered in combination with the impacts of other actions on a particular affected resource. For example, if a resource is regionally declining or imperiled, even a small, individual impact could be substantial if it contributes to or accelerates the overall resource decline.

As discussed in Section 2.4, DOE has identified many projects that may occur at the FC in the next several years, including the following:

- installation of two new wind power turbines
- installation of a new fiber optic network
- installation of a Controllable Grid Interface infrastructure to expand current research capabilities that test grid integration of utility scale renewable energy and storage technologies
- removal of the existing Northern Power Systems turbine and installation of a new turbine from Eocycle America Corporation
- installation of a Power Electronic Grid Interface Platform infrastructure to evaluate the integration, operation, control, protection, stability, and general requirements of power grids containing large shares of power electronics-based generators such as wind, solar photovoltaic, and energy storage systems
- installation of a hydrogen electrolyzer system to explore the potential for wide-scale hydrogen production and utilization

For each of these projects, DOE determined that no additional NEPA review would be required because the project was covered by a Categorical Exclusion or bounded by the environmental impact analysis contained in the existing FC site-wide EA (DOE 2014a).

DOE did not identify any notable offsite projects that could contribute to cumulative impacts.

The analysis in this EA shows that impacts associated with the Proposed Action construction and operation would be minor. Approximately 8.3–15.7 acres of land would be disturbed during construction activities. All land to be disturbed by the Proposed Action has been previously disturbed. Visually, there would be no notable change to the appearance of land along the pipeline route or on the FC. Short-term air quality impacts associated with construction would occur, but emissions would be below de minimis thresholds. No notable noise sources would be associated with construction and operation. No impacts to groundwater are anticipated from construction activities or operations. The pipeline route and associated actions on the FC are outside of the 100-year floodplain. Although wetlands associated with stream and riparian areas are present in the vicinity of the Proposed Action, less than 0.1 acre of wetlands would be affected by the Proposed Action. DOE has prepared a wetlands assessment (Appendix A) concurrently with this EA in accordance with 10 CFR Part 1022. That assessment fulfills DOE's responsibilities under Executive Order 11990.

Construction activities would not impact ecological or cultural resources. Because the peak construction workforce (50 persons) would be negligible compared to the projected population in the region of influence, socioeconomic impacts during construction, although beneficial, are expected to be negligible. Although the operational workforce at the FC would not change immediately, the Proposed Action would support future growth at FC, from current 150 workers to an end-state of 300 workers. No disproportionately high and adverse environmental or economic effects on minority or low-income populations are expected. Workers would be subject to minimal occupational risks during both construction and operation. No notable quantities or types of hazardous materials are associated with the Proposed Action, and members of the public or workers would not be exposed to hazards that could result in serious health effects. FC operations would generate the same types and quantities of wastes that are currently generated by existing operations. With regard to non-water utility requirements, the existing infrastructure would be adequate to support FC operations.

Given these minimal impacts, and the fact that no additional NEPA review would be required for any of the reasonably foreseeable projects, DOE has determined that there would be no notable cumulative impacts.

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APPENDIX A

WETLANDS ASSESSMENT

Introduction. The attached wetlands assessment has been prepared concurrently with this *Environmental Assessment for the Flatirons Campus Water System Project, Jefferson County, Colorado,* and in accordance with Title 10 of the *Code of Federal Regulations* (CFR) Part 1022, "Compliance with Floodplain and Wetlands Environmental Review Requirements." This assessment fulfills the U.S. Department of Energy's (DOE's) responsibilities under Executive Order 11990, "Protection of Wetlands." Executive Order 11990 requires federal agencies to minimize the destruction or degradation of wetlands, and to avoid undertaking new construction located in wetlands unless they find there is no practicable alternative to such construction.

DOE, in accordance with 10 CFR Part 1022, seeks to identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse impacts to wetlands and provide early and adequate opportunities for public review of plans or proposals for actions that may affect wetlands. This wetlands assessment serves to document the proposed activities that have the potential to affect wetlands, and to consider alternatives to the Proposed Action.

Definition of "Wetland" under 10 CFR 1022.4

Wetland means an area that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas.

December 22, 2021

Surface Water Resources

Flatirons Campus Water Project
Smart Reservoir To Proposed Water Treatment Plant
Jefferson County, CO

Prepared For:

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Introduction

DOE is proposing to construct and operate a water pipeline and pump station, drinking water treatment system, and wastewater treatment system to provide code-compliant water to NREL's Flatirons Campus (FC) for use in domestic water, fire suppression water, and wastewater systems. The project would also include construction of an approximately 6,000 sq ft Control Center Facility at the FC to provide operational control and monitoring of future integrated energy research projects.

The proposed project would involve reuse of a portion of an existing water line and construction of new water line segments from Smart Reservoir, located in the southwest corner of the Rocky Flats National Wildlife Refuge adjacent to the FC, to a new water treatment facility on the FC. The water pipeline would traverse about 2.3 miles from the Smart Reservoir to the southwest corner of the FC, then northeast to the water treatment plant. The construction corridor extends 20 feet on either side of the proposed waterline and includes an existing gravel access road for much of the alignment. For the purposes of this report, the study area includes the waterline corridor (20 feet on either side of the waterline route) and the construction footprint of the proposed water system and Control Center Facility structures.

Methodology

The purpose of this study is to identify surface water resources, including wetlands, Waters of the United States (WOTUS), and floodplains within the study area and determine if any of those water resources could potentially be affected by the project. An evaluation of the existing conditions using the National Wetlands Inventory (NWI), the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soils Survey map, NRCS Hydric Soils list, and the Golden and Louisville, CO USGS Quadrangle maps was conducted prior to the field investigation. Additionally, NREL researched water resources in the study area via desktop analysis using readily available data and existing studies and reports prepared for adjacent project sites: Rocky Flats National Wildlife Refuge (USFWS 2005), the National Wind Technology Center (Flatirons Campus – DOE 2014), and the DOE 115kV Transmission Line Report (Pinyon 2018). Federal Emergency Management Agency (FEMA) Flood Map Service Area, Colorado Division of Water Resources (CDWR) databases, aerial maps, and United States Geological Survey (USGS) mapping resources were used to identify water resources. Lastly, NREL staff visited the study area on several occasions during the 2021 growing season to delineate waters of the United States (WUS), which included open waters and wetlands. Notes, photographs, and sampling points were recorded during field visits. Wetlands were defined by vegetation, hydrologic, and soil features following U.S. Army Corps of Engineers Regional Supplement to the Wetlands Delineation Manual, Great Plains Region (USACE 2010). Assembling all this information, NREL staff determined locations of surface water resources within the study area.

Results

Based on the resources reviewed prior to site visits, several wetland systems ((PEM1A: Palustrine Emergent Persistent Temporary Flooded and PEM1Ch: Palustrine Emergent Persistent Seasonally Flooded Dike/Impounded), several riverine systems (R4SBC: Riverine Intermittent Streambed Seasonally Flooded, R4SBCx: Riverine Intermittent Streambed Seasonally Flooded Excavated (manmade irrigation ditches), and R5UBH: Riverine Unknown Perennial Unconsolidated Bottom Permanently Flooded), and a freshwater pond (PUBFx: Palustrine Unconsolidated Bottom Semipermanently Flooded Excavated) were

identified on the NWI Map within the Proposed Waterline Corridor project area. No floodplains were identified within the study area.

The area consists of flat, gently sloping topography within the open fields with moderate to steep slopes near the railroad embankments. The northern project corridor drains to Rock Creek, the middle portion of the project corridor drains to Walnut Creek (via the Upper Church and McKay Ditches, manmade irrigation ditches), and the southern portion of the project corridor drains to the east towards Woman Creek (which bisects the corridor) and to the south towards the Francis Smart Reservoir. The South Boulder Diversion Channel, a manmade irrigation ditch, is also located within the southern portion of the project area and runs generally in the north-south direction. The overall project corridor is located within the Big Dry Creek (Walnut and Woman Creeks) and the Coal Creek watersheds (Rock Creek).

Field results are discussed first in the context of the study area segments (Figure 1) and then summarized to illustrate the total resource areas found. As described above, the study area begins with Segments 1 & 2 (Figure 2), combined here for brevity, continues north to Segments 3 (Figure 3) and 4 (Figure 4). Finally, the study area ends within the Flatirons Campus (Figure 5).

Based on the field investigations, there are approximately 12,464 square feet of jurisdictional wetlands and 90 linear feet of stream located within the proposed waterline construction corridor. An existing 10-inch waterline will be reused as part of the project ("Segment 2"). Since no disturbance is anticipated along this portion, no impacts to wetlands or streams are proposed within the existing waterline segment.

Segments 1 & 2

A review of the southern portion of the proposed waterline corridor (Segments 1 and 2) was conducted by NREL in June and December 2021. Based on a review of the NWI map, a wetland and an associated stream system is depicted as originating from the west and extending linearly to the east, through the proposed waterline corridor. The South Boulder Diversion Channel, a manmade irrigation ditch, is located to the west of the corridor study area, then conveys flows south-southeast where it crosses the proposed waterline. Please refer to the enclosed NWI and soil maps for more detailed information.

Based on the field investigation, an area that was identified as a palustrine emergent wetland (PEM)/palustrine scrub-shrub (PSS) includes an intermittent stream channel that transects the system. The PEM/PSS system is located just west of the proposed waterline corridor and the stream channel provides hydrology to the wetland system. The intermittent stream channel flows to the east through the proposed waterline corridor approximately 48 linear feet and transitions into a perennial stream (Woman Creek). This portion of the project corridor contains an existing 10-inch waterline that will be reused for the project; therefore, no impacts to the intermittent stream channel stream are anticipated.

Sampling Point WOL-1 was collected within the PEM/PSS and exhibited all three wetland characteristics. As depicted on the enclosed Flatirons Campus - Proposed Waterline Corridor – Segment 1&2 Wetland Map, this wetland area is located just west of the proposed waterline corridor.

Sampling Point WOL-2 was collected upslope of the wetland/stream area, south of Sampling Point WOL-1 adjacent to the proposed waterline. Although hydrophytic vegetation exists, the area lacks hydric soils and hydrology.

As summarized below and depicted on the enclosed Flatirons Campus - Proposed Waterline Corridor – Southern Section Wetland Map, two sampling points (WOL-1 and WOL-2) were collected associated with Segments 1 and 2 of the project corridor. The following table summarizes the sampling points collected (refer to the enclosed Wetland Determination Data Forms for more detailed information).

Table 1. Sampling Point Summary Within Segments 1 and 2 of the Proposed Waterline Corridor

Sampling Point	Soil Map Unit	Hydrophytic Vegetation Present	Hydric Soil Present	Wetland Hydrology Present	Sample Area within a Wetland
WOL-1	31	Yes	Yes	Yes	Yes
WOL-2	100	Yes	No	No	No

Note: Field delineation forms for these sampling points are available upon request.

The proposed waterline will extend to the Francis Smart Reservoir, which is a manmade feature. Several anchors will be secured to the intake line within the reservoir. Since the reservoir was excavated in an upland area, the reservoir is considered not to be a jurisdictional feature (or waters of the U.S.).

Segment 3

A review of the middle portion (Segment 3) of the proposed waterline corridor, including a field investigation, was conducted by NREL in September and December 2021. As depicted on the NWI map, two manmade irrigation ditches - Upper Church Ditch and McKay Ditch – transect the middle portion of the proposed waterline corridor. Also as shown on the NWI map, a PEM system is located just east of the middle portion of the corridor.

Based on the field investigation, several culvert crossings exist within Segment 3 of the proposed waterline corridor and convey flows in the west-to-east direction. The culvert crossing in the upper portion of Segment 3 provides hydrology to a PEM wetland system located outside of the waterline study area. The area lacked hydrophytic vegetation and hydric soils. Additionally, while hydrology was present, the area did not possess a defined bed and bank. Another culvert crossing conveys flows from the west towards a system that does not have a direct hydrologic connection to any wetland or other stream systems. Similar to the culvert crossing in the upper portion of this segment, this area also lacked hydrophytic vegetation and hydric soils. This area also did not possess a defined bed and bank. Therefore, these drainage areas are not considered to be waters of the U.S and do not contain wetlands.

As shown on the NWI map and the Flatirons Campus - Proposed Waterline Corridor – Segment 3 Wetland Map, the Upper Church Ditch and McKay Ditch are located within the lower portion of Segment 3 and convey flows west-to-east via culverts. Since these are manmade features, they are also not considered to be waters of the U.S. Refer to the enclosed Flatirons Campus - Proposed Waterline Corridor – Segment 3 Wetland Map depicting these features.

Segment 4

The portion of the proposed waterline located just south of the Flatirons Campus (Segment 4) was reviewed by Pinyon (2018). Based on their Water Resources Review, two wetland complexes (WL-1 and WL-2) and an intermittent stream (tributary to Rock Creek) were identified within this portion of their study area (Figure 4). The resources are summarized in the table below.

Table 2. Waters of the U.S. Within Segment 4 of the Proposed Water Project Corridor

Wetland or Stream	Length (Linear Feet, LF)	Area (Square Feet, SF)	Area (Acres, Ac)
Intermittent Stream Channel	42	823	0.02
OW-1 (Open Water)	-	770	0.064
PEM WL-1a	-	2,404	0.02
PEM WL-1b	-	142	0.003
PEM WL-1c	-	67	0.002
PEM WL-1d	-	704	0.02
PEM WL-1e	-	443	0.01
PEM WL-2a	-	1,740	0.04
PEM WL-2b	-	2,091	0.05
PEM WL-2c	-	1,025	0.02
PEM WL-2d	-	704	0.02
PEM WL-2e	-	544	0.01
PEM WL-2f	-	1,008	0.02
Total	**42**	**12,464**	**0.29**

The wetland complexes identified within the northern portion of the corridor were classified as palustrine emergent wetlands (PEM) and are dominated by similar hydrophytic herbaceous species and hydrology sources (rainwater/stormwater runoff).

An open water feature (OW-1) was also identified within Pinyon's study area. Wetland 1 complex (WL-1) is generally associated with the open water feature identified as OW-1 and provides some hydrology for those smaller wetlands (WL-1a through WL-1e) surrounding OW-1.

Wetland 2 complex (WL-2) is generally associated with Rock Creek, which provides a source of hydrology for those smaller wetlands identified as WL-2a through WL-2f on the Flatirons Campus - Proposed Waterline Corridor – Northern Section Wetland Map.

Flatirons Campus

The northern portion of the proposed waterline corridor is located within NREL's Flatirons Campus. A wetland delineation was conducted by NREL for the Flatirons Campus in August and September 2020. The USACE confirmed this work formally through a Jurisdictional Determination. While wetlands are found within the Flatirons Campus, no wetlands occur within and therefore would not be impacted by the proposed water project.

Conclusion

No floodplains were identified within the study area. Within Woman Creek and Rock Creek, wetlands were identified and delineated. Some of these areas may be jurisdictional areas (WOTUS) located within the proposed construction corridor associated with the waterline alignment. Some impacts to wetlands, including WOTUS, are anticipated with the installation of the waterline. No wetlands were identified within the remaining study area, including Walnut Creek and the Flatirons Campus. Although there are wetlands within the Flatirons Campus, no wetlands would be disturbed onsite because of the Flatirons

Water Project. Avoidance, minimization, and mitigation should be used throughout the construction corridor to reduce impacts to wetlands as much as possible. It is recommended that NREL staff work with the construction contractor to identify and avoid wetlands to the extent that a Nation-Wide Permit could be used. Otherwise, a Section 404 permit, including satisfying any required mitigation, would be obtained prior to impacting any jurisdictional resources identified associated with the project.

Table 3. Summary of Surface Water Resources per Segment within the Study Area

Segment	Floodplain Resources within Segment	Wetland Resources within Segment	Impacts to Wetland Resources
1	No	No	No
2	No	Yes	No
3	No	No	No
4	No	Yes	Yes
FC	No	No	No

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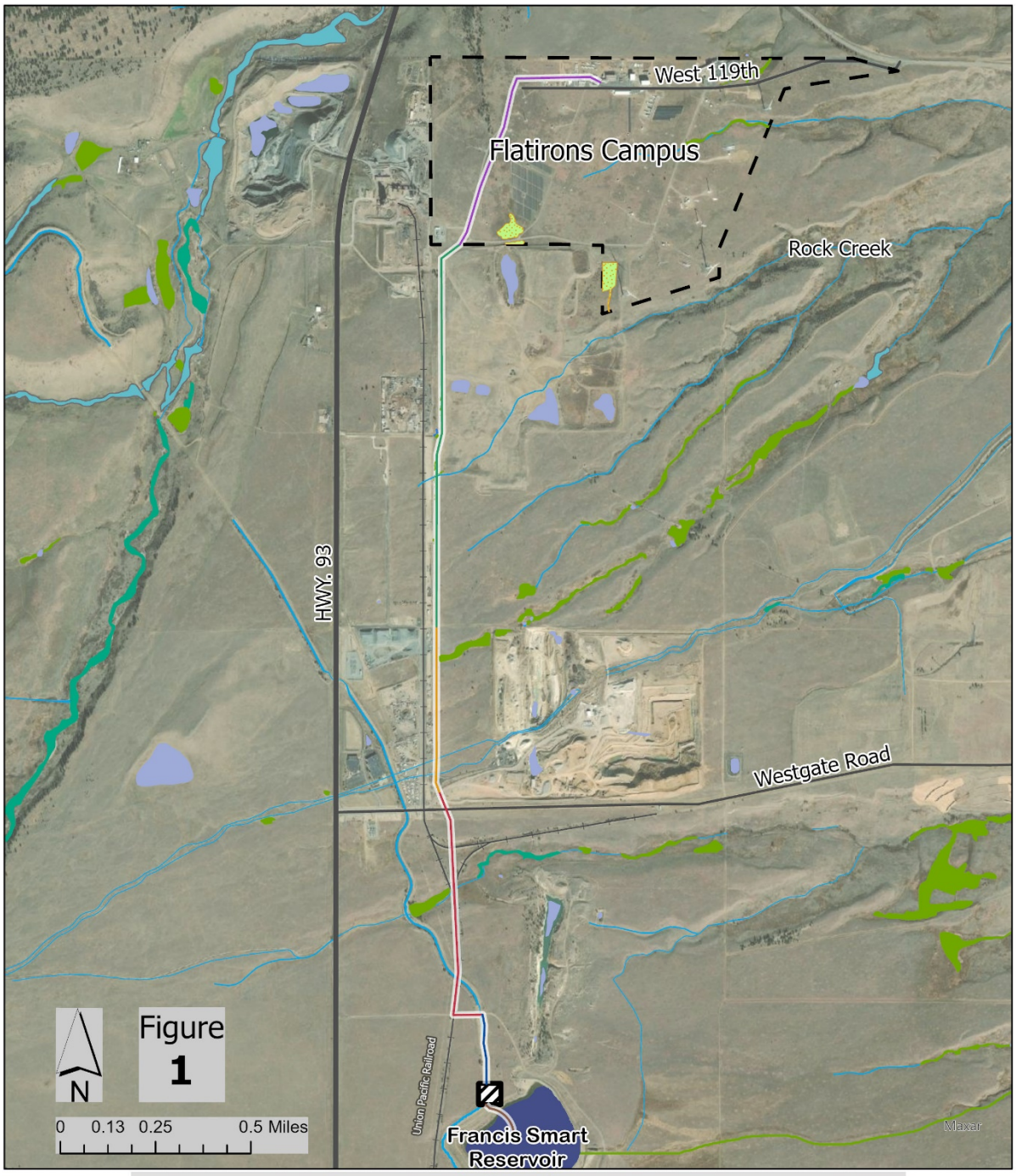
Figures

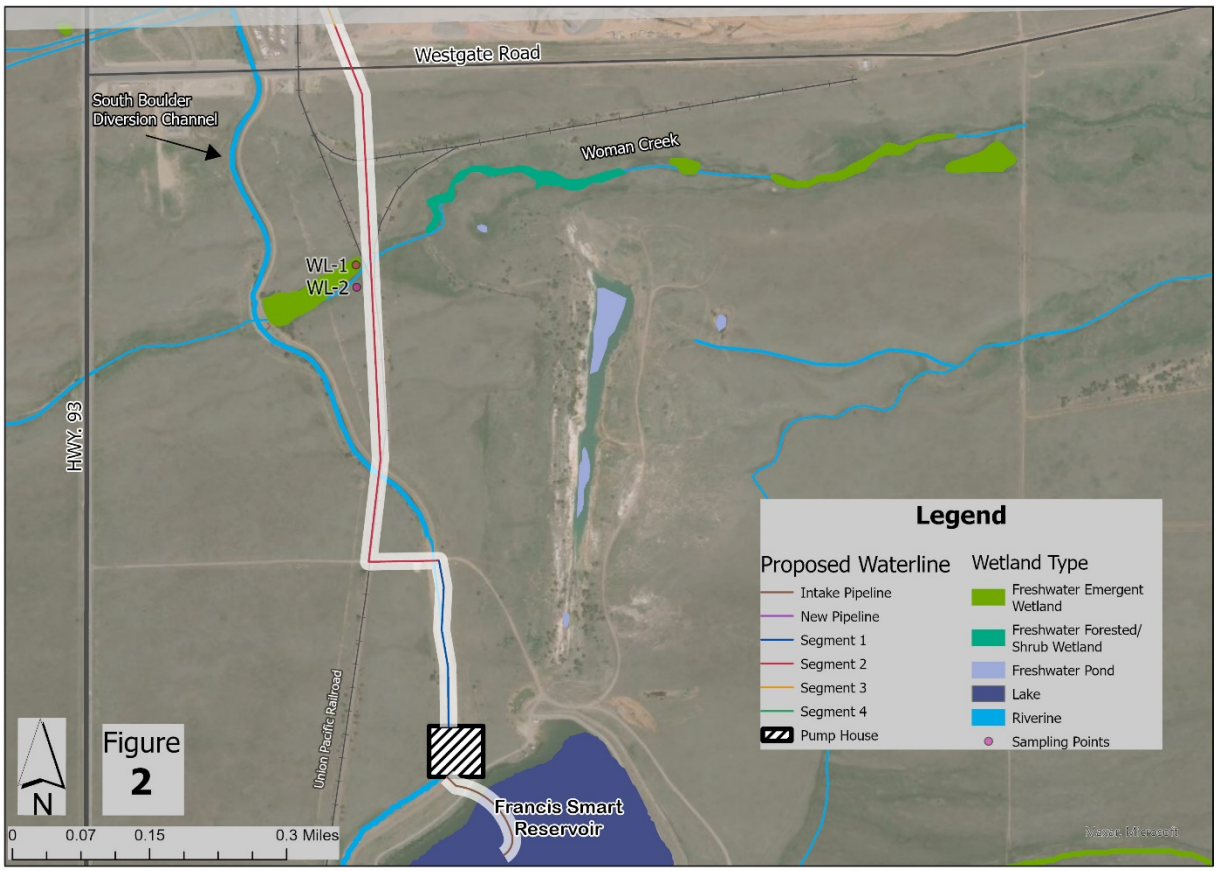
The following figure appear in this order in the pages that follow:

- Overall Map showing segments
- Segments 1 & 2
- Segment 3
- Segment 4
- Flatirons Campus New Pipeline v1. (Segment FC)

Flatirons Campus Proposed Waterline Project



Flatirons Campus Proposed Waterline - Segments 1 & 2



Flatirons Campus Proposed Waterline – Segment 3

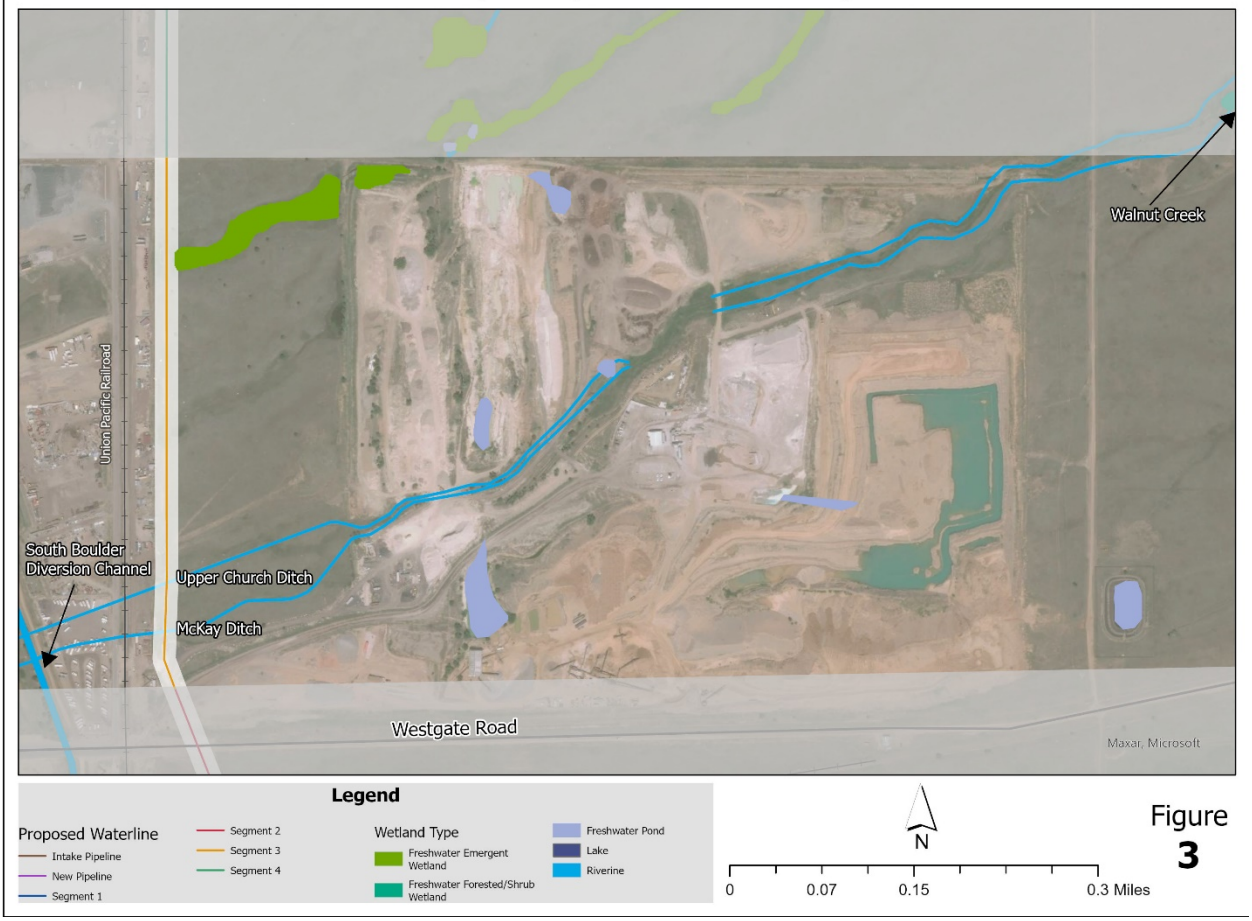


Figure **3**

Flatirons Campus Proposed Waterline – Segment 4

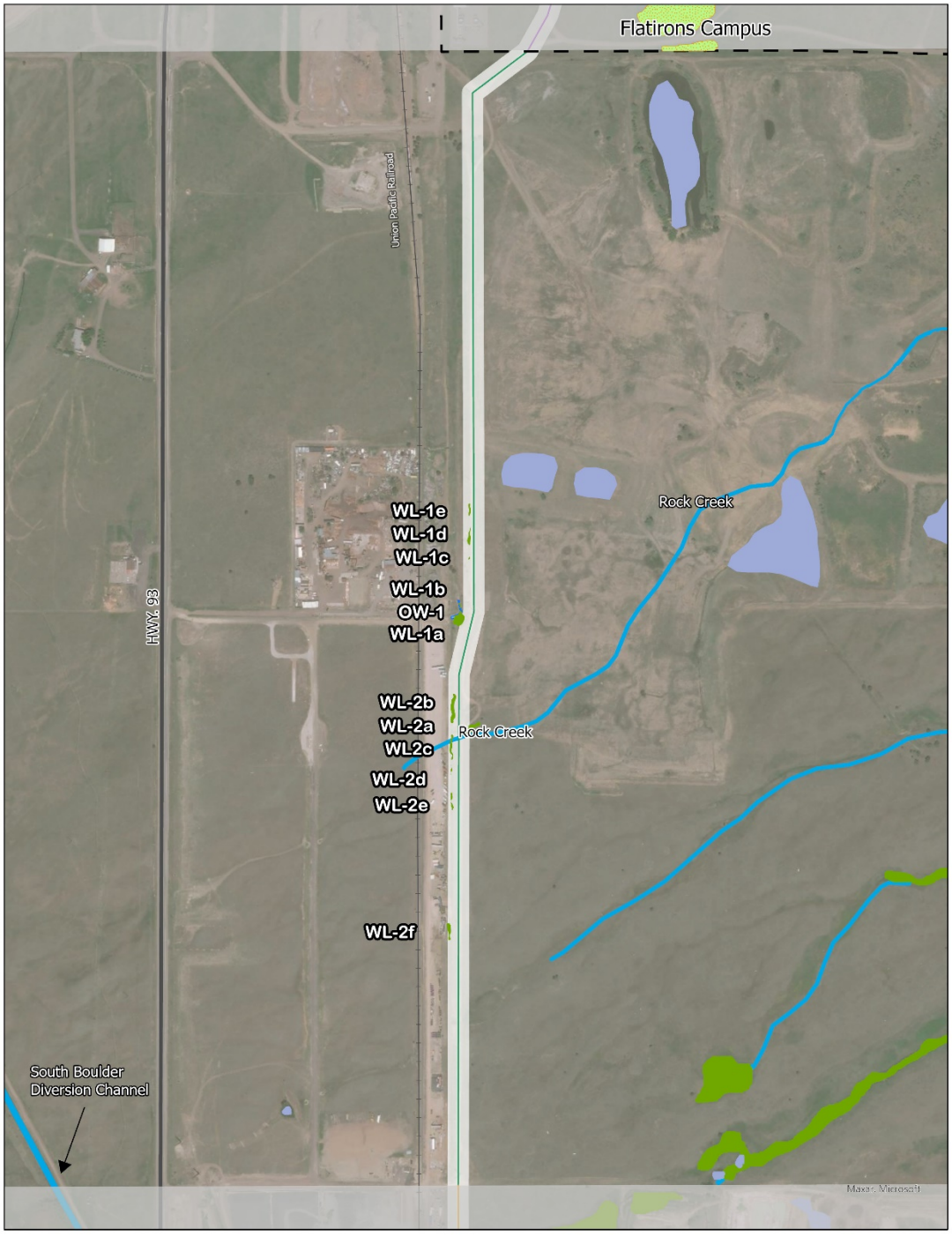
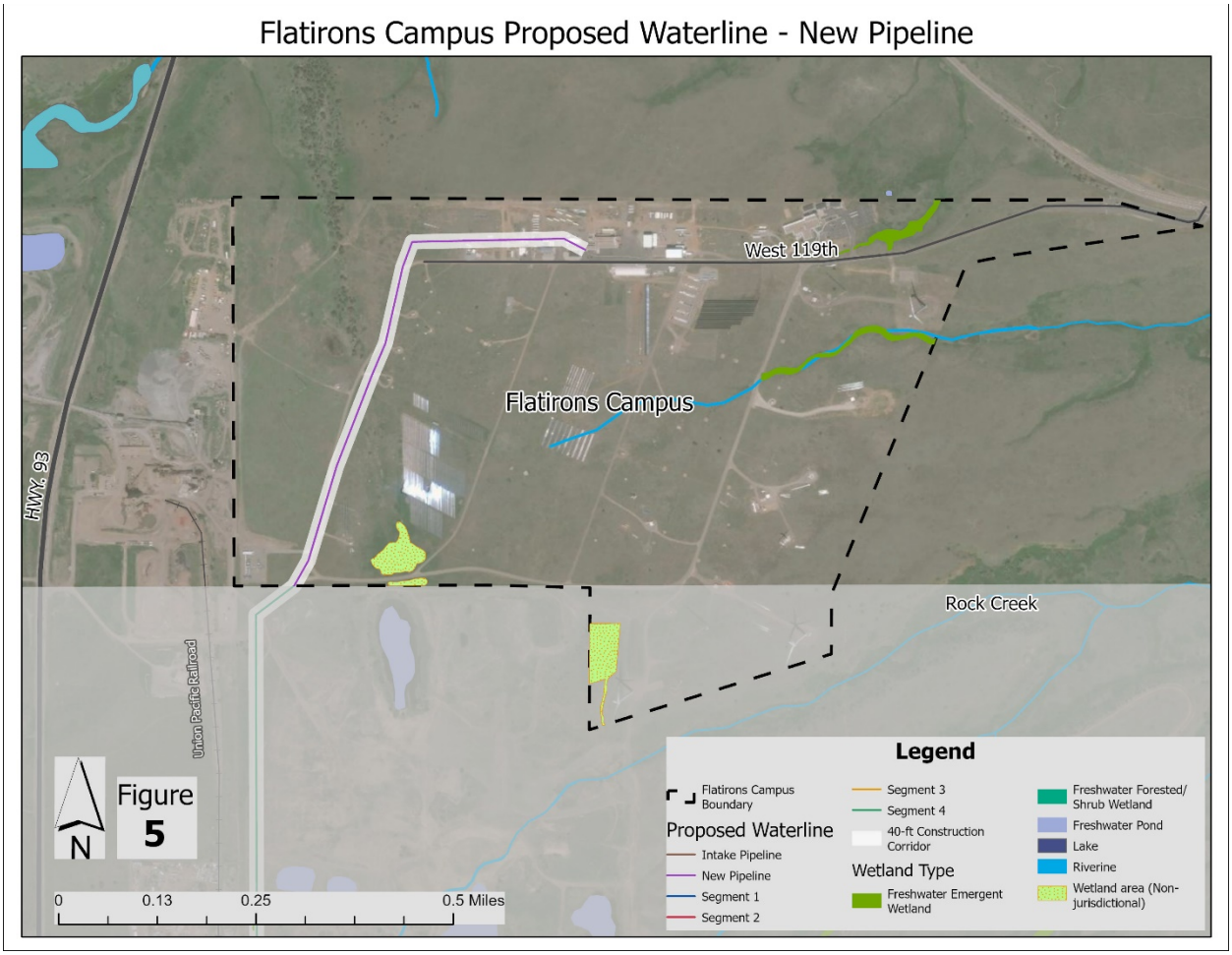


Figure **4**


Flatirons Campus Proposed Waterline - New Pipeline
West 119th
Flatirons Campus
HWY. 93
Rock Creek
Union Pacific Railroad
N
Figure
5
0
0.13
0.25
0.5 Miles
Legend
Flatirons Campus Boundary
Proposed Waterline
Intake Pipeline
New Pipeline
Segment 1
Segment 2
Segment 3
Segment 4
40-ft Construction Corridor
Wetland Type
Freshwater Emergent Wetland
Freshwater Forested/ Shrub Wetland
Freshwater Pond
Lake
Riverine
Wetland area (Non-jurisdictional)

APPENDIX B

COMMENT DOCUMENTS RECEIVED ON THE DRAFT ENVIRONMENTAL ASSESSMENT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
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http://www.epa.gov/region08

April 1, 2022

Ref: 8ORA-N

Nicole Serio
U.S. Department of Energy
Golden Field Office
15013 Denver West Parkway
Golden, CO 80401
Transmitted by email to FCwatersystem@hq.doe.gov

Dear Ms. Serio:

The U.S. Environmental Protection Agency Region 8 has reviewed the U.S. Department of Energy's (DOE) draft environmental assessment (EA) for the Flatirons Campus (FC) Water System Project. In accordance with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA), we are providing comments on the EA. These comments convey questions and concerns the EPA recommends addressing in the Final EA.

Impacts to Waters of the U.S.

The Draft EA (p. 36 and Appendix A) states that two ditches, Church Ditch and McKay Ditch, which would be crossed by the proposed pipeline, are not waters of the U.S. because they are manmade features. Some manmade ditches can be jurisdictional under the Clean Water Act; therefore, we recommend consulting with the Corps to confirm the jurisdictional status of all water-containing features that would be crossed by the pipeline. We also note that Table 2-3, which lists the permits that will be required for the project, does not include a Clean Water Act Section 404 permit. Coverage under Section 404 would be provided by Nationwide Permit 58 (*Utility Line Activities for Water and Other Substances*) and so the conditions of this permit will be needed to be followed for any crossings of waters of the U.S., including wetlands, by the pipeline. Pre-construction notification to the Corps is also required if for any reason more than 1/10 acre of jurisdictional waters would be lost by a crossing. A jurisdictional determination from the Corps would confirm any impact assumptions.

As described in the Draft EA (p. 36 and Appendix A), the upper portion of pipeline Segment 3 would cross a culvert that provides hydrology to a palustrine emergent (PEM) wetland system located to the east of the pipeline corridor that appears to be associated with Rock Creek. Since the culvert areas themselves contain no wetlands and are not believed to be waters of the U.S., there is no analysis of impacts. However, it is not clear how the culvert would be crossed and if there could be impacts associated with it. For example, if the culvert needs to be removed to install the pipeline (vs. drilling the pipeline underneath the culvert), that could likely have impacts on the PEM wetlands. Therefore, we recommend explaining how the culvert will be crossed and evaluating any impacts that could occur to

the wetlands fed by the culvert.

The Draft EA (p. 40) states that the primary impact to wetlands along Segment 4 of the proposed pipeline would be the alteration of wetland type and impacts on water quality due to sediment loading and potential spills. We recommend explaining how the pipeline crossing could alter the wetland type, the likelihood of this happening in the area to be crossed, and the impacts of such an alteration to wetland functions and values. We also note that on page 8, the Draft EA states that wetlands that may be disturbed by the pipeline are in Segment 3; however, Section 3.5 and Appendix A of the Draft EA indicate these wetlands are in Segment 4. We recommend correcting this in the Final EA.

Pipeline Testing and Treatment Procedures

We recommend including in the Final EA information on pipeline testing and treatment procedures and potential discharges from these tests and/or treatments. If hydrostatic pressure testing of the pipeline will occur, we recommend discussing where the spent water will be disposed of and any water quality concerns with such water. If water quality is a concern, we recommend specifying a testing regimen for spent waters before their disposal. If waters of the U.S. may be impacted, project specifications should include mitigation measures to ensure that contaminants do not enter these waters. Where these discharges potentially could flow into waters of the U.S., or infiltrate to shallow aquifers, the EA should evaluate whether on-site containment and removal for treatment may be needed to protect these waters, or whether a National Pollutant Discharge Elimination System (NPDES) permit is needed. If a NPDES permit is needed, an application must be submitted to the permitting authority (EPA is the NPDES permitting authority for Federal facilities in Colorado) at least 180 days before the expected commencement of the discharge.

Shock chlorinating a new drinking water pipeline is standard practice to remove bacterial contamination prior to putting new distribution lines into use. We recommend that the EA provide information on the procedures that will be utilized to test the distribution lines and prepare them for use. Water utilized to shock chlorinate the system must not be discharged to a water of the U.S., or to an upland area that may have connections to a water of the U.S. If the water utilized for shock chlorination will be neutralized and discharged to a water of the U.S., a NPDES permit may be required and should be discussed in the EA. A description of water disposal practices, chlorine neutralization, and testing procedures to ensure compliance with water quality standards is recommended.

Drinking Water System

We recommend discussing how wastewater from the drinking water system, such as filter backwash water, will be managed. If a filter backwash water settling pond or lagoon will be necessary, we recommend discussing in the Final EA where it will be placed, whether it will discharge, and any groundwater contamination concerns. We also recommend including a discussion on the disposal of residual solids.

Wastewater Treatment System

We recommend disclosing whether anything other than human waste will be discharged to the proposed septic tank and leach field. We note that Table 2-3 lists the Colorado Department of Health and Environment (CDPHE) as the permitting agency for the proposed leach field; however, CDPHE does not have Clean Water Act permitting authority for federal facilities in Colorado. As discussed in the

Draft EA (pp. 42 and 77), the Jefferson County Public Health Department does have a permitting process for such systems. Septic systems are also regulated federally as a Class V Underground Injection Control wells if the system receives any industrial or commercial wastewater or if it receives solely sanitary waste from a non-residential establishment with the capacity to serve 20 or more persons per day (also known as large-capacity septic systems).[1] Therefore, we recommend discussing the applicability of federal requirements for Class V wells. A Class V Inventory Form[2] will need to be submitted to EPA Region 8's Class V point of contact, who will verify the inventory information to determine if a UIC Permit is required, or an authorization by rule.

Project Area Soils and Geology

The Draft EA (p. 29) states that soil samples on the FC were collected in 1994 and that the analytical results for the majority of these samples were below detection limits, and therefore, below regulatory thresholds for all analyzed chemicals and radionuclides. We recommend also disclosing the results for the remaining minority of samples and whether there were any results of concern.

Based on such soil samples as well as modeling of the potential effects of wind erosion of soils with residual radionuclide contamination from the Rocky Flats Plant, the Draft EA (p. 29) concludes that wind erosion of soils or construction disturbances at the FC would not result in movement of contaminated soil. We recommend clarifying if the same conclusion can be made about soil disturbance along the proposed water pipeline route, and if so, the basis for that conclusion.

The Draft EA (pp. 30-31) states that building codes applicable for the area would ensure avoidance or mitigation of any hazards associated with high shrink-swell capacity soils that may be encountered. Since the Draft EA earlier detailed concerns with dipping bedrock and expansions thereof, it is not clear if this is also referring to Jefferson County's guidance for construction in the dipping bedrock area. Therefore, we recommend clarifying it this guidance will also be followed.

Closing

Thank you for the opportunity to participate in the NEPA process for the Flatirons Campus Water System Project. If you have any questions about our comments, please contact me at (303) 312-6074 or by email at strobel.philip@epa.gov. You may also contact Melissa McCoy, lead reviewer for this project, at (303) 312-6155 or mccoy.melissa@epa.gov.

Sincerely,

Philip S. Strobel
Chief, NEPA Branch
Office of the Regional Administrator

[1] *See* https://www.epa.gov/uic/large-capacity-septic-systems

[2] This form can be found at: https://www.epa.gov/sites/default/files/2017-03/documents/class_v_inventory_form.pdf

From: Klosterman, Megan E <megan_klosterman@fws.gov>
Sent: Tuesday, March 22, 2022 1:44 PM
To: Serio, Nicole <nicole.serio@ee.doe.gov>
Subject: Re: [EXTERNAL] FW: Draft EA - Please review by April 1, 2022

Hi Nicole,

We have reviewed the EA and it looks good, overall. The only question that we had was whether we feel that using straw for restoration planting would work properly or if it would blow away. It does seem that wind may be a more substantial issue out there for this type of work.

Thank you for providing us the opportunity to review the document. It was a very well thought out analysis. Have a great week!

Megan E. Klosterman | Deputy Project Leader/Deputy Refuge Manager
USFWS · Colorado Front Range National Wildlife Refuge Complex
☎ (303) 729-2262 | ✉ Megan_Klosterman@fws.gov (she/her)
*☎ (cell) (701) 495-2389

From:	Serio, Nicole
To:	Rose, James Jeffrey; Deborah Schneider
Cc:	Jorgensen, Lisa; Ryon, Tom (NREL); Schlomberg, Kurt (NREL); Abe Zeitoun; Itani, Maher; Buenaflor, Delight Misena; Rivers, Joseph William
Subject:	FW: [EXTERNAL] FW: Draft EA - Please review by April 1, 2022
Date:	Thursday, April 7, 2022 3:41:30 PM
Attachments:	image002.png image003.png

Hi Team,

Please see the below comments we received from FWS.

For the endangered species comment: As I understand it, it was brought to David Lucas' attention yesterday that the Ute ladies'-tresses orchid (threatened species) was observed in the area, but at this time the exact location is not known and the observation has not been confirmed. The Refuge is looking into this report and will keep us updated as they learn more. We can discuss on Wednesday.

Thank you,
Nicole

Nicole Serio, Ph.D.
Environmental Specialist
Work | (720) 356-1333
Nicole.Serio@ee.doe.gov

From: Klosterman, Megan E <megan_klosterman@fws.gov>
Sent: Thursday, April 7, 2022 1:22 PM
To: Serio, Nicole <nicole.serio@ee.doe.gov>
Cc: Lucas, David C <david_c_lucas@fws.gov>
Subject: Re: [EXTERNAL] FW: Draft EA - Please review by April 1, 2022

Hi Nicole,

We had some follow up comments on the EA. I apologize for not mentioning these sooner.

- Figure 3.2-3: The designations seem to be overly generalized and the scale appears to be off. Can we get a more specific map of the land use designations and double-check the scale of the map to make sure that it is correct?
- David sent some updates pertaining to endangered species. We will keep you updated.

Thank you so much!

Megan E. Klosterman | Deputy Project Leader/Deputy Refuge Manager
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