



Land Use

Courthouse Annex • 2045 13th Street • Boulder, Colorado 80302 • Tel: 303.441.3930 • Fax: 303.441.4856
Mailing Address: P.O. Box 471 • Boulder, Colorado 80306 • www.bouldercounty.org

MEMO TO: Agencies and adjacent property owners
FROM: Hannah Hippely, AICP, Planner II
DATE: April 15, 2011
RE: **Docket SI-11-0001**

Docket SI-11-0001: SOUTHERN WATER SUPPLY PIPELINE II

Request: Areas and Activities of State Interest (1041) for the construction of a water pipeline which would deliver Windy Gap and Colorado-Big Thompson water from Carter Lake to the project participants which include the City of Boulder, Left Hand Water District, Longs Peak Water District, and the Town of Frederick. The project consists of a north-south pipeline which will serve the City of Boulder and Left Hand Water District and an east-west pipeline that will branch from the north-south alignment to serve the Longs Peak Water District and the Town of Frederick.

Location: Northeastern Boulder County, the proposed pipeline enters the County at the north approximately 1.0 mile west of N 83rd St. and runs south past the City of Longmont to Boulder Reservoir; the eastern branch of the pipeline is proposed along Vermillion Road beginning approximately 0.5 mile west of N 87th St running east to County Line Road, in Sections 1,12,13,25,36, of Range 3N, Township 70W, and Sections 1,12,13,24,23,26,34,35 of Range 2N, Township 70W, and Section 3 of Range 1N, Township 70W, Sections 7,13,14,15,16,17,18,19, 20, 21, 22, 23, 24, 30, 31 of Range 3N, Township 69W, and Section 6 of Range 2N, Township 69W.

Zoning: Estate Residential (ER), Rural Residential (RR) and Agricultural (A) Zoning Districts
Applicant: Carl Brouwer, Northern Colorado Water Conservancy District
Agents: Rosi Dennett, Strategic Planning, Inc.
John Ko, AECOM

This process includes public hearings before the Boulder County Planning Commission and the Board of County Commissioners. Adjacent property owners and holders of liens, mortgages, easements or other rights in the subject property are notified of these hearings.

The Land Use staff, Planning Commission, and County Commissioners value comments from individuals and referral agencies. Please check the appropriate response below or send a letter. Late responses will be reviewed as the process permits; all comments will be made part of the public record and given to the applicant. Only a portion of the submitted documents may have been enclosed; you are welcome to review the entire file at the Land Use Department, 13th and Spruce, Boulder, and on-line at <http://www.bouldercounty.org/live/property/pages/dockets.aspx>. If you have any questions regarding this application, please contact the Land Use Department office at (303) 441-3930 or via email at hhippely@bouldercounty.org.

Please return responses to the above address by **April 29, 2011.**

We have reviewed the proposal and have no conflicts.
 Letter is enclosed.

Signed _____ PRINTED Name _____
Agency or Address _____

Southern Water Supply Project II

Boulder County

1041 Application



Prepared for:
Northern Colorado Water Conservancy District,
Acting by and through the
Southern Water Supply Project Water Activity Enterprise

In Partnership with:
City of Boulder
Left Hand Water District
Longs Peak Water District
Town of Frederick

Submitted to:
Boulder County
2045 13th Street
Boulder, CO 80302

Prepared by:

AECOM

240 East Mountain Avenue
Fort Collins, CO 80524

March 18, 2011

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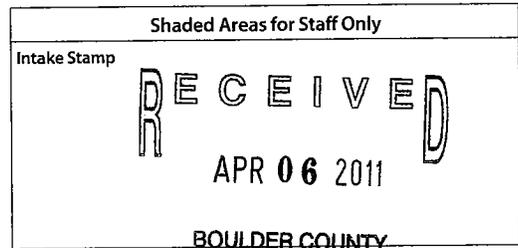
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Boulder County Land Use Department

Courthouse Annex Building
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 Email: planner@bouldercounty.org •
 http://www.BoulderCounty.org/lu/
 Office Hours: Monday — Friday 8:00 AM to 4:30 PM



Application Form

Project Number		Project Name	
* No Application Deadline		* Application Deadline: First Wednesday of the Month	
<input type="checkbox"/> Limited Impact Special Use <input type="checkbox"/> Limited Impact Special Use Waiver <input type="checkbox"/> Site Plan Review <input type="checkbox"/> Site Plan Review Waiver <input type="checkbox"/> Subdivision Exemption <input type="checkbox"/> Exemption Plat <input checked="" type="checkbox"/> 1041 State Interest Review <input type="checkbox"/> Other: _____		<input type="checkbox"/> Variance <input type="checkbox"/> Appeal <input type="checkbox"/> Sketch Plan <input type="checkbox"/> Preliminary Plan <input type="checkbox"/> Final Plat <input type="checkbox"/> Resubdivision (Replat) <input type="checkbox"/> Special Use/SSDP <input type="checkbox"/> Rezoning <input type="checkbox"/> Road/Easement Vacation <input type="checkbox"/> Location and Extent <input type="checkbox"/> Road Name Change	
Location(s)/Street Address(es) Southern Water Supply Project II - Pipeline from Carter Lake in Larimer County to Boulder Reservoir.			
Subdivision Name			
Lot(s)	Block(s)	Section(s)	Township(s)
Area in Acres	Existing Zoning	Existing Use of Property	Number of Proposed Lots
Proposed Water Supply		Proposed Sewage Disposal Method	

Applicants:

Applicant/Property Owner Southern Water Supply Enterprise			Email Address cbrouwer@ncwcd.org	
Mailing Address Carl Brouwer, North.Colo.Water Cons.Dist., 220 Water Avenue				
City Berthoud	State CO	Zip Code 80513	Phone 970-622-2298	Fax 970-532-0942
Applicant/Property Owner/Agent/Consultant Rosi Dennett, Strategic Planning, Inc.			Email Address rosiplanning@yahoo.com	
Mailing Address 3665 Smuggler Place				
City Boulder	State CO	Zip Code 80305	Phone 303-499-0619	Fax
Agent/Consultant John Ko, AECOM			Email Address john.ko@aecom.com	
Mailing Address 240 East Mountain Avenue				
City Fort Collins	State CO	Zip Code 80524	Phone 970-484-6073	Fax 970-484-8518

Certification: (Please refer to the Regulations and Application Submittal Package for complete application requirements.)

I certify that I am signing this Application Form as an owner of record of the property included in the Application. I certify that the information and exhibits I have submitted are true and correct to the best of my knowledge. I understand that all materials required by Boulder County must be submitted prior to having this matter processed. I understand that public hearings or meetings may be required. I understand that I must sign an Agreement of Payment for Application processing fees and that additional fees or materials may be required as a result of considerations which may arise in the processing of this docket. I understand that the road, school, and park dedications may be required as a condition of approval.

I understand that I am consenting to allow the County Staff involved in this application or their designees to enter onto and inspect the subject property at any reasonable time, without obtaining any prior consent.

All landowners are required to sign application. If additional space is needed attach additional sheet signed and dated.

Signature of Property Owner <i>Carl Brouwer</i>	Date 2-23-11	Signature of Property Owner	Date
Other Signature	Date	Other Signature	Date

* Only if the Land Use Director waives the landowner signature requirement for good cause shown under the applicable provisions of the Land Use Code.

Introduction

This document provides documentation for the Boulder County 1041 review for the Southern Water Supply Project (SWSP II) proposed by the Northern Colorado Water Conservancy District (Northern Water), acting by and through the Southern Water Supply Project Water Activity Enterprise. SWSP II is a planned water transmission pipeline, beginning at Carter Lake in Larimer County and extending south into Boulder County, with a terminus near Boulder Reservoir. The northern portion of the pipeline within Boulder County will parallel the original SWSP pipeline (constructed in 1995). From a point near Vance Brand Municipal Airport in Longmont, the proposed pipeline route diverges from the alignment of SWSP and follows a new alignment requiring the acquisition of new permanent and temporary construction easements. Beginning with a 60-inch pipe in the first leg paralleling West CR 8E in Larimer County, the pipeline transitions to a 45-inch diameter pipe at the first southern turn and progressively decreases in diameter at each turnout. Due to the heavy congestion of utilities paralleling West CR 8E, it was decided to install a larger 60-inch line through this segment to minimize the need to install an additional line if a future project required it. However, most of the pipeline alignment from this point south through Boulder County would be 45 inches in diameter or less and will serve Left Hand Water District (LHWD) and the City of Boulder.

Another element of the project known as the “eastern turnout” is a segment extending east from the main SWSP II pipeline, from a point approximately 0.5 mile west of the intersection of 87th Street and Vermillion Road, to the Weld County line. This pipeline, which will serve the Longs Peak Water District (LPWD), and Town of Frederick, has a diameter of 24-26 inches, and will be located within and adjacent to the easement of the existing SWSP pipeline that serves the City of Fort Lupton, Town of Hudson, City of Fort Morgan and Morgan County Quality Water District.

This submittal begins with a description of the proposed project and continues with a discussion of the relevant provisions of the Boulder County, Article 8, Location & Extent Areas & Activities of State Interest (1041). Portions of this project that fall within Larimer and Weld counties are not covered by 1041 requirements and are therefore not discussed in great detail. Although some detailed information, such as typical cross-section illustrations, is provided in this document, it is only intended to indicate one of several possible solutions. A detailed project design will be performed in subsequent phases of the project process.

III. Submittal Requirements

A. Overview of the Proposed SWSP II Project

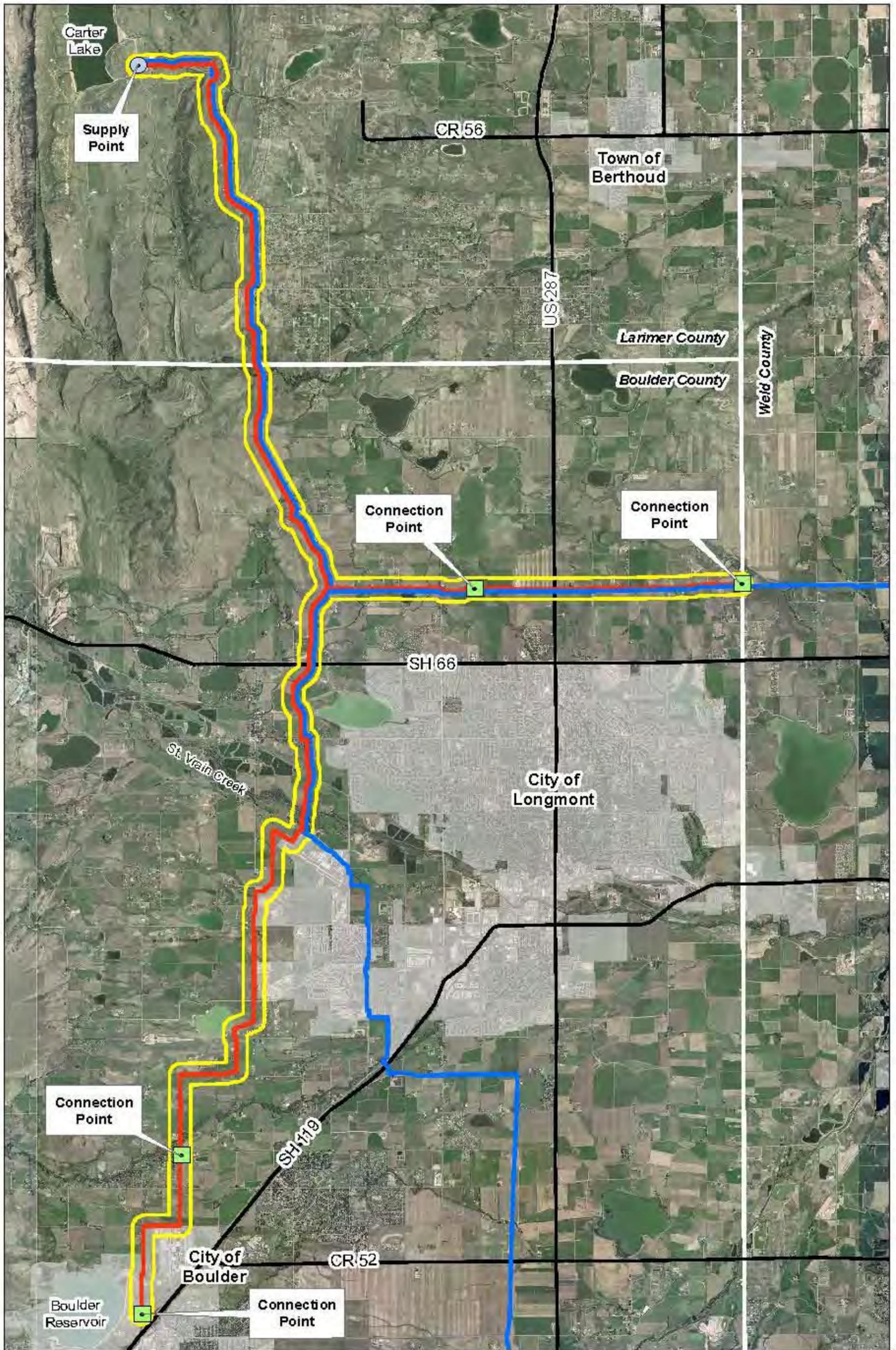
The SWSP II project will deliver Windy Gap and Colorado-Big Thompson (C-BT) Project water from the existing diversion structure on the St. Vrain Supply Canal near Carter Lake, to delivery locations that include the City of Boulder's Boulder Reservoir Water Treatment Plant (WTP) and Left Hand Water District Dodd Treatment Plant (LHWD Dodd WTP). Water will be delivered to the LPWD at its Kugel Treatment Plant on Vermillion Road. Future extensions of the eastern turnout into Weld County are expected to deliver water to a future planned delivery point for the Town of Fredrick. The project will provide improved water quality and greater reliability to the participants served in addition to meeting capacity needs of the participating water providers.

The SWSP II alignment will parallel the existing SWSP easement (further described in Section B) for the northern portion of the project, extending from Carter Lake through Larimer County to where the alignments diverge at St. Vrain Road near the Longmont Vance Brand Municipal Airport (Map 1). In 2006, Integra Engineering studied the initial feasibility of potential alternative routes for the second SWSP pipeline. The route evaluation considered 55 route alternatives and concluded that an alignment parallel to the existing pipeline, North of St. Vrain Road, is the best option. Benefits of a parallel alignment include limited new, permanent easement acquisition, limited environmental and land use impacts, limited constructability issues, and potentially lower project costs.

A more focused siting study was performed in 2010 by AECOM, which identified and evaluated four alternatives in greater detail through the City of Longmont. The four alternatives evaluated in the 2010 siting study included a route following the existing SWSP easement to the east; a route following 63rd Street to the west; a route along N. 75th Street; and a route along N. 73rd Street.

Another element of the project is the eastern turnout extending east from the main SWSP pipeline, from a point 0.5 mile west of the intersection of 87th Street and Vermillion Road. The 24-26 inch diameter pipeline will deliver water to the LPWD Treatment Plant on Vermillion Road and provide a future connection to the Town of Frederick in Weld County. The eastern turnout will utilize the existing SWSP pipeline easement that extends into Weld County.

Following a review by Larimer and Boulder counties, Northern Water will begin easement acquisitions and final design activities. The final design process will take into account property-specific factors that result from a detailed corridor survey and coordination with individual property owners. During the design process, specific utility locations will be identified to finalize the pipeline's location. Northern Water will continue to work with County departments and other service providers to avoid conflicts with existing and future utilities, including buried irrigation and tile drains.



Map Number & Title:	Project Title & Applicant	Consultant	Engineer	Preparation Date: 1/20/11	
Map 1 Overall Selected Alignment	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 632-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	

Construction of the project will likely begin between 2014 and 2015. The typical pace for constructing the pipeline will most likely range between 200 to 400 feet per day, depending on the specific complexity of the alignment corridor. Tunneling and reduced easements would slow that rate of construction. Limited short-term road closures may be necessary and typically do not last more than a few days. A traffic control plan will be developed to provide an alternative traffic route.

All lands will be returned to pre-existing conditions that are consistent with a restoration plan prepared prior to construction, consistent with Boulder County requirements, and approved by each property owner. Full restoration of the surface, including fencing, drain tiles, irrigation systems, landscaping, private roads and other improvements will take additional time, but will be completed as soon as seasonal requirements allow. Irrigation grades will be restored and adjusted if settling occurs, post construction. Once the pipeline is buried and the ground surface is restored, the pipeline will be unnoticeable. Northern Water's easement agreements allow approved landscaping, crops, driveways, and parking lots to be placed over the pipeline. The placement of trees and permanent building and structures will not be allowed within the permanent easement. The previous SWSP provides a good demonstration of how little impact to the land and natural resources this project will have when proper construction zone restoration and revegetation techniques are employed (Photographs 1 through 3). In most areas, the SWSP construction disturbance is difficult to locate.



Photograph 1. Example of pre-construction conditions of the original SWSP, near Woodland Road.



Photograph 2. Example of construction of the original SWSP in 1995, near Woodland Road.



Photograph 3. Example of post-construction restoration of the original SWSP, near Woodland Road. No trees were removed during the original SWSP construction. Windrow of trees were removed in 2003 during the construction of a local irrigation ditch.

B. Project Background

In 1995, the original SWSP pipeline (Carter Lake to Broomfield Pipeline) was constructed from the St. Vrain Supply Canal diversion structure at Carter Lake south to its terminus at the City of Broomfield's then new water treatment plant and storage reservoir located northeast of the intersection of Sheridan Boulevard and 144th Avenue, a length of approximately 33.5 miles. The original project was collaboration between 12 project participants and Northern Water to convey Windy Gap and C-BT Project water from Carter Lake to each participant's delivery point. Since construction of the original pipeline, Northern Water has constructed two booster pumping stations along the existing pipeline to increase flow rates in order to meet additional water demands of the original project participants. The capacity of the original pipeline is now fully utilized.

In 1998, the eastern phase of SWSP was constructed from a point 0.5 mile west of the Intersection of North 87th Street and Vermillion Road, east to a treatment plant in Weld County located northeast of the City of Fort Lupton, a length of approximately 29 miles. The eastern phase was constructed to serve the City of Fort Lupton, Town of Hudson, City of Fort Morgan and Morgan County Quality Water District.

Due to interest from water provider participants (consisting of new participants) to improve water quality, provide a year-round water supply, and meet new demands, Northern Water has proposed to construct SWSP II.

C. Applicant and Consultants

Project Applicant

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Randy Parks, Project Manager

D. Purpose and Need for the Proposed Project

SWSP II is a collaborative project between five water providers (participants) and Northern Water to provide a mechanism to convey Windy Gap and C-BT Project water from Carter Lake to each of the individual participants. Each of the five project participants is located in the northern Colorado Front Range within Northern Water and Municipal Subdistrict boundaries.

There are two principal objectives that would be accomplished by the project. First, the existing open canal delivery systems serving the City of Boulder and Left Hand Water District (the primary project participants), as well as other participants, have had a number of water quality problems that have not been specifically identified or resolved. There have been a number of isolated spikes in fecal coliform bacterial contamination measurements in the Boulder Feeder Canal; however, a point source could not be located. Drinking water standards are becoming more stringent and the open canal delivery system is susceptible to tampering along the 23 miles of open canal starting at Carter Lake, with numerous publicly accessible road crossings. Transmission of water using a piped system would improve water quality and eliminate the potential risk of water quality degradation during delivery.

After September 11, 2001, the U.S. government recognized vulnerability in the country's drinking water supplies and developed the Bioterrorism Act (BTA) to help keep the nation's water supply safe. Prior to September 11, the Safe Drinking Water Act (SDWA) made sure that all tap water was free of contaminants and safe to drink. Title IV of the Bioterrorism Act of 2002 adds several provisions to the SDWA; these are known as the Drinking Water Security and Safety Amendments. One of these provisions states that any Community Water System (CWS) that serves more than 3,300 people must complete a one-time assessment of its vulnerability to attack by June 2004. These assessments are held by the EPA administrator to safeguard the information. The second provision requires the EPA administrator to focus on prevention, detection and response. An enclosed pipe would leave only one potential contamination source at the inlet at Carter Lake, which is managed by the U.S. Bureau of Reclamation (BOR). BOR has its own security plan to reduce the risk of intentional contamination threats. In addition, it would be more difficult to contaminate the intake at Carter Lake due to the large volume dilution factor.

Secondly, SWSP II would offer the ability to deliver year-round water supplies from Windy Gap and C-BT Project facilities. Presently, participants can only receive water deliveries between April 1 and October 31 through the St. Vrain Supply Canal and the Boulder Feeder Canal. The open canal systems are unable to deliver water during the winter months due to icing and associated consequences.

In addition, SWSP II would maintain the current water supply needs as well as accommodate a small increment of planned future water supply needs. SWSP II will tie into water treatment plants in the future and is intended for municipal use (residential and commercial) only. The St. Vrain Supply Canal and Boulder Feeder Canal would continue to serve agricultural needs. There are no plans to increase SWSP II capacity beyond 45 cfs due to engineered design limitations of the pipeline. Table 1 lists the needed pipeline capacity for each participant, with a summary of their purpose and need.

Table 1. Project participants and required demand

Participants	Capacity (cubic feet per second)	Purpose and Need
City of Boulder	25	Year-round delivery, improved security and water quality
Left Hand Water District	11	Year-round delivery, improved security and water quality
Longs Peak Water District	3	Year-round delivery, improved security and water quality
Town of Frederick	6	Year-round delivery, improved security and water quality, and increased supply
Total	45	

E. Activities Requiring 1041 Permits

This project requires Boulder County approval and meets the criteria in Section 8-401 of the Boulder County, Article 8, Location & Extent Areas & Activities of State Interest as shown below.

Section 8-401 Specific Water and Sewage Treatment Activities Requiring Permits

A permit shall be required for any new major domestic water or sewage treatment system, major extension to existing major domestic water or sewage treatment system, or municipal and industrial water project, which is proposed to be located in whole or in part in the unincorporated portions of Boulder County and which meets any of the following criteria:

Extensions to water supply and wastewater systems that:

1. Use 12-inch or larger distribution or transmission lines; or
2. Are not located entirely within an approved service area.

F. Permits Required after Designation; Receipt of Application Form

Section 8-501 requires that the entire development contemplated or reasonably foreseeable for at least a five-year period be submitted to ensure that the project is not considered piecemeal. SWSP II responds to the water demands previously documented in approved master plans and Intergovernmental Agreements (IGAs). The following master plans and IGAs are applicable to the five participants and their applicable service areas. All master plans and IGAs will be provided to Boulder County as part of this submittal, if requested.

City of Boulder
Boulder Valley Comprehensive Plan, 2005

Left Hand Water District
Left Hand Water District, 2006-2007 Treated Water Master Plan, 2007

Longs Peak Water District
City of Longmont IGA, 2003
Boulder County Service Plan Amendment, 2003

Other permits and reviews required to complete this project include a Section 404 permit of the Clean Water Act from the U.S. Army Corps of Engineers, City of Boulder Community and Environmental Assessment Process (CEAP), City of Boulder Open Space Advisory Committee (OSAC), City of Boulder Wetland Permit, and a Boulder County Utility Construction Permit. The City and County of Boulder approval processes will be performed during the easement acquisition.

G. Application Fee

The application fee for this project is not applicable since the City of Boulder and Left Hand Water District are political subdivisions located within Boulder County.

H. Pre-Application Conference

A pre-application meeting was held on April 15, 2008 and included representatives from Boulder County Land Use Department, Transportation, Health, and Open Space, as well as the applicant representatives from Northern Water, and Northern Water's permitting Consultant, EDAW, Inc., a company that now operates as AECOM. A follow-up meeting between the Boulder County Land Use Department staff planner and Rosi Dennett occurred on August 27, 2010 and served as the pre-application for this revised 1041 application.

I. Description of the Project Alternatives

One of the main objectives of the original feasibility study completed in January 2006 was to determine an optimum pipeline route to deliver the required flows to each participant's delivery point. This section documents the pipeline route alternatives evaluation process, which was initiated in 2006 (Dewberry-Integra) and further refined in 2010 (AECOM). The section begins with the development of preliminary proposed route alignment segments and continues through to selection of the proposed pipeline route.

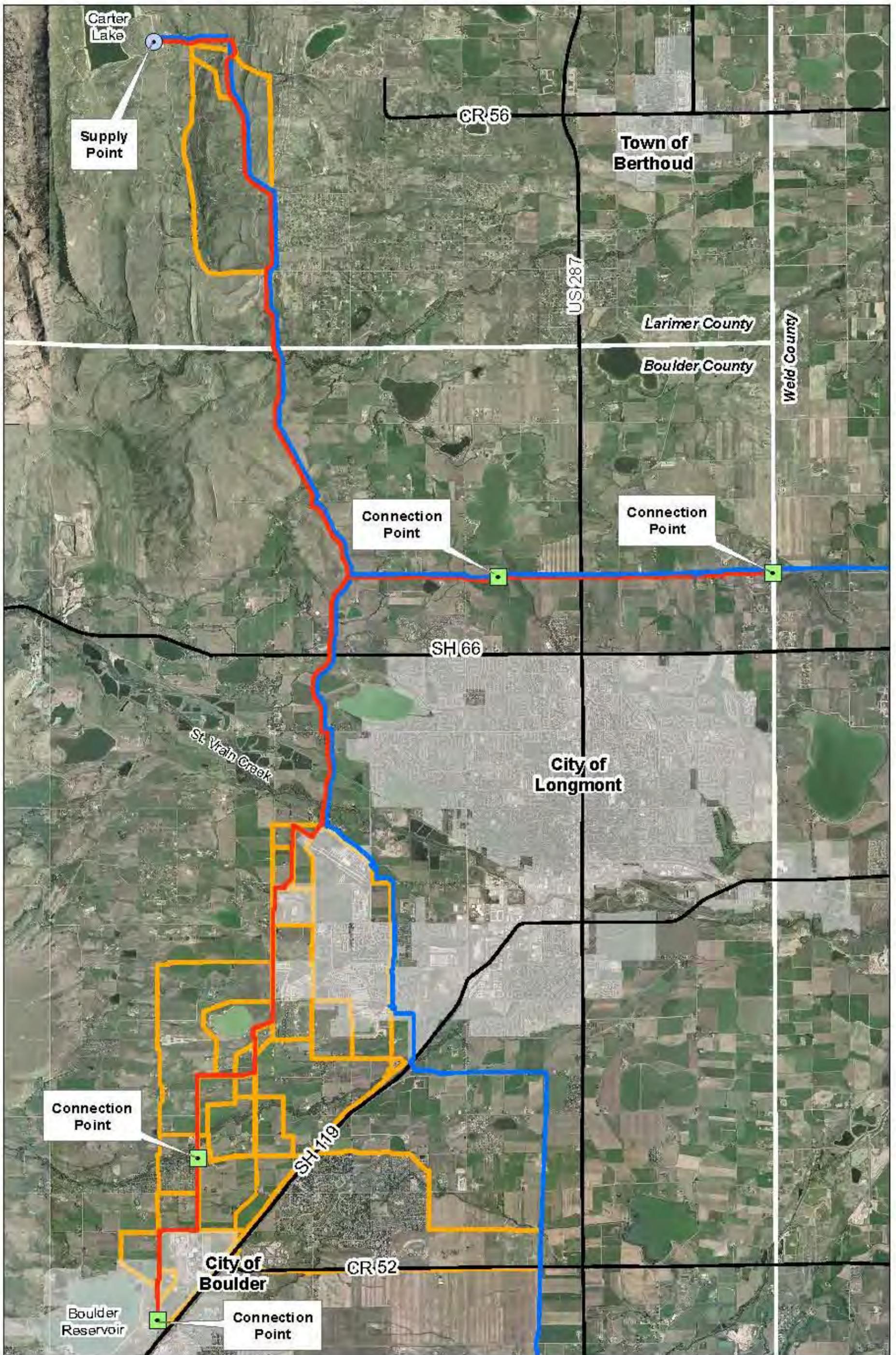
Development of Pipeline Route Alternatives

Alternatives were developed using each participant's specific delivery point, required hydraulic grade line at the delivery point, and the participant's required delivery flow rate. The selected alternative parallels the existing SWSP pipeline, which extends from the St. Vrain Supply Canal at Carter Lake south to its terminus at the City of Broomfield, for much of the route. Benefits of paralleling the existing alignment include limited new permanent easement acquisition, limited environmental and public impacts, limited constructability issues, and potential lower project costs. As a result, the existing SWSP pipeline route was considered as the primary route alternative for the majority of the new SWSP II pipeline, from Carter Lake to where it meets St. Vrain Road.

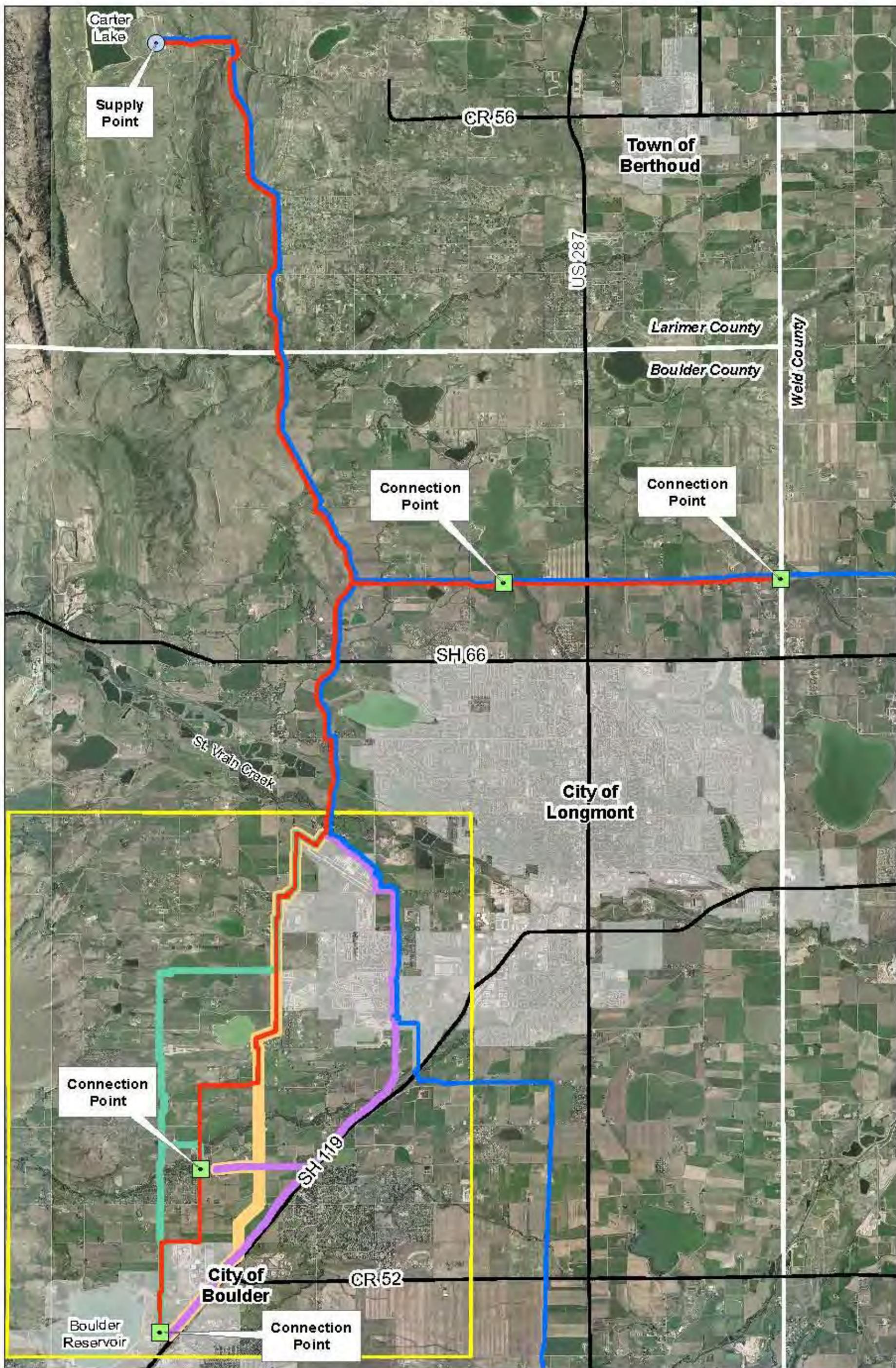
The initial network of pipeline route alternatives is shown in Map 2.

Beginning at St. Vrain Road on the north side of the Longmont Vance Brand Municipal Airport, more than 40 alternative route segments were generated to achieve water deliveries to the LHWD Dodd WTP and the City of Boulder's Boulder Reservoir WTP. Alternative routes were developed by examining existing corridors, such as roadways, railroads or railroad beds, canals, pipelines or existing utilities, and parcel boundaries. These alternatives were initially screened based upon qualitative criteria, including environmentally sensitive areas, future development, property boundaries, and existing rights-of-way (ROWs). The initial screening reduced the number of feasible route segments to approximately 35 individual segments.

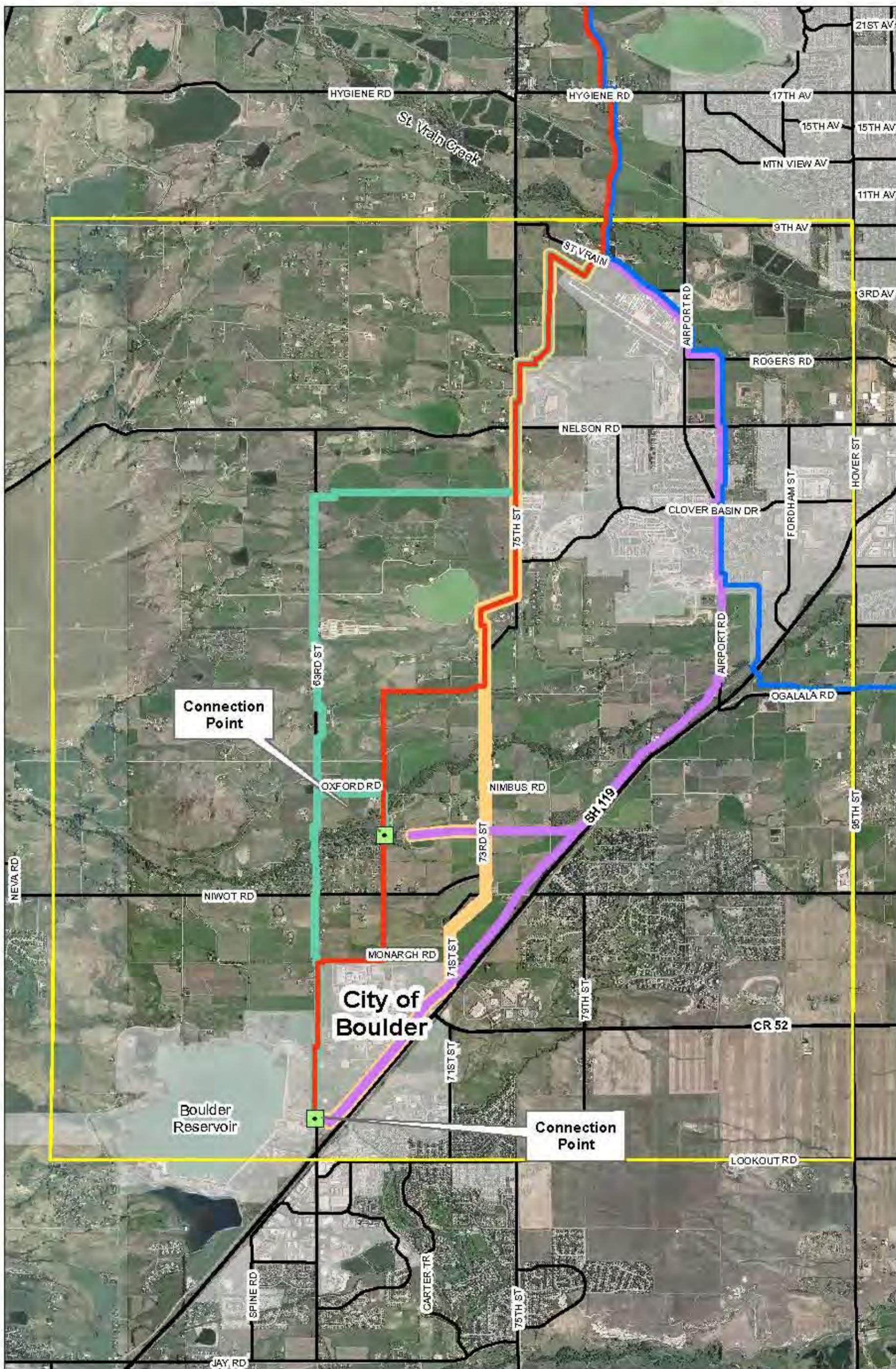
Following the 2006 alternatives evaluation, four alternative routes (Map 3) were selected to evaluate in greater detail in the area extending from St. Vrain Road to the delivery point near Boulder Reservoir. These alternatives included an eastern alternative along Airport Road and State Highway (SH) 119, a western route using N. 63rd Street, and two more direct routes using N. 73rd Street and N.75th Street.



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map 2 Overall Alternatives Considered	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map 3 Final Alternatives	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
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Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: 4 Final Alternatives	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	

Selection of Complete Pipeline Route Alternatives

A detailed quantitative analysis of the four alternatives can be reviewed in the Siting Report (AECOM 2010), which is attached as Appendix II. A summary of these results is provided below. Table 2 provides a tabulation of the occurrence of each of the evaluation criteria for each alternative, or a measurement using an appropriate metric, e.g., length, number of acres, etc.

Given the relatively similar length of each alternative (8.6-9.7 miles) and somewhat homogeneous nature of the project area, dramatic differences do not emerge in the ranking of alternatives. However, there are clear distinctions within certain evaluation categories. Based on a full analysis of these rankings and distinctions, Alternative 1 is the preferred alternative.

Alternative 1

This alternative has numerous advantages and few disadvantages, which include:

- Lower number of native trees removed, including lowest number of landscape trees
- Lowest number of parcels crossed
- Lower number of residences within 100 feet
- Lower level of disturbance to agricultural lands, including lands of national importance
- Lowest level of transportation effects
- A crossing of Left Hand Creek at a location that will minimize removal of cottonwoods and other riparian trees
- Lowest degree of conflict with existing utilities

Disadvantages of this alternative include:

- Greatest distance through open space.
- One of two alternatives with 3 raptor nests within 100 feet. This conflict will be mitigated by seasonal avoidance.

Alternative 2 (Western)

This alternative has relatively few advantages and several notable disadvantages. Advantages of this alternative include:

- Least disturbance to agricultural land of national importance

Disadvantages of this alternative include:

- Highest number of intermittent stream crossings
- Highest amount of wetland disturbance
- Two crossings of critical wildlife habitat
- Highest amount of crossing through riparian forest
- Highest amount of new easement required
- Highest overall level of disturbance to agricultural lands
- Highest level of transportation effects

Alternative 3 (Central)

This alternative falls in the mid-range for most criteria. Advantages of this alternative include:

- Lower distance through open space areas, including both areas with conservation easements and areas owned fee simple by local governments
- Least number of residences within 100 feet of the alignment
- Lowest amount of riparian vegetation disturbed

Disadvantages of this alternative include:

- Highest number of native riparian trees removed
- Some isolated construction difficulties, such as along 73rd Street at Left Hand Creek and adjacent residences
- Although mid-range in total agricultural land crossed, County staff report that these lands are some of the highest value lands in the project area

Alternative 4 (Eastern)

This alternative has several advantages as well as distinct disadvantages. Advantages of this alternative include:

- Lowest amount of wetland
- Lower amount of riparian vegetation disturbed
- Lowest amount of agricultural land disturbed

Disadvantages of this alternative include:

- Highest number of landscape trees removed
- Highest level of land use conflicts including number of residences within 100 feet, total number of parcels crossed, and number of commercial uses within 100 feet that would be disrupted by construction activities
- Highest level of transportation effects due to over 4 miles of construction adjacent to SH 119 and the highest number of crossings of major arterials and paved county roads
- Highest degree of conflict with existing utilities

Table 2. Route Evaluation Criteria

Category	Alternative 1 (Original Proposal)	Alternative 2 (Western Route)	Alternative 3 (Central Route)	Alternative 4 (Eastern/Hwy Route)
Impact Ranking				
Water Features				
Perennial Streams				
number of crossings	3	3	3	3
Intermittent Streams				
number of crossings	2	7	2	1
Vegetation				
Wetlands				
area (acres)	1.9	3.5	1.7	1.1
Significant Natural Communities (Great Plains Salt Meadow)	-	-	-	-
Trees Removed				
Native Trees (cottonwood and coyote willow and peachleaf willow)	17	21	43	23
Landscape Trees	40	81	80	286
Exotic (Russian olive, Siberian elm, etc.)	70	93	11	23
Wildlife				
Critical Wildlife Habitat (Boulder Co)				
(number of crossings)	1	2	1	-
State and Federal T & E Habitat (PCAs)				
area (acres)	-	-	-	-
Riparian Forest				
(acres)	0.7	1.3	0.5	0.3
Raptor Nests				
Number of Nests within 100 ft.	3	3	2	-
Open Space				
Open Space				
length (miles)	2.8	2.4	2.0	2.2
Conservation Easements				
length (miles)	1.2	0.4	0.7	1.3
Total Distance (miles)	4.0	2.8	2.7	3.5
Land Use				
Number of Parcels Crossed	32	44	36	60
Number of Residences within 100 ft.	13	27	9	82
Number of Commercial Buildings within 100 ft.	6	8	4	18
Total Area of new easement (ac)	75.0	79.0	69.0	43.5

Category	Alternative 1 (Original Proposal)	Alternative 2 (Western Route)	Alternative 3 (Central Route)	Alternative 4 (Eastern/Hwy Route)
Agriculture				
Significant Agricultural Lands In Cultivation (unless noted, all ag lands crossed are flood irrigated)				
<i>National (acres)</i>	14.4	7.4	17.4	19.3
<i>State (acres)</i>	15.3	36.4	12.0	9.4
<i>Local (acres)</i>	-	-	0.5	-
Overall (acres)	29.7	43.8	29.9	28.7
Transportation				
State Highway				
number of crossings	-	-	-	-
length of parallel (miles)	-	-	1.4	4.2
Major Arterials				
number of crossings	7	8	8	10
length of parallel (miles)	4.4	6.2	3.1	1.6
County Road (paved)				
number of crossings	1	4	2	7
length of parallel (miles)	-	-	0.4	0.7
County Road (unpaved)				
number of crossings	3.0	5.0	2.0	4
Utilities				
Conflict Rating (see Sec. 4)				
Constructibility	Easy	Isolated Difficulties	Isolated Difficulties	Difficult

Based on a thorough analysis of the alternatives, Alternative 1 is the least damaging. Alternative 1 has the lowest disturbance to trees, lowest level of transportation effects, and the least amount of conflict with existing utilities. It is also close to having the lowest amount of disturbance to agricultural lands. In addition, Alternative 1 has the lowest number of parcels crossed and close to the lowest number of residences within 100 feet. For other considerations such as stream crossings, wetlands, crossings of critical habitat, and riparian vegetation, Alternative 1 falls in the mid-range among the alternatives considered. Although other alternatives have an advantage on some individual evaluation criteria, none are consistently better or result in less environmental damage.

The environmental impacts associated with Alternative 1 can be mitigated to minimize both the short- and long-term effects. Impacts to riparian forest through Left Hand Creek are minimized by the Alternative 1 alignment, which routes the construction between the large trees, thereby avoiding impacts that are reflected in an overall acreage calculation. Timing of construction across the larger perennial and intermittent drainages will occur in winter to minimize impacts to active wildlife. Nearby raptor nests will be avoided during the nesting season. Open space and conservation land designations, as well as agricultural land uses, will be mitigated by fully revegetating the easement to pre-construction conditions. Construction on agricultural and irrigated lands will occur when soil conditions are dry (to the extent possible) to minimize the collapse of soil structure and increased compaction. Soil amendments and decompaction (through deep ripping) or subsoil will be used if compaction occurs. Flood irrigated fields will be restored and grade adjustments will be made if settling occurs. Any tile drains encountered will be repaired.

No alternatives were considered for the eastern segment of the project along Vermillion Road. This segment is located adjacent to the existing eastern phase of the SWSP pipeline and primarily utilizes existing SWSP permanent easements. It is anticipated that Northern Water will need to acquire an additional 20 feet of permanent easement for the SWSP II pipeline.

Selected Pipeline Route Description

The selected SWSP II pipeline begins at the existing diversion structure at the St. Vrain Supply Canal near Carter Lake and runs generally south to the Boulder County line, following the alignment of the existing SWSP pipeline. From the St. Vrain Supply Canal to the eastern turnout located west of the intersection of North 87th Street and Vermillion Road, the existing permanent easement is 90 feet in width.

After crossing the Little Thompson River at the Larimer-Boulder County line, the selected route continues nearly due south for just under 1 mile, where it intersects an existing overhead power transmission utility. From this point, the pipeline turns southeast, paralleling the overhead power line for approximately 1 mile until the pipeline intersects Woodland Road. After Woodland Road, the pipeline continues southeasterly a little over 1 mile to the existing eastern turnout, generally following the overhead power line, though not exactly parallel.

At this point, the pipeline turns southwesterly for approximately 2,000 feet until again turning south and continuing to SH 66, crossing the Highland Ditch, the Rough & Ready Ditch, and the Supply Ditch along the route. After crossing SH 66, the pipeline continues south around the west side of McIntosh Lake on Boulder County Open Space property, and then continues south a little over 1 mile to the intersection of Hygiene Road. After crossing Hygiene Road, the pipeline turns east for approximately 400 feet and then resumes a southerly alignment, crossing the Burlington Northern Santa Fe railroad and the St. Vrain River until reaching St. Vrain Road. From Hygiene Road south to St. Vrain Road, the City of Longmont's 36-inch diameter Clover Basin Pipeline is also proposed to parallel the existing SWSP pipeline within the existing permanent easement. From the eastern turnout located 0.5 mile west of the

intersection of North 87th Street and Vermillion Road to St. Vrain Road, the existing permanent easement is 80 feet in width. This length of pipeline traverses generally open agricultural property along with a few residential acreages.

The SWSP II route diverges from the original SWSP pipeline alignment on the south side of St. Vrain Road, skirting the Longmont Vance Brand Municipal Airport and heading west across the Clover Basin Ditch and then south paralleling the Clover Basin Ditch. The pipeline continues southwest and crosses the Downing and Davis Ditch through a gap in the trees, and heads west towards N. 75th Street. Before reaching N. 75th Street, the pipeline turns south and crosses to the west side of N. 75th Street south of Peck Ditch, and continues south. The pipeline route crosses Nelson Road and continues south across North Dry Creek, James Ditch, and Pike Road to a point just east of Lagerman Reservoir. At this location, the route continues southwest along the north side of Dry Creek for approximately 1,300 feet before crossing over Dry Creek and turning south. From this location, the alignment continues south across a wet meadow, crosses N. 73rd Street, and continues along the east side of N. 73rd Street for approximately 1,300 feet to the Holland Ditch. Here, the alignment turns west, crosses N. 73rd Street a second time, and continues west along the north side of the Holland Ditch for approximately 4,000 feet. The alignment would then turn due south for approximately 6,000 feet, crossing Nimbus Road and Left Hand Creek to the LHWD Dodd WTP. From the LHWD Dodd WTP, the alignment would continue due south approximately 4,500 feet to the north side of Monarch Road, crossing Niwot Road along the way. At Monarch Road, the alignment turns west along the north side of Monarch Road to N. 63rd Street. At N. 63rd Street, the alignment turns south to Boulder Reservoir WTP just north of SH 119.

The eastern segment of the project begins approximately 0.5 mile west of the intersection of N. 87th Street and Vermillion Road. This segment of the pipeline typically has an existing 50-foot-wide permanent easement and typically traverses open pasture lands with few improvements in this length. The eastern segment parallels Vermillion Road and jogs around (to the south) two separate residences near 95th Street. The pipeline crosses to the north side of Vermillion Road, approximately 1,000 feet west Vermillion Trail, and continues east to the Weld County line.

As a result of the analysis of the 2010 Siting Report (AECOM), the preferred route was refined at several locations. The purpose of these refinements was to reduce the environmental impacts associated with the route. The route refinements are provided below.

- West of the airport, the preferred route follows the Clover Basin Ditch south instead of N. 75th Street to avoid significant agricultural lands and a windrow of mature trees.
- South of Lagerman Reservoir, the preferred route jogs west to avoid impacts to the existing prairie dog colony fence and an adjacent wetland.
- North of Monarch Road, the preferred route heads due south instead of following the parcel boundary to avoid large mature cottonwoods.

Easement Requirements

Permanent Easement

The portions of the proposed SWSP II pipeline alignment alternatives, which parallel the existing SWSP Broomfield pipeline and will serve the City of Boulder and Lefthand Water District, are anticipated to be constructed within the existing permanent easement, requiring no new permanent easement acquisition. The existing permanent easement ranges between 80-90 feet in width and should provide adequate space to construct a parallel pipeline. The portions of the alignment that diverge from the existing SWSP pipeline alignment will require the acquisition of new permanent easement, typically 70-90 feet in width, depending when co-location with other existing ROW.

The eastern phase of SWSP II, which will serve LPWD and the Town of Frederick, will parallel the existing eastern phase of SWSP. SWSP II will utilize a portion of the existing 50-foot-wide permanent easement; however, an additional 20 feet of permanent easement will be required to safely construct, operate, and maintain the eastern section of SWSP II.

Temporary Construction Easement

The original SWSP pipeline project typically utilized an additional 20 feet of temporary construction easement. It is anticipated that 20 feet of temporary construction easement will also be obtained for the proposed SWSP II pipeline. The 20 feet of temporary construction easement will have to be acquired for the entire length of the proposed alignment, even in those portions where the proposed pipeline will parallel the existing SWSP pipeline.

The eastern phase of the SWSP project utilized an additional 40 feet of temporary construction easement. Since an additional 20 feet of permanent easement will be acquired, Northern Water will need to acquire an additional 20 feet of temporary construction easement for the entire length of the proposed eastern alignment.

Prior to construction, the limits of construction easement will be delineated to ensure material and activities remain within the easement.

Typical Pipeline Construction Corridors

As noted previously, for those locations of SWSP II to be constructed within the existing SWSP pipeline easement, the typical existing permanent easement width is 80-90 feet with 20 additional feet of temporary construction easement to be obtained for SWSP II. For those locations where the SWSP II pipeline diverges from the existing SWSP easement, the permanent easement width will typically be 70-90 feet in width, depending upon co-location with other existing ROW.

For the eastern phase of SWSP II, which will be constructed parallel to the eastern phase of the existing SWSP, Northern Water presently owns a 50-foot-wide permanent easement. Therefore, 20 additional feet of permanent easement and an additional 20 feet of temporary construction easement will be obtained for the eastern phase of SWSP II.

To achieve an efficient pipeline construction project, adequate space for the following construction components needs to be provided:

- Safe excavation of the pipeline trench (dependent upon soil types and conditions)
- Stockpiling and maintenance of topsoil (strippings)
- Stockpiling of excavated material (spoil)
- Delivery and stockpiling of pipe bedding material
- Delivery and layout (stringing) of pipe
- Delivery of pipeline appurtenances, concrete, other construction materials
- Execution of dewatering activities, welding, appurtenance construction
- Movement of construction equipment alongside excavation, backfill operations

Construction widths ranging from 90 to 110 feet total, available for construction of pipelines ranging from 28 to 60 inches in diameter, provide adequate space for the contractor to efficiently perform the above listed tasks and maintain a good production rate, resulting in faster construction and lower pipeline installation costs.

It should be noted that some variations will occur in the typical cross-section shown due to variations in width of the existing SWSP easement. Where the proposed SWSP II pipeline would be parallel to the existing SWSP pipeline, it will be located within the existing 50 to 90-foot-wide permanent easement. Figure 1 shows a typical construction corridor cross-section

where the proposed SWSP II pipeline is parallel to the existing SWSP pipeline and within the existing 90-foot easement. Figure 2 shows a typical construction corridor cross-section where the proposed SWSP II pipeline is parallel to the existing SWSP Pipeline and within the existing 80-foot easement. Figure 3 shows a typical cross-section of the eastern phase of the SWSP II pipeline, which will utilize a 70-foot permanent easement (Northern Water presently owns a 50-foot permanent easement and an additional 20-feet will need to be acquired) and an additional 20-foot temporary construction easement. The various construction corridor cross-sections for the locations where SWSP II diverges from the existing SWSP easement are shown in the September 2010 Siting Study included in appendix II. With a gross estimation of 110-foot-wide (maximum) construction impact (permanent and temporary construction easements), a maximum of 352 acres would need to be restored to existing conditions.

As the project design is further refined, construction widths will be narrowed for short distances to reduce impacts to environmentally sensitive areas (including some of the stream or creek crossings), existing residences or surface improvements, or other constraints. At these locations, the zone of disturbance can be reduced to a width of approximately 50 feet. Creek crossings will be performed via open trench during low flow periods in the winter months. In addition to offering low flows, winter construction assures that the riparian corridors will be largely dormant and many species will be either hibernating (such as some mammals and amphibians), or will have migrated south (such as some birds). Most aquatic species, such as fish, will have moved to deeper pools. Construction is expected to be completed at stream crossings within 7-14 days, even with a confined work area in environmentally sensitive areas.

Stream crossings using boring versus open trench construction methods is a topic that frequently comes up on pipeline projects. The primary advantage of boring is a reduction in the amount of surface area disturbed within the stream channel. When compared to open trench construction, this advantage is partially offset by a longer construction period, i.e., an extended period during which construction activity occurs in or adjacent to riparian corridors, higher costs, and more complex construction. Boring requires excavation of an entry and exit pit at each end of the bore, dewatering, and increased risk of collapse with an associated safety hazard. Given the temporary nature of the disturbance, the ability to restore the site quickly and the benefits of a reduced construction period, Northern Water has proposed to use open trench construction techniques. Photograph 4, which shows the crossing of the St. Vrain River by the first SWSP project, illustrates how completely a stream crossing can be restored using open trench construction. Prior to entering major waterways, construction equipment will be treated and cleaned in accordance with CDOW guidelines to avoid the spread of invasive aquatic species.



Photograph 4. View of SWSP I at crossing of St. Vrain River.

Figure 4 shows a typical construction corridor cross-section narrowed to 50 feet in width. Narrowing the construction corridor to 50 feet is a significant constraint for pipeline installation and cannot be effectively maintained for long distances.

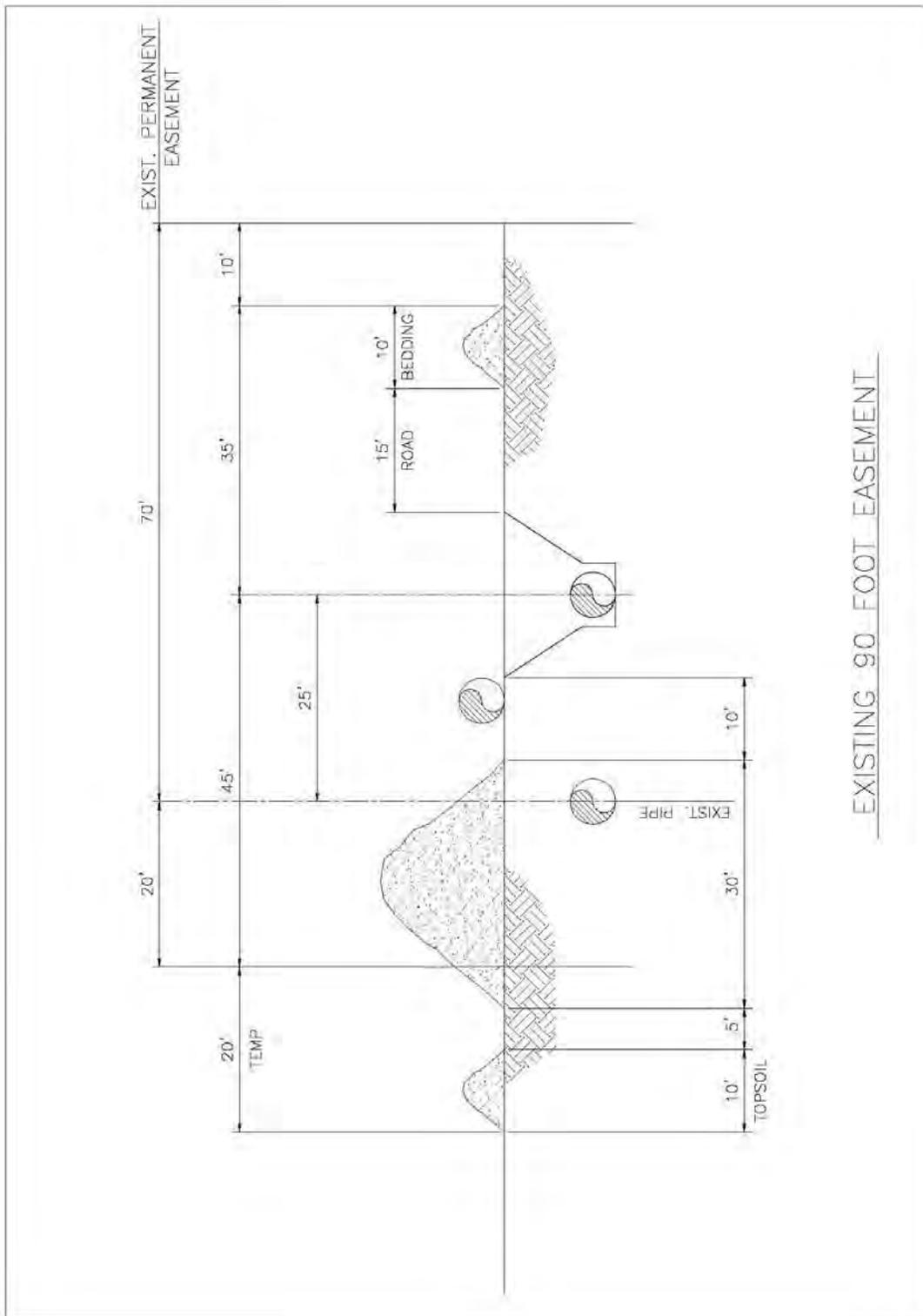
Environmental Commitments

Similar to the original SWSP, this project will be designed and constructed in a manner that minimizes both short-term and long-term effects on land use and environmental resources. A complete list of SWSP II environmental mitigating commitments is provided in the Appendices. Maps showing Land Use and Environmental Resources are provided in Appendices II and IV; a table listing water, wetland, and sensitive habitat crossings are provided in Appendix V. As described in more detail in Appendix I, a comprehensive set of environmental mitigation measures were developed to minimize project impacts on land use, natural and cultural resources. A summary of these environmental commitments is provided in the remainder of this section.

1. **Special Construction Measures:** Special construction measures will be utilized in sensitive areas such as wetlands to minimize the width of the zone of the disturbance associated with construction activities.
2. **Seasonal Restrictions:** Construction will not take place near raptor nests and other sensitive habitats during the most sensitive seasons. Also, construction will occur at major drainage crossings during periods of low flow.
3. **Sedimentation Control:** In areas of high water table, the water that accumulates in the trench will be diverted to specially constructed settling basins prior to discharge into the nearest natural water body or drainage channel.

4. **Reclamation/Revegetation of Disturbed Areas:** Plant cover of a density equal to or greater than that of the original cover will be achieved in disturbed areas within two growing seasons. This will be done in consultation with appropriate governmental agencies and interested private landowners.
 - a. ***Landscaped Areas:*** NCWCD will pay just compensation for or, at the landowner's option, replace landscape plantings (trees, shrubs, ground covers, lawns), and built features (terraces, paved areas, parking lots, fences, gates, minor structures, etc.) removed or damaged by pipeline construction.
 - b. ***Cultivated Land:*** NCWCD will pay compensation for crops destroyed, damaged, or foregone because of construction. The land and facilities will be restored as nearly as practicable to original condition.
5. **Right-of-Way:** Landowners will be paid just compensation for the rights acquired.
6. **Additional Specialized Mitigation Measures:** Special mitigation measures will be used as needed in sensitive locations:
 - a. Perform geologic investigations to identify potential landslides/subsidence area.
 - b. Stabilize areas of potential mass movement.
 - c. Resurvey for sensitive species if determined necessary by USFWS and CDOW.
 - d. Relocate any rare plant populations identified.
 - e. Perform burrowing owl surveys to ensure owls are not present at prairie dog towns if construction will be performed between March 1 and November 1.
7. **Cultural:** Prior to easement acquisition and final engineering, NCWCD will hire a professional archaeologist to survey and identify cultural resources that could be affected by the project. The project will be designed in so far as technically, economically, and environmentally feasible to avoid the placement of development and construction activities in a manner that may affect historical or archeological resource areas of statewide importance.
8. **Specific Siting of Project Elements:** The 1041 Submittal and Feasibility Study were based on available published, mapped information, and supplemented by field checking. Prior to construction of the selected route, specific site conditions at environmentally sensitive areas will be examined to identify opportunities for reducing impacts by minor route adjustments within the defined corridor.
9. **Wildlife:** Prior to any construction that may occur during the breeding seasons, segments will be surveyed for any nesting birds that may be covered under the Migratory Bird Treaty Act. All active nests will be avoided and CDOW and USFWS will be consulted to minimize impacts to adjacent nesting activity.
10. **Environmental Monitor:** Northern Water will fund an environmental monitor to monitor the construction of the project to ensure that all of the environmental commitments are being met.

Figure 1. Existing 90-foot permanent easement and 20-foot temporary construction easement



EXISTING 90 FOOT EASEMENT

Figure 2. Existing 80-foot permanent easement and 20-foot temporary construction easement

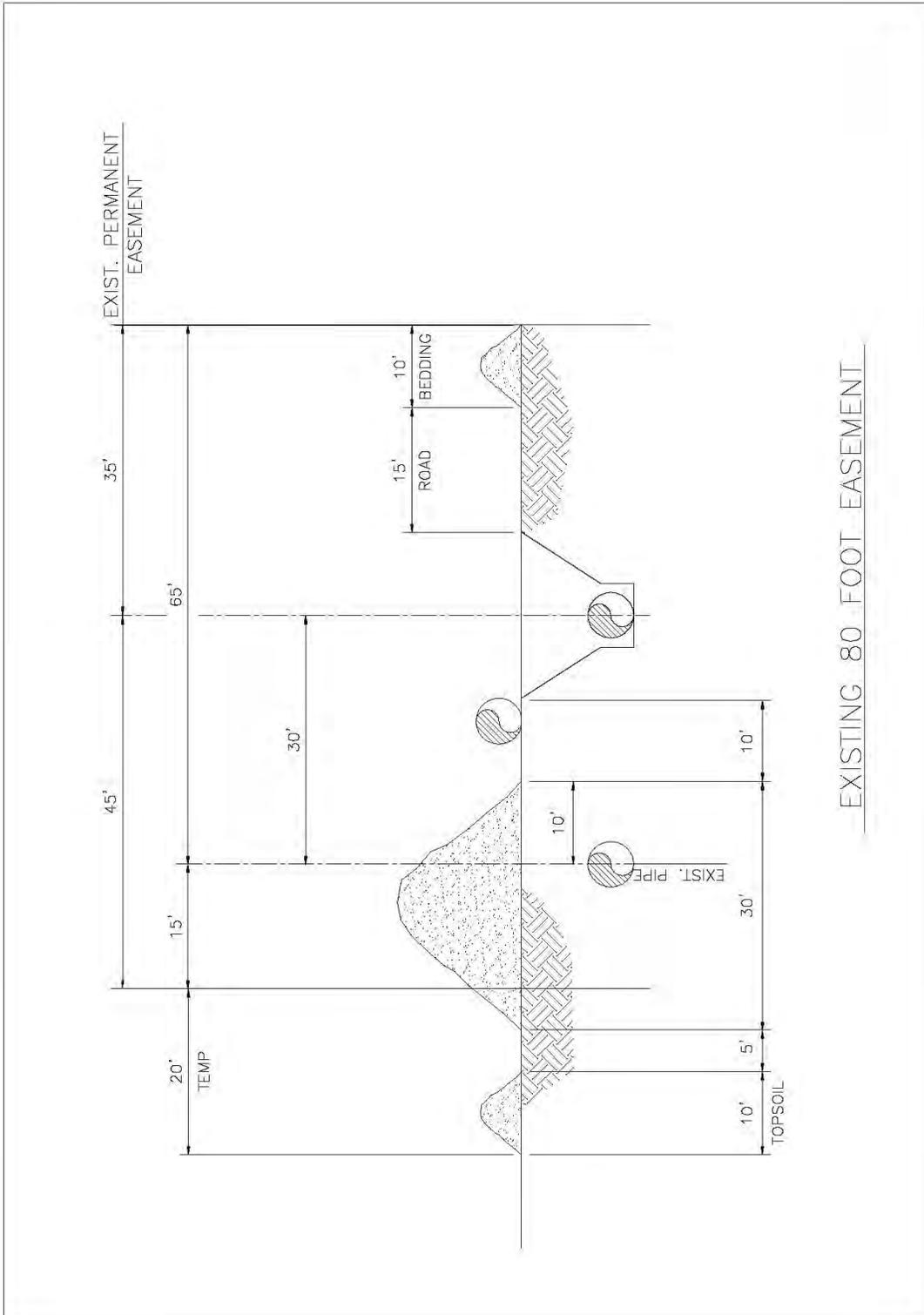
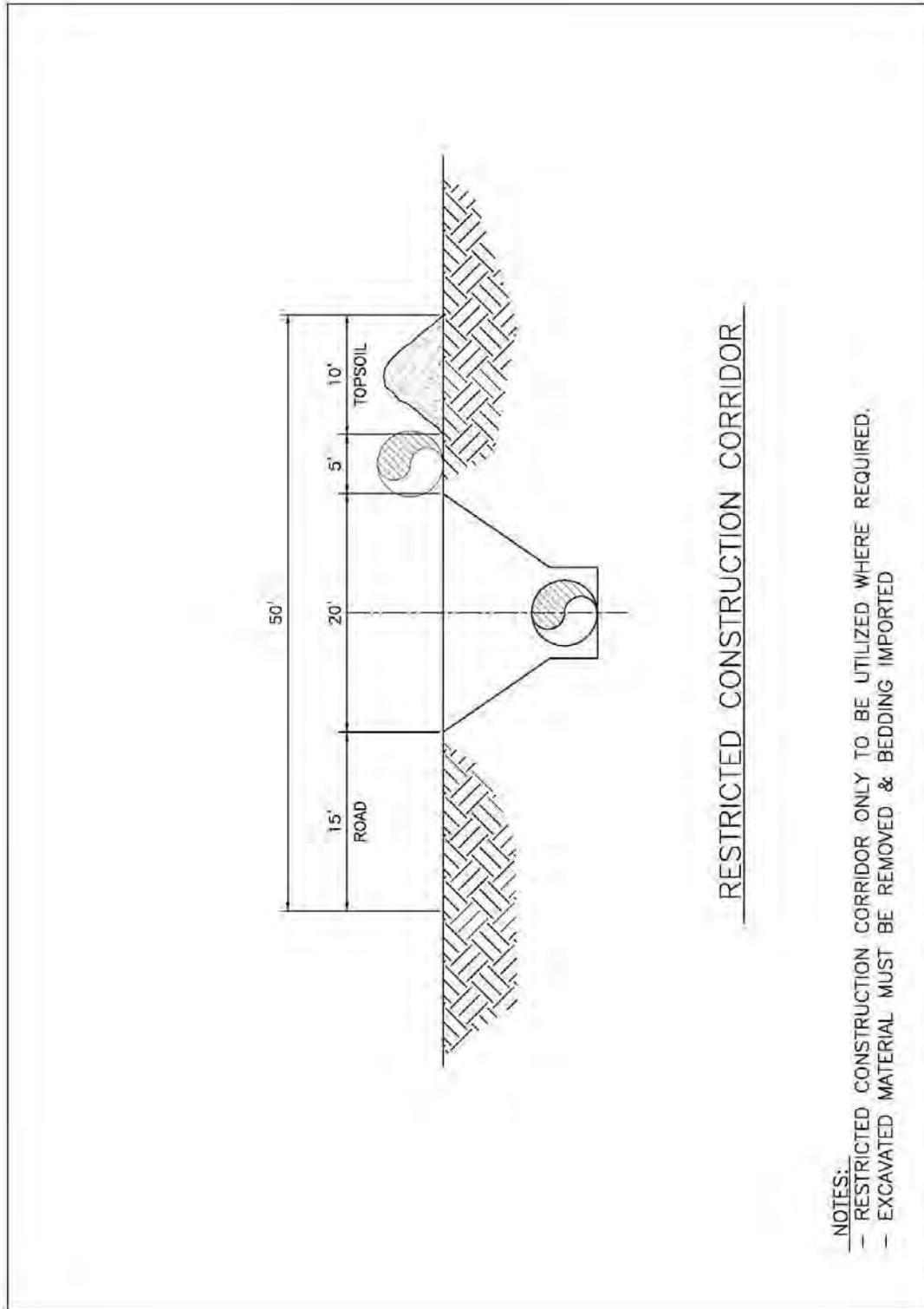


Figure 4. Restricted 50-foot construction corridor



J. Service Area and System Capacity

The existing source water system being replaced is the St. Vrain Supply Canal and the Boulder Feeder Canal, which does not provide year-round flow or secure water quality conveyance due to the open canal delivery system. SWSP II will replace a portion of the City of Boulder and LHWD's open canal diversions with an enclosed pipeline. The St. Vrain Supply Canal and the Boulder Feeder Canal will continue to exist and provide deliveries to both agricultural and municipal users.

SWSP II is primarily intended to serve existing demands. The capacity designed into the project is 45 cfs, including 25 cfs for the City of Boulder, 11 cfs for LHWD, 3 cfs for LPWD, and 6 cfs for Town of Frederick; no excess capacity has been included in the design.

The service area for each of the five participants is discussed below and is shown on Map 5. Table 3 summarizes capacity and growth for each participant, and Table 4 describes how this project ties into each of the participant's master plans.

Table 3. Summary of participants use and expected growth

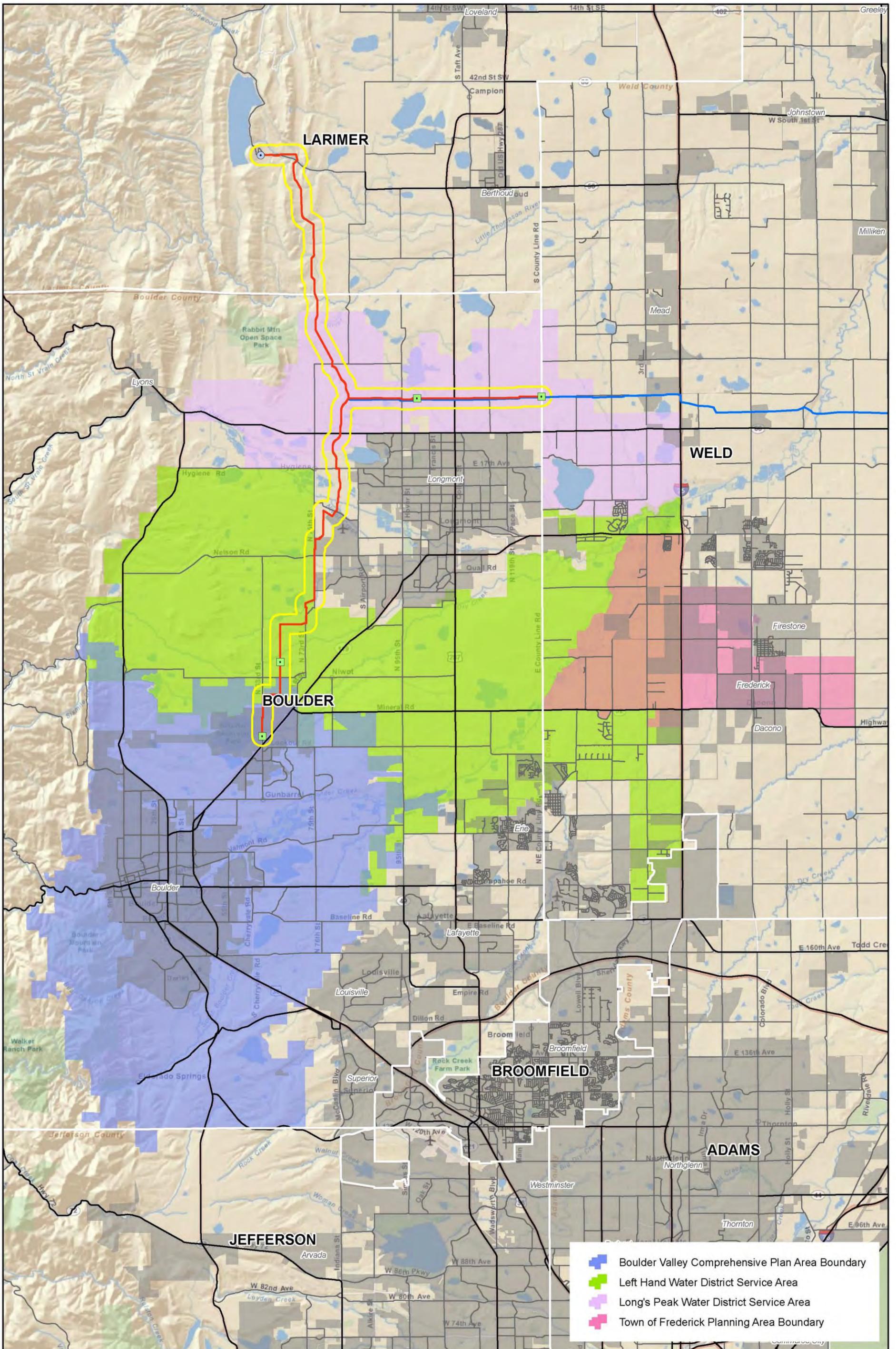
Participants	2008 Use Type	2008 Current Use (AF)	2008 System Capacity (cfs)	SWSP II Capacity (cfs)	Projected System Capacity with SWSP II (cfs)	Projected 2020 Use Following SWSP II (AF)	Population	Water from NCWCD	Projected 2020 Population (extrapolated estimates)
City of Boulder	Residential (62%), commercial/industrial/institutional (26%), municipal (3%), unaccounted (9%)	20,311	95	25	95	Expected to be similar to 2008 use	112,000	21,015 units C-BT; 37 units Windy Gap	118,000
Left Hand Water District	Residential (6,020 accounts), commercial (299 accounts)	4,639.9	24	11	24	7,344	18,781	6,753 (CBT)	25,157
Longs Peak Water District	Residential, some commercial	1,018	4.35	3	5.65	Not Available, but not expected to change as a result of SWSP II	2,800	1,726.8 units C-BT; 2 shares Highland Ditch Co.; 4 shares Supply Ditch Co.; 2/3 share Rough & Ready Ditch Co.; 1/2 share Pleasant Valley Reservoir; 6 shares Oligarchy Ditch Co.	3,640
Town of Frederick	Residential	N/A	N/A	6	N/A	N/A	7,997	N/A	46,000

N/A – Not applicable

Table 4. Summary of how SWSP II will achieve participant's master plan goals

Participant	Document Title	How SWSP II will tie into plan
City of Boulder	Boulder Valley Comprehensive Plan (BVCP) Source Water Management Plan 2009-2014 Capital Improvement Program Integrated Evaluation of Boulder Reservoir Water Treatment Plant (BRWTP) Source Water Protection and Treatment Improvements Study Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188)	Year-round delivery, improve security and water quality.
Left Hand Water District	Boulder County Resolution 96-83 [LHWD's] Strategic Plan and Capital Improvement Program Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188) New approved 1041 Permit for Dodd WTP, BOCO Resolution 2009-126 ¹	Year-round delivery, improve security and water quality.
	additional city land use and master plans	
Longs Peak Water District	No Master Plan available	LPWD plans to be involved in SWSP II to use either LPWD supply from LTWD, treat water using LPWD, or a combination of both to ensure tap holders the best and most economical water supply possible. Further, it provides a secondary source that will ensure uninterrupted service should the other source fail - either long-term or short-term.
Town of Frederick	Town of Frederick Comprehensive Plan [Town of Frederick and Boulder County] Inter-governmental Agreement	SWSP II water will help the Town of Frederick support its expected growth.

¹ BOCO Resolution 2009-126 includes permit for "construction of a supplemental raw water pipeline from the proposed Northern Colorado Water Conservancy District's Southern Water Supply Project II line.."



- Boulder Valley Comprehensive Plan Area Boundary
- Left Hand Water District Service Area
- Long's Peak Water District Service Area
- Town of Frederick Planning Area Boundary

Map Number & Title:	Project Title & Applicant	Consultant	Engineer	Preparation Date: 1/20/2011	<ul style="list-style-type: none"> — Selected Pipeline Alignment — Study Area (3000 ft wide) — Existing SWSP Pipeline <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="flex: 1; border-bottom: 1px solid black; margin-right: 5px;"></div> <div style="margin-right: 5px;">0</div> <div style="margin-right: 5px;">1</div> <div style="margin-right: 5px;">2 Miles</div> <div style="margin-left: 10px; text-align: center;"> </div> </div>
Map: 5	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Water District				Revision Date 2:	
Service Area Boundaries and Planning Areas				Revision Date 3:	

City of Boulder

The Boulder Valley Comprehensive Plan (BVCP) defines the limits for urban development in the Boulder Valley. Map 6 shows the established framework for annexation and service provision as described below:

- Area I is the area within the city.
- Area II is the area planned for annexation and service provision within the 15-year planning period.
- Areas I and II form the city's service area.
- Area III - Rural Preservation Area includes lands designated to remain rural in character.
- Area III - Planning Reserve is an area where the city and county intend to maintain the option of expanded urban development beyond the planning period.

The City of Boulder provides water for these areas consistent with the BVCP. Future needs are evaluated in accordance with service criteria and standards set forth in the BVCP, and comprise approximately 58 square miles.

The City of Boulder supplies water to Area I, and will supply water to Area II within the planning period pursuant to the city's annexation policies and capital improvements program.

The St. Vrain Supply Canal and the Boulder Feeder Canal provide enough capacity to the City of Boulder for planned build-out in 2035. SWSP II is not intended to increase capacity for the city, but instead is designed to address safety and reliability needs. The additional requirements of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188) and the need for a year-round water supply are satisfied with SWSP II. There are no other municipal providers within the Boulder service area. The City of Boulder's total water treatment capacity is 61 million gallons/day, or 95 cfs (45 MGD from Betasso WTP and 16 MGD from the Boulder Reservoir WTP), and there are no additional plans to expand this capacity.

The City of Boulder currently owns 21,015 units of the 310,000 units in the C-BT Project. In addition, the City of Boulder owns 37 units of the Windy Gap Project. SWSP II will deliver only a portion of this water. The remainder of the water will continue to be transported via the St. Vrain Supply Canal and the Boulder Feeder Canal. Boulder plans to deliver all water intended for potable use via pipeline. The Boulder Reservoir WTP capacity is 16 MGD, so up to 16 MGD (about 49 acre feet/day) that is now carried in the canal would not be delivered by the canal with the pipeline in operation. While it's not possible to make a statement like "X% of the city's total CB-T and Windy Gap water will be transported via the pipeline" because flows will vary based upon demand, the city reviewed historical canal flows and deliveries to the WTP. Estimated changes in canal flows are described below (from a 6/15/09 informational update to the city's Water Resources Advisory Board):

Boulder Feeder Canal/Boulder Reservoir Water Quantity and Quality

Questions have been raised concerning reduction in water quantity and associated potential degradation in water quality in the Boulder Feeder Canal if the pipeline were to be constructed. In terms of water quantity, future canal flows would not include up to 25 cfs of water that the canal would otherwise convey for treatment to meet municipal demand in the City of Boulder. The pipeline would not carry water that the city uses for exchange purposes, irrigation or city-owned Boulder Reservoir storage. Such flows would continue to be conveyed through the feeder canal. Estimates of average Boulder Feeder Canal flows if the pipeline were to be constructed are summarized in Table 5.

Table 5. Seasonal Boulder Feeder Canal Flow

Percent of Historical Canal Flow				
	April	May-August	September	October
Dry Year	80%	80%	47%	24%
Average Year	35%	85%	57%	9%
Wet Year	70%	70%	55%	20%

On an annual basis, BFC flows with the Carter Lake Pipeline in operation would be approximately 71.4%, 73.4% and 64.0% of historical canal flows for dry, average and wet years, respectively. The BFC will continue to be shut down in the winter and therefore, there will be no flow during the months of November through March.

Contamination levels in BFC water could rise due to less dilution as a result of reduced flows, but these future effects will be somewhat counteracted by ongoing efforts by Northern Water and the city to isolate existing outfalls to the BFC. The only two water utilities using the BFC for drinking water are Boulder and Left Hand Water District, and both are currently parties to the pipeline project, which, if constructed, would improve source water quality over current conditions. Dilution in the canal is of greater importance if the water is a direct drinking water supply, but it is not as great a concern if the water is used for irrigation or for reservoir storage.

The City of Boulder would still monitor water quality in the BFC and Boulder Reservoir as needed. However, there would not be an urgent need to track and predict contaminant events in the BFC and reservoir if water destined for treatment is transported via a pipeline.

With regard to the ongoing efforts to isolate existing outfalls, during 2008, the following activities to mitigate run-off to the Boulder Feeder Canal took place:

- Outfalls 79 and 90 located within the Cemex cement plant property were graded to an existing underpass.
- Outfalls 370 and 357 north of Prospect Road were graded to existing Crossings.
- Outfall 364 north of Prospect Road was crossed.
- Crossings of outfalls 379 and 372 were planned, but have not progressed due to down gradient landowner requests.

SWSP II is included in Boulder's Source Water Management Plan (in preparation) and in the 2009-2014 Capital Improvements Program. This project is an alternative included in the Integrated Evaluation of Boulder Reservoir Water Treatment Plant Source Water Protection and Treatment Improvements Study (Black & Veatch 2007). The study develops and evaluates alternatives for source water protection and long-term improvements to treatment processes.

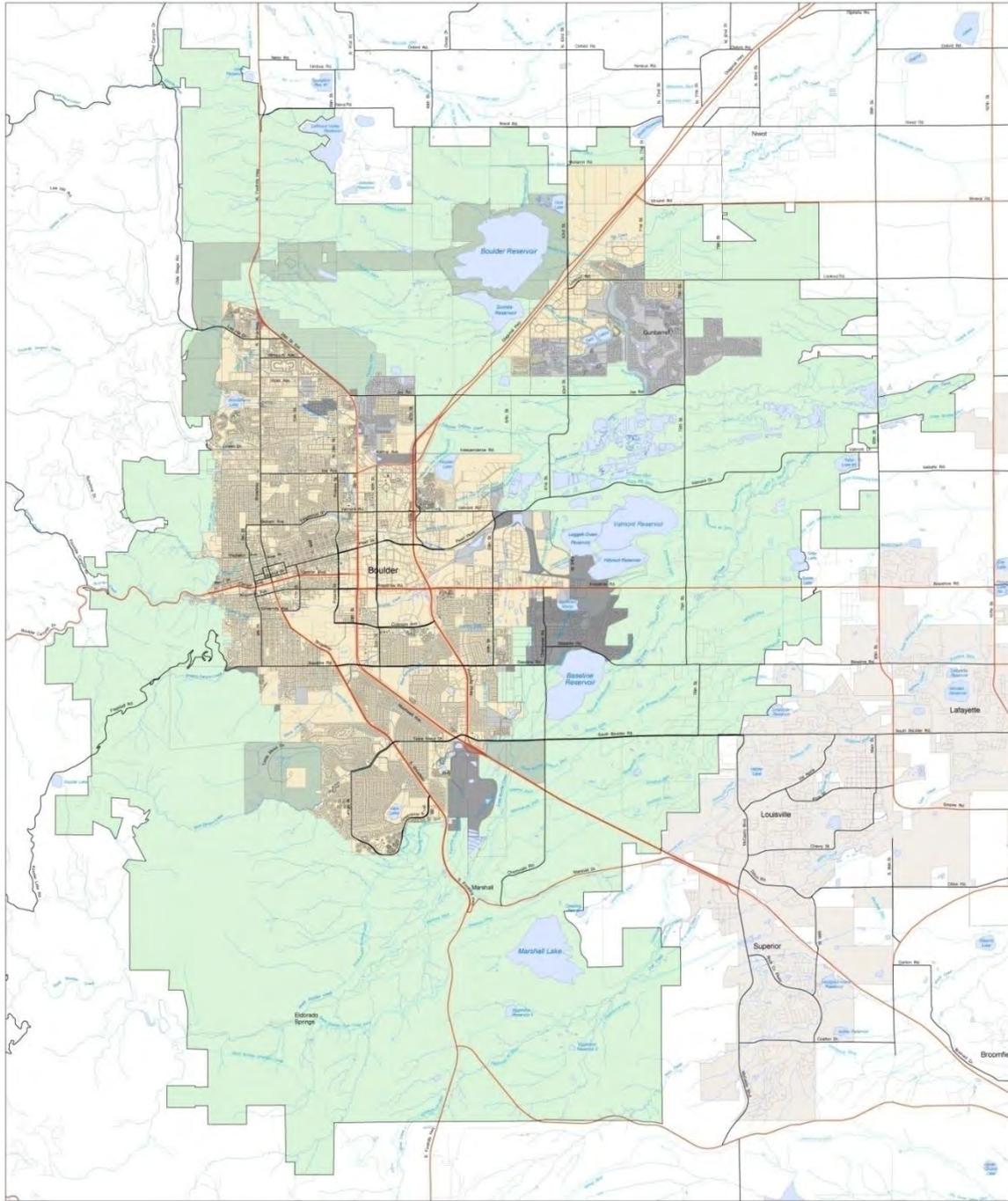
Since 1970, the City of Boulder and Boulder County have jointly adopted a comprehensive plan that guides land use decisions in the Boulder Valley. The core components of the BVCP are:

The BVCP policies guide decisions about growth, development, preservation, environmental protection, economic development, affordable housing, culture and the arts, neighborhood character, and transportation. The policies also help inform decision

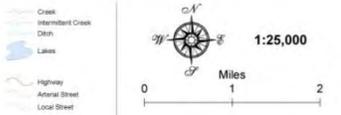
makers about the manner in which services are provided, such as police, fire, emergency medical services, water utilities, flood control, and human services.

The BVCP Future Land Use and Area I, II, and III Maps defined the desired future land use pattern for the Boulder Valley regarding location, type, and intensity of development.

Map 6. Boulder Valley Comprehensive Plan Areas I, II, III



- Legend**
- | | |
|-------------------------------|--|
| Area I | Area III |
| Area I - Boulder City Limits | Area III - BVCP Planning Area Boundary |
| Area II - Service Area | Area III - Rural Preservation Area |
| Area II A | Area III - Planning Reserve |
| Area II B | Area III - Annexed |



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SUBJECT TO REVISION

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Source: Boulder Valley Comprehensive Plan, 2005

The City of Boulder provides a number of water conservation programs for residential users and homeowners' associations. These programs include rebates, education, outreach, and landscape and irrigation audits. The City's water conservation programs can be found at http://www.bouldercolorado.gov/index.php?option=com_content&view=article&id=12698&Itemid=360

Left Hand Water District

Left Hand Water District's (LHWD) service area includes land historically irrigated by the Left Hand Ditch Company, land historically irrigated by other ditches or with C-BT Project water, and a small area that had no historic irrigation through the Left Hand Ditch Company or C-BT Project. LHWD's service area primarily consists of the unincorporated areas between the City of Boulder, City of Longmont, Town of Firestone, Town of Frederick, Town of Dacono, and Town of Erie (Map 7). It also provides water to the Town of Frederick west of I-25.

Boulder County Resolution 96-83 previously approved a pipeline and pump station conveying summertime deliveries from the Boulder Feeder Canal to the Left Hand Valley Reservoir (LHVR) and Dodd WTP. The portion of the pipeline from the Boulder Feeder Canal to LHVR was never constructed. The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (Public Law 107-188) requirements, coupled with Boulder County's desire to utilize portions of the Boulder Feeder Canal ROW as a public trail, made an alternative to the 11-mile open channel Boulder Feeder Canal necessary. SWSP II provides an alternative solution that fulfills the need for this previously approved project. The project also provides a year-round water supply, secures water quality, and allows cost sharing for construction and maintenance.

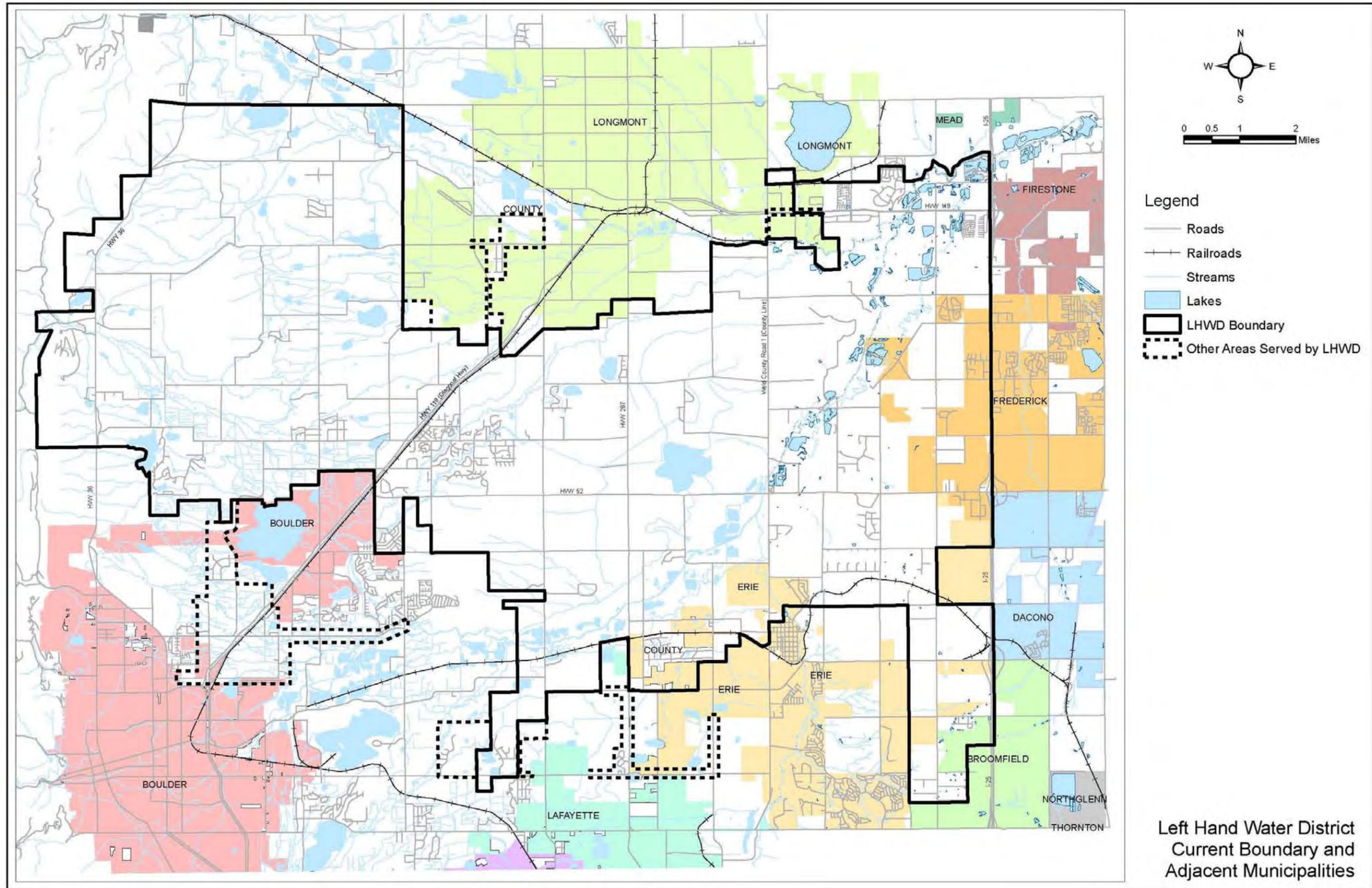
SWSP II is included in LHWD's Strategic Plan and Capital Improvement Program. LHWD's participation in SWSP does not increase the treatment capacity of LHWD's WTP. LHWD has an approved BOCO Resolution 2009-126, which includes connection to this proposed project. There are no other municipalities within the LHWD service area.

The total rated treatment capacity of LHWD is currently 15.5 MGD. Operational constraints common to water treatment facilities reduce the actual combined capacity to 13.5 MGD. With a historic maximum day demand of approximately 10 MGD, LHWD is operating at 74% of treatment capacity.

This project is a fundamental component in LHWD's Capital Improvements Program and long range strategic planning efforts. The concept of an additional pipeline to the Dodd WTP for the reasons stated in this application has been accepted in the approval of LHWD's 1996 1041 Application through Boulder County Resolution 96-83 as well as LHWD's Dodd WTP expansion and upgrade 1041 permit approval, BOCO Resolution 2009-126.

In an effort to promote water conservation, LHWD provides its indoor and outdoor residential users access to conservation rebates. In addition, LHWD provides a free irrigation inspection program called Slow the Flow Colorado. LHWD's water conservation programs can be found at http://lefthandwater.org/Water_Conservation.html

Map 7. Left Hand Water District Service Area



Source: Left Hand Water District 2006-2007 Treated Water Master Plan, March 9, 2007

Longs Peak Water District

The Longs Peak Water District (LPWD) service area was defined in 1991 when the company changed from an Association to a Title 32 Special District. All land previously served by the Longs Peak Water Association was incorporated into the service area of the newly formed LPWD. The service area consists of the unincorporated areas between the City of Longmont and LHWD on the south, I-25 on the east, the Town of Lyons on the west, and LTWD on the north. Additionally, those areas within the Town of Mead located west of I-25 and south of LTWD are within the LPWD service area.

LPWD provides domestic water to approximately 1,200 tap holders in an approximate 42-square mile area in western Weld and eastern Boulder counties (Map 8). Untreated irrigation water is also provided to approximately 100 tap holders in eastern Weld County. Currently, LTWD treats and delivers most of LPWD water. The LPWD Kugel Plant is now used as a “peaking plant” during the summer months. The LPWD Kugel Plant was originally designed to operate on a year-round basis; however, it has only been used seasonally over the past 20 years due to poor water quality available during fall/winter/spring from Pleasant Valley Reservoir (Terry Lake). The total rated capacity of the LPWD Kugel Plant is 0.75 MGD. The plant operates at about 75% capacity from time-to-time during peak periods in the summer.

Participation in SWSP II at 3 cfs will afford LPWD the opportunity to receive much higher quality water at its LPWD Kugel Plant located at 9875 Vermillion Road in Longmont, Colorado 80504. That treatment plant is currently fed via the Rough & Ready Ditch, which provides seasonal water of a far inferior quality than that to be received from SWSP II. Additionally, SWSP II will provide water on a year-round basis, which will allow LPWD to treat and deliver much more of its own water rather than relying on the purchased water capacity from LTWD.

Participation will also provide LPWD with some flexibility in delivering untreated irrigation water to those developments so designed during the “shoulder months”, i.e., those months during which some irrigation water is needed before and after the local ditch companies deliver water. It is LPWD’s goal to have all developments of size to incorporate untreated irrigation systems into their design, thereby reducing the need for treated water used for outdoor irrigation.

Currently LPWD water rights portfolio consists of the following:

- 1,726.8 Units C-BT Project Water
- 2 Shares Highland Ditch Company
- 4 Shares Supply Ditch Company
- 2/3 Share Rough & Ready Ditch Company
- ½ Share Pleasant Valley Reservoir
- 6 Shares Oligarchy Ditch Company

No additional acquisition of water rights is anticipated in conjunction with this project. No change in use of any currently owned water right is anticipated.

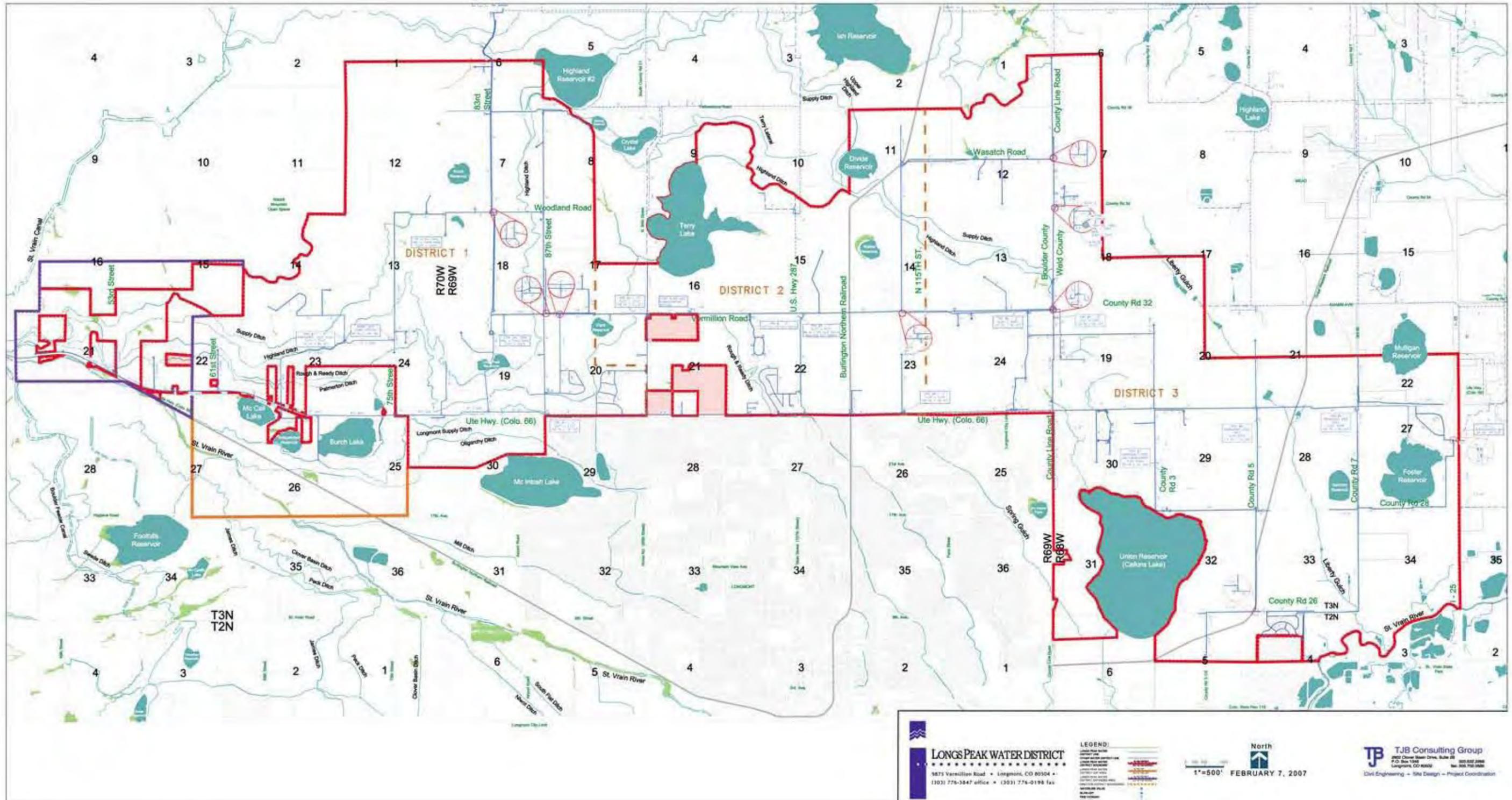
Town of Frederick

The Town of Frederick (Frederick) has adopted a comprehensive plan, including a Land Use Map, which was last revised on July 19, 2007. Frederick’s service area is limited to Frederick (Map 9). As indicated on the Land Use Map, Frederick has no plans to develop land in Boulder County. Frederick and Boulder County recently adopted an IGA that stipulates how the two parties will cooperate on the development of land along the western edge of

Frederick. Frederick's participation in the SWSP II project would not result in any more water being available for future growth, but could provide an option for the location of future water treatment facilities. The major reason Frederick is participating in the SWSP II project is the fact that local water supplies are of such poor quality that they are not economically feasible to treat for potable water supplies.

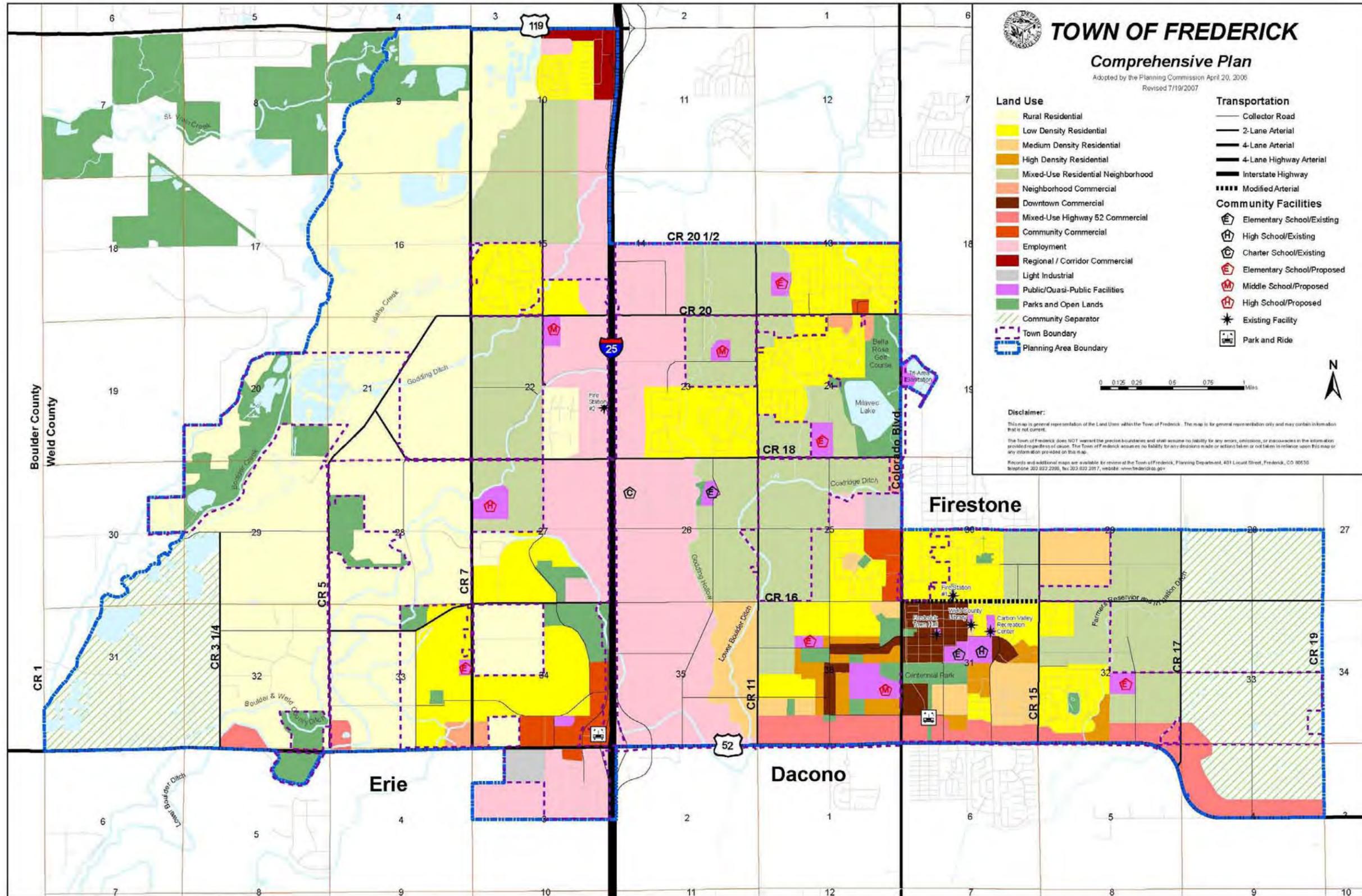
In August 2010, the Town of Frederick was awarded a grant to prepare the Town's water conservation plan. The conservation plan is expected to be completed in 2011.

Map 8. Longs Peak Water District Service Area



Source: Long's Peak Water District Map 2007

Map 9. Town of Frederick Service Area



Source: Town of Frederick Comprehensive Plan July 19, 2007

K. Population and Characterization of Users

City of Boulder

The City of Boulder (Boulder) currently provides treated water service to approximately 112,000 people residing inside and outside the city limits (BVCP). In addition, Boulder provides water to industries with about 100,000 employees. Approximately two-thirds of the water is used for indoor purposes and about one-third is for outdoor use. The residential sector (both single and multifamily) consumes 62% of the water, and 26% is used by commercial, industrial, and institutional sectors. About 3% of the water use is for the municipal sector with 9% for unaccounted uses, such as fire protection, leaks, or main breaks. This distribution is similar to other municipalities in the region. In 2006, a total of 20,311 acre-feet of water was delivered. This is a reduction from 2001, when drought restrictions began to limit use.

Left Hand Water District

It is estimated that the population currently served (using persons/household from the 2000 census for both Weld and Boulder Counties) is 19,088. This consists of 5,957 residential accounts and 296 commercial accounts. In addition, LHWD has committed to an additional 585 taps – the majority of which are located within Weld County. LHWD's participation in this project is not associated with any increase in capacity above that which has been previously reviewed by Boulder County. LHWD will apply for approval of additional capacity at the Dodd WTP separately in a future application.

LHWD's service area includes land historically irrigated by the Left Hand Ditch Company (LHDC), land historically irrigated by other ditches and C-BT Project water, and a small area that has no historic irrigation by LHDC or C-BT Project. LHWD's treatment facilities are situated such that the only sources of water that can be utilized are Left Hand Creek and C-BT Project water through the Boulder Feeder Canal.

The LHWD maintains a water bank, which is made up of shares of Left Hand Ditch Company stock and C-BT Project units. As shown in the list below, some of these rights are assigned to tap holders and some are held in reserve.

Colorado-Big Thompson Project

Owned: 6,750

Assigned: 5,312

Left Hand Ditch Company

Owned: 2,854

Assigned: 2,014

This project involves only the delivery of C-BT Project water from Carter Lake, which is currently delivered through the Boulder Feeder Canal.

Long's Peak Water District

In 2008, the Longs Peak Water District (LPWD) provided service to approximately 1,200 taps, with an estimated population of 2,800. Approximately 97% of LPWD taps are residential in nature, with the remaining 3% being dairy and commercial use. LPWD is currently committed to provide service to an additional 400 taps – approximately 50 of which are in Boulder County with the remaining committed services located in Weld County. With incorporation of untreated water irrigation systems in new development, and more efficient use of Longs Peak Water District Kugel Plant due to supply from SWSP II, little if any additional treatment capacity will be needed in the foreseeable future.

Currently approved development plans in the Weld County area will result in a population increase of about 720. Approved developments in the Boulder County area will result in an increase in population of about 120. LPWD previously committed to provide service to these developments, and the SWSP II is/was not a factor in those commitments.

Town of Frederick

In 2007, the Town of Frederick (Frederick) had an estimated population of 7,997, and is expected to be built out in the year 2030 at a population of 80,000. With 6 cfs, the SWSP II is anticipated to fulfill a small portion of Frederick's projected water supply demand. The SWSP II will serve only a small portion of Frederick's future water supply needs.

L. Environmental Impact

Land Use

The project is located in undeveloped rural Boulder County, an area primarily consisting of rolling hills with pasture/hay fields and rural estates. The SWSP II route crosses through a number of land use types, including rangeland/agriculture, conservation land, other public land, rural estate, rural residential, and industrial. Existing land use is shown on Reference Maps A-E in Appendix III for the SWSP II connection to the City of Boulder's 63rd Street water treatment plant. A similar pattern of land use occurs along the eastern segment of the project. Land use along this segment is depicted in Reference Maps F-H in Appendix III.

In addition, the project crosses through incorporated areas in the City of Longmont and City of Boulder. These areas have a variety of zoning classes, including Industrial-Manufacturing, Public, Business/Light Industrial, General Industrial, Residential Planned Unit Development, Agriculture, Estate Residential, and Rural Residential (Map 10).

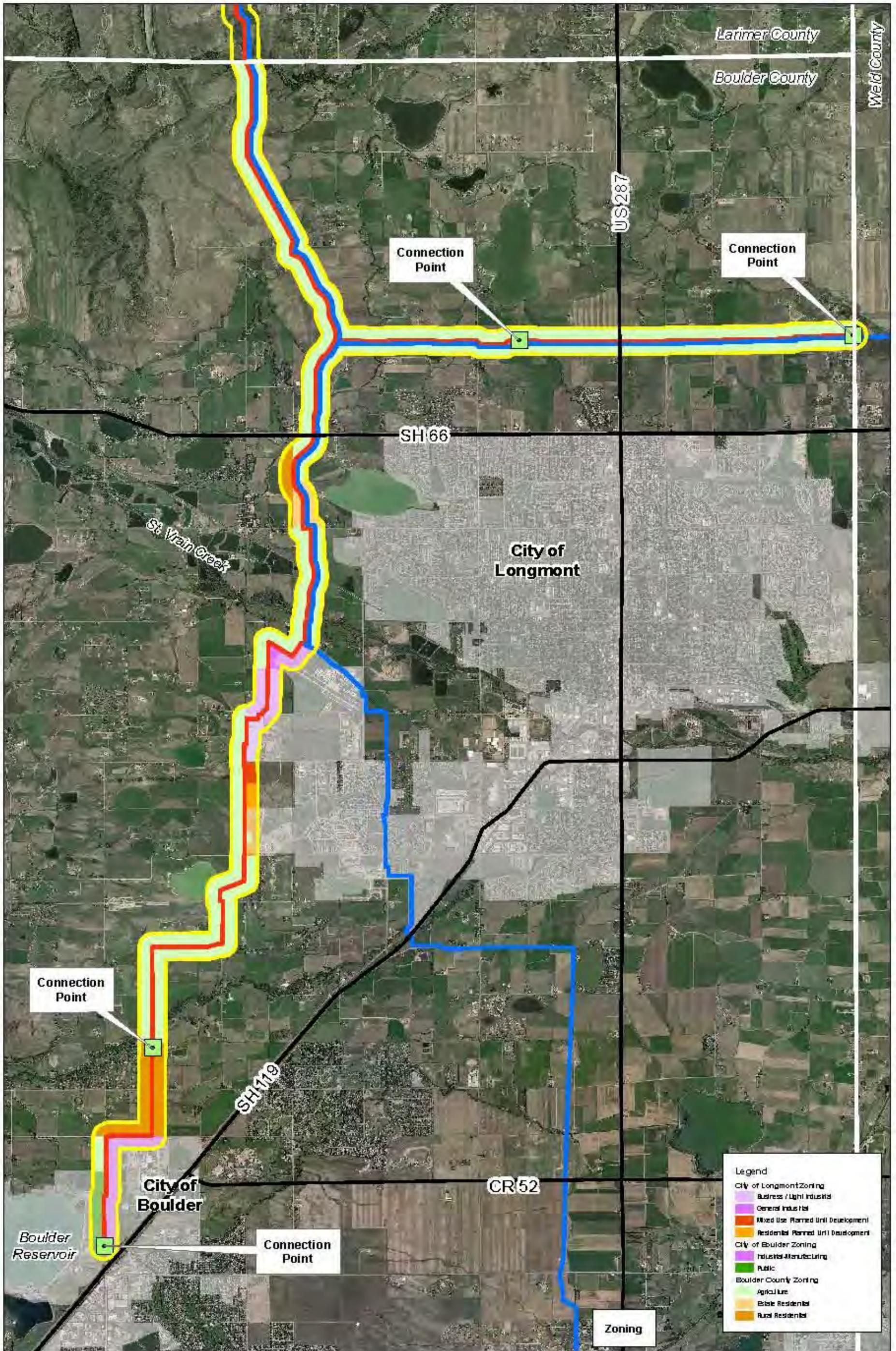
The project will have both short and long-term effects on land use. In areas where the pipeline will be located within the existing SWSP pipeline easement, impacts will be limited to short-term disruptions associated with construction activities, including increased noise, equipment operation and storage, and temporary disruptions of traffic flow. At an anticipated construction rate of 200-400 feet per day, the disruption at any one location will be relatively short in duration. Approximately half of the construction within Boulder County will be limited to short-term disturbances with no additional easement acquisition required and, therefore, no long-term effect on future land use. The construction zone would be restored to preconstruction conditions as agreed to by each property owner, including fences, drain tile, irrigation systems, landscaping, private roads, and other improvements.

At locations south of the Vance Brand Municipal Airport in Longmont, both short and long-term effects to land use will occur. Short-term effects will be similar to those described above. Long-term effects will result from the acquisition of a new permanent easement, which prohibits certain types of uses within the easement. Agricultural uses can continue within the easement, but construction of permanent buildings or structures would be prohibited. Planting of trees and shrubs will not be permitted unless granted by Northern Water in advance. As noted previously, the pipeline was routed at most locations requiring new permanent and temporary construction easements adjacent to existing road rights-of-way, land lines, and other edges where the disruption of existing and future uses is minimized.

The project would not require the removal of any existing residences or other permanent buildings.

The pipeline alignment crosses through a total distance of approximately 17.5 miles of cultivated lands. Of this, approximately 0.3 mile is designated by the Natural Resources Conservation Service as farmland of statewide importance and 1.3 miles through land designated as prime farmland if irrigated. The Boulder Comprehensive Plan shows approximately 17.5 miles of pipeline crossing Significant Agricultural Land, including 1.9 miles of land of statewide importance, 7.5 miles of land of local importance, and 8.1 miles of lands of national importance. For nearly all of this distance, the alignment is located at field edges along roads or other features.

Agricultural uses will not be permanently affected by this project. Some pastures and cultivated areas will be temporarily disturbed by construction activities. The area temporarily disturbed by pipeline construction will be restored to pre-construction conditions. Prior to construction, agricultural improvements such as drain tiles and irrigation will be identified and either avoided to the extent practical or restored following construction. Topsoil will be segregated from lower horizon soils and sub-soils, stockpiled, and replaced in its natural order to ensure that unsuitable subsoil does not mix with the fertile topsoil. The ground contours will be restored and uncultivated areas will be revegetated with desirable species. If undesirable soil settling occurs, such as in areas that may disrupt flood irrigation, Northern Water will return to fix the grade.



Map Number & Title: Map 10 Land Use Zoning	Project Title & Applicant Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	Consultant AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Engineer Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Preparation Date: 1/20/2011 Revision Date 1: Revision Date 2: Revision Date 3:	<ul style="list-style-type: none"> Selected Pipeline Alignment Existing SWSP Pipeline Study Area (750 Feet Buffer)
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There is some interest by the City of Boulder to co-locate a trail and fire-fighting access within the pipeline easement at the City of Boulder Open Space near Boulder Reservoir. In addition, the City of Longmont has shown interest to co-locate and co-construct a water line north of the Longmont Vance Brand Municipal Airport. Northern Water will coordinate with both cities to consider the potential for cooperative agreements.

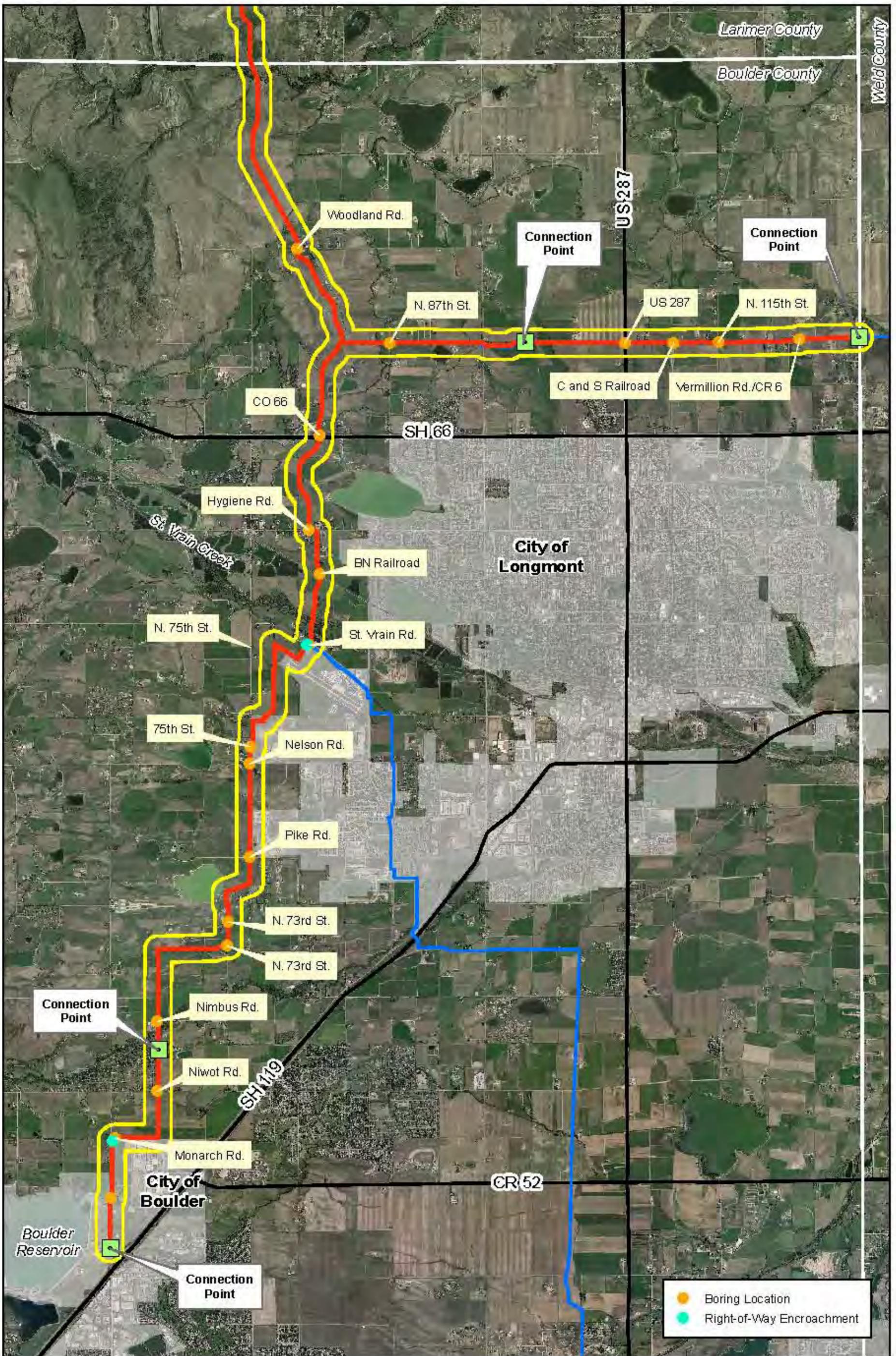
Approximately 7 of the 21 miles of SWSP II pipeline in Boulder County will be constructed within the existing SWSP easement. Tables 6 through 12 list other utility easements that parallel the selected SWSP II route. For the most part, SWSP II is located outside of existing road rights-of-way and parallels a number of roads. Where SWSP II crosses an existing road right-of-way, the crossing will be bored and jacked under the road if required. The SWSP II will potentially enter into existing Boulder County road right-of-way at four locations, including:

- St. Vrain Road west of the airport – Existing road right-of-way for 200 – 500 feet.
- Two or three structures south of Clover Basin drainage could push the pipeline into the right-of-way for a short distance.
- Along 75th Street – One or two structures north of Nelson Road could push the pipeline into the right-of-way for a short distance.
- Monarch Road at 63rd Street – There is a short section (200 feet±) where the pipeline may need to jump to the south of Monarch Road to avoid a residence, and it may need to push into the right-of-way for a few hundred feet.

Map 11 shows the locations of each of the road crossings as well as the four potential encroachments into the existing road rights-of-way. The temporary construction into Boulder County road rights-of-way will result in limited closures of roads. Construction will comply with all of the conditions set forth in an approved Boulder County Traffic Control Plan and Traffic Management Plan.

Any future development within Boulder County that might be served by the project will be subject to Boulder County review and will be required to comply with the policies and guidance contained within the Boulder County Comprehensive Plan. Similarly, future development within the City of Boulder will be done in a manner that is consistent with the BVCP, a joint plan between the City of Boulder and Boulder County.

Overall, the project complies with the Boulder County Comprehensive Plan, resulting in no long-term adverse effects to existing land uses and serving future development that is consistent with the land use framework defined in the plan. Four of the five project participants serve areas outside of Boulder County. Based on the amount of water to be received by each of the participants and how much is estimated for residential growth, the SWSP II is capable of supporting an increased population of approximately 18,100 in neighboring Weld County (Table 11). The majority of this new population would be located in the Town of Frederick along the I-25 corridor. Frederick's comprehensive plan provides for the development of major employment centers along the I-25 corridor as well as parks, trails, and other services. Based on these plans and the community's easy access to the Denver metropolitan area, it is anticipated that potential future impacts on Boulder County facilities and services will be minimal.



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: 11 Road and Railroad Crossings	Southern Water Supply Project II NCWC D 220 Water Ave. Berthoud, CO 80513 (970) 632-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	

Table 6. Utilities on North 75th Street - St. Vrain Road to Nelson Road

No.	Existing Utility	Utility Owner	Approximate Location	Above or Below Grade	Anticipated Typical Depth
1	Electric	City of Longmont Power	West ROW line	Above (overhead)	N/A
2	Potable water	City of Longmont	East side of ROW	Below (buried)	4-8 ft.
3	Potable water	Left Hand Water District	East and west sides of ROW	Below (buried)	4-8 ft.
4	Gas	Xcel	Within ROW	Below (buried)	3-8 ft.
5	Telephone/fiber-optic	Qwest	Within ROW	Below (buried)	2-10 ft.
6	Cable TV	Comcast	Within ROW	Above and/or below	2-4 ft.

*No research was completed for the highlighted utilities, but they are anticipated to also be within the right-of-way.

Table 7. Utilities on North 75th Street - Nelson Road to Plateau Road

No.	Existing Utility	Utility Owner	Approximate Location	Above or Below Grade	Anticipated Typical Depth
1	Electric	Poudre Valley REA	West ROW line	Above (overhead) and below (buried)	N/A and 3-8 ft.
2	Potable water - 8" dia.	Left Hand Water District	East and west sides of ROW	Below (buried)	4-8 ft.
3	Gas	Xcel	Within ROW	Below (buried)	3-8 ft.
4	Telephone/fiber-optic	Qwest	Within ROW	Below (buried)	2-10 ft.
5	Cable TV	Comcast	Within ROW	Above and/or below	2-4 ft.

*No research was completed for the highlighted utilities, but they are anticipated to also be within the right-of-way.

Table 8. Utilities on North 73rd Street - Plateau Road to Holland Ditch

No.	Existing Utility	Utility Owner	Approximate Location	Above or Below Grade	Anticipated Typical Depth
1	Electric	Poudre Valley REA	West ROW line	Above (overhead)	N/A
2	Potable water - 4" dia. Asbestos cement	Left Hand Water District	West ROW	Below (buried)	4-8 ft.
3	Gas	Xcel	Within ROW	Below (buried)	3-8 ft.
4	Telephone/fiber-optic	Qwest	Within ROW	Below (buried)	2-10 ft.
5	Cable TV	Comcast	Within ROW	Above and/or below	2-4 ft.

*No research was completed for the highlighted utilities, but they are anticipated to also be within the right-of-way.

Table 9. Utilities on North 67th Street - Oxford Road to Nimbus Road

No.	Existing Utility	Utility Owner	Approximate Location	Above or Below Grade	Anticipated Typical Depth
1	Potable water - 16 " dia.	Left Hand Water District	West ROW	Below (buried)	4-8 ft.
2	Telephone/fiber-optic	Qwest	Within ROW	Below (buried)	2-10 ft.
3	Cable TV	Comcast	Within ROW	Above and/or below	2-4 ft.

*No research was completed for the highlighted utilities, but they are anticipated to also be within the right-of-way.

Table 10. Utilities on Monarch Road - North 63rd Street to ¼ Mile East

No.	Existing Utility	Utility Owner	Approximate Location	Above or Below Grade	Anticipated Typical Depth
1	Electric	Xcel	South ROW line	Above (overhead)	N/A
2	Potable water	Left Hand Water District	North ROW	Below (buried)	4-8 ft.
3	Gas	Xcel	Within ROW	Below (buried)	3-8 ft.
4	Telephone/fiber-optic	Qwest	Within ROW	Below (buried)	2-10 ft.
5	Cable TV	Comcast	Within ROW	Above and/or below	2-4 ft.

*No research was completed for the highlighted utilities, but they are anticipated to also be within the right-of-way.

Table 11. Utilities on North 63rd Street - Monarch Road to Boulder Reservoir WTP

No.	Existing Utility	Utility Owner	Approximate Location	Above or Below Grade	Anticipated Typical Depth
1	Electric	Xcel	East ROW line	Above (overhead)	N/A
2	Electric	Poudre Valley REA	West ROW line	Above (overhead)	N/A
3	Potable water - 1 1/2" dia.	Left Hand Water District	East ROW	Below (buried)	4-8 ft.
4	Potable water - 12" dia.	City of Boulder	East ROW	Below (buried)	4-8 ft.
5	Gas	Xcel	West ROW	Below (buried)	3-8 ft.
6	Telephone/fiber-optic	Qwest	Within ROW	Below (buried)	2-10 ft.
7	Cable TV	Comcast	Within ROW	Above and/or below	2-4 ft.

*No research was completed for the highlighted utilities, but they are anticipated to also be within the right-of-way.

Table 12. Summary of Potential Growth Outside of Boulder County

Participant	SWSP II Capacity	AF/Year @ 724 AF/cfs	% intended to serve new residential growth	Future Households Served @ (.5 AF/HH)	Population Served @ 2.78/HH	% of Water District outside of Boulder County	Estimated population growth outside of Boulder County supported by SWSP II
City of Boulder	25 cfs	18,100 AF	0%	36,200 HH	100,636	0%	0
Left Hand Water District	11 cfs	7,964 AF	0%	15,928	44,280	30%	0
Longs Peak Water District	3 cfs	2,172 AF	0%	4,344 HH	12,076	NA	0
Town of Frederick	3 cfs	2,172 AF	100 %	4,344 HH	12,076	100%	12,076

Water Resources

Floodplain

The only identified hazard areas crossed by the pipeline are stream crossings and their associated floodplains. As previously described, the pipeline route crosses through a number of floodplain hazards that are identified from the Boulder County GIS data. The floodplains identified from the data include Little Thompson River, St. Vrain River, Dry Creek No. 1, Left Hand Creek, and Dry Creek No. 2. Although these hazards are present, the pipeline will not adversely affect the floodplain, nor will it be affected by flood events. The pipeline will be completely buried and will not change the ground topography or floodplain capacity. The pipeline will be constructed at river crossings to withstand any potential scouring. All structures, such as air release vents (ARV) and blow off assemblies, will be installed below grade and accessed through flush level manholes. All grades will be returned to preconstruction conditions.

Flood Hazard

The Boulder County Comprehensive Plan Geologic Hazards and Constraints Map indicates that Little Thompson River, St. Vrain River, and Left Hand Creek all have a moderate geologic hazard with regard to flash-flooding. In addition, the Little Thompson River, St. Vrain River, Dry Creek No. 1, Left Hand Creek, and Dry Creek No. 2 all have defined 100-year floodplains (see Reference Maps I-P in Appendix IV.). The majority of the project is located outside of these areas. The project will be designed to mitigate any potential risks associated with flash-flooding and scouring. The pipeline will be buried and there will not be any above ground structures in these areas. All necessary ARV's and blow off assemblies will be located below ground and accessed through a flush mounted manhole. The pipeline itself will be buried to a minimum of 4 feet. As a result of these measures, the project will not have any effect on the pattern or intensity of flooding.

Surface Water

The selected pipeline route crosses a number of natural surface waters and irrigation ditches, including the Little Thompson River, St. Vrain River, Dry Creek No. 1, Left Hand Creek, Dry Creek No. 2, Supply Ditch, Highland Ditch, Rough & Ready Ditch, Longmont Supply Ditch, etc. (Maps I through P). These reaches of surface water are not listed on the Colorado Department of Public Health and Environment, Water Quality Control Commission, classifications and numeric standards.

Water Quality

The project will have no adverse effects on water quality. Best management practices (BMPs) will be used during construction; and following construction, the disturbed area will be restored with native vegetation, where applicable. A storm water discharge and construction dewatering permit will be obtained from the Colorado Department of Public Health and Environment for construction at drainage crossings. These permits will include the preparation of a Storm Water Management Plan (SWMP) and BMPs to prevent storm water runoff and sediment in disturbed areas from reaching nearby waterways. BMPs will be consistent with the Urban Drainage and Flood Control District's Urban Storm Drainage Criteria Manual, Volume 3. Typical measures employed may include detention basins, silt fences, hay bales, wattles, and hydro mulch. These measures will deflect runoff, collect sediment, and allow infiltration. Storm water and erosion control measures will be carefully monitored during construction to ensure their effectiveness.

Ground Water

Where construction activities intercept high ground water, the trench will be dewatered and routed to settling basins in upland areas to allow infiltration and collection of sediment. No

discharge to the creeks will be allowed. Effects to ground water will be minor, short term, and limited to the construction phase of the project. No long-term effects to ground water or surface water are anticipated. Trench plugs will be placed around the pipeline to prevent water from flowing down the porous material in the trench, thus eliminating potential effects on the ground water movement.

All water that will be delivered by the SWSP II pipeline consists of existing Windy Gap and C-BT Project water rights. No additional water rights are needed to implement the project.

Wetland and Riparian Areas

The project crosses riparian vegetation and wetlands at multiple locations, including perennial streams, intermittent and ephemeral drainages, irrigation ditches, isolated wetlands, and associated riparian areas (Reference Maps I-P in Appendix IV.). The table in Appendix V shows the dominant vegetation present at each crossing. The vegetation within the riparian and wetland areas consists of three primary vegetation types, including riparian woodland, riparian shrubland, and emergent wetland. These plant communities are often intertwined and transition from one to the other along a hydrological gradient.

The riparian woodland plant community primarily consists of mature trees such as plains cottonwoods (*Populus deltoids*), narrow leaf cottonwood (*Populus angustifolia*), and crack willow, (*Salix fragilis*). These species occur where suitable hydrology occurs, primarily along natural drainages or irrigation ditches. Some of these species were planted as individual trees or as windbreaks along irrigation ditches. These woodlands and some individual trees provide nesting and roosting habitat for raptors and other bird species. The riparian shrubland community primarily consists of wood rose (*Rosa woodsii*), coyote willow (*Salix exigua*), golden current (*Ribes aureum*), skunkbush (*Rhus trilobata*), virgin's bower (*Clematis ligusticifolia*), and chokecherry (*Prunus virginiana*).

The emergent wetland plant community is often dominated by species such as narrowleaved cattail (*Typha latifolia*), Nebraska sedge (*Carex nebrascensis*) or four squares, common threesquare (*Schoenoplectus pungens*), Emory's sedge (*Carex emoryi*), and reed canarygrass (*Phalaris arundinacea*). Other species present include smooth brome (*Bromus inermis*), Canada wild rye (*Elymus canadensis*), foxtail barley (*Critesion jubatum*), western wheatgrass (*Pascopyrum smithii*), and Russian olive (*Elaeagnus angustifolia*).

The project will temporarily disturb areas within these wetland and riparian corridors. Many of these crossings have already been disturbed by previous projects, including the original SWSP that has been subsequently restored. A restoration plan will be developed for new disturbances at each crossing.

Jurisdictional waters of the United States (U.S.) and wetlands occur at several locations where the pipeline crosses a drainage. Impacts to these jurisdictional waters will require a Section 404 permit under the Clean Water Act. A Pre-Construction Notification for the pipeline impacts has been sent to the U.S. Army Corps of Engineers (Corps) and is expected to be permitted under Nationwide Permit (NWP) 12 for utility lines. NWP 12 permits up to half an acre of permanent impact to waters of the U.S. at each crossing. All impacts to waters of the U.S. will be temporary in nature and no permanent impacts will result. The ground contours will be restored, topsoil will be salvaged and replaced, and the disturbance will be revegetated with native species.

The City of Boulder also regulates disturbance of stream margins or buffers under its wetland ordinance. This ordinance applies to all wetlands within its incorporated boundary or on land owned wholly or in part by the City of Boulder. Some wetlands and jurisdictional crossings also meet the City of Boulder wetland criteria, which require the presence of two of the three Corps wetland criteria (vegetation, hydrology, and soils).

All of the wetlands and jurisdictional crossings are shown on Reference Maps I-P in Appendix I. and are listed in Appendix II. These wetlands and associated riparian buffers were avoided where possible; however, there is no way to avoid the crossing of all drainages (many of which have a generally west to east orientation) with a linear pipeline that generally runs north to south. Impacts were minimized where possible. For example, the crossing point of Left Hand Creek was selected to avoid most of the cottonwoods present.

During the routing feasibility study, Colorado Natural Heritage Program (CNHP) performed a search through its Biodiversity Tracking and Conservation System database (BIOTICS) for natural heritage elements (occurrences of significant natural communities and rare, threatened, or endangered plants and animals) documented in the vicinity of the project alignments. CNHP species identified within the selected route easement are shown in Table 13 and CNHP sensitive vegetation communities are shown in Table 14.

In addition, CNHP has identified several areas as Network of Conservation Areas² (NCA) or Potential Conservation Areas³ (PCAs), including the Little Thompson River and St. Vrain Creek corridors (Reference Map I and K in Appendix IV). NCAs and PCAs have been identified because of their biological values, ecological processes, and habitat integrity.⁴ These areas provide large, well developed habitats that are used by a variety of wildlife and contain occurrences of rare species elements. Both of the PCA stream crossings were previously crossed by the original SWSP, and the SWSP II would be constructed in the existing easement. Photographs of the crossings at the two riverine PCAs are shown below in photographs 5 and 6.

² **Network of Conservation Areas (NCA) will fit one of the following definitions:**

A. A landscape area that encompasses Potential Conservation Areas (PCAs) that share similar species or natural communities and ecological processes. NCAs include unoccupied or unsurveyed areas that are within the same ecological system that the species or natural communities require. NCAs contain PCAs with an obvious repeating pattern (that is, the same species or natural communities are in each associated PCA).

B. A mostly intact, lightly fragmented landscape that supports wide-ranging species and large scale disturbances. NCAs include unoccupied or unsurveyed areas that demonstrate the connectivity of the landscape. NCAs contain PCAs that may occur at a variety of ecological scales.

³ **Potential Conservation Areas**

PCAs identify lands that capture the ecological processes that are necessary to support the continued existence of a particular element or suite of elements of natural heritage significance.

The proposed boundary does not automatically exclude all activity. Activities within PCAs should be carefully considered to ensure that ecological processes are not disrupted.



Photograph 5. Proposed crossing of the Little Thompson River (existing SWSP easement)



Photograph 6. Proposed crossing of the St. Vrain River (existing SWSP easement)

Table 13. Colorado Natural Heritage Program Sensitive Species February 12, 2009 within selected route easement in Boulder County

Scientific Name	Common Name	G Rank/ S Rank	F/S Status	Habitat	Occurrence
<i>Melanerpes lewis</i>	Lewis's woodpecker	G4/S4	FC	Open forest and woodland, (primarily coniferous)	Potential habitat occurs at riparian crossings with riparian woodland; none observed.
<i>Zapus hudsonius preblei</i>	Preble's meadow jumping mouse	G5-T2/S1	FT/ ST	Riparian shrubland	Potential habitat occurs; none found during focused surveys.
<i>Cynomys ludovicianus</i>	black-tailed prairie dog	G4/S3	FC/SC	Grassy plains and prairies	Potential habitat occurs; specimens found in several selected alignment areas.
<i>Anodontoides ferussacianus</i>	cylindrical papershell	G5/S2	SC	Shallow creeks, springs, or lakes with muddy or sandy bottoms	Potential habitat occurs; none observed.
<i>Hybognathus hankinsoni</i>	brassy minnow	G5/S3	ST	Cool gravelly streams with a sediment overlay and aquatic vegetation	Potential habitat occurs; none observed.
<i>Notropis cornutus</i>	common shiner	G5/S2	ST	Cool gravelly streams that are not covered with sediment but are shaded by overhanging vegetation	Potential habitat occurs; specimens found at selected alignment crossings of Little Thompson River.
<i>Rana pipiens</i>	Northern leopard frog	G5/S3	SC	Wet meadows; banks and shallows of lakes, ponds, and rivers	Potential habitat occurs; none observed.

FT – Federally threatened

FC – Federal species of concern (This is the term used in the data provided by CNHP. We assume this is the former C2 category that is no longer recognized by USFWS.)

ST – State threatened

SC – State Species of Special Concern

G4 - Apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery.

G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

TRINOMIAL RANK (T): used for subspecies or varieties. These taxa are ranked on the same criteria as G1-G5:

T2 - Imperiled globally because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it very vulnerable to extinction throughout its range.

(Endangered throughout its range).

S1 - Critically imperiled in state because of extreme rarity (5 or fewer occurrences, or very few remaining individuals, or because of some factor of its biology making it especially vulnerable to extirpation from the state. (Critically endangered in state).

S2 - Imperiled in state because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it very vulnerable to extirpation from the state. (Endangered or threatened in state).

S3 - Vulnerable in state (21 to 100 occurrences).

S4 – Apparently, secure in state; (usually > 100 occurrences)

Table 14. Colorado Natural Heritage Program Sensitive Vegetation Communities February 12, 2009 within selected route easement in Boulder County.

<i>Scientific Name</i>	Common Name	G Rank/S Rank	Occurrence
<i>Populus deltoids</i> – (<i>Salix amygdaloides</i>) / <i>Salix (exigua, interior)</i> Woodland	Plains Cottonwood Riparian Woodland	G3G4/S3	One potential occurrence
<i>Distichlis spicata</i> - Herbaceous Vegetation	Salt Meadows	G5/S3	One potential occurrence
<i>Suaeda moquinii</i> - Shrubland	Salt Meadows	G5/S2	One potential occurrence

G3 – Globally vulnerable; typically 21 to 100 occurrences

G4 - Apparently secure globally, though it might be quite rare in parts of its range, especially at the periphery.

G5 - Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.

S2 - Imperiled in state because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it very vulnerable to extirpation from the state. (Endangered or threatened in state).

S3 - Vulnerable in state (21 to 100 occurrences).

Terrestrial and Aquatic Animals and Habitat

Project biologists completed an inventory of the natural resources within the project alignment. A summary of the sensitive environmental issues is provided in Table 15 and are discussed in subsequent sections of this report. The project avoids all areas identified in the Boulder County Comprehensive Plan as critical wildlife habitat areas. However, the SWSP II does cross the St. Vrain River riparian corridor near an area designated as a significant riparian corridor in the comprehensive plan. This crossing is within the existing SWSP easement, which is being used as a drivable stream crossing. The selected route also crosses near a Great Plains Salt Meadow, and the Left Hand Creek Critical Wildlife Habitat; however, these specific areas are avoided.

Table 15. Summary of sensitive environmental issues

Status	Criteria	Determination
Federally Threatened and Endangered (T&E) Species	Critical or potential habitat for federally designated threatened or endangered species.	Potential habitat present. None found within study area in focused surveys.
State T & E Species and Species of Special Concern	Potential habitat for, or known locations of, state T&E species or species of special concern.	Potential habitat present. Two of six species observed within selected alignment.
Colorado Natural Heritage Program (CNHP) Tracked Species	Potential habitat present for CNHP tracked species	Potential habitat present. Focused surveys performed for some species, but none found within selected alignment
Migratory Bird Treaty Act Protected Species	Potential habitat and nesting sites present for raptors or other protected passerine and waterfowl species.	Several raptor nests present. Potential passerine and waterfowl breeding habitats present.

Threatened and Endangered Species

Preble's Meadow Jumping Mouse

The Preble's meadow jumping mouse (PMJM) (*Zapus hudsonius preblei*) is listed as threatened under the federal Endangered Species Act. PMJM inhabit areas containing riparian vegetation with extensive tree and shrub cover that provide good potential habitat. Previous studies indicate that a number of riparian corridors crossed by the selected route may contain suitable habitat. Based on additional targeted surveys performed by a PMJM specialist, potential high quality habitat exists at the Little Thompson River, St. Vrain River, and Left Hand Creek. Poor habitat was observed at several ditch, drainage, and creek crossings, but the PMJM specialist did not recommend trapping in these locations. Potential habitat areas not previously trapped were trapped by the specialist in accordance with U.S. Fish and Wildlife Service (USFWS) protocol. All other areas were disqualified for trapping due to the lack of habitat or lack of connectivity. The analysis of each crossing for PMJM habitat is shown in the table in Appendix II. No PMJM were found and the project is not expected to have any effect on this species. The USFWS has been consulted on this trapping effort, and they concur with the recommendations for PMJM trapping and accept the survey findings.

Ute Ladies'-Tresses Orchid

The Ute ladies'-tresses orchid (*Spiranthes diluvialis*) is a federally threatened plant species under the Endangered Species Act. The Ute ladies'-tresses orchid occurs in seasonally moist alluvial soils and wet meadows near springs, lakes and streams, and associated floodplains below 6,500 feet elevation. A number of wetland crossings fit this description along the selected route. An analysis of potential habitat at each crossing is summarized in the table in Appendix II. All of the crossing locations were surveyed for Ute ladies'-tresses orchids during the orchid's blooming period (conducted on August 9 and 17). A reference site was visited near Cherryvale Road in Boulder for comparison before each site survey. No orchids were found, a CNHP search does not list occurrences of this species within the selected alignment easement, and the project is not expected to have any effect on this plant species.

Brassy Minnow

The brassy minnow (*Hybognathus hankinsoni*) is a small, state-threatened species of fish that prefers cool, gravelly streams with a sediment overlay and aquatic vegetation. It has been found in the lower St. Vrain River and is predicted to occur at river crossings within the selected alignment. BMPs such as those found in the Urban Drainage and Flood Control District's Urban Storm Drainage Criteria Manual, Volume 3 will be applied to river and stream crossings to minimize any potential impacts to this fish or its habitat and minimize the duration of temporary impact. Streams will be crossed using the open trench method during the winter months when stream flows are at their lowest levels. Sediment control measures, such as berms, silt fence, or filter fabrics will be used to minimize the downstream migration of sediments and the inadvertent trapping of aquatic species.

Common Shiner

The common shiner (*Notropis cornutus*) is a small, state-threatened species of fish that prefers cool gravelly streams, which are not covered with sediment but are shaded by overhanging vegetation. Shiners are only found in tributary streams to the South Platte River, including the St. Vrain River, and this species is predicted to occur at river crossings within the selected alignment. Dead common shiners were observed by field personnel in a side pool of the Little Thompson River. BMPs will be applied to river and stream crossings to minimize any potential impacts to this fish or its habitat. Minimization measures discussed for the brassy minnow will also be used.

Colorado State Species of Special Concern

Black-tailed Prairie Dog

Black-tailed prairie dogs (*Cynomys ludovicianus*) are undergoing review by USFWS for possible listing, and are currently listed as a Colorado species of special concern due to loss of habitat in the state, their function as prairie and grassland ecosystem cornerstone species, and widespread plague outbreaks that have dramatically reduced populations in some locations. Prairie dog colonies are located within the study area and edges of their colonies cross into the selected alignment in several locations. Permits from the Colorado Division of Wildlife (CDOW) are required to relocate or eradicate prairie dogs. Boulder County makes efforts to relocate prairie dogs when practical; Northern Water will follow Boulder County guidelines in its management of prairie dogs where they exist within the selected easement.

Cylindrical Papershell

The cylindrical papershell (*Anodontoides ferussacianus*) is a medium sized freshwater mussel found in muddy or sandy bottoms of lakes and quiet streams. The papershell is a species of special concern in Colorado. It has been observed in freshwater sources in the Hygene, Niwot, and Longmont quads in Boulder County, and is predicted to occur in the St. Vrain River outside of the selected alignment. However, the last recorded observations of this species occurred in 1977. BMPs will be applied to river and stream crossings to minimize any potential impacts to this mollusk or its habitat in case it is still present.

Minimization measures described for the brassy minnow will be used to minimize impacts to the cylindrical papershell. Additionally, surface alluvium and sediments excavated from within the stream will be replaced in the same order in which they are removed, preserving sediment horizons. If cylindrical papershell are found during construction, excavated alluvium will be kept moist while stockpiled, until material is placed back to post construction elevations.

Northern Leopard Frog

The Northern leopard frog, a state species of special concern, is found in both mountains and plains habitats throughout central and western Colorado. They can be locally common, but are rare or extirpated from a majority of the state, particularly in the mountains. They live and breed in and near shallow permanent water, wet meadows, and quiet streams and ditches, and are predicted to occur within the selected alignment in two locations. BMPs will be applied to river and stream crossings and adjacent habitats to minimize any potential impacts to this frog or its habitat. Minimization of the extent of disturbed area will be used when crossing aquatic habitats in order to minimize impacts to the Northern leopard frog.

Additional Sensitive Species

Bell's Twinpod

The Bell's twinpod (*Physaria bellii*) is a former Category 2 candidate plant species. This classification no longer exists; however, surveys were specifically performed for this species in all areas with suitable habitat, including shaley outcrops. One population of Bell's twinpod was located close to the selected route in Larimer County. This population is located near the end of Larimer County Road 6 and is outside of the proposed easement. No Bell's twinpod were found within the selected route easement in Boulder County.

Migratory Birds

All migratory birds, including raptors, are protected under the Migratory Bird Treaty Act (MBTA) of 1918, which prohibits the taking of migratory birds, eggs, and nests. The Act states:

Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703)

A number of raptor nests are located in proximity to the selected alignment. Nesting raptors can be sensitive to nearby activity or disturbances. The CDOW has developed guidelines for seasonal buffers to prevent the disruption of nesting activities. These seasonal avoidance buffers will be used to schedule construction activities. For example, red-tailed hawk nests should be avoided within a 1/3-mile radius of the nest site between February 15 and July 15. Prior to construction, all raptor nests and roost locations will be reviewed with CDOW to discuss their recommendation for each specific situation. Raptor nests identified near the proposed pipeline alignment are identified on Reference Maps I-P in Appendix IV. Pre-construction surveys will be performed for all spring through fall construction activities to identify locally breeding migratory passerines and waterfowl within and immediately adjacent to the selected route. Locations where active breeding is observed (nest-building, mating behavior, incubation, presence of fledglings), will not be disturbed by construction activities. In compliance with MBTA, no active nests will be directly disturbed by the project. Most bird

species are protected under this act with the exception of nonnative species such as European starlings and house sparrows. A full list of species protected by this Act can be found at <http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtandx.html>.

In addition, prairie dog colonies, which provide nesting habitat for the burrowing owl, have been identified along the proposed route and are identified on Reference Maps I-P in Appendix IV. Burrowing owls are sensitive to human encroachment and should be avoided within 75 yards of the colony site from April 1 through August 15. Construction through prairie dog colonies will be performed between November 1 and March 1, unless focused surveys for burrowing owls can demonstrate that this species is not present. Prior to construction, affected prairie dog colonies will be relocated consistent with County and City of Boulder requirements.

Wildlife and Fisheries

The primary riparian corridors that are crossed by the selected route, such as the Little Thompson River, St. Vrain River, and Left Hand Creek, provide essential habitat for fish and wildlife. These riparian corridors provide cover and feeding opportunities for many terrestrial species, breeding habitat for birds, and aquatic habitat for fish. In addition, riparian corridors provide important migration corridors for larger mammals such as muledeer (*Odocoileus hemionius*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). These migration corridors are especially important in areas where the foothills transition to the eastern plains. No long-term disruption to these important habitats is anticipated.

The Boulder County data indicates there are critical wildlife habitats along these drainages. The CDOW data identifies specific wildlife habitat, including bald eagle roost and winter concentration areas, Potential and occupied PMJM habitat, and snow goose production area (Reference Maps I-P in Appendix IV.). Although these identified areas are seasonally sensitive, temporary disturbance associated with construction can be scheduled during non-sensitive periods. In addition, snow geese nest only in the arctic; this designated production area is likely a winter concentration area and may be the result of a map labeling error. The bald eagle roost identified at St. Vrain River is within the vicinity of the SWSP II alignment and seasonal buffers recommended by the CDOW will be followed for construction activities. These recommendations include avoiding activities within ¼ mile of roost areas between November 15 and March 15. Once the pipeline is constructed and restored, there is not expected to be any long-term effect on wildlife.

Terrestrial and Aquatic Plant Life

The USGS GIS data set indicates three plant communities within the study area, including forested, grassland, and natural herbaceous. The CDOW riparian habitat data set shows five vegetation types, including forested, riparian shrub, willow, riparian herbaceous, and open water. The Boulder County GIS data set identifies one area as Great Plains Salt Meadow. In addition to the wetland and riparian plant communities described above, mixed grassland and shrubland are also prevalent throughout the selected route. The CNHP also tracks the occurrences of rare or potentially-imperiled vegetation communities (see Table 13).

Mixed Grassland

The upland grassland that exists along the selected route consists of a mixture of native and weed plant species. The plant community is dominated by western wheatgrass (*Pascopyrum smithii*), smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa secunda*), sideoats grama (*Bouteloua curtipendula*), crested wheatgrass (*Agropyrum cristatum*), and cheatgrass (*Bromus tectorum*). Some of the forbs include field horsetail (*Equisetum arvense*), chicory (*Cichorium intybus*), alfalfa (*Medicago sativa*), lambs quarters (*Chenopodium album*), showy milkweed (*Asclepias speciosa*), kochia (*Kochia scoparia*), scarlet globe mallow (*Sphaeralcea coccinea*), horseweed (*Conyza canadensis*), asparagus (*Asparagus officinalis*), wild licorice (*Glycyrrhiza lepidota*), salsify (*Tragopogon dubius*), mullein (*Verbascum thapsus*), smooth

groundcherry (*Physalis virginiana*), and western tansy mustard (*Descurainia pinnata*). Although mixed grassland will be temporarily affected, no long-term impacts are expected as a result of this project. Impacts to mixed grassland will be reclaimed with similar species composition.

Shrubland

Several areas of shrubland exist along the northern portion of the alignment. The shrubland is dominated by species such as rubber rabbitbrush (*Chrysothamnus nauseosus*), fringed sagebrush (*Artemisia frigida*), winterfat (*Krascheninnikovia lanata*), yucca (*Yucca glauca*), and broom snakeweed (*Gutierrezia sarothrae*). Grasses include western wheatgrass (*Pascopyrum smithii*) and blue grama (*Bouteloua gracilis*). Shrubland will be temporarily affected during construction. Following reclamation of shrubland, no long-term impact to this community will result.

Great Plains Salt Meadow

Boulder County identifies a Great Plains Salt Meadow at a location near Lagerman Reservoir. Although the data shows a polygon of Great Plains salt meadow north of Pike Road (east side of North 75th Street, on opposite side of street as pipeline), there is an area along Dry Creek, downstream of Lagerman Reservoir, with similar characteristics. This area is a saline wet meadow that is saturated to the surface. The vegetation at this location is dominated by inland saltgrass (*Distichlis stricta*), common spikerush (*Eleocharis palustris*), and includes annual rabbitsfoot grass (*Polypogon monspeliensis*), alkali sacaton (*Sporobolus airoides*), arctic rush (*Juncus arcticus*), salt sandspurry (*Spergularia marina*), common threesquare (*Schoenoplectus pungens*), and jointleaf rush (*Juncus articulatus*). No long-term impacts to salt meadow will result from construction. Impacts will be temporary in nature and salt meadow habitat will be reclaimed following construction. Photograph 7 shows the Great Plains Salt Meadow.



Photograph 7. Great Plains Salt Meadow located along Dry Creek downstream of Lagerman Reservoir

Forested Riparian

Most of the mature trees will be avoided by the selected route. One area that is heavily congested with mature trees is Left Hand Creek. However, at the selected crossing, there is a small opening that can be used for pipeline construction, which will avoid the removal of trees. Some trees may need to be trimmed to avoid damage to the trees. Photograph 8 shows the alignment at Left Hand Creek.



Photograph 8. The pipeline route at Left Hand Creek

Noxious Weeds

Weeds listed in the Colorado Noxious Weeds Act are common along the pipeline alignment. There are several large patches of Russian olive found along the alignment, such as at IBM and near the Left Hand Creek crossing. No other large patches of noxious weeds were identified and no noxious weeds from the Colorado Noxious Weeds List A were observed during the field surveys. The following Colorado Noxious Weeds from Lists B and C, some of which are also listed as Boulder County noxious weeds (Appendix V), were observed sporadically within the selected route:

List B

- Canada thistle (*Cirsium arvense*)
- Common teasel (*Dipsacus fullonum*)
- Dalmatian toadflax, narrow-leaved (*Linaria genistifolia*)
- Diffuse knapweed (*Centaurea diffusa*)
- Leafy spurge (*Euphorbia esula*)
- Russian-olive (*Elaeagnus angustifolia*)

List C

- Chicory (*Cichorium intybus*)
- Common mullein (*Verbascum thapsus*)
- Downy brome (*Bromus tectorum*)

- Field bindweed (*Convolvulus arvensis*)
- Perennial sowthistle (*Sonchus arvensis*)

To avoid the spread of these noxious weeds, topsoil will be salvaged and stockpiled separately from subsoil and other materials to prevent the spread of noxious weed seed. To do this, areas containing noxious weeds will be identified and delineated at the start of construction and avoided. Noxious weeds will be controlled with herbicide, and weed infested soil will not be mixed with topsoil and other soils. If noxious weeds, such as Russian olive, are encountered within the construction right-of-way, they will be eradicated, pending property owner permission⁵. Following construction, restoration activities will occur and maintenance to treat any noxious weeds will occur until native vegetation is established. A full list of Boulder County noxious weeds can be found at <http://www.bouldercounty.org/find/library/environment/weedlist.pdf>.

Air Quality

The SWSP II will not result in any long-term changes to air quality. Construction of the project will result in short-term emission exhaust from construction traffic and traffic delays. The short-term effects will be minimized by using standard contract requirements concerning vehicle idling and by minimizing traffic delays.

The contractor will be responsible for developing and implementing a fugitive dust control plan. The plan will be submitted and approved by the Boulder County Health Department and Colorado Division of Public Health and Environment prior to construction⁶.

The City of Boulder may install a hydroelectric generator on the end of the Boulder Reservoir WTP. This renewable source of electricity could potentially offset some emissions produced at a fossil fuel burning plant. At this time, the inclusion of a hydroelectric generator has not been determined. Further details will be available if hydroelectric generation is included during the final design.

Significant Environmentally-Sensitive Factors

Potential Natural Hazards

The 100-year floodplain crossed by the pipeline at the Little Thompson River, St. Vrain River, Dry Creek No. 1, Left Hand Creek, and Dry Creek No. 2 are the only potential natural hazards in the area. These natural hazards will not be affected by construction of the SWSP II because of the nature of the project. The buried pipeline will not change the floodplain and the pre-construction grades will be restored.

Public Outdoor Recreation and Open Space Areas

One property at the Boulder Reservoir is used for public outdoor recreation. There will be no recreation closures during construction.

Unique Areas of Geologic, Historic, and Archaeological Importance

Cultural and historic resources information was obtained from a file search of the State Historical Preservation Office (SHPO) and a review of known cultural resources by Peter Gleichman of Native Cultural Services. The file search for the entire project alignment

⁵ With the property owner's permission, all Russian olive trees within the easement will be cut and stump treated with herbicide and will be monitored as part of the restoration monitoring.

⁶ The Land Development APEN/Dust Control Plan can be found at: <http://www.cdphe.state.co.us/ap/downpermitforms/APENLandDevelopment.pdf> Regulations Numbers 1 & 3 can be found at: www.cdphe.state.co.us/regulations/airregs Colorado Air Quality Control Commission's Regulation No. 3 will be complied with for non-attainment areas and appropriate controls will be used.

revealed one prehistoric resource (isolated artifact) within the study area; however, isolated artifacts are not eligible for listing on the National Register of Historic Places (NRHP). The file search also revealed 17 historic resources, including irrigation ditches, railroads, and standing buildings. The pipeline route does not adversely affect any known cultural resources. All of the eligible buildings will be avoided. The alignment will cross the Clover Basin Ditch; not enough data was available in the records search to determine if it is eligible. In order to comply with Section 106 of the Historical Preservation Act, a field determination of the status of this ditch is needed before a 404 permit can be obtained. If necessary, the pipeline can be engineered and constructed without impact to the ditch.

The SHPO files list the Boulder and Left Hand Railroad as occurring in the project vicinity and eligible for listing on the NRHP. However, Peter Gleichman, who performed the literature review, believes this information is erroneous and the Boulder and Left Hand Railroad may have been confused with the Middle Park and Pacific Railroad.

Given the potential for undocumented cultural resources to occur, a field survey of the alignment will be performed once the easement is acquired. Adverse effects to significant cultural properties from pipeline construction will be avoided or mitigated.

The SWSP II will follow the cultural mitigation measures identified in the Environmental Commitments (Appendix I). A Class III resource inventory of the right-of-way will be conducted. Identified cultural resources within the right-of-way will be avoided to the extent practical. If avoidance is not possible, SHPO will be consulted regarding eligibility of the subject sites for inclusion in the NRHP. Cultural resources reporting will include site forms and the results of archaeological testing.

These mitigation measures include having a paleontologist present during trench excavation in geologic formations with a potential to contain significant fossils. If significant fossils are found, construction will be rescheduled to allow for resources recovery or the trench will be realigned. If fossils are noticed elsewhere, a paleontologist will be consulted.

Visual Aesthetics and Nuisance Factors

The selected SWSP II route is visible from a number of public roads. The construction will temporarily disturb the existing vegetation and associated land use. A restoration plan using native species will be developed for impacts to native habitats once the easement is acquired and final design is underway. Reclamation plans will also be developed for hay pastures. Grades will be restored to pre-construction conditions and any surficial irrigation will be graded to restore function. If post-construction soil settling occurs, additional correction will be made. Examples of the level of restoration can be seen at the original SWSP alignment, which is difficult to locate except for the pipeline markers (Photograph 9).



Photograph 5. Habitat previously impacted by original SWSP and restored to native conditions. Pipeline marker located at the top of the hill, with little other evidence of the pipeline through this area.

Potential temporary disturbances:

- Construction will result in temporary construction noise. Construction practices will comply with the following conditions to minimize noise disruptions.
- Construction shall not exceed 82 dB (average) from the nearest residence during the hours of 7:00 a.m. and 7:00 p.m. for work of any type, and shall not exceed 75 dB (average) all other times. Boulder County can monitor this noise standard and grant variances, if determined to be necessary.
- Sound from any moving vehicle source associated with the project shall not exceed 82 dB (A) at any time. Mufflers on equipment will be rated to fall below this level.
- In cultivated fields, construction will occur to minimize the amount of time the field is out of production. Agricultural lands will be avoided from March 1 to October 1 to the maximum extent practical. However, any loss of crop production or crop damages will be compensated by Northern Water.
- Construction can attract public curiosity and create a safety hazard for both workers and the public. Signing, fencing, and traffic control will be used to limit risk to the public and workers. A health and safety plan will be created and implemented during

construction to further enhance public and worker safety. Emergency responders will be notified of the project, and regular progress updates will be reported to ensure first responders know the current location of workers.

Transportation Impacts

During construction of the pipeline, temporary delays or detours may affect traffic patterns on roadways along, or crossed by the alignment. The majority of roads within the study area are under the jurisdiction of Boulder County, and are typically two-lane with asphalt surfacing. The county typically requires that existing paved roadways be crossed by bore and jack methods, perpendicular to the roadway, unless overriding circumstances render this method infeasible. Major highways within the study area include State Highways 66, 287, 119, and 52. The Colorado Department of Transportation also typically requires that state highways be crossed by bore and jack methods perpendicular to the roadway. This type of crossing roadways will create minor impacts. Routes that parallel roadways are assumed to be constructed in a separate pipeline easement unless constraints require construction in a road right-of-way or in the roadway. Construction in active travel lanes could create major impacts to transportation and will be avoided to the extent practical.

One lane of traffic will be maintained at all times and residential and emergency access will be provided at all times to adjacent properties. Traffic closures may require altering one-way traffic flow and the use of flagmen. Under normal traffic volume patterns, only several minutes of delay would be expected. During nonworking hours, steel plates will be installed to allow traffic to flow freely in both directions.

Road crossings will be completed during the spring and summer months so that any necessary road repaving can be completed as quickly as possible. Working hours may be altered to avoid peak traffic periods. Following the completion of the pipeline, street repaving will take approximately one day to complete at each location.

Prior to the commencement of construction activities, a pre-construction meeting will be held with the contractor and agency representatives to set forth the hours of work, access points, snow removal in the construction zone, traffic management and traffic control, and construction and inspection schedules.

Open Space

The SWSP II alignment crosses multiple open space properties. Given the success of the open space programs in Boulder County, avoiding any crossings of these areas was not possible. Open space properties are summarized in Table 16. From an overall distance perspective, the majority of these crossings occur through areas that are under active cultivation. Construction through these areas will be conducted in a manner that minimizes disruptions to agricultural activities, and all disturbed areas will be carefully restored to original condition in terms of soil profile and contours.

Natural features within open space properties, such as the St. Vrain River crossing at the Golden/Feldstrom property, are summarized in Appendix V. Disturbance in these areas will be minimized, and the area will be restored to similar conditions prior to the project. The SWSP II project team met with Boulder County Parks on April 20, 2007, and attended a field trip on May 17, 2007, to specific properties to obtain input on some of the concerns regarding the alignment and construction methods. In addition, the SWSP II project team also met with City of Boulder Open Space and Mountain Parks on November 22, 2007, to review project concerns.

Table 16. Open space properties crossed

Property Name	Property Type	Crossing Distance	Alignment	Comments
Tveten	CE	5,400 feet	Adjacent to SWSP	Cultivated/Dryland - Includes Little Thompson crossing (see Appendix V.)
Turner-Taylor Ranch	CE	4,300 feet	Adjacent to SWSP	Dryland
Cushman-Brooks-Toltz	CE	1,400 feet	Adjacent to SWSP	Dryland
Kubel	CE	4,500 feet	Adjacent to SWSP	Cultivated/Dryland
Rough & Ready	CE	1,100 feet	Adjacent to SWSP	Cultivated
Lohr	County-owned	3,000 feet	Adjacent to SWSP	Cultivated
Braggs-Spangler	County-owned	1,500 feet	Adjacent to SWSP	Cultivated
Golden/Feldstrom	County-owned	2,800 feet	Adjacent to SWSP	St. Vrain River crossing (see Appendix V) Cultivated
Suitts	Joint City and County-owned	1,300 feet	New alignment adjacent to North 75 th Street	Dryland
Lagerman Reservoir	County-owned	3,500 feet	New alignment adjacent to North 75 th Street plus new ROW	Dryland/Salt Meadow (see Appendix V.)
Heil	CE	500 feet	New alignment east of North 73 rd Street	Dryland/Cultivated
Alpenglow Acres	CE	1,300 feet	New alignment north of Holland Ditch	Cultivated
Goose Point Ranch	CE	1,300 feet	New alignment north of Holland Ditch	Dryland
Imel	Joint City and County-owned	5,200 feet	New alignment	Cultivated
IBM	Joint City and County-owned	3,600 feet	New alignment	Cultivated
Lynch	CE	1,100 feet	New alignment adjacent to Monarch Road	Cultivated
Boulder Reservoir	City Park and Open Space	2,800 feet	New alignment adjacent to North 63rd Street	Natural
Turner-Taylor Ranch	CE	2,700 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated
Dirk	CE	100 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated

Property Name	Property Type	Crossing Distance	Alignment	Comments
Redrock	CE	2,400 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated
Pasqual	CE	2,600 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated
Puma 66	County-owned	2,600 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated
Wood Meadow	CE	2,500 feet		Cultivated
Barrett	County-owned	2,400 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated
Carlson	County-owned	2,500 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated
Rocky Mountain Fuel 3	County-owned	2,600 feet	Adjacent to SWSP, Fort Lupton/Hudson Phase, along Vermillion Road	Cultivated

Appendices

Appendix I. Environmental Commitments

Environmental Commitments

1. **Special Construction Measures:** In constricted areas, such as between a building and an existing right-of-way, or when crossing or passing particularly sensitive environmental conditions such as wetlands and treebelts, special construction methods will be used. Use of special construction methods narrows the zone of disturbance by using supported, near vertical trench walls and, if necessary, by storing bedding material and excavated material along the right-of-way from the sensitive condition. In wetlands, the U.S. Army Corps of Engineers' guidelines for construction in wetlands will be used. These guidelines require that the area to be disturbed be kept to a minimum, that topsoil be kept separate from subsoil during excavation and backfilled in the correct relationship (i.e., subsoil first, topsoil at the surface), that excess fill be disposed of away from the wetland, and that the wetland plant communities present before construction be reestablished.
2. **Seasonal Restrictions:** Certain potential affected wildlife areas, including heronries, designated critical wildlife habitat, and raptor nests, are more sensitive at certain times of the year, generally late spring/early summer. Construction will not take place in these areas during the most sensitive seasons. This measure effectively eliminates many of the potential impacts to these species at these locations. The only remaining potential impact would be the extremely remote chance of a pipeline failure in the sensitive area at the critical season, which would necessitate potentially disturbing construction activities.

Construction will occur at major crossings during periods of low flow such as during the winter.

3. **Sedimentation Control:** When the pipeline trench is being excavated in areas of high water table (for example floodplains, wetlands, and riparian areas), the water that accumulates in the trench must be pumped out to allow construction to continue. Rather than discharging the sediment-laden water to an adjacent water body, it will be diverted to specially constructed settling basins and then, after most of the sediment has settled out, diverted to the nearest natural water body or drainage channel. The Corps of Engineers will be consulted prior to any proposed fill that might impact wetlands.
4. **Reclamation/Revegetation of Disturbed Areas:** In all cases, the primary objective in applying reclamation measures is the prevention of soil erosion and the stabilization of slopes and runoff channels. This will be achieved primarily by the establishment (within two growing seasons) of plant cover of a density equal to or greater than that of the original cover adjacent to the specific disturbed area (ultimately consisting, where feasible, of the communities present before disturbance). Where required, areas that were disturbed during project construction will be reclaimed during and soon after construction by site-specific application of the mitigation measures described below. This will be done, when appropriate, in consultation with appropriate governmental agencies and interested private landowners.

potable water lines and sewers. The pipeline will also be constructed to avoid conflicts, where possible, with gas, power, cable TV, telephone lines and related facilities. Any required relocation of existing utilities will be paid for by NCWCD.

7. **Additional Specialized Mitigation Measures:** The mitigation measures outlined above will be applicable along most segments of the pipeline. Various other mitigation measures will be used as necessary for special environmental conditions or circumstances. These additional measures are listed below.
 - a. Perform geologic investigations to identify potential landslides/subsidence area.
 - b. Stabilize areas of potential mass movement.
 - c. Resurvey for sensitive species if determined necessary by USFWS and CDOW.
 - d. Relocate any rare plant populations identified.
 - e. Perform burrowing owl surveys to ensure owls are not present at prairie dog towns if construction will be performed between March 1 and November 1.

8. **Cultural:** NCWCD will determine if any portion of the route is located in historical or archeological resource areas of statewide importance. Where development will take place in such areas, NCWCD will submit to the Board:
 - a. A state historical site survey form completed by a qualified professional acceptable to the State Historical Preservation Officer for all resources affected by the project; and
 - b. Plans and procedures for notification to the State Historical Society and State Archaeologist upon discovery of historical or archaeological resources.In such areas, development will be:
 - a. Designed to preserve the integrity of the resource; and
 - b. Conducted in a manner which will be compatible with the preservation of the resource and minimize damage to the resource.

9. **Specific Siting of Project Elements:** The 1041 Submittal and Feasibility Study were based on available published, mapped information, and supplemented by field checking. Prior to construction of the selected route, specific site conditions at environmentally sensitive areas will be examined to identify opportunities for reducing impacts by minor route adjustments within the defined corridor.

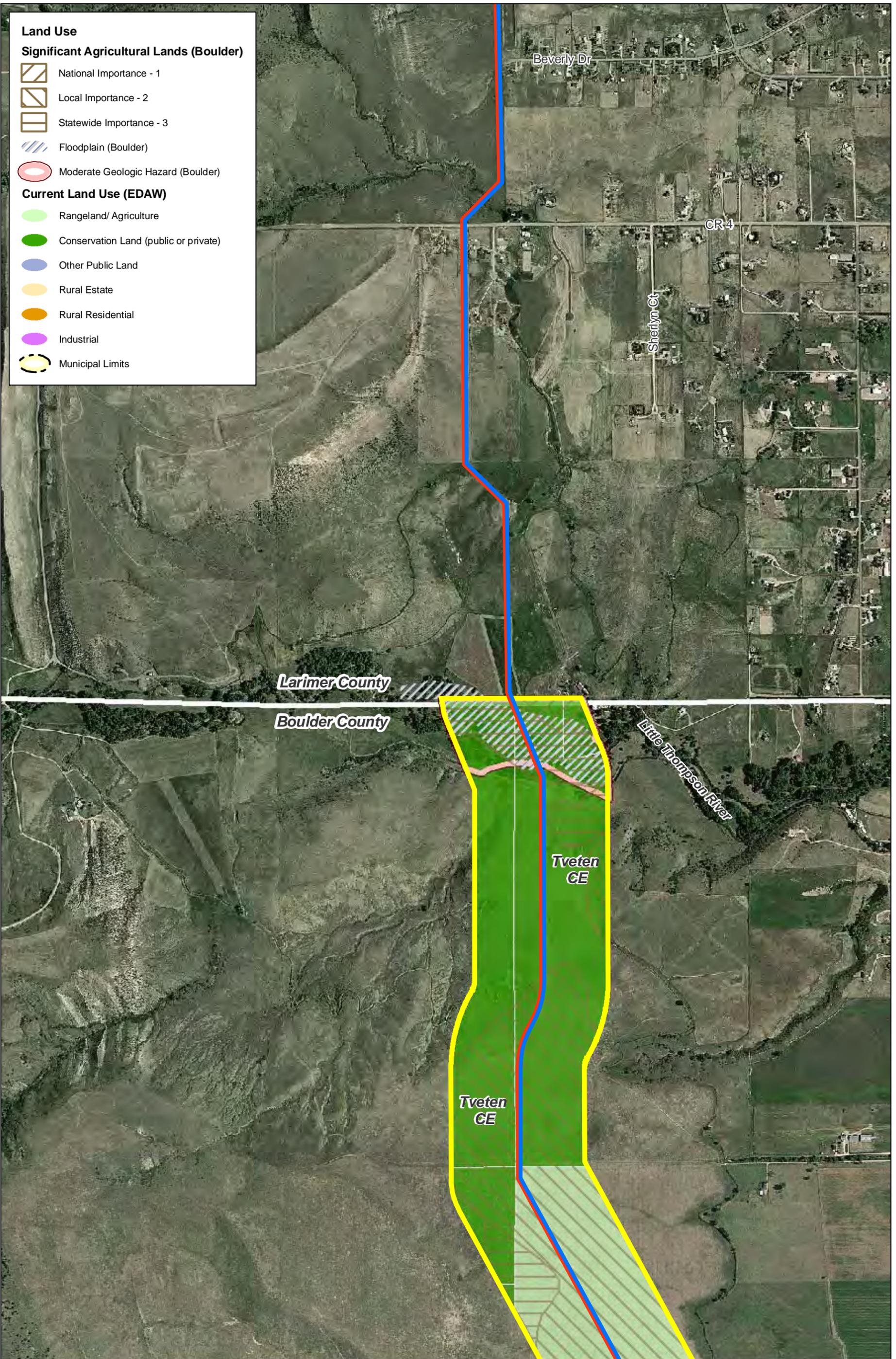
10. **Wildlife:** Prior to any construction that may occur during the breeding seasons, segments will be surveyed for any nesting birds that may be covered under the Migratory Bird Treaty Act. All active nests will be avoided and CDOW and USFWS will be consulted to minimize impacts to adjacent nesting activity.

11. **Environmental Monitor:** Northern Water will fund an environmental monitor to monitor the construction of the project to ensure that all of the environmental commitments are being met.

- a. **Topsoil Removal and Storage:** In appropriate areas (i.e., those areas with a significant topsoil horizon), topsoil will be stripped, stockpiled separate from other excavated material, and used for revegetation.
 - b. **Replacemnt and disposal of Excavated Material:** After installation of the pipeline and bedding material in the trench, excavated soil will be replaced in its original relationship to the surface, i.e., subsoil below, topsoil at the surface. All topsoil will be replaced, and any surplus subsoil will be removed and disposed of properly.
 - c. **Regrading of Disturbed Areas:** After construction, areas disturbed by construction operations will be graded, shaped, and smoothed to contours close to the original, or (if this is not feasible) to natural-appearing contours. In all cases, cut and fill slopes will be designed to be revegetated and stable when plant cover is established.
 - d. **Stabilization of Slopes and Banks:** Steep areas crossed by the pipeline, including the banks of streams and drainage channels will be stabilized after construction. If necessary, mulch, fabric, netting, or appropriate application of riprap will be used to achieve stability.
 - e. **Seeding:** All previously vegetated areas disturbed by project construction will be reseeded. Seeding will normally be with suitable and appropriate grass mixes. Where necessary, these will consist of native, pasture, or other species adapted to local soil and water conditions. Steep areas or other areas where soil erosion might be difficult to control will be fertilized and mulched if warranted. If necessary, in severe cases, fabrics or netting will be used.
 - f. **Landscaped Areas:** NCWCD will pay compensation for or will replace, landscape plantings (trees, shrubs, ground covers, lawns) and built features (terraces, paved areas, parking lots, fences, gates, minor structures, etc.) which required removal to allow pipeline construction.
 - g. **Cultivated Land:** NCWCD will pay compensation for crops destroyed, damaged, or foregone because of construction. On cultivated lands, deep ruts and scars caused during construction that might be hazardous to farming operations will be leveled, filled and graded, or otherwise eliminated. Areas of compacted or hard-packed soil will have the soil decompacted. Damage to ditches, terraces, tile drains, roads, or other features of agricultural land will be corrected. The land and facilities will be restored as nearly as practicable to original condition.
 - h. **Screening Planting:** Where necessary to screen surface facilities associated with SWSP II, or to help areas of disturbance blend into a surrounding natural environment, shrub plantings will be established.
 - i. **Cleanup of Construction Materials:** All waste construction materials and debris from all construction areas will be collected, hauled away and disposed of at approved sites.
5. **Right-of-Way:** Landowners will be paid just compensation for the rights acquired.
 6. **Other Utilities:** Other underground utilities will often be encountered, particularly at highway/roadway crossings. Excavations will be designed to avoid, where possible,

Appendix II. Siting Report (electronic version)

Appendix III. Land Use Map A Through H



Land Use

Significant Agricultural Lands (Boulder)

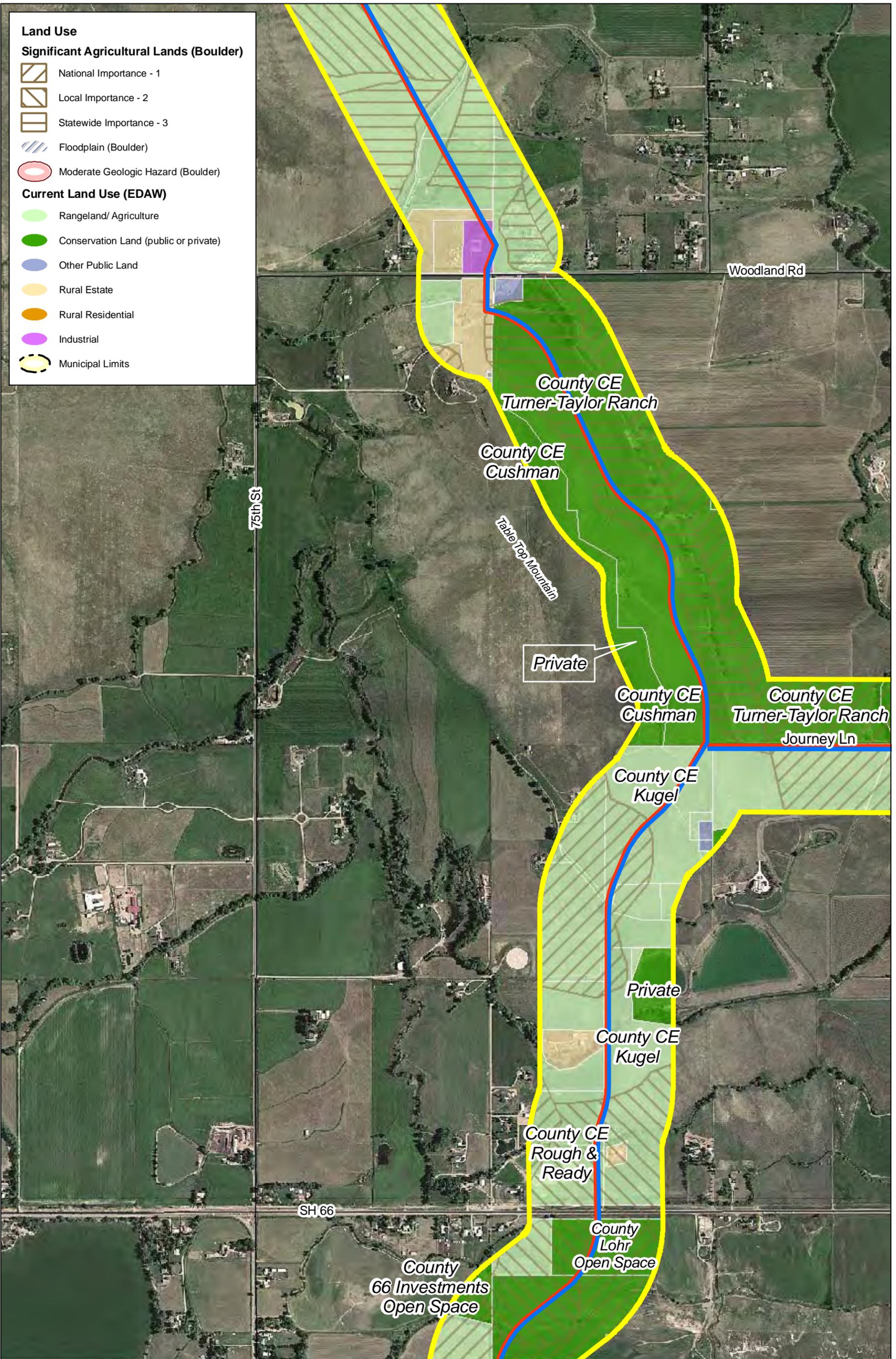
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- Local Importance - 2
- Statewide Importance - 3
- Floodplain (Boulder)
- Moderate Geologic Hazard (Boulder)

Current Land Use (EDAW)

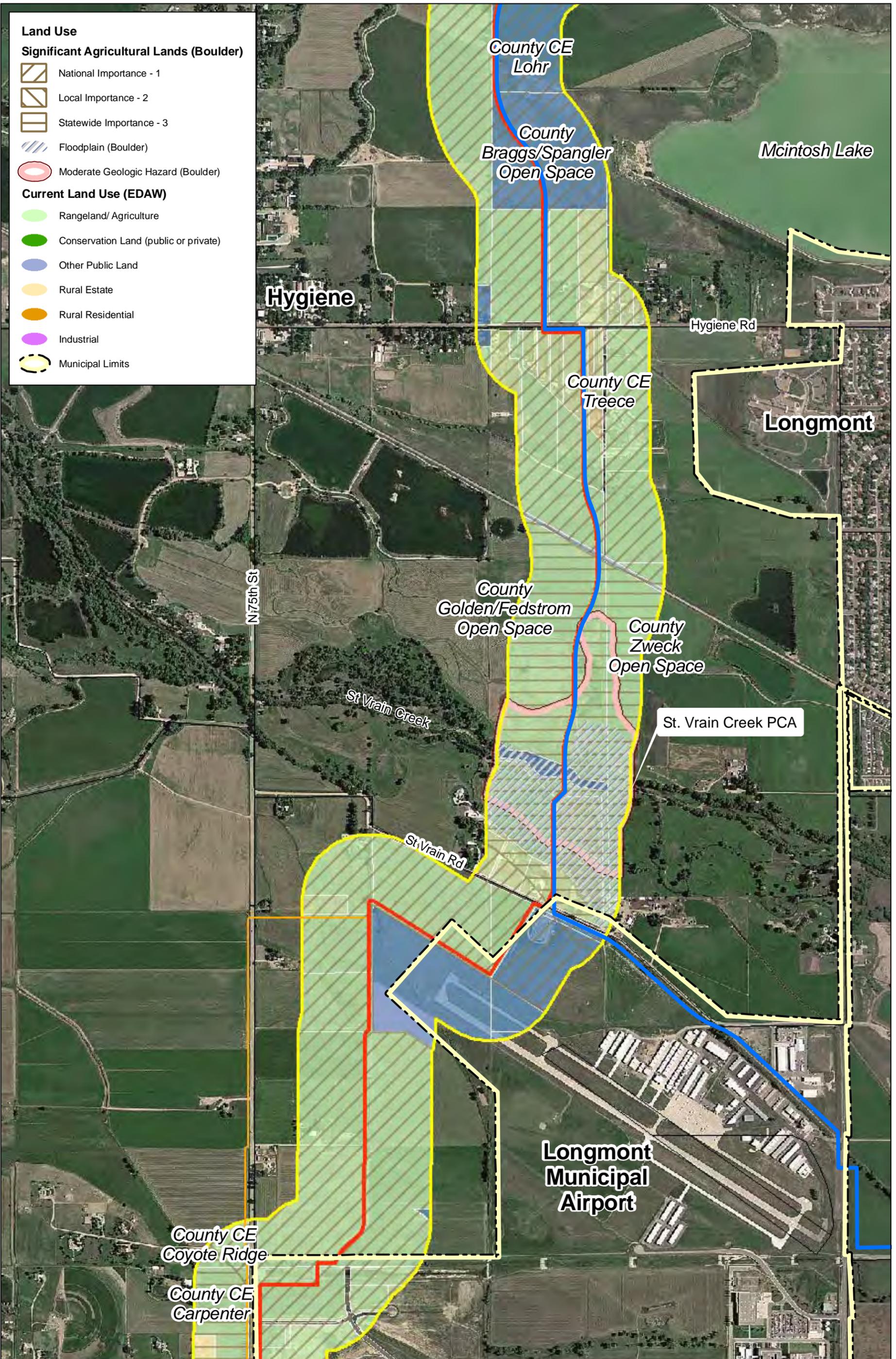
- Rangeland/ Agriculture
- Conservation Land (public or private)
- Other Public Land
- Rural Estate
- Rural Residential
- Industrial
- Municipal Limits

Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 10/22/08	 Selected Pipeline Alignment Existing SWSP Pipeline Study Area (750 ft Buffer)
Map: A	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	EDAW AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Larimer County Line Segment				Revision Date 2:	
				Revision Date 3:	

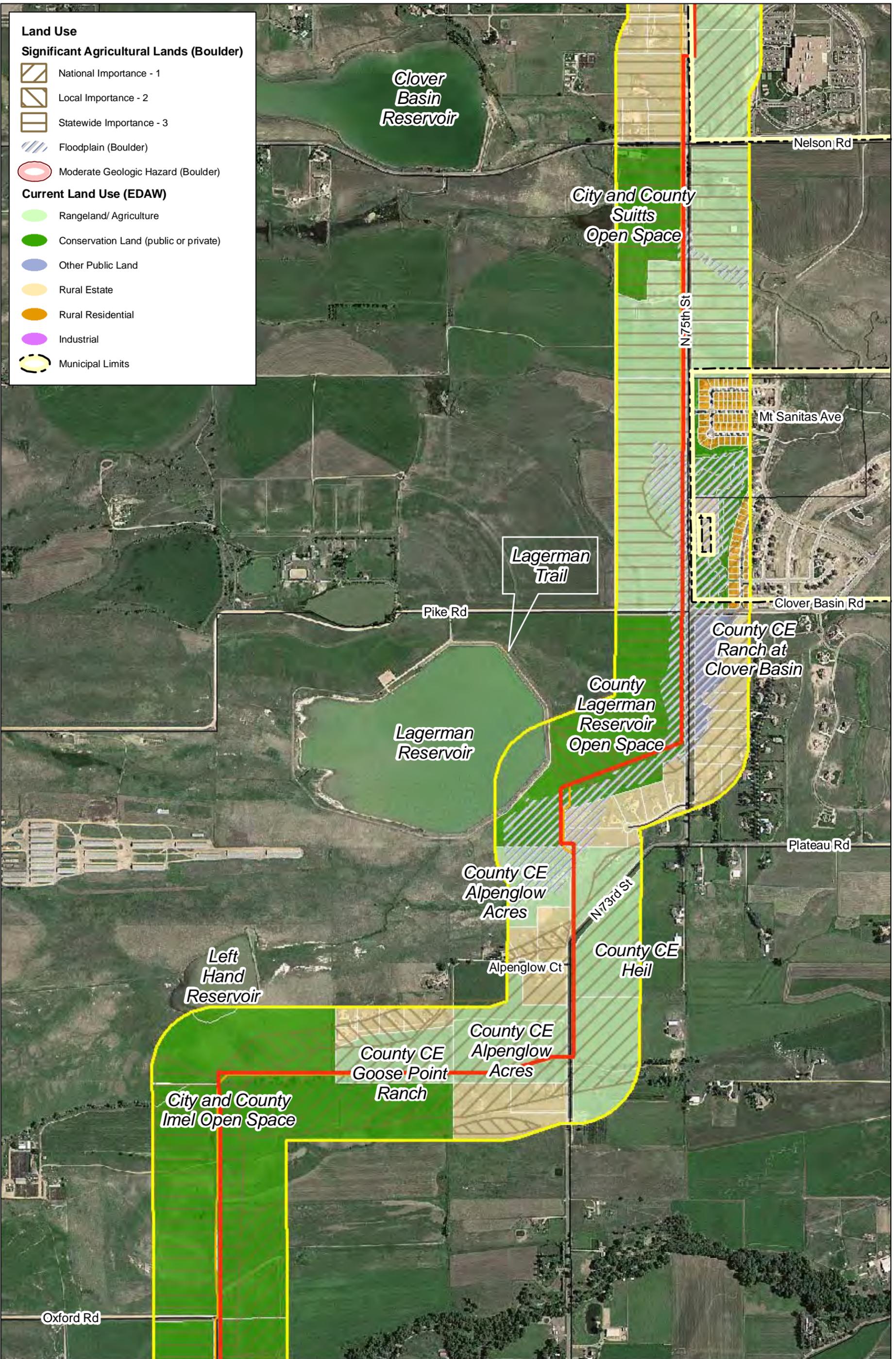




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Map: B	Southern Water Supply Project II	AECOM	Dewberry-Integra Engineering	Revision Date 1:	
Table Top Mountain Segment	NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 2:	
				Revision Date 3:	



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011		
Map: C	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:		
West Side Longmont Segment				Revision Date 2:		
				Revision Date 3:		



Land Use

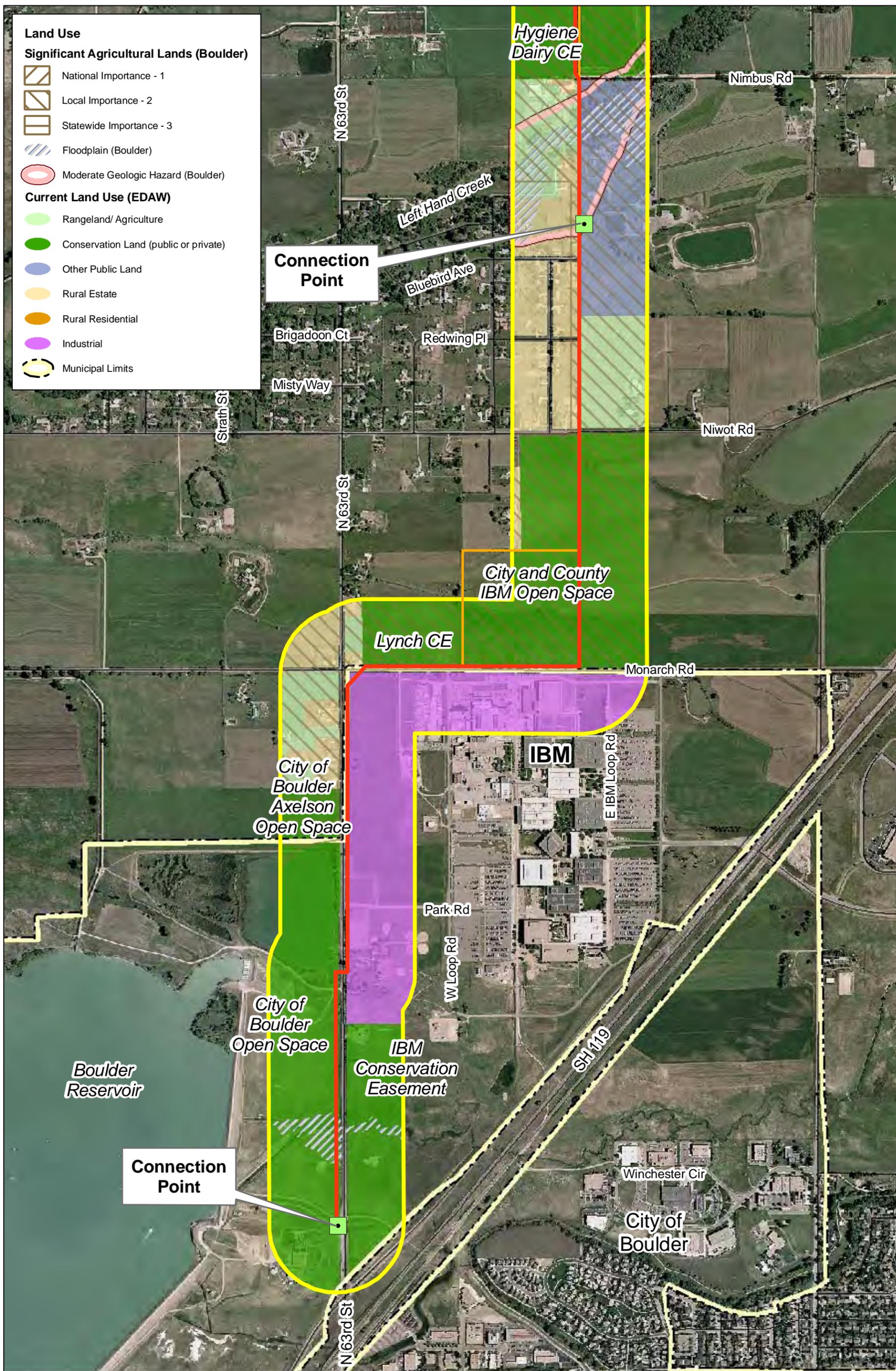
Significant Agricultural Lands (Boulder)

- National Importance - 1
- Local Importance - 2
- Statewide Importance - 3
- Floodplain (Boulder)
- Moderate Geologic Hazard (Boulder)

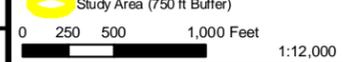
Current Land Use (EDAW)

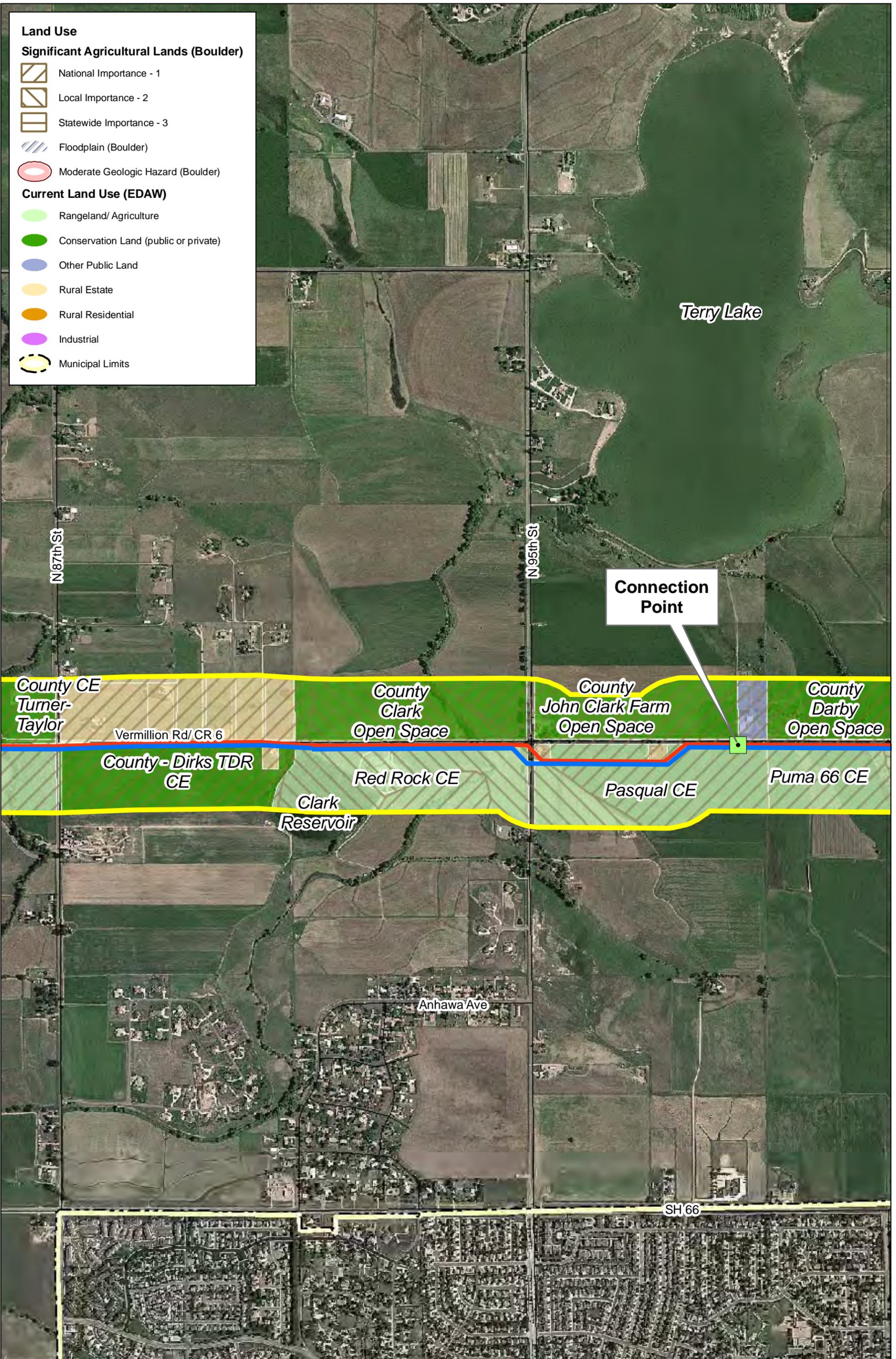
- Rangeland/ Agriculture
- Conservation Land (public or private)
- Other Public Land
- Rural Estate
- Rural Residential
- Industrial
- Municipal Limits

Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: D	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Lagerman Reservoir Segment				Revision Date 2:	
				Revision Date 3:	



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: E	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Boulder Reservoir Segment				Revision Date 2:	
				Revision Date 3:	





Land Use

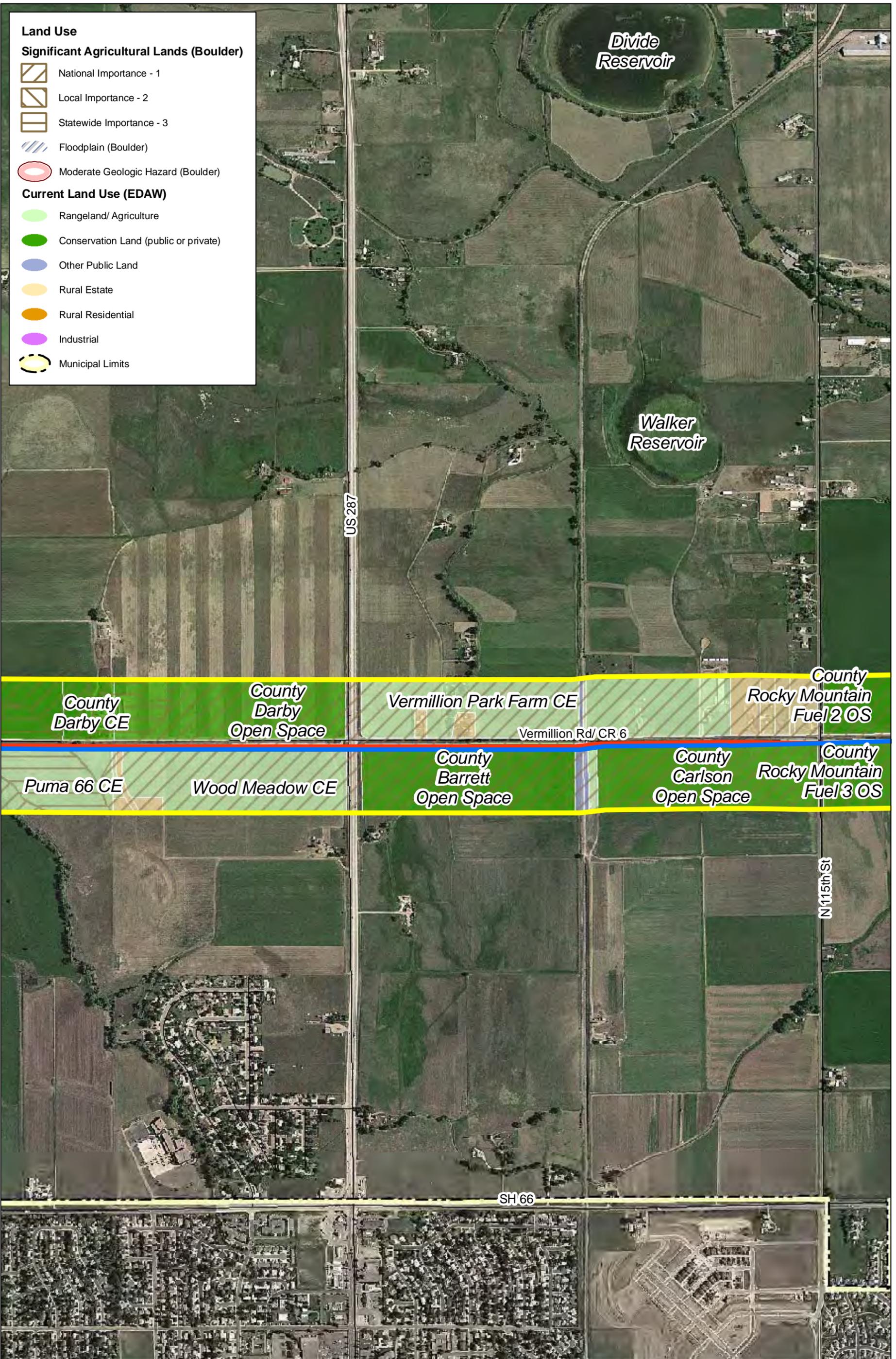
Significant Agricultural Lands (Boulder)

- National Importance - 1
- Local Importance - 2
- Statewide Importance - 3
- Floodplain (Boulder)
- Moderate Geologic Hazard (Boulder)

Current Land Use (EDAW)

- Rangeland/ Agriculture
- Conservation Land (public or private)
- Other Public Land
- Rural Estate
- Rural Residential
- Industrial
- Municipal Limits

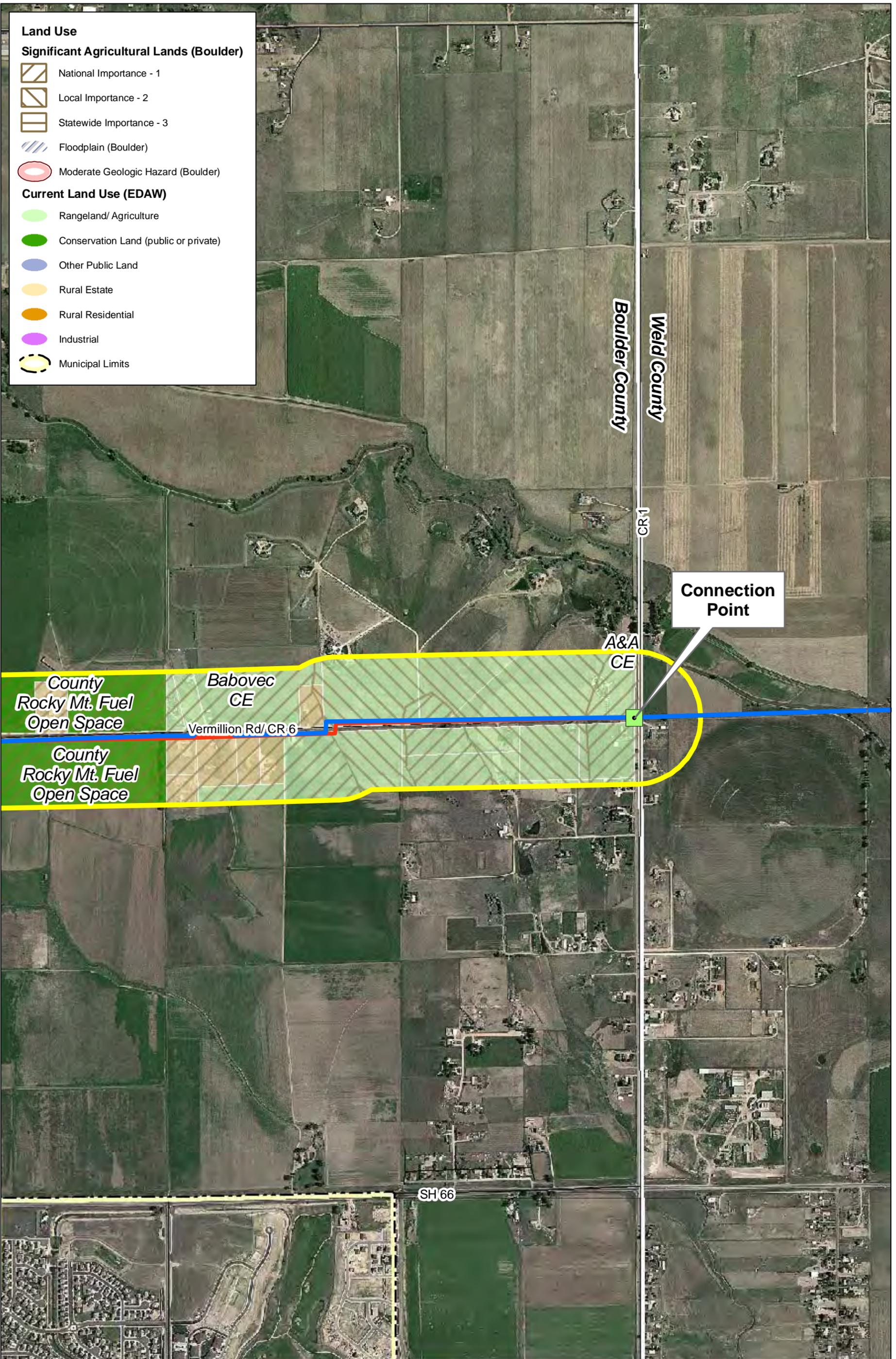
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Map: F	Southern Water Supply Project II	AECOM	Dewberry-Integra Engineering	Revision Date 1:	
Terry Lake	NCWCD	240 East Mountain Ave.	1095 South Monaco Parkway	Revision Date 2:	
Segment	220 Water Ave.	Fort Collins, CO 80524	Denver, Colorado 80224	Revision Date 3:	
	Berthoud, CO 80513	(970) 484-6073	(303) 825-1802		



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	 Selected Pipeline Alignment Existing SWSP Pipeline Study Area (750 ft Buffer)
Map: G	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
US 287 Crossing Segment				Revision Date 2:	
				Revision Date 3:	



1:12,000



Land Use

Significant Agricultural Lands (Boulder)

- National Importance - 1
- Local Importance - 2
- Statewide Importance - 3
- Floodplain (Boulder)
- Moderate Geologic Hazard (Boulder)

Current Land Use (EDAW)

- Rangeland/ Agriculture
- Conservation Land (public or private)
- Other Public Land
- Rural Estate
- Rural Residential
- Industrial
- Municipal Limits

County
Rocky Mt. Fuel
Open Space

County
Rocky Mt. Fuel
Open Space

Babovec
CE

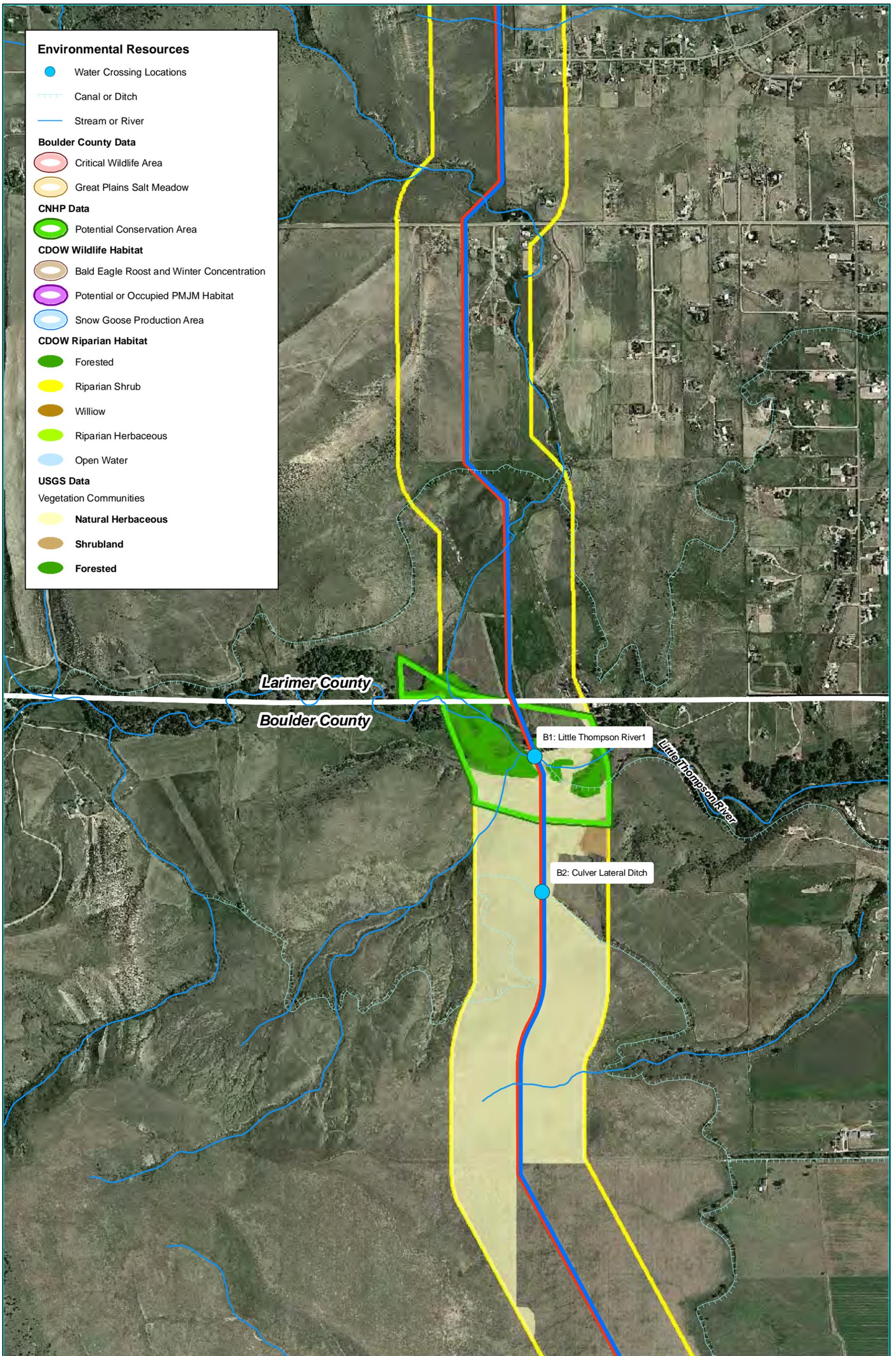
Vermillion Rd/CR 6

A&A
CE

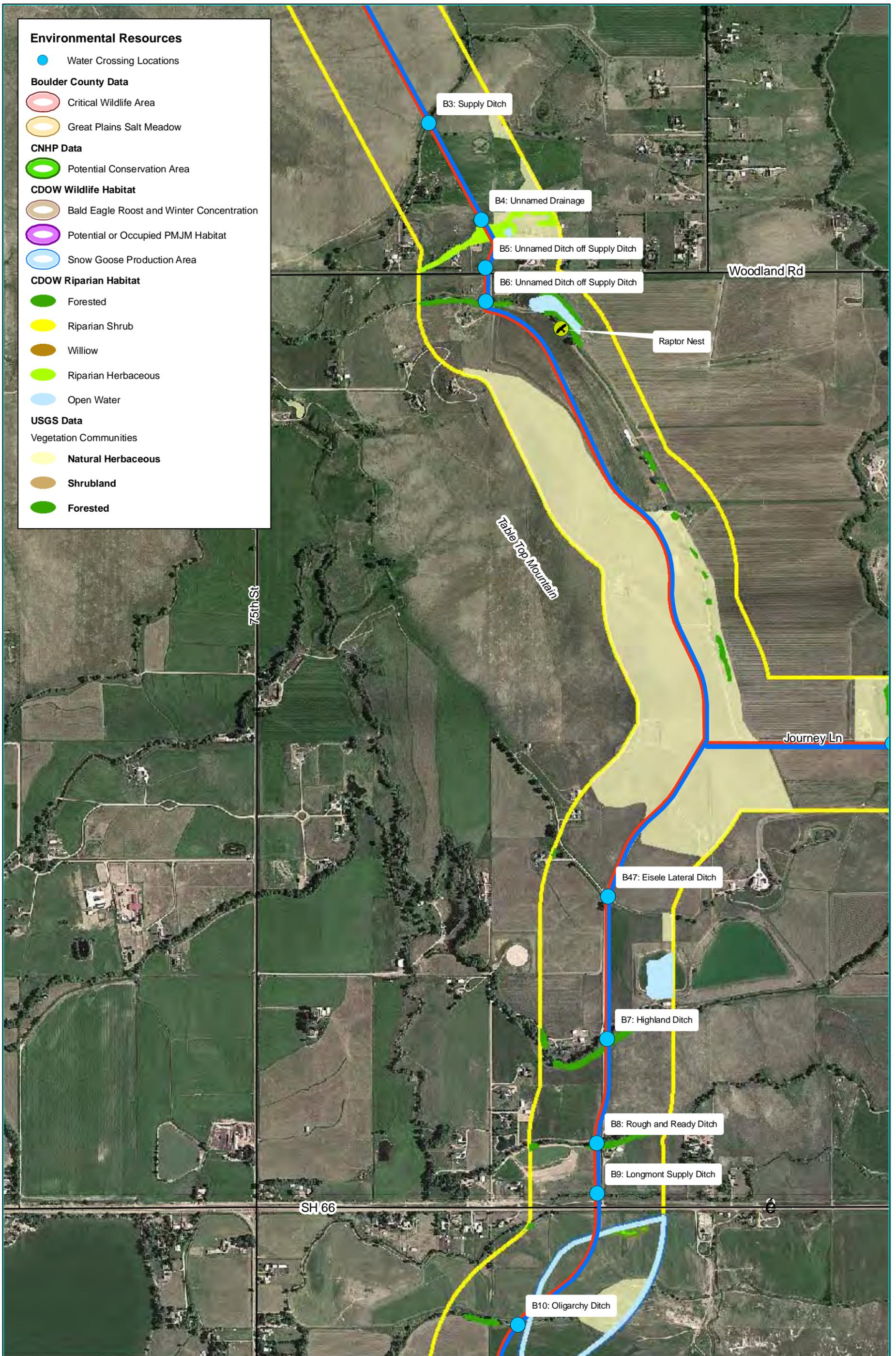
Connection
Point

Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	 Selected Pipeline Alignment Existing SWSP Pipeline Study Area (750 ft Buffer) 0 250 500 1,000 Feet 1:12,000
Map: H	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Weld County Segment				Revision Date 2:	
				Revision Date 3:	

Appendix IV. Resource Maps I Through P

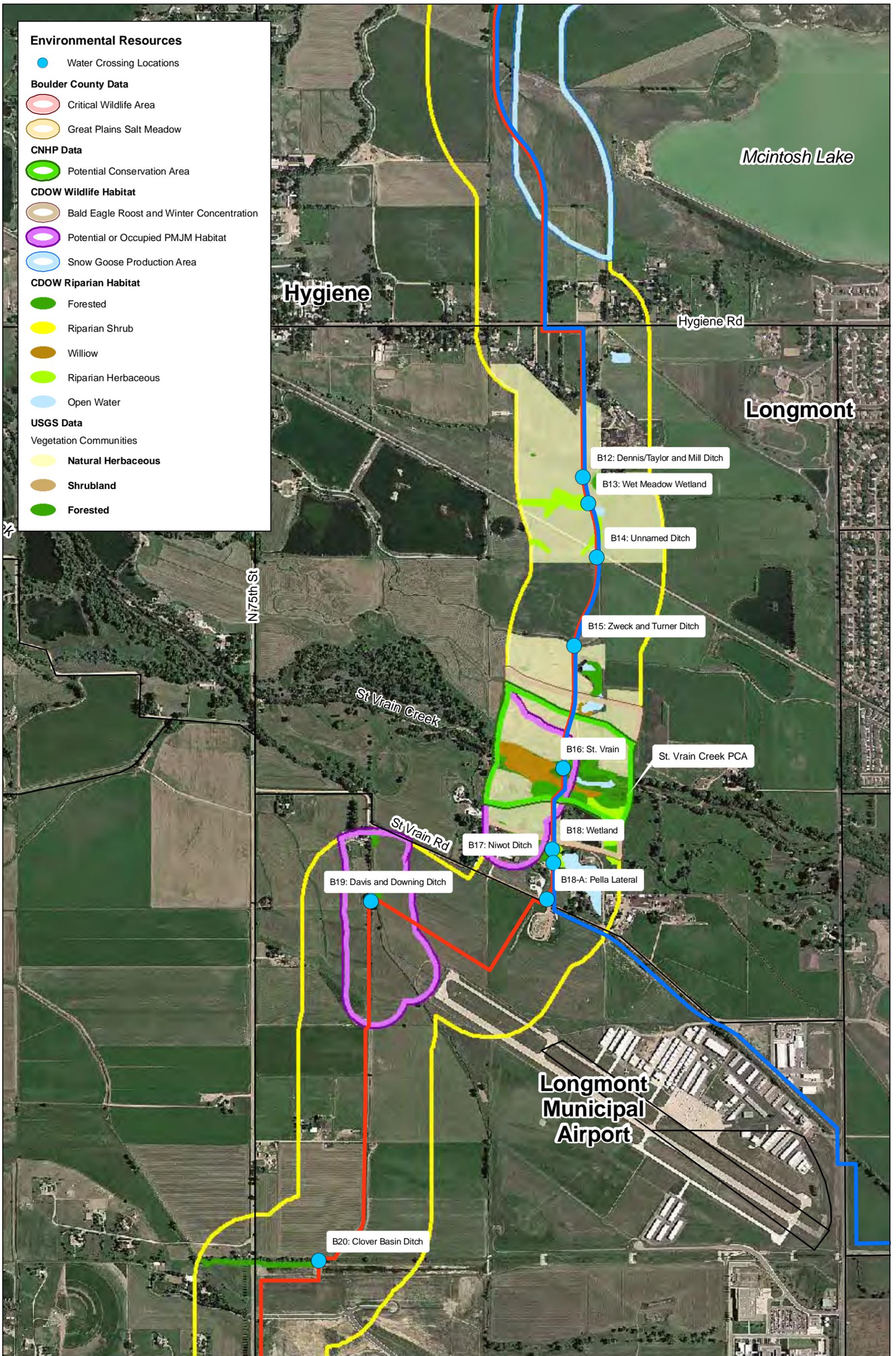


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Map: I	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Larimer County Line				Revision Date 2:	
Segment				Revision Date 3:	

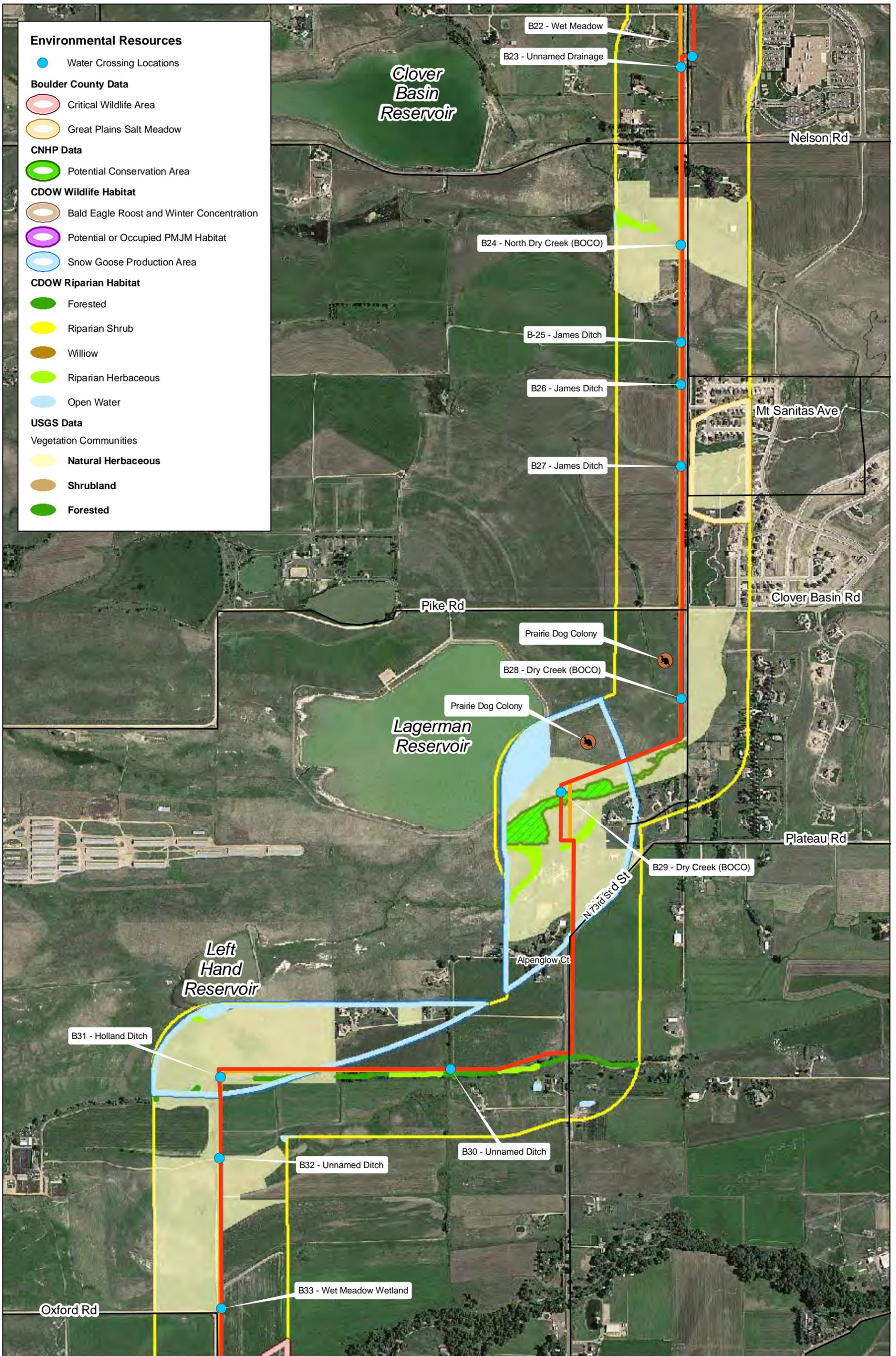


- Environmental Resources**
- Water Crossing Locations
- Boulder County Data**
- Critical Wildlife Area
 - Great Plains Salt Meadow
- CNHP Data**
- Potential Conservation Area
- CDOW Wildlife Habitat**
- Bald Eagle Roost and Winter Concentration
 - Potential or Occupied PMJM Habitat
 - Snow Goose Production Area
- CDOW Riparian Habitat**
- Forested
 - Riparian Shrub
 - Willow
 - Riparian Herbaceous
 - Open Water
- USGS Data**
- Vegetation Communities
- Natural Herbaceous
 - Shrubland
 - Forested

Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: J	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Table Top Mountain				Revision Date 2:	
Segment				Revision Date 3:	
					1:12,000



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: K	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
West Side Longmont				Revision Date 2:	
Segment				Revision Date 3:	



Environmental Resources

- Water Crossing Locations

Boulder County Data

- Critical Wildlife Area
- Great Plains Salt Meadow

CNHP Data

- Potential Conservation Area

CDOW Wildlife Habitat

- Bald Eagle Roost and Winter Concentration
- Potential or Occupied PMJM Habitat
- Snow Goose Production Area

CDOW Riparian Habitat

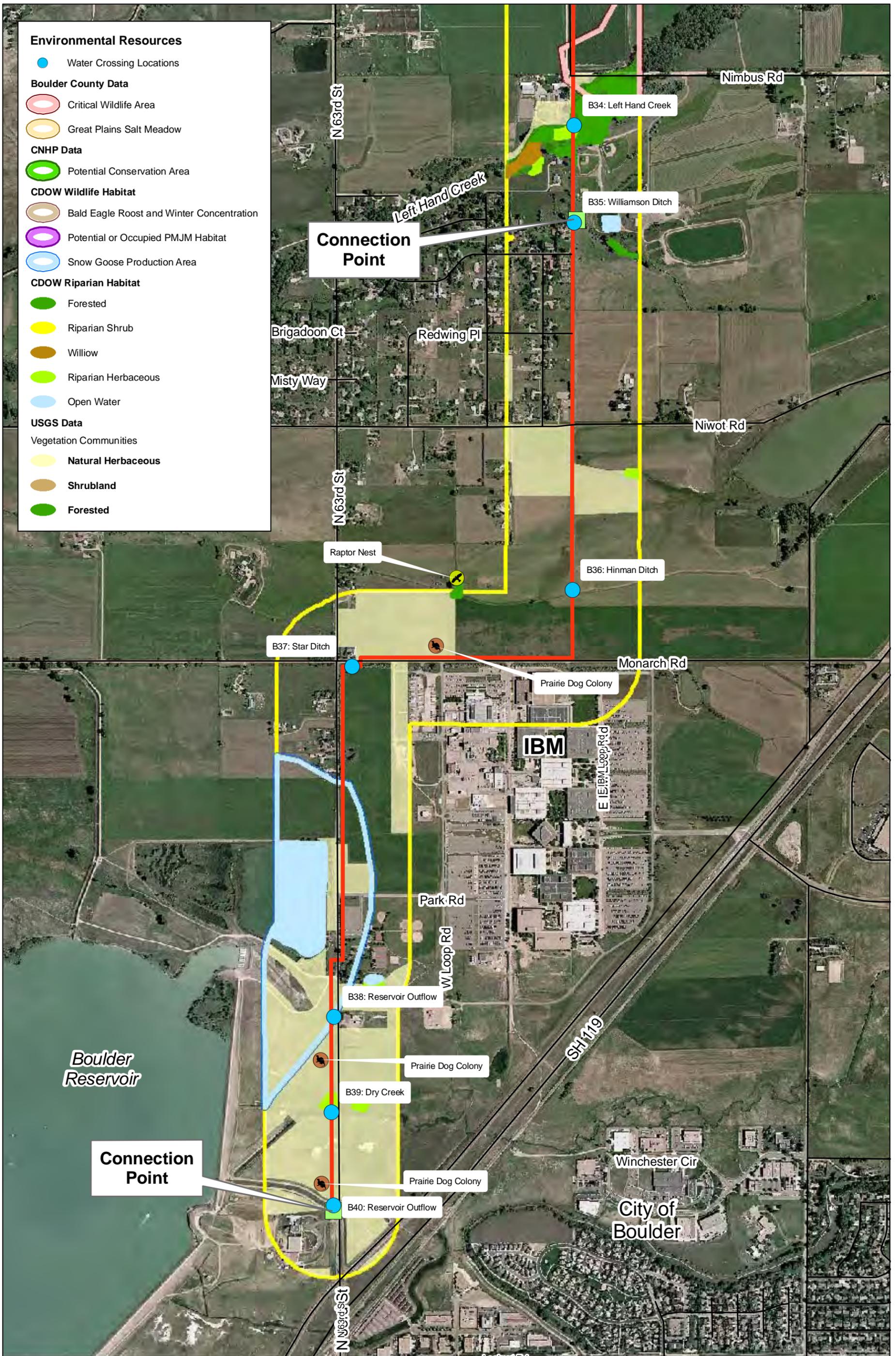
- Forested
- Riparian Shrub
- Willow
- Riparian Herbaceous
- Open Water

USGS Data

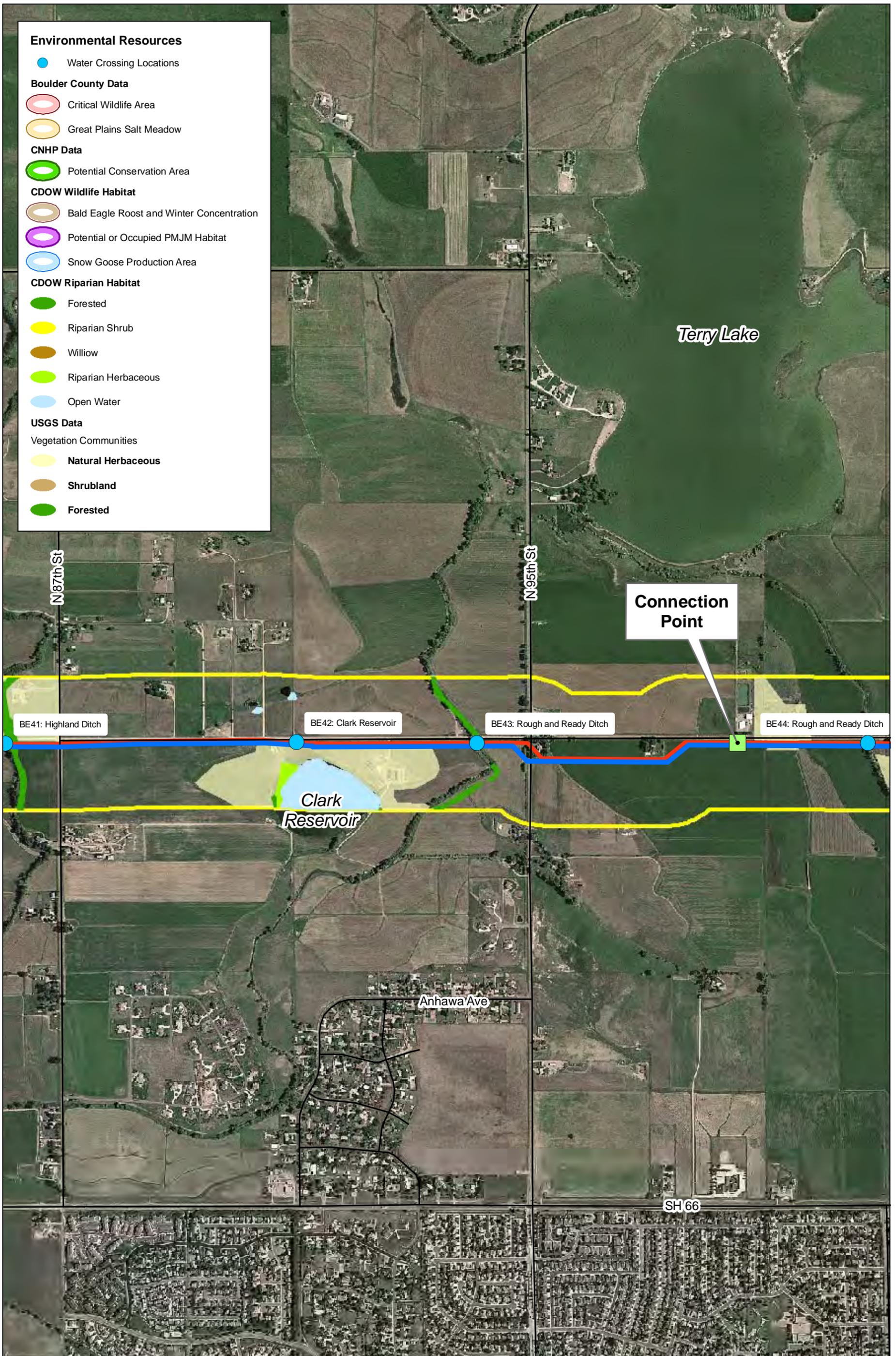
Vegetation Communities

- Natural Herbaceous
- Shrubland
- Forested

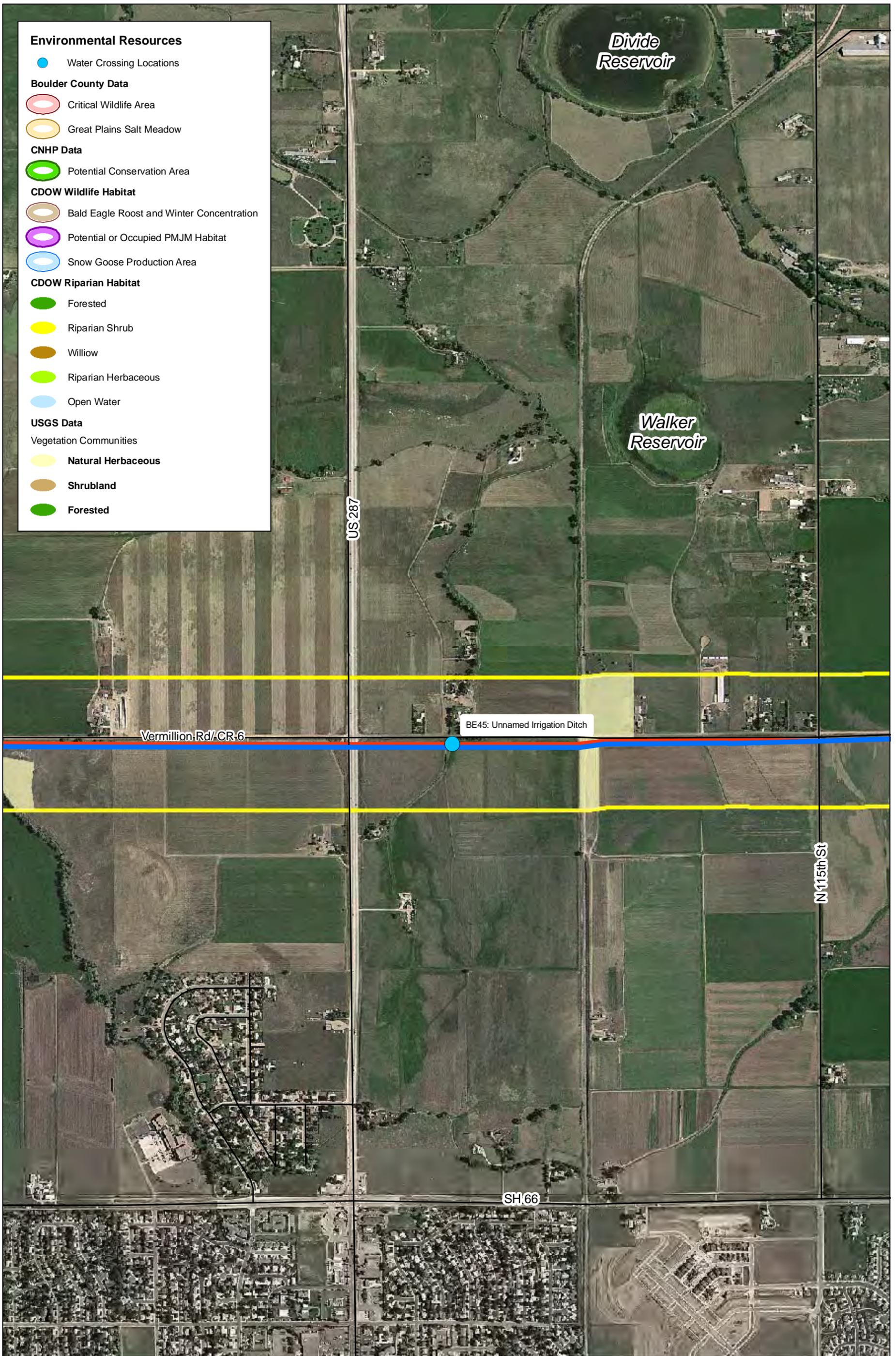
Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: L	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Environmental Resources				Revision Date 2:	
				Revision Date 3:	



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	 1:12,000
Map: M	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
Boulder Reservoir Segment				Revision Date 2:	
				Revision Date 3:	



Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: N Terry Lake Segment	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	



Environmental Resources

- Water Crossing Locations

Boulder County Data

- Critical Wildlife Area
- Great Plains Salt Meadow

CNHP Data

- Potential Conservation Area

CDOW Wildlife Habitat

- Bald Eagle Roost and Winter Concentration
- Potential or Occupied PMJM Habitat
- Snow Goose Production Area

CDOW Riparian Habitat

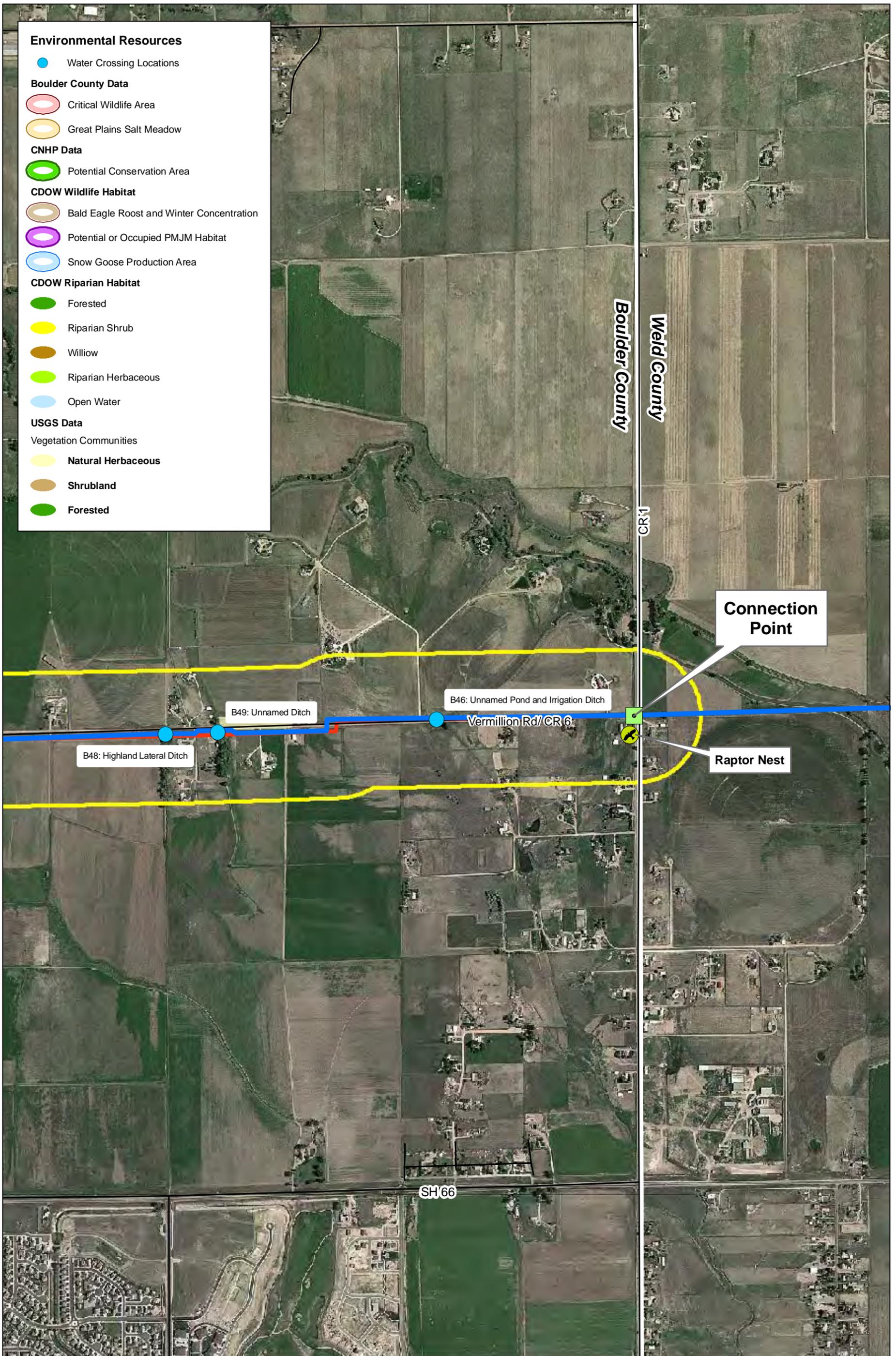
- Forested
- Riparian Shrub
- Willow
- Riparian Herbaceous
- Open Water

USGS Data

Vegetation Communities

- Natural Herbaceous
- Shrubland
- Forested

Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	<ul style="list-style-type: none"> — Selected Pipeline Alignment — Existing SWSP Pipeline Study Area (750Ft Buffer)
Map: O US 287 Crossing Segment	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	
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- Environmental Resources**
- Water Crossing Locations
- Boulder County Data**
- Critical Wildlife Area
 - Great Plains Salt Meadow
- CNHP Data**
- Potential Conservation Area
- CDOW Wildlife Habitat**
- Bald Eagle Roost and Winter Concentration
 - Potential or Occupied PMJM Habitat
 - Snow Goose Production Area
- CDOW Riparian Habitat**
- Forested
 - Riparian Shrub
 - Willow
 - Riparian Herbaceous
 - Open Water
- USGS Data**
- Vegetation Communities
- Natural Herbaceous
 - Shrubland
 - Forested

Map Number & Title:	Project Title & Applicant:	Consultant:	Engineer:	Preparation Date: 1/20/2011	
Map: P Weld County Segment	Southern Water Supply Project II NCWCD 220 Water Ave. Berthoud, CO 80513 (970) 532-7700	AECOM 240 East Mountain Ave. Fort Collins, CO 80524 (970) 484-6073	Dewberry-Integra Engineering 1095 South Monaco Parkway Denver, Colorado 80224 (303) 825-1802	Revision Date 1:	
				Revision Date 2:	
				Revision Date 3:	
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Appendix V. List of Crossings of Wetlands or Waters of the U.S., PMJM Habitat, or ULT Habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Little Thompson River	B1	<i>Populus angustifolia</i> FACW <i>Salix exigua</i> OBL <i>Carex nebraskensis</i> OBL <i>Juncus spp.</i>			Good Potential Habitat	Negative trapping 2007	Potential habitat None observed
Culver Lateral	B2	<i>Bromus inermis</i> FACU* <i>Phalaris arundinacea</i> FACW+			No Habitat	Not recommended for trapping	No potential habitat
Supply Ditch	B3	<i>Phalaris arundinacea</i> FACW+ <i>Agrostis stolonifera</i> FACW <i>Cirsium arvense</i> FACU <i>Solidago canadensis</i> FACU <i>Elaeagnus angustifolia</i> FAC <i>Juncus arcticus</i> NI	50 10 5 5 5 10	Riparian area 12 feet wide Small concrete lined ditch 100 feet south of Supply Ditch (appears inactive)	Poor Potential Habitat, no thick shrubby riparian vegetation present	Not recommended for trapping	No potential habitat, steep-sided canal

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Unnamed drainage	B4	<i>Typha latifolia</i> OBL <i>Schoenoplectus pungens</i> OBL	50 30	Riparian area 50 feet wide Standing water in channel	Poor Potential Habitat, no thick shrubby riparian vegetation present	Not recommended for trapping	Potential habitat, grazed area None observed
Unnamed ditch off Supply Ditch	B5	<i>Carex emoryi</i> OBL <i>Elaeagnus angustifolia</i> OBL <i>Festuca pratensis</i> FACU	80 5 5	Riparian area 5 feet wide	Poor potential habitat, no thick shrubby riparian vegetation	Not recommended for trapping	No potential habitat
Unnamed ditch off Supply Ditch	B6	<i>Populus deltoids</i> subsp. <i>monilifera</i> FAC	20	Concrete lined irrigation ditch No wetland vegetation	Poor Potential Habitat, concrete lined ditch	Not recommended for trapping	No potential habitat
Highland Ditch	B7	none	80	Concrete lined ditch	No Potential Habitat, concrete lined ditch.	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Rough and Ready Ditch	B8	<i>Phalaris arundinacea</i> OBL <i>Cirsium arvense</i> FACU <i>Salix exigua</i> OBL <i>Salix amygdaloides</i> FACW	50 10 10 10	Riparian area 40 feet wide	Poor Potential Habitat, no downstream connection to river or stream, connects to Terry Lake	Riparian on both banks Not recommended for trapping	Marginal potential habitat, no downstream connection to river or stream, connects to Terry Lake
Longmont Supply Ditch	B9	<i>Phalaris arundinacea</i> OBL <i>Carex emoryi</i> OBL <i>Salix amygdaloides</i> FACW <i>Agrostis stolonifera</i> FACW	50 10 10 5	Riparian area 20 feet wide	Poor Potential Habitat, isolated riparian vegetation, no downstream connection to stream	Riparian on both banks Not recommended for trapping	Marginal potential habitat, isolated riparian vegetation, no downstream connection to stream
Oligarchy Ditch	B10	<i>Phalaris arundinacea</i> OBL <i>Carex emoryi</i> OBL <i>Agrostis stolonifera</i> FACW	10 5 50	Riparian area 20 feet wide Active ditch Low volume base flow in channel	Poor Potential Habitat, no riparian shrub vegetation present	Not recommended for trapping	Poor potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Mill Ditch	B11	<i>Carex emoryi</i> OBL <i>Phalaris arundinacea</i> OBL <i>Festuca pratensis</i> FACU <i>Salix fragilis</i> FAC	50 20 20 5	Riparian area 15 feet wide Flowing 2 cfs	Poor potential habitat, limited riparian shrubs/trees, heavily grazed	Not recommended for trapping	Poor potential habitat, limited riparian shrubs/trees, heavily grazed
Irrigation Ditch	B12	<i>Phalaris arundinacea</i> OBL <i>Festuca pratensis</i> FACU <i>Elaeagnus angustifolia</i> FAC	50 20 10	Riparian area 10 feet wide	Poor Potential Habitat, no riparian shrub vegetation	Not recommended for trapping	No potential habitat
Wet Meadow Wetland	B13	<i>Schoenoplectus pungens</i> OBL <i>Festuca pratensis</i> FACU <i>Thinopyrum ponticum</i> UPL	20 30 30	Appears to be dry area with residual wetland vegetation	Poor Potential Habitat, no riparian vegetation	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Unnamed ditch	B14	<i>Festuca pratensis</i> FAC <i>Typha latifolia</i> OBL <i>Salix exigua</i> OBL	80 10 10	Riparian area 5 feet wide No water flowing during survey period	Poor potential habitat, narrow field ditch, isolated willow stand	Not recommended for trapping	No potential habitat, narrow field ditch, isolated willow stand
Unnamed ditch	B15	<i>Carex emoryi</i> OBL <i>Asclepias speciosa</i> FAC <i>Helianthus nuttallii</i> FACW <i>Asparagus officinales</i> FACU-	80 T T T	Riparian area 12 feet wide Active ditch No water flowing during survey period	Poor potential habitat	Not recommended for trapping	Potential habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
St Vrain River	B16 NORTH	<i>Festuca pratensis</i> FAC <i>Phalaris arundinacea</i> OBL <i>Salix exigua</i> OBL <i>Schoenoplectus lacustris subsp. creber</i> OBL	20 20 10 10	Riparian area 105 feet wide	Good Potential Habitat, the area has been trapped several times in the past; assume that no Preble's mice are present. Occupied habitat approx. 0.6 miles upstream.	The crossing area has been trapped once before (unknown date) with no captures, 2 negative trappings approx. 1 mile west just east of North 75 St. (1997,2000). One negative trapping 1 mile downstream of crossing (unknown date). Creek is considered occupied habitat to West of North 75 St. Because of past negative trapping in area not recommended for further trapping.	Potential habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
St Vrain River	B16 SOUTH	<i>Typha latifolia</i> OBL <i>Schoenoplectus lacustris</i> subsp. <i>creber</i> OBL <i>Carex emoryi</i> OBL <i>Salix exigua</i> OBL <i>Phalaris arundinacea</i> OBL <i>Panicum virgatum</i> FAC <i>Populus angustifolia</i> FACW <i>Agrostis stolonifera</i> FACW	5 5 10 50 20 T T T	Riparian area 105 feet wide	Good Potential Habitat, the area has been trapped several times in the past; assume that no Preble's mice are present. Occupied habitat approx. 0.6 miles upstream.	The crossing area has been trapped once before (unknown date) with no captures, 2 negative trappings approx. 1 mile west just east of North 75 St. (1997,2000). One negative trapping 1 mile downstream of crossing (unknown date). Creek is considered occupied habitat to West of North 75 St. Because of past negative trapping in area not recommended for further trapping.	Potential habitat None observed
Niwot Ditch (not shown on aerial photos)	B17	<i>Salix fragilis</i> FAC <i>Carex emoryi</i> OBL <i>Cirsium arvense</i> FACU <i>Phalaris arundinacea</i> OBL	5 50 5 10	Riparian area 8 feet wide Flowing < 1cfs	Poor Potential Habitat, limited shrubby riparian vegetation	Not recommended for trapping	Potential habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
East Branch of Clover Basin Ditch	B18	<i>Typha latifolia</i> OBL <i>Juncus arcticus</i> OBL <i>Elaeagnus angustifolia</i> OBL <i>Phalaris arundinacea</i> OBL <i>Eleocharis palustris</i> OBL	40 20 10 5 10	Riparian area 90 feet wide Low volume base flow present	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Potential habitat None observed
Clover Basin Ditch	B19	<i>Sparganium eurycarpum</i> OBL <i>Phalaris arundinacea</i> OBL <i>Carex emoryi</i> OBL <i>Epilobium ciliatum</i> OBL	30 10 30 T	Riparian area 20 feet wide Active ditch No water flowing during survey Large 50 inch DBH <i>Populus deltoides</i> supsp. <i>monilifera</i> in vicinity	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Clover Basin Ditch	B20	<i>Populus deltoids</i> <i>subsp.. monilifera</i> FAC <i>Salix fragilis</i> FAC <i>Phalaris arundinacea</i> OBL	30 20 30	Riparian area 15 feet wide	Poor potential habitat, narrow ditch, isolated riparian stand	Not recommended for trapping	No potential habitat
Peck Ditch	B21	<i>Festuca pratensis</i> FAC	30	No wetland vegetation Ditch replaced with irrigation pipe	No Habitat	Not recommended for trapping	No potential habitat
Wet Meadow	B22	<i>Juncus arcticus</i> OBL <i>Schoenoplectus pungens</i> OBL <i>Distichlis stricta</i> FACW	20 60 10	Wet meadow with no outflow	No Habitat	Not recommended for trapping	No potential habitat
Unnamed drainage	B23	<i>Festuca pratensis</i> FAC <i>Juncus arcticus</i> OBL <i>Eleocharis palustris</i> OBL	20 10 10	Riparian area 10 feet wide Water flowing in channel	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
North Dry Creek (BOCO)	B24	<i>Typha latifolia</i> OBL <i>Schoenoplectus pungens</i> OBL	60 20	Riparian area 30 feet wide Water flowing < 1cfs	Poor Potential Habitat, no shrubby riparian vegetation	Water flowing < 1cfs	Potential habitat None observed
James Ditch	B25	<i>Carex emory</i> OBL <i>Phalaris arundinacea</i> OBL <i>Elaeagnus angustifolia</i> OBL <i>Asclepias speciosa</i> FAC <i>Apocynum cannabinum</i> FAC	50 20 5 T T	Riparian area 15 feet wide Water flowing Part of James Ditch and connects to wetland site number B22	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Marginal potential habitat
James Ditch	B26	<i>Salix exigua</i> OBL <i>Phalaris arundinacea</i> OBL	50 30	Riparian are 15 feet wide Water flowing	Poor potential habitat, narrow ditch, isolated willow stand	Not recommended for trapping	Marginal potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
James Ditch	B27	<i>Phalaris arundinacea</i> OBL	80	Riparian area 10 feet wide Water flowing	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Marginal potential habitat
Dry Creek (BOCO)	B28	<i>Festuca pratensis</i> FAC <i>Phalaris arundinacea</i> OBL <i>Carex emoryi</i> OBL	20 20 20	Riparian area 10 feet wide No water present Channelized creek	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Marginal potential habitat
Dry Creek (BOCO)	B29 NORTH	<i>Eleocharis palustris</i> OBL <i>Distichlis stricta</i> FACW <i>Polypogon monspeliensis</i> OBL <i>Sporobolus airoides</i> OBL	30 20 10 10	Riparian area 20 feet wide Alkaline wet meadow Water flowing < 1cfs Saturated to surface Some standing water	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Potential habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Dry Creek (BOCO)	B29 SOUTH	<i>Distichlis stricta</i> FACW <i>Juncus arcticus</i> OBL <i>Spergularia marina</i> OBL <i>Schoenoplectus pungens</i> OBL <i>Sporobolus airoides</i> OBL <i>Juncus articulatus</i> OBL	30 20 10 10 20 10	Riparian area 20 feet wide Alkaline wet meadow Water flowing < 1cfs Saturated to surface Some standing water	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Potential habitat None observed
Unnamed ditch	B30	<i>Salix exigua</i> OBL <i>Bromus inermis</i> FACW* <i>Asclepias speciosa</i> FAC <i>Festuca pratensis</i> FAC <i>Solidago Canadensis</i> FACU	50 20 T 20 5	No channel present	Poor potential habitat, narrow field ditch, isolated willow stand	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Holland Ditch	B31	<i>Festuca pratensis</i> FAC <i>Agrostis stolonifera</i> FACW <i>Carex sp.</i> <i>Juncus arcticus</i> FAC <i>Elaeagnus angustifolia</i> OBL <i>Conium maculatum</i> FACW	60 10 10 5 T T	Riparian area 12 feet wide	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	No potential habitat
Unnamed ditch	B32	<i>Juncus arcticus</i> OBL <i>Phalaris arundinacea</i> OBL	90 10	Riparian area 2 feet wide Water seeps to north to 20 feet wide by 100 foot long wetland area west of fence line (not numbered on map)	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Potential habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Wet Meadow Wetland	B33	<i>Eleocharis palustris</i> OBL <i>Schoenoplectus pungens</i> OBL <i>Typha latifolia</i> OBL <i>Festuca pratensis</i> FAC	50 25 5 5	Emergent wetland area in seep area	No Habitat	Not recommended for trapping	Potential habitat None observed
Left Hand Creek	B34	<i>Populus deltoids</i> subsp. <i>monilifera</i> FACW <i>Alnus incana</i> subsp. <i>tenuifolia</i> FACU/FACW <i>Elaeagnus angustifolia</i> OBL <i>Festuca pratensis</i> FAC <i>Salix fragilis</i> FAC	20 10 10 50 10	Riparian area 80 feet wide	Good Potential Habitat	Negative Trapping 2007	Potential habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Unnamed ditch	B35	<i>Elaeagnus angustifolia</i> OBL <i>Festuca pratensis</i> FAC <i>Populus deltoids subsp. monilifera</i> FACW	50 30 10	Riparian area 15 feet wide Water flowing 1-2 cfs	Poor Potential Habitat, limited riparian shrubby vegetation	Not recommended for trapping	No potential habitat
Hinman Ditch	B36	<i>Festuca pratensis</i> FAC	50	Riparian area 3 feet wide	Poor Potential Habitat	Not recommended for trapping	No potential habitat
Star Ditch	B37	<i>Festuca pratensis</i> FAC <i>Carex emoryi</i> OBL <i>Elaeagnus angustifolia</i> OBL <i>Pinus ponderosa</i> FACU- <i>Populus angustifolia</i> FACW	60 10 Upland Upland Upland	Riparian area 4 feet wide	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Reservoir outflow	B38	<i>Typha latifolia</i> OBL <i>Salix amygdaloides</i> FACW <i>Juncus arcticus</i> OBL <i>Phalaris arundinacea</i> OBL <i>Cirsium arvense</i> FACU	Variable Variable Variable Variable Variable	Narrow wetland area 5 to 15 feet wide and 1000 feet long Water flowing 1 cfs	Poor Potential Habitat, very limited shrubby riparian vegetation	Not recommended for trapping	Potential habitat None observed
Little Dry Creek	B39	<i>Distichlis stricta</i> FACW <i>Cirsium arvense</i> FACU <i>Spergularia marina</i> OBL <i>Typha latifolia</i> OBL <i>Juncus arcticus</i> OBL <i>Sporobolus airoides</i> FAC <i>Hordeum jubatum</i> FACW	10 T 10 50 10 5 5	Alkaline wet meadow to south of creek Water flowing in creek 2 cfs Saturated wet meadow area to north of creek	Poor Potential Habitat, no shrubby riparian vegetation	Not recommended for trapping	Potential Habitat None observed

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Reservoir outflow	B40	No vegetation		No wetland vegetation	No Habitat	Not recommended for trapping	No potential habitat
Highland Ditch	BE41	<i>Phalaris arundinacea</i> OBL <i>Salix fragilis</i> FAC <i>Echinochloa crus-galli</i> FACW	30 20 5	Riparian area 20 feet wide Water flowing in channel	Poor potential habitat, narrow ditch, isolated willow stand	Not recommended for trapping	No potential habitat
Clark Reservoir	BE42	<i>Festuca pratensis</i> FAC	80	No wetland vegetation	No Habitat	Not recommended for trapping	No potential habitat
Rough and Ready Ditch	BE43	<i>Populus deltoids</i> <i>subsp. monilifera</i> FACW <i>Salix fragilis</i> FAC <i>Phalaris arundinacea</i> OBL <i>Salix exigua</i> OBL	50 20 10 5	Riparian area 30 feet wide Active ditch No water in channel	Poor Potential Habitat, no downstream connection to river or stream, connects to Terry Lake	Not recommended for trapping	No potential habitat

Description	Crossing Feature No.	Dominant species (abbreviation legend at end of table)	Cover (%)	Comments	Potential for Preble's Habitat	Comments, Recommendations for Trapping	Potential for Ute Ladies'-tresses Orchid Habitat and Occurrence
Rough and Ready Ditch	BE44	<i>Populus deltoids</i> <i>subsp. monilifera</i> FACW	10	Riparian area 25 feet wide Active ditch Little vegetative cover on banks	Poor Potential Habitat, no downstream connection to river or stream, connects to Terry Lake	Not recommended for trapping	No potential habitat
Unnamed irrigation ditch	BE45	Concrete lined ditch		2 concrete lined ditches in this location	No Habitat, concrete lined	Not recommended for trapping	No potential habitat
Unnamed pond and irrigation ditch	BE46	<i>Festuca pratensis</i> FAC <i>Juncus arcticus</i> OBL <i>Eleocharis palustris</i> OBL	50 25 25	Small pond with standing water 1 foot deep	Poor Potential Habitat, no shrubby riparian vegetation.	Not recommended for trapping	No potential habitat
Eisele Lateral Ditch	B47	Concrete lined ditch		concrete lined ditches in this location	No Habitat, concrete lined	Not recommended for trapping	No potential habitat

Legend: T = Trace amounts of vegetation; OBL = Obligate wetland species; FACW = Facultative wetland species; FAC = Facultative species; FACU = Facultative upland species; UPL = Upland species; NI = No indication